

# **Express5800/320Ma: Active Upgrade™ User's Guide**

NEC Solutions (America), Inc.  
NR017W

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NEC Solutions (America), Inc.  
10850 Gold Center Drive, Suite 200  
Rancho Cordova, CA 95670

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## Purpose of This Manual

The *Express5800/320Ma: Active Upgrade™ User's Guide* describes the Active Upgrade process, which allows you to upgrade system software and applications on an Express5800/320Ma system while its critical applications remain online and accessible to users.

The manual provides an overview of the Active Upgrade process, specifies the requirements and procedures necessary to prepare the system for the upgrade process, and explains how to configure and execute the upgrade process using the Active Upgrade console. It also provides information about troubleshooting the Active Upgrade process if a problem occurs.

### NOTES

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1. The information in this manual is also contained in the **Active Upgrade Help** file, which is available in the Active Upgrade console and in the Start menu of your system in the **Express5800/320Ma** folder (after you install the Active Upgrade software).
2. For the latest information about Active Upgrade technology, including any issues that were discovered after this release, see the *Express5800/320Ma: Active Upgrade User's Guide* online at <http://support.necsam.com/servers/>.

## Audience

This manual is intended for system administrators who will prepare for and execute an Active Upgrade on an Express5800/320Ma system. It assumes that you are familiar with administering Express5800/320Ma systems.

## Notation Conventions

This document uses the notation conventions described in this section.

## Warnings, Cautions, and Notes

Warnings, cautions, and notes provide special information and have the following meanings:



## WARNING

A warning indicates a situation where failure to take or avoid a specified action could cause bodily harm or loss of life.



## CAUTION

A caution indicates a situation where failure to take or avoid a specified action could damage a hardware device, program, system, or data.

## NOTE

A note provides important information about the operation of a system.

### Typographical Conventions

The following typographical conventions are used in Express5800/320Ma system documents:

- The bold font emphasizes words in text or indicates text that you type, the name of a screen object, or the name of a programming element. For example:

**Before** handling or replacing system components, make sure that you are properly grounded by using a grounded wrist strap.

In the **System Properties** dialog box, click the **Hardware** tab.

Call the **RegisterDeviceNotification** function.

- The italic font introduces new terms and indicates programming and command-line arguments that the user defines. For example:

Many hardware components are *customer-replaceable units* (CRUs), which can be replaced on-site by system administrators with minimal training or tools.

**copy** *filename1 filename2*

Pass a pointer for the *NotificationFilter* parameter

- The monospace font indicates sample program code and output, including message text. For example:

```
#include <iostream.h>
```

*The operation completed successfully.*

## Getting Help

If you have a technical question about Express5800/320Ma hardware or software, try these online resources first:

- **Online support from NEC Technical Support.** You can find the latest technical information about an Express5800/320Ma through online product support at the [NEC Technical Support Web site](#):

<http://support.necsam.com/servers/>

- **Online product support for Microsoft® products.** Your primary source for support is the computer manufacturer who provided your software, or an authorized Microsoft Support Provider. You can also find the latest technical information about Microsoft Windows® and other Microsoft products through online product support at the [Microsoft Help and Support Web site](#):

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

If you are unable to resolve your questions with the help available at these online sites, and the Express5800/320Ma system is covered by a service agreement, please contact [NEC Technical Support](#) (866-269-1239).

## Notices

- All regulatory notices are provided in the site planning guide for your system.
- Although this guide documents modem functionality, modems are not available for all systems. Ask your sales representative about modem availability.
- ActiveService Network (ASN) is not currently available, but may be ordered in the future.



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# Chapter 1

## Overview

Active Upgrade™ technology allows you to upgrade system and application software on an Express5800/320Ma system with minimal downtime.

Instead of taking your system offline to run upgrade procedures, you can use Active Upgrade technology to split the system into two independently running systems, one *side* of which you upgrade while the other side continues to run your applications without interruption.

To learn more about Active Upgrade technology, see the following topics:

- “Features”
- “Overview of the Active Upgrade Process” on page 1-2
- “Active Upgrade State Model” on page 1-9

### NOTE

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For the latest information about Active Upgrade technology, including any issues that were discovered after this release, see the *Express5800/320Ma: Active Upgrade User's Guide* online at <http://support.necsam.com/servers/>.

## Features

Active Upgrade technology allows you to do the following:

- Install software updates with minimal disruption to your critical applications.

Your business-critical applications continue to run on one side of the system while you install software on, and even restart, the other side. There is only a brief disruption when you are finished installing updates, as your critical applications are restarted on the upgraded software.

- Test the latest software updates in your environment **before** making the updates permanent.

After your critical applications are restarted on the upgraded software, you can verify the success of your software updates in a production environment, with real users and system load. If you want to keep the changes, there is no additional downtime. Otherwise, as quickly as your system can restart, you can abort the upgrade to go back to the original version of your software.

- Abort the upgrade process at any point, until you commit the changes.

If, for any reason, you are not satisfied with an upgrade, you can abort the upgrade session to return the system to its original state. Nothing is permanent until you choose to commit the changes. (Also, if you abort the upgrade early enough in the process, before testing the software in your production environment, your critical applications are not disrupted.)

### Related Topics

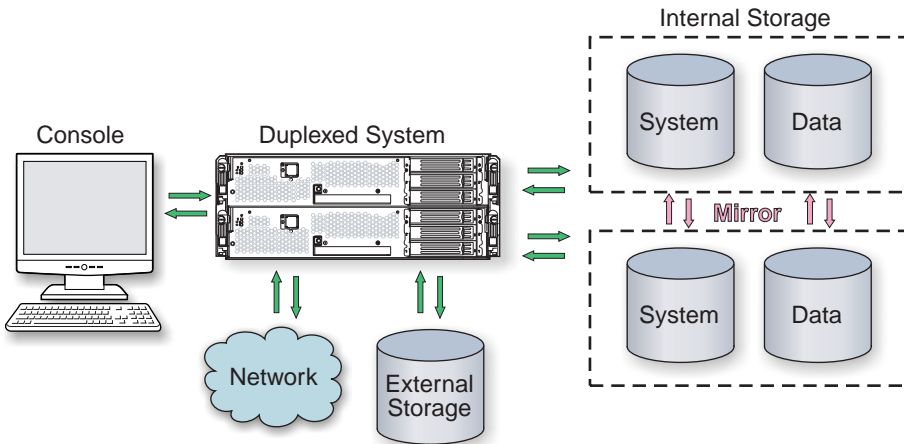
- [“Overview of the Active Upgrade Process”](#)
- [“Active Upgrade State Model” on page 1-9](#)
- [“Software Upgrade Support” on page 2-1](#)
- [“System Prerequisites” on page 2-2](#)

## Overview of the Active Upgrade Process

The Active Upgrade process involves the following basic steps:

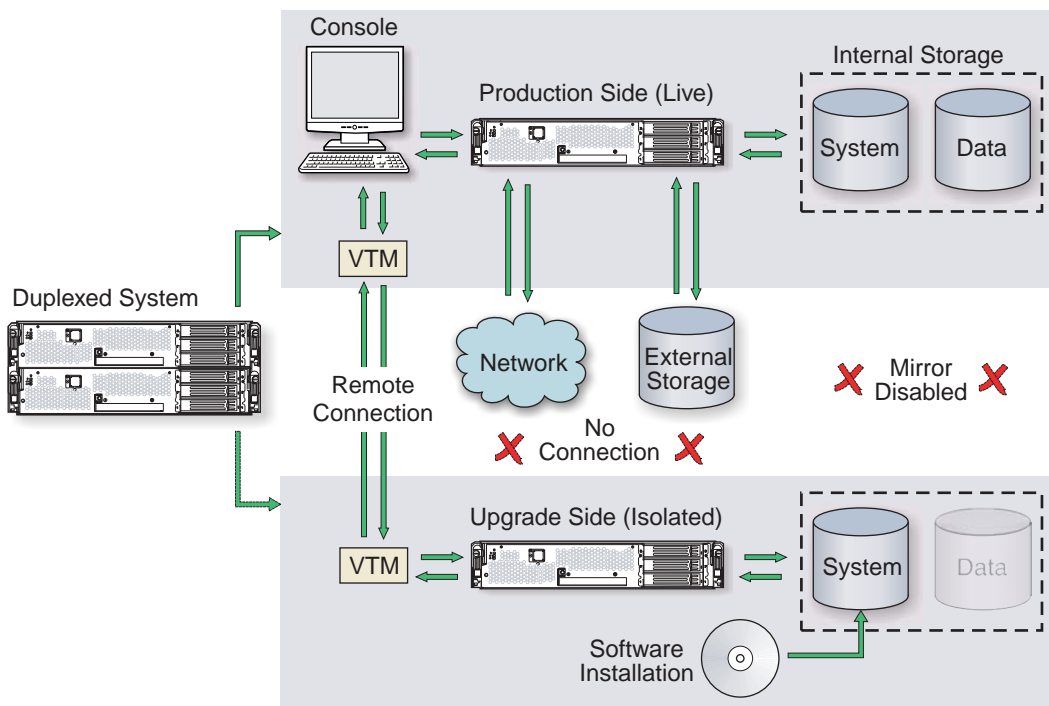
1. You prepare your system to ensure it meets the prerequisites of the upgrade process.
2. You use the Active Upgrade console to select the disks that are affected by the software upgrade and to provide information about any applications or services that require special handling during the upgrade process.
3. You run a readiness check in the Active Upgrade console to confirm that your system meets the prerequisites for the upgrade process.
4. You start the upgrade process by initiating *split mode*, which divides the fault-tolerant, duplexed system ([Figure 1-1](#)) into two independent, simplex systems ([Figure 1-2](#)) — a *Production Side*, which continues to run your applications, and an *Upgrade Side*, on which you can run software installation packages.

Figure 1-1. Duplexed System



duet001

Figure 1-2. Splitting the System



duet002

As shown in [Figure 1-2](#), when you split the system, the Active Upgrade console disables any Rapid Disk Resync (RDR) mirroring between the internal disks in each CPU-I/O enclosure and isolates the Upgrade Side from system resources such as the network, any user-specified application data disks, and any external PCI resources. It also disables user-specified applications and services on the Upgrade Side so they cannot restart if you restart the Upgrade Side.

Meanwhile, the Production Side retains access to system resources and continues to run your applications uninterrupted.

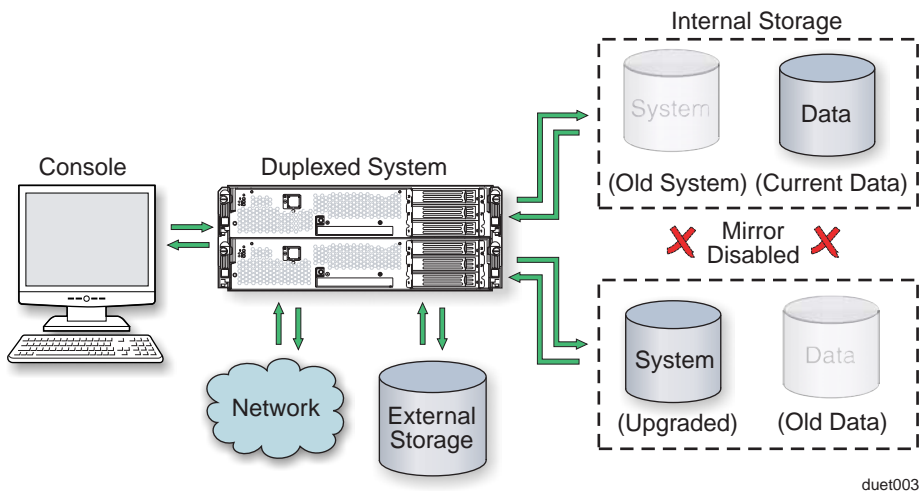
5. After the system successfully enters split mode, you establish a remote connection to the Upgrade Side of the system through the private network that exists between the VTM adapters in each CPU-I/O enclosure. Using this remote connection, you can perform any of the following upgrade tasks **on the Upgrade Side**:
  - Run software installation programs (see [“Software Upgrade Support” on page 2-1](#) for restrictions).
  - Restart the operating system, if necessary.
  - Perform limited testing of the installed updates. (The Upgrade Side has no access to the network or application data disks during this stage.)

You can also completely abort the upgrade from the Active Upgrade console, if necessary.

6. When you are finished installing software on the Upgrade Side, you disconnect the remote connection to the Upgrade Side and initiate the *merge* process.

When you merge the system, the Active Upgrade console stops your applications on the Production Side and unmounts any application data disks to ensure that pending disk updates are flushed to disk. It then merges system resources so that the network and application data disks become available to the whole system again. With the exception of the internal disks, all critical system resources return to duplex mode ([Figure 1-3](#)).

Figure 1-3. Merged System



Finally, the system restarts your applications, including the Active Upgrade console, from the Upgrade Side system disk. Depending on the complexity of your applications and the upgrade you performed, your applications may be back up and running in under a minute.

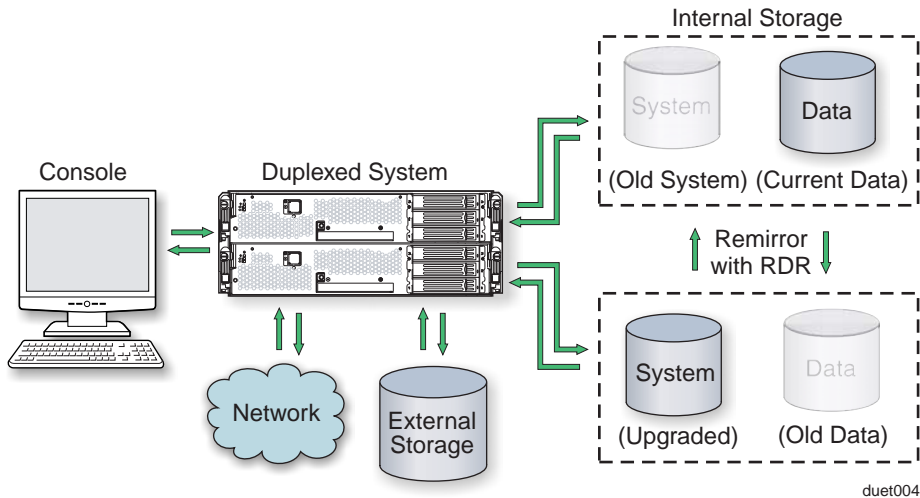
7. After the system is successfully merged, you can test your applications and verify the success of your upgrades with full access to the system's resources. If you discover a problem, you can still abort the upgrade process and restore the system to its previous state, because the original copy of your system disk (on the Production Side) has not been overwritten yet.
8. When you are certain that the upgrades were successful, you can *commit* the changes to make them permanent.

When you commit the changes, the Active Upgrade console resynchronizes the RDR disks in your system by **overwriting** the original Production Side system disk and stale Upgrade Side data disks with their partner disks, which are up-to-date (Figure 1-4).

#### NOTE

Because the original version of your system disk is erased during the commit process, you **cannot** abort an upgrade session after initiating the commit process.

**Figure 1-4. Committing the Upgrade**



duet004

When the RDR disk resynchronization is finished, all critical system resources are running in duplex mode, and the Active Upgrade process is complete. You do not need to restart the system, and, because your application is already running on the upgraded software, there is no additional downtime.

### Related Topics

- [“Aborting the Active Upgrade Process”](#)
- [“Active Upgrade State Model” on page 1-8](#)
- [“Active Upgrade State Model” on page 1-9](#)
- [“Software Upgrade Support” on page 2-1](#)
- [“System Prerequisites” on page 2-2](#)

### Aborting the Active Upgrade Process

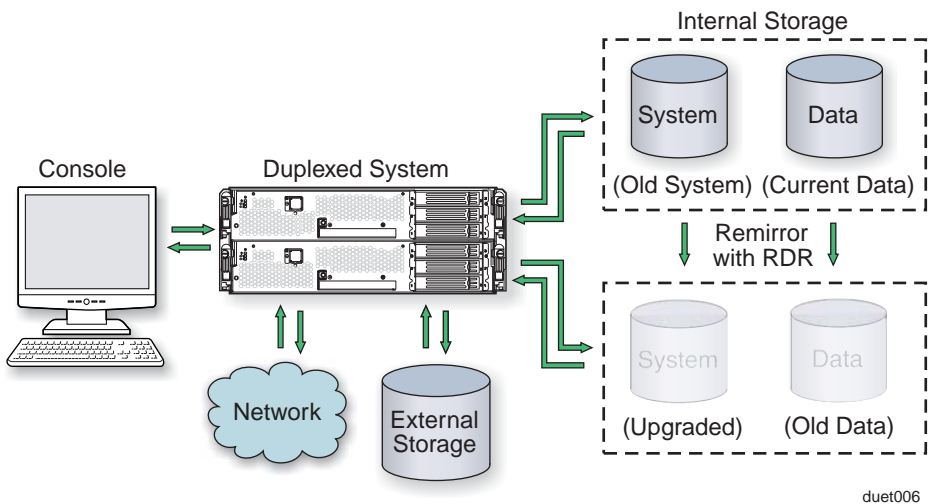
Aborting the Active Upgrade process stops the current upgrade session and returns your system to its original state. If necessary, you can abort an upgrade session at any point up until you commit the upgrade.

If you abort the upgrade session while the system is in split mode, no downtime is incurred. Your applications continue to run on the Production Side while the Active Upgrade console restores the system to duplex mode.

If you abort the upgrade session while the system is in merge mode, a short period of downtime is incurred while the Active Upgrade console initiates a system restart. The Active Upgrade console shuts down the Upgrade Side and restarts the system from the Production Side, which automatically restarts your applications from the Production Side. The period of downtime is only as long as it takes your system and applications to restart.

In either case, the abort process uses RDR resynchronization to restore the internal disks to their original state by **overwriting** the unwanted Upgrade Side system disk and stale Upgrade Side data disks with their original partner disks (Figure 1-4).

**Figure 1-5. Aborting the Upgrade**



After you abort the upgrade process, you can start another upgrade session as soon as the RDR disk resynchronization is complete.

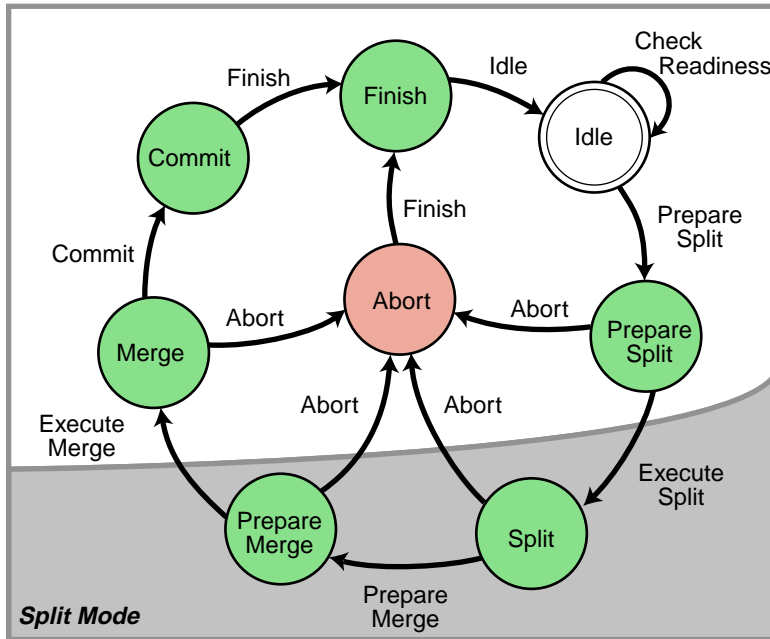
### Related Topics

- [“Active Upgrade State Model”](#)
- [“Overview of the Active Upgrade Process” on page 1-2](#)
- [“Active Upgrade State Model” on page 1-9](#)
- [“Software Upgrade Support” on page 2-1](#)
- [“System Prerequisites” on page 2-2](#)

## Active Upgrade State Model

The state model in [Figure 1-6](#) shows all of the possible Active Upgrade states, and the order in which they occur during the Active Upgrade process.

