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CHAPTER 1

Introduction to this guide

This section contains the following topics:

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- Where to go for support........................................................................................ 8
About this guide

This guide provides important information and steps that you must review and follow when upgrading from OneFS 8.x.

Read this guide in its entirety before upgrading your cluster. Complete all of the steps in the checklists in this document during each stage of the upgrade process.

Note

For upgrades from OneFS 7.x to a later version of OneFS, see the OneFS 7.x Upgrade Planning and Process Guide.

Provide feedback about this document

The links in this topic enable you to send feedback directly to the Isilon Information Development team.

Your suggestions help us to improve the accuracy, organization, and overall quality of the documentation. Send your feedback to https://www.research.net/s/isi-docfeedback. If you cannot provide feedback through the URL, send an email message to docfeedback@isilon.com.

Where to go for support

This topic contains resources for getting answers to questions about Isilon products.

| Online support       | • Live Chat  
|                      | • Create a Service Request  
|                      | For questions about accessing online support, send an email to support@emc.com.  
| Telephone support    | • United States: 1-800-SVC-4EMC (1-800-782-4362)  
|                      | • Canada: 1-800-543-4782  
|                      | • Worldwide: 1-508-497-7901  
|                      | • Local phone numbers for a specific country are available at EMC Customer Support Centers.  
| Isilon Community Network | The Isilon Community Network connects you to a central hub of information and experts to help you maximize your current storage solution. From this site, you can demo Isilon products, ask questions, view technical videos, and get our latest Isilon product documentation.  
| Isilon Info Hubs | For the list of Isilon info hubs, see the Isilon Info Hubs page on the Isilon Community Network. Use these info hubs to find product documentation, troubleshooting guides, videos, blogs, and other information resources about the Isilon products and features you’re interested in.  

Support for IsilonSD Edge
If you are running a free version of IsilonSD Edge, support is available through the Isilon Community Network. If you purchased one or more IsilonSD Edge licenses, support is available through Isilon Technical Support, provided you have a valid support contract for the product.
Introduction to this guide
CHAPTER 2
Planning an upgrade

Plan your upgrade
Performing the tasks described in this chapter helps you to plan your upgrade. Use the checklist to track your progress.

☐ Review required documentation
☐ Decide which type of upgrade you are going to perform
☐ Verify the upgrade path
☐ Check system requirements
☐ Assess upgrade impact
☐ Plan an upgrade schedule
☐ Upgrade a test cluster

Note
If you have a performance-sensitive workload, Isilon recommends that you consult your Sales Engineer for assistance during the pre-upgrade planning process.

- Upgrade planning overview ................................................................. 12
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Upgrade planning overview

An upgrade plan is helpful in determining what tasks you need to complete before and after installing a new OneFS image.

Your upgrade plan helps you estimate the time it will take to complete tasks and determine who needs to complete them.

Create an upgrade plan by evaluating how the upgrade will affect users and workflow, assessing the impact of the new version of OneFS on your Isilon cluster, and analyzing upgrade risks.

The Remote Proactive team is available to perform OneFS pre-upgrade health checks and will complete the OneFS upgrade remotely for Premium Support customers. To contact the Remote Proactive team, see the Isilon knowledge base article Remote Proactive (RCM).

Clusters running a version of OneFS that has reached the End of Service Life milestone will also need a Time & Materials engagement for upgrade. To confirm whether the version of OneFS you are upgrading from has reached the End of Service Life milestone, review the Isilon Product Availability Guide. If your version of OneFS has reached End of Service Life, contact your Account Team to discuss the available options and to develop an upgrade strategy.

Prerequisites for completing upgrade planning, pre-upgrade, and post-upgrade tasks

To complete the tasks in this guide, you must have the requisite permissions, knowledge, and skills.

Requisite permissions
To complete the tasks described in this guide, you must be able to log in to the cluster as the root user through the following interfaces:

- OneFS command-line interface
- OneFS web administration interface

Requisite knowledge and skills
To complete the tasks described in this guide, you must be able to run commands from the OneFS command-line interface.

To run the commands in this guide:

1. Connect to the cluster over SSH or through a serial connection to a node in the cluster.
2. Log in as the root user.

Note
Some of the commands documented in this guide require specific privileges to run. If you are not logged into the cluster with root privileges, you might not be able to run all of the commands in this guide.
Review required documentation

Reviewing the documentation in this list helps you to understand the upgrade process and the impact the upgrade could have on your workflow.

- **OneFS 8.x Upgrade Planning and Process Guide**
  Read the Upgrade Planning and Process Guide for the version of OneFS from which you are upgrading.

- **OneFS Upgrade Process Flowchart**
  Review this step-by-step reference guide for OneFS upgrades.

- **Isilon Info Hubs**
  Review the resources listed on the OneFS Upgrades – Isilon Info Hub for an overview of the upgrade process and links to important resources.

- **OneFS Release Notes and Maintenance Release Notes**
  Read the OneFS release notes for information about new features and changes, resolved issues, known issues, and supported upgrade paths.

- **Current Isilon Software Releases**
  Confirm which current OneFS releases have reached Target Code status.

- **Isilon Supportability and Compatibility Guide**
  Confirm that your Isilon software and Isilon hardware is compatible with the version of OneFS to which you are upgrading.

- **Isilon OneFS CLI Mappings**
  Confirm whether any OneFS CLI commands have changed or are deprecated.

- **Current Isilon OneFS Patches**
  Review patches that have been released for the version of OneFS to which you are upgrading.

- **Isilon OneFS Technical Specifications Guide**
  Confirm the recommended settings and thresholds for the version of OneFS to which you are upgrading.

- **Isilon Technical and Security Advisories**
  Determine whether any Isilon Technical Advisories or Security Advisories have been issued for the version of OneFS to which you are upgrading.

- **OneFS 7.1.1 and Later Best Practices for Upgrading Clusters Configured with Access Zones**
  If you store shared data in access zones, review this best practice guide to learn about changes to access zones in OneFS 7.1.1 and later.

Types of OneFS upgrades

There are two options available for upgrading the OneFS operating system: a simultaneous upgrade or a rolling upgrade.

Simultaneous upgrades

A simultaneous upgrade installs the new operating system and restarts all nodes in the Isilon cluster at the same time.

Simultaneous upgrades are faster than rolling upgrades but require a temporary interruption of service during the upgrade process. All client connections to the cluster must be terminated prior to completing the upgrade and data is inaccessible.
until the installation of the new OneFS operating system is complete and the cluster is back online.

**Note**
You cannot designate which nodes to upgrade when performing a simultaneous upgrade. You must upgrade all of the nodes in the cluster when performing a simultaneous upgrade.

### Rolling upgrades

A rolling upgrade individually upgrades and restarts each node in the Isilon cluster so that only one node is offline at a time.

A rolling upgrade takes longer to complete than a simultaneous upgrade. You can specify the order in which nodes are upgraded by using the `--node` parameter of the `isi upgrade cluster start` command. If you do not specify an order, nodes are upgraded in ascending order from the node with the lowest Array ID to the node with the highest Array ID. Because Array ID's are never reused, a node's Array ID might not be the same as the node's logical node number (LNN). To check each node's Array ID, run the following command:

```
isi_nodes " %{name}: LNN %{lnn}, Array ID %{id}"
```

For more information about Array IDs, see [Understanding OneFS Group Changes](https://www.emc.com/support/online-support.html) on the Online Support site.

