CA XOsoft™ High Availability for Windows

Microsoft® Exchange Server Operation Guide

r12.5

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Note: CA XOsoft is sold in Japan under the names, CA ARCserve Replication and CA ARCserve High Availability.

Contents

Chapter 1: Introduction

CA XOsoft High Availability (HA) is a high availability solution based on asynchronous real-time replication and automated application switchover and switchback to provide cost-effective business continuity for file servers and other application servers on both 32- and 64-bit Windows servers.

CA XOsoft HA offers push-button or fully automatic switchover of mission-critical servers over a LAN or WAN, server status monitoring, and integrated continuous data protection as a guard against data corruption, all in a system that sets the standard for ease of configuration and management.

When disaster strikes, whether in the form of a hurricane, a blackout, or far more likely, a virus attack or software or user error, your ability to respond well to the crisis can make the difference between a bright future and the end of your business. At the very least, you are likely to incur significant costs in lost business and, perhaps more importantly, lost confidence by your customers, investors, and other stakeholders. Disaster recovery planning (DRP) is not just about insurance. It is about maintaining your competitive edge. CA XOsoft HA is designed to give you that edge.

This section contains the following topics:

About This Guide

This document describes how to implement a CA XOsoft HA solution for MS Exchange Server. Please review each procedure before you begin. It is essential that you have the appropriate resources and permissions to carry out each task.

Related Documentation

Use this Guide along with the *CA XOsoft Installation Guide* and the *CA XOsoft User Guide*.

Server Requirements

To implement CA XOsoft or CA XOsoft HA, refer to the appropriate list of requirements, depending on the server type you selected. These components are licensed separately. If you do not have the license required to access support for a specific server type, please contact Tech Support.

Base Configuration

Base Configuration

- Two servers running Windows Server 2000, 2003, or 2008 with the same level of service packs and hot fixes installed.
- All IP addresses are statically assigned (DHCP-assigned IP addresses on the Master or Replica server are not supported)
- The protected server is not a domain controller or DNS server
- Both servers should reside in the same Active Directory forest and also be members of the same domain or trusted domain.

Exchange Server Configuration Requirements

- Microsoft Exchange Server installed on each server. Both should have the same Exchange edition and version.
- Both servers should have identical service packs and hot fixes.
- [For Exchange 2007 only] Both servers should have Mailbox role installed. If the Master and Replica servers are located on different sites, and there is only one Exchange server on the Replica site, both servers (Master and Replica) should have identical Exchange Server roles.
- [For Exchange 2007 only] Both servers should have identical PowerShell version.
- [For Exchange 2000/2003/2007] Both servers should have the same Exchange Administrative Group.

Log On Account Conditions

The CA XOsoft Replication and CA XOsoft HA Engine service must satisfy certain account conditions for successful communication with other components. If these requirements are not met, scenarios may not run. If you lack the permissions required, contact your local IS team.

- It is a member of the Domain Admins group. If the Domain Admins group is not a member of the built-in domain local group Administrators you must use an account that is.
- It is a member of the local machine Administrators Group. If the Domain Admins group is not a member, add the account manually.
- For servers in a workgroup, use the Local System account.
- Master and Replica servers must reside in the same Active Directory forest.

About Clusters

Installing on clusters is much the same as a standard installation. To configure CA XOsoft HA on a cluster, enter the Virtual Server Virtual IP Address resource (in the group you intend to protect) as the Master or Replica name. Do not use node names or IP addresses when configuring the scenario. Also, you must install the CA XOsoft Engine to all cluster nodes (see *Server Setup*).

The only configuration that requires some preparation is the use of IP Move in conjunction with a cluster. For detailed instructions on how to use Move IP with clusters, please see Cluster Move IP (see page 17).

Note: On Exchange 2007, LCR and SCC deployments are supported, but CCR and SCR deployments are not supported.

License Registration

CA XOsoft licensing policy is based on a combination of several parameters, which include: the operating systems involved, the required solution, the supported application and database servers, the number of participating hosts, and the additional modules - Assured Recovery and CDP Repository. The license key that is generated for you is therefore tailored to your exact needs.

After logging in for the first time, or if your old license has expired, you need to register CA XOsoft product using your license key. To register the product, you need to open CA XOsoft Manager, which does not depend on the existence of a valid registration key. Once the Manager opens, a License Warning message appears, prompting you to register the product. A License Warning message also appears when your license is about to expire during the next 14 days.

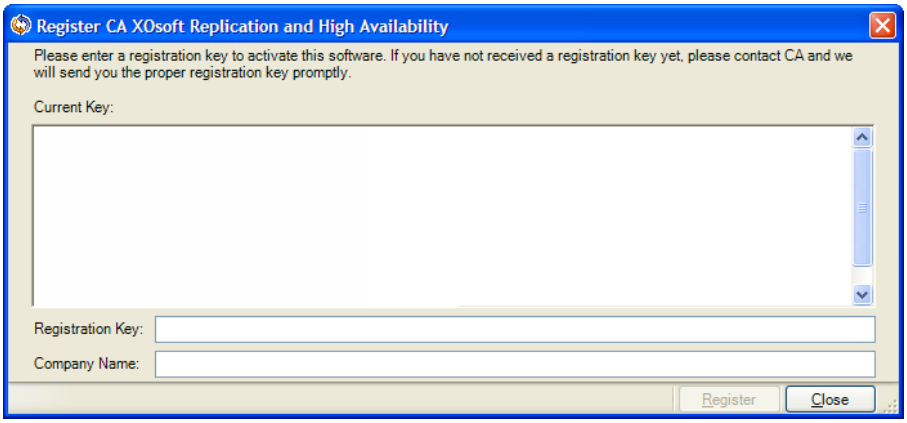
When you are creating a scenario, some of the options might be disabled following the terms of your license. However, you can create as many scenarios as you wish, since the validity of your license key is first checked when you try to run a specific scenario. Only when you click the **Run** button, the system checks whether you are allowed to run the selected scenario according to your license key. If the system determines that you do not have the required license for running this scenario, the scenario will not run and a message will appear on the Event pane informing you of the type of license you need.

To register CA XOsoft using the license key

1. Open the Manager. The **Welcome** message appears. Then, a **License Warning** message appears informing you that your product is not registered and prompting you to register it.

2. Click **OK** to close the message. Then, open the **Help** menu and select the **Register** option.

   The **Register CA XOsoft Replication and High Availability** dialog opens.



3. Enter the following information:
   - In the **Registration Key box** - enter your registration key.
   - [Optional] **Company Name** box - enter your company name
4. Click the **Register** button to register the product and close the dialog.

   Now you can start working with the CA XOsoft Manager according to your license permissions.

Chapter 2: Redirection Methods

This section contains the following topics:

How Redirection Works

Each of the server types supported by CA XOsoft can be configured to use one or more redirection methods. You should enable redirection methods based on your environment and business needs. The supported redirection methods for MS Exchange Server follow:

DNS Redirection

DNS Redirection changes the DNS "A" Record of the Master server to resolve to IP address of the Replica server. Upon failure of the Master, the Replica server modifies the appropriate DNS record so that references to the Master server resolve to the Replica's IP address rather than the Master's IP address. This redirection method requires no network reconfiguration and works in LAN and WAN network configurations.

DNS redirection works only with A (host) type records and cannot update CNAME (Alias) records directly. However, if the CNAME record points to the modified A record, it is indirectly redirected.

Using the record that has the Master server's name is the default, however you can configure CA XOsoft HA to redirect any DNS A (host) record via the *Master's name in DNS* setting in the switchover properties tab.

Move IP Redirection

Move IP redirection involves moving the Master server IP address to the Replica server.

This redirection method is preferred for Virtual Machine scenarios and is usable only in a LAN configuration in which the Master and Replica servers reside in the same network segment. In this configuration, switchover of the Master server causes the Replica to take over one or more of the IP addresses assigned to the Master server.

Important! Use this method only when both servers are on the same IP subnet.

When using Move IP as the redirection method, you must first add IP addresses to the Master host. For more information, refer to the topic, Add IP on the Master Server.

Add IP on the Master Server

You need to add an additional IP address to the Master host, (which is denoted as *XO-IP* in the following steps) to use Move IP redirection in your HA scenarios. This new IP address is used for CA XOsoft internal communication and replication. This is necessary because once switchover occurs, the current production IP address is no longer available on the Master -- it switches to the Replica server.

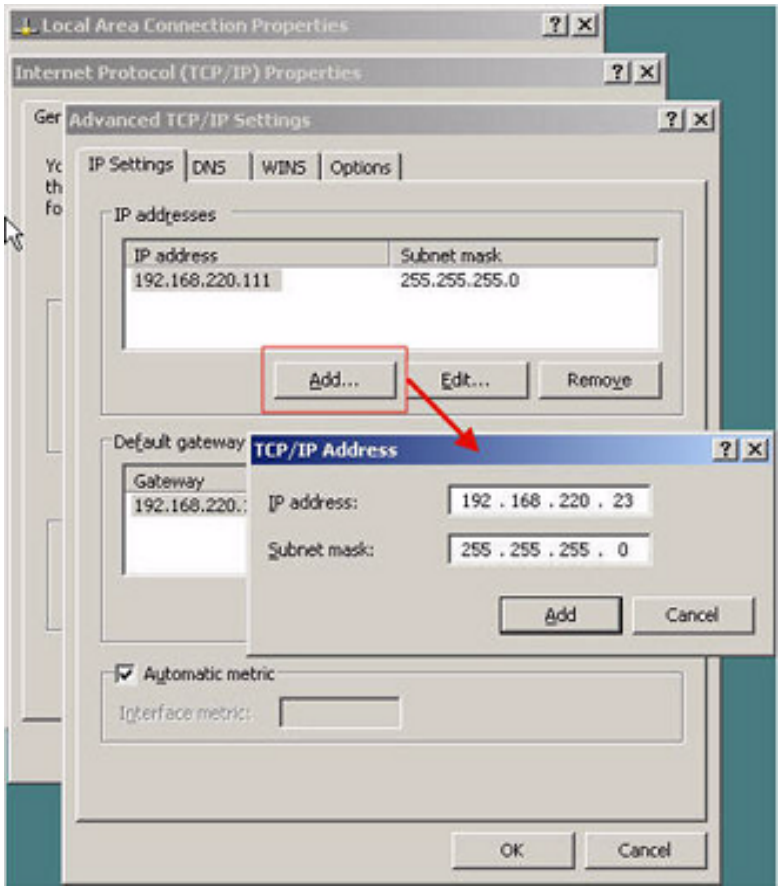
Important! Perform the following only if you are using the Move IP redirection method.

Add IP Address to Master Server

1. Open the Control Panel and choose Network Connections.
2. Right-click Local Area Network and choose Properties.
3. Click Internet Protocol (TCP/IP) and then click the Properties button.
4. Click Advanced.

5. Click Add and enter an additional IP address (XO-IP).

   In the following screenshot, the XO-IP IP address is 192.168.220.23 and the current production server IP address is 192.168.220.111.



6. Click Add.
7. Click OK.
8. Click OK to exit the LAN settings.

After you add the IP to the Master, you must add the XO-IP to your HA scenarios. There are two ways to add the XO-IP address to an HA scenario:

- For new scenarios, from directly in the Wizard
- For existing scenarios, by modifying the master host name

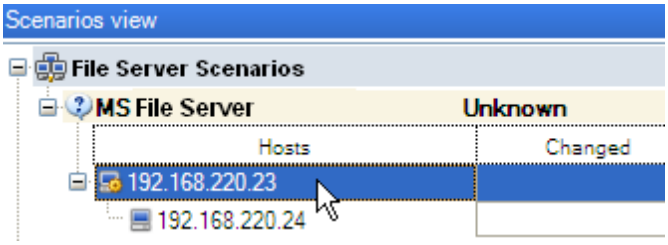
The procedures for both ways follow.

Add XO-IP to Existing Scenarios

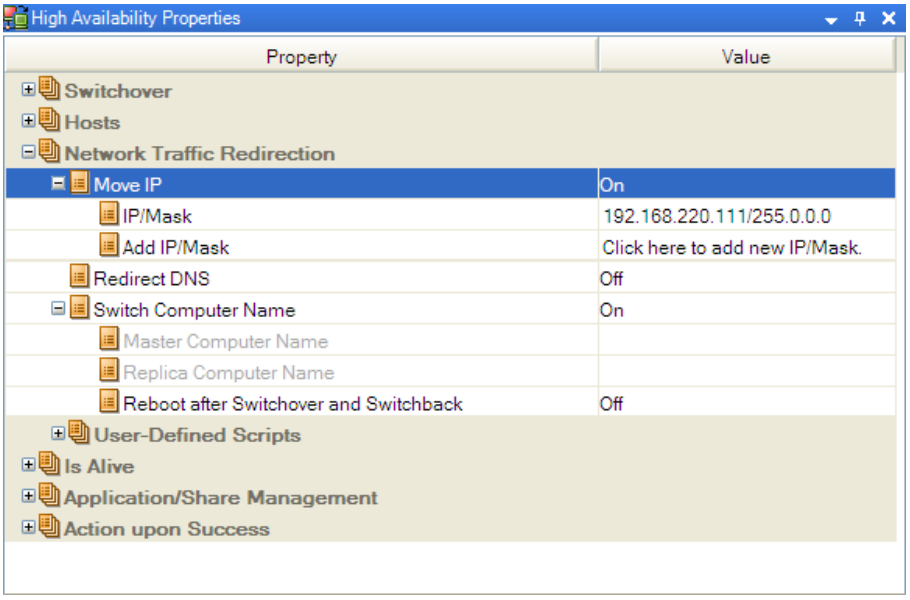
Perform this procedure only if you are using the Move IP redirection method.

To add the XO-IP to existing scenarios:

1. On the Scenario pane, select the required Master host.



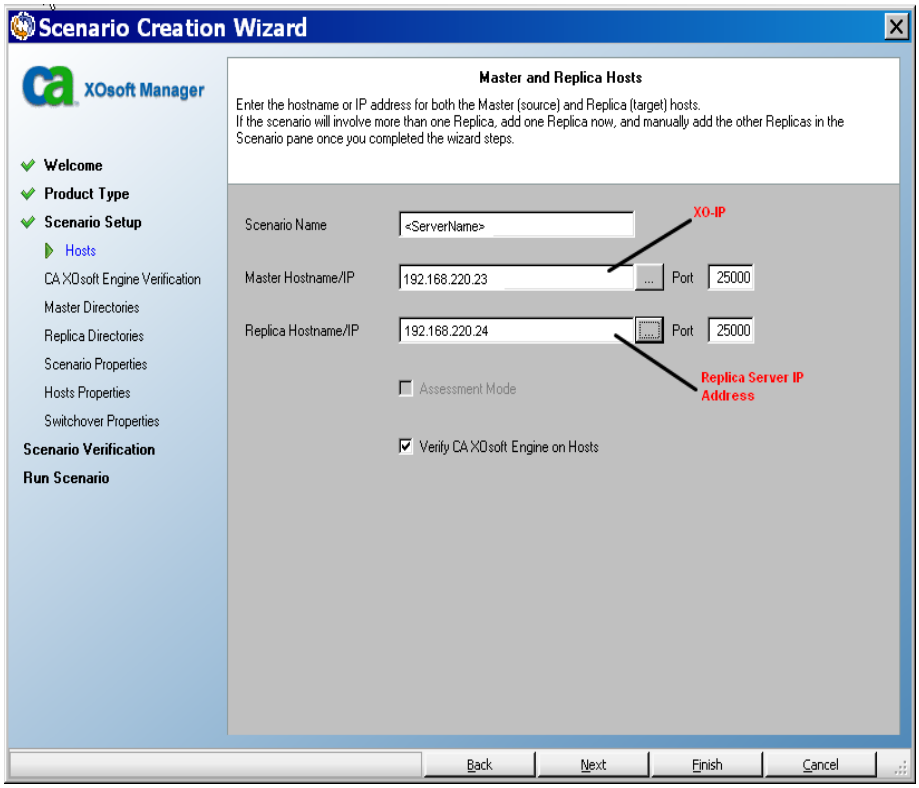
2. Right-click the Master and select **Rename** from the pop-up menu. Then, enter the XO-IP address.
3. On the Framework pane, select the **Switchover** tab and then select the Replica server as the switchover host.
4. Set the **Move IP** option to On. Ensure that the IP address under **Move IP**, **IP/Mask** matches the production server IP address: this is the IP address that will switch over. If you are moving more than one IP address you can add multiple production IP addresses by selecting **Click here to add new IP/Mask.**



Add XO-IP to New Scenarios

Perform this procedure only if you are using the Move IP redirection method.

During the initial run of the Scenario Creation Wizard, enter the XO-IP and Replica IP addresses instead of the server names.



Cluster Move IP

Using Move IP redirection with a clustered Master (MSCS with shared storage) requires you to add an additional IP resource to the Master Exchange resource group. This section describes how to configure this redirection method.

Note: If both Master *and* Replica are clusters, there are special configuration issues involved in the Move IP redirection process that are not detailed in this Guide. For a cluster-cluster scenario, use Redirect DNS or contact technical support to receive detailed instructions and guidance.

Using the Master Cluster

To use Cluster Move IP through the Master cluster

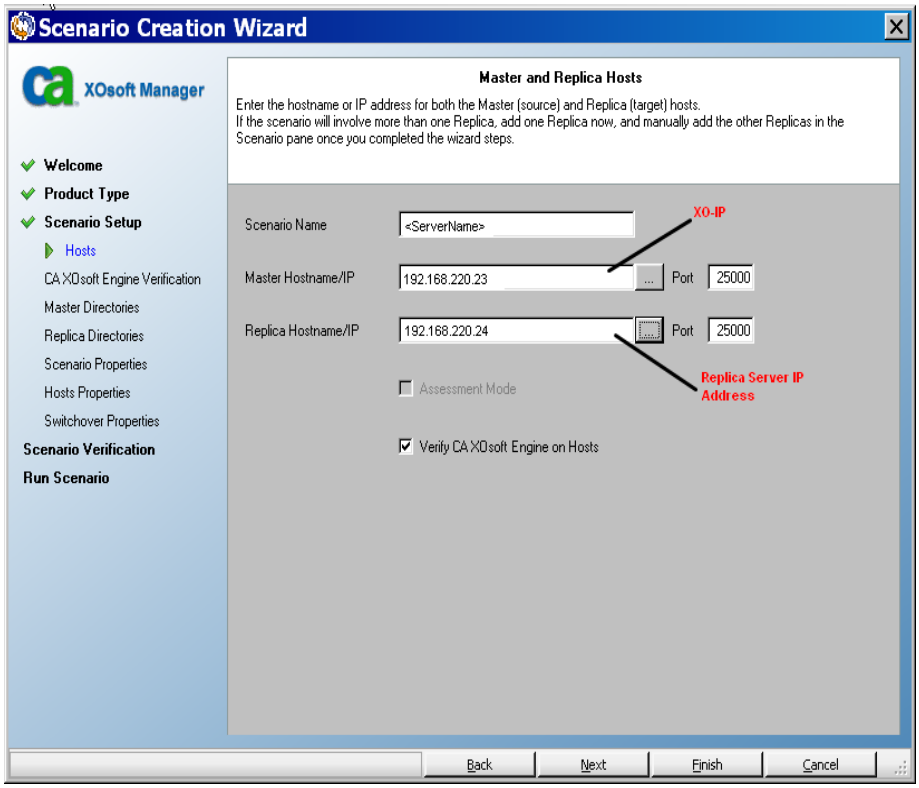
1. Open the Cluster Administrator.
2. In the Master Cluster Exchange Resource Group, create a new IP resource and name it **XO-IP**.
3. Bring this resource online and verify it is visible from the Replica via the ping command. This new IP address is used for CA XOsoft HA internal communication and replication. This is necessary since the current production IP address is not available on the Master cluster after switchover -- it switches to the Replica server.

Using the Manager

This section details Cluster Move IP redirection using the Manager.

For New Scenarios

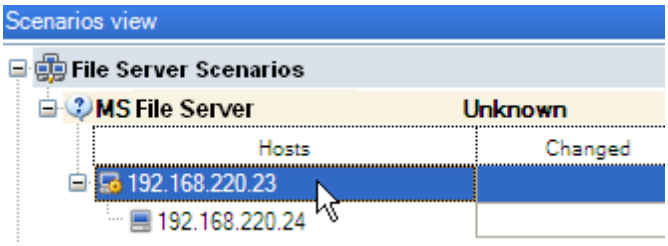
During the initial run of the Wizard, enter the XO-IP and Replica IP addresses instead of the cluster virtual server names. The following screen shows the XO-IP entered in the Master Hostname/IP field and the Replica Server IP address entered in the Replica Hostname/IP field.



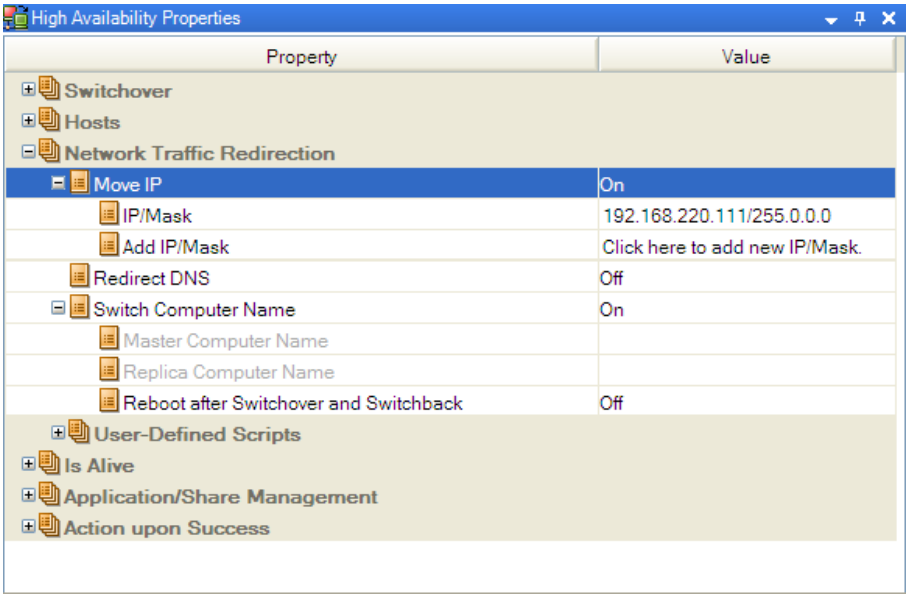
For Existing Scenarios

To use Cluster Move IP with existing scenarios

1. On the Scenario pane, select the required Master host.



2. Right-click the Master and select **Rename** from the pop-up menu. Then, enter the XO-IP address.
3. On the Framework pane, select the **Switchover** tab and then select the Replica server as the switchover host.
4. Set the **Move IP** option to On. Ensure that the IP address under **Move IP**, **IP/Mask** matches the production server IP address: this is the IP address that will switch over. If you are moving more than one IP address you can add multiple production IP addresses by selecting **Click here to add new IP/Mask.**



Scripts Redirection

Custom Scripts: CA XOsoft HA can trigger custom scripts or batch files to perform the user redirection or any additional steps not covered by built-in methods. If the above methods are not appropriate or do not fully meet all requirements, please see the *CA XOsoft User Guide* for details on scripted redirection methods.

Chapter 3: Creating and Using Scenarios

This section describes how to create and configure HA scenarios for Exchange Server, and how to run and stop them.

