CA XOsoft™ High Availability for Windows

BlackBerry Enterprise 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

Documentation Changes

The following documentation updates have been made since the last release of this documentation:

- About BlackBerry Enterprise Server (see page 10)—Describes the architectural changes made to the BES product since the CA XOsoft HA v4.
- The BlackBerry HA Solution (see page 11) -- Introduces the two main methods of making BES highly available, given changes made to the product configuration since 4.1 SP2.
- Base Configurations (see page 13) -- Provides the information necessary to install BES on the same machine running the database, or on a separate machine.
- Setting up the CA XOsoft HA Servers (see page 19) - Presents the two main methods of configuring BlackBerry Enterprise Server for use with CA XOsoft HA.
- Installation for Same Machine Configurations (see page 19) -- Introduces the procedures for setting up the Master BES Server on the same machine as the database
- Installation for Separate Machine Configurations (see page 24) -- Introduces the procedures for setting up the Master BES Server and database on different machines.
- Install BES on the Master Without MDS (see page 20) -- Explains the procedure for setting up the Master BES Server on the same machine as the database, without the BlackBerry MDS component.
- Install BES on the Master With MDS (see page 22) -- Explains the procedure for setting up the Master BES Server on the same machine as the database, with the BlackBerry MDS component.
- Install BES On the Master Without MDS (see page 25) -- This new topic explains the procedure for setting up the Master BES Server and database on different machines, without the BlackBerry MDS component.
- Install BES on the Master With MDS (see page 28) -- Explains the procedure for setting up the Master BES Server and database on different machines, with the BlackBerry MDS component.
- Install and Configure the Replica BlackBerry Server (see page 32) -- Includes changes made to the BES product configuration.
- The Replica BES Server Data Source (ODBC) Configuration (see page 34) -- Includes changes made to the BES product configuration.

- Redirection Methods (see page 37) -- Presents a group of topics excerpted from the CA XOsoft User Guide for your convenience, and updated to reflect changes to the product as well as recommendations appropriate to this Operation Guide.
- Creating and Using Scenarios (see page 41) -- Provides specific instructions for making BES highly available. There are now two ways to create scenarios - SQL and File Server. There are also user-defined script settings described in the topic, Configure Additional BlackBerry HA Scenario Settings.
- Recovering Data (see page 79) -- Presents a group of topics excerpted from the CA XOsoft User Guide for your convenience.
- Switchover and Switchback (see page 70) -- Presents a group of topics excerpted from the CA XOsoft User Guide for your convenience and also provides information specific to BES scenarios.
- Additional Information and Tips (see page 91) -- Provides help for solving problems with BES scenario creation or the included script.

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 BlackBerry Enterprise Server

BlackBerry Enterprise Server (BES) is becoming a critical component of the enterprise communications infrastructure in support of mobile productivity. CA XOsoft HA for BlackBerry Enterprise Server (BES) is a customized solution for BlackBerry high availability (HA) using script-enhanced SQL or File Server switchover solutions with asynchronous real-time replication and automated server switchover and switchback to provide cost-effective business continuity for BlackBerry Server on both 32- and 64-bit Windows servers as well as MSCS clusters.

With version 4.1 SP5, the BlackBerry Enterprise Server architecture changed significantly as compared to earlier service packs. These changes include new services (MDS Integration Service), changes to existing services (MDS Connection Service), changes in how BES queries the SQL database, and on what host the BES database runs.

The CA XOsoft HA installation procedure varies depending on whether you have the BlackBerry MDS Integration Service installed, so make sure you follow the proper procedure and understand it thoroughly before you begin.

About This Guide

This document describes how to implement CA XOsoft HA solutions for BlackBerry Enterprise Server. Please review each procedure before you begin. It is essential that you have the appropriate resources and permissions to carry out the tasks that apply to your particular configuration.

This guide covers BES All in One and Front End (distributed) Configurations using CA XOsoft for Applications and CA XOsoft HA File Server scenarios enhanced by the provided BlackBerry HA script. Standard SQL HA scenarios (for protecting Back-End Configurations) are not covered in this Guide. This Guide also does not cover e-mail server high availability. High availability for those servers is covered under their own scenarios and documented in separate Operation Guides.

Related Documentation

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

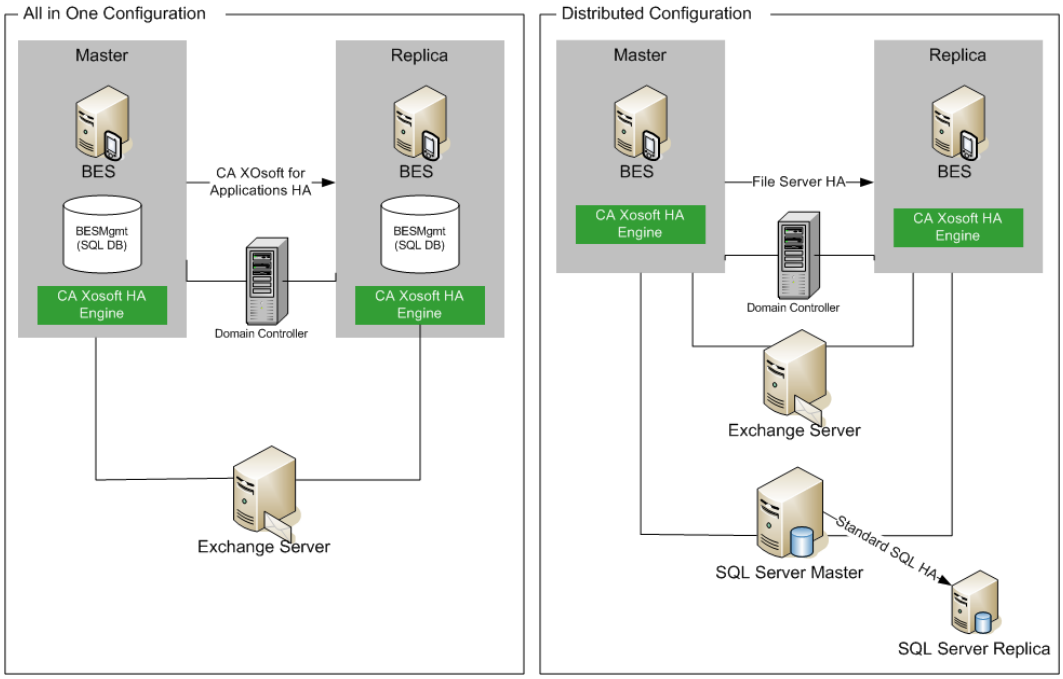
The BlackBerry HA Solution

As most BlackBerry administrators are well aware, configuration information regarding BES is stored almost entirely in the configuration database. This information is critical for proper BES operation, and is also relied upon by CA XOsoft HA for a successful switchover. The configuration database could be installed on the same machine as BES or on a different machine, depending on the needs of your environment.

Local or same machine installation creates a dependency between SQL and BES, establishing a platform that is tied together and, in regards to high availability, managed together with CA XOsoft HA for Applications. For this reason, we refer to this solution as All in One Configuration.

If the SQL database is installed on a different machine (distributed configuration), you can combine multiple HA scenarios to decide how much protection to implement:

- **Front-End Configuration**--Create File Server HA scenarios modified to use the provided BlackBerry HA script to protect BES in environments where the separate SQL database is already protected.
- **Back-End Configuration**--Create standard SQL Server HA scenarios to protect the SQL server separately from BES. See the CA XOsoft HA SQL Operation Guide for more information.



In an environment with two production BES servers and one separate SQL server, you would be required to create three HA scenarios to protect all six servers participating in the scenarios.

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

BlackBerry Enterprise Server can be configured in two basic ways:

- **All in One Configuration** -- Both BES and database (MSDE or SQL) are running on the same machine (Master server). In an All in One Configuration, you need:
  - 1 Exchange Server
  - 2 Windows Servers (Master and Replica)
  - 1 Domain Controller
- **Distributed Configuration** -- BES and SQL are running on different machines (two Master servers). In a Distributed Configuration, you need:
  - 1 Exchange Server
  - 2 Windows Servers (Master and Replica)
  - 1 SQL Server (If desired, this machine can be protected separately in a back-end SQL scenario. See the CA XOsoft HA SQL Operation Guide for more information.)
  - 1 Domain Controller

Install the CA XOsoft Engine on all servers participating in HA scenarios.

The following conditions also apply:

- The two Windows servers should be 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 server to be protected is **not** a domain controller or DNS server.
- The Exchange System Manager is installed on both Windows Servers prior to installing CA XOsoft.

For SQL 2000, 2005 or MSDE in Same Machine Configuration:

- Ensure you have installed a SQL instance on both servers (Master and Replica).
- Ensure both servers have the same SQL version, service packs and hot fixes installed.
- Ensure both servers hold identical SQL Server instances, such as "default" or "named".
- Ensure both servers reside in the same Active Directory forest and are members of the same domain or trusted domains.

- Ensure the drive letters containing database files are identical on both servers.
- Ensure the full path to the default system database of each instance is identical on both servers.
- Verify that the port defined in the Network Configuration TCP/IP properties of the SQL instance(s) is assigned statically and is identical on both servers.

Important! Install BES ONLY on the production server prior to installing CA XOsoft. If you have already installed BES on the server you intend to use as the Replica, uninstall BES before proceeding.

BlackBerry HA Script

The script referenced by this Operation Guide must be present on both SQL servers (or on all nodes, for SQL MSCS clusters) at the same path. By default, this script is provided in all versions of CA XOsoft build 65 and above, and no additional action is required. The default location is C:\Program Files\CA\XOsoft\Engine\BBha.vbs. Contact Tech Support if the script is not present.

The BlackBerry HA script controls and monitors BES services via RPC communication ports so make sure all required RPC communication ports are open between the SQL servers and all protected BES servers.

BlackBerry Configuration Database

The BES configuration database (BESMgmt) contains all the BES configuration information. The CA XOsoft HA solution for BlackBerry protects and utilizes this database in order to provide BlackBerry high availability. If you use your current BES SQL instance (the one hosting BESMgmt) for any applications other than BES and still wish to provide BES high availability, you must move the BES configuration database to a new dedicated SQL instance. It can be on the same, or a different, server but must be a new dedicated SQL instance just for the BES configuration database. Once installed as a new named instance, CA XOsoft HA can be configured to protect only this instance, without affecting other SQL instances or CA XOsoft HA scenarios running on the server (BES Servers can be switched over without also disrupting service to other SQL databases or instances on the server). For more information, please review *Independent BlackBerry SQL Instance*.

To move the BlackBerry configuration database, please follow the official instructions provided on the RIM Technical Support website at http://na.blackberry.com/eng/support: *How To Move the BlackBerry Configuration Database from one server to another*; Article Number: KB-03112.

This operation requires a brief restart for some BES services, so it is recommended that this procedure is performed alongside the BES server configuration to reduce the total amount of downtime required.

When you edit the configuration file, ensure you change 'SERVER' to the new SQL instance dedicated to the configuration database. For example, suppose your new dedicated SQL instance is called 'xobessql' and is on a server called 'xooperations.' The configuration file should be modified as follows:

Example

```
; Name of Server to install the db
; Local machine can be specified as local
;
SERVER=xooperations\xobessql
```

After moving the BESMgmt database (finishing the above referenced KB) to the new server, you must restart the BlackBerry Manager before it will reconnect if it was open during the move process.

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 MSDE

While this Operation Guide refers to a full-featured SQL Server as the underlying database infrastructure, BES also supports working with a local MSDE installation by default. If this is the case with your configuration, simply regard all SQL references as MSDE references.

Servers Operating in a Workgroup

For servers in a workgroup, set the CA XOsoft Engine service account to Local System (unless you have added any custom scripts that require higher level permissions). Servers in a workgroup can use Redirect DNS only with DNS servers that allow non-secure updates. You can use Move IP, switch computer name, and custom redirection scripts normally.

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.

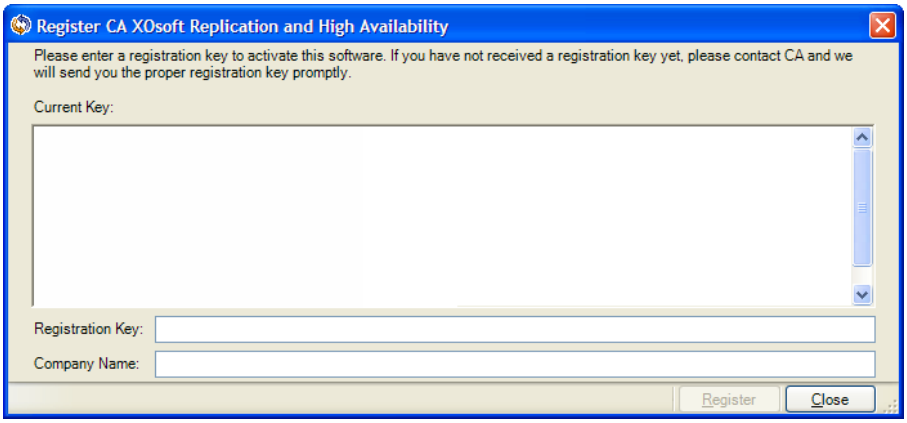
When you are creating a scenario, some of the options might be disabled following the terms of your license. However, you can create as many scenarios as you wish, since the validity of your license key is first checked when you try to run a specific scenario. Only when you click the **Run** button, 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: Setting up the CA XOsoft HA Servers

This section describes how to set up a BlackBerry Enterprise Server for use with CA XOsoft HA.

You can install BlackBerry Enterprise Server on the same machine as SQL Server or MSDE (All in One Configuration), or on a different machine (Distributed Configuration). Note that CA XOsoft HA supports both configurations, but additional modifications are required on the SQL server in a distributed configuration.

Further, the installation procedures vary if you are running BES with or without MDS Integration Service. This service is required only if you wish to run enterprise applications on BlackBerry devices. Installing this service also installs the BlackBerry MDS Application Repository on the database server machine.

This section contains the following topics:

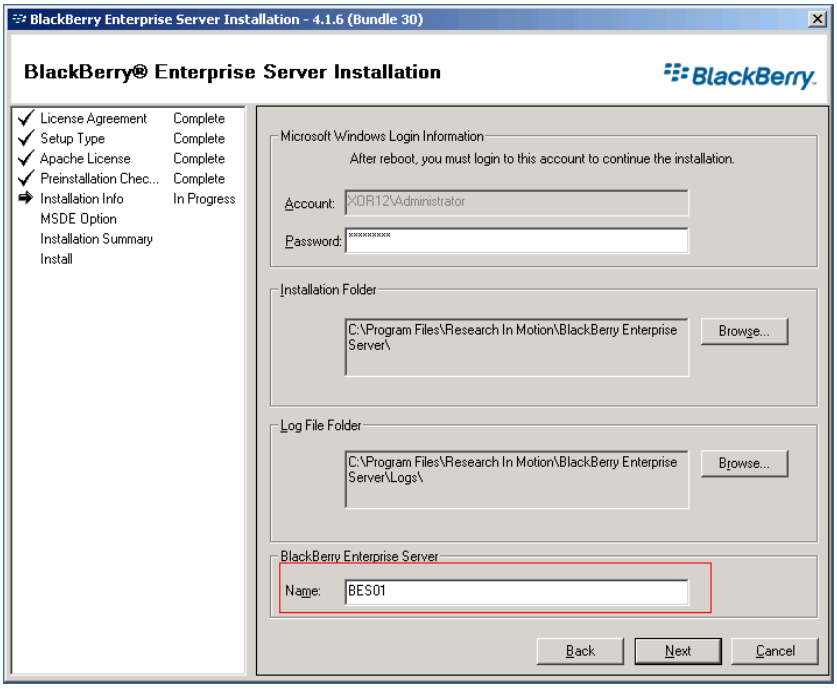
Installation for All in One Configurations

The following topics describe the procedures for setting up the Master server in BlackBerry Enterprise Server environments in which the database is installed on the same machine as BES.

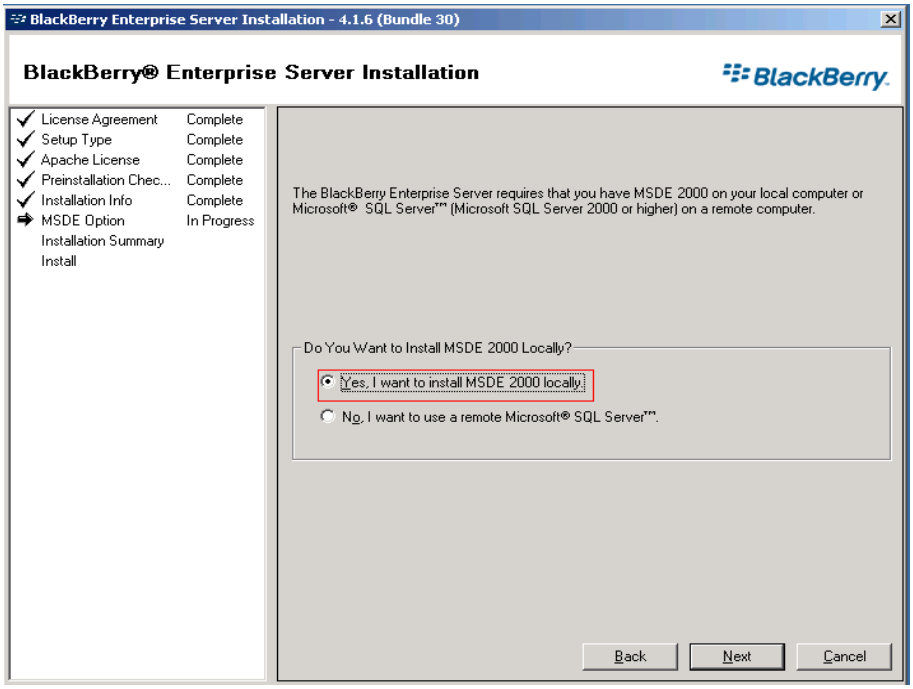
Install BES on the Master without MDS-All in One Config

To install BES without MDS

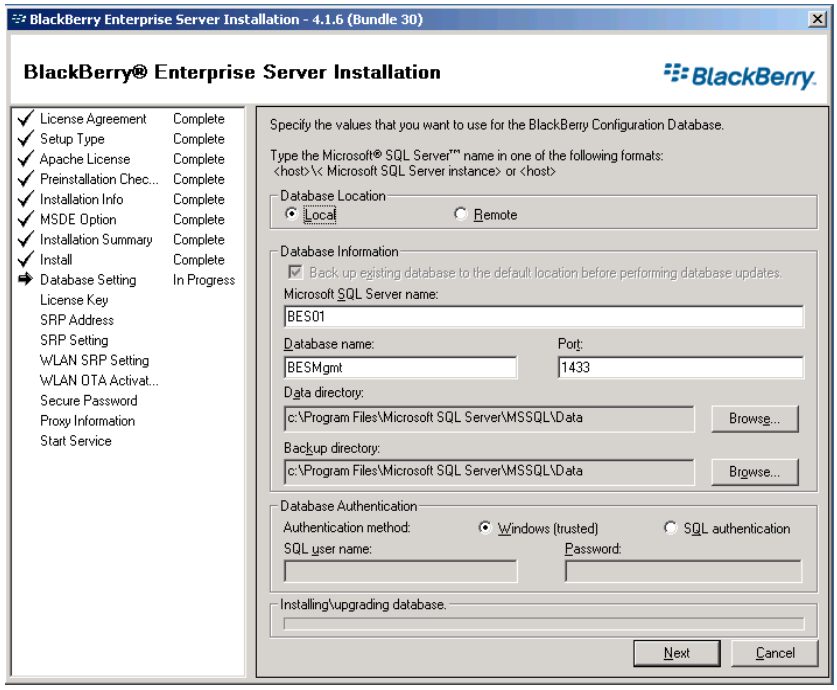
1. Select the BlackBerry Enterprise Server option from the Installation dialog and click Next. This option installs all BES components except MDS Integration Service.
2. Enter the name of the Master BES Server in the BlackBerry Enterprise Server name field and click Next.