During a rolling upgrade, nodes that are not actively being upgraded remain online and can continue serving clients. However, clients that are connected to a restarting node are disconnected and reconnected. How the client connection behaves when a node is restarted depends on several factors including client type, client configuration (mount type, timeout settings), IP allocation method, and how the client connected to the cluster.

**Note**
Rolling upgrades are not available between all OneFS versions. See the [Verify the upgrade path](#) topic for information about which types of upgrades are supported between OneFS versions.

### Verify the upgrade path

Verify that the current version of OneFS on your Isilon cluster can be upgraded to the target version.

You may be able to upgrade directly to the target version of OneFS, or you may be required to upgrade to an intermediate version before you can upgrade to the target version.

To view which version of OneFS is running on a node, run the following command:

```
uname -r
```
To view which version of OneFS is running on all nodes in the cluster, run the following command:

    isi_for_array uname -r

To confirm which version of OneFS you can upgrade your cluster to, review the supported upgrade paths for the version of OneFS that you want to upgrade to.

### Supported upgrade paths for OneFS 8.1.0

To ensure that the version of OneFS you are upgrading to contains all the fixes in the version of OneFS you are upgrading from, upgrades are supported only from specified versions of OneFS.

#### Upgrades from OneFS 8.0.1 to OneFS 8.1.0

The supported upgrade paths from earlier OneFS 8.0.1 releases to later OneFS 8.1.0 releases are provided in the following table.

Rolling and simultaneous upgrades are supported for all upgrades from OneFS 8.0.1 to OneFS 8.1.0. Rolling upgrades are performed by default.

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
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<tr>
<td>8.0.1.0 through 8.0.1.1</td>
<td>8.1.0.1</td>
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</tbody>
</table>

#### Upgrades from OneFS 8.0.0 to OneFS 8.1.0

The supported upgrade paths from OneFS 8.0.0 to OneFS 8.0.1 are provided in the following table.

Rolling and simultaneous upgrades are supported for all upgrades from OneFS 8.0.0 to OneFS 8.1.0. Rolling upgrades are performed by default.

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
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<tr>
<td>8.0.0.5</td>
<td>8.1.0.1</td>
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<tr>
<td>8.0.0.0 through 8.0.0.4</td>
<td>8.1.0.0</td>
</tr>
</tbody>
</table>

#### Upgrades from OneFS 7.2.1 to OneFS 8.1.0

The supported upgrade paths from OneFS 7.2.1 to OneFS 8.1.0 are provided in the following table.

Only simultaneous upgrades are supported for upgrades from OneFS 7.2.1 to OneFS 8.1.0.

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<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
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<tr>
<td>7.2.1.6</td>
<td>8.1.0.1</td>
</tr>
<tr>
<td>7.2.1.0 through 7.2.1.5</td>
<td>8.1.0.0</td>
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</tbody>
</table>

#### Upgrades from OneFS 7.2.0 to OneFS 8.1.0

The supported upgrade paths from OneFS 7.2.0 to OneFS 8.1.0 are provided in the following table.
Only simultaneous upgrades are supported for upgrades from OneFS 7.2.0 to OneFS 8.1.0. Direct upgrades to OneFS 8.1.0 are not supported from OneFS 7.2.0.0 or OneFS 7.2.0.1

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
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<td>7.2.0.2 through 7.2.0.5</td>
<td>8.1.0.0, 8.1.0.1</td>
</tr>
</tbody>
</table>

**Upgrades to OneFS 8.1.0 from OneFS 7.0.x, OneFS 7.1.0, or OneFS 7.1.1**
Direct upgrades to OneFS 8.1.0 are not supported from OneFS 7.0.x, OneFS 7.1.0, or OneFS 7.1.1. To upgrade to OneFS 8.1.0 from these OneFS versions, you must upgrade twice. First upgrade to a version of OneFS that supports upgrades to OneFS 8.1.0, and then upgrade to the target version of OneFS 8.1.0. For example, if the cluster is running OneFS 7.1.1.4, you can upgrade to OneFS 8.0.0.3, and then upgrade to OneFS 8.1.0.0.

**Note**
Intermediate upgrades must be treated like full upgrades, with all the recommended planning and preparations that apply. If you must upgrade to an intermediate version of OneFS before you can upgrade to the target version, complete the pre-upgrade and post-upgrade steps in the OneFS Upgrade Planning and Process Guide first for the intermediate upgrade, and then complete the pre-upgrade and post-upgrade steps again for the upgrade to the target version. Follow the instructions in the version of the OneFS Upgrade Planning and Process Guide that matches the OneFS version that you are upgrading from. For more information, see the OneFS Upgrades - Isilon Info Hub.

**Supported upgrade paths for OneFS 8.0.1**
To ensure that the version of OneFS you are upgrading to contains all the fixes in the version of OneFS you are upgrading from, upgrades are supported only from specified versions of OneFS.

**Upgrades from OneFS 8.0.1 to later versions of OneFS 8.0.1**
The supported upgrade paths from earlier OneFS 8.0.1 releases to later OneFS 8.0.1 releases are provided in the following table.
Rolling and simultaneous upgrades are supported for all upgrades from OneFS 8.0.1 to later versions of OneFS 8.0.1. Rolling upgrades are performed by default.

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0.1.0</td>
<td>8.0.1.1</td>
</tr>
</tbody>
</table>

**Upgrades from OneFS 8.0.0 to OneFS 8.0.1**
The supported upgrade paths from earlier OneFS 8.0.0 releases to later OneFS 8.0.1 releases are provided in the following table.
Rolling and simultaneous upgrades are supported for all upgrades from OneFS 8.0.0 to OneFS 8.0.1. Rolling upgrades are performed by default.

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0.0.2 through 8.0.0.4</td>
<td>8.0.1.1</td>
</tr>
</tbody>
</table>
If your cluster is running this version of OneFS | You can upgrade to this version of OneFS
---|---
8.0.0.0 through 8.0.0.1 | 8.0.1.0, 8.0.1.1

### Upgrades from OneFS 7.2.1 to OneFS 8.0.1

The supported upgrade paths from OneFS 7.2.1 to OneFS 8.0.1 are provided in the following table.

Only simultaneous upgrades are supported for upgrades from OneFS 7.2.1 to OneFS 8.0.1.

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2.1.4 through 7.2.1.5</td>
<td>8.0.1.1</td>
</tr>
<tr>
<td>7.2.1.0 through 7.2.1.3</td>
<td>8.0.1.0, 8.0.1.1</td>
</tr>
</tbody>
</table>

### Upgrades from OneFS 7.2.0 to OneFS 8.0.1

The supported upgrade paths from OneFS 7.2.0 to OneFS 8.0.1 are provided in the following table.

Only simultaneous upgrades are supported for upgrades from OneFS 7.2.0 to OneFS 8.0.1. Direct upgrades to OneFS 8.0.1 are not supported from OneFS 7.2.0.0 or OneFS 7.2.0.1.

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<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2.0.2 through 7.2.0.5</td>
<td>8.0.1.0, 8.0.1.1</td>
</tr>
</tbody>
</table>

### Upgrades from OneFS 7.1.1 to OneFS 8.0.1

The supported upgrade paths from OneFS 7.1.1 to OneFS 8.0.1 are provided in the following table.

Only simultaneous upgrades are supported for upgrades from OneFS 7.1.1 to OneFS 8.0.1. Direct upgrades to OneFS 8.0.1 are not supported from OneFS versions 7.1.1.0 through OneFS 7.1.1.3.