This section contains the following topics:

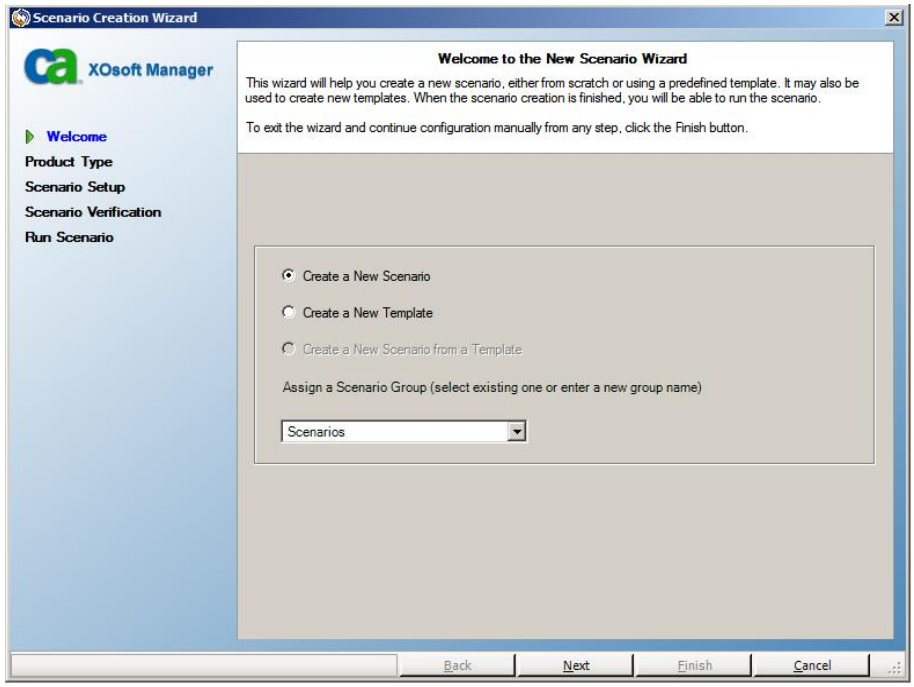
Create an Exchange High Availability Scenario

Creating scenarios is covered in full detail in the CA XOsoft User Guide. This section provides additional information specific to a MS Exchange High Availability scenario. The Scenario Creation Wizard guides you through the steps required to create a high availability scenario. When completed, you should run your scenario to start data synchronization. Synchronization could take a while, depending on database size and network bandwidth. Once synchronization completes, your high availability scenario now maintains the Replica server so that it can take over for the Master the moment a failure is detected.

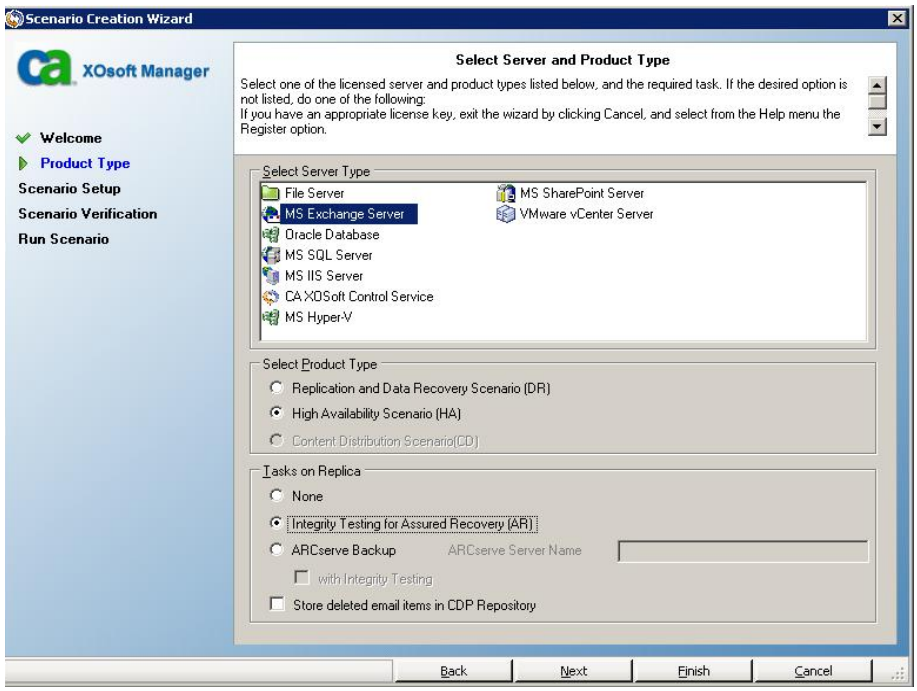
Please read the entire procedure, including cross-referenced information, if applicable, before you proceed.

To create a exchange high availability scenario

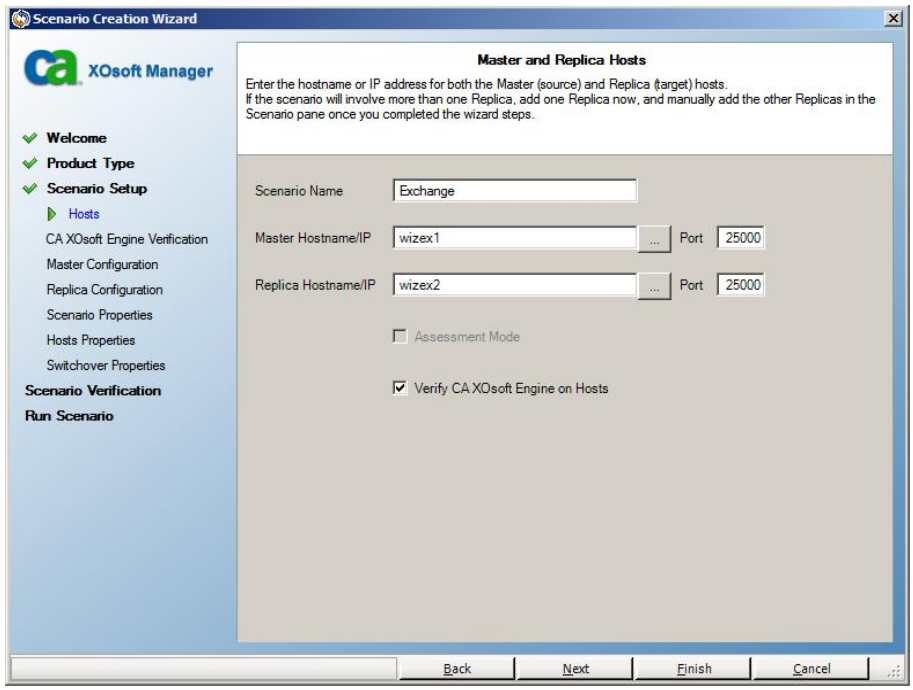
1. From the CA XOsoft Manager, choose Scenario, New or click the New Scenario button.
2. When the Welcome dialog opens, select Create New Scenario and click Next.



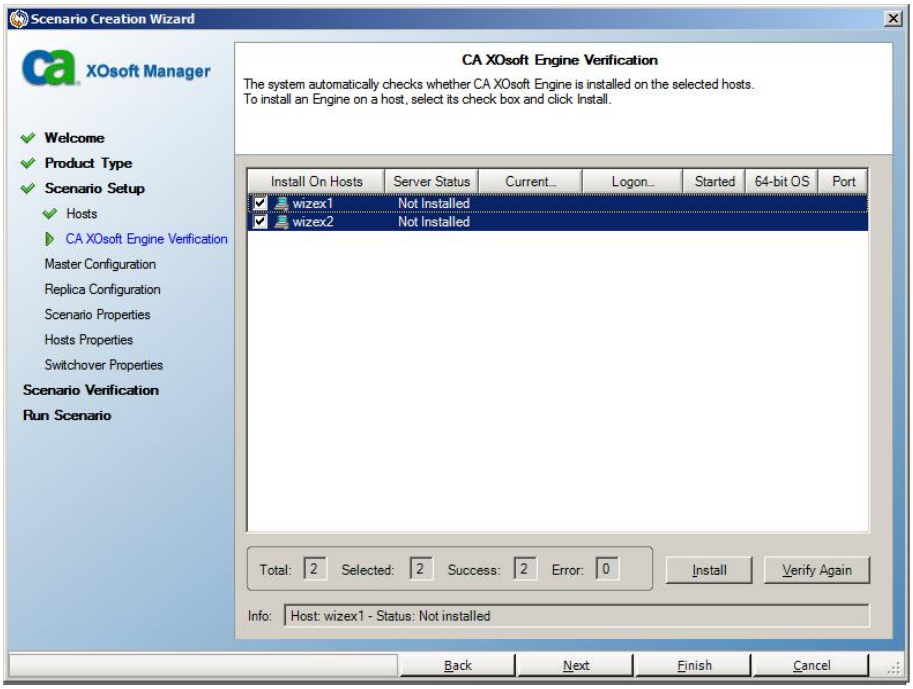
3. When the Select Scenario Type dialog opens, select Exchange, High Availability (HA) Scenario, and Replica Integrity Testing for Assured Recovery (optional). For more information on Assured Recovery, see the *CA XOsoft User Guide*.



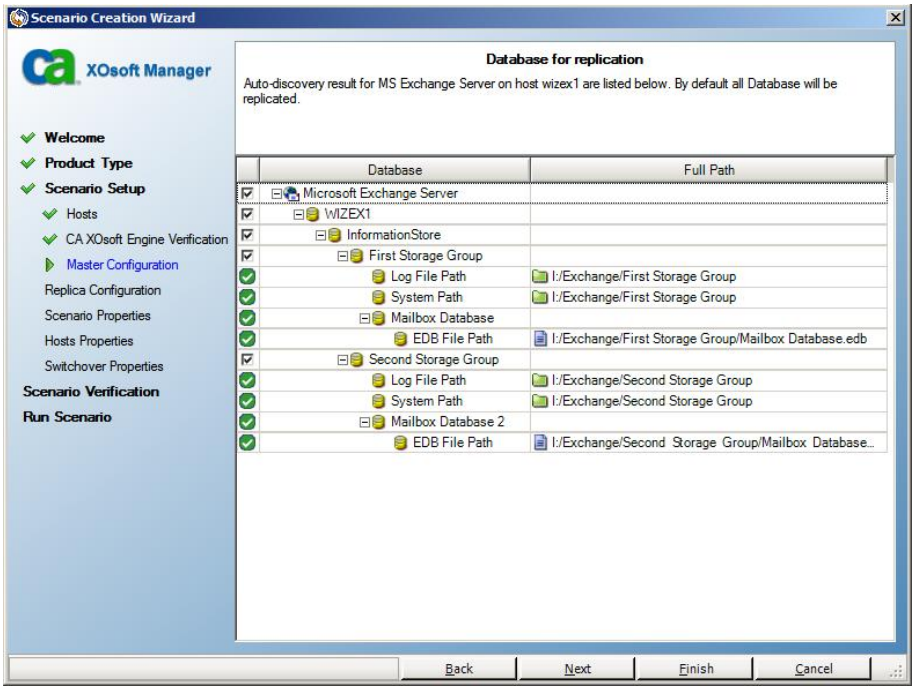
4. When the Master and Replica hosts dialog opens, name your scenario and provide the hostname or IP address for the Master and Replica servers. If either server is an MSCS cluster, enter the cluster resource virtual server name or IP address. Click Next. For more information, see Redirection Methods (see page 13).



5. Wait for Engine Verification to complete. If needed, click Install to upgrade the Engine on one or both servers and then click Next.

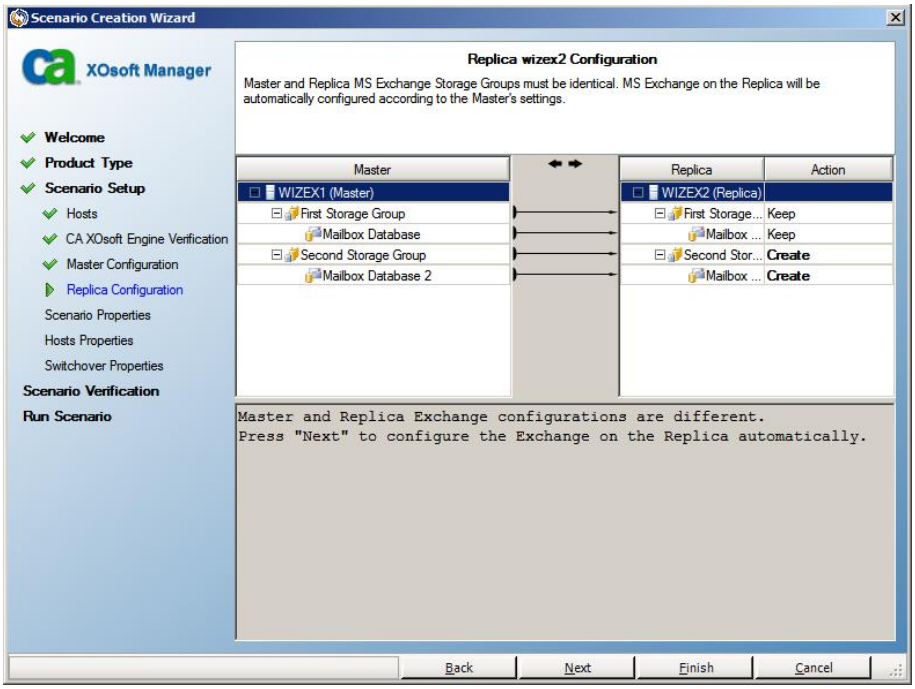


6. The Database for Replication dialog opens, listing all auto-discovered results for the specified Master. By default, all databases are included. Change selections if desired and then click Next.



[For Exchange 2007 with Outlook 2003 support, Exchange 2003 and earlier] **Important!** When selecting Exchange Storage Groups for replication, you must include at least one Public Folder for replication.

7. From the Replica Configuration dialog, click Next to automatically configure Exchange on the Replica to match the Master.

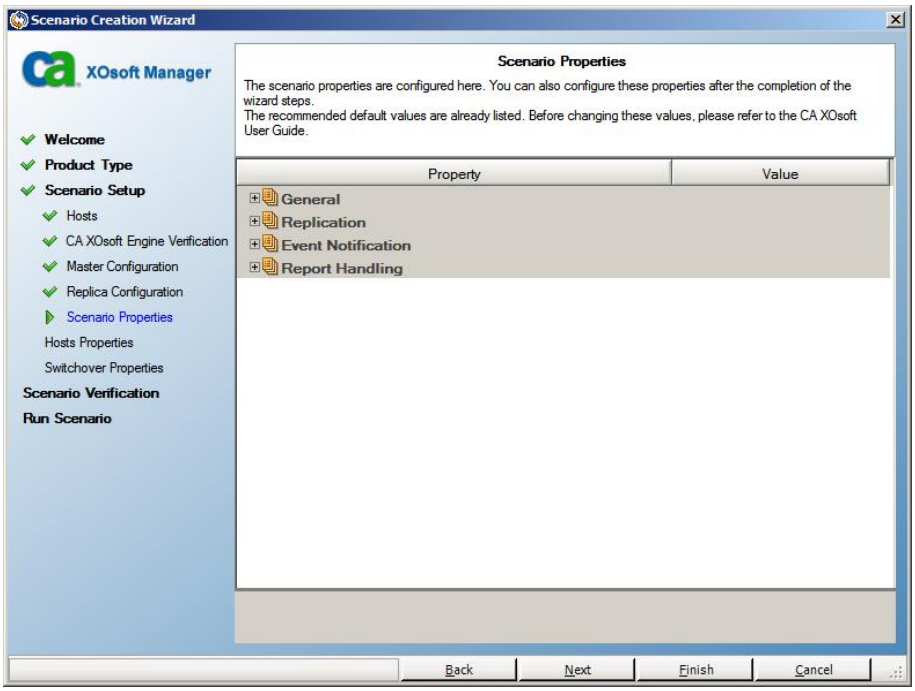


CA XOsoft auto-configuration component verifies that the Exchange Server configuration on the Master and Replica servers will be identical during the replication procedure. This means that if there are discrepancies, CA XOsoft will perform the required actions, including: deleting storage groups, public folders or mailbox stores from the Replica, create new ones and make modifications to existing ones. The actions that will be performed during the configuration process are indicated in the Action column on the right.

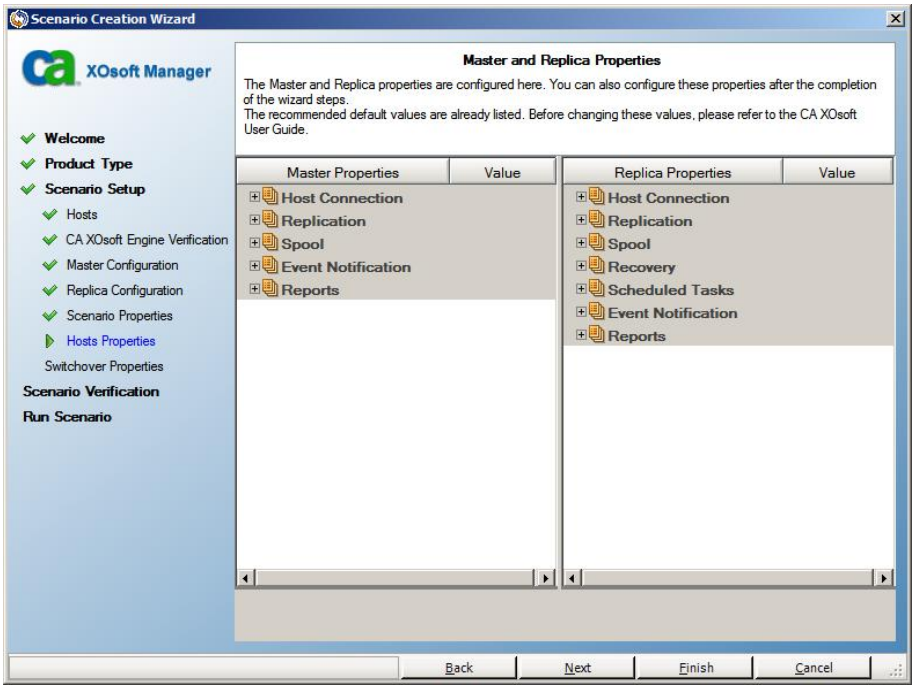
You can performed the auto-configuration tasks:

- **Create** - a new, storage group, public folder or mailbox store will be created.
- **Keep** - the existing storage items will remain the same.
- **Remove** - the existing storage items store will be deleted.
- **Update** - the existing storage items will remain, but its location will be changed.

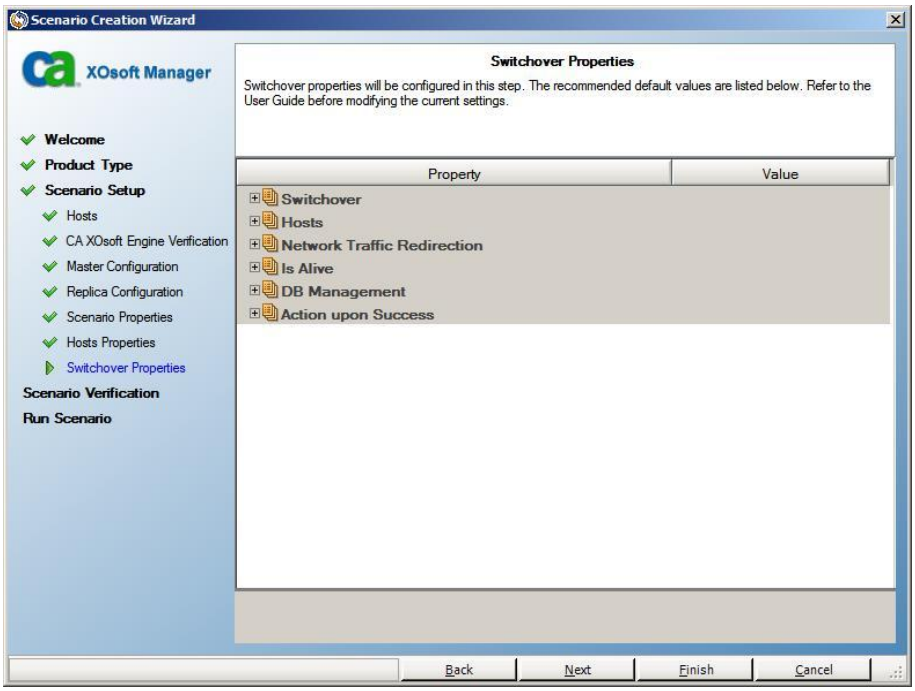
8. When the Scenario Properties dialog opens, configure additional properties, if needed. Click Next. For more information, see Scenario Properties (see page 31) or the *CA XOsoft User Guide*.



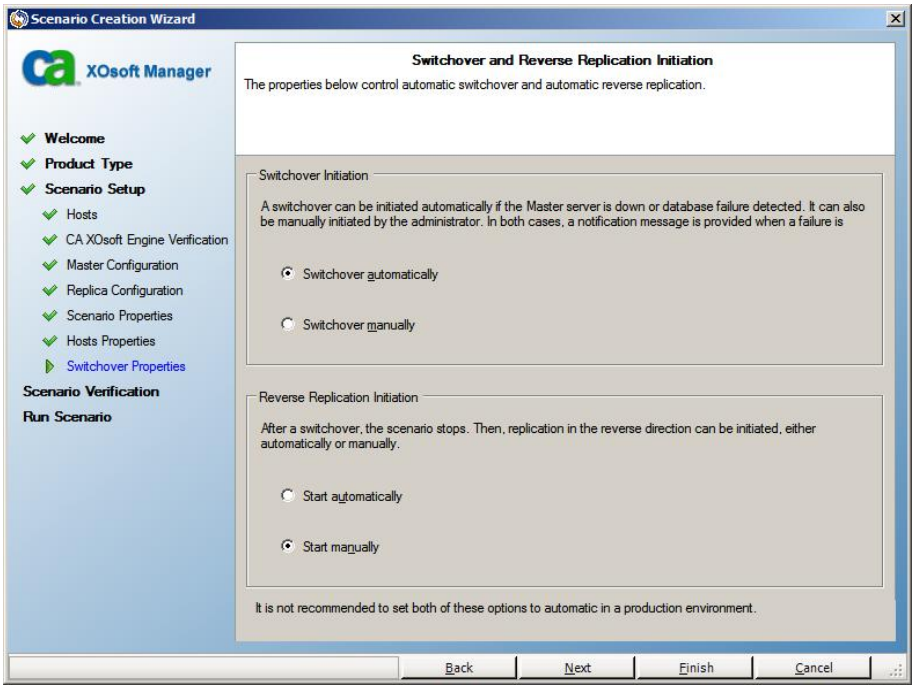
9. The Master and Replica Properties dialog opens. Accept default settings or make the desired changes and click Next.



10. Wait for the Switchover Properties dialog to retrieve information. Configure the desired redirection properties and click Next. For more information, see Switching Over and Switching Back (see page 69).

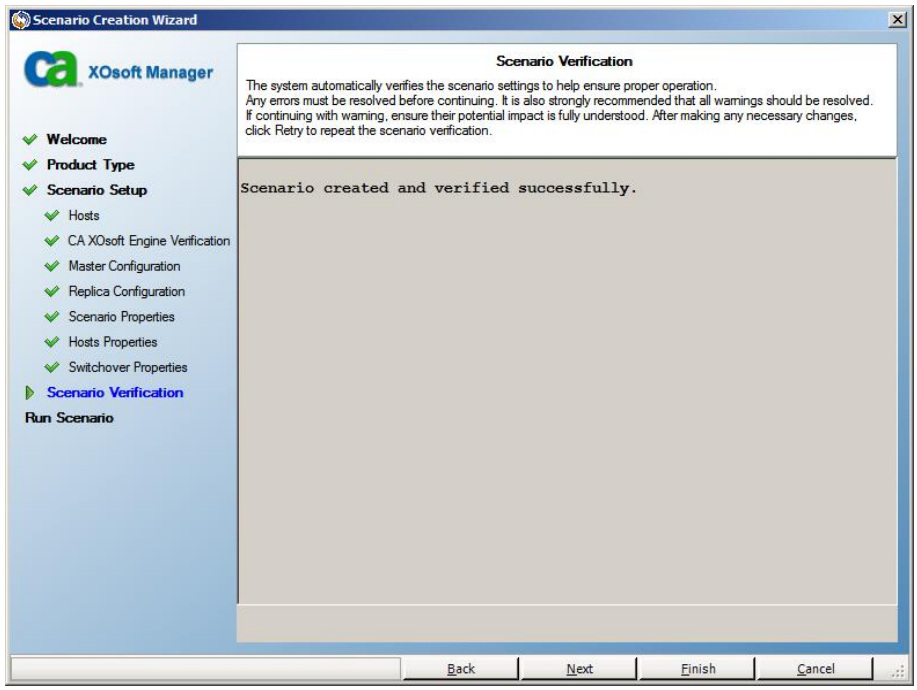


11. From the Switchover and Reverse Replication Initiation dialog, choose automatic or manual switchover, and automatic or manual reverse replication, as needed.

