

# Crystal Enterprise

## Configuring Multiple File Repository Server Pairs

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### Overview

This document is intended to assist you install and configure multiple File Repository Server (FRS) pairs in a Crystal Enterprise (CE) 8.5 environment. The discussion assumes that the FRS pairs are installed on a Microsoft Windows operating system. The intended audience is CE administrators with full administrative access to the computers hosting CE components.

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## Introduction

This paper includes information on the following topics:

- CE 8.5's concept of active and passive FRS services.
- How to install and configure the FRS services.
- How to test failover.
- Issues that may be encountered during failover.

## Active and passive Input and Output FRS Services

CE 8.5 supports multiple Input and Output File Repository Server (FRS) services, or pairs. The first FRS pair to start and register with the APS cluster is considered the active FRS pair while all other FRS services are considered passive. While multiple FRS services run simultaneously, only the active FRS pair services requests. If the active FRS pair fails, the second FRS pair that registered with the APS cluster is promoted to active status. When the previously active FRS pair is operational again, it registers as the passive FRS.

<b>NOTE</b>	References to multiple FRS services.  "Multiple FRS services", also called "FRS pairs", refers to having more than one FRS of the same type (Input or Output) running on the same computer or in the same environment. Having one Input and one Output FRS on the same computer or environment does not constitute having multiple FRS services.
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Multiple FRS services are implemented to provide server or site redundancy for failover. For this reason, each FRS pair is installed on a different computer.

### Each FRS stores its files in its root directory

For each FRS service, you must configure a root directory – a disk resource where the FRS stores, updates, and deletes files in the system. Input and Output FRS services cannot share the same root directory. FRS services of the same type can share the same root directory or have separate root directories. If they have separate root directories, the two root directories must be synchronized so that if the active FRS fails, the new active FRS has access to all necessary information to service requests without error.

To understand the considerations of successful directory replication, it is first necessary to understand the activities of the Input and Output FRS services.

### How the Input FRS manages files

Each time a report is added to the CE system, it is sent to the Input FRS. If that report is deleted from the CE system, the Input FRS is invoked to delete the object from its file repository.

Consider the following scenario:

A user adds four reports to the CE system and those four reports are streamed to the active Input FRS for storage. Those four files are replicated to the root directory of the passive Input FRS.

The active Input FRS then fails and the passive Input FRS is promoted to active status. The file repository of the currently active Input FRS must be synchronized so that it has access to these four new files.

The user then deletes two of the existing reports and adds two more.

Before the system can fail back to the original Input FRS without errors, replication must be reversed so that the 2 reports that were added exist in the root directory and the 2 reports that were removed no longer exist in the root directory.

<b>IMPORTANT</b>	If your FRS services use separate root directories, it is important to note that CE does not manage the required two-way replication. A third party application or service provided by the operating system is required for this replication.
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## Using a common root directory

In all cases, it is easier to have the FRS services use a common root directory to eliminate the need for directory replication. That is, all Input FRS services use a common root directory and all Output FRS services use a common root directory. In CE 8.5, the FRS services support using a UNC path for a root directory.

It is important to make sure that you create a highly available root directory so that it does not become a single failure point. There are several hardware and software solutions to do this such as Microsoft NT Cluster Services. For more information on NT Cluster Services go to [www.microsoft.com](http://www.microsoft.com)

## How the CE environment recognizes the FRS services

To be recognized correctly, each server in a CE system must have a unique name. When the CE installation creates the servers, it uses the naming convention of **ComputerName.ServerType** to take care of this. Because computer names are unique on the network, these server names are always unique and therefore can all be part of the same CE environment.

However, the installation does not use this naming convention when creating the Input and Output FRS services. It simply names them "Input" and "Output". Therefore, when the Input and Output FRS services are installed on a second computer, another "Input" and "Output" are created.

The second pair of FRS services to start up does not register with the APS. If the services are installed on Microsoft Windows NT4 or 2000, the Event log records this failure.

To successfully configure active and passive FRS services, the Input and Output FRS services must have unique names. The procedure outlined in this paper involves recreating the FRS services so they have unique names. These steps are outlined in the [Configuring active and passive FRS Pairs](#) section of this paper.

## Configuring active and passive FRS pairs

### Overview of steps

There are a number of steps that must be taken to successfully configure multiple FRS pairs. These steps are explained in detail in the following sections of this paper and are briefly listed below.

1. Note how each FRS server is configured. Go to **Manage Servers** in the CMC and view the properties of each FRS in the environment. Make a note of the root directory the environment and the FRS server is using.
2. Stop each FRS.
3. Create a network share point to be used by the FRS pair.
4. Copy the file stores to the new share point.
5. Delete all FRS services on each computer using the CCM and the CMC.
6. Recreate and start the new FRS pairs.
7. Reconfigure the FRS services' root directories.
8. Restart the servers so the configuration changes take effect.
9. Enable the servers.
10. Test the system to ensure functionality and failover.