3. Select local install option and click Next.



4. Reboot the machine, when prompted. After the machine reboots, configure the BES database.



5. When you are prompted to create the BES database, click Yes.
6. Provide the CAL Key, SRP ID and SRP Key.

   Note: This information must be the same on both Master and Replica.

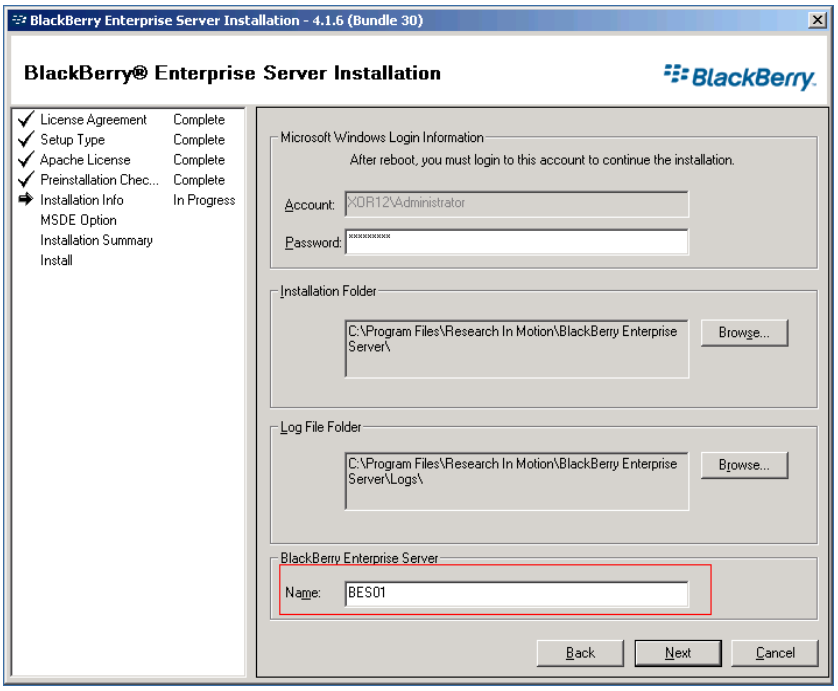
You must also provide a Microsoft Exchange User with Send as/Receive as rights within the Exchange organization. See the BlackBerry Enterprise Server User Guide for more information.

Start Services. Open the BlackBerry Manager and verify the BlackBerry name used. This must be the same name used on the Replica installation.

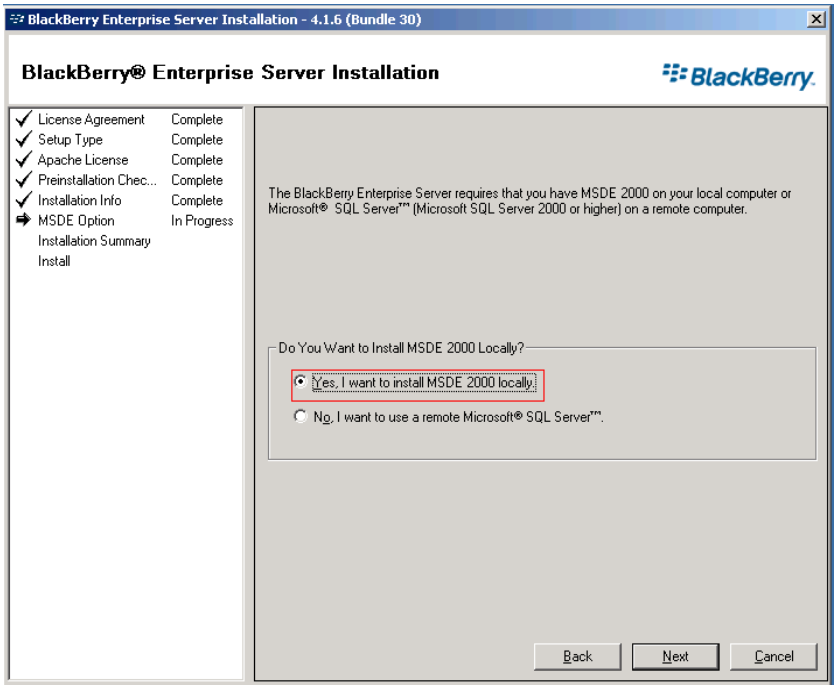
Install BES on the Master with MDS-in All in One Configuration

To install BES on the Master with MDS

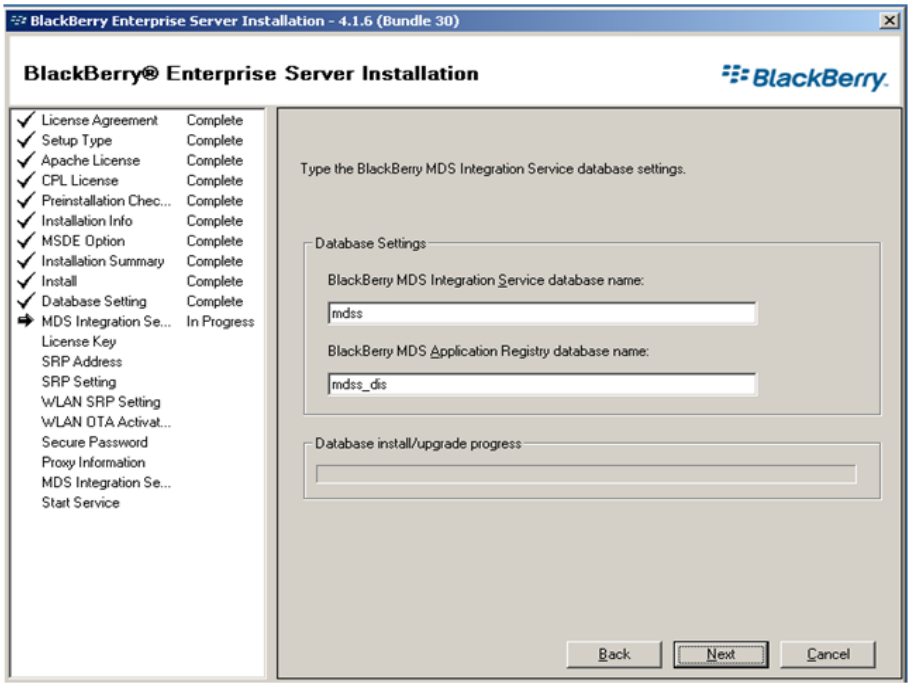
1. Select the BlackBerry Enterprise Server with MDS Integration option from the Installation dialog and click Next. This option installs all BES components including the MDS Integration Service.
2. Enter the name of the Master BES Server in the BlackBerry Enterprise Server name field and click Next. Make sure you note the name used here.



3. Select local install option and click Next.



4. Reboot the machine, when prompted. After the machine reboots, configure the BES database.
5. When you are prompted to create the BES database, click Yes.
6. Provide the BlackBerry MDS Integration Service database settings:



7. When you are prompted to create the MDS database, click Yes.
8. When you are prompted to create the Application Registry database, click Yes.
9. Provide the CAL Key, SRP ID and SRP Key.

   Note: This information must be the same on both Master and Replica.

You must also provide a Microsoft Exchange User with Send as/Receive as rights within the Exchange organization. See the BlackBerry Enterprise Server User Guide for more information.

Start Services. Open the BlackBerry Manager and verify the BlackBerry name used. This must be the same name used on the Replica installation.

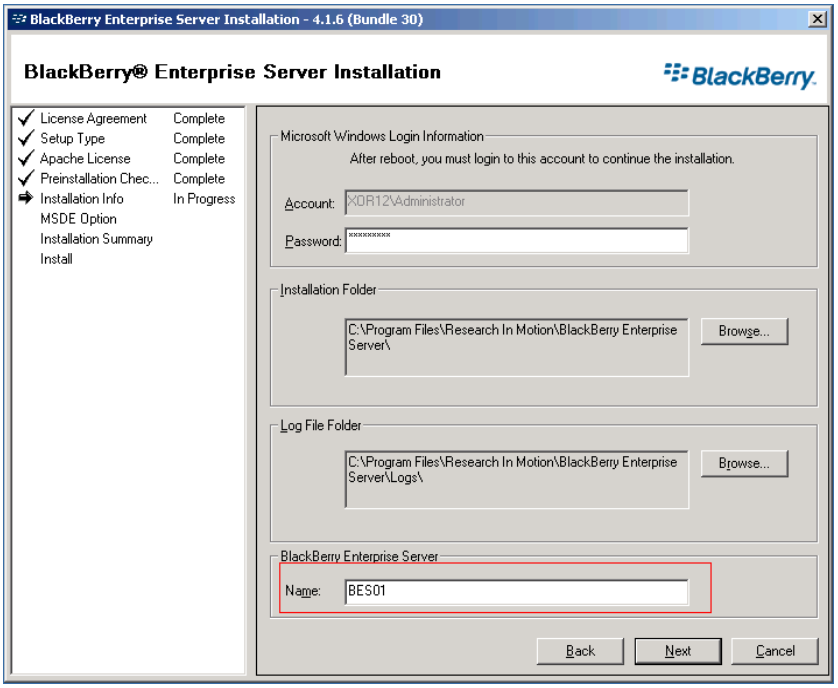
Installation for Distributed Configurations

The following topics describe the procedures for setting up the Master server in BlackBerry Enterprise Server environments in which the database and BES are installed on separate machines.

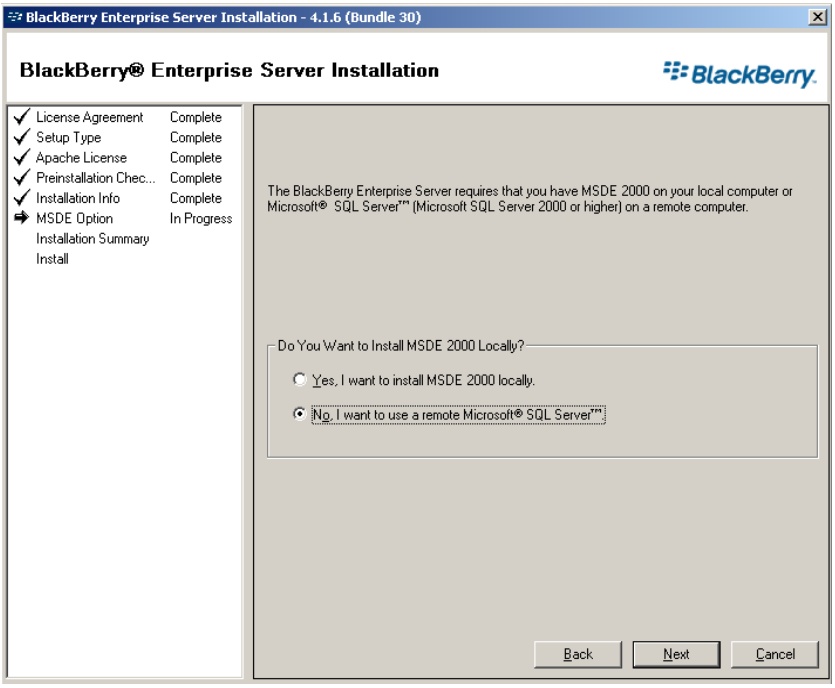
Install BES on the Master without MDS-Distributed Configuration

To install BES without MDS

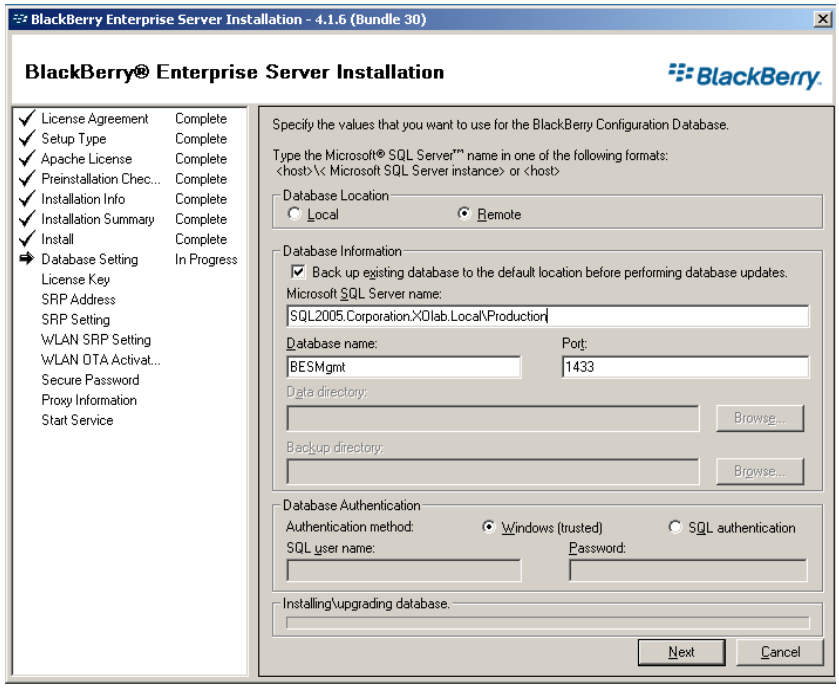
1. Select the BlackBerry Enterprise Server option from the Installation dialog and click Next. This option installs all BES components except MDS Integration Service.
2. Enter the name of the Master BES Server in the BlackBerry Enterprise Server name field and click Next. Note the name you enter here for later.



3. Select "No, I want to use a remote Microsoft SQL Server" and click Next.



4. Reboot the machine, when prompted. After the machine reboots, configure the BES database.
   a. Click Start, Administrative Tools, Data Source (ODBC).
   b. Choose the System DSN tab and click Add.
   c. When prompted to provide a name for the data source, make sure you use the SQLFQDN\Instance.
   d. Ensure this instance connects to the Master database.
   e. Verify successful connection and continue installation.



5. When you are prompted to create the BES database, click Yes.
6. Provide the CAL Key, SRP ID and SRP Key.

   Note: This information must be the same on both Master and Replica.

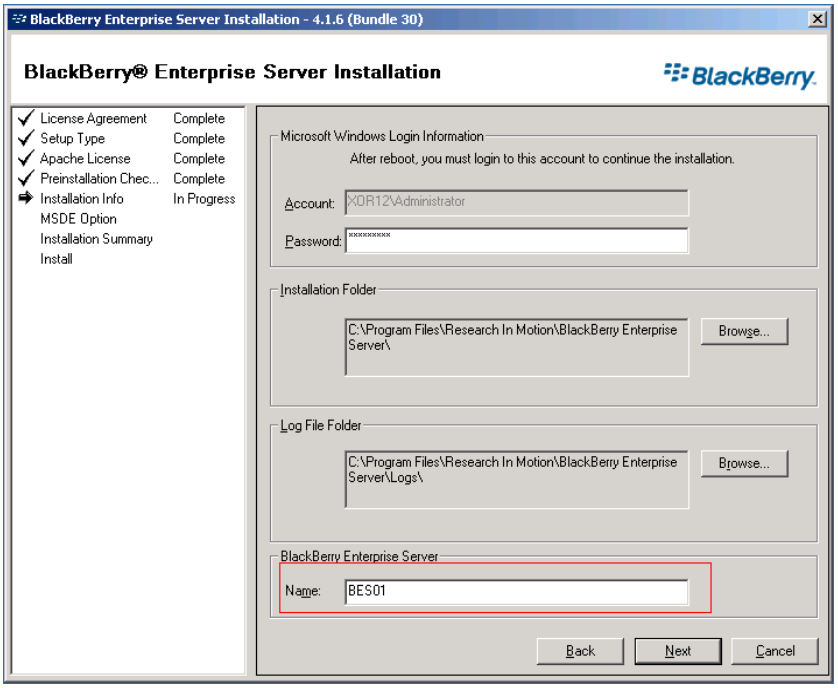
You must also provide a Microsoft Exchange User with Send as/Receive as rights within the Exchange organization. See the BlackBerry Enterprise Server User Guide for more information.

Start Services. Open the BlackBerry Manager and verify the BlackBerry name used. You must use the same name on the Replica installation.