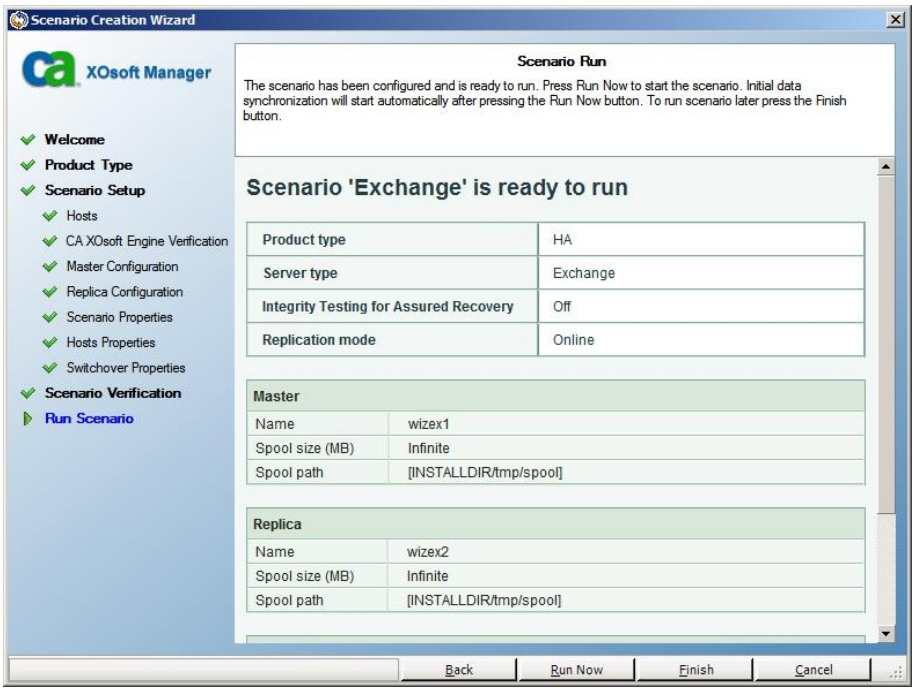


We recommend that you do not set both options to Automatic. For more information, see Scenario Properties (see page 31) or the *CA XOsoft User Guide*.

12. Click Next to initiate scenario verification. If errors are reported, you should resolve them before continuing. At successful verification, click Next to complete scenario creation.



13. Choose Run Now or Finish, as desired. Run Now starts synchronization. Finish allows you to run the scenario later. See Run the Scenario from Outside the Wizard. (see page 36)



Modify an Existing Exhange High Availablity Scenario

When the HA scenario is running, do not make any changes to the Exchange configuration on the Master (such as adding a new database to a replicated Exchange storage group). You must stop the scenario before making changes.

Important! If you make changes to an HA scenario that is running, after a switchover the Exchange Server on the Replica may not be able to start.

To modify the Exchange configuration on the Master

1. Stop the scenario.
2. Make the changes on the Exchange Server on the Master.
3. Make the same changes on the Exchange Sever on the Replica.
4. Run auto-discovery. (On the Framework pane, open the Root Directories tab for the Master, and double-click the Auto-discovered icon.)
5. Save the scenario by clicking the Save button.
6. Restart the scenario.

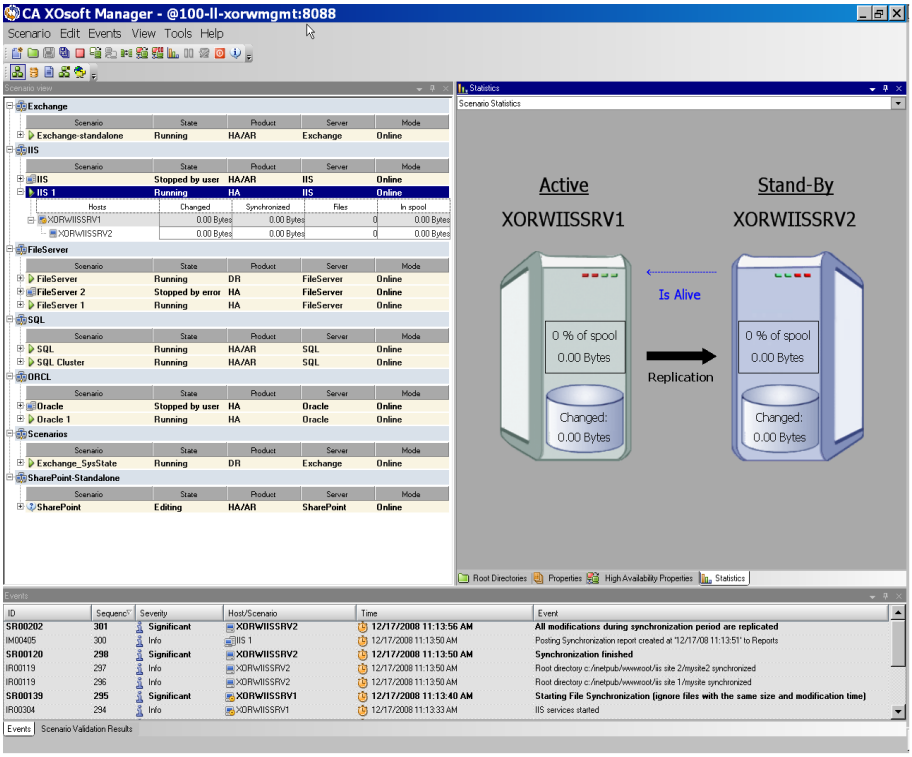
Alternatively, you can stop and delete the existing scenario, and create a new HA scenario that includes the new Exchange configuration.

Scenario Properties

If you wish to change a scenario configured through the Wizard or configure additional settings, you can use the Properties pane to modify the scenario.

The Properties pane and its tabs are context-sensitive and change whenever you select a different node from a scenario folder. You must stop a scenario before configuring its properties. Certain values cannot be modified once set; they are noted. For full details on configuring scenario properties and their descriptions, see the CA XOsoft User Guide.

Properties are organized into tabs on the CA XOsoft Manager Framework pane. The tabs displayed are based upon server type, CA XOsoft solution, and scenario status. Select the scenario for which you wish to change properties, and then select the appropriate tab. The following screen shows an IIS scenario as an example:



Settings on the Root Directories tab

Select a Master Server from the Scenario Pane. Double-click its Directories folder to add or remove Master Root Directories. Select or clear checkboxes next to folders, as desired, to include or exclude them. You may also edit directory names.

Select a Replica Server from the Scenario Pane. For each Master Root directory, you must specify a Replica Root directory. Double-click the Directories folder for the Replica server. Select or clear checkboxes next to folders, as desired, to hold the corresponding Master directory.

Settings on the Properties Tab

Scenario Properties

These settings establish default behavior for the entire scenario.

- General properties -- cannot be changed once created
- Replication properties -- choose the replication mode (Online or Scheduled), synchronization values (File or Block, Ignore Files of Same Size/Type) and optional settings (Replicate NTFS Compress Attribute, Replicate NTFS ACL, Synchronize Windows Shares, Prevent Automatic Re-sync upon Error)
- Event notification properties -- specify a script to run, choose email notification, or write to event log.
- Report Handling -- specify report settings, email distribution or script execution

Master and Replica Properties

These settings establish server properties on both Master and Replica. Some settings vary by server type.

- Host connection properties -- Enter the IP address, Port number and Fully Qualified Name of the Master and Replica
- Replication properties -- These properties differ for Master and Replica. See the CA XOsoft User Guide for more information.
- Spool properties -- Set the size, minimum disk free size and directory path. See Spool Directory Settings (see page 89) for more information.
- Event notification properties -- specify a script to run, choose email notification, or write to event log.
- Report properties -- choose synchronization or replication reports, specify distribution or script execution
- (Replica) Scheduled Tasks -- set or suspend tasks, including Replica Integrity Testing for Assured Recovery. For more details, see the CA XOsoft User Guide.
- (Replica) Recovery properties -- set delay, data rewind properties, or scheduled task for replica.

Settings on the HA Properties Tab

These settings control how switchover and switchback are performed

- Switchover properties -- choose automatic or manual switchover, provide switchover hostname, and reverse replication settings
- Hosts properties -- specify the Master and Replica Fully Qualified Name
- Network Traffic Redirection properties -- choose Move IP, Redirect DNS, Switch Computer Name or User-defined scripts.

  Note: Network Traffic Redirection does not apply to Hyper-V HA scenarios.
- Is Alive properties -- set the heartbeat frequency and check method
- DB Management properties (does not apply to File Server scenarios) -- instructs CA XOsoft to manage shares or services on a database server
- Action upon Success properties -- defines custom scripts and arguments for use

Run the Scenario from Outside the Wizard

After you create a scenario, you need to run it to start the replication process. Normally, before data changes on the Master will begin to be replicated on the Replica, the Master and the Replica need to be synchronized. Therefore, the first step in initiating a replication is synchronizing the Master and Replica servers. After the servers have been synchronized, online replication starts automatically, continuously updating the Replica with all of the changes that occur on the Master.

Note: In order for the replication process to succeed, verify that the user under which the CA XOsoft Engine is running has Read permission on the Master, and Read and Write permissions on each replication root directory and included files, and on all participating Replica hosts.

To run the scenario from outside the wizard

1. From the Scenario pane, select the scenario you want to run.
2. Click **Run**  on the Standard toolbar.

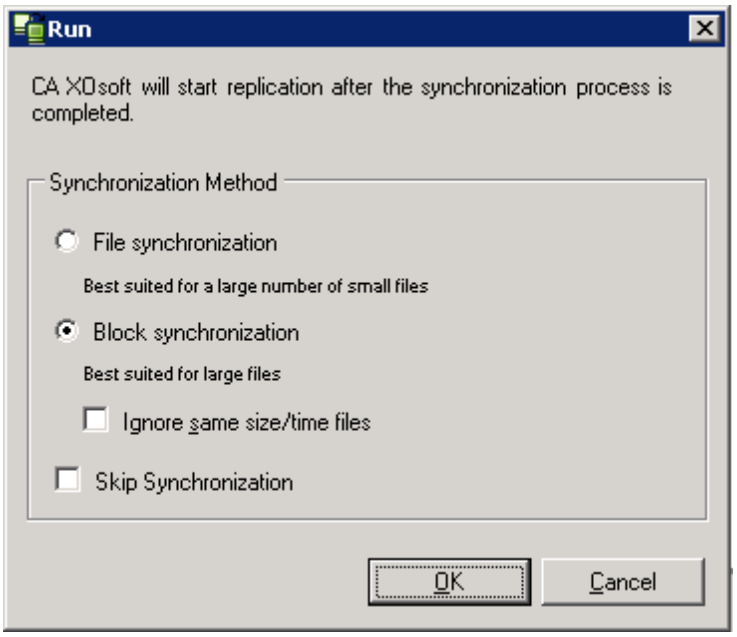
   Before initiating synchronization and replication, CA XOsoft verifies your scenario configuration. When verification completes successfully, CA XOsoft Manager displays the message: *Are you sure you want to run scenario "scenario_name?"* If problems are discovered, the top pane displays any warning and error messages resulting from verification.

Note: Scenario Verification checks many different parameters between the Master and Replica servers to ensure a successful switchover. If any errors or warnings are reported you should not continue until they are resolved.

3. Correct errors before you continue. Errors are reported on the Event pane.

   Note: Replication of mount points succeeds only if those were added to the Master before the Engine was started. If you included the mount points in the Master root directories when the Engine was already running, no error is reported but the replication does not start. In this case, you need to restart the Engine on the Master before initiating replication.

   When no error is reported, the **Run** dialog appears and contains synchronization options.



   Note: Do not use Skip Synchronization for any scenarios replicating a database.

4. If you have a large number of small files, select File Synchronization. If you have large files, select Block Synchronization. Select the Ignore same size/time files to skip the comparison of files with the same path, name, size and modification time, which are generally identical, to reduce synchronization time. You should enable the Skip Synchronization option only when you are certain the files on both Master and Replica are identical. The default selections are File Synchronization and Ignore files of same size/time option enabled.

5. Click the **OK** button. Synchronization may take a while, depending on database size and network bandwidth between the Master and Replica. You will receive the following message in the event window when the synchronization is complete: *All modifications during synchronization are replicated.*

At this point, the scenario is operational and active. By default, a Synchronization Report is generated when synchronization finishes. To view the report, refer to the topic, View a Report. You can also generate regular Replication Reports to monitor the replication process on each participating server. For more information, see the *CA XOsoft User Guide*.

Stop a Scenario

To stop a scenario

1. From the Scenario pane, select the scenario you want to stop.
2. To stop the scenario, click the **Stop** button on the Standard toolbar.

   A confirmation message appears prompting you to approve the scenario stopping.
3. Click **Yes** in the confirmation message. The scenario stops.

   After stopping the scenario, the Manager no longer shows the green play symbol to the left of the scenario, the scenario's state turns into **Stopped by user**, and the Statistics tab is no longer available on the Framework pane.

View a Report

CA XOsoft can generate reports on the replication and synchronization processes. These reports can be stored on your desired location, opened for view from the Report Center, sent by email to a specified address, or they can trigger script execution.

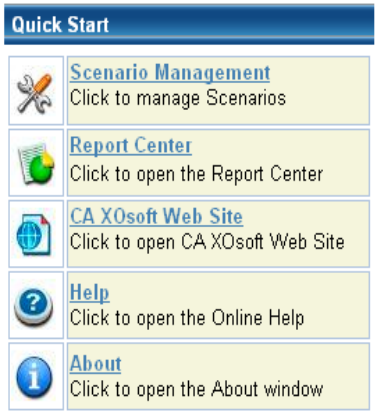
The default storage directory of the generated reports is:
[ProgramFilesFolder]\CA\XOsoft\Manager\reports

To view a report

Note: Though an Exchange report is shown for illustrative purposes, the steps and screens are similar regardless of scenario type.

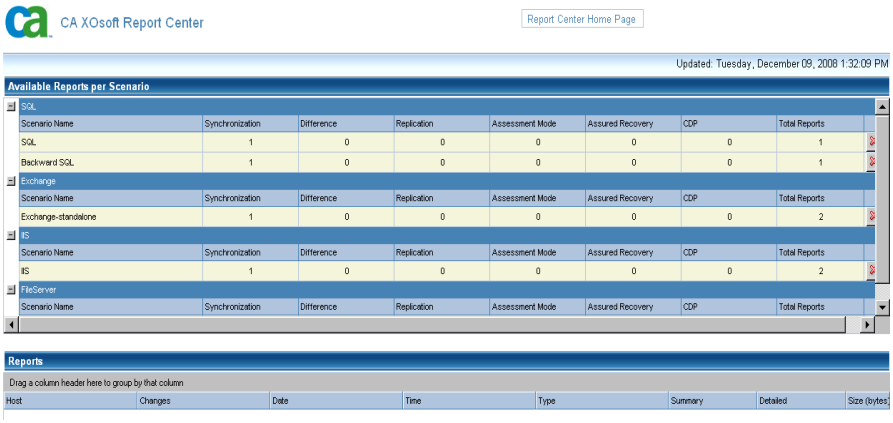
1. To view a report, first you need to open the Report Center. There are two ways to open it:

   - On the Overview Page, click the **Report Center** link on the **Quick Start** pane on the left:



2. From the **Tools** menu, select the **Reports** option and then **Show Scenario Reports**.

   The Report Center opens in a new window:



   The Report Center consists of two tables:

   - The upper table - **Available Reports per Scenario** - contains a list of all scenarios that have reports, along with the type and number of available reports for each scenario.
   - The lower table - **Reports** - contains a list of all the reports that are available for the scenario selected in the upper table.

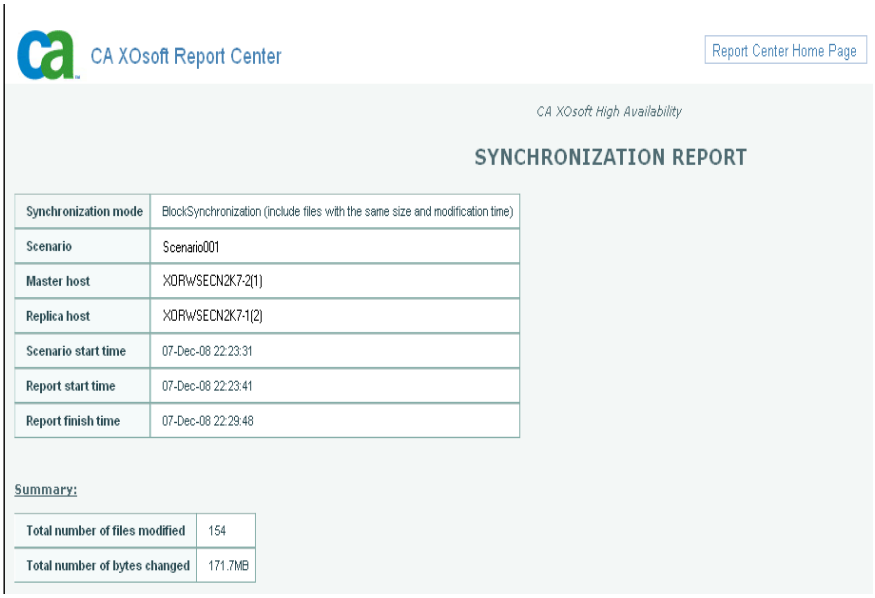
3. To view a specific report, select from the **Available Reports per Scenario** table the scenario that this report represents. Then, from the **Reports** table below, click the report you want to open:

Drag a column header here to group by that column

Host	Changes	Date	Time	Type	Summary	Detailed	Size (bytes)
XORWEXCH2K7-1	UnKnown	Today	03:29:37	Assured Recovery			811
XORWEXCH2K7-1	Changes found	12/07/08	22:29:48	Synchronization			28415

Note: Depending on your settings, for Synchronization and Replication reports a **Detailed** report can be generated in addition to the **Summary** report. Both reports represent the same process, but the **Detailed** report also provides a list of the files that participated in the process.

The report you selected appears in a new window:



CA XOsoft Report Center

Report Center Home Page

CA XOsoft High Availability

SYNCHRONIZATION REPORT

Synchronization mode	BlockSynchronization (include files with the same size and modification time)
Scenario	Scenario001
Master host	XORWSECN2K7-2(1)
Replica host	XORWSECN2K7-1(2)
Scenario start time	07-Dec-08 22:23:31
Report start time	07-Dec-08 22:23:41
Report finish time	07-Dec-08 22:29:48

Summary:

Total number of files modified	154
Total number of bytes changed	171.7MB

Chapter 4: Using the CDP Repository

This section provides instructions for creating, managing and using the CDP Repository module.

This section contains the following topics:

Understanding the CDP Repository

The CDP Repository module provides the ability to store deleted Outlook items, to search for certain items according to different criteria, and to retrieve them upon end-users requests. Thus, it helps the enterprise to better protect, manage and use its Exchange server environment.

The CDP Repository module uses CA XOsoft data replication and recovery capabilities, and introduces the ability to restore and retrieve a single or numerous deleted messages upon end-user requests, without administrative intervention. The CDP Repository uses the data that was replicated from the Master and stored on the Replica servers. Therefore, the bulk of the data processing is done outside the production servers, avoiding performance overload.

When scanning the replicated data, the CDP Repository use of indexing allows it to capture and process only changes that occur in this data. This means that when a request arrives, only deleted messages are scanned, and consequently the retrieval process is rapid and efficient. The deleted messages are kept in the CDP Repository even if the scenario that initially replicated them is deleted from the Manager.

There are two kinds of users who use the CDP Repository:

- **End-user**: A user who has an account in the enterprise domain and a mailbox in the replicated Exchange Store. Using the Web-based E-mail Retrieval, each end-user can directly access his or her own deleted messages, search and sort them, and retrieve the ones that are needed. The end-users have access only to their mailbox. They do not need to have any knowledge of the underlying system, only an access to the easy-to-use E-mail Retrieval.

- **Administrator**: A user who configures and manages the CDP Repository via the CA XOsoft Manager. The administrator configures through the Manager the CDP Database and the Exchange scenario properties that define when to run the data extraction operation and where to store the extracted data. The administrator is not expected to be a DBA in order to manage the CDP Repository.

  The administrator is responsible for defining the types of Outlook items that can be retrieved. These can include: e-mail messages, appointments, contacts, tasks, journal entries, notes, and attachments. The administrator also set a retention policy that determines for how long the deleted messages will be kept, according to size and type, and the maximum disk space allocated for the deleted messages. Once this size is reached, new deleted messages are not inserted into the CDP database.

  The administrator can configure all the relevant CDP settings. However, unless the administrator will explicitly log on as a DB owner to the SQL Server (not through the CA XOsoft Manager) he will not be able to view the content of the users' mailboxes. That way, an organization can set a stricter privacy policy, by which the CA XOsoft administrator has no direct access to the users' mailboxes.

Important! The CDP Repository module can be used with both DR and HA solutions. It is activated solely with Exchange scenario.

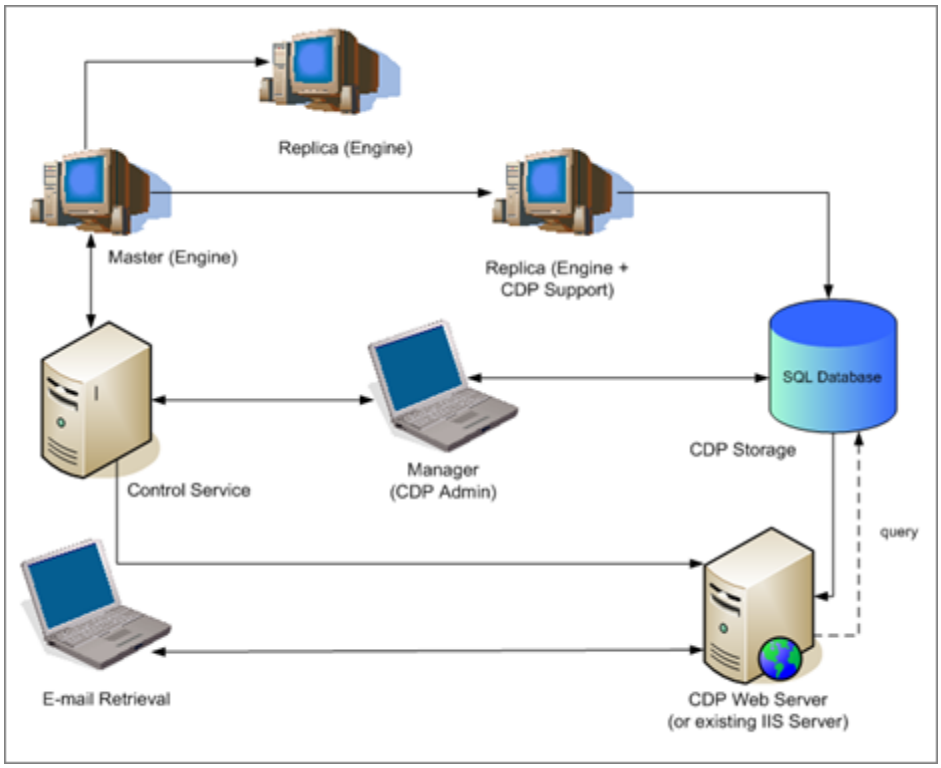
CDP Repository Components

The CA XOsoft CDP Repository consists of five components:

- **CDP Storage -** a storage area that resides in an instance of SQL Server 2005 and contains the entire deleted message data. The deleted messages can be stored in one or several databases. The SQL configuration is done through the CDP Admin, and multiple Exchange servers can use the same repository. Besides SQL Server 2005, this component does not need any additional installation.
- **CDP Web Server -** a component that receives end-user requests regarding deleted messages, passes queries on to the CDP Storage, receives from it the requested information, and passes it back to the user via the E-mail Retrieval component.
- **CDP Support** - a component that supports the CDP Repository functions and activities. It extracts deleted messages from database files and feeds them to the SQL Server. This component is installed as an additional component during the Engine installation.
- **CDP Admin -** a User Interface that resides in the Manager, which enables administrators to configure and deploy the CDP Storage retention and quota policies. It is installed as part of the Manager installation.