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1.1.11</td>
<td>8.0.1.0, 8.0.1.1</td>
</tr>
</tbody>
</table>

### Upgrades to OneFS 8.0.1 from OneFS 7.0.0, OneFS 7.0.1, OneFS 7.0.2, or OneFS 7.1.0

Direct upgrades to OneFS 8.0.1 are not supported from OneFS 7.0.0, OneFS 7.0.1, OneFS 7.0.2, or OneFS 7.1.0. First upgrade to a version of OneFS 7.2.1, 7.2.0, or 7.1.1 that supports upgrades to OneFS 8.0.1, and then upgrade to the target version of OneFS 8.0.1. For example, if the cluster is running OneFS 7.0.2.12, you can upgrade to OneFS 7.2.0.5, and then upgrade to OneFS 8.0.1.0.
Note

Intermediate upgrades must be treated like full upgrades, with all the recommended planning and preparations that apply. If you must upgrade to an intermediate version of OneFS before you can upgrade to the target version, complete the pre-upgrade and post-upgrade steps in the OneFS Upgrade Planning and Process Guide first for the intermediate upgrade, and then complete the pre-upgrade and post-upgrade steps again for the upgrade to the target version. Follow the instructions in the version of the OneFS Upgrade Planning and Process Guide that matches the OneFS version that you are upgrading from. For more information, see the OneFS Upgrades - Isilon Info Hub.

Supported upgrade paths for OneFS 8.0.0

To ensure that the version of OneFS you are upgrading to contains all the fixes in the version of OneFS you are upgrading from, upgrades are supported only from specified versions of OneFS.

Target Code versions of OneFS 8.0.0

Isilon recommends the following version of OneFS as Target Code. A OneFS release is designated as Target Code after it satisfies specific criteria, which includes production time in the field, deployments across all support node platforms, and other quality metrics. To ensure that your clusters are running the most stable and reliable version of OneFS, upgrade to the latest Target Code available for the OneFS family that meets your business needs.

- OneFS 8.0.0.4

Upgrades from earlier OneFS 8.0.0 releases to later OneFS 8.0.0 releases

The supported upgrade paths from earlier OneFS 8.0.0 releases to later OneFS 8.0.0 releases are provided in the following table.

Rolling and simultaneous upgrades are supported for all upgrades from earlier OneFS 8.0.0 releases to later OneFS 8.0.0 releases. Rolling upgrades are performed by default.

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0.0.4</td>
<td>8.0.0.5</td>
</tr>
<tr>
<td>8.0.0.3</td>
<td>8.0.0.4, 8.0.0.5</td>
</tr>
<tr>
<td>8.0.0.2</td>
<td>8.0.0.3 through 8.0.0.5</td>
</tr>
<tr>
<td>8.0.0.1</td>
<td>8.0.0.2 through 8.0.0.5</td>
</tr>
<tr>
<td>8.0.0.0</td>
<td>8.0.0.1 through 8.0.0.5</td>
</tr>
</tbody>
</table>

Upgrades from OneFS 7.2.1 to OneFS 8.0.0

The supported upgrade paths from OneFS 7.2.1 to OneFS 8.0.0 are provided in the following table.

Only simultaneous upgrades are supported for upgrades from OneFS 7.2.1 to OneFS 8.0.0.
If your cluster is running this version of OneFS | You can upgrade to this version of OneFS
---|---
7.2.1.6 | 8.0.0.5
7.2.1.5 | 8.0.0.4, 8.0.0.5
7.2.1.4 | 8.0.0.3 through 8.0.0.5
7.2.1.3 | 8.0.0.2 through 8.0.0.5
7.2.1.2 | 8.0.0.1 through 8.0.0.5
7.2.1.0, 7.2.1.1 | 8.0.0.0 through 8.0.0.5

**Upgrades from OneFS 7.2.0 to OneFS 8.0.0**
The supported upgrade paths from OneFS 7.2.0 to OneFS 8.0.0 are provided in the following table.

Only simultaneous upgrades are supported for upgrades from OneFS 7.2.0 to OneFS 8.0.0. Direct upgrades to OneFS 8.0.0 are not supported from OneFS 7.2.0.0 or OneFS 7.2.0.1.

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2.0.2 through 7.2.0.5</td>
<td>8.0.0.1 through 8.0.0.5</td>
</tr>
<tr>
<td>7.2.0.2 through 7.2.0.4</td>
<td>8.0.0.0 through 8.0.0.5</td>
</tr>
</tbody>
</table>

**Upgrades from OneFS 7.1.1 to OneFS 8.0.0**
The supported upgrade paths from OneFS 7.1.1 to OneFS 8.0.0 are provided in the following table.

Only simultaneous upgrades are supported for upgrades from OneFS 7.1.1 to OneFS 8.0.0. Direct upgrades to OneFS 8.0.0 are not supported from OneFS versions 7.1.1.0 through OneFS 7.1.1.3.

<table>
<thead>
<tr>
<th>If your cluster is running this version of OneFS</th>
<th>You can upgrade to this version of OneFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1.1.11</td>
<td>8.0.0.4, 8.0.0.5</td>
</tr>
<tr>
<td>7.1.1.8, 7.1.1.9</td>
<td>8.0.0.1 through 8.0.0.5</td>
</tr>
<tr>
<td>7.1.1.4 through 7.1.1.7</td>
<td>8.0.0.0 through 8.0.0.5</td>
</tr>
</tbody>
</table>

**Upgrades to OneFS 8.0.0 from OneFS 7.0.0, OneFS 7.0.1, OneFS 7.0.2, or OneFS 7.1.0**
Direct upgrades to OneFS 8.0.0 are not supported from OneFS 7.0.0, OneFS 7.0.1, OneFS 7.0.2, or OneFS 7.1.0. First upgrade to a version of OneFS 7.2.1, 7.2.0, or 7.1.1 that supports upgrades to OneFS 8.0.0, and then upgrade to the target version of OneFS 8.0.0. For example, if the cluster is running OneFS 7.0.2.12, you can upgrade to OneFS 7.2.0.5, and then upgrade to OneFS 8.0.0.4.
Check supportability and compatibility requirements

Verify that your Isilon cluster and operating environment meet the minimum system requirements for the later version of OneFS.

Review the Isilon Supportability and Compatibility Guide to confirm that your current hardware components, software components, and protocol versions are compatible with the version of OneFS to which you are upgrading.

For information about OneFS compatibility with Hadoop, see the Hadoop - Isilon Info Hub page on the Isilon Community Network website.

Assess upgrade impact

Assessing the impact of the upgrade is a critical step in the upgrade planning process.

Consider all the areas of your environment that might be affected by upgrading to a new version and plan a strategy for performing the tasks that need to be completed and addressing issues that might occur. Assessing the impact of the upgrade on your environment, clients, and performance helps ensure that the upgrade does not disrupt your Isilon cluster, workflow, or users.

Consider upgrade limitations

The OneFS upgrade process has limitations that should be considered before you begin the upgrade.

- If the upgrade cannot be completed for any reason—for example, if there is insufficient space on the cluster or on the /var partition or if the upgrade process detects a stalled drive—the system will revert to the existing version and the upgrade will be cancelled. You cannot pause the upgrade process in order to resolve the blocking issue. Preparing your cluster as recommended in the Completing pre-upgrade tasks section will help you to avoid situations that might result in a cancelled upgrade.