**Figure 1-6. Active Upgrade State Model**



duet005a

The state model helps to demonstrate the sequence of events in the Active Upgrade process, as follows:

1. All upgrade sessions start in the Idle state, where you can run the readiness check as many times as necessary to verify that your system meets the prerequisites of the upgrade process. The system continues to run normally, and both sides of the system continue to be synchronized.
2. When you start an upgrade session, the Active Upgrade console switches to the PrepareSplit state, during which it runs a final readiness check and additional background tasks. If the system is ready, the console immediately switches to the Split state and proceeds to divide the system into two independently running systems.

**NOTE**

After the upgrade session leaves the Idle state, you must complete the full upgrade process in sequence or abort the process altogether. You cannot go back to a previous state or skip states, and you cannot proceed to the next state if the upgrade is in a Broken or Busy operational state.

3. When you are done installing software on the Upgrade Side and you start the merge process, the Active Upgrade console switches to the PrepareMerge state, during which it runs additional readiness tests and background tasks. If the system is ready, the console immediately switches to the Merge state and restarts your applications on the Upgrade Side.
4. When you are satisfied that everything is working correctly and you start the commit process, the Active Upgrade console switches to the Commit state, during which it starts the resynchronization of your RDR disks. You can subsequently start the finish process, during which the Active Upgrade console switches to the Finish state, cleans up system resources, and then returns the system to the Idle state. The upgrade session is complete.

If necessary, you can abort the upgrade process from the PrepareSplit, Split, PrepareMerge, and Merge states. When you abort an upgrade session, the Active Upgrade console switches to the Abort state, during which it restores your system to its original configuration and starts the resynchronization of your RDR disks. You can subsequently initiate the finish process, as you would after committing an upgrade.

Alternatively, you can retry any of the Active Upgrade states to recover the system from a transient failure and move on to the next states without aborting the entire upgrade session.

All of these Active Upgrade states are reported in the activity log and status bar of the Active Upgrade console during the upgrade process. See [“Understanding the Active Upgrade Console Interface” on page 2-20](#) for more information.

**Related Topics**

- [“Overview of the Active Upgrade Process” on page 1-2](#)
- [“Active Upgrade State Model” on page 1-9](#)
- [“Software Upgrade Support” on page 2-1](#)
- [“System Prerequisites” on page 2-2](#)



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## Chapter 2

# Preparing for the Active Upgrade Process

Preparing for the Active Upgrade process involves the following tasks:

- Learning about the [types of upgrades](#) that the Active Upgrade process supports.
- Learning about the [prerequisites](#) and [recommendations](#) for your Express5800/320Ma system.
- Learning how the Active Upgrade console can [control your critical applications](#).
- Performing [pre-upgrade tasks](#) on your system, such as:
  - [Installing the Active Upgrade console](#).
  - [Configuring Windows Firewall](#) for the Active Upgrade process.
  - [Configuring a UPS-protected system](#) for the Active Upgrade process.
  - [Gathering information](#) about your system.
  - [Copying any software installation packages to the system](#) **before** the upgrade starts.
  - [Configuring Microsoft Windows Automatic Updates](#).
- [Starting the Active Upgrade console](#).
- [Understanding the Active Upgrade console](#).

## Software Upgrade Support

Active Upgrade technology currently supports the installation of [high-priority updates](#) (also known as hotfixes) for the Microsoft Windows Server 2003 operating system. It also supports the installation or upgrade of application software that meets the following criteria:

- The application's [executable files](#), [configuration files](#), and [temporary files](#) (for example, cache files) reside on internal [system disks](#) that are mirrored with RDR.
- The application's [persistent data files](#) reside on separate [data disks](#), either internal or external. (Data volumes that reside on the same physical disk as a system volume are not supported.)

- The application's installation or upgrade utility does not involve changes to files or databases on the data disks while the system is in split mode. (For example, the utility cannot create new databases or convert existing data records to be compatible with the new version of the application). The Upgrade Side has no access to the data disks while the system is split.

Active Upgrade technology does not support the following types of upgrades:

- Any upgrade that requires network connectivity during the upgrade process.  
For example, you cannot use an installation program that downloads its installation files from the Internet as the upgrade progresses. If possible, you must download the complete installation package to the system prior to initiating split mode.
- BIOS, BMC, or VTM firmware updates, which you can already perform while the system is duplexed and online. See the *Express5800/320Ma: Software Installation and Configuration Guide* for more information.

### Related Topics

- [Overview](#)
- ["System Prerequisites"](#)
- ["Recommendations" on page 2-5](#)
- ["Managing Critical Applications During the Upgrade Process" on page 2-6](#)
- ["Pre-Upgrade Tasks" on page 2-7](#)

## System Prerequisites

Active Upgrade technology is supported **only on Express5800/320Ma 3.2 GHz, 3.6 GHz, and Dual-Core systems** that:

- Are running in duplex mode prior to starting the upgrade process.  
The CPU-I/O enclosures must be duplexed, and all critical resources in the enclosures must be duplexed.

A critical resource is a device (such as a CPU, hard disk, or host bus adapter) that is necessary to maintain fault tolerance. Non-fault-tolerant resources (such as tape drives) connected to the system do not affect the Active Upgrade process.

- Contain **teamed** embedded Ethernet PCI adapters.  
All **embedded** Ethernet PCI adapters must be teamed with the Intel PROSet utility, and each Ethernet team must contain at least one Ethernet PCI adapter from each CPU-I/O enclosure. Furthermore, at least one team of embedded Ethernet PCI adapters must have an active network link in each CPU-I/O enclosure.

All ports on any dual-port adapter must be either teamed or not teamed. You cannot have only one port on an adapter teamed.

You do not need to team non-embedded Ethernet PCI adapters for the Active Upgrade process, but it is best to do so to ensure that the network connectivity provided by these adapters continues to be available throughout the upgrade process. The readiness check in Active Upgrade console displays a warning for each unteamed Ethernet PCI adapter, but the warnings do not prevent you from proceeding with the upgrade process.

#### NOTE \_\_\_\_\_

If you modify the configuration of your Ethernet PCI adapters and Ethernet teams to meet these prerequisites, it could impact network connectivity for the system. You should schedule this work to minimize impact to your critical applications.

See the *Express5800/320Ma: PCI Adapter Guide* for more information about configuring Ethernet PCI adapters and Ethernet teams.

- Contain Virtual Technician Modules (VTMs).

The VTMs provide the connection between the Production Side and Upgrade Side during the Active Upgrade process. Both VTMs must be configured properly and connected to the same subnetwork, preferably on a dedicated maintenance network.

For information about configuring VTM adapters, see the *Express5800/320Ma ActiveService Network Configuration Guide* and the *Express5800/320Ma Virtual Technician Module User's Guide*.

- Can tolerate running in simplex mode for a brief period during the upgrade.

Because each side of the system runs in simplex mode during the upgrade, an interruption on the side that is actively running your critical applications can result in downtime.



#### CAUTION \_\_\_\_\_

You cannot restart the operating system on the Production Side during an upgrade (though you can restart the Upgrade Side as many times as necessary.) Also, it is unsafe to pull an enclosure from a split-mode, simplex system because doing so terminates all processes running on that enclosure.

- Can tolerate a potential decrease in performance during the upgrade.  
For example, if your system contains teamed network adapters that are configured for load balancing or link aggregation, there might be a decrease in network performance when the system is split because the network adapters on the Upgrade Side lose access to the network.
- Are running Express5800/320Ma System Software Release 4.1 or higher.
- Have been updated with the latest firmware to support Active Upgrade technology, including required BMC and VTM updates.

If you have installed Express5800/320Ma System software Release 4.1 or higher, the BMC and VTM firmware image files are available on your system in the C:\Program Files\Stratus\firmware directory. For information about updating the firmware, see the *Express5800/320Ma: Software Installation and Configuration Guide*.

Furthermore, the Active Upgrade process has the following storage requirements:

- All internal hard disks must be configured with RDR and must be duplexed (synchronized) before the upgrade process starts.
- The operating system boot volume and all active Windows operating system components must be located on internal RDR disks. This includes any volumes that contain paging (virtual memory) files for the operating system.
- Any disk that contains software you want to upgrade **cannot** contain [persistent data files](#) for your business-critical applications (those applications that continue to run during the upgrade process). You must store your data files on separate [data disks](#), either internal or external. (Data volumes that reside on the same physical disk as a system or paging volume are also not supported.)
- External storage devices are always considered data disks. You cannot upgrade software on external storage devices, as these devices not available to the Upgrade Side of the system while the system is in split mode.

Also see [“Recommendations” on page 2-5](#) for more information.

### Related Topics

- [Overview](#)
- [“Software Upgrade Support” on page 2-1](#)
- [“Recommendations” on page 2-5](#)
- [“Managing Critical Applications During the Upgrade Process” on page 2-6](#)
- [“Pre-Upgrade Tasks” on page 2-7](#)

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## Recommendations

When preparing your system for the Active Upgrade process, also consider the following recommendations:

- If possible, assign static IP addresses for embedded Ethernet teams and VTM adapters.

The Active Upgrade process also supports Dynamic Host Configuration Protocol (DHCP) addresses for these adapters; however, if the DHCP server becomes unavailable during the upgrade process, your system cannot obtain an IP address and configuration when needed. The readiness check in Active Upgrade console reports if the system cannot connect to the DHCP server to renew the leases for your DHCP addresses. If this problem occurs, you should resolve the problem with the DHCP server before initiating split mode.

- If your system is protected by Windows Firewall, enable the exceptions for Active Upgrade console and Remote Desktop as shown in [“Configuring Windows Firewall for the Active Upgrade Process” on page 2-10](#).

If Windows Firewall is running, and these exceptions are not enabled, communication between the Production Side and Upgrade Side might fail during the upgrade process.

- If your system is protected by an uninterruptible power supply (UPS), ensure that the CPU-I/O enclosure with A-side power (CPU enclosure 0, I/O enclosure 10) is marked as the **Primary** enclosure in ftSMC before starting the upgrade process. This configuration provides better protection for your system should power fail during an upgrade. See [“Configuring a UPS-Protected System for the Active Upgrade Process” on page 2-11](#) for more information.
- If you have installed QLogic™ SANsurfer® Fibre Channel HBA Software to upgrade the BIOS in your host bus adapter, you should uninstall this utility and reboot the system (or stop the SANsurfer background service) when you are done upgrading the BIOS, otherwise, it may prevent the upgrade process [from successfully entering split mode](#).
- Use caution when applying hotfixes from any source. Applying updates indiscriminately may introduce serious problems to your system.
  - You should install all Microsoft Security hotfixes (identified by the prefix **MS**).
  - Do not install other types of hotfixes, such as Microsoft patches that fix a particular problem, before obtaining validation from NEC Solutions (America), Inc..

Use the Display Hotfix feature of Active Service Manager (ASM) to inquire about Quick Fix Engineering hotfixes (identified by the prefix **QFE**) that are not security related. If NEC Solutions (America), Inc. has not previously validated

the particular QFE hotfix, contact NEC Technical Support or your authorized service representative to request such validation.

For more information about evaluating hotfixes for Express5800/320Ma systems, see the following web page:

<http://www.necsam.com/support/servers/ft/hotfixes.htm>

### Related Topics

- [Overview](#)
- [“Software Upgrade Support” on page 2-1](#)
- [“System Prerequisites” on page 2-2](#)
- [“Managing Critical Applications During the Upgrade Process” on page 2-6](#)
- [“Pre-Upgrade Tasks” on page 2-7](#)

## Managing Critical Applications During the Upgrade Process

The Active Upgrade console allows you to specify how business-critical applications are started and stopped during the Active Upgrade process.

If your system runs business-critical applications, such as Microsoft Exchange Server or SQL Server, these applications can run on only one side of the system—the Production Side—when you split the system. They must be stopped on the other side—the Upgrade Side—to prevent resource conflicts and to allow you to proceed with upgrade tasks. Furthermore, when you merge the system, the same applications must be stopped on the Production Side and restarted on the Upgrade Side, so you can test the applications with the newly-upgraded system disk, and possibly commit the upgrade.

Typically, critical applications are started and stopped automatically by the operating system. For example, your application might be configured to start as a service in the Services Control Manager, or as a startup item in the system registry. But these resources control your applications only when the operating system itself is started or stopped. In most cases, to minimize downtime, the Active Upgrade console executes upgrade operations, like split and merge, **without** restarting the operating system. Therefore, if you want your applications to start and stop at the appropriate times during the upgrade process, you must configure the Active Upgrade console itself to control the applications

Active Upgrade console provides two methods for controlling your critical applications during the upgrade process. The method you use for each application depends on the type of application you want to control:

- Application services

If your application runs as a standard service that already accounts for interdependencies (with other services) and requires no special handling, you can specify it on the **Application Services** page of the Active Upgrade console during the configuration process. On the **Application Services** page, you can select each service you want to manage from the list of services on your system, and, when you start the upgrade process, the Active Upgrade console automatically starts and stops these services at the appropriate times. See [“Selecting Application Services to Control” on page 3-9](#) for more information.

- Custom actions

If you have a custom application or integrated applications from several different software vendors, and you have special executable files that start and stop these applications, you can specify the executable files on the **Custom Actions** page of the Active Upgrade console during the configuration process. Using the controls on the **Custom Actions** page, you can specify when your executable files will run during the upgrade process, and, if you have several files, you can specify the order in which they will run. See [“Configuring Custom Actions” on page 3-12](#) for more information.

### Related Topics

- [“Software Upgrade Support” on page 2-1](#)
- [“Selecting Application Services to Control” on page 3-9](#)
- [“Configuring Custom Actions” on page 3-12](#)

## Pre-Upgrade Tasks

To prepare for upgrading the system, do the following:

1. Ensure that your system meets the requirements and recommendations discussed in [“Software Upgrade Support” on page 2-1](#), [“System Prerequisites” on page 2-2](#), and [“Recommendations” on page 2-5](#).
2. If necessary, plan for the brief downtime associated with restarting your critical applications while [merging](#) the system.
3. Run backups of the system.

4. Verify the integrity of all RDR disks, as follows:
  - a. In ftSMC, expand **ftServer I/O Enclosures** and click **Logical Disk Information**.
  - b. Right-click an RDR virtual disk.
  - c. Select **Verify RDR Virtual Disk**. A message appears stating that the operation completed successfully, meaning that the command has been executed.
  - d. Repeat for each RDR disk.
5. If necessary, upgrade the BMC and VTM firmware to support Active Upgrade technology.
6. If necessary, create a user account for yourself in the local Administrators group on the system.

To install and run the Active Upgrade console, your user account must be in the Administrators group. Furthermore, because the Upgrade Side of the system has no access to the network while the system is in split mode, your administrator account must be a **local** system account, not a domain account.

7. Install the Active Upgrade console as described in [“Installing the Active Upgrade Software” on page 2-9](#).
8. If necessary, enable access for Remote Desktop connections from the Production Side to the Upgrade Side of the system while the system is in split mode, as follows:
  - a. Open the **System** control panel.
  - b. Click the **Remote** tab to display remote settings.
  - c. Under **Remote Desktop**, click the check box next to **Allow users to remotely connect to this computer** to activate it.
  - d. Click **OK** or **Apply** to save the setting.

(You need to use either Remote Desktop or Remote KVM to connect to the Upgrade Side to perform upgrade tasks. For more information, see [“Connecting to the Desktop on the Upgrade Side” on page 4-6](#).)

9. If applicable, enable the exceptions for Active Upgrade console and Remote Desktop in Windows Firewall properties, as shown in [“Configuring Windows Firewall for the Active Upgrade Process” on page 2-10](#).
10. If applicable, ensure that the CPU-I/O enclosure with A-side, UPS-protected power (CPU enclosure 0, I/O enclosure 10) is the primary, active enclosure, as shown in [“Configuring a UPS-Protected System for the Active Upgrade Process” on page 2-11](#).
11. Gather information about your system using the worksheet in [“Gathering Information” on page 2-13](#).
12. If necessary, copy any required software installation packages to the system, as described in [“Copying Software Installation Packages to the System” on page 2-16](#).

When you are finished preparing for the upgrade, [start the Active Upgrade console](#). Follow the on-screen instructions (and this document) to configure the process, then run a [Readiness Check](#) to verify if your system is ready to upgrade.

### Related Topics

- [“Installing the Active Upgrade Software”](#)
- [“Software Upgrade Support” on page 2-1](#)
- [“System Prerequisites” on page 2-2](#)
- [“Recommendations” on page 2-5](#)

## Installing the Active Upgrade Software

### NOTE

---

Your login account must be in the Administrator group to install the Active Upgrade console.

### To install the Active Upgrade console

1. Insert the Active Upgrade Software CD-ROM into one of the CD/DVD drives. If the installation process does not start automatically, do the following:
  - a. Open **My Computer**.
  - b. Right-click the appropriate CD/DVD icon, and click **Explore** in the shortcut menu.
  - c. In the CD/DVD file listing, double-click **install.exe** to start the installation utility.The Active Upgrade Setup Wizard is displayed.
2. Click **Next** to view the end-user license agreement.
3. If you agree to the terms of the license, click the radio button for **I accept...** and click **Next**.
4. Click **Install** to install the files.
5. Click **Finish** to close the wizard.

The setup process installs the Active Upgrade console and associated files in C:\Program Files\Stratus\ActiveUpgrade. It also creates Start menu items under **Stratus** and a shortcut on your desktop for the Active Upgrade console.

### Related Topics

- [“Pre-Upgrade Tasks” on page 2-7](#)
- [Configuring the Active Upgrade Process](#)

## Configuring Windows Firewall for the Active Upgrade Process

The Active Upgrade console requires network access to:

- Communicate with system components and underlying services in the ftServer System Software.
- Allow communication between the Production Side and the Upgrade Side while the system is split, so you can perform upgrade tasks.

If you have enabled Windows Firewall to protect your system, it might prevent you from using some of the features of Active Upgrade console; therefore, you should enable the exception for the Active Upgrade console in your Windows Firewall settings.