- **E-mail Retrieval -** an end-user web-based GUI, which enables users to search for deleted Outlook items and retrieve them. It can be opened from any workstation with a Web browser and a connection to the CDP Web Server machine, without additional installation.

A typical deployment of CDP Repository shows the component residing on its own web or IIS server.



Configuring the CDP Repository

There are three steps in configuring the CDP Repository

1. Defining the CDP Database (see page 42).
2. Creating an Exchange scenario with the CDP option (see page 47).
3. Running the scenario.

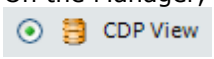
The CDP Database configuration needs to be done before the scenario creation.

Defining the CDP Database

The CDP Database configuration consists of three tasks:

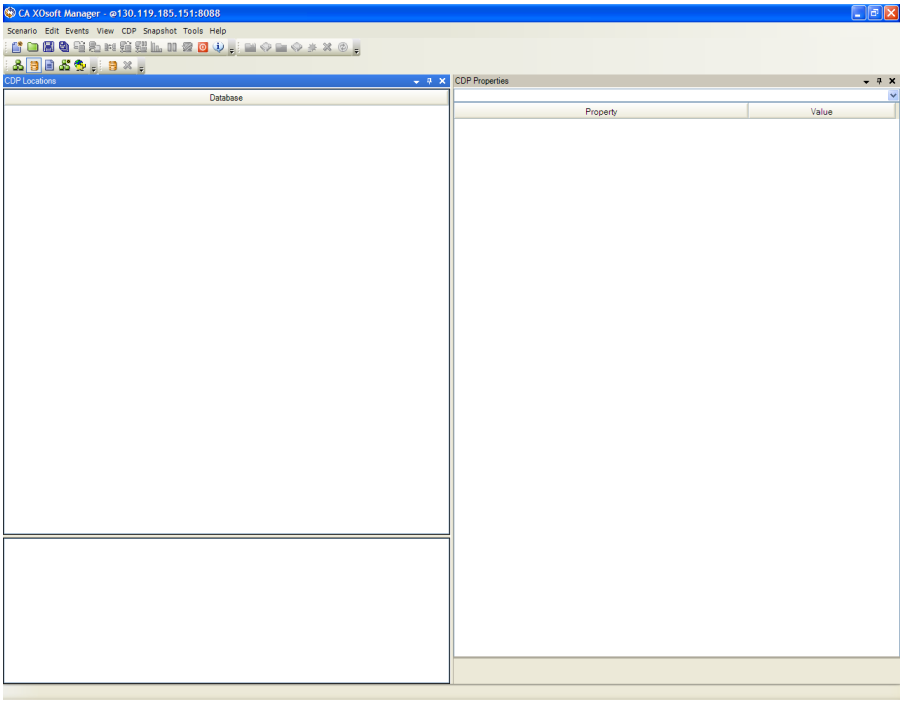
1. Selecting the SQL instance that will contain the new CDP repository.
2. Defining the name and the path of the repository.
3. Setting the retention and quota policy for the entire database and for each message type folder.

To define the CDP database

1. On the Manager, open the CDP View by selecting the **CDP View** 

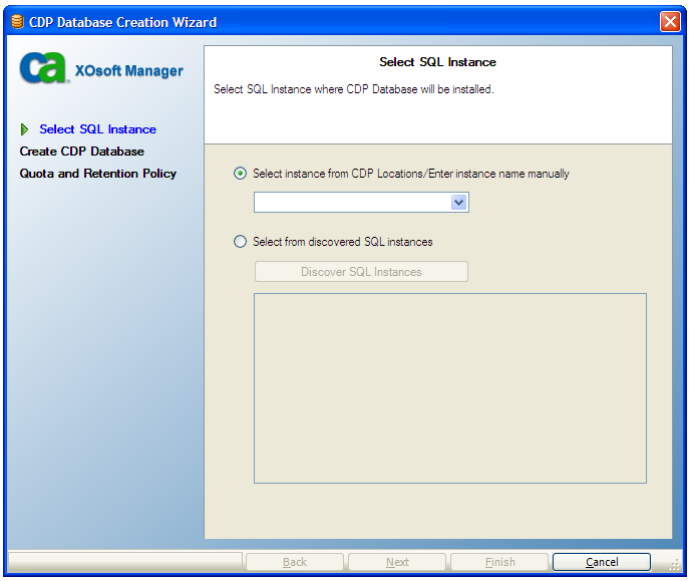
option button on the Viewing toolbar. Alternatively, select from the **View** menu the **Active View** - **CDP View** option.

   The **CDP View** opens.



2. To create a CDP Database, select from the **CDP** menu the **Add Database** option.

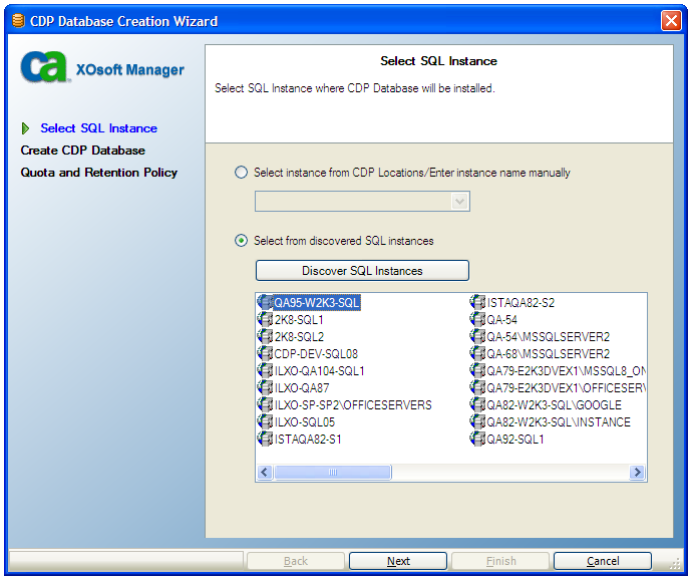
The **Select SQL Instance** dialog opens.



In this page, you select the SQL instance where the CDP database will be created.

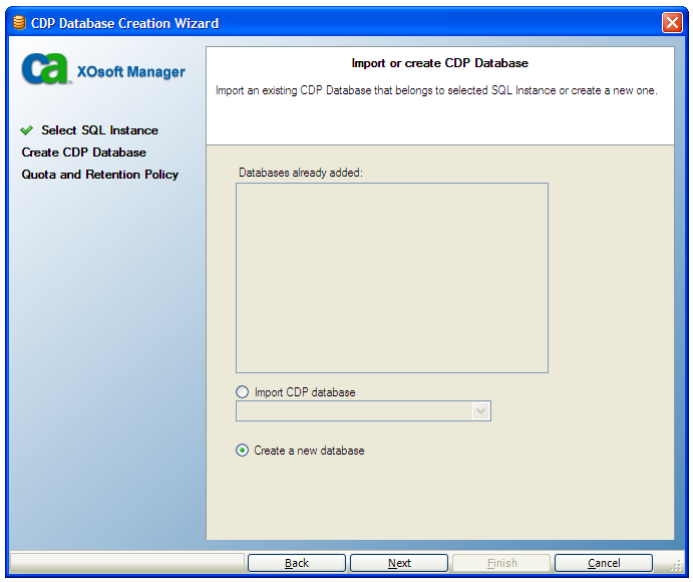
3. When creating a CDP database for the first time, do one of the following:

   - Manually enter the SQL instance name - select the first option button, and enter the name in the empty box.
   - Select the instance name from a list of existing instances - select the second option button and click the **Discover SQL Instances** button. CA XOsoft automatically discovers the existing SQL instances, and displays them.



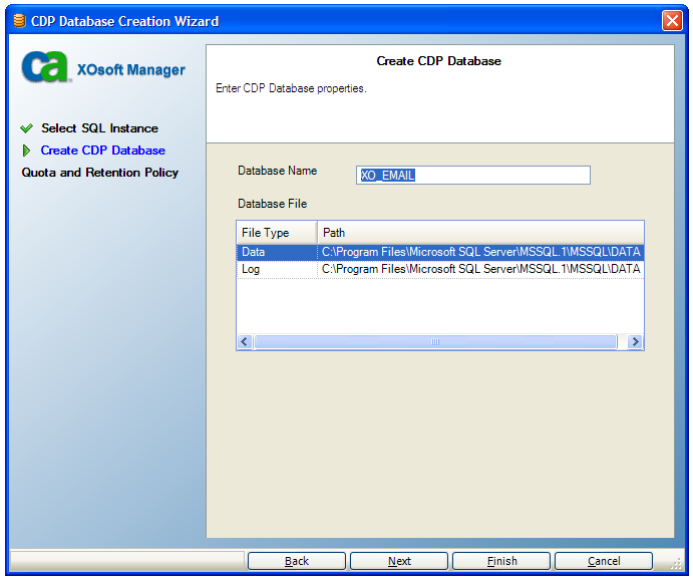
Select from the list the required SQL instance.

4. After defining the SQL instance, click **Next**. The **Import or create CDP Database** page opens.



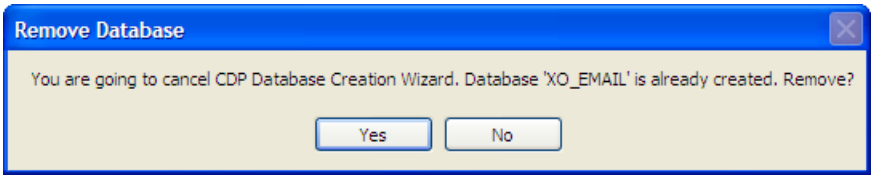
To create a new CDP database, select the **Create a new database** option button. If you already created a CDP database and you want to re-use it, select the **Import CDP database** option button and import the database.

5. Click **Next**. The **Create CDP Database** page opens.



In this page, you can see the default CDP Database name and its storing path.

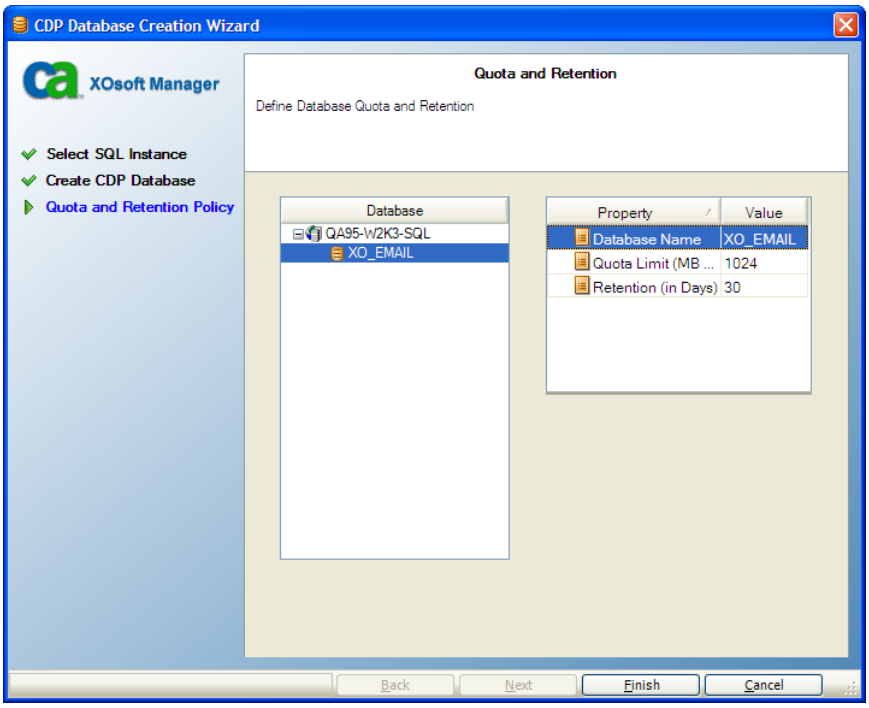
Note: If you click **Cancel** at this stage, the following message opens.



Since the CDP Database is already created, you have the option of keeping it and configuring it at a later stage, or removing it from the SQL Instance. Select the required option. If you click **Finish**, the new CDP Database will be kept automatically.

6. In the **Create CDP Database** page, keep the default database values or change them. Then, click **Next**.

   The **Quota and Retention** page opens.



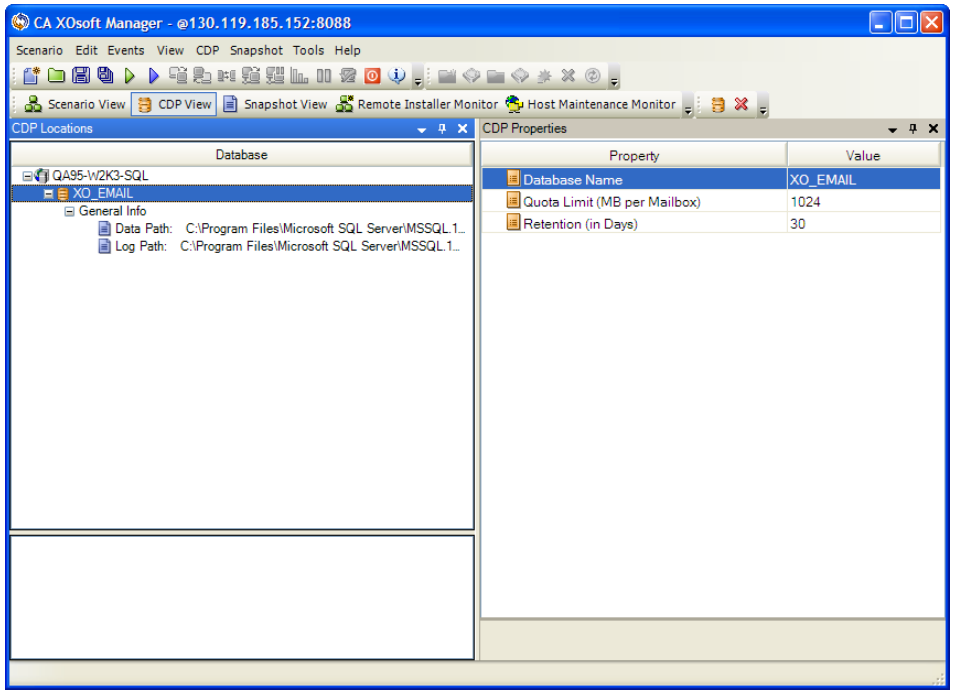
   In this page, you define for the entire database its **Quota Limi**t, meaning the maximum disk space allocated for the deleted messages. Once this size is reached, new messages will not be inserted into the database. You can also define a **Retention** period for the database, meaning for how many days the deleted messages will be kept in the CDP database.

7. To change the default quota limit of the entire database, from the **Property** area on the right, select the **Quota Limit** property, and double-click the value field to enter a new size in MB.

8. To change the default aging period of the entire database, from the **Property** area on the right, select the **Retention** property, and double-click the value field to enter a new number in days.

9. After you defined the quota and aging policy for the entire CDP database, select **Finish**.

   The CDP database is created and configured. It appears on the CDP View window.



10. You can change the database configuration from here as well.

    To configure the CDP database from the CDP View, select the database on the Database pane on the left, and change its property values on the Properties pane on the right.

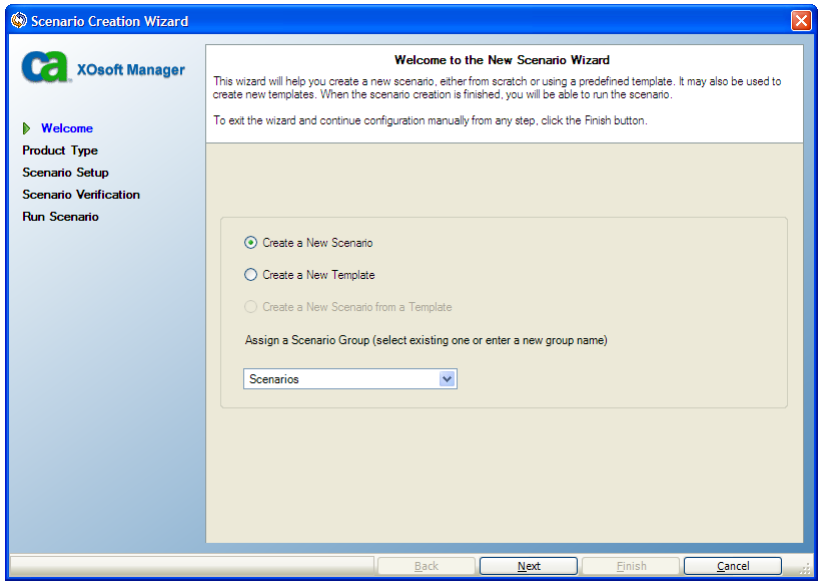
Creating an Exchange Scenario with the CDP Option

To activate the CDP Repository module, you need to create an Exchange scenario with the CDP option enabled.

To create an Exchange scenario with CDP

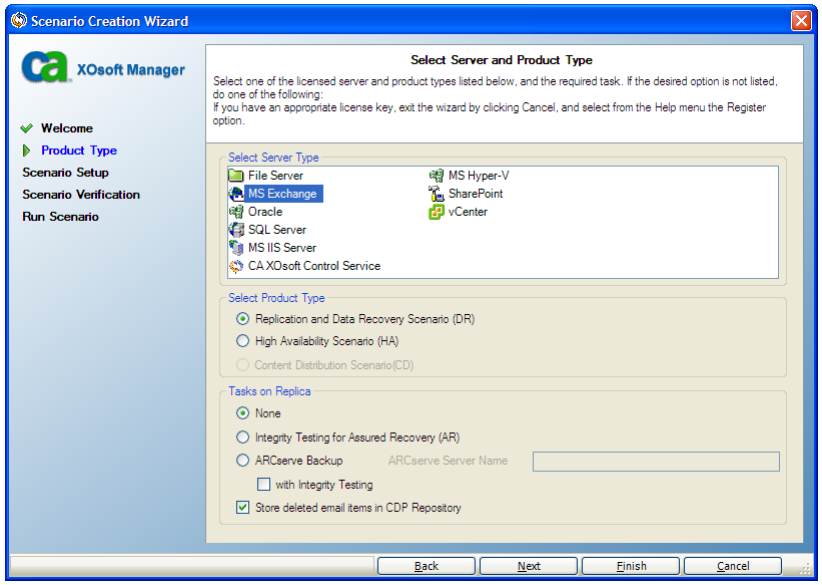
1. On the Manager, click the **New** button on the Standard toolbar.

   The **Scenario Creation Wizard** opens.

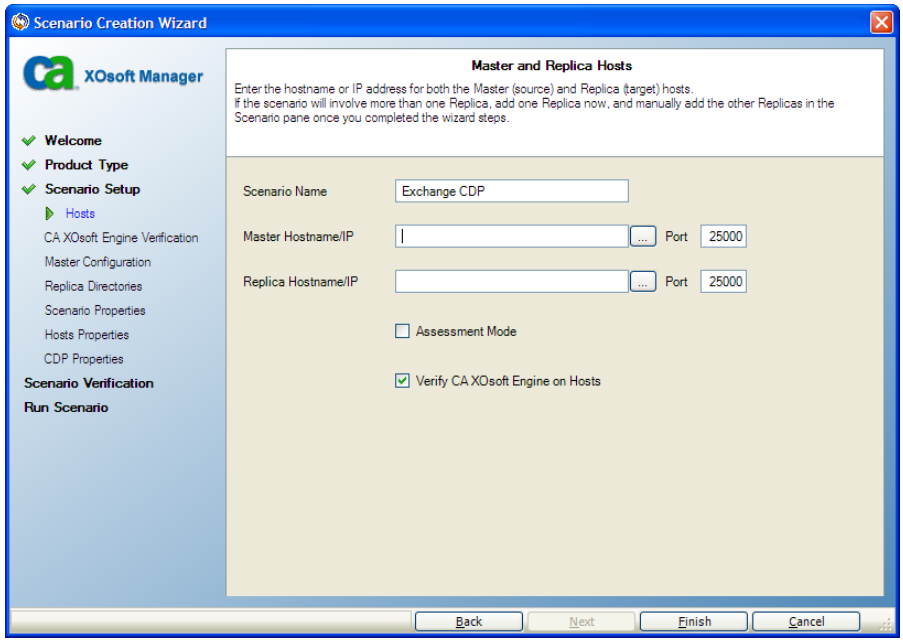


2. Select the **Create a New Scenario** option button, and click **Next**.

   The **Select Server and Product Type** page opens.



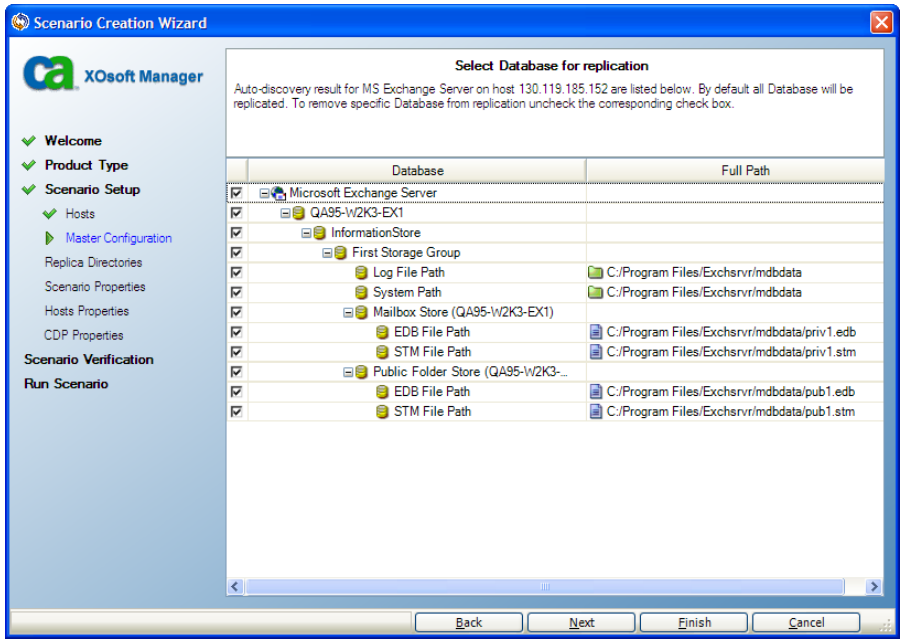
3. Select the required scenario options, as follows:
   - From the S**elect Server Type** list, select **MS Exchange**.
   - From the **Select Product Type** options, select either **Replication and Data Recovery** or **High Availability Scenario**.
   - From the **Tasks on Replica** options, select Stored deleted email items in **CDP Repository**.
4. Click **Next**. The **Master and Replica Hosts** page opens.



5. Enter the required information, as follows:
   - **Scenario name** - accept the default name or enter a new name for the scenario.
   - **Master Hostname/IP** and **Replica Hostname/IP** - enter the name or IP of the Master and Replica hosts, or use the **Browse** button to find it.

     Note: If either server is a MSCS cluster, enter the Exchange Virtual Server Name or IP address as the Master and/or Replica name (instead of the physical node's name or IP).
   - In the **Port** boxes: accept the default port no. (25000) or enter a new port numbers for the Master and Replica.
   - **Assessment Mode** - make sure this check box is NOT selected.
   - **Verify CA XOsoft Engine on Host** - select this option if you want the system to verify whether Engines are installed and running on the Master and Replica hosts you specified in this page. If you select this option, the **Hosts Verification** page appears after you click **Next**.