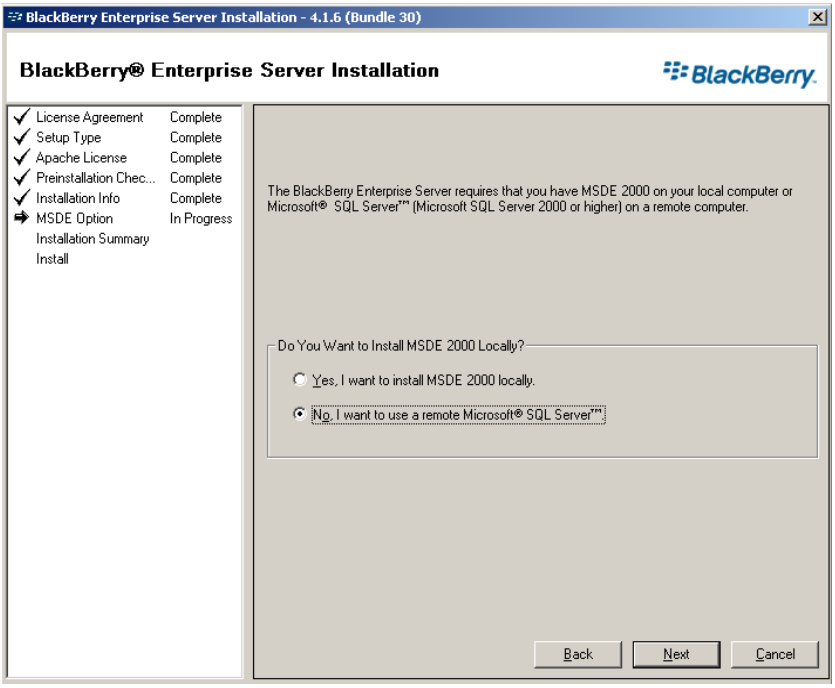
Install BES on the Master with MDS-in Distributed Configuration

To install BES with MDS

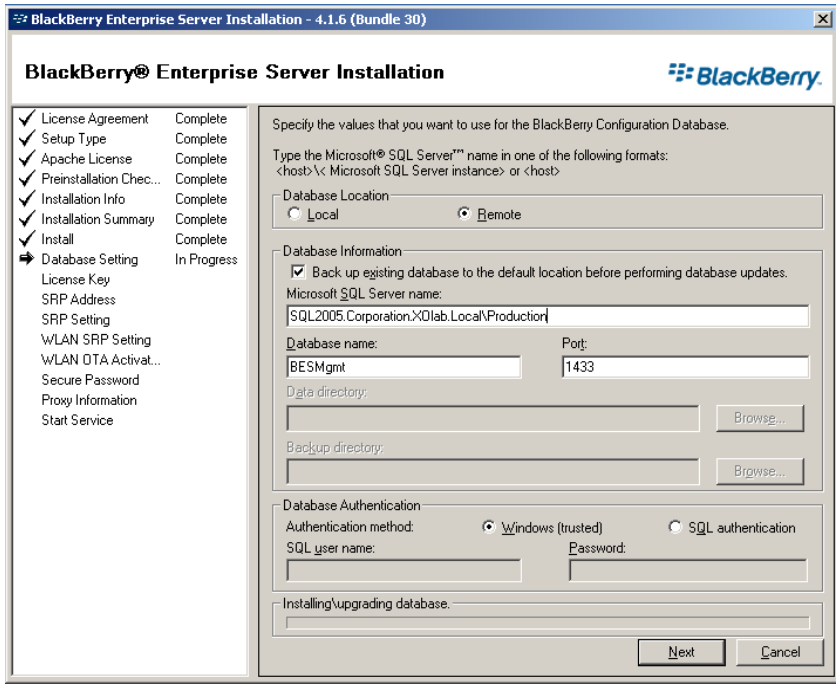
1. Select the BlackBerry Enterprise Server with MDS Integration option from the Installation dialog and click Next. This option installs all BES components including the MDS Integration Service.
2. Enter the name of the Master BES Server in the BlackBerry Enterprise Server name field and click Next. Note the name you enter here for later.



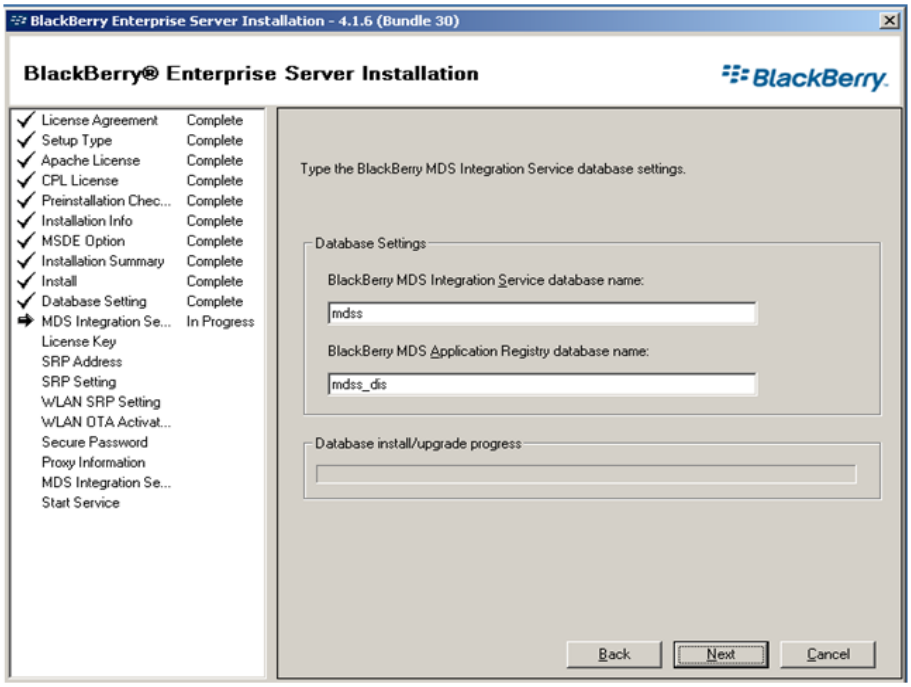
3. Select "No, I want to use a remote Microsoft SQL Server" and click Next.



4. Reboot the machine, when prompted. After the machine reboots, configure the BES database.
   a. Click Start, Administrative Tools, Data Source (ODBC).
   b. Choose the System DSN tab and click Add.
   c. When prompted to provide a name for the data source, make sure you use the SQLFQDN\Instance.
   d. Ensure this instance connects to the Master database.
   e. Verify successful connection and continue installation.



5. When you are prompted to create the BES database, click Yes.
6. Provide the MDS Integration Service database settings:



7. When prompted to create the MDS Integration database, click Yes.
8. When prompted to create the MDS Application Registry database, click Yes.
9. Provide the CAL Key, SRP ID and SRP Key.

   Note: This information must be the same on both Master and Replica.

You must also provide a Microsoft Exchange User with Send as/Receive as rights within the Exchange organization. See the BlackBerry Enterprise Server User Guide for more information.

Start Services. Open the BlackBerry Manager and verify the BlackBerry name used. You must use the same name on the Replica installation.

Install and Configure the Replica BlackBerry Server

Once the Master BES server is configured and ready, you are ready to install the Replica BES server. The procedure for setting up the Replica server is nearly identical for All in One and Distributed Configurations; the difference is marked.

Please consider the following information when installing this server.

Important! Before starting the installation, stop the BES services on the Master BES server (for this server pair), and set them to 'manual'. This is done in order to avoid SRP Key conflicts (see *SRP Connection Errors*). Both Master and Replica BES services cannot be online simultaneously at any time.

You will also be directed to rename the Master server. For clarity, suppose the names of the server pair are BlackBerry1 (Master) and BlackBerry2 (Replica).

To configure the replica server

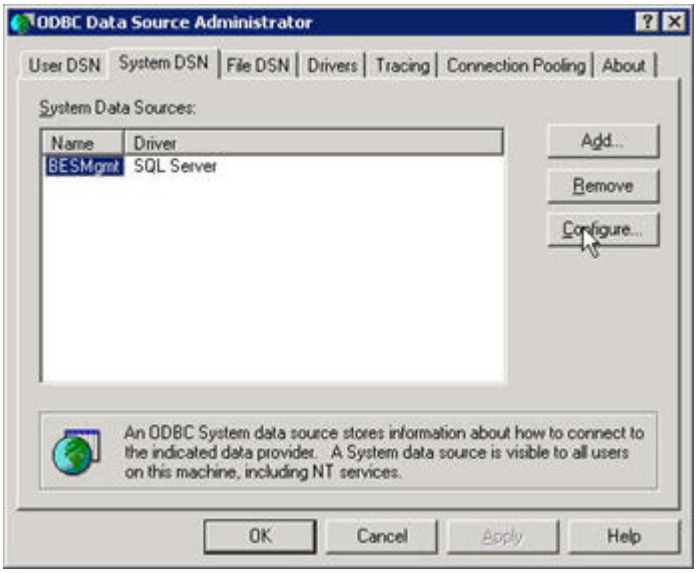
1. Change all BES services running on the Master server to Manual Startup mode.
2. Rename the Master server to <MasterHostname>-XO and reboot. For example, if the Master server is named BlackBerry1, rename it to BlackBerry1-XO and reboot.
3. Rename the Replica server to the original Master Hostname (without the -XO suffix) and reboot. Using the example in the previous step, rename the Replica to BlackBerry1.
4. Install BES 4.1 software on the Replica server, ensuring the following:
   - Use the same BlackBerry server name used for the Master server
   - (For Distributed Configuration only) Create the ODBC connection. For more information, refer to the topic, The Replica BES Server Data Source (ODBC) Configuration (see page 34).
   - Specify the same SQL server specified for the Master server. If the SQL server is installed locally to the Master, you must make sure you also install SQL on the Replica and choose local.
   - Use the same BES Cal Key, SRP ID and SRP Key used on the Master server
   - Verify all services started and that they can stop and start without issues
5. Change the services installed on the Replica server to Manual Startup mode.
6. Rename the Replica server to its original name (for example, BlackBerry2) and reboot.
7. Change the services installed on the Master server back to Automatic Startup mode.
8. Rename the Master server to its original name (for example, BlackBerry1) and reboot.
9. Validate that all services started properly and that BES is functioning correctly.

The Replica BES Server Data Source (ODBC) Configuration

If you are using a Distributed Configuration, you must perform the following procedure to ensure database connectivity in the context of CA XOsoft HA scenarios.

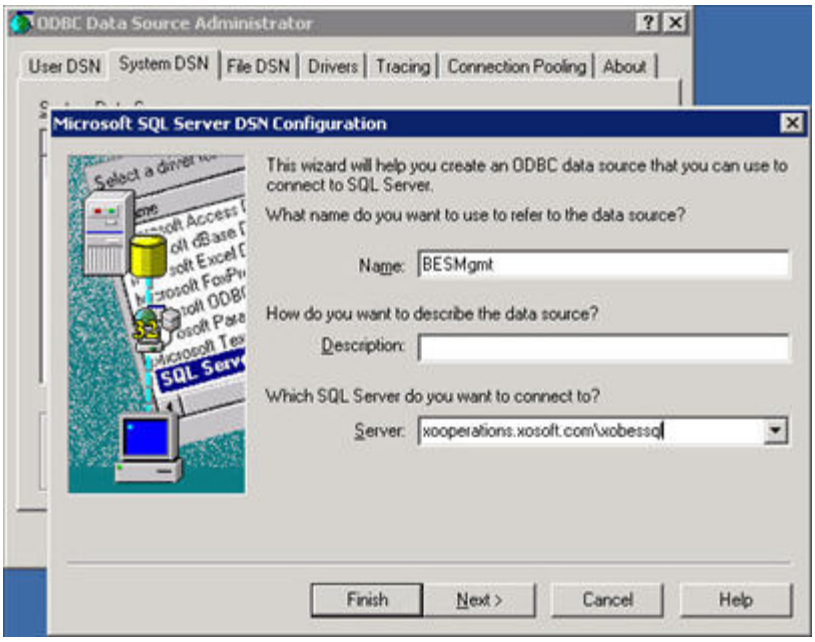
To use the replica BES server data source (ODBC) configuration

1. Click Start, Programs, Administrative Tools, Data Source (ODBC).
2. Choose the System DSN tab; highlight *BESMgmt* and click Configure.



3. In the server field, enter the full DNS name (FQDN) for your SQL server (and the named instance path if not installed as the default instance).

   Important! Remember to use the alternate SQL server record you created if you are following *Independent BlackBerry SQL Instance* (for example, bbdb.xosoft.com/xobessql).



4. Click Next and continue to test your connection; verify that it is successful.

Complete the Configuration

After you install BES on the Master and Replica servers, complete configuration by installing the CA XOsoft HA Engine on all servers, including the SQL Server pair, if using Distributed Configuration. A Domain Account is required for the permissions needed for switchover and monitoring services.

For more information, see the *CA XOsoft Installation Guide*.

Multiple BlackBerry Servers

If you are protecting multiple BES Servers, the previous procedures must be performed for all BES server pairs.

Chapter 3: 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 BlackBerry Enterprise 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.

Switch Computer Name Redirection

If you are redirecting File Shares, in which clients connect via the Master server name, enable switch computer name. For example, if the Master server name is fs01 and clients connect to \\fs01\sharename or \\fs01.domain.com\sharename, using the Switch computer name method redirects clients to the failover server.

It's also recommended to enable one other method as well. The most common method is to use both DNS Redirection and Switch Computer Name. CA XOsoft HA makes the required computer name switch by assigning a temporary name to the Master server and taking over its computer name for use with the Replica server.

CA XOsoft HA updates records directly and does not generally require a reboot. If, however, you encounter any problems after switchover, consider setting the reboot option to On and testing again.

Note: For Windows Server 2008 systems, you must reboot the machine after a switchover occurs when the switch computer name method is used. We recommend setting the Reboot After Switchover and Switchback property to On when using this method.

Important! This is the redirection method preferred for BlackBerry Enterprise Server scenarios.

Automatic Redirection Using Switch Computer Name

When possible during switchover, CA XOsoft HA renames the master host to *masterhostname-XO* and assigns its original name to the replica server. This step prevents name conflicts since the master's name is now assigned to the replica server. In this graceful case, if automatic reverse replication is set to on, CA XOsoft starts the backward scenario automatically. If automatic reverse replication is set to off, run the scenario again manually by selecting the Run button or choosing *Run* from the Tools menu. Once the backward scenario has run and synchronization is complete you can click the Perform Switchover button to switch back.

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.

For BlackBerry Enterprise Server, a custom script is required for both SQL and File Server scenario types. For more details, see the topic, Configure Additional BlackBerry HA Scenario Settings.

Chapter 4: Creating and Using Scenarios

The procedure for creating BES HA scenarios varies depending upon your configuration. For All in One Configurations, create a SQL Server scenario modified to use the provided BBha.vbs script. For Distributed Configurations, protect the BES front end using a File Server scenario modified to use the same script. (Back-end protection can be achieved using standard SQL HA scenarios.)

Before you begin, ensure the following:

- SQL servers and additional instances meet all specifications listed in the topic, The BlackBerry HA Solution (see page 11)
- You have added the required DNS Host (A) Record for the Master SQL server. This DNS record is used for all BES HA purposes related to the SQL database. It should have a unique name and must be a host (A) record type. CNAME alias records are not supported.
- You are using the additional DNS record and not the hostname when you set up the Blackberry server for all SQL configuration settings in BES and OBDC.
- You have the script required to run the scenario in the specified folder. For more information, see the topic, BlackBerry HA Script (see page 15).

Example

Suppose the real name of your SQL server is xooperations.xosoft.com. Add a new DNS Host (A) record named BBDB.xosoft.com. BBDB is the name you must specify in your SQL configuration settings and in the Switchover Properties step of the scenario creation process.

For more information, refer to the topic, Independent Blackberry SQL Instance. (see page 92)

Important! At the end of the scenario creation process, click Finish. Do not click Run Now. You must modify the scenario with the provided script at several locations in Scenario Properties. For more information, refer to Configure Additional BlackBerry HA Scenario Settings (see page 59).

This section contains the following topics:

Create CA XOsoft HA for Applications Scenarios

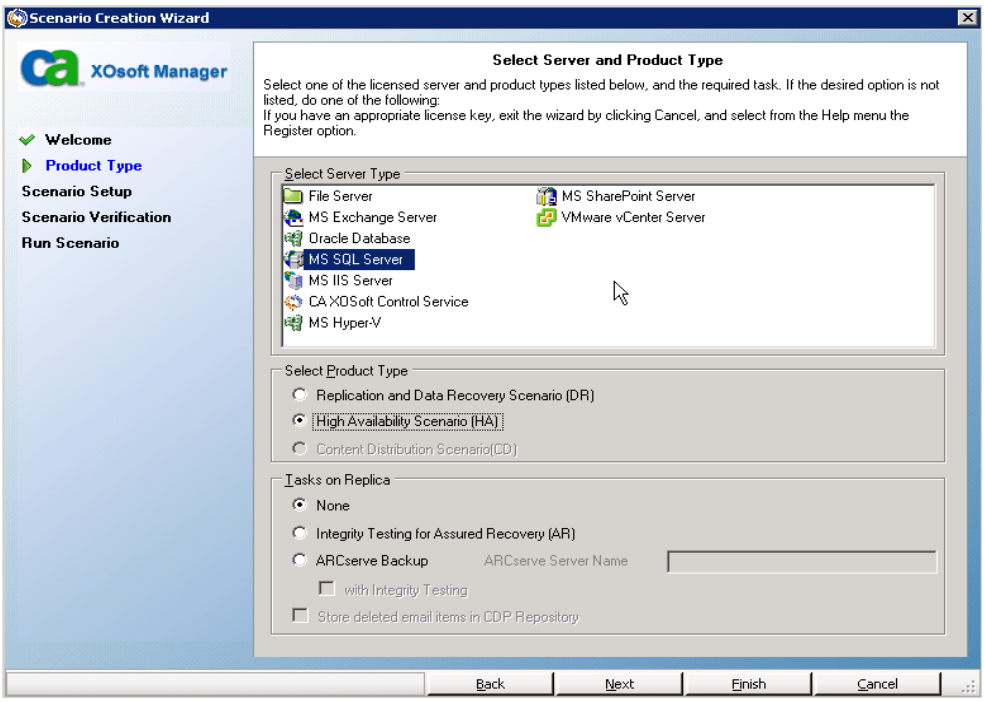
Perform this procedure to create BES HA scenarios if you are running BES and SQL on the same machine (All in One Configuration). If you are running BES and SQL on separate machines (Distributed Configuration), see the topic, Create BES-File Server HA Scenarios.

Creating scenarios for BlackBerry Enterprise Server high availability requires you to set additional scenario properties to protect BlackBerry servers. You may configure these additional properties as part of the scenario creation process (using the Wizard), or after the scenario is created, from the Properties pane of the CA XOsoft Manager. The properties you need to configure are described in the topic, Configure Additional BlackBerry HA Scenario Settings. In the following procedure, configuring the additional properties is done outside of the wizard, and requires that you select the Finish option instead of the Run Now option from the final scenario creation screen.