### NOTES

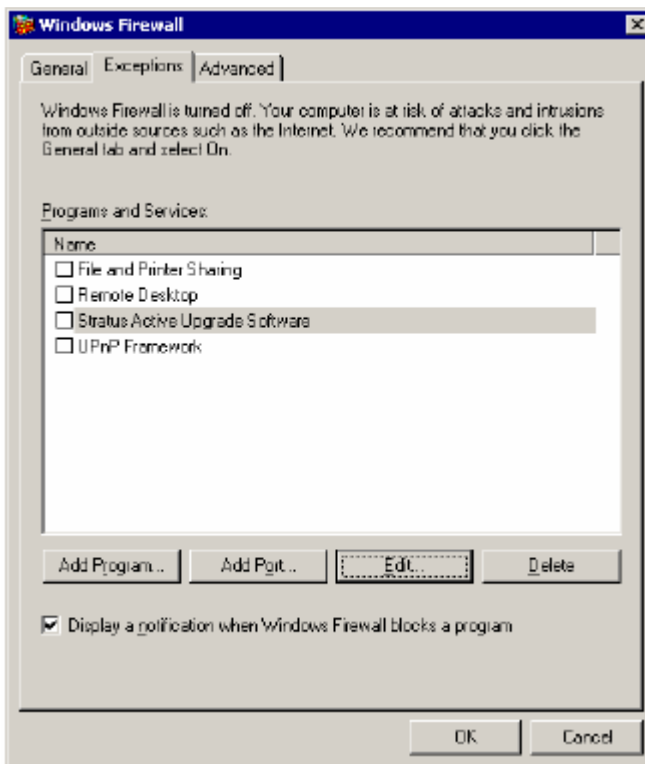
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1. Install the Active Upgrade software **before** modifying your Windows Firewall settings. If Windows Firewall is enabled on your system, the installation process adds an entry for the Active Upgrade console to the list of Windows Firewall exceptions. This entry is disabled by default.
2. If you enable Windows Firewall **after** installing the Active Upgrade software, you can reinstall the Active Upgrade software to add the exception to Windows Firewall.

### To configure Windows Firewall

1. Open the **Windows Firewall** control panel.
2. Click the **Exceptions** tab to display the list of exceptions ([Figure 2-1](#)).
3. Click the check box next to **Active Upgrade Software** to activate it.
4. Click the check box next to **Remote Desktop** to activate it. (This allows you to connect to the Upgrade Side with Remote Desktop while the system is in split mode. See [“Connecting to the Desktop on the Upgrade Side” on page 4-6](#) for more information.)
5. Click **OK** to enable this exception and close the control panel.

Figure 2-1. Windows Firewall Exceptions



### Related Topics

- [“Pre-Upgrade Tasks” on page 2-7](#)
- [Configuring the Active Upgrade Process](#)

## Configuring a UPS-Protected System for the Active Upgrade Process

If your system is protected by a UPS, and you have configured the UPS power connections as specified in the *Express5800/320Ma: Site Planning Guide*, it is best to ensure that the CPU- I/O enclosure with A-side, UPS-protected power (CPU enclosure 0, I/O enclosure 10) is marked as the **Primary** enclosure in ftSMC before starting the Active Upgrade process.

When you initiate the upgrade process and split the system, the primary (active) CPU- I/O enclosure becomes the Production Side of the system. Because the Production Side controls the upgrade session for most of the Active Upgrade process, and also contains the most current version of your data disks during the upgrade process, allowing the Production Side to run on UPS power provides better protection for your system should power fail during an upgrade.

**To check the operational state of the enclosure with UPS (A-side) power**

1. Open ftSMC.
2. Expand **ftServer (Local)**.
3. Expand **ftServer I/O Enclosures**.
4. Click **I/O Enclosure - 10**.
5. Verify that the value for **Op State: Reason** is **Primary** and the value for **ActiveCompatibilityFlag** is **True**.

If the value for **Op State: Reason** is **Secondary** and the value for **ActiveCompatibilityFlag** is **False** under **I/O enclosure 10**, you can manually set this enclosure as the primary enclosure.

**To set the enclosure with A-side power as primary**

1. Open ftSMC.
2. Expand **ftServer (Local)**.
3. Expand **ftServer I/O Enclosures**.
4. Expand **I/O Enclosure - 10**.
5. Expand **VTM adapter - n**
6. Right-click **VTM - n**
7. Click **Set Primary** in the shortcut menu.

When you set the VTM adapter in I/O enclosure 10 as the primary VTM, the UPS-protected enclosure (CPU enclosure 0 and I/O enclosure 10) automatically becomes the primary enclosure.

**NOTE** \_\_\_\_\_

After this procedure, you might need to wait 5-10 minutes for the system components to stabilize and return to full duplex mode before running a readiness check.

**Related Topics**

- [“Pre-Upgrade Tasks” on page 2-7](#)
- [Configuring the Active Upgrade Process](#)

## Gathering Information

Before you start configuring the Active Upgrade process on your system, considering the following questions:

- ❑ After you complete this upgrade, will you ever want to run the same type of upgrade again? If so, plan to create a [configuration file](#) with the details of your upgrade, so you can use it again at a later date.
- ❑ Did your support provider give you a configuration file that you could use as a template for your specific system and the type of upgrade you are performing? Or, do you have settings from other existing configuration files that you want to incorporate into your current configuration? (If applicable, you might be able to use more than one configuration file at a time by [nesting](#) them).
- ❑ Which disks in your system contain the software you want to upgrade? Which disks cannot or should not be upgraded given the prerequisites of the Active Upgrade process? You need to [select these disks](#) before splitting the system.
- ❑ Which software installation utilities are you going to run during the Active Upgrade process? (If you are [copying](#) these to the system from a network resource, you need to do so before initiating split mode.) Do any of these installation programs require access to the network or data disks during the upgrade? (If so, you cannot use them with Active Upgrade technology.)
- ❑ How do you start and stop critical applications on the system you want to upgrade? Are the applications configured as services in the Services snap-in to Microsoft Management Console? Or do you need to run custom actions (executable files such as .bat, .vbs, .exe) to start your applications, possibly in a particular order? You need to identify these [services](#) and [custom actions](#) during configuration to allow the Active Upgrade console to start and stop your applications at the appropriate times during the upgrade process. See [“Managing Critical Applications During the Upgrade Process” on page 2-6](#) for more information.
- ❑ Do you want to preserve Event Viewer log entries that are generated on the Production Side while the system is running in split mode? These log entries are typically lost during the commit process, when the system resynchronizes your RDR disks. If you want to save the files, you can configure the Active Upgrade console to copy them to a backup directory before it commits the upgrade. You can save the standard log files as well as any custom log files you have opened in the Event Viewer.

When you finish answering these questions, you can use the worksheet in [Table 2-1](#) to record your configuration information.

**Table 2-1. Active Upgrade Process Worksheet**

Item	Value
Configuration files to use	<hr/> <hr/> <hr/>
Disks to upgrade	<hr/> <hr/> <hr/>
Disks that cannot be upgraded	<hr/> <hr/> <hr/>
Software installation utilities to run	<hr/> <hr/> <hr/> <hr/>
Application services to start/stop	<hr/> <hr/> <hr/> <hr/>

**Table 2-1. Active Upgrade Process Worksheet (Continued)**

Item	Value
Custom actions to run	<hr/> <hr/> <hr/> <hr/>
Log files to back up	<hr/> <hr/> <hr/> <hr/>

**Related Topics**

- [“Pre-Upgrade Tasks” on page 2-7](#)
- [“Software Upgrade Support” on page 2-1](#)
- [“System Prerequisites” on page 2-2](#)
- [“Recommendations” on page 2-5](#)
- [“Managing Critical Applications During the Upgrade Process” on page 2-6](#)
- [Configuring the Active Upgrade Process](#)

## Copying Software Installation Packages to the System

When the system runs in split mode, the Upgrade Side has no access to the network, or internal data disks; therefore, if you need to download or copy any High Priority updates (hotfixes), installation packages, or disk images (for example, .msi files) to the system, put them on one of the disks you want to upgrade **before** you split the system. You might want to do so even before you run the Active Upgrade console.

Make note of the location of the installation packages so you can find them later.

### NOTE

If your installation packages are on CD-ROM, no action is necessary. You can access the CD/DVD drive on the Upgrade Side while the system is in split mode.

For more information about downloading updates with the Microsoft Windows Automatic Updates utility, see [“Configuring Windows Automatic Updates”](#).

### Related Topics

- [“Configuring Windows Automatic Updates”](#)
- [“Pre-Upgrade Tasks” on page 2-7](#)
- [Configuring the Active Upgrade Process](#)

## Configuring Windows Automatic Updates

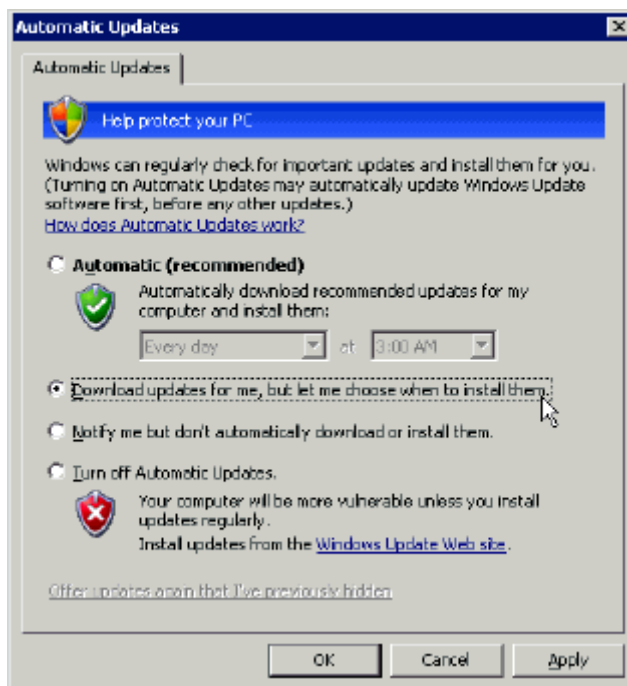
When the system runs in split mode, the Upgrade Side has no access to the network. Windows Automatic Updates requires network access to download software updates; therefore, if you manage High-Priority updates (hotfixes) with Automatic Updates, you must use it to download all of the updates you need to the system **before** you split the system.

You can optionally configure Automatic Updates to automatically download the software updates for you; however, you must be able to install the updates on your own schedule, **while the system is split**.

### To configure Automatic Updates

1. Open the Automatic Updates control panel ([Figure 2-2](#)).
2. Select **Download updates for me, but let me choose when to install them**.
3. Click **OK** to save the configuration.

Figure 2-2. Automatic Updates Control Panel

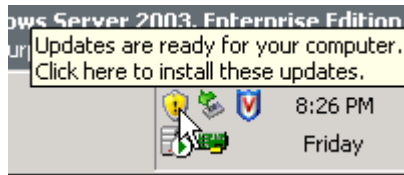


If your company pushes software updates from an enterprise-wide service, like Windows Server Update Services (WSUS), you might need to override the default Automatic Update policies for your system.

Typically, WSUS clients are set to install all critical updates at a time specified by the WSUS administrator. The Automatic Update control panel on the client system can be locked to enforce this policy. If the control panel on your system is locked, you must ask the WSUS administrator for permission to modify your update policies.

After you configure Automatic Updates, the utility starts downloading updates in the background. When it displays an icon indicating that updates are ready to install, you can click the icon (Figure 2-3) to see the list of updates that have been downloaded.

**Figure 2-3. Automatic Updates Icon in System Tray**



### To verify the list of updates

1. Click the Automatic Updates icon to display the **Automatic Updates** dialog box.
2. Select **Custom Install (Advanced)** and click **Next**. The next page displays the list of the updates you downloaded.
3. Check the list of updates against the list of updates that have been evaluated by NEC Solutions (America), Inc. for compatibility. Make note of the updates you can install during the Active Upgrade process.
4. Click **Cancel** to exit the Automatic Updates utility. **Do not select or install updates at this time.**

#### NOTE

You should plan to install all security-related hotfixes, but do not install other types of hotfixes, such as Microsoft QFE patches that fix a particular problem, before obtaining validation from NEC Solutions (America), Inc.

After you have verified and recorded the list of updates you need to install, you are ready to run the Active Upgrade console. To install your updates, click the Automatic Updates icon in the system tray **on the Upgrade Side after you have split the system**. See [“Running Software Installation Programs” on page 4-10](#) for more information.

### Related Topics

- [“Copying Software Installation Packages to the System” on page 2-16](#)
- [“Pre-Upgrade Tasks” on page 2-7](#)
- [Configuring the Active Upgrade Process](#)


## Starting and Exiting the Active Upgrade Console


### NOTES

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1. Your login account must be in the local Administrators group to run the Active Upgrade console. You cannot use a domain account.
2. The Active Upgrade console is not supported over remote connections.

To start the Active Upgrade console, do one of the following:

- Double-click the **ftServer Active Upgrade** console icon  on your system's desktop.
- On the **Start** menu, click **All Programs**, select the **Express5800/320Ma** folder, and click **ftServer Active Upgrade**.

To exit the Active Upgrade console, click the close button (  ) in the upper right-hand corner of the window.

### NOTES

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1. If you are currently editing a configuration file, save the file before exiting the Active Upgrade console.
2. If you exit the Active Upgrade console by mistake during an upgrade task, the program maintains its state. For example, if you exit the Active Upgrade console while you are in the process of splitting the system, the split process continues to run in the background. You can safely restart the Active Upgrade console to continue where you left off.

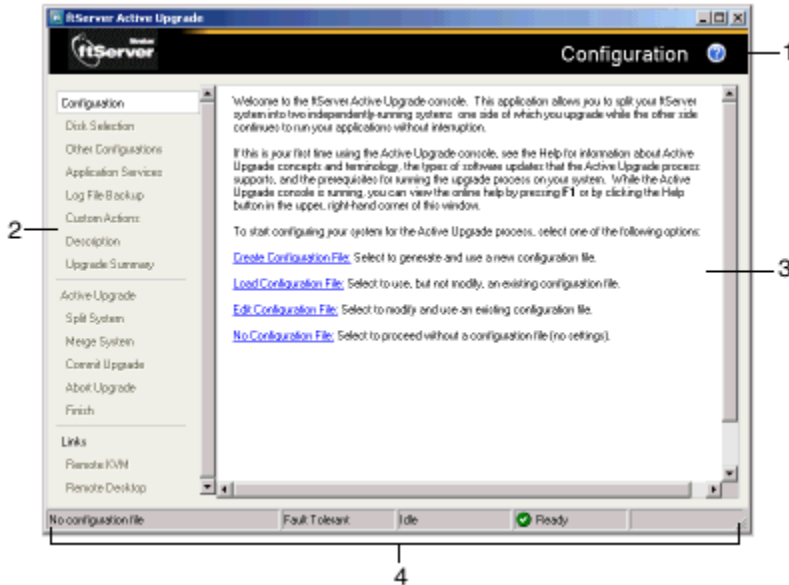
### Related Topics

- [“Understanding the Active Upgrade Console Interface”](#)
- [“Pre-Upgrade Tasks”](#)
- [Configuring the Active Upgrade Process](#)

## Understanding the Active Upgrade Console Interface

The Active Upgrade console window (Figure 2-4) is divided into four major parts: a title bar, a navigation bar, a main window, and a status bar.

Figure 2-4. Active Upgrade console




- 1 Title bar
- 2 Navigation bar
- 3 Main window
- 4 Status bar

### Related Topics

- “Starting and Exiting the Active Upgrade Console”
- “Pre-Upgrade Tasks”
- Configuring the Active Upgrade Process

### Title Bar

The title bar displays the name of the current page of the Active Upgrade console.

The title bar also contains a Help button (  ), which you can click to display the Help topic associated with the current page of the Active Upgrade console.

(You can also access the Help from the Production Side or Upgrade Side by clicking **Start**, **All Programs**, **Stratus**, and **Active Upgrade Help** to open the Help viewer.)

### Related Topics

- [“Starting and Exiting the Active Upgrade Console”](#)
- [“Understanding the Active Upgrade Console Interface”](#)
- [“Pre-Upgrade Tasks”](#)
- [Configuring the Active Upgrade Process](#)

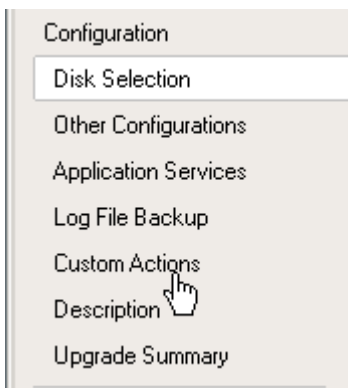
## Navigation Bar

The navigation bar displays your current location in the Active Upgrade console, and, in some cases, allows you to control the Active Upgrade process. The navigation bar is divided into three sections:

- [Configuration](#)
- [Active Upgrade](#)
- [Links](#)

The **Configuration** section of the navigation bar ([Figure 2-5](#)) displays entries specific to configuring your system for the upgrade process.

**Figure 2-5. Navigation Bar: Configuration**



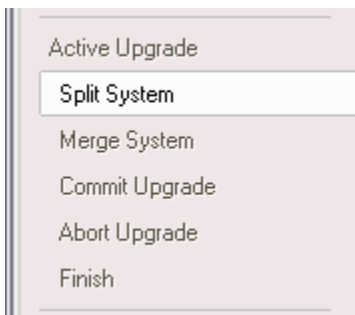
If you are creating or editing a configuration file, you can click any entry in the **Configuration** section to skip directly to the associated configuration page. These pages have the following purposes:

**Configuration** — Allows you to create or select a configuration file to modify, or to start the upgrade process with no configuration file. (When you start the Active Upgrade console, it opens on this page.)

- **Disk Selection** — Allows you to select the disks that contain the software you want to upgrade.
- **Other Configurations** — Allows you to select other configuration files to incorporate into the current configuration.
- **Application Services** — Allows you to select the application services that need to be stopped and restarted during the upgrade process.
- **Log File Backup** — Allows you to select the event log (.evt) files from the Production Side that the Active Upgrade console preserves upon merging the system. (Otherwise, any event messages generated on the Production Side while the system is in split mode are lost when you commit the upgrade).
- **Custom Actions** — Allows you to specify executable files that the Active Upgrade console can use to stop and start your applications (or to perform special tasks) during the upgrade process.
- **Description** — Allows you to specify a title and comments for the current configuration file.
- **Upgrade Summary** — Displays a summary of the current upgrade configuration, and allows you to save the current configuration file.

The **Active Upgrade** section of the navigation bar (Figure 2-6) contains entries specific to the executing the upgrade process.

**Figure 2-6. Navigation Bar: Active Upgrade**



You can click **Active Upgrade** to perform a readiness check, and, if you are still modifying a configuration file, you can click any page in the **Configuration** section to go back and make additional changes.

After you initiate an upgrade session (by clicking **Split** on the **Active Upgrade** page), the navigation bar reverts to a static mode, in which it only indicates where you are in the upgrade process and does not allow you to skip between pages. At that point, you use the controls in the [main window](#) to complete the upgrade process.

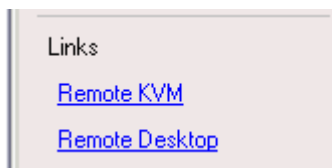
The pages in the **Active Upgrade** section of the navigation bar have the following purposes:

**Active Upgrade** — Allows you to perform a readiness test, and if applicable, to split the system for an upgrade.

- **Split System** — Indicates that the system is entering split mode, and allows you to merge system resources (or abort the upgrade) after you finish running installation packages.
- **Merge System** — Indicates that the system is entering merge mode, and allows you to commit (or abort) the upgrade after you have tested your changes.
- **Commit Upgrade** — Indicates that the system is committing the upgrade, and allows you to finish the process by cleaning up system resources.
- **Abort Upgrade** — Indicates that the upgrade process has been aborted, and allows you to finish the process by cleaning up system resources. (You can abort the upgrade process at any point prior to committing the upgrade.)
- **Finish** — Indicates that the upgrade process is complete and allows you to save a copy of the activity log to a file, start another upgrade, or exit the Active Upgrade console.