### Preparing the File Stores

This paper discusses a system in which each FRS type uses a common file store, which is a UNC path to a network share.

To avoid the file server or the share point being a single point in failure, consider creating a high availability file store such as one managed by NT Cluster services.

To create one file store for each FRS type, complete the following steps:

1. With the FRS services running, open the CMC and click the **Manage Servers** button. Choose each FRS and view the **Properties** tab. Note the location of the input and output files so that later, you can copy these files to the new location.

The default location of the root directories is C:\Program Files\Crystal Decisions\Enterprise\FileStore\Input and C:\Program Files\Crystal Decisions\Enterprise\FileStore\Output.

2. Stop all FRS services.
3. Create a share point on the file server. Use Share level permissions to secure the folder and do not use a hidden share point. Using a hidden share point is not supported by Crystal Decisions. Set the permissions so that a domain user account has at least **Change** rights. Remove all other users and groups so that only the domain user has access. The FRS services will be configured to run under this same domain user account in later steps. Removing permissions for all other users and groups ensures that only the FRS services have access to the File store.

4. Create “Input” and “Output” sub-folders at the share point and copy the contents of the Input and Output FRS services’ root directories to these new folders on the share point.

<b>NOTE</b>	Copy the file store to the new location instead of moving it. If there is a problem restarting the new FRS after changing its configuration in the Crystal Configuration Manager, the server only starts if it can resolve the original location of the root directory. If this does not exist because the files were moved, the server fails to start and the name must be resolved by modifying the registry directly. For this reason, it is recommended that the file store be copied instead of moved to the new location. Once everything is operating correctly with the new configuration, the original file store can be deleted.
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5. Do not restart the FRS services.

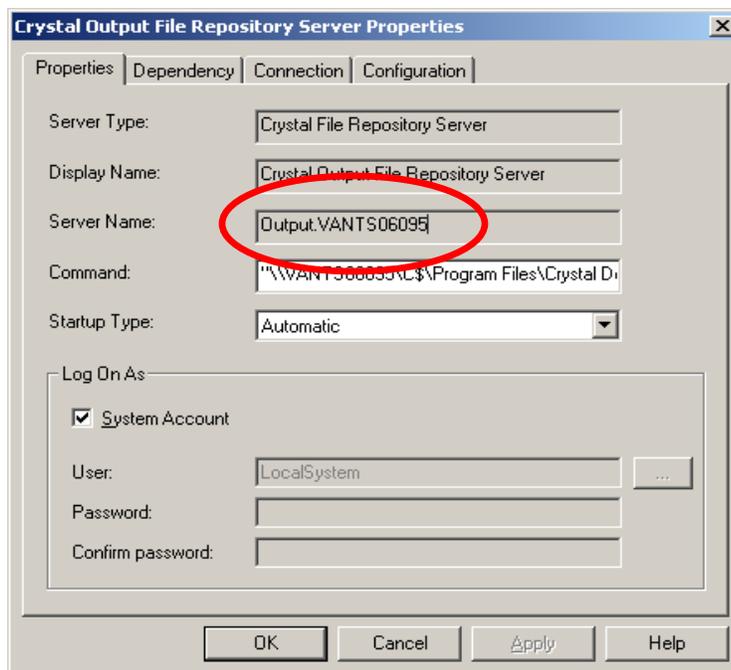
## Deleting and recreating all FRS services

Next, the FRS services must be deleted and then recreated so that they have unique names. The reason for this was discussed in the [How the CE environment recognizes the FRS services](#) section of this paper. If you have already done this, go to the [Configuring the root directories](#) section below.

To give the FRS services unique names, you must delete and recreate the FRS services. To do this, complete the following steps:

1. In the CCM, right-click the Crystal Input File Repository Server and select **Stop** from the submenu.
2. When the service has stopped, click the **Delete** icon to delete the service.
3. Click the **Add Server** icon and follow the prompts in the Add Crystal Server Wizard to create a new Input FRS. For detailed steps on adding a server, refer to the Crystal Enterprise Administrator’s Guide or the CE Online Help by pressing the **F1** key and looking up “Servers”.
4. Right-click the new Input FRS and select **Properties** from the submenu. Note the new Server Name. It is now **Input.computername** instead of just **Input**.
5. Repeat steps 1-4 for the Crystal Output File Repository Server.

Upon viewing the properties of the newly added servers, note that the server name is now qualified with the computer name as shown in Figure 1.



**Figure 1**

## Setting the FRS services' accounts

Because each FRS type uses a UNC path for a root directory (a network resource), their logon accounts must be changed from the default System account to a domain user account that has at least **Change** rights to the share point you have created.