6. Click **Next.** The **Master Configuration** page opens.

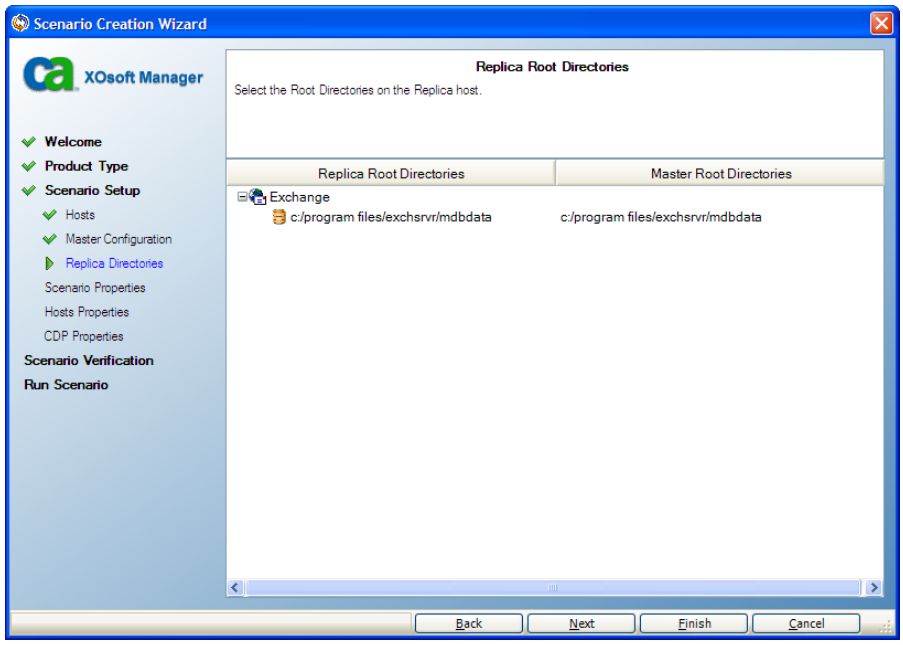


CA XOsoft auto-discovery component automatically discovers all Exchange databases on your Master server. These are the databases that can be replicated and protected.

7. By default, all the discovered databases are selected and all will be replicated. You can exclude some of these storage groups from replication by clearing their check boxes.

8. After defining the data to be replicated, click **Next**.

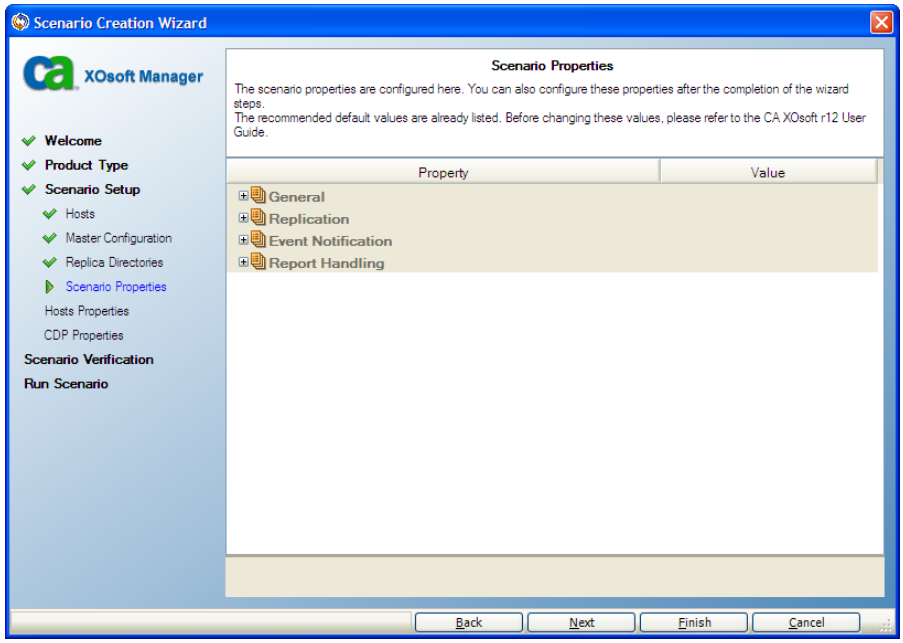
   The **Replica Root Directories** page opens.



   CA XOsoft auto-configuration component verifies that the Exchange Server configuration on the Master and Replica servers will be identical during the replication procedure.

9. After defining the storage location of the replicated data, click **Next**.

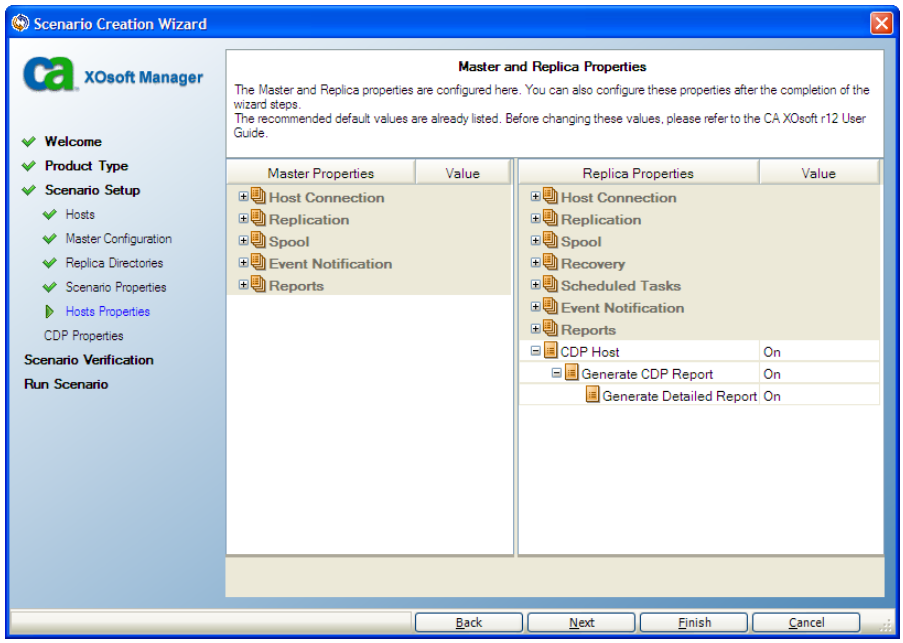
   The **Scenario Properties** page opens.



The **Scenario Properties** page enables you to configure the scenario properties that affect the entire scenario. Typically, the default values are sufficient.

If you want to configure the scenario properties at this stage, refer to Understanding Scenario Properties. To configure the scenario properties at a later stage, refer to Configuring Scenario Properties.

10. Click **Next**. The **Master and Replica Properties** page opens.



The **Master and Replica Properties** page enables you to configure the properties that are related to either the Master or Replica host. Typically, the default values are sufficient. All you need to verify at this stage is that on the **Replica Properties** list, the **CDP Host** property is **On**.

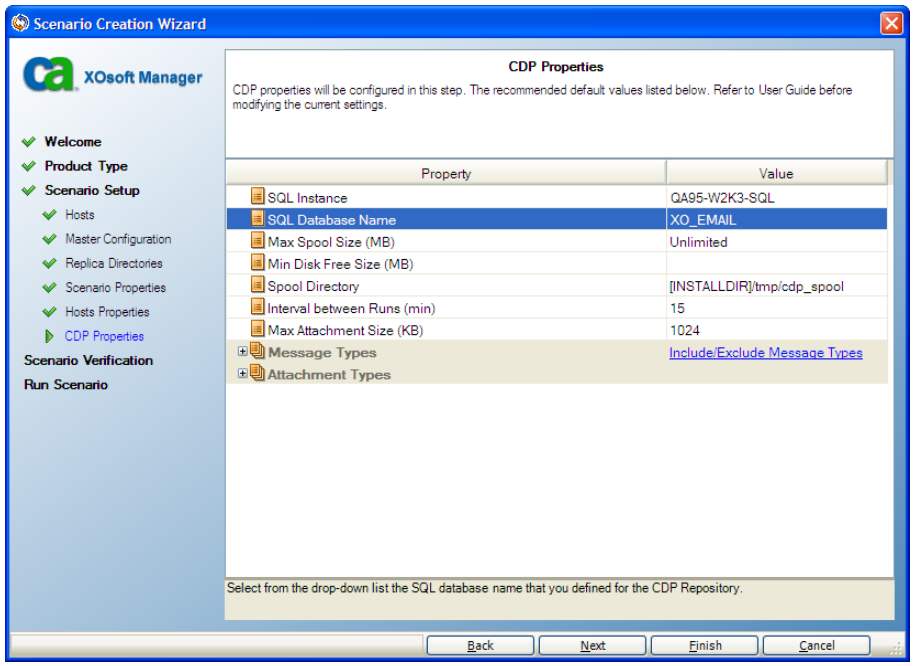
Note: in a CDP Exchange scenario, one Replica, and only one, should function as the CDP Replica, meaning the Replica that participates in the CDP Repository process.

If you want to configure the Master and Replica properties at this stage, refer to Setting Master and Replica Properties. To configure the scenario properties later, refer to Configuring Master or Replica Server Properties.

Note: You can modify all the settings in this pane after the scenario is created. However, before changing any Spool properties (which can be configured here), review the Spool information for configuration details.

11. Once you are satisfied with the Master and Replica properties, click **Next**.

    The **CDP Properties** page opens.



    The **CDP Properties** page enables you to configure the properties that are related to the CDP Repository.

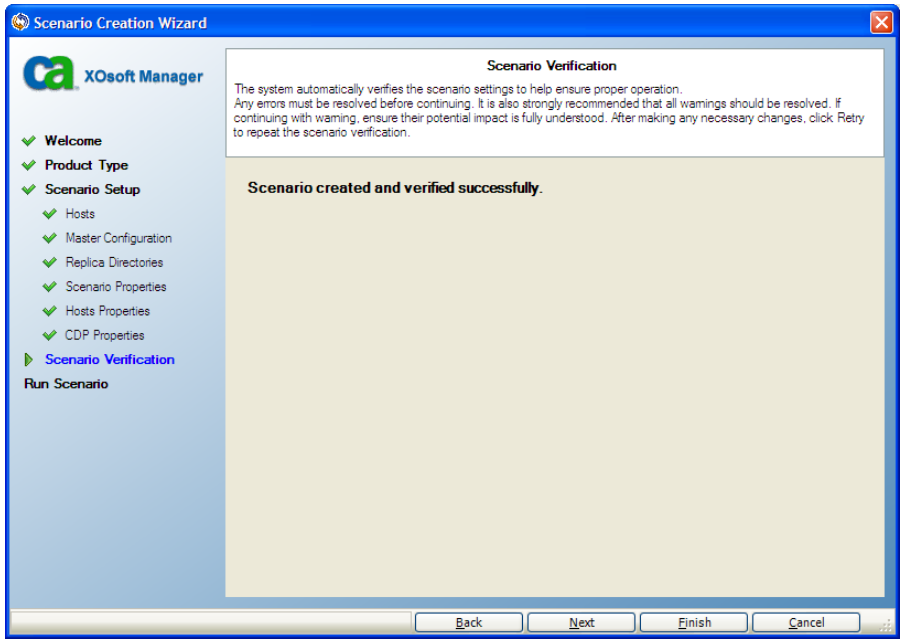
12. Set the CDP properties as follows:

    - **SQL Instance** - select from the drop-down list the SQL instance name that contains the CDP SQL database.
    - **SQL Database Name** - select from the drop-down list the SQL database name that you defined for the CDP Repository.

    Typically, the other default values are sufficient. If you want to configure the other CDP properties at this stage, refer to Understanding CDP Scenario Properties (see page 57). To configure the CDP scenario properties at a later stage, refer to Configuring CDP Scenario Properties (see page 56).

13. Once you set the CDP Repository properties, click **Next**.

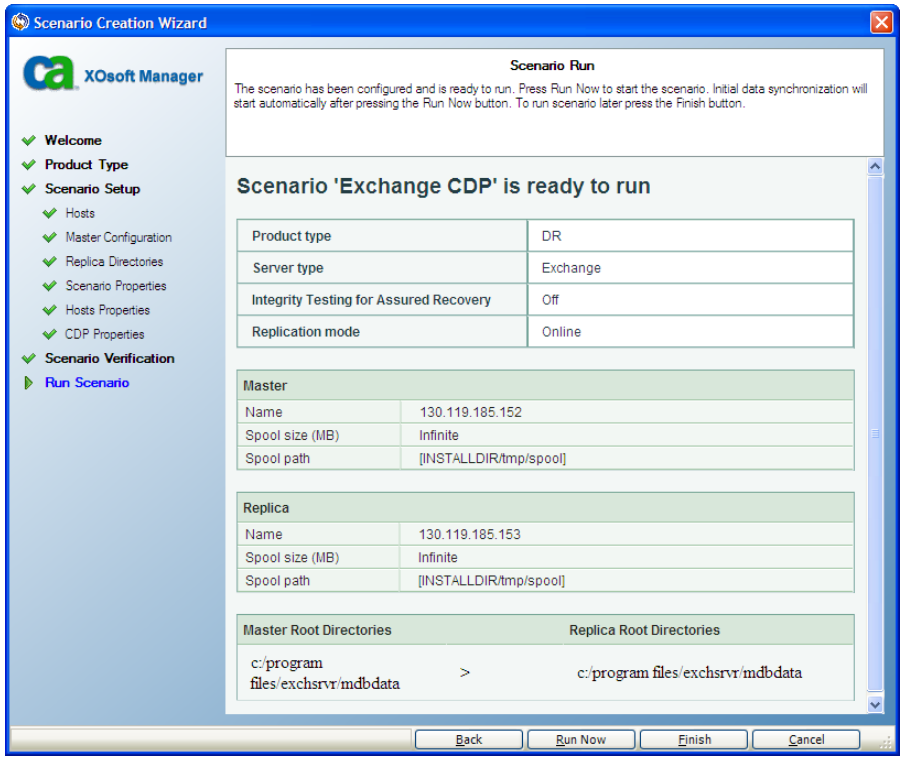
    CA XOsoft verifies the validity of the new scenario and checks many different parameters between the Master and Replica servers to ensure a successful replication and data recovery process. Once the verification is completed, the **Scenario Verification** page opens.



    Note: Although the software allows you to continue with warnings, it is not recommended to do so. Resolve any warning situations before continuing to ensure proper operation of the application.

14. If the scenario is verified successfully, click **Next**.

    The **Scenario Run** page opens.

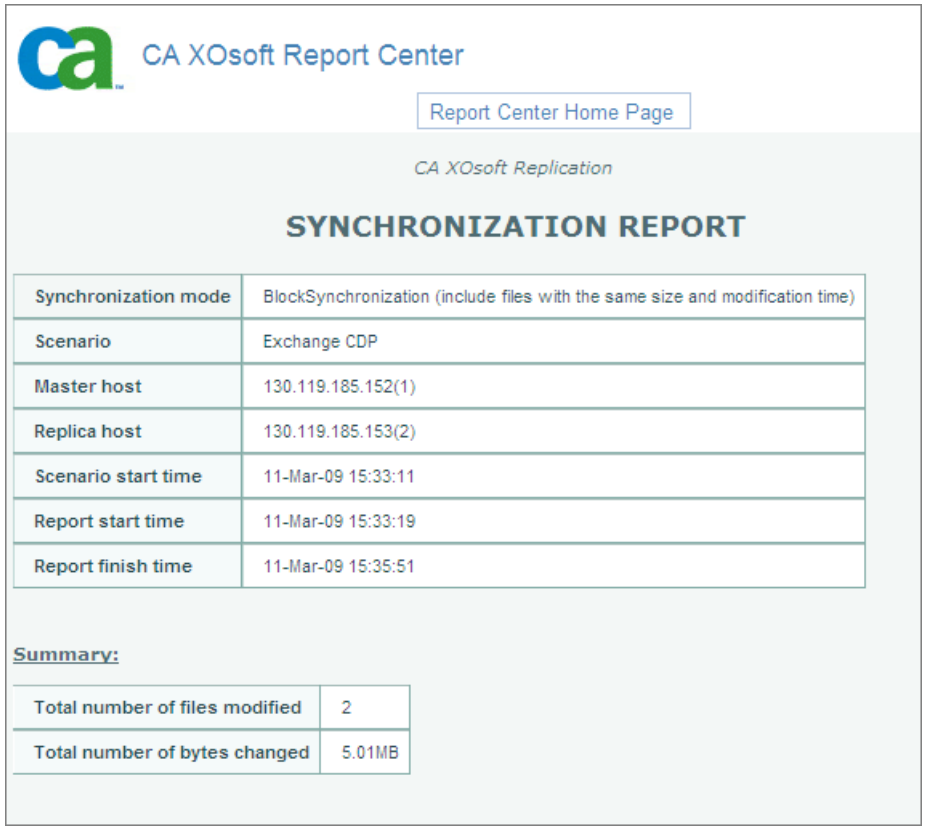


15. After the scenario is verified, you are prompted to run it. Running the scenario starts the data synchronization process.

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

      The synchronization process starts, and the CDP Repository is starting to be filled with the enterprise deleted messages.

16. By default, once a synchronization occurs, a synchronization report is generated.



CA XOsoft Report Center

Report Center Home Page

CA XOsoft Replication

SYNCHRONIZATION REPORT

Synchronization mode	BlockSynchronization (include files with the same size and modification time)
Scenario	Exchange CDP
Master host	130.119.185.152(1)
Replica host	130.119.185.153(2)
Scenario start time	11-Mar-09 15:33:11
Report start time	11-Mar-09 15:33:19
Report finish time	11-Mar-09 15:35:51

Summary:

Total number of files modified	2
Total number of bytes changed	5.01MB

Note: For more information about opening a report, see Viewing a Report.

Setting CDP Scenario Properties

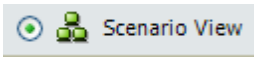
This section describes how to configure the CDP Repository properties, and provides the list of properties, corresponding values, and an explanation of each property. Some of the CDP properties are configured in the CDP Scenario Properties list, while others are configured in the CDP Replica Properties List.

Configuring CDP Scenario Properties

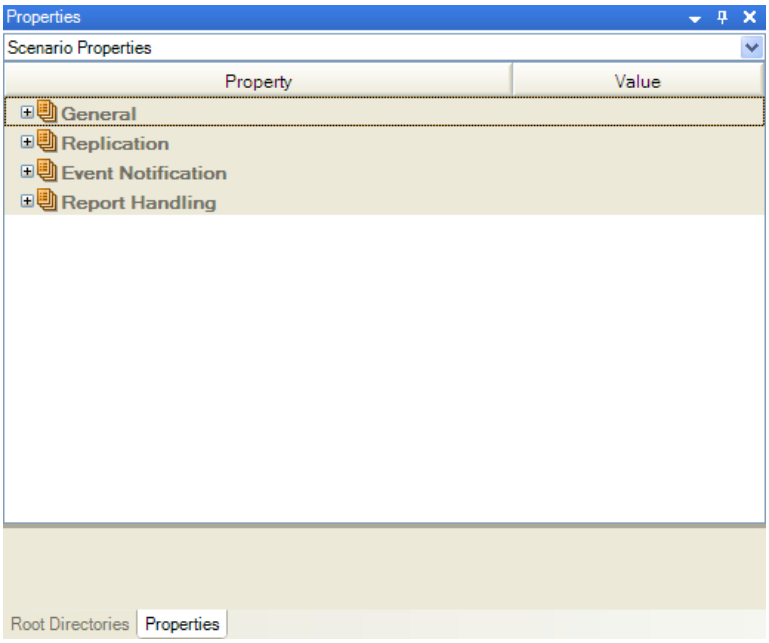
After you defined an Exchange scenario with the CDP option, you can set or modify its properties.

Note: To configure the CDP scenario properties, the scenario must be stopped.

To set CDP scenario properties

1. If you are not in the Scenario View, open it by selecting the **Scenario View** 

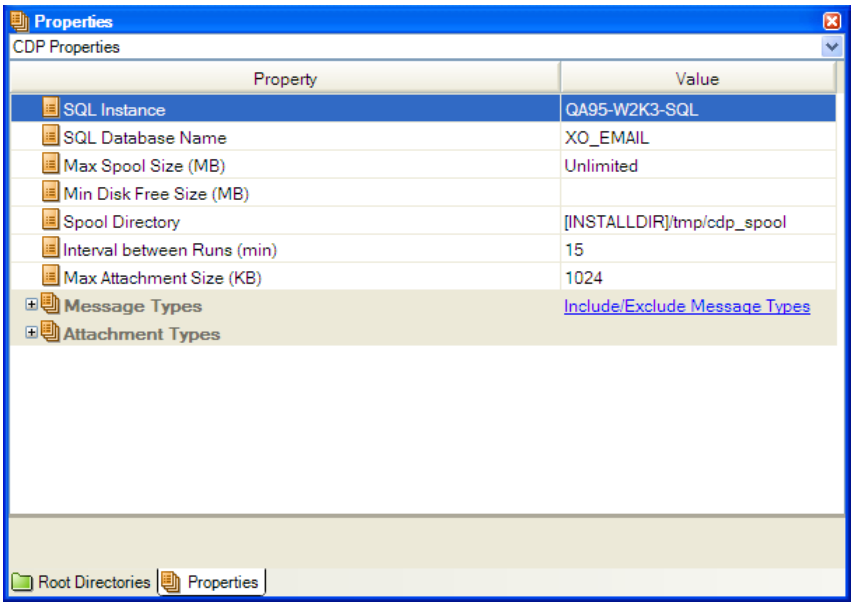
option button on the Viewing toolbar.
2. On the Scenario pane, select the Exchange scenario its CDP properties you want to configure. On the Framework pane on the left, the Scenario Properties list opens.



Note: A running scenario has a gray background, and scenarios that are not running have a white background.

3. From the **Properties** drop-down list on the Framework pane, select **CDP Properties**.

   The **CDP Properties** list opens.



4. On the CDP Properties list, select the required property, and select or enter the appropriate values. Some values can be manually entered in an edit box field, while others can be selected from a drop-down list.

5. After you set the required properties, click the **Save** button on the Standard toolbar to save and apply your changes.

Understanding CDP Scenario Properties

This section lists the CDP Scenarios properties, corresponding values, and provides an explanation of each property.

SQL Instance

Select from the drop-down list the SQL instance name that contains the CDP SQL database.

SQL Database Name

Select from the drop-down list the SQL database name that you defined for the CDP Repository.

Max Spool Size (MB)

Enter the maximum spool size allowed in MB. This disk space is used only if needed – it is not pre-allocated. The default is **Unlimited**. To enter a value of Unlimited, enter a zero. When this threshold is exceeded, the system issues an error message, and stops the CDP checkup session.

Min Disk Free Size (MB)

Enter the free disk space threshold in MB. When reaching this threshold, the system issues an error message, and stops the CDP checkup session.

Spool Directory

Enter the directory to be used to store the spool for the CDP Repository on the Replica.

Interval between Runs (min)

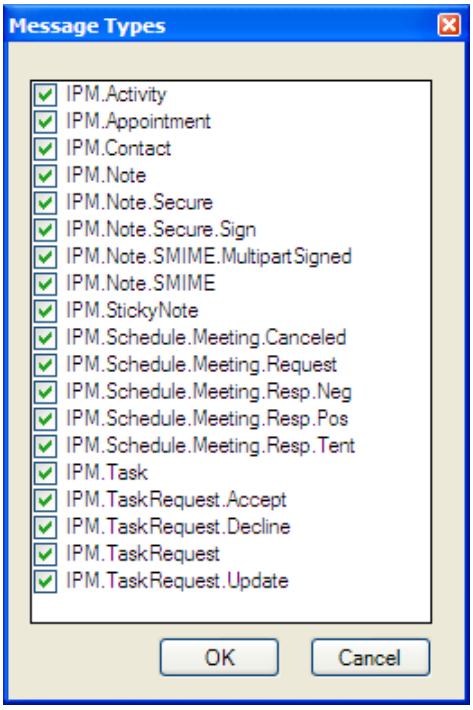
Enter the number of minutes between each check the system will perform in the Exchange database, in search for new deleted messages. The minimum allowed value is 15 minutes.