The navigation bar also contains the **Links** shown in [Figure 2-7](#), which are active only while the system is running in split mode.

**Figure 2-7. Navigation Bar: Links**



These links have the following purposes:

- **Remote KVM** — Allows you to establish an Advanced Video Redirection session to the Upgrade Side while the system is split to perform upgrade tasks.
- **Remote Desktop** — Allows you to establish a Remote Desktop Connection session to the Upgrade Side while the system is split to perform upgrade tasks.

(For more information about any of these navigation bar entries, click the name of the entry in this Help topic.)

## Related Topics

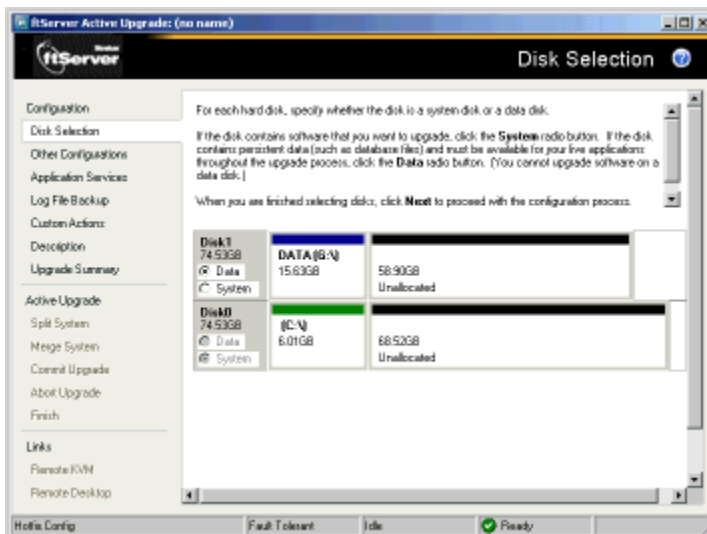
- [“Starting and Exiting the Active Upgrade Console”](#)
- [“Understanding the Active Upgrade Console Interface”](#)
- [“Pre-Upgrade Tasks”](#)
- [Configuring the Active Upgrade Process](#)

## Main Window

The main window contains controls associated with the configuration and execution of the Active Upgrade process.

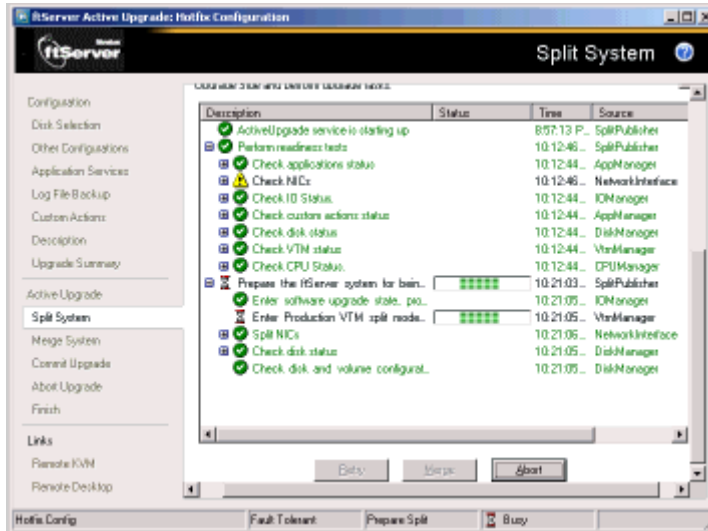
During the configuration phase, the main window allows you to specify settings for your system ([Figure 2-8](#)), which you can save to a [configuration file](#).

**Figure 2-8. Main Window: Configuring the Active Upgrade Process**



When you perform a readiness test and begin the upgrade process, the configuration settings in the main window are replaced with an activity log (Figure 2-9) that allows you to track the progress and success status of the upgrade process.

**Figure 2-9. Main Window: Activity Log**



For more information about viewing and interpreting items in the activity log, see [“Viewing Active Upgrade Process Status”](#) on page 4-21.

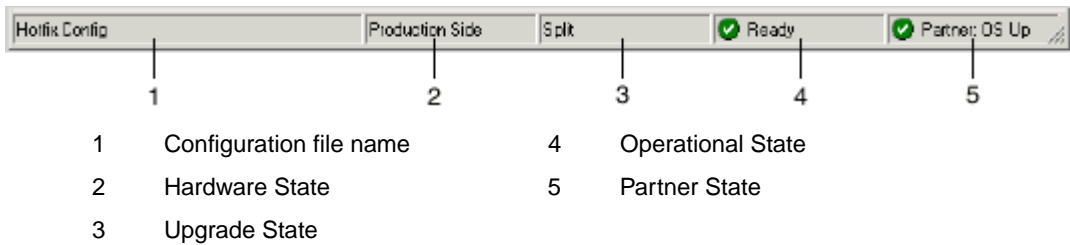
## Related Topics

- [“Starting and Exiting the Active Upgrade Console”](#)
- [“Understanding the Active Upgrade Console Interface”](#)
- [“Pre-Upgrade Tasks”](#)
- [Configuring the Active Upgrade Process](#)

## Status Bar

The status bar (Figure 2-10), which is located at the bottom of the Active Upgrade console window, reports a quick summary of the status of the upgrade.

**Figure 2-10. Status Bar**



For more information about interpreting items in the status bar, see [“Viewing Active Upgrade Process Status”](#) on page 4-21.

**Related Topics**

- [“Starting and Exiting the Active Upgrade Console”](#)
- [“Understanding the Active Upgrade Console Interface”](#)
- [“Pre-Upgrade Tasks”](#)
- [Configuring the Active Upgrade Process](#)

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## Chapter 3

# Configuring the Active Upgrade Process

Configuring the Active Upgrade process involves the following tasks:

- [Creating and managing configuration files](#)
- [Selecting disks to upgrade](#)
- [Selecting other configuration files to include](#)
- [Selecting application services to control](#)
- [Selecting event log files to back up](#)
- [Configuring custom actions](#)
- [Providing a description for a configuration file](#)
- [Displaying the upgrade summary](#)

## Creating and Managing Configuration Files

Configuration files allow you to save upgrade configurations that you can use immediately or in the future.

If you frequently perform upgrades to your system, you can create a configuration file to preserve your settings so you can perform similar upgrades as often as necessary. If applicable, you can create multiple configuration files, each with different system settings, to prepare the system for a particular type of system or application software upgrade.

In addition, you can *call* one or more existing configuration files from the configuration file you are currently editing, so that the settings from the called files will also apply to the file you are editing. This is called *nesting*.

The default location for Active Upgrade configuration files is `\Program Files\Stratus\ActiveUpgrade\User Configurations`, but you can save a configuration file in any directory. If you specify a different directory when saving or opening files, the Active Upgrade console uses the same user-specified directory (on a per-user basis) the next time you open the file browser.

## NOTE

You can save a configuration file to any disk — system or data, internal or external. The Active Upgrade console automatically copies configuration files to a staging area before beginning the upgrade to ensure that they are available throughout the upgrade process.

### Related Topics

- [“Creating a Configuration File”](#)
- [“Loading a Configuration File” on page 3-3](#)
- [“Editing an Existing Configuration File” on page 3-4](#)
- [“Performing an Upgrade with No Configuration File” on page 3-4](#)
- [“Saving a Configuration File” on page 3-5](#)
- [“Selecting Other Configurations to Include” on page 3-7](#)
- [“Providing a Description for a Configuration File” on page 3-19](#)

## Creating a Configuration File

Creating a configuration file allows you to generate a configuration file that you can save and use immediately or at a later time.

### To create a configuration file

1. On the **Configuration** page, click **Create Configuration File**.
2. In the **Create Configuration File** dialog box, specify a file name for the new file. (When you save the file, a **.Config** extension is automatically appended to the file name.)
3. Next to **Save in**, select the directory in which to save the configuration file.

You can specify any directory on the system. The default location is `\Program Files\Stratus\ActiveUpgrade\User Configurations`; however, if you choose a new configuration directory, the Active Upgrade console uses the new directory the next time you create or open a file.

4. Click **Save** to start editing the configuration.

After you create a configuration file, the configuration process opens on the **Disk Selection** page.

## Related Topics

- [“Creating and Managing Configuration Files” on page 3-1](#)
- [“Saving a Configuration File” on page 3-5](#)
- [“Providing a Description for a Configuration File” on page 3-19](#)
- [“Selecting Disks to Upgrade” on page 3-5](#)

## Loading a Configuration File

Loading a configuration file allows you to open an existing configuration file for use. After you load a configuration file, you can view the **Upgrade Summary**, and, if applicable, proceed with the upgrade as configured, but you cannot modify the configuration.

### NOTE

To modify a configuration file, use the **Edit Configuration File** option.

### To load a configuration file

1. On the **Configuration** page, click **Load Configuration File**.
2. Do one of the following to select the configuration file:
  - In the **Locate Configuration File** dialog box, type the full path name and file name for the configuration file next to **Configuration File**. (You must include the **.Config** file extension.)
  - Click **Browse** to locate the file using a file browser. (The browser displays only files with the **.Config** extension.) Click the file in the file browser, then click **Open** to select the file.
3. In the **Locate Configuration File** dialog box, click **Load** to open the configuration file.

(You can also drag a configuration file onto the **Configuration** page of the Active Upgrade console window to load it.)

When you load a configuration file, the file opens on the **Upgrade Summary** page.

## Related Topics

- [“Creating and Managing Configuration Files” on page 3-1](#)
- [“Displaying the Upgrade Summary” on page 3-19](#)
- [Performing the Upgrade](#)

## Editing an Existing Configuration File

Editing a configuration file allows you to open and edit a configuration file that you have previously saved. After you edit the configuration file, you can view the **Upgrade Summary**, and, if applicable, proceed with the upgrade as configured.

### To edit a configuration file

1. On the **Configuration** page, click **Edit Configuration File**.
2. Do one of the following to open the file:
  - In the **Locate Configuration File** dialog box, type the full path name and file name for the configuration file next to **Configuration File**.
  - Click **Browse** to locate the file using a file browser. (The browser displays only files with the **.Config** extension.) Click the file in the file browser, then click **Open** to select the file.
3. In the **Locate Configuration File** dialog box, click **Load** to open the configuration file.

When you edit a configuration file, the file opens on the **Disk Selection** page.

### Related Topics

- [“Creating and Managing Configuration Files” on page 3-1](#)
- [“Saving a Configuration File” on page 3-5](#)
- [“Selecting Disks to Upgrade” on page 3-5](#)
- [“Displaying the Upgrade Summary” on page 3-19](#)

## Performing an Upgrade with No Configuration File

If the upgrade you want to perform does not require any special settings, you can proceed without a configuration file.

For example, if you have only one system disk, and you just want to split the system briefly to test how a hotfix would affect the operating system without committing the changes, you might not need a configuration file.

To proceed without a configuration file, click **No Configuration File** on the **Configuration** page. The Active Upgrade console immediately displays the **Active Upgrade** page and runs a readiness check. If your system meets the [prerequisites](#) for the Active Upgrade process, you can split the system at this time.

## Related Topics

- [“Creating and Managing Configuration Files” on page 3-1](#)
- [Performing the Upgrade](#)

## Saving a Configuration File

The Active Upgrade console automatically prompts you to save your configuration file if you leave the Configuration section of the application, or exit the application. (To save the configuration file, click **Yes**, otherwise click **No** or **Cancel**.)

You can also optionally click **Save** or **Save As** on the **Upgrade Summary** page, as described in the following procedure.

### To save the current configuration file

1. Click **Upgrade Summary** in the navigation bar.
2. On the **Upgrade Summary** page, do one of the following:
  - Click **Save** to save the configuration file with the file name and path name you previously specified. Your file is saved.
  - Click **Save As** to save the configuration file with a new file name or path name. Continue with step 3.
3. In the **Save Configuration File** dialog box, specify a name for the new file. (When you save the file, a **.Config** extension is automatically appended to the file name.)
4. Next to **Save in**, select the directory in which to save the configuration file.
5. Click **Save** to save the file. Your file is saved.

## Related Topics

- [“Creating and Managing Configuration Files” on page 3-1](#)
- [“Displaying the Upgrade Summary” on page 3-19](#)

## Selecting Disks to Upgrade

Use the **Disk Selection** page to select the disks that contain the software you want to upgrade with the Active Upgrade process. By marking these disks in your upgrade configuration, you ensure that they will be available to the Upgrade Side of the system when the system is in split mode.

When you open the **Disk Selection** page, the Active Upgrade console scans for and displays the disks in your system. **Only internal disks mirrored with RDR are displayed, because these are the only disks that can be configured.**

You can mark each disk as a *system disk* or a *data disk*:

- System disk

A disk that contains the system or application software you want to upgrade. Only disks marked as **System** are available to the Upgrade Side while the system is split.

The Active Upgrade console automatically marks some disks as system disks. These *mandatory system disks* contain either boot files or paging files (virtual memory files) that are currently in use by the running operating system. (For more details, see the [mandatory system disk](#) glossary entry.) You cannot change a mandatory system disk to a data disk.



**CAUTION**

You **cannot** use a system disk for storing persistent data (for example, database files) related to your critical applications. Any new data written to the original system disk by the Production Side while the system is in split mode is overwritten when you commit the upgrade. (See the [Overview](#) for information about the steps of the Active Upgrade process.)

- Data disk

A disk that contains persistent data for your critical applications. Any disk marked as **Data** is available **only** to the Production Side while the system is split. You **cannot** upgrade software on a data disk.

(See the [prerequisites](#) for the Active Upgrade process for additional restrictions.)

Volumes on the **Disk Selection** page are color-coded as described in [Table 3-1](#).

**Table 3-1. Hard Disk Color Coding**

Color	Description
Black	Unassigned disk space
Blue	Data disk
Light Green	System disk
Dark Green	Mandatory system disk
Red	Disk is currently simplexed because it is being resynchronized with RDR

For more information about any volume, move your cursor over the volume to display ToolTip help.

### To select system and data disks

- For any disk you want to mark as a system disk, click **System**. (This automatically marks any volume that the disk contains as a System volume.)
- For any disk you want to mark as a data disk, click **Data**.

#### NOTE

---

Volumes can span multiple physical disks, and physical disks can contain multiple volumes. If a volume spans two or more disks, and you mark one of the disks that contains that volume as a system disk, any disk that contains a part of that volume automatically becomes a system disk.

When you are finished selecting disks, you can click **Next** to proceed with the next configuration step.

### Related Topics

- [“System Prerequisites” on page 2-2](#)
- [“Displaying the Upgrade Summary” on page 3-19](#)

## Selecting Other Configurations to Include

Use the **Other Configurations** page to optionally call one or more existing configuration files into the configuration file you are currently editing, so that the settings from the called files will also apply to the file you are editing. This is known as nesting files, or creating nested files.

The configuration files that you call into the current configuration file are *child configurations*, and the file from which you call the child configurations is the *parent configuration*.

Potential uses for nested files include:

- Your support provider creates a configuration file that you can call into an existing configuration file for your system.
- You create separate configuration files, each for upgrading a different application, which you can enable or disable at will in your parent configuration.
- You create a configuration file for an application that runs on several of your systems and call that file into a parent configuration file that is specific to each system.

The following restrictions apply to nested files:

- Child configuration files must be located in the same directory as the files in which they are called. When you select configuration files in the Active Upgrade console, only files in the present working directory are displayed.
- If you call a configuration file, and that file itself has one or more child configuration files, those child configuration files also become part of your configuration.
- If a setting in a child configuration conflicts with a setting in the parent configuration, the Active Upgrade console uses the setting in the parent configuration. Also, the parent configuration always ignores disk selections from child configurations.
- If you call a configuration that you created on a different system, configuration items (for example, application services and custom actions) must be present and applicable on the current system, otherwise the parent configuration fails the readiness check.

### To call a child configuration file into the current file

1. On the **Other Configurations** page, select the check box next to the configuration files you want to call into the current file.
2. In the file window, verify that you have selected the correct configuration files. Also, if any of the files contain additional child configurations, ensure that you are including only the configurations that apply to the current parent file.
3. When you are finished editing the current configuration, [save the configuration file](#).

To remove a child configuration file from the current configuration, clear the check box next to that configuration file. (If you need to remove a child configuration from another configuration file, you must edit that configuration file separately.)

When you have finished specifying child configuration files, you can click **Next** to proceed with the next configuration step.

## Related Topics

- [“Creating and Managing Configuration Files” on page 3-1](#)
- [“Saving a Configuration File” on page 3-5](#)
- [“Displaying the Upgrade Summary” on page 3-19](#)

## Selecting Application Services to Control

Use the **Application Services** page to select the critical application services you want the Active Upgrade console to automatically stop and restart during the upgrade process.

If you select a service on the **Application Services** page, the Active Upgrade console controls the service as follows:

- When the system is split, the console saves the current **Startup Type** for the service, changes the **Startup Type** to **Disabled** on the Upgrade Side, and then stops the service on the Upgrade Side.
- When the system is merged, the console stops the service on the Production Side, restores the previous **Startup Type** for the service on the Upgrade Side, and starts the service on the Upgrade Side. This ensures continuous availability of the service, allows for comprehensive testing on the Upgrade Side, and prevents any conflicts associated with two instances of a service running at the same time.
- When an upgrade is aborted, if the system is in merge mode, the console shuts down the Upgrade Side (which automatically stops the service) and restarts the Production Side (which automatically starts the service based on its default **Startup Type**). This returns the system to its previous, fault-tolerant state.

### NOTES \_\_\_\_\_

1. Standard operating system services do not require control during the Active Upgrade process. Select only services that pertain to your critical applications (for example, Exchange, SQL, and IIS).
2. The Active Upgrade console never changes the default **Startup Type** for a service on the Production Side. Maintaining the default **Startup Type** on the Production Side ensures that a service is **always** able to restart on the Production Side if the upgrade process is aborted or fails.

Each service on the **Application Services** page has a three-state check box, as described in [Table 3-2](#).

**Table 3-2. Selection of Application Services**

Check Box State	Description
Cleared	Not selected.
Checked	Selected in the current configuration file.
Checked (Gray)	Selected in a child configuration file. If applicable, you can click the check box to explicitly select the service in the current configuration file, but you cannot deselect it without editing the child configuration.

**To select a service for the Active Upgrade console to control**

1. On the **Application Services** page, find a service you want to stop and start.
2. Click the check box to the left of the service name.
3. Repeat these steps for each service you want to stop and restart.

To deselect a service, clear the check box to the left of the service name.

(By default, the services on the **Application Services** page are listed alphabetically. If you prefer to sort them by other criteria, click one of the column headings. For example, if you want to group services by those you have selected and not selected, click the heading above the check boxes.)

When you have finished selecting services to control, or if you have no services to control, you can click **Next** to proceed with the next configuration step.