- After you upgrade from OneFS 7.x, to a new version of OneFS, you cannot restore the previous version. A OneFS version upgrade consists of re-imaging the kernel and file system and copying user changes from the old file system to the new one.
Once the OneFS kernel is re-imaged, there is no mechanism for rolling back to the previous version. For example, if you upgrade from OneFS 7.2.0.5 to OneFS 8.0.0, you cannot roll the upgrade back to OneFS 7.2.0.5.

Review feature changes and known issues

Review feature changes and known issues introduced in the upgrade version of OneFS.

Familiarize yourself with new, modified, and deprecated features in the version to which you are upgrading and evaluate whether the new version is right for your environment. Differences between major versions of OneFS might mean that some of your requirements are not supported in exactly the same way. Functionality changes and new features in the upgrade version might impact the performance, configuration, or functionality of your cluster after upgrading.

Also familiarize yourself with known issues and limitations in the upgrade version to make sure that the issues do not affect your requirements, workflow, or users. If the new version contains an issue that affects your environment, you should consider waiting to upgrade until after the issue is resolved in a later version of OneFS.

See the OneFS Release Notes for a summary of new features, feature changes, and known issues in the upgrade version of OneFS. See the Isilon OneFS CLI Mappings guide for information about command name changes. You can find links to these documents, as well as other resources, on the following Isilon Info Hubs and by searching the Online Support site:

- OneFS 8.1.0 Documentation - Isilon Info Hub
- OneFS 8.0.1 Documentation - Isilon Info Hub
- OneFS 8.0.0 Documentation - Isilon Info Hub
- OneFS 7.2.1 Documentation - Isilon Info Hub
- OneFS 7.2 Documentation - Isilon Info Hub

Plan an upgrade schedule

Consider all the factors that go in to preparing and carrying out the upgrade and create an upgrade schedule.

An upgrade schedule can help ensure that the upgrade goes smoothly. The schedule should estimate how long each stage of the upgrade process might take.

The upgrade process begins with ensuring that your Isilon cluster is ready to be upgraded. Cluster preparation is important to minimize upgrade errors or failure. It is recommended that you set aside two weeks to check the cluster health and resolve issues before performing the upgrade itself. The two-week period allows time for shipping and replacing degraded hardware.

The main factors that you should consider when estimating a schedule include:

Data back-up and information collection

Estimate the time that it will take to back up your data. Consider cluster size, number of files, types of files, and file size. Also include time to collect information about the cluster such as status, logs, and settings.

Cluster preparation and readiness

Schedule time for node and drive health checks and replacement of bad hardware. Include time to update configurations and settings that are not supported in the new version.
Upgrade maintenance window

Estimate the time that it will take to run the upgrade. Consider cluster size and upgrade type (rolling or simultaneous). If performing rolling upgrade, consider whether you will configure client connection drain times, which will extend the required maintenance window, but lower the impact on client connections. Build in time to let the upgrade jobs run to completion and to re-establish permissions and connections. A best practice is to upgrade the cluster during an off-hours maintenance window. Schedule time to inform users when the upgrade will take place and how they might be affected. Client connections might be slow, file access might be affected, and clients might be disconnected.

If you have upgraded the cluster previously, use the time it required to perform the previous upgrade to estimate how long the next upgrade will take. You can view the amount of time the previous upgrade required by viewing the update_handler file on the node that started the last upgrade. The file is located under /var/log, and is named according to the following format:

/var/log/update_handler_<date_upgrade_started>.txt

Troubleshooting

Schedule time or extend the maintenance window to accommodate post-upgrade tasks such as reconfiguring custom settings, updating scripts to reflect command and functionality changes in the upgrade version, and potential troubleshooting.

Upgrade a test cluster

If available, upgrade a test cluster that has the same version of OneFS and the same software configurations as your production cluster.

Upgrading a test cluster before you upgrade your production cluster can expose issues that could slow down or prevent the upgrade of your production system.

After you upgrade a test cluster, verify that the cluster is operational and validate key workflows on the test cluster by simulating how administrators, users, and applications interact with the system.
Performing the tasks described in this chapter helps you to prepare to upgrade your cluster. Use the checklist to track your progress.

- Collect cluster information
- Collect cluster status
- Gather cluster logs
- Run the Isilon Advisor diagnostic tool
- Check hardware health
- Check available space
- Resolve outstanding events and errors
- Reconfigure unsupported SMB settings
- Verify global namespace requirements
- Configure the NIC aggregation method
- Preserve the Kerberos keytab file
- Install supported version of InsightIQ
- Run the upgrade compatibility check utility
- Back up data
- Back up custom settings
- Complete NDMP backup
- Complete system jobs
- Update drive firmware
- Disconnect IPMI ports
- Enable EMC Secure Remote Support (ESRS)

- About pre-upgrade tasks
- Collect cluster information
- Check cluster readiness
- Verify configurations and settings
- Upgrade compatibility check utility
- Back up data
- Complete or stop jobs in progress
- Update drive firmware
- Disconnect IPMI ports
- EMC Secure Remote Services (ESRS)
About pre-upgrade tasks

Ensure that your Isilon cluster is ready to be upgraded.

Performing the pre-upgrade tasks described in this guide helps to ensure that the cluster hardware, software modules, configuration, features, and file system do not have preexisting issues that could adversely affect the upgrade process. Performing the pre-upgrade tasks also ensures that important cluster data is collected, the current configuration settings are recorded, and the potential for data loss is minimized.

Collect cluster information

Collect information about your Isilon cluster before you upgrade.

The data you collect before starting the upgrade process enables you to confirm your cluster configuration and status following the upgrade and helps you and Isilon Technical Support to troubleshoot and resolve any issues you might encounter.

Collect and record information about your cluster configuration and environment

Before you upgrade, collect and record key information about your Isilon cluster and how it is configured.

Collect and record the information requested in the table below before you upgrade the cluster. This information can be used to verify that your settings were preserved following the upgrade, verify that your hardware and software modules are compatible with the version you are upgrading to, enables you to quickly reconfigure the cluster to match the pre-upgrade configuration if necessary, and provides important information to Isilon Technical Support if you encounter issues during the upgrade.

| Information to collect | Information
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Date and time the cluster will be upgraded</td>
<td></td>
</tr>
<tr>
<td>Name of the cluster</td>
<td></td>
</tr>
<tr>
<td>Current version of OneFS</td>
<td></td>
</tr>
<tr>
<td>Upgrade version of OneFS</td>
<td></td>
</tr>
<tr>
<td>Location of the cluster</td>
<td></td>
</tr>
<tr>
<td>Types of nodes in the cluster</td>
<td></td>
</tr>
<tr>
<td>Quantity of each type of node</td>
<td></td>
</tr>
<tr>
<td>Which software modules are licensed on the cluster?</td>
<td></td>
</tr>
<tr>
<td>Is the cluster a SyncIQ source or SyncIQ target cluster?</td>
<td></td>
</tr>
<tr>
<td>How is the cluster used (production, test, development, or evaluation)?</td>
<td></td>
</tr>
<tr>
<td>Information to collect</td>
<td>Information</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>What data protection level is set on the cluster?</td>
<td></td>
</tr>
<tr>
<td>If multiple disk pools or node pools are configured, what data protection levels are set on those pools?</td>
<td></td>
</tr>
<tr>
<td>If custom protection levels are set on directories, files or pools, what data protection levels are set on those objects?</td>
<td></td>
</tr>
<tr>
<td>What type of IB switch is installed (dual or single)?</td>
<td></td>
</tr>
<tr>
<td>What MTU is configured (9,000 or 1,500)?</td>
<td></td>
</tr>
<tr>
<td>Which file sharing protocols (for example, SMB or NFS) are enabled?</td>
<td></td>
</tr>
<tr>
<td>What method do you use to administer the cluster (for example, serial console, SSH, web administration interface)?</td>
<td></td>
</tr>
<tr>
<td>Is ESRS enabled?</td>
<td></td>
</tr>
<tr>
<td>Is SupportIQ enabled?</td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td></td>
</tr>
<tr>
<td>SupportIQ is no longer supported. For information, see the Isilon Product Availability Guide.</td>
<td></td>
</tr>
<tr>
<td>What local accounts are configured and what are their passwords?</td>
<td></td>
</tr>
<tr>
<td>If protocol auditing is enabled, which protocols are being audited (SMB or NFS)?</td>
<td></td>
</tr>
<tr>
<td>Do you run any custom scripts?</td>
<td></td>
</tr>
<tr>
<td>Do you use OneFS API calls?</td>
<td></td>
</tr>
<tr>
<td>If you have static routes configured, what is the configuration?</td>
<td></td>
</tr>
<tr>
<td>Have you modified any sysctl values? If yes, which sysctl</td>
<td></td>
</tr>
</tbody>
</table>
Review and save information about cluster status

