



Return to Factory Install (RTFI) Process

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Introduction

SolidFire uses the Return To Factory Install (RTFI) process to image a new node or restore a node to its factory original state. The RTFI process secure erases all existing data and configurations (if any) and installs an unconfigured Element OS. The RTFI process is available for all SolidFire nodes and can also be used on pre-validated hardware configurations that offer Element X support.

SolidFire uses one RTFI process for all Element OS installations. This includes internal manual installations performed by developers, automatic installations by automated test framework, field installations by service engineers and customers, and installations performed by various integrators and partners. The same RTFI process is used on all SolidFire nodes and nodes that support Element X, regardless of the chassis or node type in use, to automatically fix any issues.

The intended audience for the RTFI Configuration Guide is integrators who install, configure, use, or troubleshoot storage-related issues.

- **Linux:** You have some background with Linux systems.
- **Networking:** You have a familiarity with server networking and networked storage, including IP addresses, netmasks, and gateways.

CAUTION: The RTFI process is data destructive and secure erases all data and configuration details from the node and installs a new operating system. Ensure that the node used for the RTFI process is not active as part of a cluster.

Deployment and Installation Options

Bootable, installable media with a completely self-contained, minimalistic Linux OS is used to deploy Element OS on a node. The RTFI ISO specific to your Element OS version can be downloaded from the SolidFire support FTP.

Once the RTFI ISO is received, it can be deployed according to one of the following commonly used methods.

- **Physical USB key:** A bootable Element OS ISO can be written to a USB key using a tool such as [UNetbootin](#). Insert the USB key with the ISO into the node and boot from the USB key.
- **Virtual media via iDRAC:** Use iDRAC (or its equivalent) to dynamically attach to the ISO located on your client system. The ISO will be available to the host OS as a virtual drive (CD/DVD).
- **Network boot via PXE/TFTP/FTP:** Instead of manually unpacking an ISO image, you can use `autoifs` to automatically extract an image when the RTFI process requests it. This deployment mechanism requires more initial setup but allows for proper automation and scalability of installation. For more information on automation options, see [Runtime Options for the RTFI Process](#).

RTFI Process Overview

CAUTION: The RTFI process is data destructive and secure erases all data and configuration details from the node and installs a new operating system. Ensure that the node used for the RTFI process is not active as part of a cluster.

The SolidFire Return To Factory Install (RTFI) process is initiated through terminal user interface prompts.

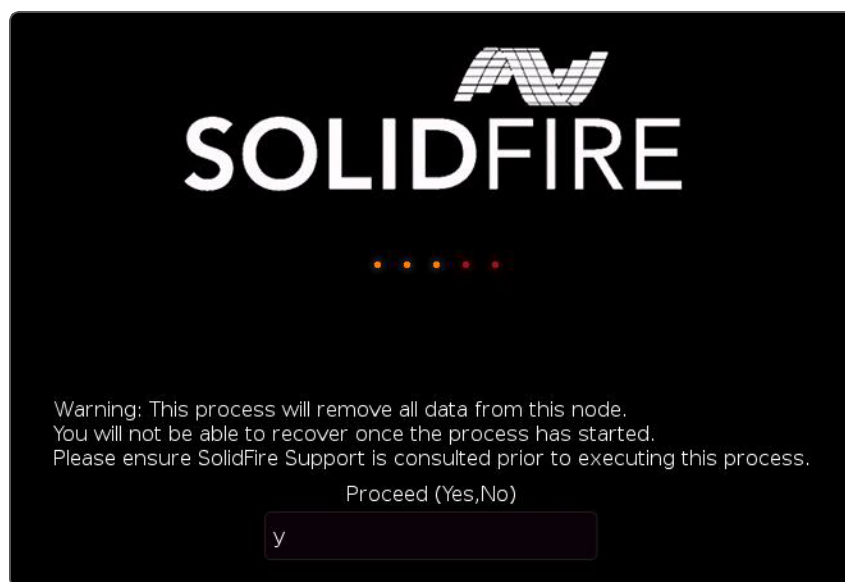


Figure 1: Initiating the RTFI process

The RTFI process performs the following high-level operations:

1. Starts the installation after user confirmation and validates the image.
2. Unlocks all drives on a node.
3. Validates and flashes firmware.
4. Checks hardware.
5. Tests hardware.
6. Secure erases all selected drives.
7. Partitions root drive and creates file systems.
8. Mounts and unpacks image.
9. Configures host name, networking (DHCP), default cluster configuration, and GRUB bootloader.
10. Stops all services, collects logs, and reboots.

To configure your node once the RTFI process has successfully completed, see the [SolidFire Element Setup Guide](#). A node that has successfully completed RTFI will be in an *available* (unconfigured) state by default.

Performing the RTFI Process

Follow these Return to Factory Install (RTFI) steps to image or restore the Element OS on your SolidFire node or alternative node that supports Element X.

Prerequisites

- Access to a console for the SolidFire node or alternative node with Element X support.
- The node on which you will perform the RTFI process is powered up and connected to a network.
- The node on which you will perform the RTFI process is not part of an active cluster.
- Access to bootable installation media that contains the image of the relevant Element OS version for your configuration.
- Contact SolidFire [Support](#) if you have any concerns before performing the RTFI process.

Procedure

1. Boot the node from the bootable installation media that contains the Element OS image for your configuration.
2. Start the RTFI process from the console.
The RTFI image Element OS name and version number appears.
3. At the initial prompt, you are notified that the process will remove all data from the node and that data is not recoverable once the process has begun. Type **Yes** to begin.

CAUTION: All data and configuration details will be permanently erased from the node once the process is initiated. If you elect not to proceed, you will be directed to the RTFI Options Menu. See [RTFI Options Menu](#).