Each FRS service must be reconfigured to run under the domain account that you gave **Change** permissions to on the share point created earlier.

To do this, complete the following steps:

1. In the Crystal Configuration Manager (CCM), right-click the stopped Input FRS and select **Properties** from the submenu.
2. Clear the **System Account** check box.
3. Change the **User** box from "LocalSystem" to the domain account you created.
4. Type the password in the **Password** and **Confirm password** boxes.
5. Click **Apply** and then click **OK**.
6. Repeat steps 1-5 for each Input and Output FRS on each computer.

Now that the FRS services have been added to each computer under a domain account they must be started, reconfigured, and enabled.

## Starting the new FRS servers

To start the servers, complete the following steps:

1. Go to the CMC and click **Manage Servers**.
2. Click the **Selected** check box to the right of each Input and Output FRS and then click the **Start** button. Alternatively, you could use the CCM to start the services on each computer.

<b>IMPORTANT</b>	<b>Do not enable the servers at this time.</b> Before an FRS' root directory can be configured in the CMC it must be running but it does not have to be enabled. If the server is running but not enabled, CE does not use it in its environment. This allows you to ensure the server is configured correctly before it is used by the system.
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If a server fails to start, the cause is likely the server's inability to resolve its root directory. If the server is installed on Microsoft Windows, check the Application Event Log for details. You will see a critical stop error with the following message:

“Cannot find the root directory ‘<root directory name>’ to start the File Repository Server.”

If you cannot resolve starting the server, do not hesitate to contact Crystal Decisions Technical Support.

## Configuring the root directories

As stated previously, to avoid the problems associated with synchronizing individual root directories, each FRS type (Input or Output) discussed in this document uses the same root directory. The root directory is a UNC path that must always be available. Using NT cluster services is one way to ensure this.

To set the root directory, complete the following steps:

1. In the CMC, click **Manage Servers**.
2. Click one of the Input FRS services and then click the **Properties** tab.
3. In the **Root Directory** field, type the share point you created for the Input FRS (\\Computer\_Name\Share\_Point\Input).
4. Click **Apply**. You will receive a prompt saying that the services will be restarted. Click **OK** so the changes take effect immediately.
5. Repeat steps 2 – 4 for the other Input FRS services and for each Output FRS service, changing the root directory to \\Computer\_Name\Share\_Point\Output.

## Enabling the FRS servers

The Input and Output FRS services are now properly configured and the files stores have been moved to avoid loss of information. The final step is to enable the servers so that they are used by the system.

To do this, complete the following steps:

1. Go to the CMC and click **Manage Servers**.
2. Click the **Selected** check box to the right of each Input and Output FRS.
3. Choose Enable.

With the new servers created, configured and enabled, the system is ready to test.

## Testing the system

There are two stages of testing to be done at this point. The first is to test each FRS pair individually to ensure that they work correctly. The second is to test failover between FRS pairs.

### Testing each FRS pair individually

To test each pair individually, complete the following steps:

1. Assuming that you now have an Input and Output FRS pair running on more than one computer, leave the services running on the computer you are going to test first and stop all other Input and Output FRS services.
2. Confirm that you can do the following things:
  - add reports to the system using both the CMC and the Crystal Publishing Wizard
  - view reports on demand.
  - schedule reports
  - view instances
3. Stop this first FRS pair and start another FRS pair you have configured in the system.
4. Repeat steps 1-4 using each FRS pair you have configured.

### Testing failover between FRS pairs

Now that you have confirmed that the individual FRS pairs are functioning correctly, it is time to test failover and failback. To do this, complete the following steps:

1. Ensure that all FRS services are stopped.
2. Restart the FRS pair on the computer you want to act as the active FRS pair. Remember that the first FRS pair to register with the APS is the active FRS pair.
3. Start the FRS pairs on any subsequent computers to act as the passive FRS services.
4. Have a user or users schedule and view several reports. As the user or users are doing this, stop the active FRS services. Confirm that failover to the passive FRS services happens without error or with only the errors discussed in the [Issues that may occur during FRS failover](#) section of this document.

5. While the system uses the passive FRS services that have been promoted to active FRS services, confirm that the user or users can perform the following tasks:
  - add reports to the CE system
  - view reports on demand
  - view scheduled instances
  - modify existing reports (for outlined steps, see the **Test report modification** section of this document)
6. Restart the FRS services that you stopped in step 4. Continue to test the functionality outlined in step 5 as you shut down the active FRS pair to confirm that you can fail back to the original active FRS pair.