Before you upgrade, run the `isi status` command to get the status of your Isilon cluster and save the information to a file.

For more information, see the OneFS CLI Administration Guide for your version of OneFS.

Procedure

1. Run the `isi status` command to view the status of the cluster, events, and jobs.
2. Run the `isi status > /ifs/data/isi_status_output` command to save the output of the `isi status` command to a file named `isi_status_output` in the `/ifs/data` directory.

Gathering cluster logs

You can gather cluster logs and send the logs to Isilon for troubleshooting and analysis.

Cluster logs can be sent automatically or manually through the cluster command-line and web administration interfaces, or from a remote location through FTP.

Your cluster must be connected to the Internet to be able to send log files directly. If your cluster does not have an Internet connection or if your upload has failed, you can copy the log file from the cluster and upload the log file with an FTP client to an Isilon FTP server.

The log gathering process can take several minutes, depending on the log file size and your Internet connection.

Gather cluster logs through the command-line interface

You can gather and send cluster logs from each node in the cluster to Isilon Technical Support.

Before you begin

You must have root access to run the `isi_gather_info` command.

Procedure

1. To gather the log files, run the following command.

   ```
   isi_gather_info
   ```

   The files generated by this command are stored in the `/ifs/data/Isilon_Support/pkg` directory.

   For more information about the `isi_gather_info` command, including the command parameters for configuring how logs are uploaded to Isilon Technical Support.
Gather cluster logs through the OneFS web administration interface

You can gather and send cluster logs from each node in the cluster to Isilon Technical Support.

**Before you begin**

You must have root access to the cluster or be assigned to the SystemAdmin role to start a log gather from the web administration interface.

**Procedure**

1. In the web administration interface, navigate to **Cluster Management > Diagnostics**.
2. Click **Start Gather**.

   After the log gathering process is complete, a link to the file that the process generates appears under **Filename** in the **Archived Info Manager** section. The files generated during the gathering process are stored on the cluster in the `/ifs/data/Isilon_Support/pkg` directory.

**Check cluster readiness**

Ensure that the Isilon cluster hardware and file system do not have issues that might interrupt the upgrade.

Completing pre-upgrade tasks such as checking the health of the hardware components on the cluster, ensuring that storage space requirements are met, and managing outstanding cluster events and errors are recommended for a successful upgrade.

**Run the Isilon Advisor diagnostic tool**

It is recommended that you run the Isilon Advisor diagnostic tool before and after upgrading OneFS. This tool includes pre- and post-upgrade checks and can be used to assess the health of the cluster.

The **Isilon Advisor** is an off-cluster log analyzer that inspects and reports on cluster logs. It is the same tool that Isilon Technical Support and Isilon field representatives use to identify, troubleshoot, and prevent a wide range of known issues that can occur on Isilon clusters.

**Procedure**

- To download the **Isilon Advisor** and user guide, go to the **Isilon Advisor** website.

**Check hardware health**

You can manually check the health of the cluster's hardware components to confirm that the Isilon cluster can support an upgrade.

Run the following commands to evaluate the health of the devices in the cluster and the status of job engine jobs.
Note

Unless otherwise noted, run the commands from the OneFS command-line interface as the root user.

Procedure

1. Run the following command to check for jobs or devices that report a status of ATTENTION, SMARTFAIL, or DOWN.

   ```
   isi status -v
   ```

   The `isi status -v` command returns information about cluster health, node health, drive health, storage capacity, storage used, IP addresses, throughput, critical events, and job status. For more information, see article 317462, How to determine why a node is in an attention state.

2. Run the following command to check for drives that do not report a status of HEALTHY, L3, or JOURNAL.

   ```
   isi_for_array -s 'isi devices drive list | egrep -v "HEALTHY|L3|JOURNAL"'
   ```

   The `isi devices` command returns the status of a node and the health of each drive on the node.

3. Run the following command to check the mirror status of the boot drives on each node. If a drive is degraded, do not continue with the upgrade until the issue is resolved.

   ```
   isi_for_array -s 'gmirror status'
   ```

   For more information, see article 456690, Cannot perform upgrade with degraded boot drive.

4. In the OneFS web administration interface, perform the following steps for each node in the cluster.

   Do not continue with the upgrade if any errors are reported as correctable or fatal in the Totals section of the Hardware Logs area.

   a. Click Dashboard > Cluster Overview > Cluster Status.
   b. In the Status area, click the ID of a node.
   c. In the Chassis and drive status area, click Platform.
   d. If any correctable or fatal errors are reported, see the following knowledge base articles, assess whether the articles are related to the errors, and follow the instructions in the articles.

   - Article 424865, ECC error policy violation alert does not clear after replacement
   - Article 424324, Physical memory low
   - Article 471897, Temperature sensitivity in the DIMM module used in the Isilon IQ 10000X-SSD, IQ 5000S-SSD, and IQ
• **Article 471888, DIMM replacement policy for Isilon nodes**

e. If the errors cannot be resolved, contact Isilon Technical Support to determine whether a DIMM must be replaced. Only an Isilon technician should replace a DIMM.

The node must be powered off during DIMM replacement.

5. If the cluster has an InfiniBand network, run the following command to confirm whether a node has been assigned the OpenSM (subnet manager) master role.

```bash
isi_for_array -s 'ps -auwwwx | grep master | grep opensm'
```

Confirm that the output for one node in the cluster includes the phrase `master (opensm)`. The output should be similar to the following:

```
node-2: root   1610   0.0   2.3   436292   384672   ??   Ss
19May15   97:31.63
opensm: 0x00151b00007a671b master (opensm)
```

**Note**

Only one node in the cluster is assigned the OpenSM master role. If the command does not return output that includes `master (opensm)` for any node, then the InfiniBand switch or another device has assumed the OpenSM master role. In that case, confirm that InfiniBand cables from another cluster are not connected to the cluster's primary or secondary InfiniBand switch, and then run the command again.

If the cluster has two InfiniBand switches, there might be two OpenSM masters. It is possible for one node to fulfill the OpenSM master role for both switches.

6. Isilon recommends that you enable the Virtual Hot Spare (VHS) feature. VHS ensures that the cluster has enough free space available to smartfail a drive and re-protect the drive's data. See **article 471814, How to enable and configure Virtual Hot Spare (VHS)** for instructions.