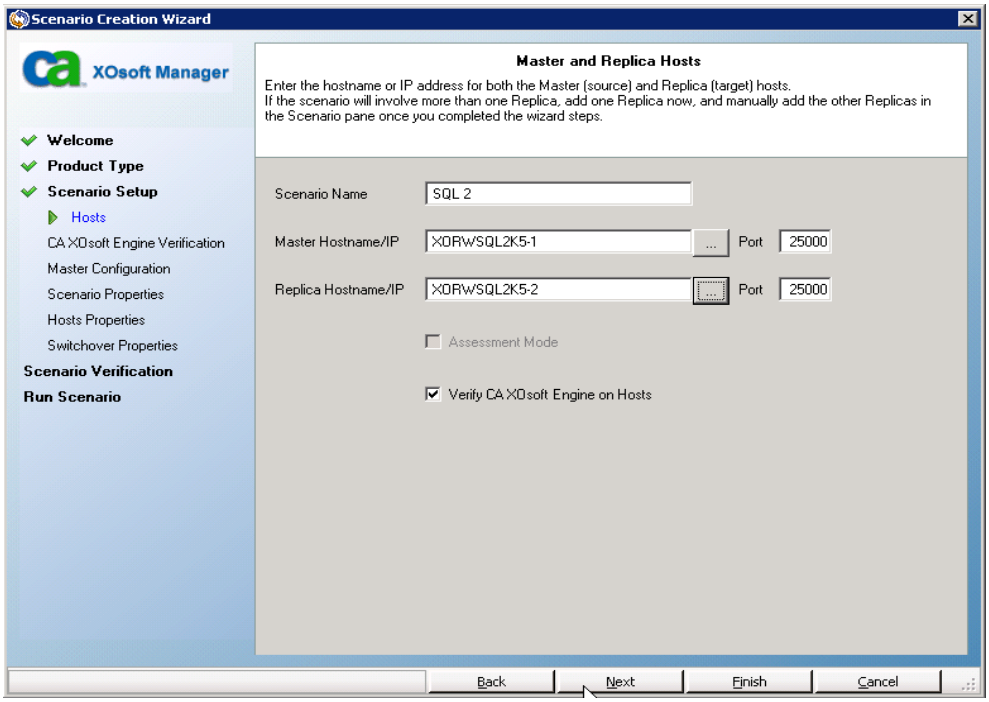
To create CA XOsoft HA for Applications scenarios

1. From the CA XOsoft Manager, choose Scenario, New or click the New Scenario button.
2. When the Welcome screen opens, select Create New Scenario, provide a Group name, if desired, and click Next.

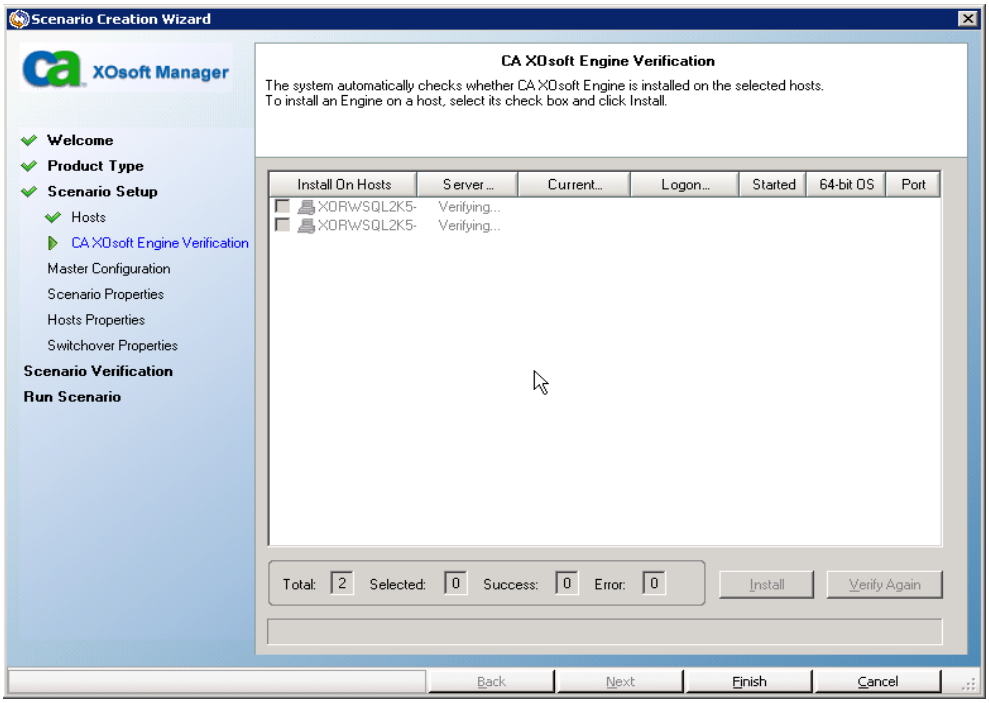
3. When the Select Scenario Type dialog opens, select MS SQL, and High Availability Scenario. Assured Recovery is not applicable to BES scenarios due to SRP key conflicts.



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. Click Next. For more information, refer to the topic, Redirection Methods (see page 37).

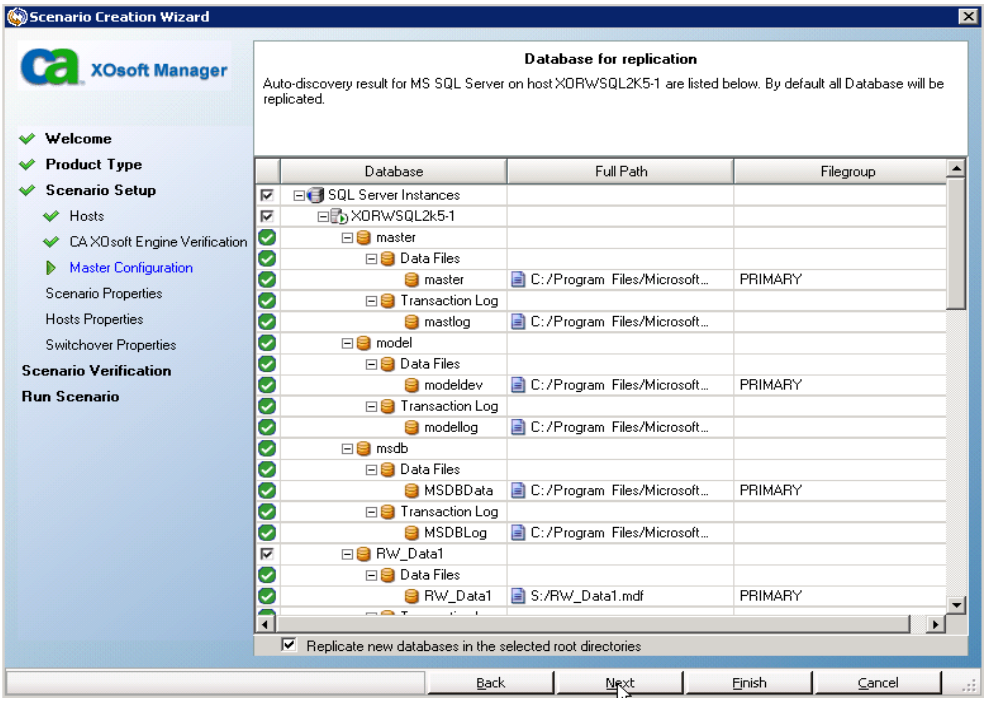


5. Wait for Engine Verification to complete.



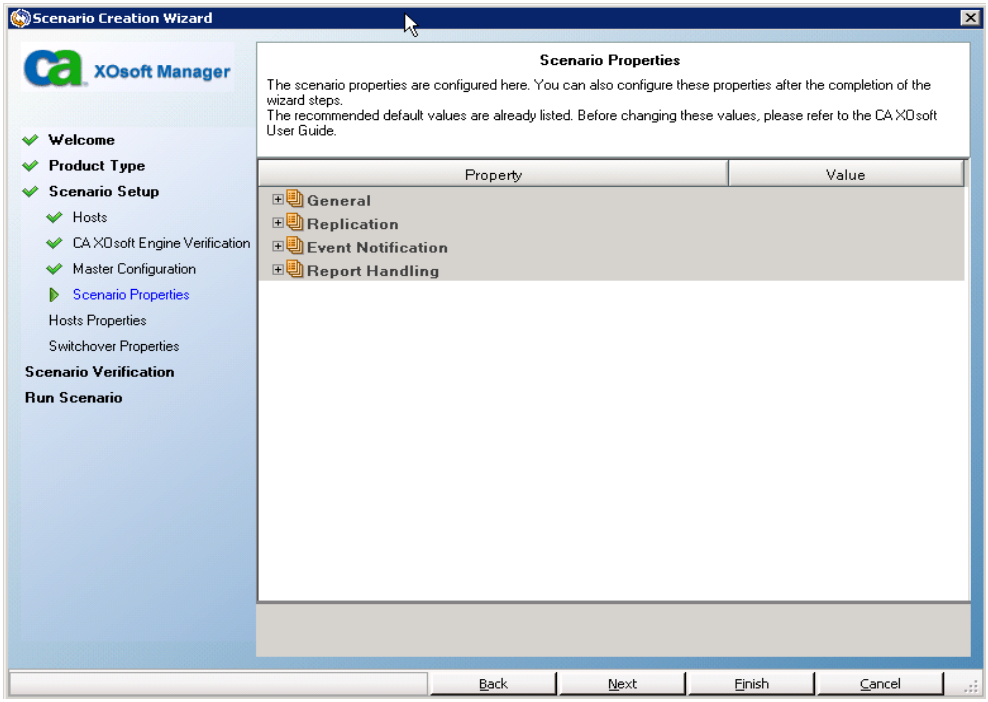
If needed, click Install to upgrade the Engine on one or both servers. Click Next to continue.

The Database for Replication dialog opens, listing all auto-discovered results for the specified Master. By default, all databases are included.



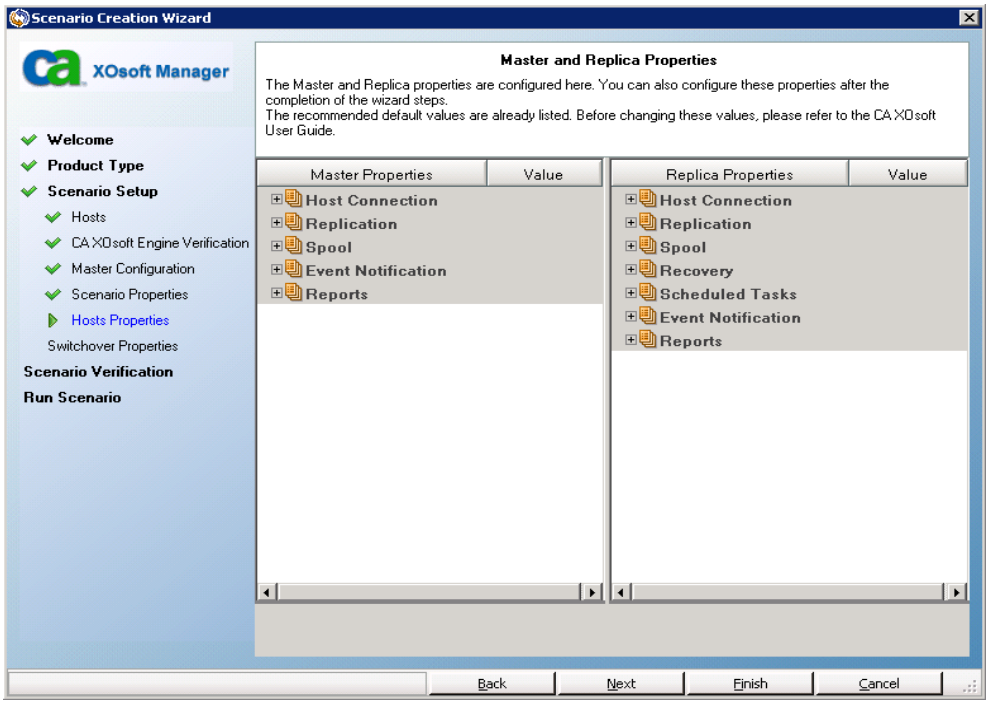
6. Accept the default selection or make changes, if desired. At minimum, you should select the System and BESMgmt databases, as well as mdss and mdss_dis if you also have MDS applications to protect. You should also include the following directory: c:\Program Files\Research in Motion\BlackBerry Enterprise Server\Logs. Exclude the Install and Webserver subdirectories. Click Next to continue.

7. When the Scenario Properties dialog opens, you may configure additional required properties now, or accept the defaults and configure additional properties later. (Refer to the topic, Configure Additional BlackBerry HA Scenario Settings (see page 59).)



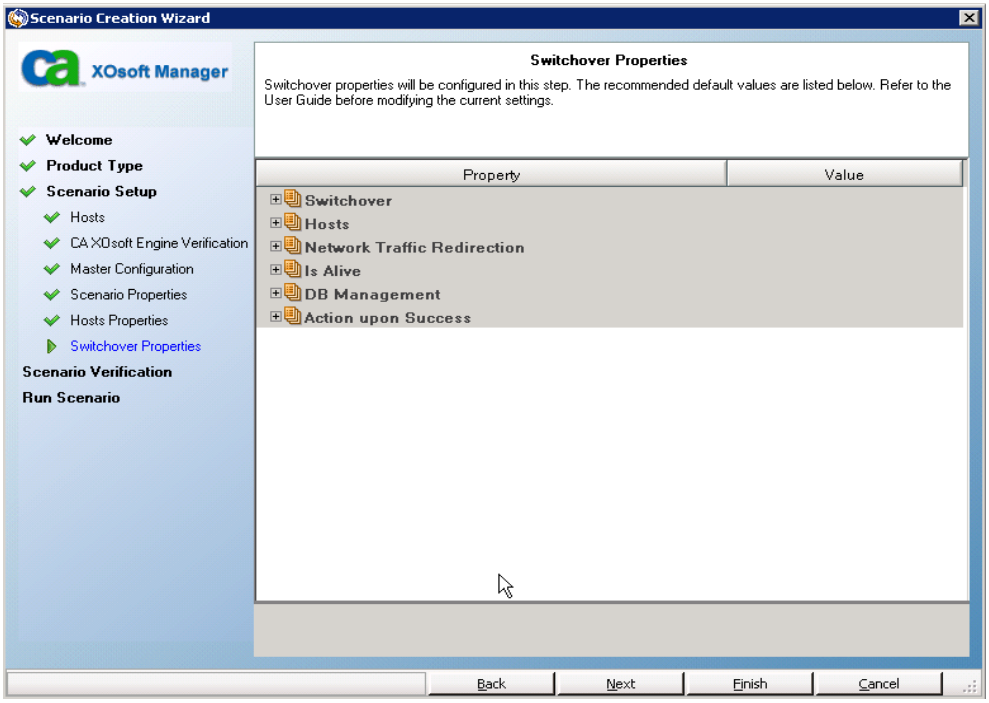
If you use NTFS ACLs with domain accounts for user access control, we recommend that you choose the Replicate NTFS ACL option and click Next. For more information, refer to the topic, Scenario Properties (see page 65) or the CA XOsoft User Guide.

The Master and Replica Properties dialog opens.



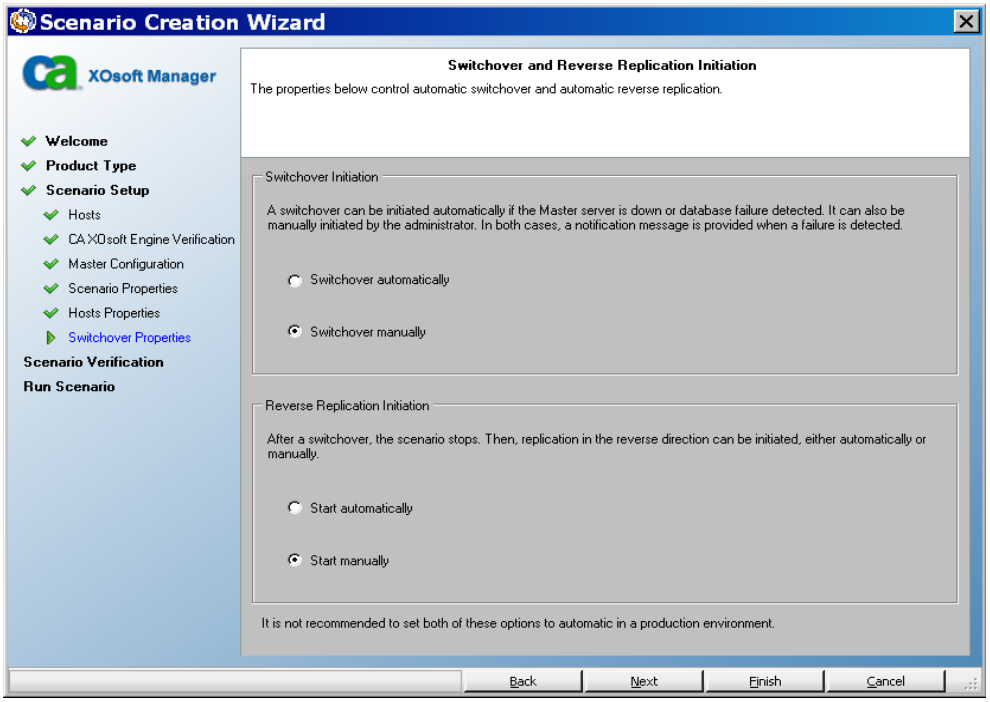
8. Accept default settings or make changes and click Next.

9. Wait for the Switchover Properties dialog to retrieve information. Configure the desired redirection properties and click Next. We recommend setting Redirect DNS, Switch Computer Name, and Reboot on Switchover and Switchback to On. For more information, refer to the topic, Switching Over and Switching Back (see page 71).



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

    For BlackBerry scenarios, we recommend using manual for both selections to avoid SRP key conflicts. For more information, refer to the topic, Scenario Properties (see page 65) or the CA XOsoft User Guide.



11. 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.

    Important! Do not click Run Now.

12. Choose Finish to save the scenario. You need to make additional changes before running this scenario. For more information, see Configure Additional BlackBerry HA Scenario Settings (see page 59).