Max Attachment Size

Enter the attachment size allowed for storage. Deleted attachments that exceed this size will not be stored in the CDP SQL database.

Message Types

Specify whether deleted message of this type will be stored in the CDP SQL database. By default, all message types are stored. To exclude a type from being stored, click the **Include/Exclude Message Types** link. The **Message Types** dialog opens.

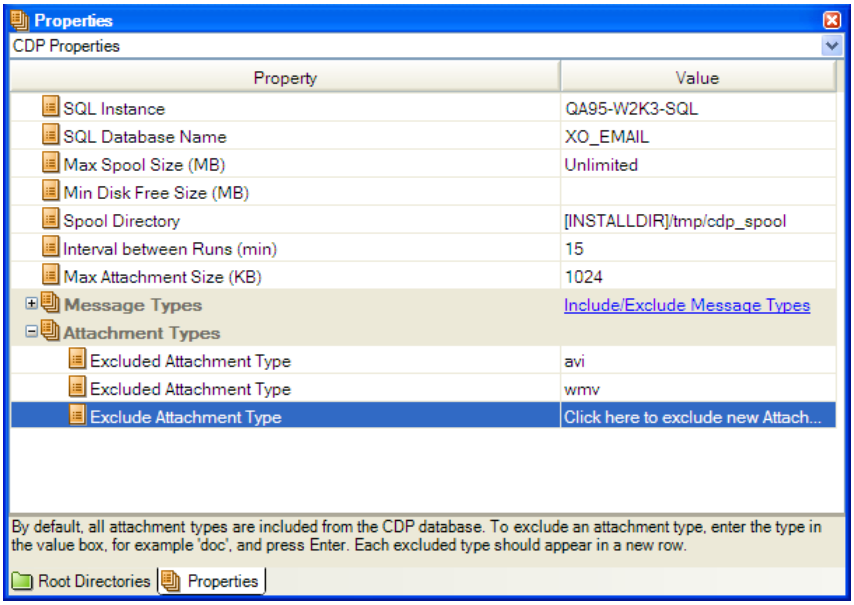


To exclude message types from storage, clear their check boxes.

Attachment Types

Enter the type of attachments to be stored. By default, all attachment types are included in the CDP SQL database. To exclude an attachment type, enter the type in the value box, for example **avi**, and press the **Enter** key.

Each included type should appear in a new row.



Understanding the CDP Repository Statistics and Reports

CA XOsoft checks at regular intervals whether the Exchange database contains new deleted items. On each checkup session, CA XOsoft updates the CDP Statistics on the Manager, and by default generates two reports: a **Summary Email CDP Repository Report** and a **Detailed Email CDP Repository Report**. The CDP Statistics is updated only during a new checkup session, and the CDP Reports are generated only when new deleted items are found in the checkup session.

Notes:

- You can change the checkup interval through the **Interval between Runs** property in the CDP Properties list (see page 57). The minimum allowed value is 15 minutes.
- You can cancel the CDP Report generation by setting to Off the **Generating CDP Report** and **Generate Detailed Report** properties.

CDP Repository Statistics

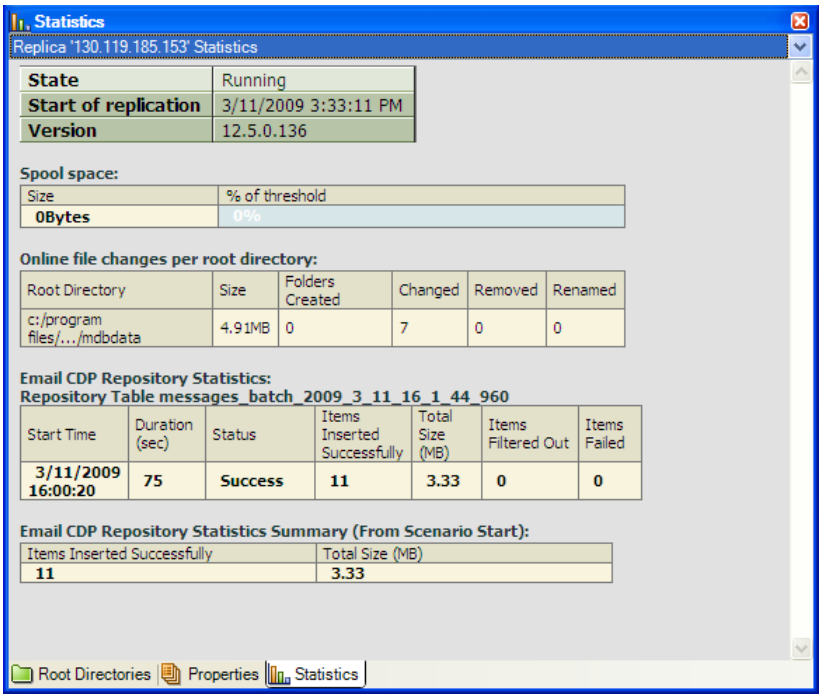
The Statistics tab in the Framework pane displays live statistics. Different statistics information is displayed for a scenario, a Master and each Replica host. The CDP Statistics is displayed for a CDP Replica, in addition to the replication statistics that is provided for this Replica.

Note: The Statistics tab on the Framework pane appears only when a scenario is running.

To view the CDP Repository Statistics

1. On the Scenario pane, select the CDP Replica whose statistics you want to view.
2. On the Framework pane, select the **Statistics** tab.

   The CDP Statistics appears at the lower half of the pane.



   The CDP Repository Statistics consists of two tables:

   - The **Email CDP Repository Statistics** table
   - The **Email CDP Repository Statistics Summary** table

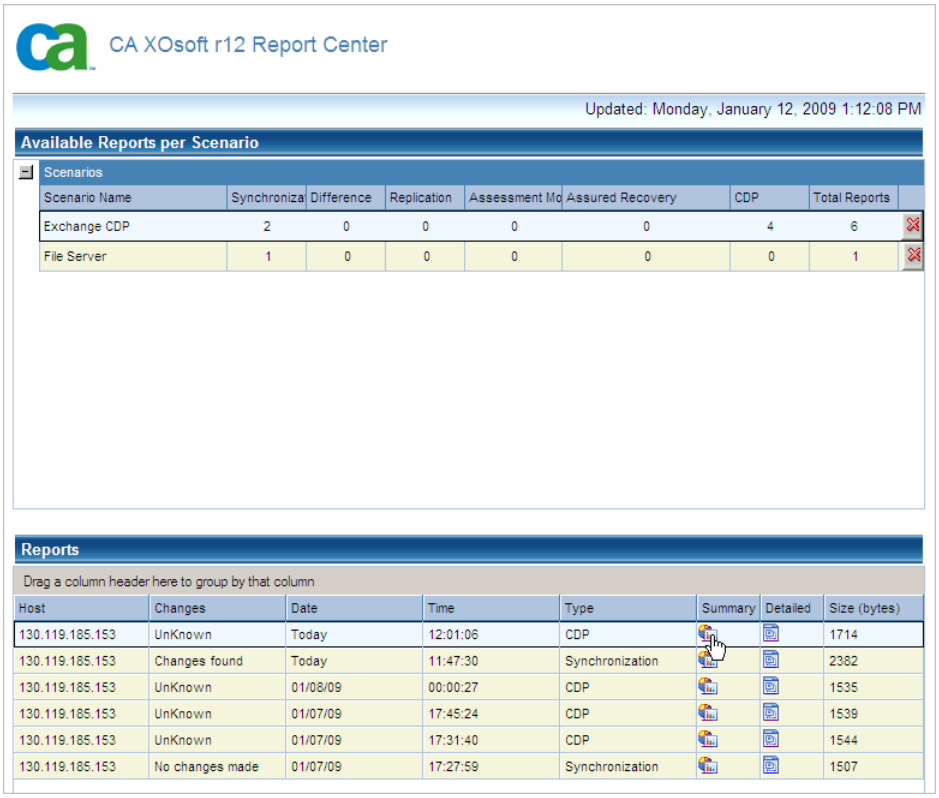
CDP Repository Reports

If deleted messages are found in a CDP checkup session, by default a Summary Email CDP Repository Report and a **Detailed** Email CDP Repository Report are generated.

Note: For detailed instructions on how to open and use the Report Center, refer to Viewing a Report.

To view an Email CDP Repository Report

- On the Report Center, select from the **Available Reports per Scenario** table the Exchange CDP scenario that this report represents. Then, from the **Reports** table, click the CDP report you want to open, either **Summary** or **Detailed.**



The report you selected opens.

Retrieving Deleted Outlook Items Using the E-mail Retrieval

The E-mail Retrieval enables you to search for deleted Outlook items and retrieve them. The types of Outlook items that can be retrieved are defined by the Administrator, and they can include: e-mail messages, appointments, contacts, tasks, journal entries, notes, and attachments.

Logging Into the Email Retrieval

CA XOsoft Email Retrieval does not require any component or application installed in advance. It can be opened from any workstation that has a network connection and a Web browser. To log in, you will need your:

- Hostname/IP Address and Port Number of the server where the Control Service is installed.
- User Name, Password and Domain

To open CA XOsoft Email Retrieval

1. Select **Start**, **Programs**, **CA**, **XOsoft**, **Email Retrieval**.

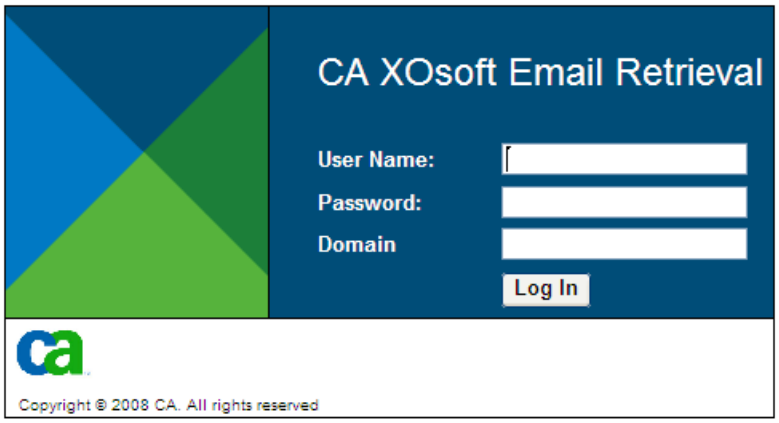
   - or -

   Open Internet Explorer. On the **Address** box, enter the Control Service Host Name/IP Address and Port Number as follows:
   http://host_name:port_no/pages/entry_point.aspx

   Notes:

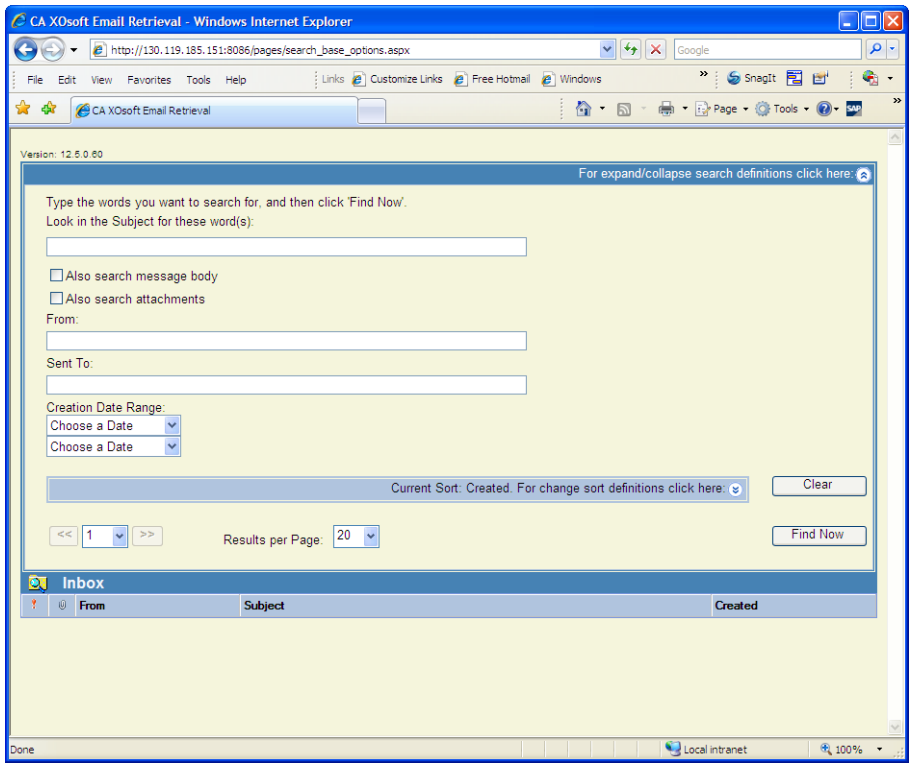
   - If you are opening the Email Retrieval from the machine where the Control Service is installed, you can use the default parameters:
     http://localhost:8086/pages/entry_point.aspx
   - If you selected the **SSL Configuration** option during the installation of the Control Service**,** when you open the Email Retrieval page, you need to use the hostname of the Control Service machine (instead of its IP Address). Enter the Control Service Host Name and Port No. as follows:
     https://host_name:port_no/pages/entry_point.aspx

The **Login** dialog opens.



2. Enter your User Name, Password and Domain and click **Log In**.

   The **Email Retrieval** window opens.

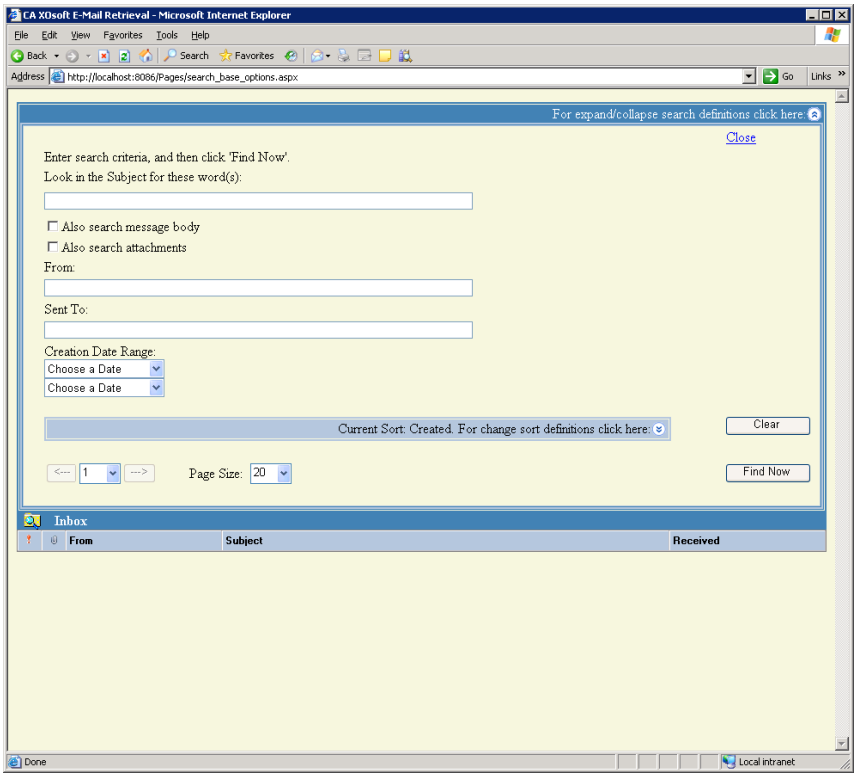


Search for Deleted Items and Retrieve Them

To search and retrieve a deleted item:

1. On the Email Retrieval window, enter any text you want to search for in one of the available fields: **Subject**, **From** or **Sent To.**

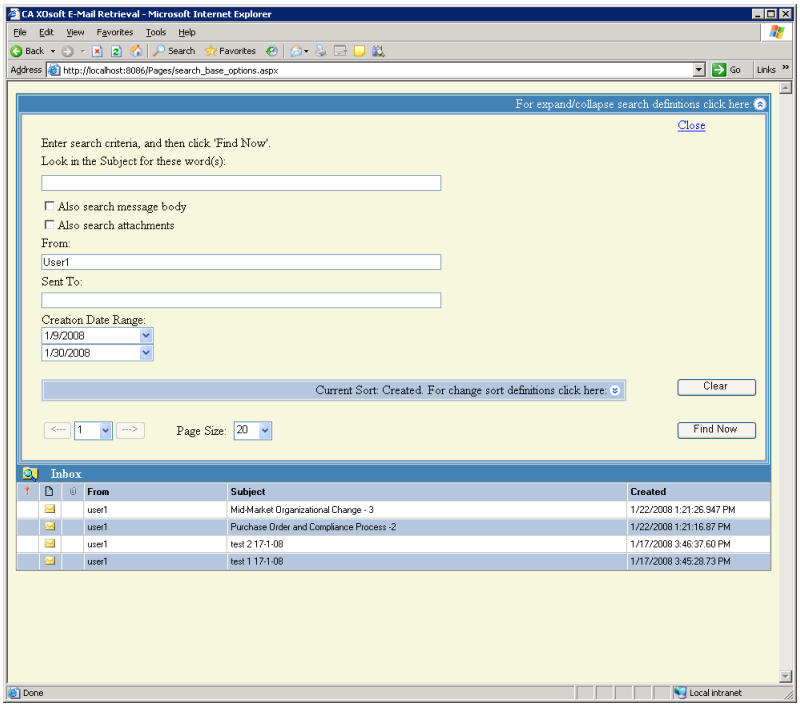
   Note: to search in the message body or attachments, enter the text in the **Subject** field and use check boxes that underneath it.



2. [Optional] Define the date range in which you want to conduct the search by using the **Creation Date Range** drop-down menus.

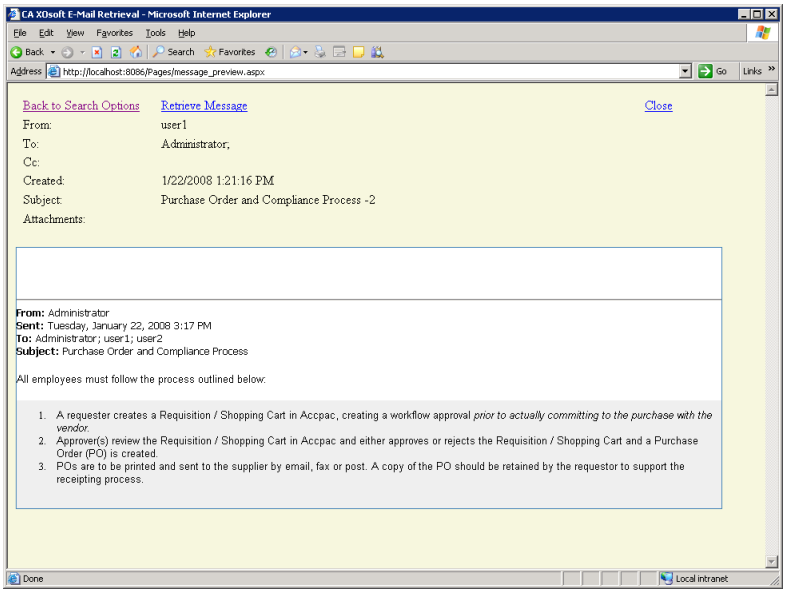
3. After you entered the criteria, click the **Find Now** button.

The search results open.



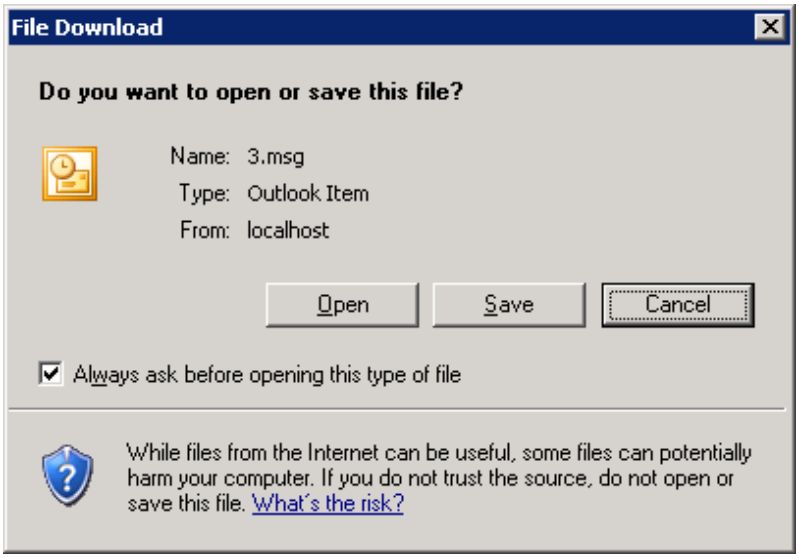
4. To view a deleted message, double-click it.

The message opens.

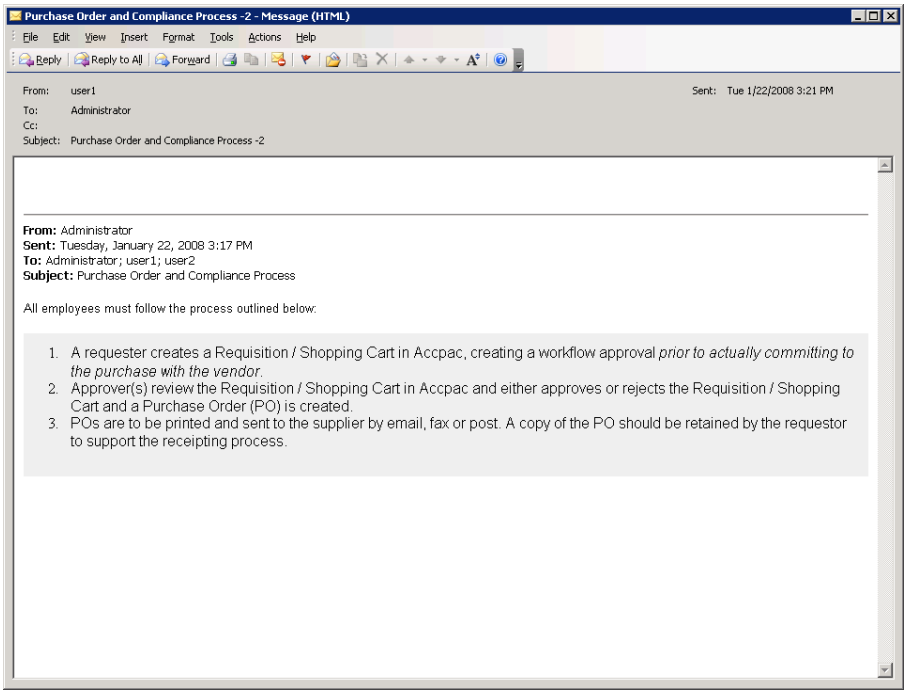


5. To retrieve the message, click the **Retrieve Message** link at the top of the page.

   A standard **File Download** dialog opens.



6. To open the message as an Outlook item, click **Open.**



Chapter 5: Switching Over and Switching Back

Switchover and *Switchback* is the process in which active and passive roles are exchanged between the Master and Replica servers, so that if the Master is currently active, it changes to passive after Switchover passes the active role to the Replica. If the Replica is active, it changes to passive after Switchover passes the active role to the Master. Switchover can be triggered at the push of a button or automatically by CA XOsoft HA when it detects that the Master is unavailable, if you enabled the Perform Switchover Automatically option from the Switchover and Reverse Initiation dialog. When this option is Off, the system notifies you that the Master server is down so you can manually initiate switchover from the CA XOsoft Manager.