**Related Topics**

- [“Configuring Custom Actions” on page 3-12](#)
- [“Managing Critical Applications During the Upgrade Process” on page 2-6](#)
- [“Displaying the Upgrade Summary” on page 3-19](#)

## Selecting Event Log Files to Back Up

Use the **Log File Backup** page to optionally preserve Windows Event Viewer log files from the Production Side of your system during the Active Upgrade process.

When you commit an upgrade, the system reestablishes the RDR mirrors of any system disks by overwriting the Production Side disks (which contain the old version of your software) with the newer Upgrade Side disks (which contain your newly-upgraded software). Because the event log files on the Production Side are lost during this process, you might want to preserve them for future reference. These log files contain the only record of log messages your live applications generated while the system was split.

The **Log File Backup** page allows you to select from all event logs available in the Windows Event Viewer, including user-created logs.

#### NOTES \_\_\_\_\_

1. For information about creating a Custom Action that preserves other files from the Production Side system disk, see [“Configuring Custom Actions” on page 3-12](#).
2. You must save the log files to an internal data disk or an external disk. Do **not** save the files to a system disk or network share.
3. There is no default directory. You must specify a directory, otherwise, the Active Upgrade console displays a warning message.

#### To preserve event log files

1. Specify a directory in which to save the files by doing one of the following:
  - In the **Staging Directory** dialog box, type the full path name of the directory.
  - Click **Browse** to locate a folder using the **Browse for Folder** dialog box. Click a folder and click **OK** to select it.
2. For each log you want to save, click the log name to highlight it, then click the check box to the left of the log name to preserve the file.

When you have finished selecting event log files to preserve, you can click **Next** to proceed with the next configuration step.

#### Related Topics

- [“Configuring Custom Actions” on page 3-12](#)
- [“Displaying the Upgrade Summary” on page 3-19](#)

## Configuring Custom Actions

Use the **Custom Actions** page to customize the way that the Active Upgrade process runs in your environment. You can create custom actions to perform the following types of tasks:

- Specify how a critical application is stopped and started during the upgrade process.

For example, if you use special executable files to start and stop your applications, you can use the controls on the **Custom Actions** page to specify when these executable files will run during the upgrade process, and, if you have several files, you can specify the order in which they will run.

- Check if a certain condition exists before starting the upgrade process.

For example, you can write a program to verify that a critical backup has completed, if the load on the system is acceptable, or if it is a certain time of day before starting the upgrade process.

- Back up files during the upgrade process.

Any files that are modified on the Production Side system disks while the system is in split mode are lost during the commit process, when the RDR mirrors are resynchronized. If applicable, you can write a program to save copies of important files before you commit an upgrade. For example, you can save a copy of an application-specific log file that does not appear in the system Event Viewer. (For information about saving Event Viewer logs, see [“Selecting Event Log Files to Back Up” on page 3-10.](#))

By default, the **Custom Actions** page supports executable files that are batch files (.bat), application files (.exe), or Visual Basic scripts (.vbs). For other types of executable files, see [“Executing Visual Basic Scripts and Other Types of Executable Files” on page 3-18.](#)

### NOTES

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1. Custom actions run consecutively when called. If one action fails to terminate, it might prevent the next action from executing, and, ultimately, prevent the upgrade process from continuing. When you specify an executable file for a custom action, verify that it runs successfully outside of the Active Upgrade process, and ensure that it completes in a timely manner.

2. Executable files for custom actions must be located on a system disk. If a executable file is located on an external or network disk, the Upgrade Side loses access to the file while the system is in split mode.
3. For information about writing your own programs for custom actions, see [“Programming Notes for Custom Actions” on page 3-15](#).

### To configure a custom action

1. On the **Custom Actions** page, do one of the following:
  - Next to **File**, type the full path name and file name of the executable file you want to run. (The file must already exist on the system.) For example:  
C:\bin\mybatchfile.bat
  - Click **Browse** to locate the executable file using a file browser. Click the file name in the file browser, then click **Open** to select the file.
2. Next to **Arguments**, type any arguments that you need to run with your executable file.  
  
No arguments are required; however, see [“Programming Notes for Custom Actions” on page 3-15](#) for information about optionally passing Active Upgrade environment variables to your executable file.
3. In the drop-down list for **Control type**, select the option that best describes when the Active Upgrade console should execute your custom action, as described in [Table 3-3](#).

**Table 3-3. Control Types for Custom Actions**

Control Type	Purpose
Start Application	Executes the custom action whenever the Active Upgrade console needs to start applications. For example, the console needs to restart applications on the Upgrade Side when you merge the system.
Stop Application	Executes the custom action whenever the Active Upgrade console needs to stop applications. For example, the console needs to stop applications on the Upgrade Side when you split the system. It also stops applications on the Production Side when you merge the system.
Readiness Check	Executes the custom action once during the <a href="#">readiness check</a> , before you initiate the Active Upgrade process. This control type allows you to build your own verifications into the readiness check.

**Table 3-3. Control Types for Custom Actions** (Continued)

Control Type	Purpose
Advanced	<p>Executes the custom action during every step of the Active Upgrade process, including interim steps such as PrepareSplit and PrepareMerge, which occur prior to the Split and Merge operations.</p> <p>This control type allows you to have more precise control over a custom action. Your executable file runs each time the upgrade process switches states, but you can write a program with conditional statements based on Active Upgrade environment variables to specify exactly when and where particular tasks should be executed. For example, you can write a conditional statement that triggers only on the Upgrade Side if the system is in merge mode. See <a href="#">"Using Active Upgrade Environment Variables"</a> on page 3-16 for more information.</p> <p>If you have more than one custom action, the Advanced control type also allows you to control the order in which the custom actions are executed (step 4).</p>
Backup	<p>Executes the custom action when the system is merged, allowing you to back up files that were modified on the Production Side system disk while the system was in split mode (before these files are lost during the commit process).</p>

4. If you selected the **Advanced** control type, optionally select an item from the **Timing** drop-down list which best describes the order in which you want this custom action to run with your other custom actions. [Table 3-4](#) describes the timing options. If the timing does not matter, keep the **Default** setting.

**NOTE** \_\_\_\_\_

**Timing** does not affect the order in which custom actions run with other Active Upgrade tasks. Use this option only if you want to ensure that one custom action runs before or after another custom action.

**Table 3-4. Timing for the Advanced Control Type**

Timing	Purpose
Default	Executes the custom action in the default, consecutive order.
Early	Executes the custom action early in the list of custom actions, before items marked as Default or Late.
Late	Executes the custom action late in the list of custom actions, after items marked as Early or Default.

Custom actions run consecutively according to their timing options. Subsequent custom actions do not start until the current custom action terminates.

5. Click **Add** to accept the custom action. (If the **Add** button is inactive, ensure that you typed the **File** path name and file name correctly. The executable file must exist to be added.)

You can view the custom actions you have created at the bottom of the **Custom Actions** page. If you want to remove a custom action from the list, select it and click **Remove**.

When you have finished specifying custom actions to run, or if you have no custom actions to specify, you can click **Next** to proceed with the next configuration step.

### Related Topics

- [“Programming Notes for Custom Actions”](#)
- [“Selecting Application Services to Control” on page 3-9](#)
- [“Managing Critical Applications During the Upgrade Process” on page 2-6](#)
- [“Displaying the Upgrade Summary” on page 3-19](#)

## Programming Notes for Custom Actions

The following topics describe some of the features available for programming and monitoring custom actions:

- [“Starting and Stopping Applications”](#)
- [“Using Active Upgrade Environment Variables” on page 3-16](#)
- [“Generating Exit Values” on page 3-17](#)
- [“Viewing Standard Output and Error Stream” on page 3-17](#)
- [“Executing Visual Basic Scripts and Other Types of Executable Files” on page 3-18](#)

### Starting and Stopping Applications

If you write a program to control a critical application during the upgrade process, ensure that your program not only stops and starts the application at the appropriate times, but also **disables** and **enables** the default startup mechanism for the application (for example, the default **Startup Type** setting in the Services Control Manager or a startup item in the system registry). If you do not disable the default startup type for an application, it might interfere with or override your custom action.

See [“Selecting Application Services to Control” on page 3-9](#) for information about how the Active Upgrade console changes the **Startup Type** for application services.

### Related Topics

- [“Programming Notes for Custom Actions” on page 3-15](#)
- [“Configuring Custom Actions” on page 3-12](#)

### Using Active Upgrade Environment Variables

You can optionally use the environment variables specified in [Table 3-5](#) in any program that you write for a custom action. These environment variables are useful if you want to write a conditional statement in your program that, for example, runs only on a particular side of the system or only during a particular stage of the Active Upgrade process.

**Table 3-5. Environment Variables for Custom Actions**

Environment Variable	Description
ACTIVE_UPGRADE_SIDE	Describes the side of the system on which the program is running.  Values: Production, Upgrade
ACTIVE_UPGRADE_STATE	Describes the current upgrade state.  Values: Idle, PrepareSplit, Split, PrepareMerge, Merge, Commit, Abort
ACTIVE_UPGRADE_REQUEST	Describes the current task that the Active Upgrade console is executing.  Values: Idle, CheckReadiness, PrepareSplit, ExecuteSplit, PrepareMerge, ExecuteMerge, Commit, Abort, Start, Stop, Backup
ACTIVE_UPGRADE_HW_SPLIT	Describes whether or not the system is running in split mode.  Values: Yes, No

By default, these environment variables are available to any child process of the Active Upgrade console, including executable files for custom actions. However, if necessary, you can also pass the environment variables to your executable files as arguments.

For example, to pass only the ACTIVE\_UPGRADE\_SIDE variable to an executable file, append the following string to the **Arguments** for the custom action on the **Custom Actions** page:

```
%ACTIVE_UPGRADE_SIDE%
```

To pass multiple variables, add a space between each variable, as follows:

```
%ACTIVE_UPGRADE_SIDE% %ACTIVE_UPGRADE_REQUEST%
```

### Related Topics

- [“Active Upgrade State Model” on page 1-8](#)
- [“Programming Notes for Custom Actions” on page 3-15](#)
- [“Configuring Custom Actions” on page 3-12](#)

### Generating Exit Values

An exit value of 0 indicates that the executable file exited normally. Any other exit value indicates that there was an error, which prevents the Active Upgrade process from continuing with the current upgrade request. If this happens, you must correct the problem and click **Retry** in the Active Upgrade console to retry the current upgrade request (which also runs the custom action again). The Active Upgrade process does not continue until the executable file for your custom action runs successfully.

### Related Topics

- [“Programming Notes for Custom Actions” on page 3-15](#)
- [“Configuring Custom Actions” on page 3-12](#)

### Viewing Standard Output and Error Stream

After your program executes, you can view standard output and error output from the program in the Active Upgrade console, as follows:

1. In the activity log, expand an **Execute custom actions** node.  
(There can be more than one **Execute custom actions** node, depending on the types of custom actions you have created. Find the node for the upgrade stage in which your custom action was set to run.)
2. Double-click a specific custom action to display more information about it.
3. In the [detail window](#), view the output for your program under **Status**. If necessary, scroll down in the **Status** box to see the full output. Or move your cursor over the **Status** box to view the output as ToolTip help.

If you save the activity log to a file, you can also view the output in that file. See [“Saving the Activity Log to a File” on page 5-1](#) for more information.

### Related Topics

- [“Programming Notes for Custom Actions” on page 3-15](#)
- [“Configuring Custom Actions” on page 3-12](#)

## Executing Visual Basic Scripts and Other Types of Executable Files

By default, the **File** field on the **Custom Actions** page accepts only batch files (.bat), application files (.exe), and Visual Basic scripts (.vbs). However, if necessary, you might be able to run another type of executable file (such as a Perl script) by implementing the command-line script host for the file.

You can also optionally run the command-line script host for Visual Basic scripts (cscript.exe) if you need to enable options that are available only in that environment.

For example, to run your Visual Basic script in a command-line script host, do the following when performing the procedure in [“Configuring Custom Actions” on page 3-12](#):

- Next to **File**, type the full path and file name of the command-line script host:

```
%SystemRoot%\system32\cscript.exe
```

(%SystemRoot% is an environment variable that automatically inserts your system root directory, typically C:\WINNT.)

- Next to **Arguments**, type the full path name and file name of your executable file. For example:

```
C:\bin\myvbscript.vbs
```

If applicable, you can type additional arguments that are specific to your script file or options that are specific to the session. For example, for a cscript session, you might want to specify the //T option to control the maximum amount of time your program is allowed to run:

```
C:\bin\myvbscript.vbs //T:30
```

The preceding example would terminate the program and cscript session after 30 seconds. Setting this type of time limit is a useful way of ensuring that your executable file cannot delay the upgrade process.

For more information about the cscript command, open a **Command Prompt** session and enter **cscript /?**.

### Related Topics

- [“Programming Notes for Custom Actions” on page 3-15](#)
- [“Configuring Custom Actions” on page 3-12](#)

## Providing a Description for a Configuration File

Use the **Description** page to specify a title and comments for your configuration file.

These items appear on the **Other Configurations** page, the **Upgrade Summary** page, and in the **Locate Configuration File** dialog box when you are selecting a configuration file to load or edit.

Type a brief summary next to **Title**, and type additional details next to **Comments**.

For **Comments**, you might want to include information such as:

- Purpose of the configuration file (type of upgrade)
- Systems to which the file applies
- Special settings required before using the file for an upgrade
- Your name and contact information (or contact information for a support provider)
- Date you created or updated the file

When you have finished providing a description for the configuration file, you can click **Next** to proceed with the next configuration step.

### Related Topics

- [“Creating and Managing Configuration Files” on page 3-1](#)
- [“Saving a Configuration File” on page 3-5](#)
- [“Displaying the Upgrade Summary” on page 3-19](#)

## Displaying the Upgrade Summary

When you finish creating a new configuration file, or when you load or edit an existing configuration file, you can display a summary of the upgrade configuration that the file contains.

To display the upgrade summary, click **Upgrade Summary** in the navigation bar of the Active Upgrade console. The summary window displays information including:

- Configuration file name, title, and description
- Disks you selected for the upgrade
- Other configuration files called by the current file
- Application services to start and stop
- Custom actions to run
- Event log files to back up

If applicable, you can also [save the current configuration file](#) from the **Upgrade Summary** page.

When you are finished viewing the Upgrade Summary, and, if necessary, saving the configuration file, you can click **Next** to proceed with the Active Upgrade process.

If you have changed your configuration file since you last saved it, the Active Upgrade console displays a message indicating that you should save the file. To save the file, click **Yes**, otherwise click **No** or **Cancel**.

In the next step, the Active Upgrade console runs a readiness check to verify that your system meets the prerequisites for an online upgrade. If necessary, you can abort the process before you split the system (or at any point up until you commit the upgrade).

### Related Topics

- [“Saving a Configuration File” on page 3-5](#)
- [“Performing a Readiness Check” on page 4-1](#)
- [“Aborting the Upgrade” on page 4-19](#)

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## Chapter 4

# Performing the Upgrade

Performing the Active Upgrade process can involve the following tasks:

- [Performing a readiness check](#)
- [Splitting the system](#)
- [Merging the System](#)
- [Committing the upgrade](#)
- [Aborting the upgrade \(if necessary\)](#)
- [Finishing the upgrade](#)
- [Viewing Active Upgrade process status](#)

### Performing a Readiness Check

Before you can initiate split mode on a system, the system must pass a readiness check. The readiness check verifies that your system meets the prerequisites for the Active Upgrade process. For example, the readiness check ensures that:






- The system is currently running in duplex mode.
- The disks you selected as system disks are present and are mirrored with RDR.
- The system contains two properly configured VTM adapters.
- The embedded Ethernet PCI adapters in your system are configured into Ethernet teams, and each team contains at least one adapter from each physical enclosure.
- The application services you specified for control are currently running, and can be stopped when necessary.
- The executable file for any custom action is present on the system and ready to run.

To perform a readiness test, do **one** of the following:




- Click **Next** on the **Upgrade Summary** page (if you are using a configuration file).
- Click **Active Upgrade** on the navigation bar (the readiness test starts automatically if you have recently opened or changed your configuration).
- Click **Retry** on the **Active Upgrade** page.

The activity log reports the overall results of the readiness check as well as the results for each individual test. [Table 4-1](#) describes the general meaning of the activity log entries.

**Table 4-1. Activity Log Entries**

Icon	Text Color	Severity	Description
	Green	Success	Task completed without error
	Black	Pending	Task is in progress
	Black	Information	Task information, no action necessary
	Black	Warning	A problem that should be addressed, but will not block an upgrade
	Red	Error	A problem that must be corrected before continuing with upgrade

The status bar at the bottom of the window indicates one of the following states for the current operation:

-  Busy  
A readiness check is in progress. Allow time for the task to complete.
-  Ready  
The system meets the prerequisites for the Active Upgrade process. You can proceed with the upgrade process by splitting the system.
-  Broken  
One or more components in the system does not meet the prerequisites for the Active Upgrade process. You must resolve the problem before you can continue with the upgrade.

(For more information about interpreting Active Upgrade status, see [“Viewing Active Upgrade Process Status” on page 4-21.](#))

If the check is successful, you can click **Split** to proceed with splitting the system. See [“Splitting the System”](#).

If one of the readiness tests fails, you must resolve the problem, then click **Retry** to run the readiness test again. When the problem is resolved, you can click **Split** to proceed with splitting the system.

## Related Topics

- [“System Prerequisites” on page 2-2](#)
- [“Splitting the System”](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Saving the Activity Log to a File” on page 5-1](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Splitting the System

Splitting an Express5800/320Ma system divides it into two independently-functioning systems: the Production Side, which continues to run your applications, and the Upgrade Side, which you can safely upgrade.

Splitting the system:

- Disables RDR mirroring between the internal disks in each CPU-I/O enclosure.
- Isolates the Upgrade Side from system resources such as the network, any user-specified application data disks, and any external PCI resources.
- Disables any user-specified applications and services on the Upgrade Side so they cannot restart if you restart the operating system on the Upgrade Side.
- Queues any ActiveService Network alerts generated on the Upgrade Side until the system is merged.

You can split a system only if it meets the [prerequisites](#) for the Active Upgrade process and has passed the [readiness check](#).

### NOTES \_\_\_\_\_

1. When in split mode, the Upgrade Side has no access to the network. If you need a network resource to obtain any software installation packages you intend to run, transfer the software to the system **before** you initiate split mode. Furthermore, put the software on one of the system disks, because these are the only disks you can access on the Upgrade Side while the system is in split mode.

2. Split the system only when you are sitting at the console for your system. The Active Upgrade console is not supported over remote connections.



### CAUTION

---

Do not perform any hardware maintenance, including the removal of either CPU-I/O enclosure, after you have initiated the Active Upgrade process (by clicking **Split**).

#### To split the system

1. Ensure that you have addressed any critical errors or warnings that were indicated by the readiness check.
2. Exit any non-essential applications.
3. Click **Split** on the **Active Upgrade** page.

When the system successfully enters split mode:

- The Active Upgrade console continues to run **on the Production Side** of the system.
- The Active Upgrade console switches to the **Split System** page.
- The upgrade state, reported in the status bar, is **Production Side | Split | Ready**, indicating that the system is currently split (and ready to be merged after your software installation).