Create BES-File Server HA Scenarios

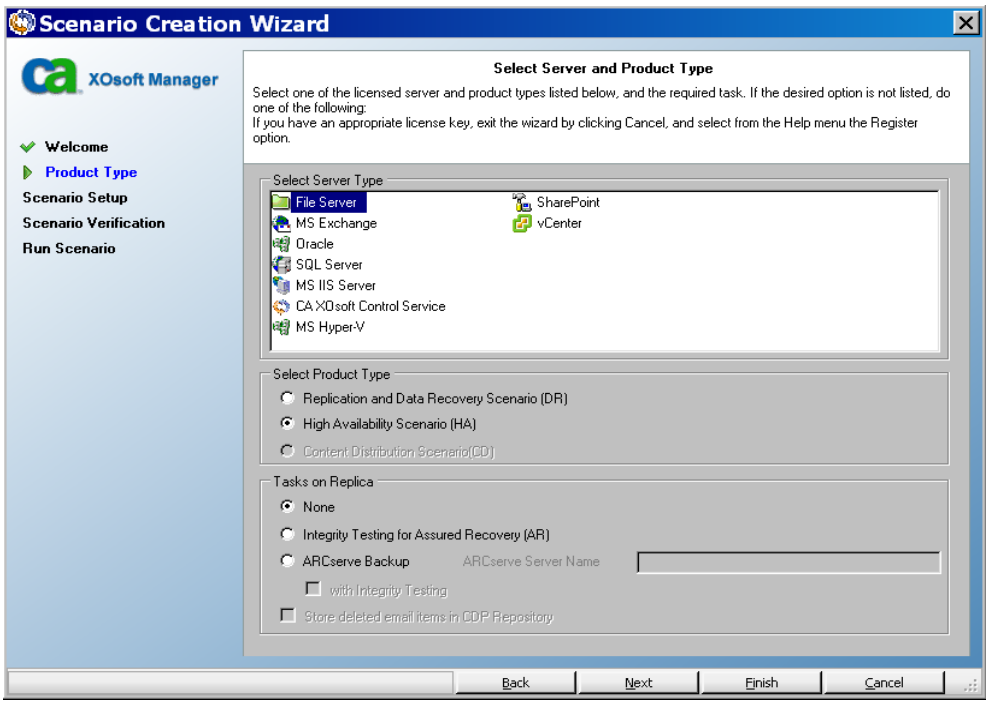
Perform this procedure if you are running BES and SQL on separate machines (Distributed Configuration). This procedure makes BES highly available. If desired, you can protect the separate SQL database in its own scenario.

Creating File Server scenarios for BlackBerry Enterprise Server high availability follows the same procedure as regular File Server HA scenarios, with this exception: You must configure additional scenario properties to protect BlackBerry servers. You may configure these additional properties as part of the scenario creation process (using the Wizard), or after the scenario is created, from the Properties pane of the CA XOsoft Manager. The properties you need to configure are described in the topic, Configure Additional BlackBerry HA Scenario Settings. In the following procedure, configuring the additional properties is done outside of the wizard, and requires that you select the Finish option instead of the Run Now option from the final scenario creation screen.

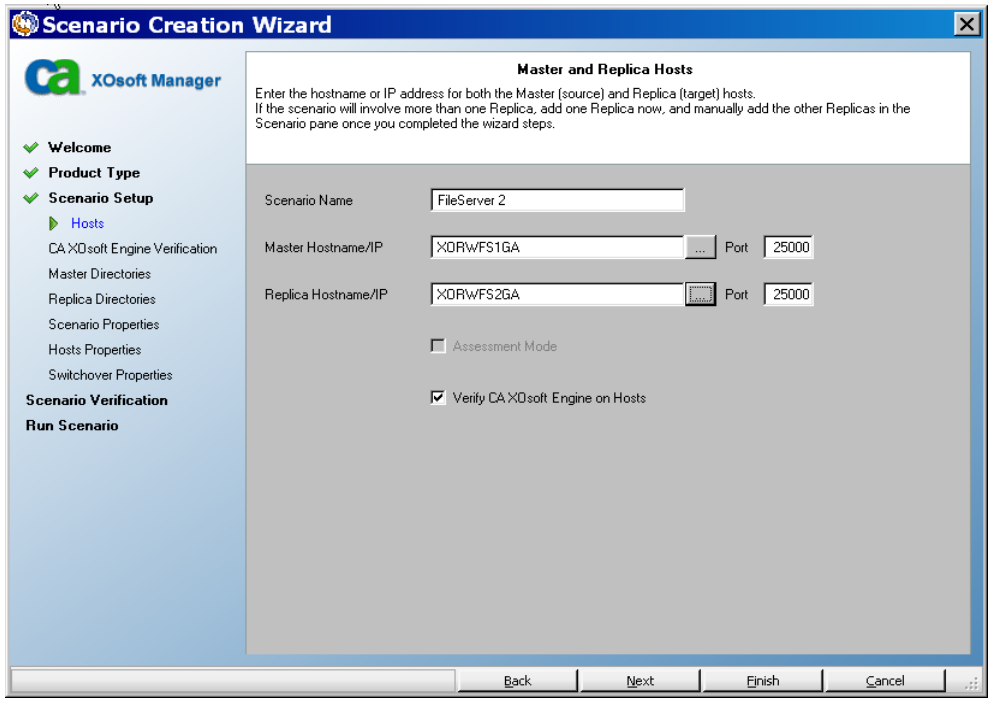
To create a BES-File Server HA scenario

1. From the CA XOsoft Manager, choose Scenario, New or click the New Scenario button.
2. When the Welcome screen opens, select Create New Scenario, provide a Group Name, if desired, and click Next.

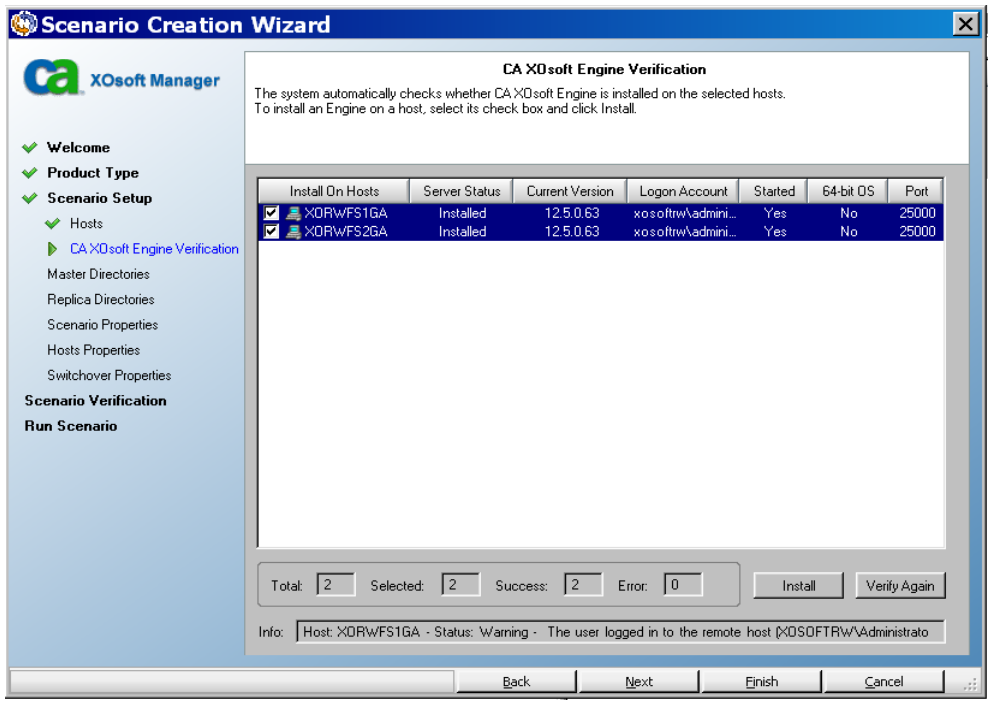
3. When the Select Scenario Type dialog opens, select File Server, and High Availability Scenario. Integrity Testing for Assured Recovery is not applicable to BES scenarios due to SRP key conflicts.



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. Click Next. For more information, refer to the topic, Redirection Methods (see page 37).

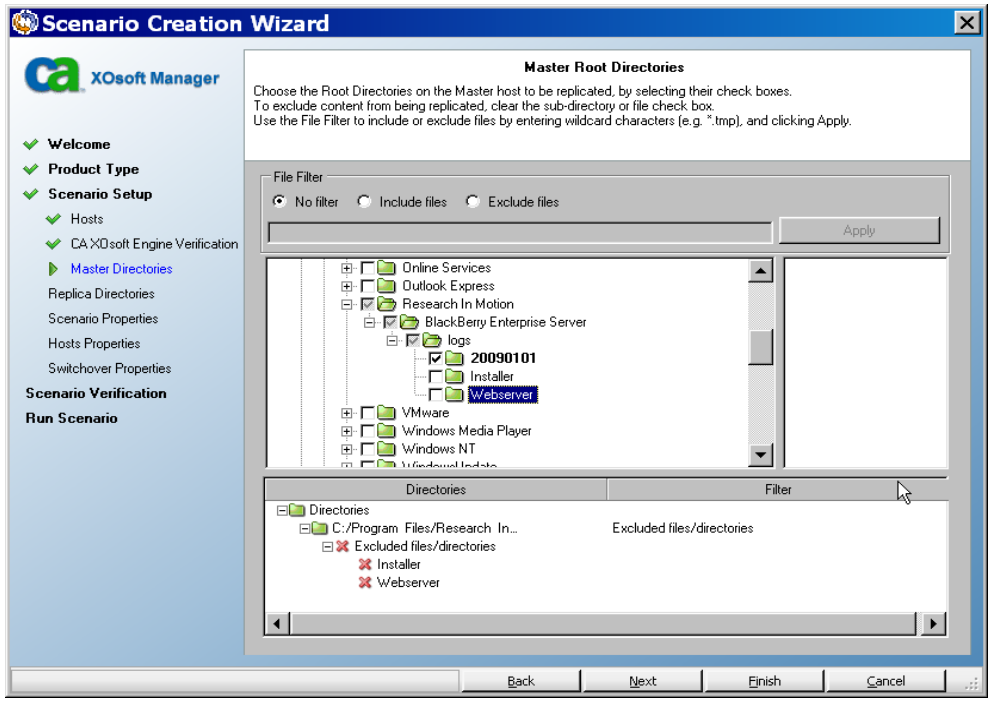


5. Wait for Engine Verification to complete.



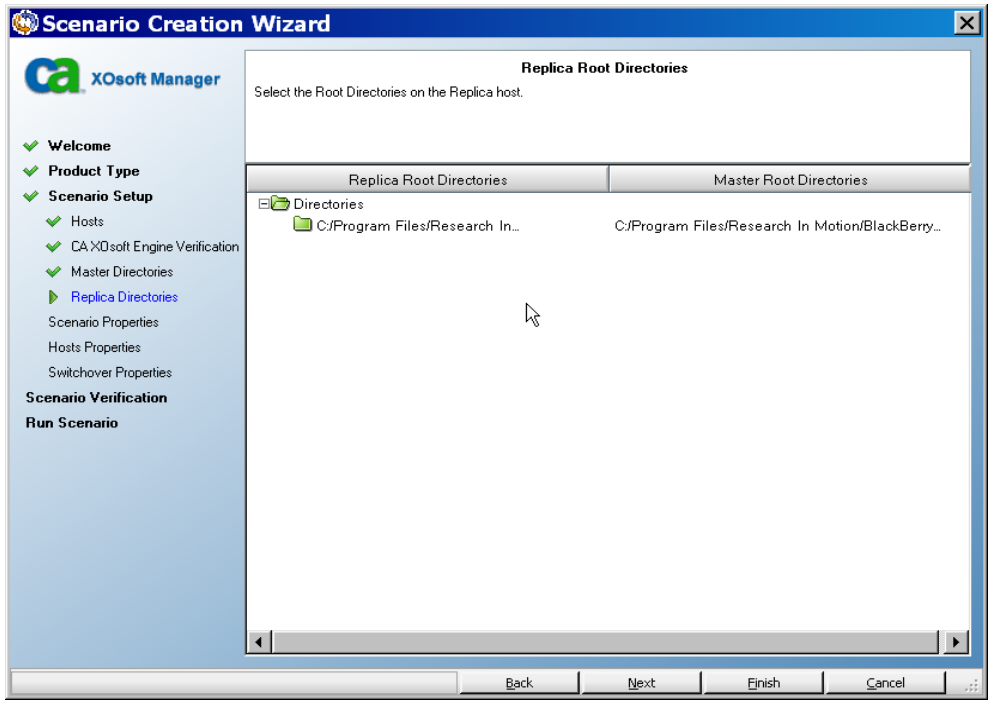
If needed, click Install to upgrade the Engine on one or both servers and then click Next.

6. The Master Root Directories dialog opens, listing all auto-discovered results for the specified Master.



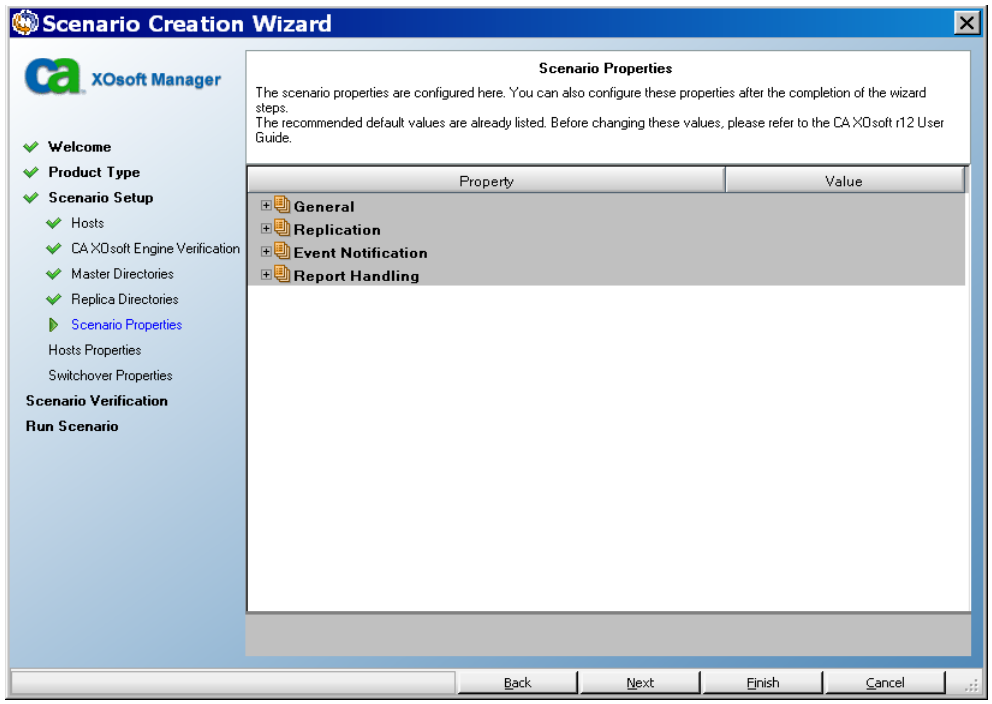
We recommend choosing the C:\Program Files\Research in Motion\BlackBerry Enterprise Server\logs and excluding the Webserver and Installer subdirectories. Click Next when you are done making selections.

7. The Replica Root Directories dialog opens.



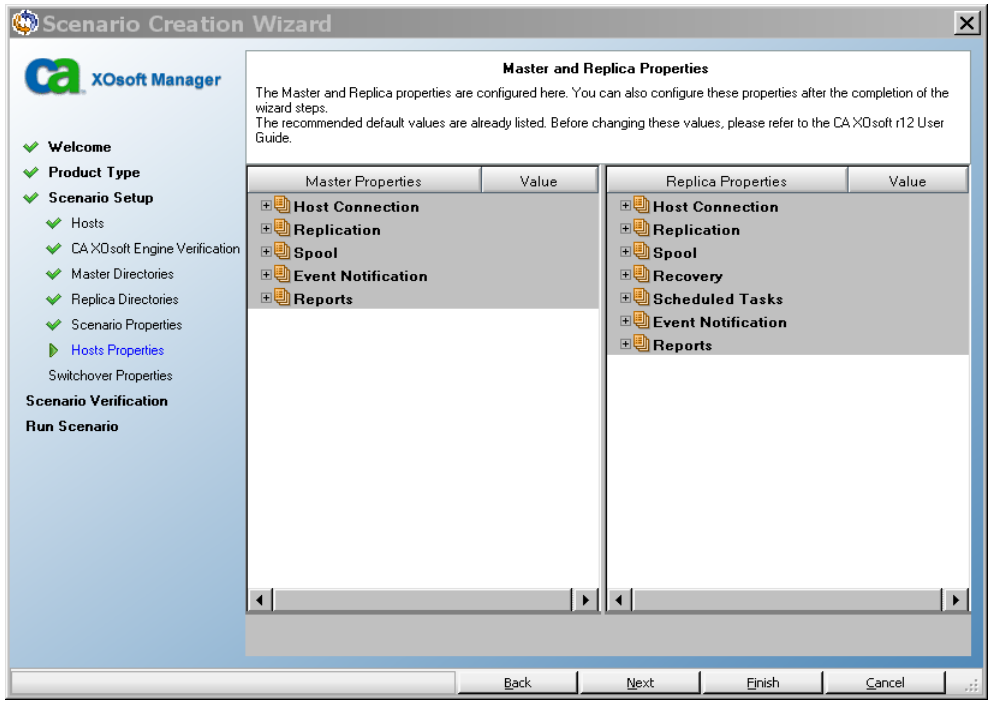
Accept the default selection or make changes, if desired, and click Next.

8. When the Scenario Properties dialog opens, you may configure the additional properties now, or accept the defaults and configure the additional properties later. (Refer to the topic, Configure Additional BlackBerry HA Scenario Settings.)