This section contains the following topics:

How Switchover and Switchback Work

After the HA scenario starts running and the synchronization process is completed, the Replica checks the Master on a regular basis, by default every 30 seconds, to see if it is alive. The following types of monitoring checks are available:

- **Ping** -- a request sent to the Master to verify that the Master is up and responding
- **Database check** -- a request that verifies the appropriate services are running and all databases are mounted
- **User-defined check** -- a custom request you can tailor to monitor specific applications

If an error occurs with any part of the set, the entire check is considered to have failed. If all checks fail throughout a configured timeout period (by default, 5 minutes), the Master server is considered to be down. Then, depending on the HA scenario configuration, CA XOsoft HA sends you an alert or automatically initiates a switchover.

When you created an HA scenario, you defined how you want the switchover to be initiated.

- If you selected the Initiate Switchover manually option from the Switchover and Reverse Replication Initiation page, perform a manual switchover. For more information, refer to the topic, Initiate Switchover (see page 71).
- If you selected the Initiate Switchover automatically option, you can still perform a manual switchover, even if the Master is alive. You can initiate switchover when you want to test your system, or you want to use the Replica server to continue the application service while some form of maintenance is performed on the Master server. Triggered (automatic) switchover is in all ways identical to manual switchover performed by the administrator, except it is triggered by a resource failure on the master server rather than by an administrator manually initiating the switchover by clicking the Perform Switchover button. The timeout parameters are configurable and are more extensively covered in the *CA XOsoft User Guide.*

When you created an HA scenario, you defined how you want the reverse scenario to be initiated.

- If you selected the Initiate Reverse Replication automatically option from the Switchover and Reverse Replication Initiation page, replication in the reverse direction (from Replica to Master) automatically begins after a switchover has finished successfully.
- If you selected the Initiate Reverse Replication manually option, you must resynchronize data from Replica to Master, even after testing a clean switchover without a Master failure.

When the Reverse Replication feature is off, to start reverse replication after a switchover has occurred, click the Run button. The benefit to this feature is, if both the master and replica servers were online and connected during switchover, resynchronization in the reverse direction is not required. Resynchronization involves comparing the data on the master and replica servers to determine which changes to transfer before real-time replication starts; this can take some time. If automatic reverse replication is turned on, and both servers were online during switchover, replication is reversed without the need for resynchronization. This is the one situation in which resynchronization is not required.

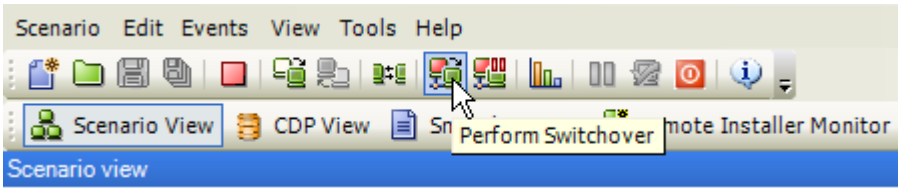
Initiate Switchover

Once triggered, whether manually or automatically, the switchover process itself is fully automated.

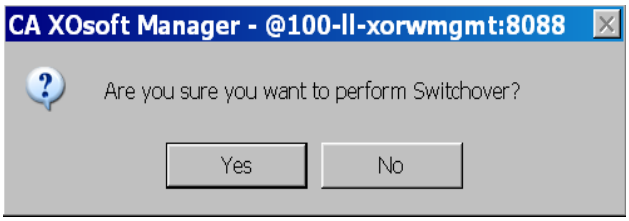
Note: Though the following steps show Exchange scenario screens as examples, the procedure is similar for all server types.

To initiate manual switchover

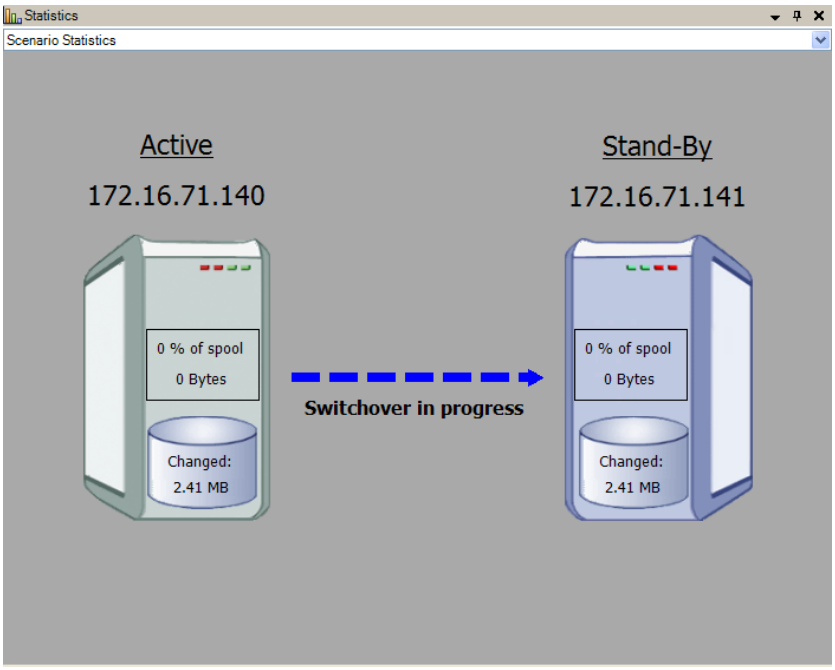
1. Open the Manager and select the desired scenario from the Scenario pane. Verify it is running.
2. Click on the **Perform Switchover** button, or select from the **Tools** menu the **Perform Switchover** option:



A confirmation message appears:

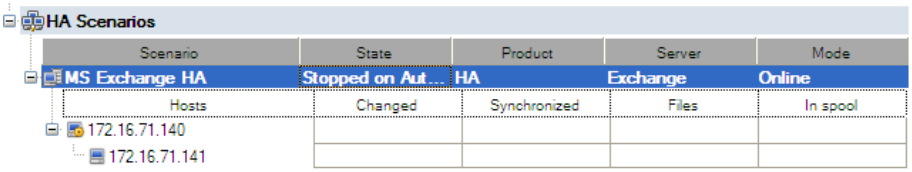


3. Click **OK** on the **Perform Switchover** confirmation message. This procedure initiates a switchover from the Master server to the Replica server:



Detailed information about the switchover processes is located in the Events pane during switchover.

4. After the switchover is completed the scenario stops:



Note: The only case in which the scenario may continue to run after switchover is when **automatic reverse replication** is defined as **Start automatically**.

In the Event pane a message appears, informing you that **Switchover completed**, and then that the **Scenario has stopped**.

Now, the Master becomes the Stand-by server and the Replica becomes active server.

Initiate Switchback

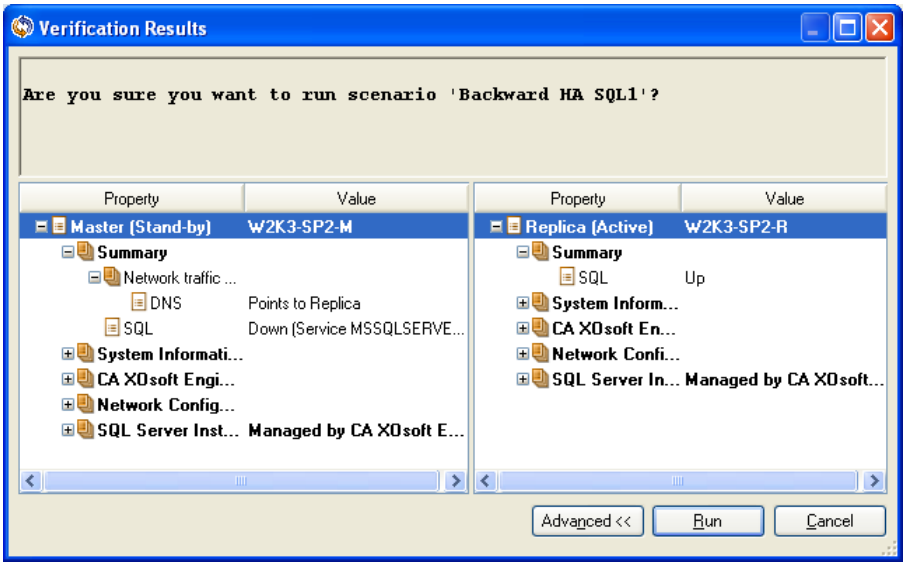
After a switchover is initiated, whether manually or automatically, at some point, you will want to reverse the server roles and make the original Master the active server again the Replica the standby server. Before you switch back the roles between servers, decide if you want to the data on the original Replica server to overwrite the data on the original Master. If yes, you must first perform a reverse scenario, called a backward scenario.

Note: The following steps are the same regardless of server type.

To initiate manual switchback

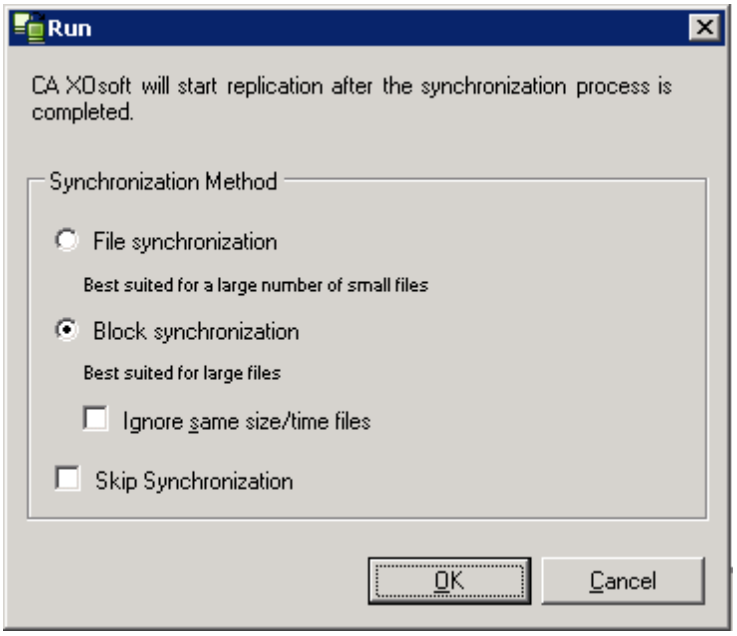
1. Ensure that both Master and Replica servers are available on the network and that the CA XOsoft Engine is running.
2. Open the Manager and select the desired scenario from the Scenario pane.
3. Perform one of the following:
   - If the scenario is already running, skip directly to Step 4
   - If the scenario is not running, perform these steps and then go to Step 4:
     a. Click Run on the toolbar to start the scenario.

     CA XOsoft HA detects that a switchover has occurred and verifies its state and configuration. After verification completes, the Verification Results dialog appears, listing existing errors and warnings if detected, and prompting you to approve the running of the backward scenario. If desired, click the Advanced button to open an additional pane with detailed information about the hosts that participate in the scenario.

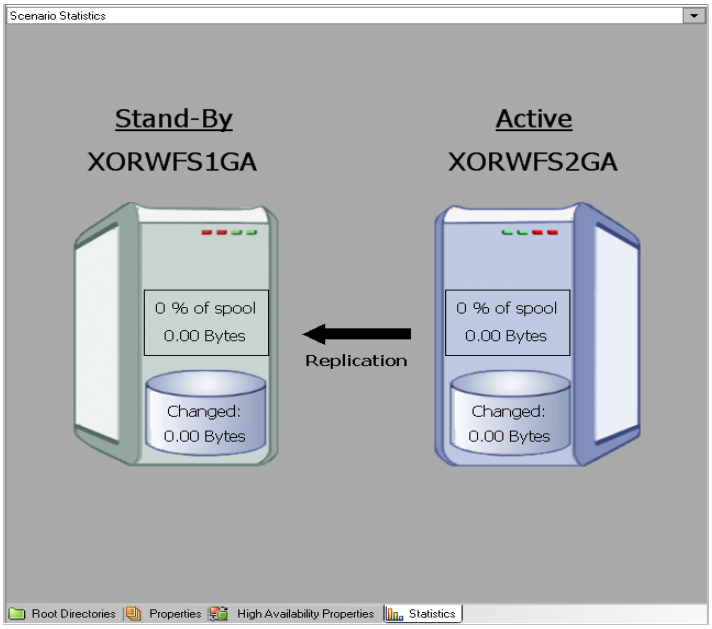


b. Select a synchronization method from the Run dialog and click OK to start resynchronization.

Note: See the CA XOsoft User Guide for more information on Synchronization Methods.



After resynchronization completes, you receive a message in the Event pane: All modifications during synchronization period are replicated. Now, replication from the active server to the standby server begins:



Note: You are now ready to reverse the roles between the Master and Replica servers.

4. Click Perform Switchover on the toolbar while the scenario is running to reverse the server roles. A confirmation message appears.
5. Click Yes to clear the message and start the switchback process.

   After the switchback is completed, the server roles are reversed back and the scenario automatically stops.

   Note: The scenario will continue to run after the switchback when the Reverse Replication Initiation option is defined as Start Automatically.

You may now run the scenario again in its original (forward) state.

Switchover Considerations

It is not recommended to set both the Switchover and Reverse Replication Initiation options to automatic in a production environment. While these options are individually beneficial it is best practice to set only one or the other to automatic. The reason for this recommendation is that automatic switchover allows CA XOsoft HA to trigger a switchover, after a failure is detected, without administrative involvement. If automatic reverse replication is also on, CA XOsoft HA may start to overwrite data on the failed production server before an administrator is able to assess the failure situation. Overwriting data on a failed server before an administrator can assess the situation may have undesirable consequences. Due to this possibility, setting both options to automatic is not recommended. Please choose either one or the other depending on what best fits your requirements. When only one option is used at a time these settings can be very beneficial and may be used safely.

Chapter 6: Recovering Data

This section contains the following topics:

The Data Recovery Process

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.

CA XOsoft enables you to recover data in two ways:

- Recover lost data from the Replica to the Master -- this option is a synchronization process in the reverse direction and requires you to stop the scenario. (This option is not recommended for Oracle, SQL or Exchange scenarios.)
- Recover lost data from a certain event or point in time (Data Rewind) -- This option uses a process of stamped checkpoints and user-defined bookmarks to roll corrupt data on the Master back to a time before corruption occurred.

Important! You must stop replication in order to initiate recovery.

Setting Bookmarks

A *bookmark* is a checkpoint that is manually set to mark a state that you may want to rewind back to. We recommend setting a bookmark just before any activity that may cause data to become unstable. Bookmarks are set in real-time, and not for past events.

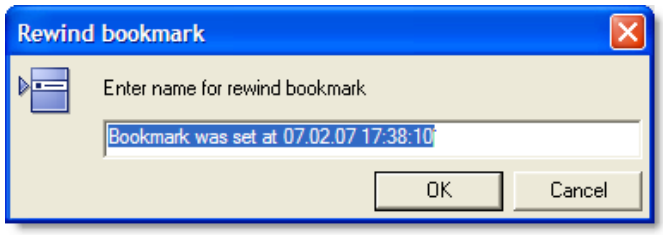
Notes:

- You can use this option only if you set the **Recovery - Data Rewind** option to **On** (default setting is Off).
- You cannot set bookmarks during the synchronization process.

To set a bookmark

1. When the required scenario is running, on the Scenario pane select the Replica host from which you want to rewind data.
2. From the **Tools** menu, select the **Set Rewind Bookmark** option.

   The **Rewind bookmark** dialog opens.

   The text that appears in the **Rewind bookmark** dialog will appear in the **Rewind Points Selection** dialog as the bookmark's name. The default name includes date and time.
3. 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.

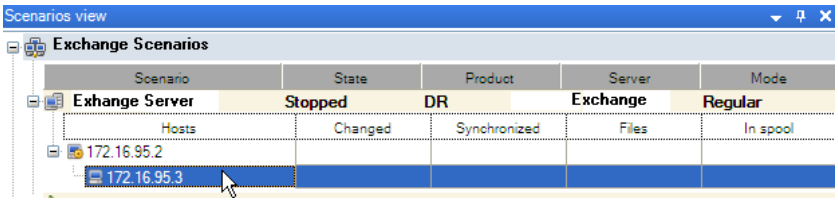
Recover Lost Data from Replica

In the following steps, File Server scenario screens are used as examples, but the procedures are similar for all server types.

To recover all lost data from a Replica

1. On the Manager, from the Scenario pane select the desired scenario and stop it.
2. [For database applications only] Stop the database services on the Master host.
3. On the Manager, from the scenario folder select the Replica host:

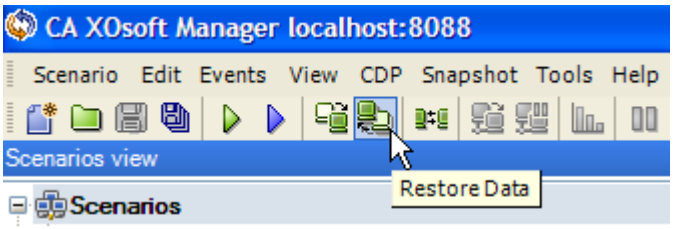
   Note: If multiple Replica servers participate in the required scenario, select the Replica from which you want to recover data.



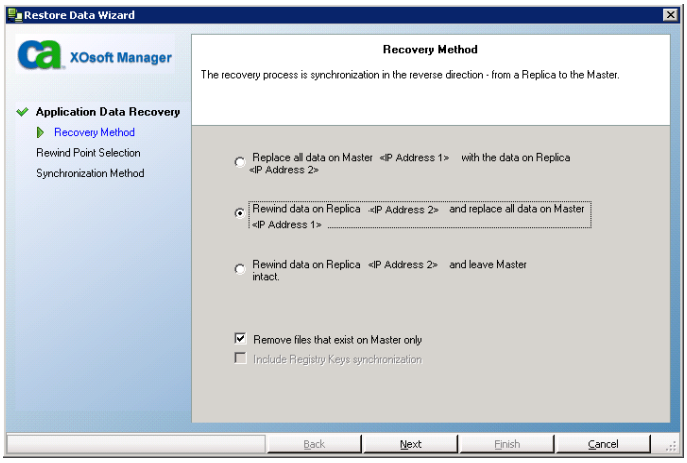
   The Restore Data option is enabled.

4. From the **Tools** menu, select **Restore Data**, or click the **Restore data** button on the Standard toolbar:

   Note: If the user credentials you used to log in to the Manager are different than the ones required for working with the Engine on the Replica, a **User credentials** dialog appears, asking you to enter log on account details for the selected Replica.

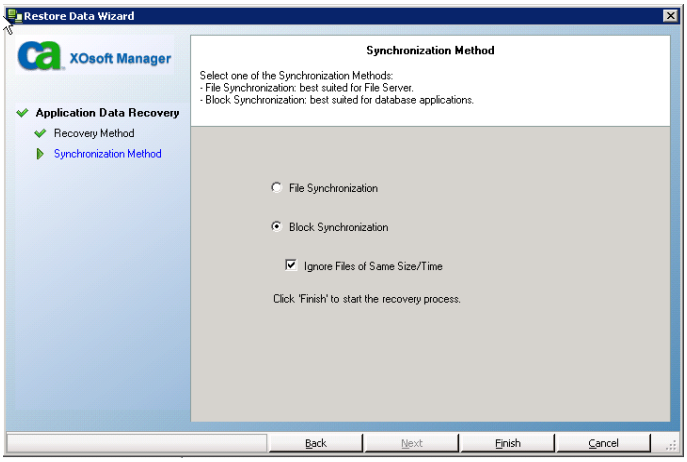


The **Recovery Method** page of the Restore Data wizard appears:



Note: If the Data Rewind property is set to On, another Restore Data dialog will appear. In this case, select the first option - **Replace all data on Master with the data on Replica**. This option simply restores data without a rewind.

5. Click **Next**. The **Synchronization Method** page appears:

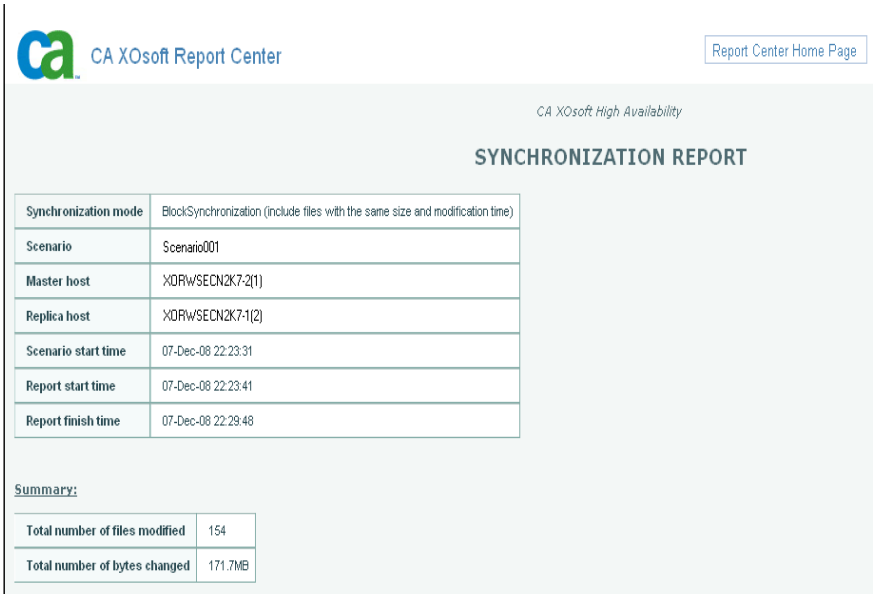


6. Make sure that the appropriate Synchronization method is selected (Block Synchronization). For more details, see the CA XOsoft User Guide. Click **Finish.**

   Once you finished initiating the recovery process, CA XOsoft 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: **Synchronization finished**.

   Note: If an error occurred during the temporary Recovery scenario run, the Recovery scenario may stop and remain in the Scenario pane. In this case, you should remove it by right-clicking it and selecting the **Remove** option from the pop-up menu. After the Recovery scenario is removed, the original scenario re-appears in the Scenario pane. Then, you can restart the original scenario, and repeat the recovery process if necessary.

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



CA XOsoft Report Center

Report Center Home Page

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SYNCHRONIZATION REPORT

Synchronization mode	BlockSynchronization (include files with the same size and modification time)
Scenario	Scenario001
Master host	XORWSECN2K7-2(1)
Replica host	XORWSECN2K7-1(2)
Scenario start time	07-Dec-08 22:23:31
Report start time	07-Dec-08 22:23:41
Report finish time	07-Dec-08 22:29:48

Summary:

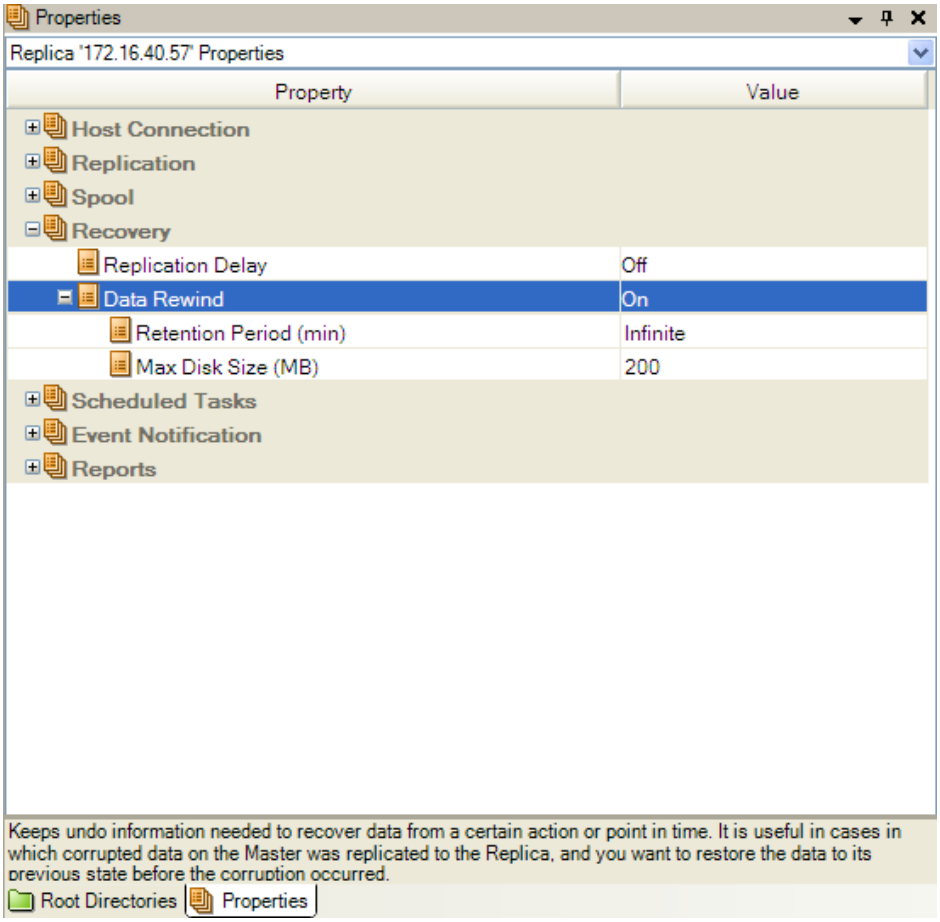
Total number of files modified	154
Total number of bytes changed	171.7MB

Now, the replication process can restart following the original scenario.