## Check the available free space

Ensure that the minimum available-space requirements for the cluster, each node, and critical directories are met before you upgrade.

The total amount of used space on the cluster must not exceed 90 percent, and the total amount of used space on each node must not exceed 92 percent. In addition, there are minimum space requirements for critical directories including the root partition (/), /ifs, /var, and /var/crash. Do not continue with the upgrade if the minimum available-space requirements are not met.

### Cluster, node, and directory free space requirements

The cluster, nodes, and several critical directories in the file system must meet free space requirements prior to upgrading OneFS.

**Free space requirements**

The total amount of used space on the cluster must not exceed 90 percent, and the total amount of used space on each node must not exceed 92 percent.
In addition, the directories in the following table must meet the minimum available-space requirements. If the available space in any of these directories falls below the minimum available-space requirement for that directory, make more space available before upgrading. Otherwise, the upgrade process will fail, but it will not return an error indicating space issues as the cause.

For more information, see the Best Practices Guide for Maintaining Enough Free Space on Isilon Clusters and Pools.

<table>
<thead>
<tr>
<th>Directory</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>root partition (/)</td>
<td>The root partition cannot be more than 97 percent full. If this directory is at or near the minimum available-space requirement, see the following resources for steps to address the issue:</td>
</tr>
<tr>
<td></td>
<td>1. Knowledge base article 464118, Node reached 95% used capacity on the root file system.</td>
</tr>
<tr>
<td></td>
<td>2. Event ID 100010003, The /(/root) partition is near capacity, in the OneFS event reference for your version of OneFS.</td>
</tr>
<tr>
<td>/ifs</td>
<td>The /ifs directory cannot be more than 90 percent full. If this directory is at or near the minimum available-space requirement, see the following resources for steps to address the issue:</td>
</tr>
<tr>
<td></td>
<td>1. Knowledge base article 471816, &quot;There is at least one SmartPool at or over capacity&quot; or &quot;The SmartPool [name] is near or over capacity&quot;.</td>
</tr>
<tr>
<td></td>
<td>3. Event ID 100010004, The cluster's /ifs partition is near capacity, in the OneFS event reference for your version of OneFS.</td>
</tr>
<tr>
<td>/var</td>
<td>The /var partition cannot be more than 90 percent full. If this directory is at or near the minimum available-space requirement, see the following resources for steps to address the issue:</td>
</tr>
<tr>
<td></td>
<td>1. Knowledge base article 471789, The /var partition is near capacity (95% used).</td>
</tr>
<tr>
<td></td>
<td>2. Event ID 100010001, The /var partition is near capacity, in the OneFS event reference for your version of OneFS.</td>
</tr>
<tr>
<td>/var/crash</td>
<td>The /var/crash directory cannot be more than 90 percent full.</td>
</tr>
</tbody>
</table>
**Directory** | **Requirement**
--- | ---
If this directory is at or near the minimum available-space requirement, see the following resources for steps to address the issue:
- Knowledge base [article 458364](#), *The crash partition of a node in the cluster has reached 90% capacity alert.*
- Event ID 100010002, *The /var/crash partition is near capacity*, in the OneFS event reference for your version of OneFS.

**Confirm used and available space**

Before you upgrade, confirm that the minimum available-space requirements for critical directories are met.

**Procedure**

- To confirm how much space is being used by critical directories on the cluster, run the following command:

  ```bash
  isi_for_array -s 'df -h'
  ```

**Results**

The `isi_for_array -s 'df -h'` command returns output similar to the following for each node in the cluster:

```
virtual-demo-3: Filesystem   Size  Used  Avail  Capacity  Mounted on
--------------------------------------------------------------------
virtual-demo-3: /dev/imdd0a  495M  418M  38M    92%       /
virtual-demo-3: devfs        1.0K  1.0K  0B     100%      /dev
virtual-demo-3: /dev/imdd1a  495M  6.7M  449M   1%        /var
virtual-demo-3: /dev/imdd2a  496M  5.9M  451M   1%        /var/crash
virtual-demo-3: OneFS        40G   283M  20G    1%        /ifs

virtual-demo-2: Filesystem   Size  Used  Avail  Capacity  Mounted on
--------------------------------------------------------------------
virtual-demo-2: /dev/imdd0a  495M  417M  38M    92%       /
virtual-demo-2: devfs        1.0K  1.0K  0B     100%      /dev
virtual-demo-2: /dev/imdd1a  495M  6.1M  449M   1%        /var
virtual-demo-2: /dev/imdd2a  496M  5.9M  451M   1%        /var/crash
virtual-demo-2: OneFS        40G   283M  20G    1%        /ifs
```

**Resolve outstanding events and errors**

Before you upgrade, resolve outstanding critical events, errors, and failures.

Unresolved events and errors can disrupt the OneFS upgrade process.

**Procedure**

1. Run the following command to view all events on the cluster:

   ```bash
   isi event events list
   ```
- If the command returns any critical errors, check the log files in the following directories for more information:
  - /var/log
  - /var/log/messages
  - /var/crash

- If the /var/log/idi.log file or the /var/log/messages file contains messages about a dynamic sector recovery (DSR) failure or an Isilon Data Integrity (IDI) failure, contact Isilon before you upgrade.

2. Cancel non-critical events before upgrading to prevent a recurrence of notifications that you know to be harmless.

   See the following knowledge base articles for more information about cancelling non-critical events:
   - Article 317661, How to quiet or cancel an event (alert)
   - Article 304312, How to reset the CELOG database and clear all historical alerts

   For information about specific events, see the OneFS Event Reference for the version of OneFS from which you are upgrading.

   See the following knowledge base articles that address specific events. If OneFS reports or logs any of these events, follow the instructions in the associated article to resolve the issue:
   - Article 471816, There is at least one smartpool at or over capacity
   - Article 454806, Detected IDI failure, attempting DSR
   - Article 373706, DSR - Dynamic Sector Recovery Failure
   - Article 373712, IDI error. Shallow verification failure in block
   - Article 447864, Detected IDI network checksum error on path
   - Article 454399, Cluster needs to be restriped but FlexProtect is not running

Verify configurations and settings

Confirm that the OneFS configuration and settings are supported by the version of OneFS to which your are upgrading.

Reconfigure unsupported SMB settings

Ensure that SMB settings on the cluster are supported by the version of OneFS to which you are upgrading.

If the SMB settings on the cluster are not supported by the version of OneFS to which you are upgrading, the upgrade might fail. Run the upgrade compatibility check utility to confirm whether your current settings are supported.

If the upgrade compatibility check utility detects unsupported SMB settings, remove or modify the unsupported SMB settings through the command-line interface or web administration interface before you upgrade. If you are upgrading from OneFS 6.0 or OneFS 5.5, remove or modify the settings by editing the `/etc/mcp/override/smbd.xml` file or the `/etc/mcp/override/smbd_shares.xml` file. After you modify your SMB settings, test the workflow.
Verify global namespace requirements

Verify that your Isilon cluster meets the minimum requirements for Global Namespace Acceleration (GNA).

If you are upgrading to OneFS 7.0 or later and GNA is enabled, the cluster must meet the following requirements before you upgrade:

- 20% or more of the nodes in the cluster must contain at least one SSD
- SSDs must make up at least 1.5% of the total storage capacity on the cluster; Isilon recommends that SSDs make up at least 2% of the cluster.