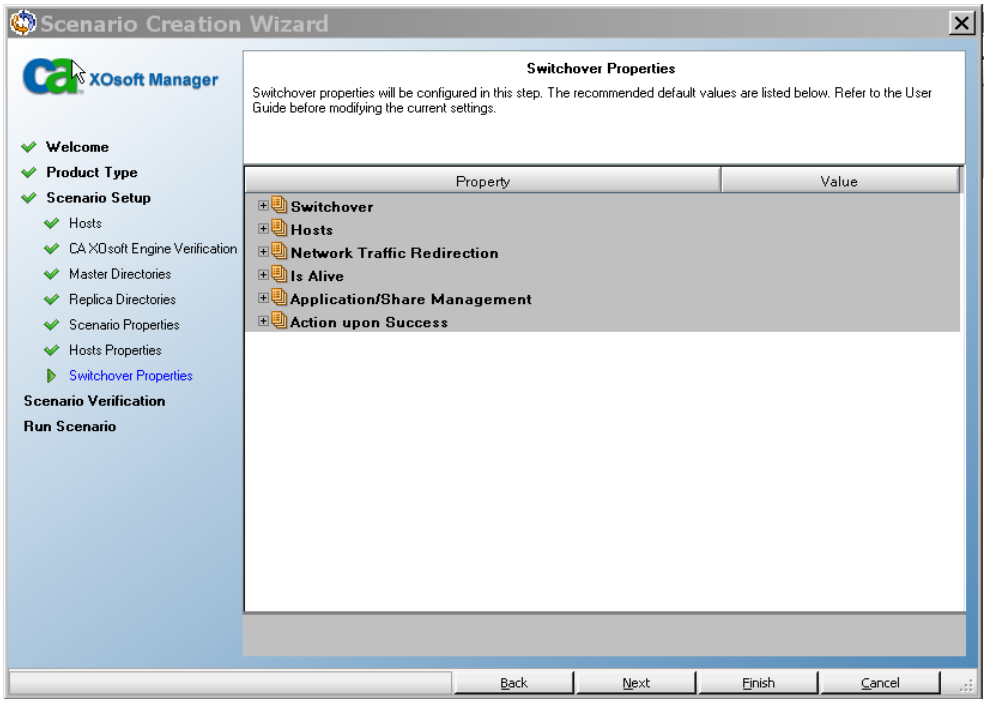
If you use NTFS ACLs with domain accounts for user access control, we recommend that you choose the Replicate NTFS ACL option and click Next. For more information, refer to the topic, Scenario Properties (see page 65) or the CA XOsoft User Guide.

The Master and Replica Properties dialog opens.



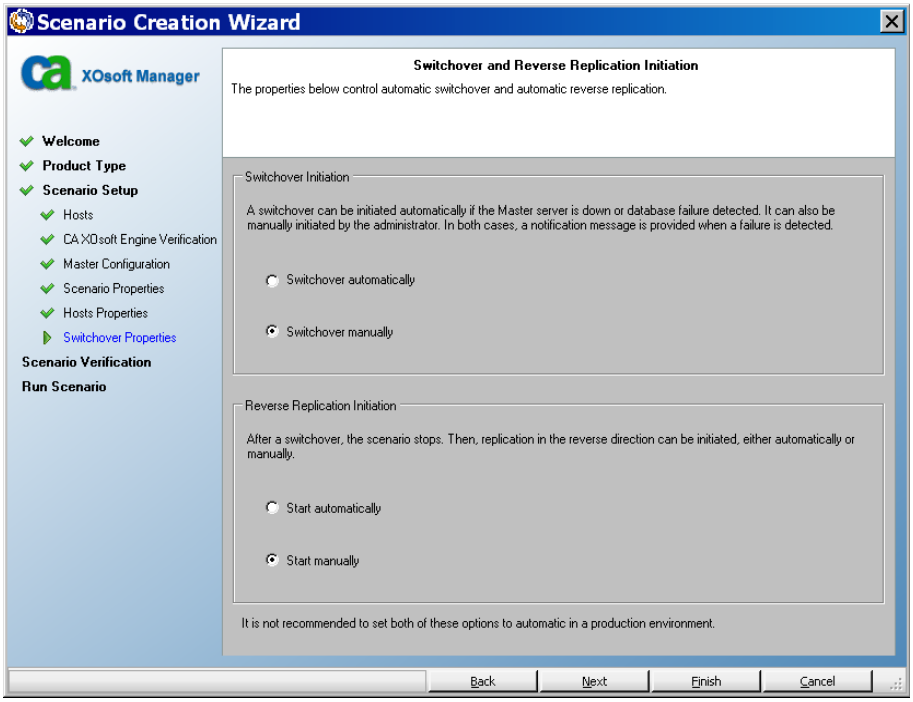
9. Accept default settings or make the desired changes and click Next.
10. Wait for the Switchover Properties dialog to retrieve information. Configure the desired redirection properties and click Next. We recommend setting Redirect DNS and Switch Computer Name with Reboot on Switchover and Switchback to On.

    For more information, refer to the topic, Switching Over and Switching Back (see page 71).



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

    For BlackBerry scenarios, we recommend using manual for both selections to avoid SRP key conflicts. For more information, refer to the topic, Scenario Properties 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.

    Important! Do not click Run Now.

13. Choose Finish to save the scenario. You need to make additional changes before running this scenario. For more information, refer to the topic, Configure Additional BlackBerry HA Scenario Settings (see page 59).

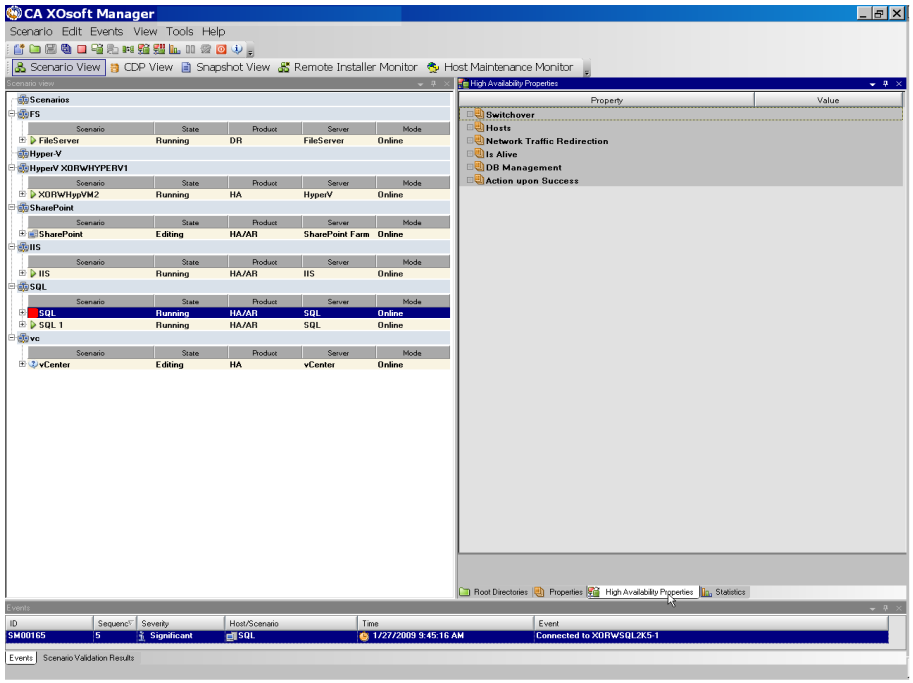
Configure Additional BlackBerry HA Scenario Settings

Before you can run the BES HA scenario, there are some additional configuration changes you must make. The High Availability Properties pane has been resized in some steps to show detail.

Important! In the following procedure, you must specify the actual Master and Replica information for the script arguments provided in angle brackets (<>). Do not omit the quotation marks (").

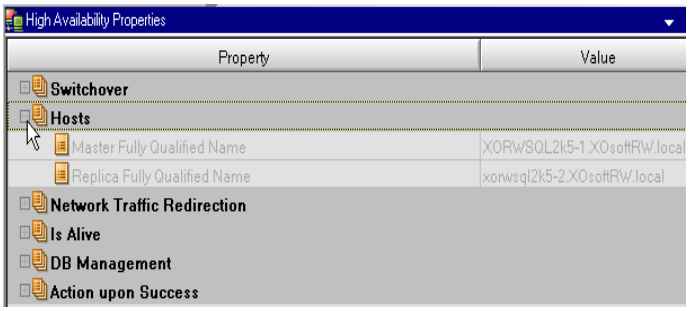
To configure the BlackBerry HA Scenario

1. From Scenario Manager, select the SQL or File Server scenario you created for BlackBerry HA and click the High Availability Properties tab from the framework pane.



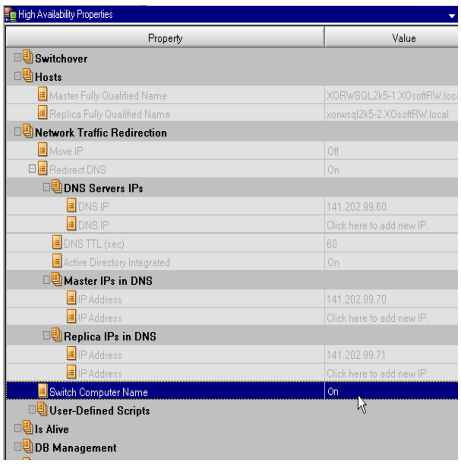
2. Expand Hosts. Verify that the Master Full Qualified Name is the correct DNS name for the SQL Server to which the BES servers connect.

   Note: If you created an additional record to be used solely for the BES SQL Instance (as described in *Independent BlackBerry SQL Instance*), remember to enter this record instead for proper redirection. For example, BBDB.xosoft.com.



3. Expand Network Traffic Redirection:

   - Redirect DNS -- turn On
     - DNS Servers IPs -- verify that the addresses for all DNS servers are correct
     - DNS TTL (sec) -- change default value of 60 to 10 to allow for faster propagation during switchover for BES servers.
     - Master IPs in DNS -- verify this is correct for SQL server
     - Replica IPs in DNS -- verify this is correct for SQL server
   - Switch Computer Name -- turn On

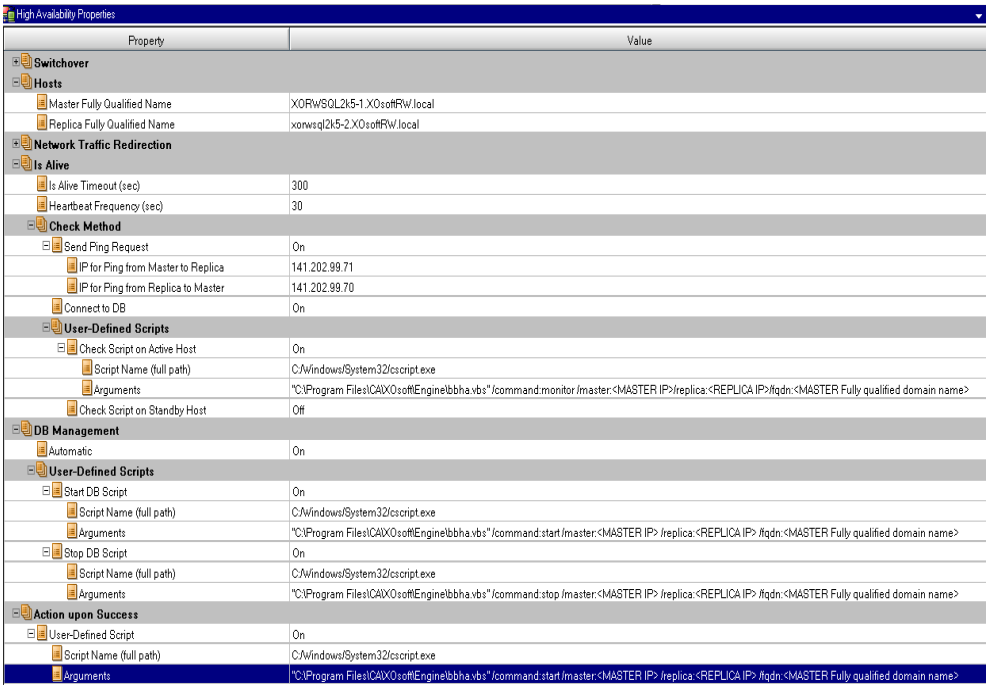


4. Expand Is Alive, Check Method, User-Defined Scripts:
   - Check Script on Standby Host -- turn On
   - Script Name -- C:\Windows\System32\cscript.exe
   - Arguments -- "C:\Program Files\CA\XOsoft\Engine\bbha.vbs" /command:monitor /master:<MASTER IP>/replica:<REPLICA IP>/fqdn:<MASTER Fully qualified domain name>

   Important! Replace the text in angled brackets with the actual IP addresses of the Master and Replica and the actual FQDN of the Master.

5. Expand DB Management, User-Defined Scripts:
   - Start DB Script -- turn On
     - Script Name (full path) -- C:\Windows\System32\cscript.exe
     - Arguments -- "C:\Program Files\CA\XOsoft\Engine\bbha.vbs" /command:start /master:<MASTER IP> /replica:<REPLICA IP> /fqdn:<MASTER Fully qualified domain name>
   - Stop DB script -- turn On
     - Script Name (full path) -- C:\Windows\System32\cscript.exe
     - Arguments -- "C:\Program Files\CA\XOsoft\Engine\bbha.vbs" /command:stop /master:<MASTER IP> /replica:<REPLICA IP> /fqdn:<MASTER Fully qualified domain name>

6. Expand DB Management, Action on Success:
   - User Defined Script -- turn On
     - Script Name (full path) -- C:\Windows\System32\cscript.exe
     - Arguments -- "C:\Program Files\CA\XOsoft\Engine\bbha.vbs" /command:start /master:<MASTER IP> /replica:<REPLICA IP> /fqdn:<MASTER Fully qualified domain name>



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

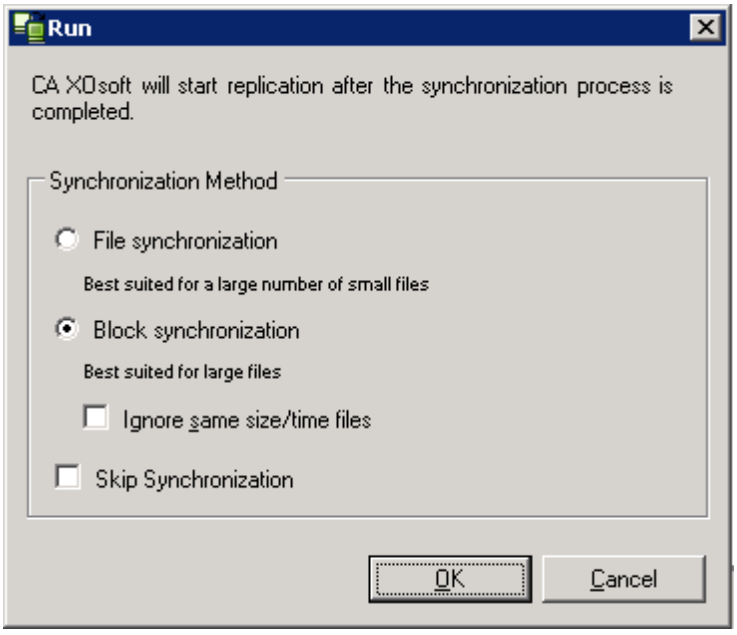
1. From the Scenario pane, select the scenario you want to run.
2. Click **Run** on the Standard toolbar.

   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*.

BES Script Operation

Once the scenario is started, the bbha.vbs script monitors all BES services and will notify you if any failures occur. The notification will look like this:

```
Script C:/Windows/System32/cscript.exe executed; return code is 1
```

To view script operation (and to confirm proper arguments), you can view the bbha log located in the scripts directory.

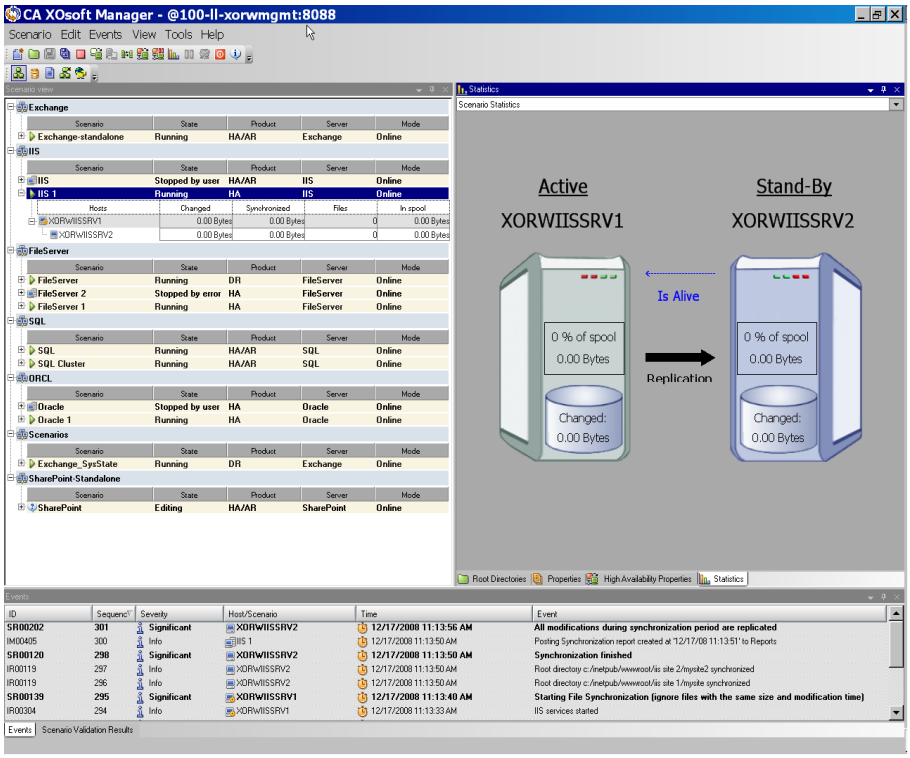
Note: If you see this warning or any other warning regarding the script, but the BlackBerry is functioning properly, it indicates that the script parameters, script configuration locations, network connectivity or administrative rights between the BES and SQL servers are incorrect or that the BES services on the Master are not currently functioning properly. Stop the scenario and check the arguments and script path. If you are still not successful, contact Support to review the bbha.log file and troubleshoot the issue. If BES is showing as down and indicates SRP Connection errors, please review *SRP Connection Errors*.

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 91) 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

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.