4. Type **no** when prompted to perform extensive hardware tests unless both of the following are true:
 - You have a SolidFire node or a node with Element X support.
 - You have reason to suspect a node hardware failure.
5. A message indicates that the RTFI process has finished. The system will now power off.
6. Remove all bootable installation media, if necessary, after the node powers off.
The node is now ready to be powered on and configured. See [SolidFire Element Setup Guide](#) for the configuration procedure for a storage node.

If you encountered an error message during the RTFI process, see [RTFI Options Menu](#).

RTFI Options Menu

The following options menu appears if the RTFI process is unsuccessful or if you elect not to proceed at the initial RTFI process prompt.



NOTE: Contact SolidFire Support before typing any of the following command options.

Option	Description
Reboot	Exits the RTFI process and reboots the node in its current state. No cleanup is performed.
PowerOff	Gracefully powers off the node in its current state. No cleanup is performed.
Exit	Exits the RTFI process and opens a shell prompt.
UploadLogs	Collect all logs on the system and uploads a single consolidated tarball to a specified URL.
OpenSupportTunnel	Opens a reverse SSH connection with <i>sfsupport.solidfire.com</i> .
CloseSupportTunnel	Closes the reverse SSH connection with the SolidFire remote server.
ShowSupportTunnel	Displays information about support tunnel connection.

Uploading Logs

Collect all logs on the system and upload them to a specified URL according to the following procedure.

Procedure

1. Type `UploadLogs` at the RTFI options menu prompt.
The Uploading Logs prompt appears.
2. Enter the remote directory information.
 - a. Type a URL that includes the protocol, for example, `ftp://`, `scp://`, `http://`, or `https://`.
 - b. (Optional) Add an embedded user name and password, for example, `scp://user:password@URLaddress.com`.

NOTE: For a full range of syntax options, see the [cURL](#) site.

3. The log file uploads and saves to the specified directory as a `.tbz2` archive.

Using the Support Tunnel

Open and close a reverse SSH connection with SolidFire Support according to the following procedure.

Prerequisites

- Contact SolidFire Support for a user name, password, and port.

Procedure

1. Type `OpenSupportTunnel` at the RTFI options menu prompt.
2. When prompted, enter the user name, password, and port provided by SolidFire Support.
3. After successful connection with the server, the process identifier (PID), user name, host name, and port used by the connection will display in the prompt. Press any key to return to the RTFI options menu.
4. After the session is complete, type `CloseSupportTunnel` to close the connection with the SolidFire support server and stop remote access.

Runtime Options for the RTFI Process

To fully automate the RTFI process, you can configure runtime options that control the behavior of the RTFI process.

These runtime options can be passed into the RTFI process as kernel parameters in the boot process of the LiveCD. PXE configuration files have the ability to add additional kernel parameters into the boot line that is passed directly into the LiveCD kernel.

Available runtime options are described in the table below. Kernel parameters are not case sensitive with RTFI, and any combination of uppercase or lowercase characters can be used.

Option	Default	Description
SF_BOND_MODE	ActivePassive	Sets the default network bond mode on <i>both</i> 1 G and 10 G interfaces. NOTE: Some installations use LACP bonding by default. LACP bonding can complicate bootstrapping node communication since it is incompatible with other bond modes.
SF_HOSTNAME	random	Sets the hostname used for each node. By default, the RTFI process picks a random hostname for each node. Each hostname begins with <i>SF-</i> with 4 random characters appended to it.
SF_POSTINST_ERASE_ROOT_DRIVE	0	Sets the root drive to be erased after installation. This runtime option allows for testing of the RTFI process or use of RTFI process to flash firmware and test hardware without leaving anything installed on the node. If set to 1, the root drive on which the RTFI image installs will be completely erased at the end of the installation.
SF_ROOT_DRIVE	""	Sets the root drive destination. Because the RTFI image installs automatically onto all supported chassis and storage node types, this runtime option is only applicable to management nodes. For management nodes with only one SATA drive, the RTFI image installs automatically to that drive. For management nodes with multiple drives, the RTFI installation prompts the operator to select the drive to image. The prompt can be avoided by setting drive destination before RTFI installation.
SF_SECURE_ERASE_RETRIES	5	Sets the number of secure erase retries for the RTFI process. The minimum value for this option is 1. Note: It is recommended that the SF_SECURE_ERASE_RETRIES option be set to the default setting to automatically retry the secure erase operation to correct failures.

Option	Default	Description
SF_START_RTFI	0	Starts the RTFI process. If set to 1, the initial RTFI warning prompt is skipped and the RTFI process is automatically initiated.
SF_SUPPORT_HOST	sfsupport.solidfire.com	Sets the host for a reverse SSH support tunnel connection. The default is SolidFire support.
SF_TEST_HARDWARE	prompt	Determines whether or not to initiate the RTFI process hardware stress tests. By default, the RTFI process prompts you to perform a 10 minute sequence of hardware stress tests against all drives. Set this option to 0 to disable the prompt and skip the tests. Set the option to 1 to disable the prompt and perform the tests automatically.
SF_UPGRADE_FIRMWARE	1	Determines whether or not to upgrade firmware. When set to the default value, this option upgrades the firmware of all system components during the RTFI process, including the NVRAM device, LSI controller, and all drives. Note: Contact SolidFire support before disabling this option.
SF_UPLOAD_LOGS_URL	""	Uploads RTFI log files to a specified URL. Replace the empty string with a URL destination to automate log file collection. The URL must follow naming protocol according to Uploading Logs .

Contacting SolidFire Active Support

If you have any questions or comments about SolidFire products in general, contact SolidFire support at <http://solidfire.com/support/portal> or support@solidfire.com



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