Splitting the system should take only a few minutes. The process will time out if it takes longer than 5 minutes.

#### NOTES

---

1. Throughout the upgrade process, icons appear and disappear in the system tray as PCI devices, such as Ethernet PCI adapters, are reconfigured or disabled for the current upgrade operation. This is normal. Do not attempt to enable or reconfigure any of these PCI devices while the upgrade session is in progress.
2. If your system is running EMC® PowerPath® software for an external storage system, you might experience a brief delay (10-15 seconds) when the system splits, as PowerPath reroutes storage operations through the Production Side.

If the split process fails the first time, you can click **Retry** to try again. If the problem persists, you can click **Abort** to abort the upgrade process, or see [Troubleshooting](#) for information about resolving the problem.

When the system is split, you can:

- [Manage upgrade tasks on the Upgrade Side.](#)
- [Manage your applications on the Production Side.](#)
- [Verify the Upgrade Side before merging the system.](#)

(To perform upgrade tasks, you must establish a remote connection to the Upgrade Side, as explained in [“Managing Upgrade Tasks on the Upgrade Side” on page 4-5.](#))

#### NOTE \_\_\_\_\_

After you establish a connection to the Upgrade Side, you can optionally check the status of your application services on the Upgrade Side, to verify that they have been stopped by the Active Upgrade console. See [“Verifying the Status of Application Services” on page 5-2.](#)

### Related Topics

- [“Managing Upgrade Tasks on the Upgrade Side”](#)
- [“Managing Your Applications on the Production Side” on page 4-14](#)
- [“Verifying the Upgrade Side Before Merging the System” on page 4-15](#)
- [“Merging the System” on page 4-15](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Managing Upgrade Tasks on the Upgrade Side

While the system is in split mode, you can perform any of the following upgrade tasks **on the Upgrade Side**:

- Run software installation programs (see [“Running Software Installation Programs” on page 4-10](#), and [“Software Upgrade Support” on page 2-1](#) for restrictions).
- Restart the operating system, if necessary (see [“Restarting the Upgrade Side” on page 4-12](#)).
- Perform limited testing of the installed updates (see [“Verifying the Upgrade Side Before Merging the System” on page 4-15](#)).

If necessary, you can also completely [abort](#) the upgrade process from the Active Upgrade console on the Production Side.

Because the Active Upgrade console itself runs on the Production Side of the system, you need to establish a remote connection to the desktop on the Upgrade Side before you can complete any of these upgrade tasks, as explained in [“Connecting to the Desktop on the Upgrade Side”](#) on page 4-6.

### Related Topics

- [“Connecting to the Desktop on the Upgrade Side”](#)
- [“Running Software Installation Programs”](#) on page 4-10
- [“Restarting the Upgrade Side”](#) on page 4-12
- [“Viewing Active Upgrade Process Status”](#) on page 4-21
- [“Merging the System”](#) on page 4-15
- [“Aborting the Upgrade”](#) on page 4-19
- [Troubleshooting](#)

### Connecting to the Desktop on the Upgrade Side

While the system is in split mode, the Active Upgrade console runs on the Production Side of the system. To perform upgrade tasks, you must establish a remote connection to the Upgrade Side.

You can access the Upgrade Side using one of two methods:

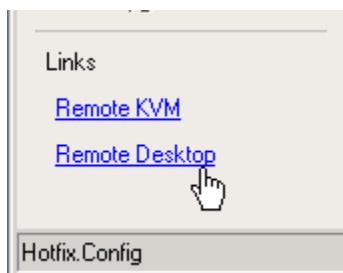
- [Remote KVM](#)

Allows you to control the keyboard, video, and mouse of the Upgrade Side using the Advanced Video Redirection (AVR) feature of the VTM console. You might prefer this option if you require access to the BIOS settings and troubleshooting information that are available in the VTM console.

- [Remote Desktop](#)

Allows you to control the keyboard, video and mouse of the Upgrade Side through the Windows Remote Desktop component. You might prefer this option if you are more familiar with it, or if it runs faster in your environment.

To use either connection method, click the associated link ([Figure 4-1](#)) in the navigation bar of the Active Upgrade console. For more information, see Related Topics.

**Figure 4-1. Links for Connecting to Upgrade Side**

### Related Topics

- [“Connecting to the Upgrade Side with Remote KVM”](#)
- [“Connecting to the Upgrade Side with Remote Desktop” on page 4-8](#)

### Connecting to the Upgrade Side with Remote KVM

Remote KVM allows you to control the keyboard, video, and mouse of the Upgrade Side using the Advanced Video Redirection (AVR) feature of the VTM console.

#### To initiate a Remote KVM session with the Upgrade Side

1. Click **Remote KVM** in the navigation bar of the Active Upgrade console on the Production Side. The system opens a Web browser window to load the VTM console, which runs as a Java applet.
2. If the browser displays a warning indicating that the Web site is being blocked, click **Add** to display the Trusted Sites dialog box. Click **Add** to add the site to your Trusted Sites zone, then click **Close** to dismiss the dialog box.
3. If the browser displays additional warning messages about running Web-based content, click **Close** or **OK** to dismiss these messages.
4. If the browser displays a message asking you to trust the signed applet distributed by NEC Solutions (America), Inc., click **Yes** to continue. When the Java applet is finished loading, the Upgrade Side desktop is displayed.

After you initiate the remote session, see [Related Topics](#) for more information about what you can do on the Upgrade Side and how you can merge the system after you have finished performing upgrade tasks

#### NOTE

If you want to refer to the Active Upgrade Help file while you are using the Upgrade Side desktop, click **Start** on the Upgrade Side desktop, then click **All Programs**, **Stratus**, and **Active Upgrade Help** to open the Help viewer.

For more information about managing an AVR session, see the *Express5800/320Ma Virtual Technician Module User's Guide*.

### To terminate a Remote KVM session with the Upgrade Side

1. Verify that any installation processes are complete, and that you have exited from any installation programs.
2. Optionally, click **Log Off** in the Start menu of your remote session. In the **Log Off Windows** dialog box, click **Log Off**.

#### NOTE

If you are about to merge the system, you can remain logged on to maintain the current desktop session. After the merge, you will be using the Upgrade Side desktop.

3. Close the browser window that contains the VTM console.

### Related Topics

- [“Connecting to the Upgrade Side with Remote Desktop”](#)
- [“Running Software Installation Programs” on page 4-10](#)
- [“Restarting the Upgrade Side” on page 4-12](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Merging the System” on page 4-15](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

### Connecting to the Upgrade Side with Remote Desktop

Remote Desktop allows you to control the keyboard, video and mouse of the Upgrade Side through the Windows Remote Desktop component.

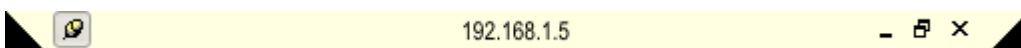
### To establish a Remote Desktop Connection to the Upgrade Side

1. Click **Remote Desktop** in the navigation bar of the Active Upgrade console on the Production Side. The system opens a Remote Desktop Connection window.
2. When the window displays the login screen for the remote system, enter your administrative username and password and click **OK**. (Remember, you can use only an account in the local Administrators group, not a domain account.) The Upgrade Side desktop is displayed.

After you initiate the remote connection, see [Related Topics](#) for more information about what you can do on the Upgrade Side and how you can merge the system after you have finished performing upgrade tasks.

## NOTES

1. If you want to refer to the Active Upgrade Help file while you are using the Upgrade Side desktop, click **Start** on the Upgrade Side desktop, then click **All Programs, Stratus, and Active Upgrade Help** to open the Help viewer.
2. If you maximize the Remote Desktop connection window, its title bar (Figure 4-2) might disappear from view (autohide). Only the Upgrade Side desktop is visible, as if it is your local desktop. If you want to redisplay the title bar to access its controls, push the mouse pointer to the top of the screen.
3. The Remote Desktop title bar is a helpful reminder that you are using the Upgrade Side desktop. If you have maximized the window for Remote Desktop and you want the title bar to be displayed for the duration of your connection, click the pin button (pushpin) on the left side of the title bar. (The pin button is displayed only when the window is maximized.)

**Figure 4-2. Remote Desktop Title Bar**

For more information about managing a Remote Desktop session, see the Windows online Help.

**To terminate a Remote Desktop Connection to the Upgrade Side**

1. Verify that any installation processes are complete, and that you have exited any installation programs.
2. Click **Log Off** in the Start menu of your remote session.
3. In the **Log Off Windows** dialog box, click **Log Off**.

## NOTE

If you are about to merge the system, you can remain logged on to maintain the current desktop session. After the merge, you will be using the Upgrade Side desktop.

## Related Topics

- [“Connecting to the Upgrade Side with Remote KVM” on page 4-7](#)
- [“Running Software Installation Programs” on page 4-10](#)
- [“Restarting the Upgrade Side” on page 4-12](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Merging the System” on page 4-15](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Running Software Installation Programs

The following topics describe how to run software installation programs on the Upgrade Side while the system is split:

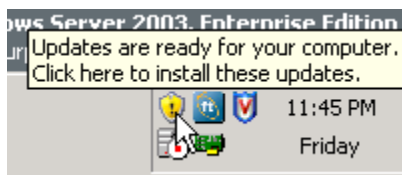
- [“Windows Automatic Updates”](#)
- [“Other Installation Packages” on page 4-12](#)

(To review the types of upgrades that Active Upgrade technology supports, see [“Software Upgrade Support” on page 2-1.](#))

## Windows Automatic Updates

If you are using Windows Automatic Updates, and you previously [downloaded all of the required software updates](#), the Automatic Updates icon should be present in the system tray, and it should report that updates are ready for your computer ([Figure 4-3](#)). If so, you are ready to apply the updates.

**Figure 4-3. Automatic Updates Icon in System Tray**



## NOTE

You should install all security-related hotfixes, but do not install other types of hotfixes, such as Microsoft QFE patches that fix a particular problem, before obtaining validation from NEC Solutions (America), Inc. See [“Recommendations” on page 2-5](#) for more information.

**NOTE**

Before installing any software, **ensure that you are working on the Upgrade Side desktop** (through a [remote connection](#)). Do not install software on the Production Side.

**To apply the downloaded updates**

1. Click the Automatic Updates icon in the Upgrade Side system tray to display the **Automatic Updates** dialog box.
2. Select **Custom Install** and click **Next**.  
The next page displays a list of the updates you downloaded and allows you to select which ones to install at this time.
3. Select only the updates that you previously checked for compatibility with your Express5800/320Ma system, then click **Install**.

During the installation process, the Automatic Updates dialog box minimizes to the system tray. When the installation is complete, you can display the dialog box again. It should report that all updates were successfully installed.

Some updates might require you to restart the operating system on the Upgrade Side. You can click **Restart Now** to allow Automatic Updates to restart the Upgrade Side automatically, or you can manually restart later. You can restart the Upgrade Side as many times as necessary to complete the installation.

See [“Restarting the Upgrade Side” on page 4-12](#) for information about reconnecting to the Upgrade Side after you restart it.

**Related Topics**

- [“Software Upgrade Support” on page 2-1](#)
- [“Managing Upgrade Tasks on the Upgrade Side” on page 4-5](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Merging the System” on page 4-15](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Other Installation Packages

If you previously downloaded individual installation packages to a system disk, open the Upgrade Side folder that contains the installation packages. Run each installation program, one at a time.

### NOTE

---

Before installing any software, **ensure that you are working on the Upgrade Side desktop** (through a [remote connection](#)). Do not install software on the Production Side.

Some installation programs might require you to restart the operating system on the Upgrade Side. You can allow these installation programs to restart the Upgrade Side automatically, or you can manually restart later. You can restart the Upgrade Side as many times as necessary to complete the installation; however, you might want to avoid restarting until you have run additional installation programs to reduce the total number of times you need to restart.

See [“Restarting the Upgrade Side” on page 4-12](#) for information about reconnecting to the Upgrade Side after you restart it.

## Related Topics

- [“Software Upgrade Support” on page 2-1](#)
- [“Managing Upgrade Tasks on the Upgrade Side” on page 4-5](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Merging the System” on page 4-15](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Restarting the Upgrade Side

When the system is running in split mode, if necessary, you can restart the operating system on the Upgrade Side at any time. You can either allow an installation program to restart the system automatically or you can perform the following procedure to restart the system manually.



### CAUTION

---

Before you restart the system, **ensure that you are working on the Upgrade Side desktop** (through a [remote connection](#)). Do not restart the Production Side.

**CAUTION** 

---

Do not shut down the Upgrade Side, otherwise, the Upgrade Side will not come back online, and you must abort the upgrade process to recover. If this happens, any changes you made on the Upgrade Side are lost.

**To manually restart the Upgrade Side**

1. On the Upgrade Side, click **Shut Down** in the Start menu.
2. In the **Shut Down Windows** dialog box, select **Restart** from the drop-down menu and click **OK**.

If you are using **Remote KVM**, the AVR session remains connected while the Upgrade Side is restarting; however, you must log on again when the Upgrade Side is finished restarting. (To send the Ctrl-Alt-Del key sequence necessary for login, select **Ctrl-Alt-Del** from the drop-down menu at the bottom of the window, then click **Send Key Sequence**.)

If you are using **Remote Desktop Connection**, the connection to the Upgrade Side is terminated, and the Production Side desktop is displayed. While the Upgrade Side is restarting, you can [view its status](#) in the activity log and the status bar of the Active Upgrade console. When the console displays the message **Partner: OS Up**, you can click **Remote Desktop** to log on to the Upgrade Side again.

**NOTE** 

---

Though the Active Upgrade console reports that the Upgrade Side operating system is up, it might take another minute or two for all services to finish loading and for login to be possible.

**Related Topics**

- [“Running Software Installation Programs” on page 4-10](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Merging the System” on page 4-15](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Managing Your Applications on the Production Side

While the system is split, you can continue to access and use your applications on the Production Side; however, **you must avoid doing any of the following on the Production Side** desktop:

- Installing or upgrading software.
- Creating or modifying any files on the system disk, including the system registry.
- Restarting the operating system.



### CAUTION

---

Any changes you make to files on the Production Side system disks are lost during the commit process, because the system overwrites these system disks (which contain the old version of your software) with the newer Upgrade Side disks to complete the upgrade. If you need to preserve files from the original system disks, you can save them to a data disk.

### NOTE

---

Be careful when switching between the Production Side desktop and the remote connection to the Upgrade Side desktop. When you resume software installation or restart the system, always ensure that you are on the Upgrade Side.

### Related Topics

- [“Managing Upgrade Tasks on the Upgrade Side” on page 4-5](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Merging the System” on page 4-15](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Verifying the Upgrade Side Before Merging the System

After you have upgraded or installed software on the Upgrade Side, you can perform limited testing on the Upgrade Side system disks, as long as your activities do not require access to the following resources, which are currently unavailable:

- Network
- Internal data disks

For example, you might want to perform the following tasks before you merge the system:

- Verify the presence and version number of each software package (see [“Verifying the Status of Installed Software” on page 5-3](#)).
- If possible, verify that you can start the applications you installed or upgraded.
- If possible, configure the settings for any applications you installed or upgraded.

If you are satisfied that everything is working correctly, you can [merge the system](#) to stop your applications on the Production Side and restart them on the Upgrade Side for final verification.

If there are any problems, you can [abort the upgrade](#) to return the system to its original state. Aborting the upgrade while the system is in split mode does not incur downtime, because your critical applications are still running on the Production Side.

### Related Topics

- [“Managing Upgrade Tasks on the Upgrade Side” on page 4-5](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Merging the System” on page 4-15](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Merging the System

After you are finished performing upgrade tasks on the Upgrade Side of the system, you can merge the system to verify your changes before you permanently commit them.

Merging the system:

- Stops your applications and services on the Production Side.
- Merges system resources so that the network and application data disks become available to the Upgrade Side.
- Restarts your applications (including the Active Upgrade console) from the Upgrade Side.

### To merge the system

1. Verify that all installation processes are complete, and that you have exited any installation programs.
2. Optionally, terminate any Remote KVM or Remote Desktop sessions.

NOTE \_\_\_\_\_

You can remain logged on to the Upgrade Side if you want to maintain the current desktop session. After the merge, you will be using the Upgrade Side desktop.

3. Verify that the upgrade state, as reported in the status bar, is **Production Side | Split | Ready**.

If the status is **Busy**, you must wait for the current task to complete. If it is **Broken**, you might need to [abort the upgrade](#).

4. Click **Merge**.

NOTE \_\_\_\_\_

Your screen might flicker and you might briefly lose control of your keyboard and mouse as the system is merged.

Depending on the complexity of your applications and the upgrade you performed, your applications should be back up and running in under a minute.

After the merge process completes, the upgrade state is **Fault Tolerant | Merge | Ready**, indicating that the system is currently merged and the upgrade is ready to be committed. You can [test your applications](#) to verify that the upgrade was successful.

If the merge process fails the first time, you can click **Retry** to try again. If the problem persists, you can click **Abort** to abort the upgrade process, or see [Troubleshooting](#) for information about resolving the problem.

## Related Topics

- [“Verifying the Upgrade Side Before Committing the Upgrade”](#)
- [“Committing the Upgrade” on page 4-18](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Verifying the Upgrade Side Before Committing the Upgrade

After you have merged the system, your critical applications (including the Active Upgrade console) are running from the software on the Upgrade Side system disks. At this point, you can test the software you installed and verify the general health of the system with full access to the system’s resources, including:

- Network resources
- Internal data disks

For example, you might want to perform the following tasks before you commit the upgrade:

- Verify that all of your critical applications have restarted on the Upgrade Side (see [“Verifying the Status of Application Services” on page 5-2](#)).
- Verify that you have access to your network and application data disks.
- Verify that client systems can reach all of the services that your system provides.
- Verify the presence and version number of each software package (see [“Verifying the Status of Installed Software” on page 5-3](#)).
- Verify that you can start and run any applications that you have installed or upgraded (if they are not already running).
- Check the configuration settings for your applications and the operating system, which could have been altered by software installation.

If you are satisfied that everything is working correctly, you can [commit the upgrade](#) to make the changes permanent.

If there are any problems, you can [abort the upgrade](#) to return the system to its original state. However, **aborting the upgrade while the system is in merge mode incurs downtime**, because the Active Upgrade console must stop your critical applications on the Upgrade Side before it can restart them on the Production Side.

## Related Topics

- [“Committing the Upgrade”](#)

- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Aborting the Upgrade” on page 4-19](#)
- [Troubleshooting](#)

## Committing the Upgrade

When you are finished testing your applications on the merged system, and you are satisfied that everything is working correctly, you can commit the upgrade to make it permanent.

Committing the upgrade:

- Reestablishes the mirror of any internal RDR system disk by overwriting the original partner disk with its newer, upgraded partner disk.
- Reestablishes the mirror of any internal RDR data disk by overwriting the stale partner disk with its newer, live partner disk (the disk to which your applications have been writing data throughout the upgrade process).
- Does not restart your applications, as they are already running on the upgraded system. There is no additional downtime.



### CAUTION

---

**You cannot abort the upgrade process after you commit an upgrade** because the original state of the system is lost (overwritten) as a result of completing the upgrade process. Ensure that your system is working as expected before clicking **Commit**.