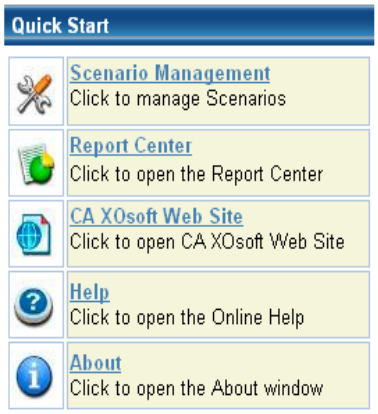
The default storage directory of the generated reports is:
[ProgramFilesFolder]\C*A**XOsoft**Manager**reports*

To view a report

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

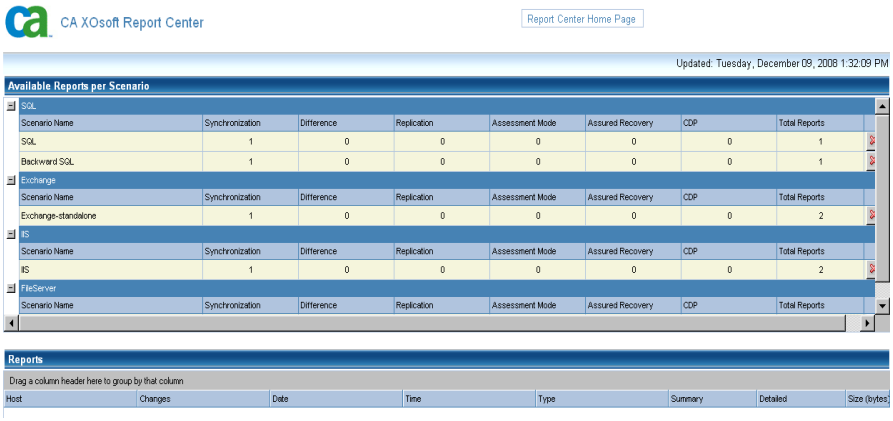
1. To view a report, first you need to open the Report Center. There are two ways to open it:

   - 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.

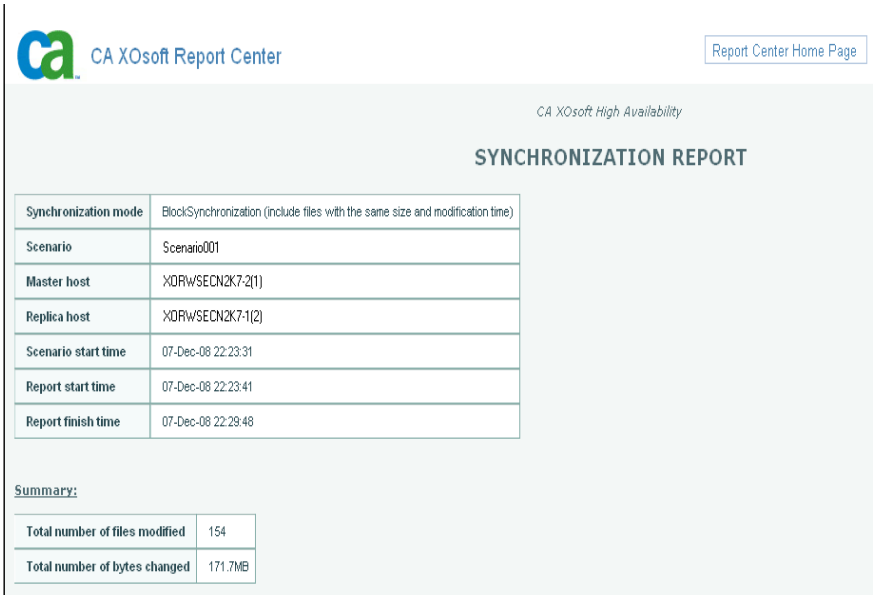
3. To view a specific report, select from the **Available Reports per Scenario** table the scenario that this report represents. Then, from the **Reports** table below, click the report you want to open:

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

When you perform a switchover, BES servers are sent stop and start controls to facilitate BES switchover alongside SQL server switchover. Detailed information about switchover processes is located in the Event Pane during the switchover.

During a switchover/switchback, when both servers are connected, CA XOsoft HA ensures that SRP key conflicts do not occur. However, if you switch over when the master is unavailable, the Master BES services may continue running. In most cases, they are stopped because they are set for manual start up mode. Before bringing the master server back on the network, double-check to ensure all BES services are stopped to prevent SRP key conflicts. BES services can run on only one BES server (master or replica) at a time for a SRP key conflict will occur. For more information, see SRP Connection Errors (see page 92).

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 73).
- 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.

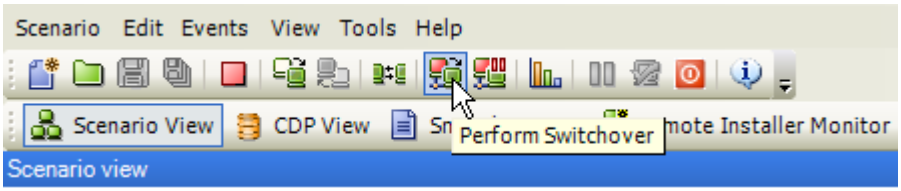
Initiate Switchover

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

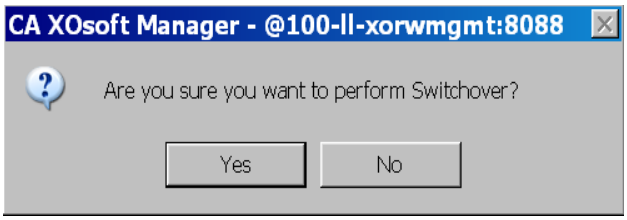
Note: Though the following steps show Exchange scenario screens as examples, the procedure is similar for all server types.

To initiate manual switchover

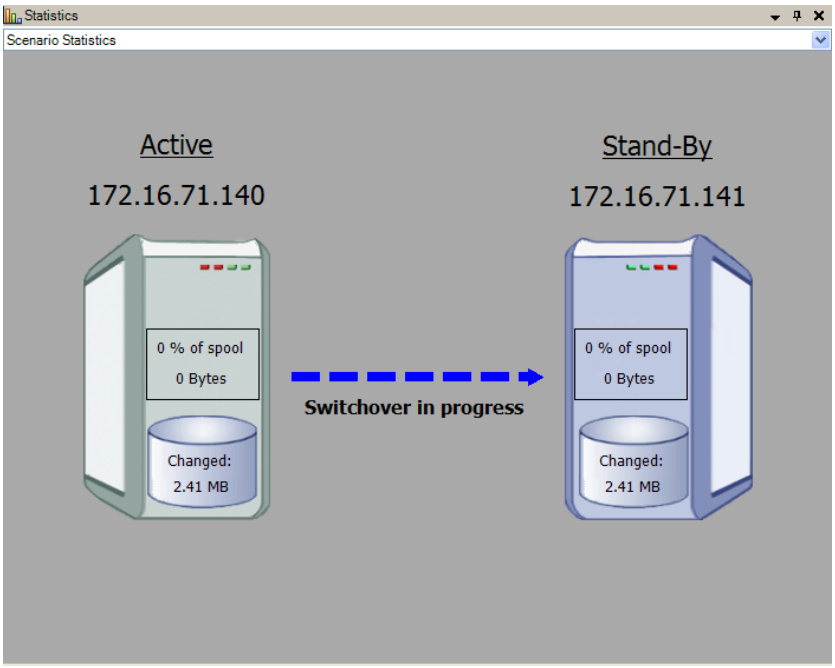
1. Open the Manager and select the desired scenario from the Scenario pane. Verify it is running.
2. Click on the **Perform Switchover** button, or select from the **Tools** menu the **Perform Switchover** option:



A confirmation message appears:

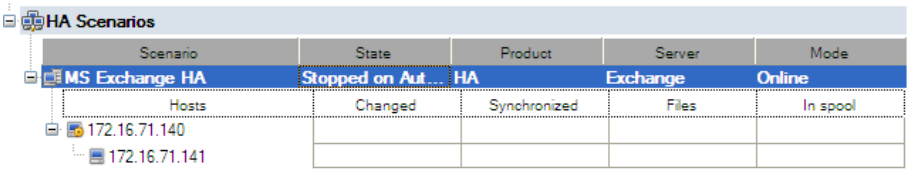


3. Click **OK** on the **Perform Switchover** confirmation message. This procedure initiates a switchover from the Master server to the Replica server:



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

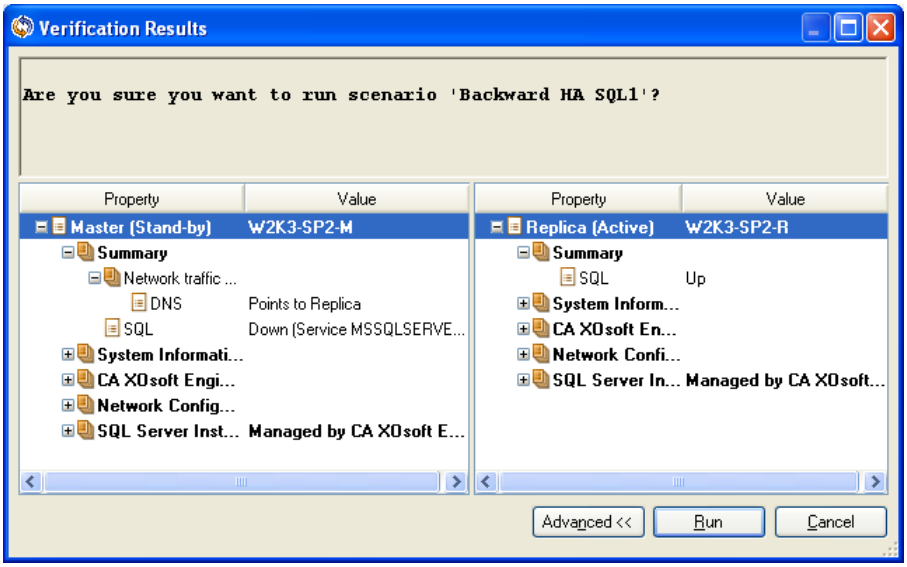
After a switchover is initiated, whether manually or automatically, at some point, you will want to reverse the server roles and make the original Master the active server again the Replica the standby server. Before you switch back the roles between servers, decide if you want to the data on the original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

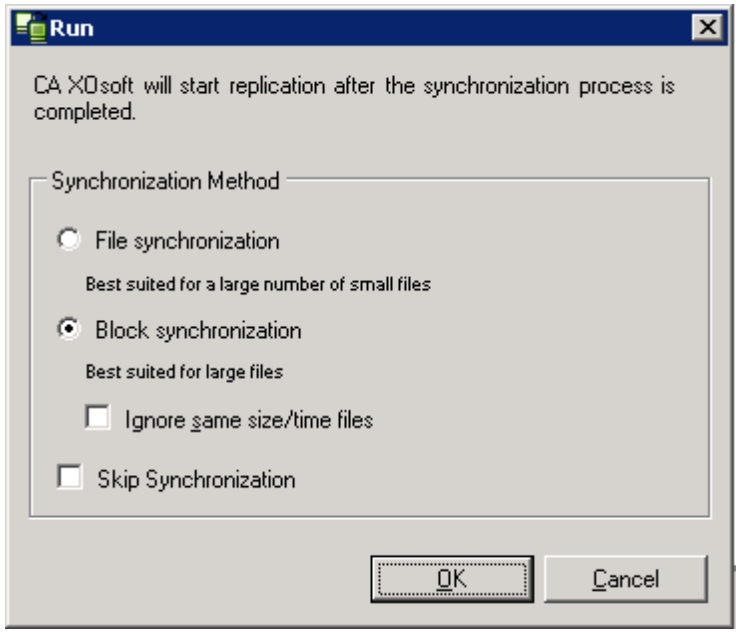
1. Ensure that both Master and Replica servers are available on the network and that the CA XOsoft Engine is running.
2. Open the Manager and select the desired scenario from the Scenario pane.
3. Perform one of the following:
   - If the scenario is already running, skip directly to Step 4
   - If the 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.

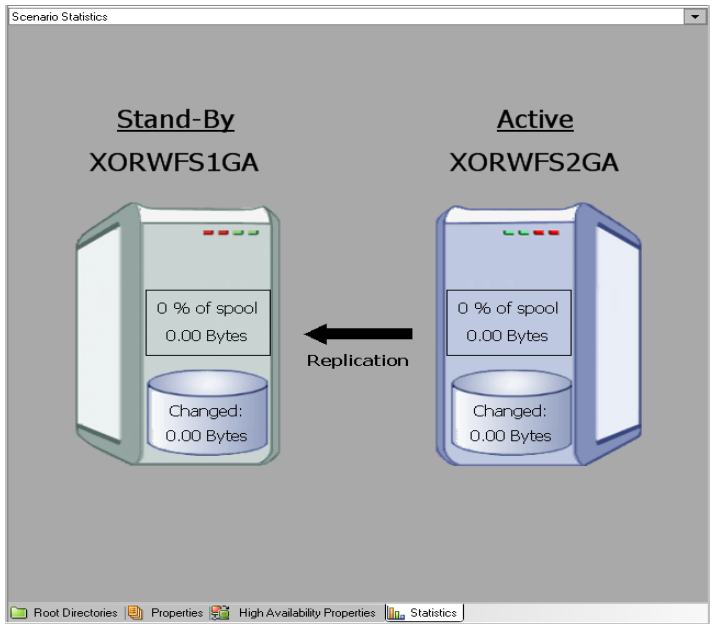


b. Select a synchronization method from the Run dialog and click OK to start resynchronization.

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.

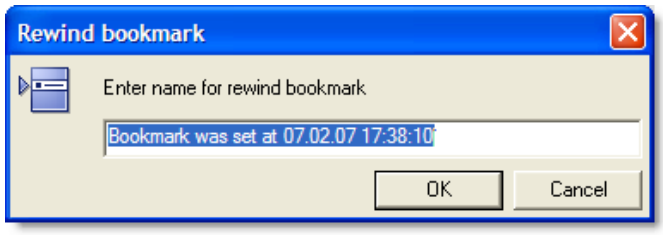
Notes:

- 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.

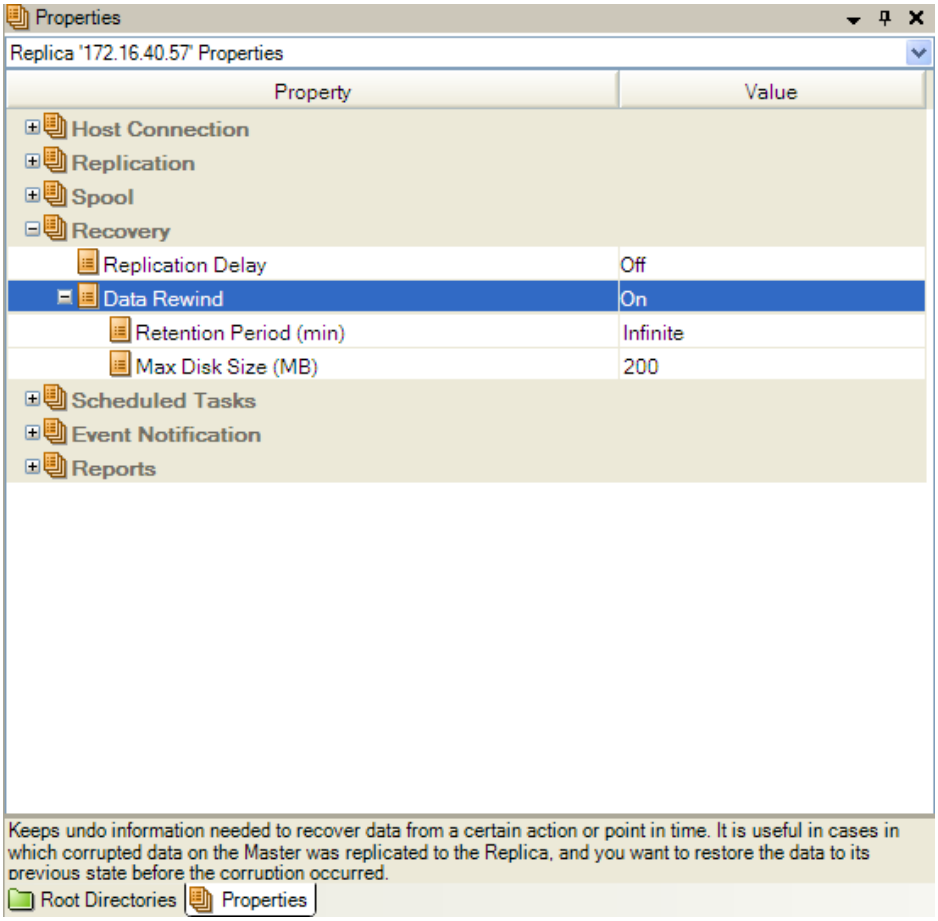
   The text that appears in the **Rewind bookmark** dialog will appear in the **Rewind Points Selection** dialog as the bookmark's name. The default name includes date and time.
3. Accept the default name, or enter a new name for the bookmark. It is recommended to give a meaningful name that will later help you recognize the required bookmark. Then, click **OK**.

   The bookmark is set.

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*.

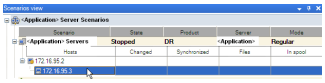
Important! The data rewind process operates in one way only - there is no replay forward. After rewind, all data subsequent to the rewind point will be lost, since data after the rewind point will be overwritten with new data.

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

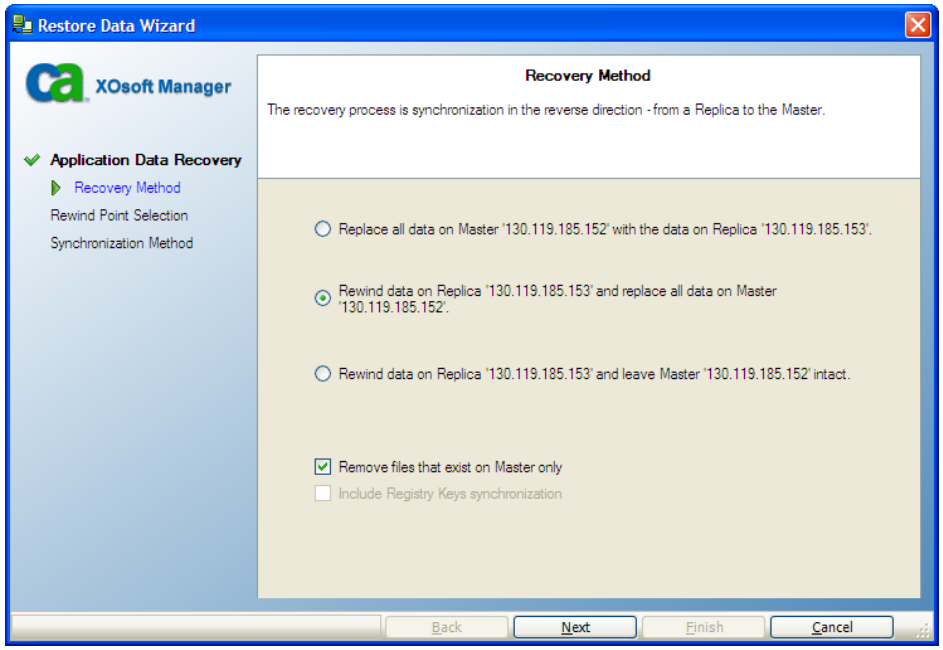
1. On the Manager, from the Scenario pane select the desired scenario and stop it.
2. [For database applications only] stop the database services on the Master host.
3. On the Manager, from the scenario folder select the Replica host:

   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 opens.