### Test report modification

To ensure that you can modify existing reports, complete the following steps:

1. In the CMC click **Manage Objects** and then click the report you want to modify.
2. Click the **Properties** tab and note the path to the object in CE. This path is in the **File Name** field.
3. In Windows Explorer, browse to the physical location of the report and note the file size and date.
4. Open the report, and in the Windows Explorer click the **Enterprise Folders** option and log into the APS as shown in Figure 2.

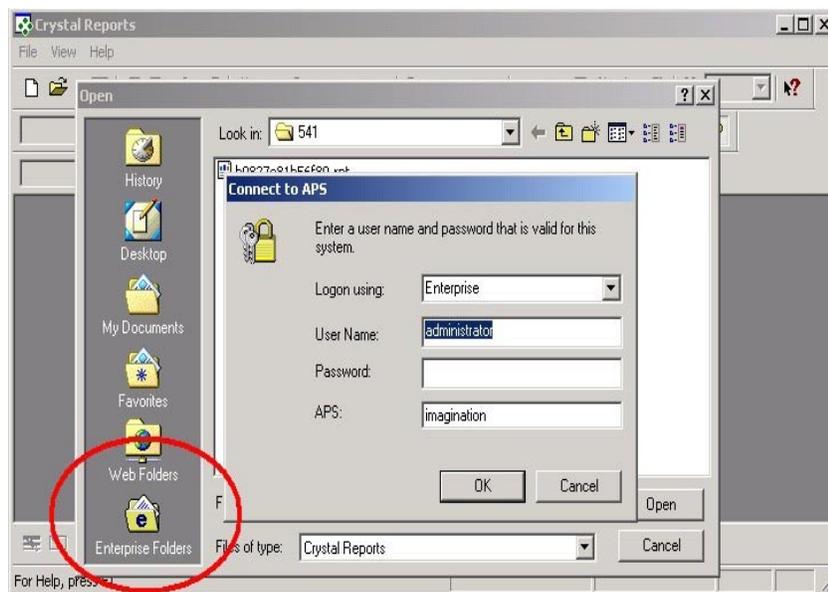


Figure 2

5. Make a change to the report and save it. The change should be something you will notice easily such as modifying the record selection or the report formatting.

6. Return to Windows Explorer and confirm the file date has changed. Close the report and CR.
7. In the CMC, refresh the report and then view it. Be sure to click the **Refresh** button before clicking the **Preview** button to ensure you view the newest copy of the report.
8. Make sure that the changes you made to the report are visible in CE.

## Issues that may occur during FRS failover

### Error Message: “File Repository Server Input is down” or “File Repository Server Output is down”

This error message may appear when a user attempts to view either an on demand report or a report instance.

When an on demand report is viewed, the Page Server requests the report template from the Input FRS. If the Input FRS is not available the following error message appears in the browser:

```
“Error encountered by Crystal PageServer  
The error message returned is:  
File Repository Server Input is down. [On Cache/Page Server:  
Servername.pageserver]”
```

If a successfully scheduled report instance is viewed, the Page Server requests the report with saved data from the Output FRS. If the Output FRS is unavailable the following error message appears in the browser:

```
“Error encountered by Crystal PageServer  
The error message returned is:  
File Repository Server Output is down. [On Cache/Page Server:  
Servername.pageserver]”
```

These error messages appear because while the failover from the active FRS services to the once passive FRS services occurs, the FRS services are momentarily unavailable to the Page Server. This error message appears if an attempt is made to view a report during that brief moment.

If the viewer is closed and the report request is made again, it is successful because the failover is complete.

### Scheduled reports may fail

Scheduled reports can fail if either the Input or Output FRS is not available when the Job Server makes the report request. This happens because the Job Server first requests the report template from the Input FRS and when it is finished processing the report it streams the report with saved data to the Output FRS. If either of these services is unavailable, the scheduling process fails.

One way to resolve this is to configure each object to retry if it fails when scheduled. To do this, complete the following steps:

1. Open the CMC and click **Manage Objects**.

2. Click the report object you want to schedule and then click the **Schedule** tab.
3. Change the value in the **Number of retries allowed** box from zero to three. The default value of this box is zero.

Now when the report is scheduled, if it fails, the Job Server notifies the APS of the failure. Rather than updating the instance to “Failed” status, the APS has another available Job Server process the report again to a maximum to three times. If the report fails on the third retry, the APS updates the status of the instance to “Failed”.

If the failure is the result of the FRS services not being available because they were in the process of failing over, the retry resolves creating unnecessary failed instances.

## Contacting Crystal Decisions for Technical Support

We recommend that you refer to the product documentation and that you visit our Technical Support web site for more resources.

**Self-serve Support:**

<http://support.crystaldecisions.com/>

**Email Support:**

<http://support.crystaldecisions.com/support/answers.asp>

**Telephone Support:**

<http://www.crystaldecisions.com/contact/support.asp>