### To commit the upgrade

1. Close all non-essential applications.
2. Verify that the upgrade state, as reported in the status bar, is **Fault Tolerant | Merge | Ready**.
3. Click **Commit**.

### NOTE

---

Your screen might flicker and you might briefly lose control of your keyboard and mouse as the system commits the upgrade.

The commit process should take only a few minutes. After it completes, the upgrade state is **Fault Tolerant | Commit | Ready**. You can click **Finish** to clean up system resources, as described in [“Finishing the Upgrade” on page 4-20](#).

If the commit process fails the first time, you can click **Retry** to try again. If the problem persists, see [Troubleshooting](#) for information about resolving the problem.

### Related Topics

- [“Finishing the Upgrade” on page 4-20](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Verifying If RDR Disks Are Resynchronizing” on page 5-5](#)
- [Troubleshooting](#)

## Aborting the Upgrade

If necessary, you can abort the Active Upgrade process and restore the system to its original state at any point of the upgrade process **prior to committing the upgrade**.



### CAUTION

You cannot abort the upgrade process after you commit an upgrade because the original state of the system is lost (overwritten) as a result of completing the upgrade process.

When you abort an upgrade, the Active Upgrade console:

- Cancels the current Active Upgrade operation.
- If applicable (if your system is in the merge state), initiates a system restart. It shuts down the Upgrade Side and restarts the system from the Production Side, which automatically restarts your applications from your original Production Side system disks.
- If applicable, reestablishes the mirror of any internal RDR system disk by overwriting the upgraded partner disk with the original partner disk.
- If applicable, reestablishes the mirror of any internal RDR data disk by overwriting the stale partner disk with its newer, live partner disk (the disk to which your applications have been writing data throughout the upgrade process).
- If applicable, brings the Upgrade Side online to enable fault-tolerant, duplex mode.

To abort an upgrade, click the **Abort** button on the **Active Upgrade** page, the **Split System** page, or the **Merge System** page.

## NOTES

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1. Your screen might flicker and you might briefly lose control of your keyboard and mouse as the system recovers its original state.
2. If the Upgrade Side crashed during split mode, and there are dump files available on the Upgrade Side, the Active Upgrade console automatically copies these dump files to C:\sradumps\Memoryn.dmp on the Production Side of the system when the upgrade is aborted.

The abort process should take only a few minutes. When the process completes, the upgrade state is **Fault Tolerant | Abort | Ready**. You can click **Finish** to clean up system resources, as described in [“Finishing the Upgrade”](#).

If the abort process fails the first time, you can click **Retry** to try again. If the problem persists, see [Troubleshooting](#) for information about resolving the problem.

### Related Topics

- [“Finishing the Upgrade”](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Verifying If RDR Disks Are Resynchronizing” on page 5-5](#)
- [Troubleshooting](#)

## Finishing the Upgrade

To complete the Active Upgrade process and clean up system resources after committing or aborting an upgrade, click **Finish** on the **Commit Upgrade** page or **Abort Upgrade** page.

The finish process should take only a few minutes. When the process completes, the upgrade state is **Fault Tolerant | Idle | Ready**.

If the finish process fails the first time, you can click **Retry** to try again. If the problem persists, see [Troubleshooting](#) for information about resolving the problem.

On the **Finish** page, upon successful completion of the Active Upgrade process, you can:

- Click **Exit** to close the Active Upgrade console.
- Click **Save Log** to save the activity log to a file.

- Click **Active Upgrade** in the navigation bar to initiate another readiness test and upgrade with the same configuration.
- Click **Configuration** in the navigation bar to create, edit, or load another configuration file.

#### NOTE

Though the Active Upgrade process is complete, your RDR disks continue to resynchronize in the background. If you intend to initiate another upgrade process, you must wait for the resynchronization to complete before you do so. See [“Verifying If RDR Disks Are Resynchronizing” on page 5-5](#) for more information.

#### Related Topics

- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [“Verifying If RDR Disks Are Resynchronizing” on page 5-5](#)
- [Troubleshooting](#)

## Viewing Active Upgrade Process Status

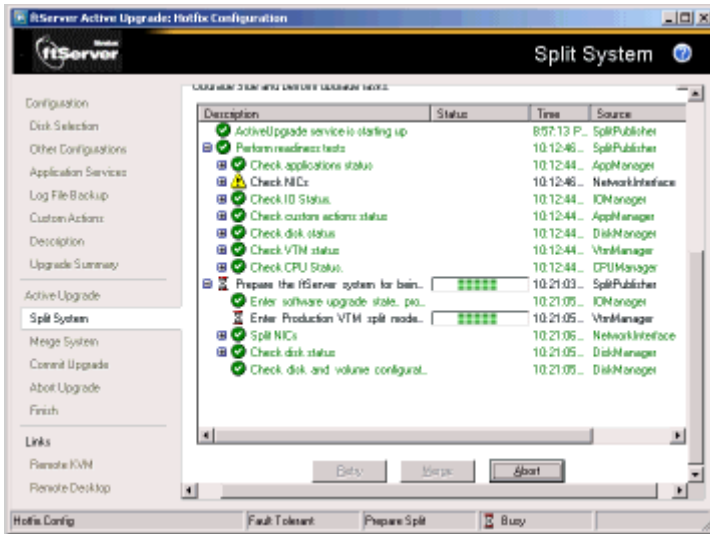
You can view the status of the Active Upgrade process at any point during the upgrade. The Active Upgrade console indicates status in two ways:

- [“Activity Log”](#)
- [“Status Bar” on page 4-25](#)

### Activity Log

The activity log ([Table 4-4](#)), which reports details about each upgrade operation, is displayed in the main window of the Active Upgrade console after you have initiated a readiness test or upgrade session.

Figure 4-4. Activity Log (in Active Upgrade Console)




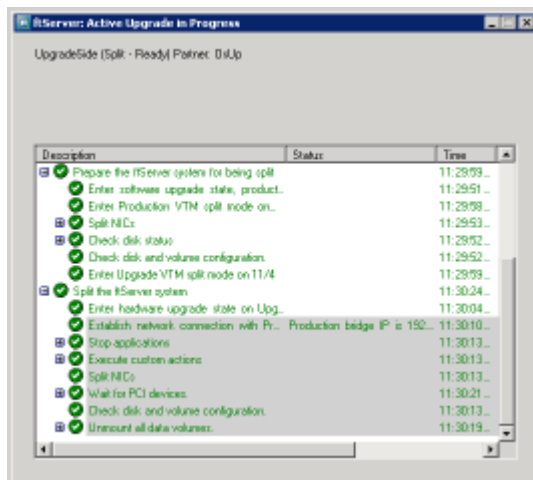
If you want to check the status of the upgrade process when you are logged on to the Upgrade Side of the system (while in split mode), you can also double-click the Active Upgrade icon (  ) in the system tray to open the remote activity log (Figure 4-5).

Figure 4-5. Remote Activity Log








## NOTE

You can only view status in the remote activity log. To control the remaining steps of the Active Upgrade process, you must minimize or close the connection to the Upgrade Side and use the Active Upgrade console on the Production Side.

Table 4-2 describes the general meaning of activity log entries that appear in the local and remote activity logs.

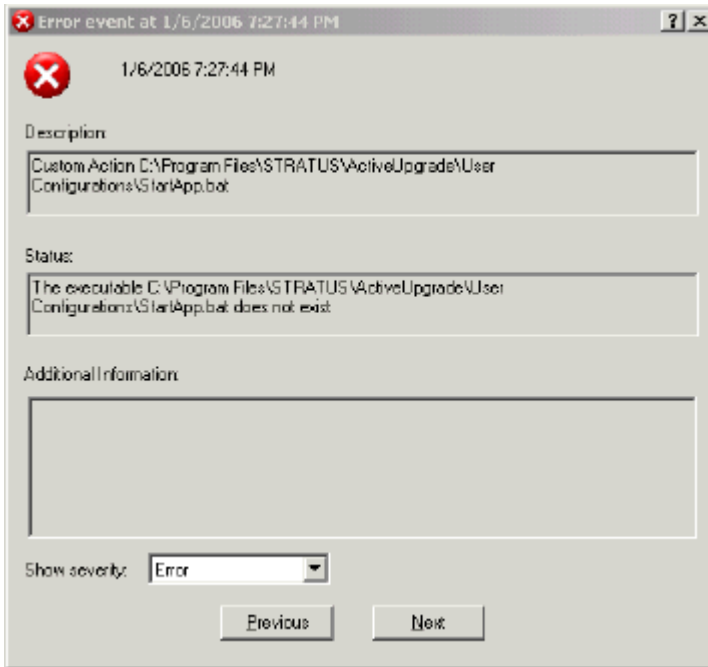
**Table 4-2. Activity Log Entries**

Icon	Text Color	Severity	Description
	Green	Success	Task completed without error
	Black	Pending	Task is in progress
	Black	Information	Task information, no action necessary
	Black	Warning	A problem that should be addressed, but will not block an upgrade
	Red	Error	A problem that must be corrected before continuing with upgrade

Some upgrade items are collapsed into a single line. To display all of the associated items, click the expand (+) button to the left of the item. To collapse them again, click the collapse (-) button to the left of the item.

Double-click any item in the activity log to open a detail window with more information about that item.

Figure 4-6. Activity Log Detail



In the detail window, you can click the **Previous** and **Next** buttons to review other items of the same severity. For example, if you are viewing an error, you can click **Next** to see the next error item. To change the severity level of the items you want to review, select an option from the **Show severity** pulldown menu. (A severity type is unavailable if there are currently no items of that severity in the activity log).

If necessary, you can save the items from the activity log in the Active Upgrade console to a file. For example, you might need to send this file to NEC Technical Support or your authorized service representative for troubleshooting purposes. See [“Saving the Activity Log to a File” on page 5-1](#) for more information.

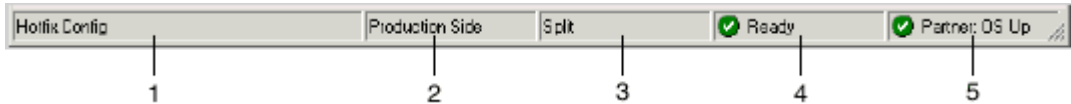
### Related Topics

- [“Status Bar”](#)
- [“Saving the Activity Log to a File” on page 5-1](#)
- [Troubleshooting](#)

## Status Bar

The status bar (Figure 4-7), which is located at the bottom of the Active Upgrade console window, reports a quick summary of the status of the upgrade.

**Figure 4-7. Status Bar**



- 1 Configuration file name
- 2 Hardware State (Table 4-3)
- 3 Upgrade State (Table 4-4)
- 4 Operational State (Table 4-5)
- 5 Partner State (Table 4-6)

The Hardware State reports whether or not your critical applications are running in lockstep. Table 4-4 describes the possible hardware states.

**Table 4-3. Status: Hardware State**

Hardware State	Description
Fault-tolerant	The system is duplexed.
Production Side	The system is currently running in split mode, and your applications are running from the Production Side (the original copy of your software). The Upgrade Side is available for installation tasks.

The Upgrade State reports the stage of the upgrade your system is entering or has entered. Table 4-4 describes the possible upgrade states.

**Table 4-4. Status: Upgrade State**

Upgrade State	Description
Idle	The current upgrade session is idle. The Active Upgrade process has just finished, or it has not been initiated yet.
Prepare Split	The Active Upgrade console is preparing to split the system by running a final readiness check and additional background tasks.
Split	If the operational state is <b>Ready</b> , the system is running in split mode. Otherwise, the Active Upgrade console is in the process of initiating split mode.
Prepare Merge	The Active Upgrade console is preparing to merge the system by running additional readiness tests and background tasks.
Merge	If the operational state is <b>Ready</b> , the system is merged. Otherwise, the Active Upgrade console is in the process of merging the system.
Commit	The Active Upgrade console is in the process of committing your changes (making them permanent).
Abort	The upgrade process has been aborted, and the Active Upgrade console is in the process of restoring the system to its previous state.

The Operational State reports the status of the last operation that was requested. [Table 4-5](#) describes the possible operational states.

**Table 4-5. Status: Operational State**

Operational State	Description
Ready	The previous operation has been completed successfully. The Active Upgrade process is ready to enter the next upgrade state.
Busy	The current operation is still in progress. Allow time for the operation to complete.
Broken	The Active Upgrade console could not complete the current operation. Check the activity log for errors. You must correct the errors and click <b>Retry</b> to complete the operation, or click <b>Abort</b> to abort the current upgrade session.

The Partner State reports the status of the partner system. For example, while the system is in split mode, the Active Upgrade console is running on the Production Side, and this field reports the health of the Upgrade Side of the system. [Table 4-6](#) describes the possible partner states.

**Table 4-6. Status: Partner State**

<b>Partner State</b>	<b>Description</b>
DC On	The partner operating system is shut down, but system power is still on.
DC Off	The partner operating system is shut down and system power is off (but the system still has housekeeping power).
BIOS POST	The partner system is performing a BIOS Power On Self Test (POST).
Hung: BIOS POST	The partner system hung in the BIOS POST.
OS Booting	The partner operating system is booting.
Hung: OS Booting	The partner system hung in the boot process.
OS Up	The partner operating system is up. (However, the system might not be available for use until other system resources finish loading.)
Hung: OS Up	The partner operating system is hung.
OS Rebooting	The partner operating system is rebooting.
Hung: OS Rebooting	The partner system hung while rebooting.
OS Shutting Down	The partner operating system is shutting down.
Hung: OS Shutting Down	The partner system hung while the operating system was shutting down.
State Sensitive Recovery: NMI issued	The partner operating system has crashed. The system controller has issued a non-maskable interrupt (NMI) to save a dump file and reset the partner operating system. (For more information about what occurs during a state-sensitive recovery, see the <i>Express5800/320Ma Virtual Technician Module User's Guide</i> ).
State Sensitive Recovery: Reset	The system controller is performing a hard reset of the partner system.

**Related Topics**

- [“Activity Log” on page 4-21](#)
- [“Saving the Activity Log to a File” on page 5-1](#)
- [Troubleshooting](#)



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## Chapter 5

# Troubleshooting

If necessary, you can collect information about the Active Upgrade process and resolve problems by:

- [Saving the activity log to a file](#)
- [Viewing the status of application services](#)
- [Viewing the status of installed software](#)
- [Verifying If RDR disks are resynchronizing](#)
- [Learning about general problems and solutions](#)
- [Getting help](#)

### Saving the Activity Log to a File

If necessary, you can save the contents of the activity log to a file for later viewing.

#### To save the activity log to a file

1. Right-click the activity log, and select **Save to File** in the shortcut menu.
2. Next to **Save in**, select a folder in which to save the file.
3. Next to **File name**, type a name for the file. (Activity log files are saved in XML format, which you can view in Internet Explorer. The .xml extension is added automatically.)
4. Click **Save**.

#### NOTE

If you have just completed an upgrade session, you can also save the activity log by clicking **Save Log** on the **Finish** page.

#### Related Topics

- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [Troubleshooting](#)

## Verifying the Status of Application Services

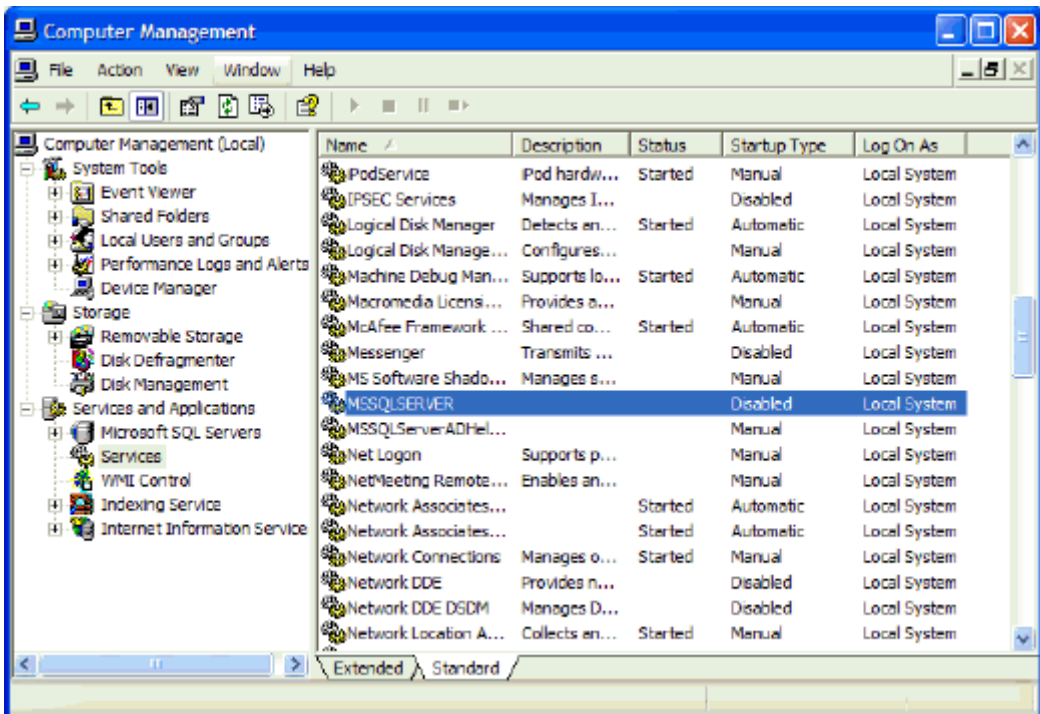
At various stages of the Active Upgrade process, you can optionally verify the status of services you specified for control on the [Application Services](#) page of the Active Upgrade console.

### To verify the status of a service

1. Right-click **My Computer** on your desktop (or in the **Start** menu).
2. Select **Manage** from the shortcut menu. **Computer Management** is displayed.
3. If necessary, click **Services and Applications** to expand it.
4. Click **Services** to display the Service Control Manager ([Figure 5-1](#)) in the right pane of the window.
5. Search for a service in the list and view its current **Status** and **Startup Type** in the fields next to the service name.

For example, while the system is in split mode, any service you selected for control by the Active Upgrade console should be stopped (blank **Status** field) and its Startup Type should be **Disabled** on the Upgrade Side of the system, as shown with the MSSQLSERVER service in [Figure 5-1](#).