Data Rewind

The Data Rewind 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 use this option only if you set the **Recovery - Data Rewind** option to **On**:



If this option is set to Off, the system will not register data rewind points. For more information about Data Rewind parameters (Retention Period, Max Disk Size), see the *CA XOsoft User Guide*.

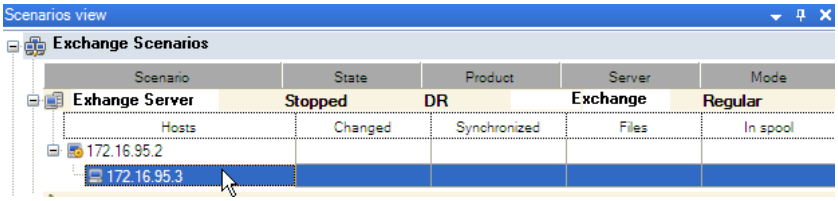
Important! The data rewind process operates in one way only - there is no replay forward. After rewind, all data subsequent to the rewind point will be lost, since data after the rewind point will be overwritten with new data.

Note: The automatic registration of the rewind points starts only after the synchronization process is completed, and the message **All modifications during synchronization period are replicated** appears on the Event pane. Similarly, you cannot manually set bookmarks during synchronization. In the following example, a File Server scenario is used, but the steps are the same for all scenario types.

To recover lost data using rewind points

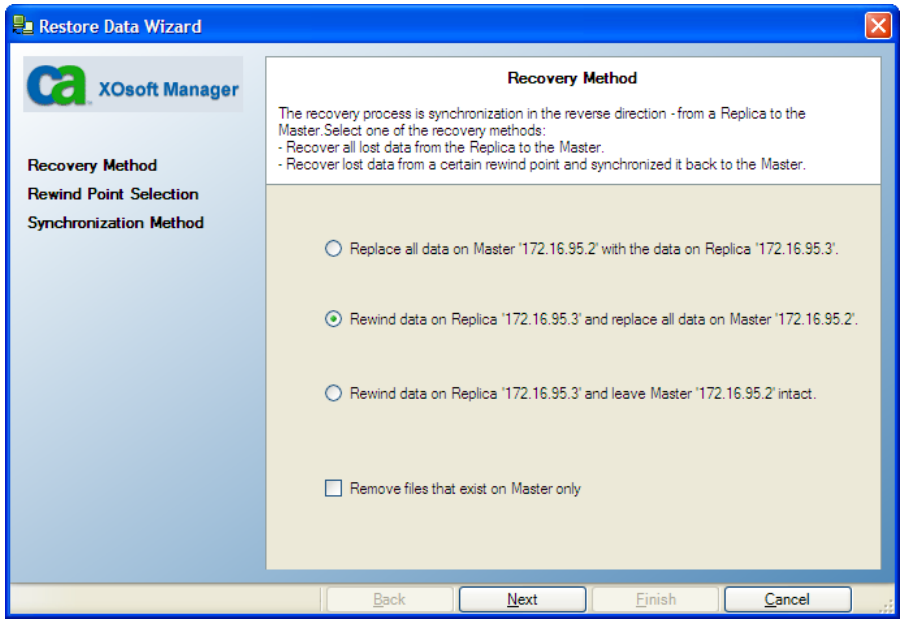
1. On the Manager, from the Scenario pane select the desired scenario and stop it.
2. [For database applications only] stop the database services on the Master host.
3. On the Manager, from the scenario folder select the Replica host:

   Note: If multiple Replica servers participate in the required scenario, select the Replica from which you want to recover data.



4. From the **Tools** menu, select **Restore Data**, or click the **Restore Data** button. If you are prompted for user credentials, enter the appropriate information and click OK.

   The **Recovery Method** page of the Restore Data Wizard appears:

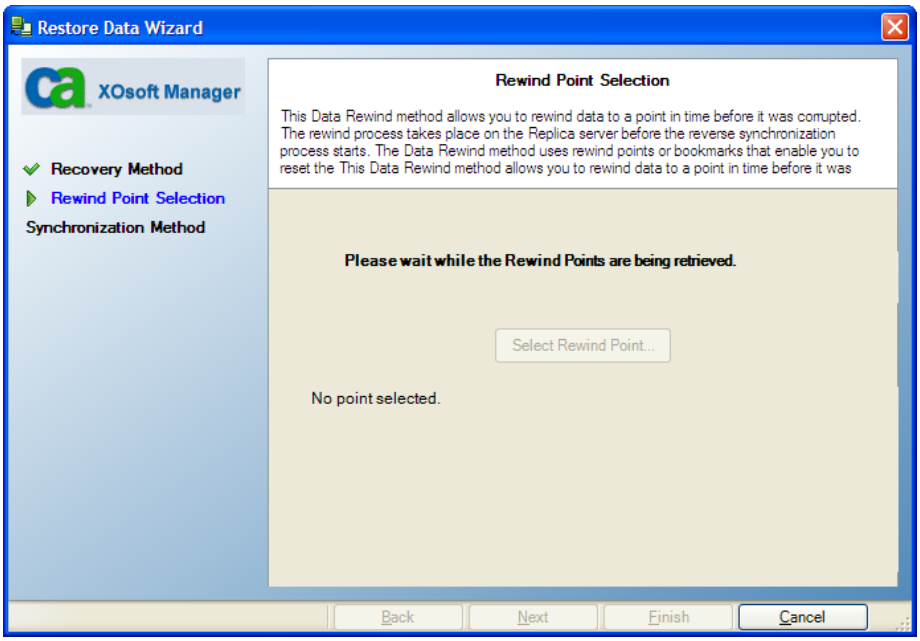


5. Select one of the Rewind data options, depending on whether you want the rewind data synchronized back to the Master (option 2) or left on the Replica only (option 3).

   Note: If the user credentials you used to log in to the Manager are different than the ones required for working with the Engine on the Replica, a **User credentials** dialog appears, asking you to enter log on account details for the selected Replica.

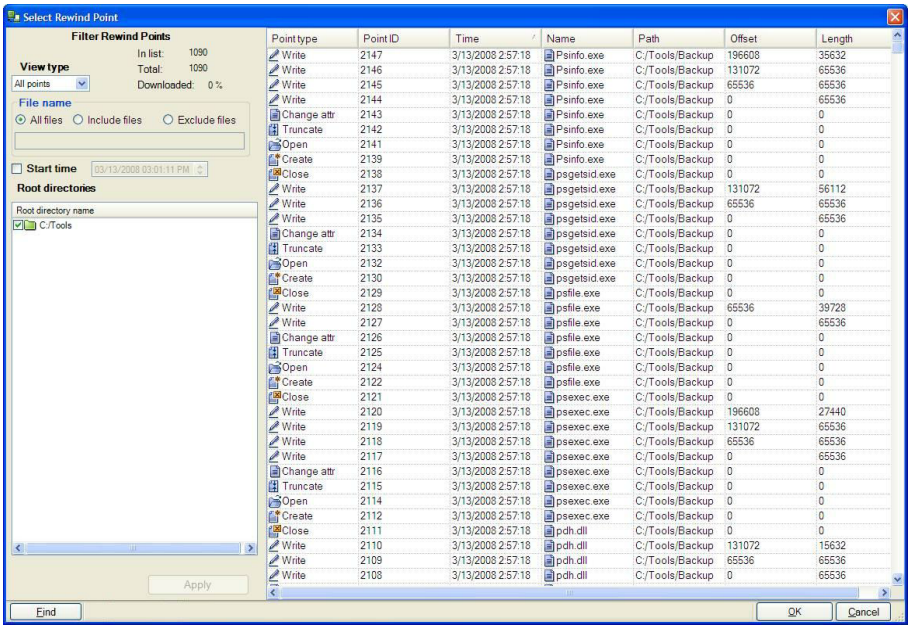
   After you select a Rewind data option, a Recovery scenario is automatically created. This Recovery scenario will run until the end of the rewind process.

6. Click **Next**. The **Rewind Point Selection** page is displayed:



7. Wait until the **Select Rewind Point** button is enabled, and click it to view the existing rewind points.

The **Select Rewind Point** dialog appears:



The **Select Rewind Point** dialog displays a list of all rewind points. These include modifications of folders and files that were automatically registered by the system and user-defined bookmarks.

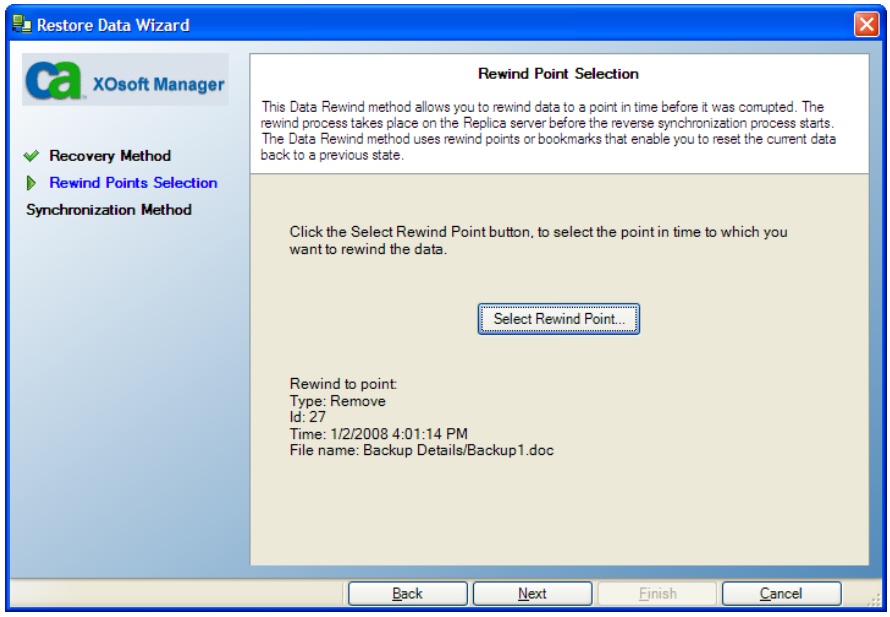
The list can be filtered according to the rewind point type or other criteria, using the **Filter Rewind Points** pane on the left.

Note: If the **Select Rewind Points** dialog is empty, make sure that the **Data Rewind** property is enabled.

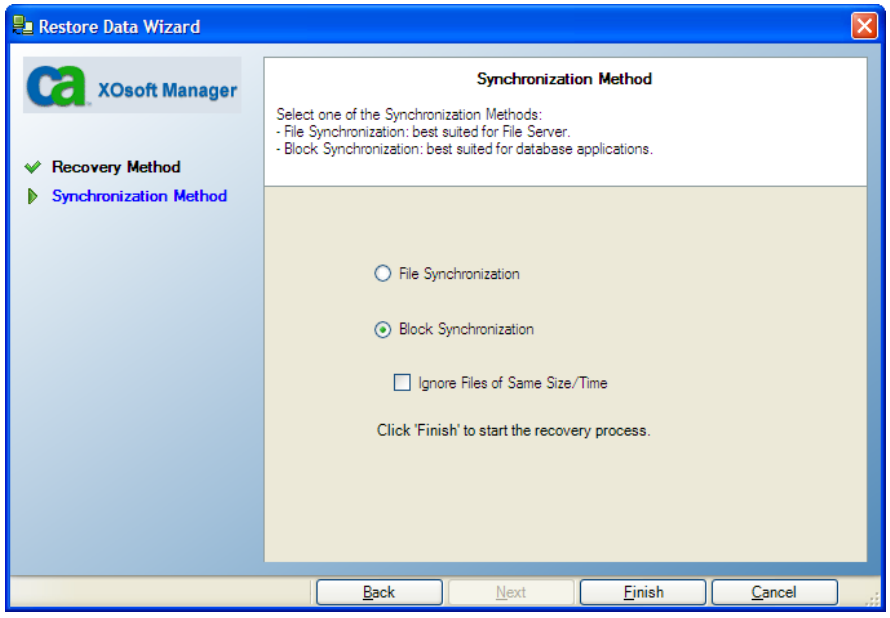
8. Select the required rewind point, and click **OK.**

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

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



9. Click **Next**. The **Synchronization Method** page is displayed:



10. Select the **Block Synchronization** method and click **Finish**.

    Note: If the user credentials you used to log in to the Manager are different than the ones required for working with the Engine on the Replica, a **User credentials** dialog appears, asking you to enter log on account details for the selected Replica.

    CA XOsoft rewinds the data to the point you selected. After the rewind process ends, you receive the following message in the Event pane: **Rewind process is completed successfully**.

    If you chose to replace the data on the Master with the data on the Replica, CA XOsoft starts a synchronization process from the Replica to the Master. Once the process ends, the temporary Recovery scenario is stopped and then deleted.

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

CA XOsoft Report Center

Report Center Home Page

CA XOsoft High Availability

SYNCHRONIZATION REPORT

Synchronization mode	BlockSynchronization (include files with the same size and modification time)
Scenario	Scenario001
Master host	XORWSECN2K7-2(1)
Replica host	XORWSECN2K7-1(2)
Scenario start time	07-Dec-08 22:23:31
Report start time	07-Dec-08 22:23:41
Report finish time	07-Dec-08 22:29:48

Summary:

Total number of files modified	154
Total number of bytes changed	171.7MB

Now, the Replication process can restart on the original scenario.

Appendix A: Additional Information and Tips

This section contains the following topics:

Spool Directory Settings

The CA XOsoft spool is a folder on disk where data to be replicated is backed up (spooled) if bandwidth is not sufficient to transfer the amount of changes in real-time. Data can spool due to temporary network disconnections, network congestion, or simply because the network bandwidth is not sufficient to transfer the amount of data changing over on the server. In addition to storing changes waiting on available bandwidth, spool space is also used as part of the normal synchronization process. Thus, some spool build up during synchronization is normal.

Place the CA XOsoft spool folder on a drive with relatively low use such as a dedicated volume or boot/system volume. Do not place the spool folder on a volume containing frequently accessed system (OS), user, or application data. Examples include volumes containing databases, shared files, or the system pagefile. By default, the spool folder is located in the tmp folder under the CA XOsoft installation directory. 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. For example, if you are replicating 50 GB of data on a server you should ensure that at least 5 GB of space is available for spool. Please note that this space is not pre-allocated.

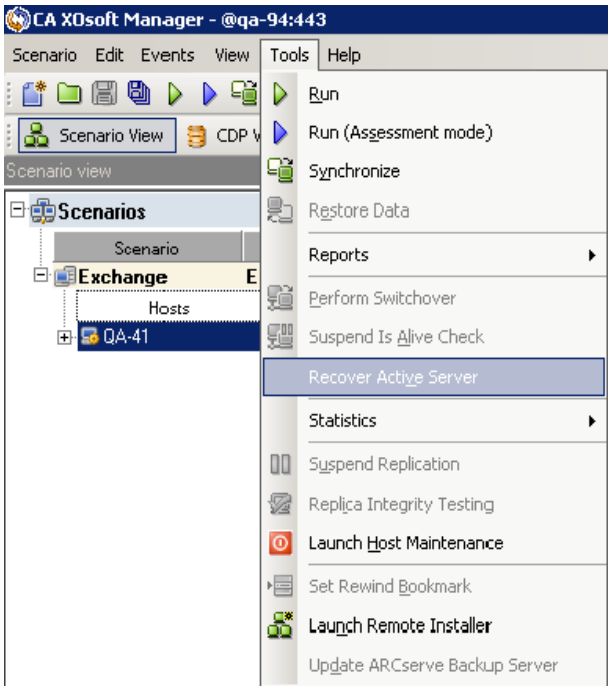
Important! If you change the spool location, please remember to remove the new path from file level antivirus scans: both scheduled and real time.

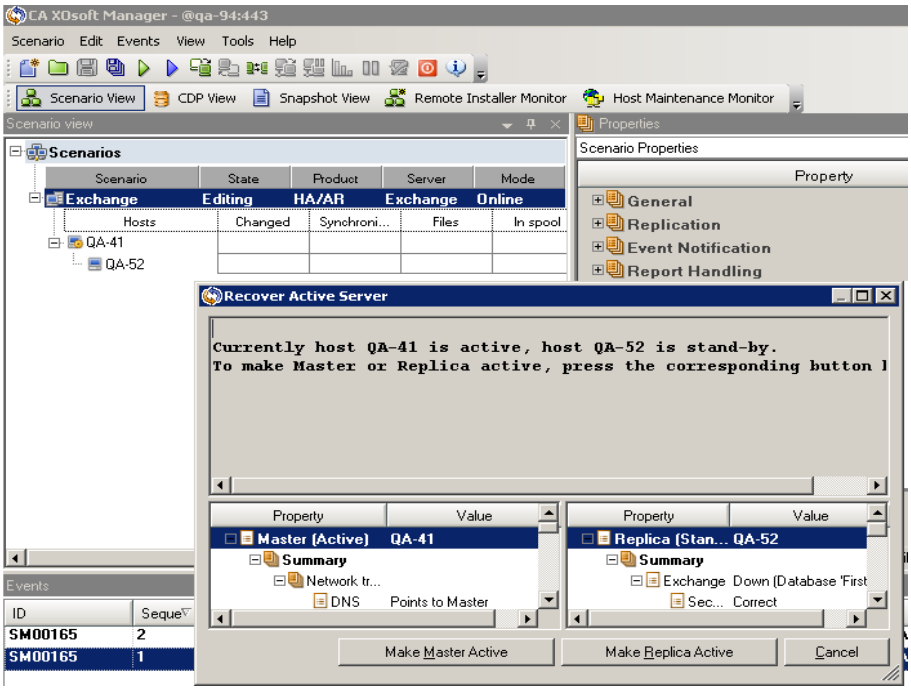
Note: The CA XOsoft Spool Directory is not a pre-allocated space folder and will be used only if needed.

Recover Active Server

In certain circumstances, it may be necessary to forcibly make the master or replica server the active server without completing the data synchronization process. For example, if switchover occurred but no data was changed on the replica server. In this case you may even have newer data on the master server making it undesirable to synchronize data from the replica to the master server. CA XOsoft allows for this option through a process called Recover Active Server. To use this option, ensure that the scenario is stopped, and select *Recover Active* Server from the Tools menu.

Important! While this option is the right choice in many situations, use it with caution. If used improperly data loss can occur. Normally CA XOsoft HA will not allow switchover from one host to another until all data is synchronized. It is designed this way so users are not redirected to an out of date data set that then overwrites what may be a more current data set. When using Recover Active Server, CA XOsoft HA is forcing users to one server or the other with no regard as to which server has the correct data set. Thus, as an administrator, you must manually ensure that the server you are making active has the most up to date data set.





Select either *Make Master Active* or *Make Replica Active* depending onto which server you want to force the active role.

Important! If a legitimate switchover in a disaster situation occurs and users are redirected to the Replica server for any period of time, it is important to replicate all changes on the Replica back to the Master before making the master server active. Using *Recover Active Server* in such a situation results in loss of data.

Recovering Servers

CA XOsoft can detect when a Replica server is now active and runs the recovery process automatically. If recovery does not complete correctly for some reason, do the following:

- First, perform the Recover Active Server procedure. For more information, refer to the topic, Recover Active Server.
- If the Recover Active Server procedure does not resolve the issue, try manually removing the IP address. For more information, refer to the topic, Manually Recover a Failed Server when IP Redirection (see page 92) is used.

Manually Recover a Failed Server - Move IP Address

To recover a failed server when Move IP redirection is used

1. Boot the Master server without a network connection, to avoid IP conficts.
2. From the TCP/IP properties dialog, remove the additional IP address.
3. Reboot the server and reconnect to the network.
4. If it is not already running, start the scenario from the CA XOsoft Manager. If automatic reverse replication was set to On, the scenario runs in backward mode so that the Replica server is now active and the Master server is on standby.
5. Wait for synchronization to complete.
6. Perform a manual switchover to return the active role to the Master server. It is recommended that you do so outside of normal business hours.

Handling Security Principal Names

During a DNS or Move IP redirection, the Security Principal Names (SPN) are moved from the Master server to the Replica server. The following list shows the SPNs on an example server named Exchange PRD1, on domain XOlab.com:

SPN	Example SPN
ExchangeMDB/<Master FQDN>	ExchangeMDB/ExchangePRD1.XOlab.ca .com
ExchangeMDB/<Master NetBios>	ExchangeMDB/ExchangePRD1
ExchangeRFR/<Master FQDN>	ExchangeRFR/ExchangePRD1.XOlab.co m
ExchangeRFR/<Master NetBios>	ExchangeRFR/ExchangePRD1
SMTPSVC/<Master FQDN>	SMTPSVC/ExchangeRPD1.XOlab.com
SMTPSVC/<Master NetBios>	SMTPSVC/ExchangePRD1

The Security Principal Names are found on the Computer Object in the Active Directory. When a switchover occurs, CA XOsoft removes these SPNs from the Master server's Computer Object and adds them to the Replica server's Computer Object. When the Replica server is active, you can see SPNs for both Master and Replica servers on the Replica server's Computer Object.

Example

If a Replica server is called ExchangeDR1 in the same XOlab.com domain, and this Replica is active, the following SPNs are listed in the Replica's Computer Object:

- ExchangeMDB/ExchangePRD1.XOlab.com
- ExchangeMDB/ExchangePRD1
- ExchangeRFR/ExchangePRD1.XOlab.com
- ExchangeRFR/ExchangePRD1
- SMTPSVC/ExchangePRD1.XOlab.com
- SMTPSVC/ExchangePRD1
- ExchangeMDB/ExchangeDR1.XOlab.com
- ExchangeMDB/ExchangeDR1
- ExchangeRFR/ExchangeDR1.XOlab.com
- ExchangeRFR/ExchangeDR1
- SMTPSVC/ExchangeDR1.XOlab.com
- SMTPSVC/ExchangeDR1

Determinig the SPN on a Server

When switchback to the Master occurs, the Master Exchange SPNs are removed from the Replica Computer Object and added back to the Master Computer Object in Active Directory again.

To determine the SPNs on a server

1. Log on to the Master server.
2. Open a command prompt.
3. Type the following command and press Enter: setspn -L <Master>
4. Run the same command referencing the replica: setspn -L <Replica>

   When this command runs, the domain controller that the host is bound to is the domain controller that is queried and returns the command results.
5. Run the SET command on both the Master and Replica servers to determine the domain controller bound to the each: SET LOGONSERVER
6. Repeat the setspn -L command on both Master and Replica.

   The commands should return the same results. If the commands return different results, there is a domain controller replication issue. When a scenario is started, CA XOsoft queries the Active Directory. The Engine service executes the same commands on both servers and compares the results. The Engine on the Master queries the domain controller to which the Master is bound, while the Engine on the Replica queries the domain controller to which the Replica is bound.

When an error such as "Security Attributes are Incorrect" or "Security Attributes are Inconsistent" occurs, this means that the SPNs are either incorrect based on which server is determined to be active, or the results of the query are different from both domain controllers.

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