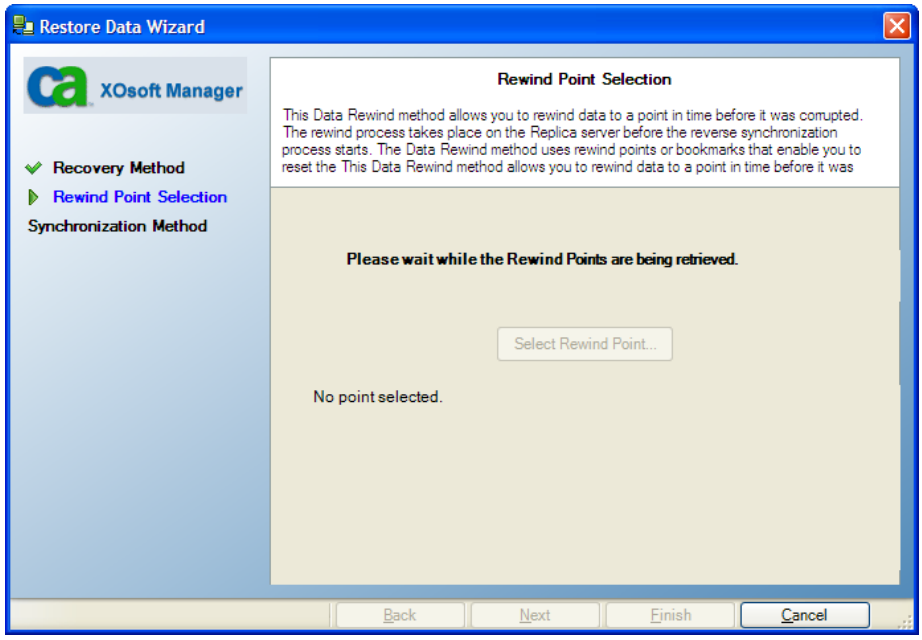
5. Select one of the Rewind data options, depending on whether you want the rewind data synchronized back to the Master (option 2) or left on the Replica only (option 3).

   Notes:

   - 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 **Include Registry Keys synchronization** checkbox is enabled, only if you activated this option before starting the scenario. If the checkbox is enabled, you can select it to include the synchronized Registry Keys in the recovery process.

   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 opens.

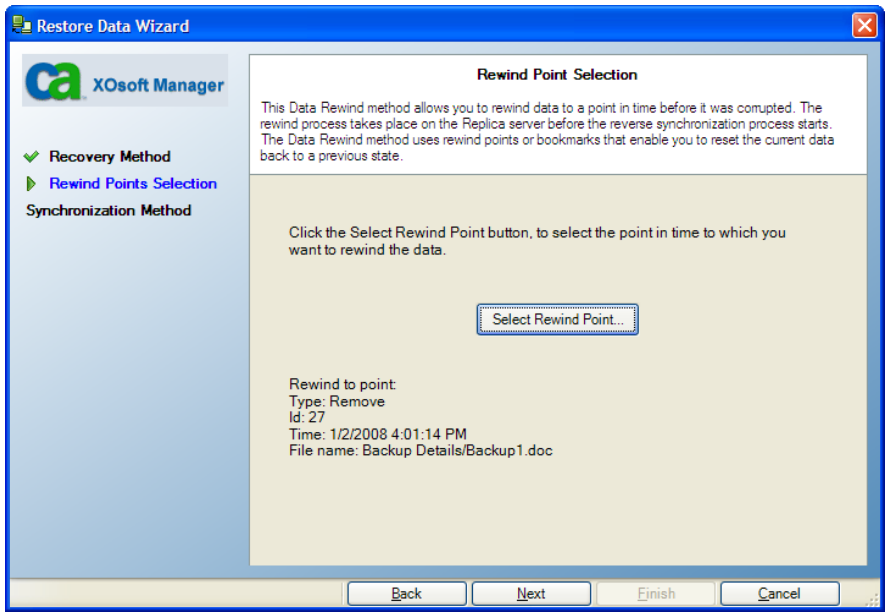
The **Select Rewind Point** dialog displays a list of all rewind points appropriate to the application you are protecting. These include modifications of folders and files that were automatically registered by the system and user-defined bookmarks.

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

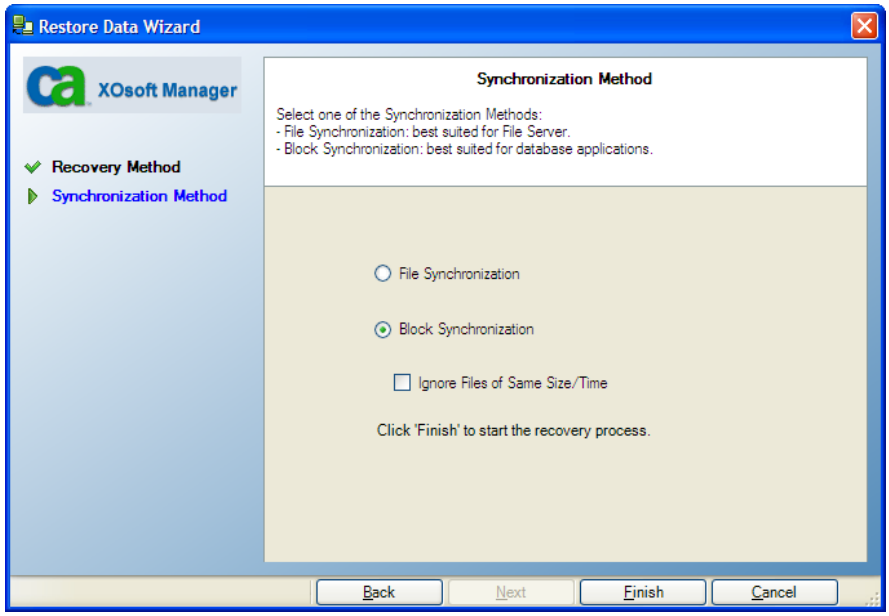
8. Select the required rewind point, and click **OK.**

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.



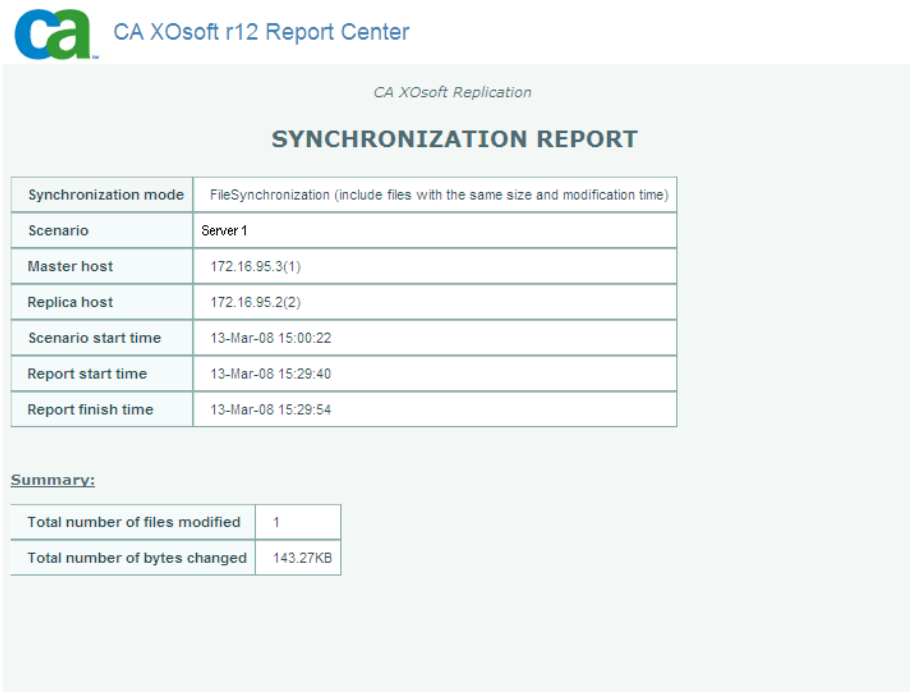
10. Select the **Block Synchronization** method and click **Finish**.

    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 r12 Report Center

CA XOsoft Replication

SYNCHRONIZATION REPORT

Synchronization mode	FileSynchronization (include files with the same size and modification time)
Scenario	Server 1
Master host	172.16.95.3(1)
Replica host	172.16.95.2(2)
Scenario start time	13-Mar-08 15:00:22
Report start time	13-Mar-08 15:29:40
Report finish time	13-Mar-08 15:29:54

Summary:

Total number of files modified	1
Total number of bytes changed	143.27KB

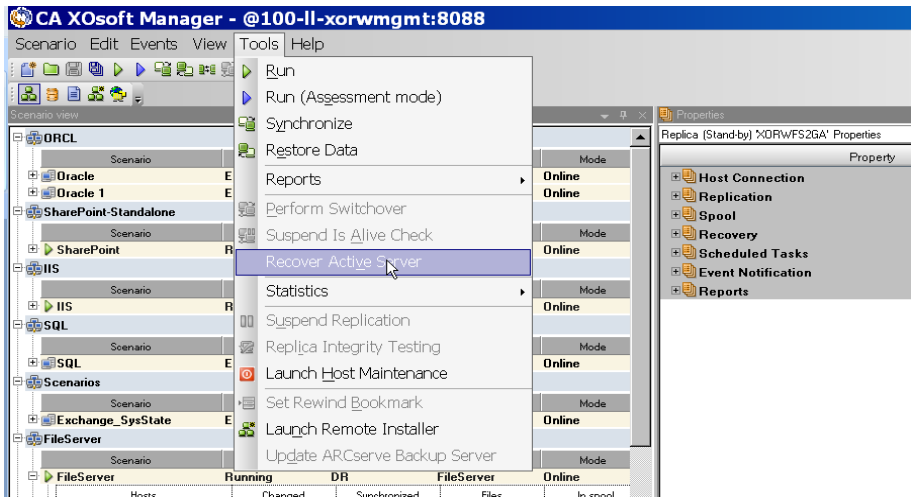
Now, the Replication process can restart on the original scenario.

Recover Active Server

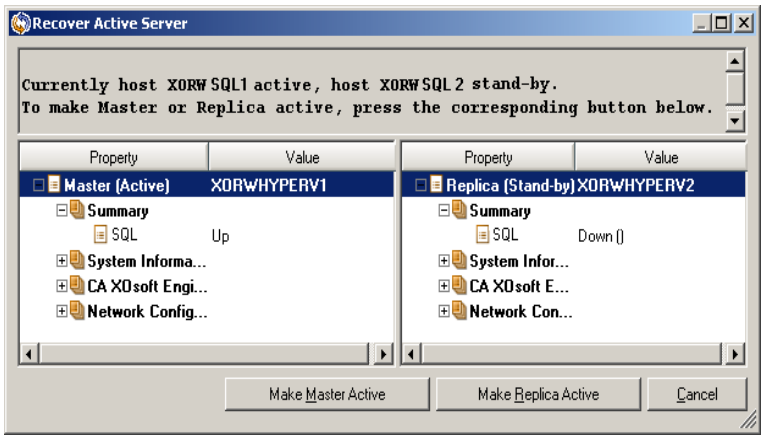
In certain circumstances, it may be necessary to forcibly make the Master or Replica server the active server without completing the data synchronization process. For example, if switchover occurred but no data was changed on the Replica server. In this case you may even have newer data on the Master server making it undesirable to synchronize data from the Replica to the Master server. CA XOsoft HA 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.

If Recover Active Server does not solve the problem, you can manually recover a server. For more information, refer to the section, Recovering Servers (see page 93).



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.

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.

SRP Connection Errors

An SRP connection error occurs if at any point both the master and replica BES servers are connected to RIM's server with services running. In this case, RIM generates an SRP key conflict and disables your SRP Key.

When a conflict occurs, despite proper connectivity, the Windows event log reports repeated SRP connection errors. Contact RIM technical support to resolve this conflict. Let them know you were in the process of moving BES servers and accidentally brought both online simultaneously; ask them to re-enable your SRP key. There is no need to mention CA XOsoft HA since it is out of the scope of a RIM support call. The conflict is on RIM's side and is not something you can fix directly.

Independent BlackBerry SQL Instance

CA XOsoft HA supports the independent transfer of a single instance (on a multi-instance or multi-function SQL server) to a replica server. This section is directed to administrators using a shared SQL server to host the BES configuration data, and wish to protect only the BES portion via CA XOsoft HA. Performing these steps ensures that only the independent instance is switched over while other instances remain working on the Master server.

Implement the Solution

1. Confirm that the SQL servers and additional instances comply with all the specifications described in The BlackBerry HA Solution.
2. Set up an additional DNS Host (A) Record for the Master SQL server. This DNS record is used for all BES HA purposes related to the SQL database. It should have a unique name and must be a host (A) record type; CNAME alias records are not supported.
3. Ensure you use the additional record just created in BlackBerry Server Setup, not the hostname for all SQL configuration settings in BES and ODBC.
4. When you configure the scenario, make sure you select only the desired instance that contains the BES Configuration database.
5. From the Switchover dialog, enter the additional DNS Record as the Master Fully Qualified Name. This is the record that is redirected during switchover.

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 (see page 88).
- If the Recover Active Server procedure does not resolve the issue, try one or more of the following manual tasks appropriate to the redirection method you use:
  - If IP Redirection is used, manually remove the IP. You cannot use this method for scenarios that do not support Move IP redirection (Hyper-V HA, CS HA). For more information, refer to the topic, Manually Recover a Failed Server when IP Redirection is used. (see page 93)
  - If Switch Computer Name Redirection is used, manually switch the names. You cannot use this method for scenarios that do not support Switch Computer Name Redirection (Hyper-V HA, Exchange HA, vCenter HA if local Oracle is used). For more information, refer to the topic, Manually Recover a Failed Server when Switch Computer Name Redirection (see page 93) is used.
  - If both IP and Switch Computer Name Redirection methods are used, manually remove the IP and switch the computer names. You cannot use this method for scenarios that do not support Move IP and Switch Computer Name redirection (Exchange, CS HA). For more information, refer to the topic, Manually Recover a Failed Server - IP and Switch Computer Name is used (see page 95).

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.

Manually Recover a Failed Server-Switch Computer Name

To manually recover a failed server using the Switch Computer Name redirection method

1. Boot the Master server without a network connection, to avoid duplicate network names.
2. Rename the server to <NewServerName>-XO and move it to a temporary workgroup. For example, if the server is called "Server1", rename it to "Server1-XO". You will be required to reboot this machine. After the reboot completes, the following error appears: "At least one Service could not be started." Ignore this, it is normal under these circumstances because the CA XOsoft Engine usually runs in a domain account.
3. Connect to the network.
4. Rejoin the domain, ensuring that you use the -XO name assigned in step 2.
5. Reboot the computer.
6. 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 now standby.)
7. Wait for synchronization to complete. Perform a manual switchover to make the Master server active. It is recommended that you do so outside of normal business hours.

Manually Recover Failed Server-IP and Switch Name

To manually recover a failed server when both IP and Switch Computer Name Redirection are used

1. Repair any hardware problems that could have caused the switchover, if any.
2. Reboot the server without a network connection to prevent IP conflicts.
3. From the TCP/IP properties dialog, remove the additional IP address.
4. From the System Properties, Computer Name dialog, change the Computer Name to <ServerName>-XO. For example, if your server is called Server 3, rename it to Server 3-XO.
5. Assign the server to a temporary workgroup.
6. Restart the computer to enable your changes to take effect. When rebooting completes, reconnect to the network now. Ignore the message, "At least one service failed during system startup." This is normal because the CA XOsoft Engine runs in a domain, which is not currently available.
7. Rejoin the domain, making sure you use the -XO name, and reboot again.
8. The reverse scenario begins and the Replica server assumes the active role. Wait while synchronization completes.
9. Perform a manual switchover by clicking the Perform Switchover button from the toolbar, to return the active role to the Master server.

Troubleshooting BES Scenarios

BlackBerry MDS Connection Service fails to stay started

Upon switchover where the Replica server becomes active, all services should start normally without errors. If you observe the MDS Connection Service start and then stop, make sure you have performed the additional configuration steps required to specify script operations on the host servers. For more information, refer to the topic, Configure the BlackBerry HA Server. (see page 59)

BlackBerry Manager shows two servers, with some services unavailable

Verify that you used the same Master hostname when you installed BES software on the Replica server. When you install the BES software on the Replica server, you cannot use the Replica's hostname or both servers are listed in the Manager.

Example

Suppose the following names are assigned:

- Master: BBS
- Replica: BBS-DR

When you install BES software on the Replica server, assign the Master hostname (BBS), not the Replica hostname. This ensures no conflicts occur after switchover.

Troubleshooting BBHA Script

The BBHA script has a log that contains the commands sent to the script and if those commands resulted in success or error. The following exit codes and error descriptions can also be found in the BBHA.VBS script, at the top of the file.

1 Invalid argument passed to Cscript.exe. This often is an issue with the quotation marks.

0 Successful

-1 One or more host pairs are identical

-2 Missing or improper argument usage

-3 Unable to bind to WMI provider or connect to local host

-4 Unable to bind to WMI provider or connect to DNS server in domain

-5 Unable to bind to WMI provider or connect to remote host

-6 DNS pointed at replica but services started on master

-7 DNS pointed at master but services started on replica

-8 Blackberry service error, switchover is necessary

-9 A service failed to stop on one of the hosts

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