Figure 5-1. Service Control Manager



### Related Topics

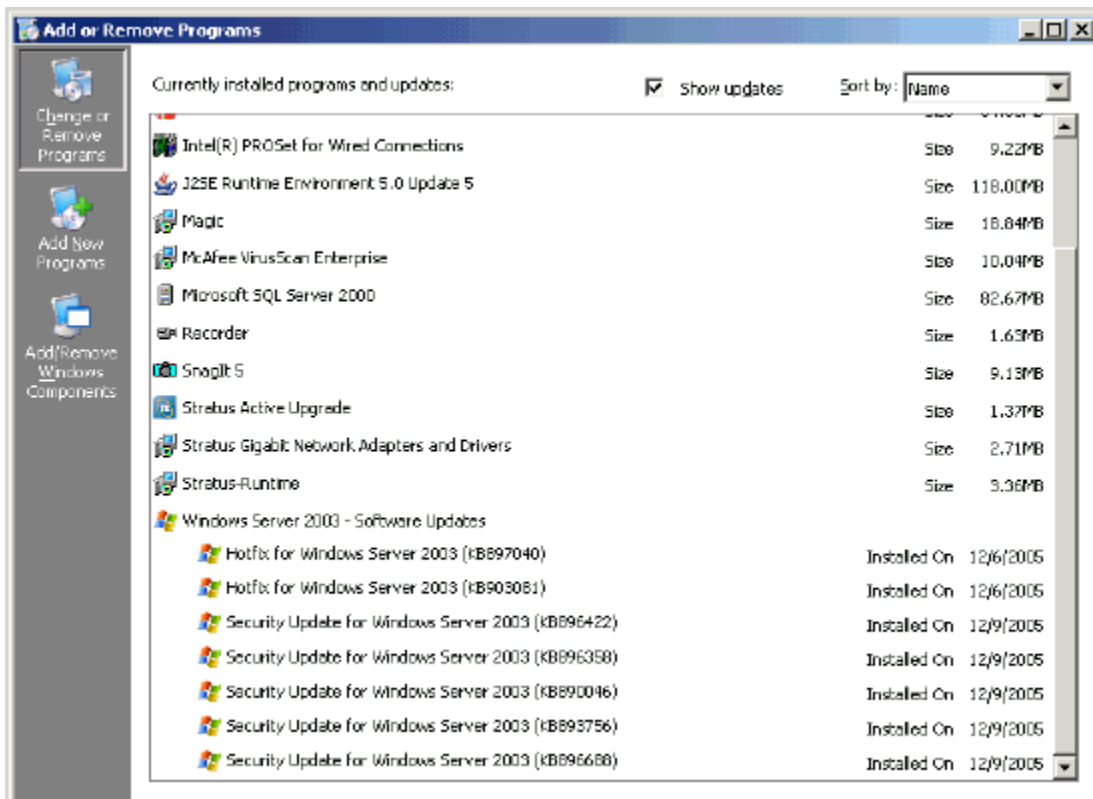
- [“Managing Critical Applications During the Upgrade Process”](#) on page 2-6
- [“Selecting Application Services to Control”](#) on page 3-9
- [“Viewing Active Upgrade Process Status”](#) on page 4-21
- [Troubleshooting](#)

## Verifying the Status of Installed Software

While you are running in split or merge mode, or after you have finished the Active Upgrade process, you might want to verify the status of the software packages that you installed.

If necessary, you can view a list of most of the programs present on your system in the **Add or Remove Programs** control panel ([Figure 5-2](#)).

Figure 5-2. Add or Remove Programs Control Panel



If you installed any Windows updates, select the **Show updates** check box in the control panel to display the updates in the list of programs.

**NOTE** \_\_\_\_\_

If your system is in split or merge mode, remember to view the **Add or Remove Programs** control panel **on the Upgrade Side**. The same control panel on the Production Side does not list the new software you installed on the Upgrade Side.

**Related Topics**

- [“Running Software Installation Programs” on page 4-10](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [Troubleshooting](#)

## Verifying If RDR Disks Are Resynchronizing

When you complete or abort the Active Upgrade process, the system reestablishes the mirrors between the RDR partner disks in each CPU-I/O enclosure. If you intend to initiate another upgrade process, you must wait for the full resynchronization to complete before you do so.

You can tell if a disk is resynchronizing by viewing the LEDs on the front panel of the disk. For information about interpreting the LEDs, see the operation and maintenance guide for your system.

You can also view the status of your disks using one of the following methods:

- Run a readiness check. On the **Active Upgrade** page, click **Retry**. If the disks are still resynchronizing, the upgrade state is reported as **Fault Tolerant | Idle | Broken** and the activity log displays errors indicating that the disks are not ready.
- View the disks on the **Disk Selection** page. Any volume that is red is simplexed (and, thus, probably still resynchronizing). When a disk volume is only green, it is duplexed and you can start another upgrade. (See [“Selecting Disks to Upgrade” on page 3-5](#) for more information about disk states on the **Disk Selection** page.)
- View the disks in ftServer Management Console (ftSMC), using the following procedure.

### To view the status of an RDR virtual disk in ftSMC

1. On the system's desktop, click **ftServer Management Tools** to open ftSMC.
2. In ftSMC, expand **ftServer (Local)**, **ftServer I/O Enclosures**, and **Logical Disk Information**.
3. Click one of the **RDR Virtual Disk** nodes.
4. Check the value of the **Status** property, which displays **Resync nn%** (where *nn* is the percentage completed) while the disk is resynchronizing. When the resync process is finished, the value is **None**.

Ensure that the value of the **Status** property for all RDR Virtual Disks is **None** before you retry the Active Upgrade process.

### Related Topics

- [“Selecting Disks to Upgrade” on page 3-5](#)
- [“Performing a Readiness Check” on page 4-1](#)
- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [Troubleshooting](#)

## General Problems and Solutions

Table 5-1 describes some common problems that could prevent your system from passing the readiness check.



### CAUTION

Never perform hardware maintenance, such as removing and replacing system components, while the Active Upgrade process is running. If you experience a problem that prevents the Active Upgrade process from completing successfully, you should always be able to abort the upgrade session to restore your system to its original state. If you cannot abort an upgrade session, contact NEC Technical Support or your authorized support representative for assistance.

### NOTE

For the latest troubleshooting information, including any issues that were discovered post release, see the *Express5800/320Ma: Active Upgrade User's Guide* online at <http://support.necsam.com/servers/>.

**Table 5-1. Troubleshooting: Readiness Check**

Error	Action
<i>IO board nn is unsafe to pull</i>	Verify that all critical system resources (including disks, Ethernet PCI adapters, and VTMs) are configured correctly and duplexed. See “ <a href="#">System Prerequisites</a> ” on page 2-2 for more information.
<i>RDR disk is not duplexed</i>	If you recently ran an upgrade session, wait for the RDR resynchronization process to complete before running another upgrade session. See “ <a href="#">Verifying If RDR Disks Are Resynchronizing</a> ” on page 5-5 for more information.
<i>Embedded NIC not teamed</i>	Use the PROset utility to configure your Ethernet PCI adapters into teams. All <b>embedded</b> Ethernet PCI adapters must be teamed. See “ <a href="#">System Prerequisites</a> ” on page 2-2 and “ <a href="#">Recommendations</a> ” on page 2-5 for more information about configuring Ethernet PCI adapters.

**Table 5-1. Troubleshooting: Readiness Check (Continued)**

Error	Action
<i>No IP address on Upgrade ready team</i>	Use the Network Connections control panel to assign an IP address (preferably a static IP address) to the Ethernet team, or renew your DHCP lease. See <a href="#">“System Prerequisites” on page 2-2</a> and <a href="#">“Recommendations” on page 2-5</a> for more information about configuring Ethernet PCI adapters.
<i>Team does not have link on both sides</i>	Ensure that an embedded Ethernet team has at least one adapter in each CPU-I/O enclosure with an active network link. Verify that the network cables are plugged in on both sides, and that the Ethernet team has a valid IP address. See <a href="#">“System Prerequisites” on page 2-2</a> and <a href="#">“Recommendations” on page 2-5</a> for more information about configuring Ethernet PCI adapters
<i>Active Upgrade may fail. Check DHCP server.</i>	The Active Upgrade console cannot obtain IP addresses from your DHCP server. If possible, assign static IP addresses to your Ethernet teams and VTMs to avoid problems during the Active Upgrade process.
<i>Remote Desktop is not enabled</i>	<p>To perform installation tasks while the system is in split mode, you need to establish a remote connection from the Production Side to the Upgrade Side. If you want to use Remote Desktop to connect to the Upgrade Side, you must enable access for Remote Desktop connections in the <b>System</b> control panel. (Or you can optionally use Remote KVM instead of Remote Desktop to connect to the Upgrade Side.) See <a href="#">“Pre-Upgrade Tasks” on page 2-7</a> and <a href="#">“Connecting to the Desktop on the Upgrade Side” on page 4-6</a> for more information.</p> <p>If you are running Windows Firewall, also ensure that the exceptions for Active Upgrade console and Remote Desktop are enabled. See <a href="#">“Configuring Windows Firewall for the Active Upgrade Process” on page 2-10</a> for more information.</p>

[Table 5-2](#) describes some common problems with custom actions.

**Table 5-2. Troubleshooting: Custom Actions**

Error	Action
<i>The executable filename does not exist.</i>	Ensure that the executable file associated with your custom action is located in the directory you specified during the configuration process. Also, ensure that the custom action is located on a system disk, otherwise the Upgrade Side loses access to the executable file while the system is in split mode.
<i>Custom action failed with exit value n</i>	<p>Check the output for the custom action for errors. See <a href="#">“Viewing Standard Output and Error Stream” on page 3-17</a> for more information.</p> <p>You must correct the problem and click <b>Retry</b> in the Active Upgrade console to retry the current upgrade request (which also runs the custom action again). The Active Upgrade process cannot continue until the executable file for your custom action runs successfully.</p> <p>If possible, test and debug the executable file outside of the Active Upgrade process. Ensure that it terminates with exit value 0 and that it completes in a timely manner.</p>

[Table 5-3](#) describes miscellaneous problems.

**Table 5-3. Troubleshooting: Miscellaneous Problems**

Error/Problem	Action
Active Upgrade console fails to start	<p>Wait a minute, and try to start Active Upgrade console again.</p> <p>If the problem persists, it might mean that the Active Upgrade console cannot communicate with related services on your local system. If your system is running a network firewall solution, check the firewall logs for blocked communications and explicitly add these items to your trusted zone. For information about configuring Windows Firewall, see <a href="#">“Configuring Windows Firewall for the Active Upgrade Process” on page 2-10</a>.</p>

**Table 5-3. Troubleshooting: Miscellaneous Problems (Continued)**

Error/Problem	Action
<i>Failed to disable PCI device: QLogic Fibre Channel Adapter</i>	If you have installed QLogic SANsurfer Fibre Channel HBA Software to upgrade the BIOS in your host bus adapter, you should uninstall this utility when you are done upgrading the BIOS. In this case, the Active Upgrade console cannot split system resources because it cannot disable the HBA on the Upgrade Side. To resolve the problem, you must abort the upgrade, uninstall SANsurfer, restart the system (or stop the SANsurfer service), and restart the upgrade process.
<i>The underlying connection was closed: Unable to connect to the remote server.</i>	If your system is running a network firewall solution, check the firewall logs for blocked communications and explicitly add these items to your trusted zone. For information about configuring Windows Firewall, see <a href="#">"Configuring Windows Firewall for the Active Upgrade Process"</a> on page 2-10.
<i>A connection attempt failed because the connected party did not properly respond...</i>	
Remote KVM browser window appears, but does not open connection	Ensure that Java™ 2 Runtime Environment (JRE) is installed and running. Also ensure that you have added the VTM console Web address to your Trusted Sites list, and that you have allowed blocked Web-based content. See <a href="#">"Connecting to the Upgrade Side with Remote KVM"</a> on page 4-7 for more information.
Remote Desktop connection fails with the error, <i>The client could not connect to the remote computer.</i>	See Action under "Remote Desktop is not enabled" in <a href="#">Table 5-1</a> .
An application fails to be stopped by the Active Upgrade console during split	If your application does not gracefully handle the loss of the network or disks on the Upgrade Side, it might not stop in a timely manner when the system enters split mode, and the Active Upgrade process will time out in a <b>Broken</b> state. If this happens, <a href="#">restart the Upgrade Side</a> before performing upgrade tasks to restore the Upgrade Side to an expected state. If configured correctly, any applications that the Active Upgrade console controls should not restart on the Upgrade Side in split mode.

## Related Topics

- [“Viewing Active Upgrade Process Status” on page 4-21](#)
- [Troubleshooting](#)

## Getting Help

If you have a technical question about Express5800/320Ma hardware or software, try these online resources first:

- **Online support from NEC Technical Support.** You can find the latest technical information about an Express5800/320Ma through online product support at the [NEC Technical Support Web site](#):  
<http://support.necsam.com/servers/>
- **Online product support for Microsoft® products.** Your primary source for support is the computer manufacturer who provided your software, or an authorized Microsoft Support Provider. You can also find the latest technical information about Microsoft Windows® and other Microsoft products through online product support at the [Microsoft Help and Support Web site](#):

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

If you are unable to resolve your questions with the help available at these online sites, and the Express5800/320Ma system is covered by a service agreement, please contact [NEC Technical Support](#) (866-269-1239).

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# Glossary

## Active Upgrade technology

A process that allows you to upgrade system software and applications on an Express5800/320Ma system while its critical applications remain online and accessible to users. For more information, see the [Overview](#).

## application service

A program that runs in the background and performs tasks related to other programs on the local system or on remote systems. For example, a server may run an Exchange service, which can process email for local and remote systems.

The Active Upgrade console allows you to specify services that are related to your applications so that, when necessary, the applications and services may be started or stopped simultaneously.

See also [custom action](#).

## advanced video redirection (AVR) session

See [Remote KVM](#).

## call

To declare a program, script, or file that will be referenced by the current file. See also [nesting](#) (for configuration files).

## child configuration

A configuration file that is [called](#) into a [parent configuration](#) file in a [nested configuration](#).

## commit upgrade

The stage of the Active Upgrade process during which the system makes the upgrade permanent by remirroring the upgraded system disk and the current data disk with their older partner disks.

You cannot abort the Active Upgrade process after you commit the upgrade, because the original version of your system is erased as a result of reestablishing the RDR mirrors.

### **configuration file**

A file that contains all of the settings pertaining to the Active Upgrade process for your system. You can create multiple configuration files, each for a different type of upgrade that you regularly perform on your system. You can also use [nesting](#) to incorporate the settings of one configuration file into another configuration file.

### **critical system resource**

A system component, such as a hard disk or network adapter, that is required to run mission-critical applications.

### **custom action**

A mechanism for controlling your critical applications during the Active Upgrade process. By specifying executable files and certain parameters in the Active Upgrade console, you can ensure that your applications are stopped or restarted at the appropriate times when the system is split or merged.

### **data disk**

An internal RDR disk that is resynchronized from the [Production Side](#) to the [Upgrade Side](#) upon completion of the Active Upgrade process.

Data disks are available only on the Production Side while the system is running in [split mode](#). They typically contain live data (for example, database files and transaction logs) required by your applications.

A disk that contains active Windows operating system components (boot partition, paging file) cannot be a data disk (see [system disk](#)).

### **duplex mode (duplexed)**

The state of an ftServer system when most or all of its individual components are paired with redundant partner components that can keep the system operational if a hardware failure occurs.

It is safe to initiate an Active Upgrade on a duplexed system because redundant components continue to run your applications during the upgrade process.

### **element**

Redundant segments of an ftServer system that contain components such as processors, hard drives, PCI slots, and certain I/O ports.

Each system comes with a minimum of two CPU elements and two I/O elements, usually distributed over two or more enclosures. The elements in an enclosure operate with each other, or, if necessary, with elements in another enclosure, to emulate a single logical system.

(Note that, in ftSMC, elements are displayed as enclosures, for example, **CPU Enclosure - *n*** and **I/O Enclosure - *n***.)

**enclosure**

A physical container that includes at least one CPU [element](#) and at least one I/O element. In a system with more than one physical enclosure, you may be able to remove or upgrade one enclosure while the other continues to run your applications uninterrupted.

**executable file**

A program file, such as a .exe, .bat, or .vbs file, that you can assign to a [custom action](#).

**fault-tolerant mode**

Same as [duplex mode](#).

**high priority update (hotfix)**

Critical update that should be installed as soon as it becomes available.

**installation program**

A program file that installs a software package.

**mandatory system disk**

A disk that is automatically marked as a system disk (on the **Disk Selection** page of the Active Upgrade console) and cannot be changed to a data disk. A mandatory system disk contains either boot files or paging files (virtual memory files) that are currently in use by the running operating system.

In detail, a disk becomes a mandatory system disk if:

- It contains a volume or part of a volume that the operating system identifies as a system volume.
- It contains a volume or part of a volume that contains an operating system paging file.
- It contains a volume or a part of a volume that contains a mount point for a volume that is either a system volume or contains a paging file.

Note that volumes can span multiple disks and that disks can contain multiple volumes. The operating system defines as a system volume the volume that was used to perform the initial low level boot of the system and the volume that contains the Windows directory. These are typically the same volume but they need not be.

### **merge system**

The stage of the Active Upgrade process during which the system restarts your applications on the [Upgrade Side](#).

When the system is in a merged state, it has access to [critical system resources](#), which you can use to test your applications and verify if the upgrade was successful.

### **nesting (nested configuration files)**

A method of [calling](#) one or more existing configuration files from the configuration file you are currently editing, so that the settings from the called files will also apply to the file you are editing. See also [child configuration](#) and [parent configuration](#).

### **parent configuration**

A configuration file that calls [child configuration](#) files and incorporates their settings in a [nested configuration](#).

### **persistent data file**

A file that stores permanent records for an application, such as a database file.

### **Production Side**

The side of a split-mode system that continues to run your applications and serve live users during the upgrade process. See also [Upgrade Side](#).

### **Remote Desktop Connection**

A Microsoft Windows component that allows you to control the keyboard, video and mouse of a remote system from your local system as though you were sitting at that system's console.

You can click the **Remote Desktop** link in the Active Upgrade console to open a Remote Desktop Connection to the Upgrade Side of a [split system](#).

### **Remote KVM**

A Web browser-based utility that allows you to control the keyboard, video, and mouse of a remote system from your local desktop as though you were sitting at that system's console. (Remote KVM employs the Advanced Video Redirection (AVR) feature of the VTM console.) Unlike [Remote Desktop Connection](#), Remote KVM can control the remote system even when the remote operating system is not running.

You can click the **Remote KVM** link in the Active Upgrade console to open an AVR session to the Upgrade Side of a [split system](#).

**service**

See [application service](#).

**session**

One complete Active Upgrade process, from split mode to finish. Or, a remote connection to the upgrade side of the system, as in a [Remote KVM](#) (or AVR) session.

**simplex mode (simplex)**

The state of an ftServer system when one or more of its individual components is operating without a redundant partner component. If a hardware failure occurs, system operations may terminate.

You cannot initiate an Active Upgrade on a simplex system because there are insufficient system resources to keep the system operational during the upgrade process.

**split mode**

The state of an ftServer system when its elements are split into two independent, simplex systems — a [Production Side](#) and an [Upgrade Side](#).

**split system**

The stage of the Active Upgrade process during which the system enters [split mode](#).

Also, a system that is running in split mode.

**system disk**

An internal RDR disk that is resynchronized from the [Upgrade Side](#) to the [Production Side](#) upon completion of the Active Upgrade process.

Only software located on system disks can be upgraded online. System disks are available on both sides of the system when it is running in [split mode](#). They typically contain binary files (for example, operating system drivers and application services) and configuration information (the Windows registry).

A disk that contains active Windows operating system components (boot partition, paging files) is automatically marked as a [mandatory system disk](#), and cannot be changed to a [data disk](#). Other disks default to data disks, but can be changed to system disks per user configuration if they contain only application binaries and configuration data.

**temporary file**

A file that stores data only for a short time, such as a cache file.

**Upgrade Side**

The side of a split-mode system on which you can upgrade software. See also [Production Side](#).

**volume**

A fixed amount of storage on a hard disk (or spanning many hard disks) that is defined and managed as a single device in the operating system.

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