If the cluster does not meet these requirements before you upgrade the cluster to OneFS 7.0 or later, the upgrade process will fail and GNA will be disabled.

Run the following command to view the size and capacity of the SSDs in the cluster:

```bash
isi status -q
```

For more information, see article 447292, Upgrade to OneFS 7.0.1.2 and later is halted if Global Namespace Acceleration is enabled and SSD storage is less than the enforced minimum of 1.5 percent of total storage.

Configure the NIC aggregation method

Support for the Legacy Fast EtherChannel (FEC) link aggregation method was removed in OneFS 8.0.0.

Network interface card (NIC) aggregation, also known as link aggregation, enables you to combine the bandwidth of a node's physical network interface cards into a single logical connection.

**Note**

Configuring link aggregation is an advanced function of network switches. Consult the network switch documentation before configuring the cluster for link aggregation.

**Procedure**

- If the cluster has one or more IP address pools that use the Legacy FEC link aggregation method, you should configure the link aggregation method before upgrading to OneFS 8.0.0 or later. If the Legacy FEC link aggregation method is selected, the OneFS upgrade process automatically resets the Legacy FEC link aggregation method to standard FEC. For information about NIC aggregation, see the OneFS CLI Administration Guide or the OneFS Web Administration Guide for the version of OneFS to which you are upgrading.

Preserve the Kerberos keytab file

Configure Kerberos settings to ensure that the keytab file is preserved through the OneFS upgrade.

If Kerberos authentication is configured on the cluster, upgrading OneFS might delete the local `/etc/<name>.keytab` file that is on each node. Choose one of the following methods to preserve the keytab file during the upgrade:
• Add the following text to the `/etc/mcp/override/user_preserve_files.xml` file of each node on the cluster where `<name>` is the name of the keytab file:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<user_preserve>
    <files>
        <file name="/etc/allow_unsupported_boot" recursive="no"/>
        ...
        ...
        <file name="/etc/`<name>`.keytab" recursive="no"/>
    </files>
</user_preserve>
```

• Copy the keytab file to the `/ifs` directory where it can be accessed by all nodes on the cluster instead of saved locally on each node.

For more information, see article 304460, *How to configure the Isilon cluster to use Kerberos with NFS in a non-Active Directory environment*.

### Install a supported version of InsightIQ

Ensure that the version of OneFS to which you are upgrading supports the version of InsightIQ you are using.

Before you upgrade OneFS, confirm the version of InsightIQ you are running is compatible with the version of OneFS to which you are upgrading. If the versions are not compatible, upgrade InsightIQ before upgrading OneFS. See the *Isilon Supportability and Compatibility Guide* for OneFS and InsightIQ compatibility information. As of InsightIQ 4.0, the license is free.

**Note**

OneFS 8.0 File System Analytics (FSA) are compatible only with InsightIQ 4.0 and later.

Refer to the *InsightIQ - Isilon Info hub* for documents and content that are related to InsightIQ, including release notes, installation guides, user guides, and troubleshooting guides.

**Procedure**

• To determine whether InsightIQ is licensed on the cluster, run the following command:

```bash
isi license | grep -i insightiq
```

### Upgrade compatibility check utility

The upgrade compatibility check utility performs a number of checks to verify whether the cluster is compatible with the new version of OneFS and ready for an upgrade.

The utility examines cluster settings, activities, or statuses that might interrupt the upgrade process or cause the upgrade to fail. If the upgrade compatibility check utility detects any issues, investigate and resolve the issues, and then run the utility again for verification.
The upgrade compatibility check utility is included in the OneFS installation package. You can run the utility alone or as part of the upgrade process.

Download the OneFS installation image

Download the installation file for the version of OneFS to which you are upgrading. OneFS installation images are available from the Online Support site.

Procedure

1. Navigate to the Isilon OneFS Downloads page on the Online Support site.
2. Download the installation file for the version of OneFS to which you are upgrading.
3. Below the description of the installation file, click Checksum and record the MD5 or SHA-256 checksum value.
4. Open a secure shell (SSH) connection to any node in the cluster and log in using the root account.
5. Move the installation file you downloaded into the /ifs/data directory on the cluster you want to upgrade.
6. To confirm the integrity of the downloaded installation image, run the following command that matches your checksum type where <installation-file-name> is the name of the downloaded installation file:
   - md5 /ifs/data/<installation-file-name>
   - sha256 /ifs/data/<installation-file-name>
7. Compare the MD5 or SHA-256 checksum value that you recorded in step three of this procedure to the checksum value returned by the command in step six. If the values do not match, re-download the installation file.

Run the upgrade compatibility check utility

To confirm that the Isilon cluster is compatible with the OneFS version that you are upgrading to, run the upgrade compatibility check utility.

Before you begin

Download the installation files for the OneFS version that you are upgrading to.

Procedure

1. Open a secure shell (SSH) connection to any node in the cluster and log in to the cluster with the root account.
2. Run the isi version command and, in the output, view the OneFS version that is running on the cluster.
3. Start the upgrade compatibility check utility by running the following command, where <install-image-path> is the file path of the upgrade install image. The file path must be accessible in an /ifs directory.
   
   isi upgrade cluster assess <install-image-path>

   The utility may take several minutes to run.

After you finish

If the utility returns errors, resolve the errors before continuing with the upgrade. Warnings are informational and do not prevent an upgrade.
## Upgrade compatibility checks

The upgrade compatibility check utility examines the following areas of the cluster and returns warnings or errors if an area is not compatible with the version of OneFS to which you are upgrading.

<table>
<thead>
<tr>
<th>Check</th>
<th>Description</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disk load</strong></td>
<td>Checks the cluster usage level and returns a warning if the disk load is greater than 50 percent.</td>
<td>Isilon recommends that you disconnect all client connections and stop all system jobs before upgrading. A disk load that is greater than 50 percent might indicate that multiple clients are connected to the cluster or that system jobs are running.</td>
</tr>
<tr>
<td><strong>Free space</strong></td>
<td>Checks cluster free space and returns a warning or an error if capacity thresholds are exceeded for the following partitions and node pools:</td>
<td>Do not continue with the upgrade if the utility reports a capacity-related error. See the Check the available free space section of the Upgrade Planning and Process Guide for more information.</td>
</tr>
<tr>
<td></td>
<td>/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Returns a warning if the root partition exceeds 97 percent of its capacity. Returns an error if the partition reaches 100 percent capacity.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>/var</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Returns a warning if the /var partition is more than 90 percent full. Returns an error if the partition reaches 100 percent full.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>/ifs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Returns a warning if the /ifs partition exceeds 95 percent of its capacity. Returns an error if the partition reaches 100 percent capacity.</td>
<td></td>
</tr>
<tr>
<td><strong>Node pools</strong></td>
<td>Returns a warning if one or more node</td>
<td></td>
</tr>
<tr>
<td>Check</td>
<td>Description</td>
<td>Recommendation</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Check pools exceed 90 percent of its capacity. Returns an error if all the node pools reach 90 percent capacity.</td>
<td>If the utility reports a stalled drive, do not continue with the upgrade until you smartfail and replace the stalled drive or resolve the stall. See article article 466391, Introduction to drive stalls, for information about resolving drive stalls.</td>
<td></td>
</tr>
<tr>
<td>Drive stalls</td>
<td>Checks the health of the drives in the cluster and returns a warning if the cluster contains stalled drives.</td>
<td>If a smartfail operation is running, the utility returns an error. Wait for the smartfail operation to complete before continuing with the upgrade.</td>
</tr>
<tr>
<td>Smartfail operation status</td>
<td>Determines whether a smartfail operation is running on any drives or nodes in the cluster.</td>
<td>If the integrity scan job is running, wait for the job to complete before continuing with the upgrade.</td>
</tr>
<tr>
<td>IntegrityScan job status</td>
<td>Determines whether the integrityScan job is running.</td>
<td>If the utility reports that there are unresolved critical events, do not continue with the upgrade until you resolve the issues. See the OneFS Event Reference for more information.</td>
</tr>
<tr>
<td>Unsupported chmod_mask_nfs_only ACL policy</td>
<td>Checks whether the chmod_mask_nfs_only ACL policy is set. This policy is not available in OneFS 7.2 and later.</td>
<td>If the utility returns an error, the ACL policy is set. Upgrades will succeed regardless of whether the policy is set; however, the policy will not be available after the upgrade completes.</td>
</tr>
<tr>
<td>Unsupported SMB configuration</td>
<td>Checks for unsupported SMB settings.</td>
<td>If the utility reports that the SMB configuration is not supported, do not continue with the upgrade until you remove the unsupported settings and reconfigure SMB. See the Reconfigure unsupported SMB settings section for more information.</td>
</tr>
<tr>
<td>SMB access zone association</td>
<td>Checks if one or more SMB shares are associated with multiple access zones where the share paths overlap.</td>
<td>If the utility reports an error, the upgrade will succeed. However, you cannot create access zones until the path overlap is fixed.</td>
</tr>
<tr>
<td>Kerberos keytab</td>
<td>Checks whether Kerberos settings have been configured to preserve the keytab file.</td>
<td>If the utility reports an error, you must configure Kerberos settings before upgrading OneFS. See the Preserve the Kerberos keytab file section for more information. The keytab file is used to migrate Kerberos settings into the OneFS web administration interface and command-line interface.</td>
</tr>
<tr>
<td>HDFS Kerberos keytab</td>
<td>Checks whether HDFS Kerberos settings have been configured to preserve the keytab file.</td>
<td>If the utility reports an error, you must configure Kerberos settings before upgrading OneFS. See the Preserve the Kerberos keytab file section for more information.</td>
</tr>
</tbody>
</table>
### Check Description Recommendation

Information. The keytab file is used to migrate Kerberos settings into the OneFS web administration interface and command-line interface.

**Note**
This check was first added for upgrades to OneFS 7.2. If you are upgrading to an earlier version of OneFS, you must manually make sure that Kerberos settings have been configured correctly.

---

**Back up data**

It is recommended that you back up all files and data on your Isilon cluster immediately before you upgrade.

Allow sufficient time for a full and an incremental backup, if needed. Depending on the size of your cluster and the file types stored, a back up can take one or more days.

It is recommended that you back up the following directories:

- **Back up modified files from:**
  - `/usr/`
  - `/usr/local/`
  - `/usr/libexec/`
  - `/var/`
  - `/var/crash/`

- **Back up all files from** `/etc/mcp/override/`. Some files in this directory may need to be reconfigured after upgrading.

You should validate that you can restore the data from your backup system before you upgrade.

**SynclIQ backup**

You can back up the data on an Isilon cluster by replicating the data from one cluster to another with SynclIQ.

SynclIQ enables you to retain a consistent backup copy of your data on another Isilon cluster. You must configure a SynclIQ license on both clusters before you can replicate data between them.

You can replicate data at the directory level while optionally excluding specific files and sub-directories from being replicated. SynclIQ creates and references snapshots to replicate a consistent point-in-time image of a root directory. Metadata such as access control lists (ACLs) and alternate data streams (ADS) are replicated along with data.

See the OneFS CLI Administration Guide or the OneFS Web Administration Guide for information on replicating data with SynclIQ.
NDMP backup

You can back up the data on your Isilon cluster through the Network Data Management Protocol (NDMP).

From a backup server, you can direct backup and recovery processes between a cluster and backup devices such as tape devices, media servers, and virtual tape libraries (VTLs).

You can perform both NDMP three-way backup and NDMP two-way backup. NDMP two-way backup is the most efficient method in terms of cluster resource consumption. However, NDMP two-way backup requires that you attach one or more backup accelerator nodes to the cluster.

During an NDMP three-way backup operation, a data management application (DMA) on a backup server instructs the cluster to start backing up data to a tape media server that is either attached to the LAN or directly attached to the DMA. During a two-way NDMP backup, a DMA on a backup server instructs a backup accelerator node on the cluster to start backing up data to a tape media server that is attached to the backup accelerator node. In both backup models, file history data is transferred from the cluster to a backup server over the network, even if the NDMP stream is backed up directly to tape over fiber-channel interfaces.

See the OneFS Web Administration Guide or the OneFS CLI Administration Guide for information about backing up data with NDMP.

Back up custom settings

Document and back up any custom settings you have on your Isilon cluster.

Most settings are preserved during a OneFS upgrade. However, some customer settings might not be preserved. Backing up custom settings enables you to reapply any settings that are not preserved during the upgrade process.

Back up the following custom settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMB audit logging</td>
<td>If you have an audit log directory in /ifs—for example, /ifs/auditlog—you might have custom SMB logging settings configured.</td>
<td>After upgrading, you must reconfigure SMB audit logging. See File System Auditing with Isilon and Common Event Enabler (CEE) for more information about SMB audit logging.</td>
</tr>
<tr>
<td>Passwords for local user accounts</td>
<td>After you upgrade, you might have to reset the passwords of the local user accounts that you configured on the cluster. Other users should be prepared to reset the passwords of their local accounts after the upgrade.</td>
<td>Make a list of the local accounts and their passwords before you upgrade.</td>
</tr>
<tr>
<td>sysctl parameters</td>
<td>If you changed the default value assigned to sysctl parameters unless you are instructed to do so by</td>
<td>Isilon does not recommend modifying sysctl parameters unless you are instructed to do so by</td>
</tr>
</tbody>
</table>
## Setting Description

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>one or more sysctl parameters by editing either the /etc/mcp/override/sysctl.conf file or the /etc/local/sysctl.conf file</strong></td>
<td>If you must modify a sysctl parameter, configure the parameter in the /etc/mcp/override/sysctl.conf file to ensure that the change is preserved when you upgrade a node or a cluster. Before you upgrade, document your custom sysctl parameters and back up the /etc/mcp/override/sysctl.conf and /etc/local/sysctl.conf files. For more information, see article 462759, Configuring sysctls and making sysctl changes persist through node and cluster reboots and upgrades.</td>
<td>Isilon Technical Support. If you modified a sysctl parameter by editing another file—for example, the /etc/sysctl.conf file—the change will not be preserved during the upgrade. If you modified a sysctl parameter by editing another file—for example, the /etc/sysctl.conf file—the change will not be preserved during the upgrade. Before you upgrade, document your custom sysctl parameters and back up the /etc/mcp/override/sysctl.conf and /etc/local/sysctl.conf files. For more information, see article 462759, Configuring sysctls and making sysctl changes persist through node and cluster reboots and upgrades.</td>
</tr>
<tr>
<td><strong>Certificates</strong></td>
<td>If you configured a certificate for the cluster, you must configure a certificate again after you upgrade.</td>
<td>Ensure that you have the certificate information on hand so that you can set up the certificate after the upgrade.</td>
</tr>
<tr>
<td><strong>Static routes</strong></td>
<td>If you are upgrading a cluster running a version of OneFS earlier than 6.5, you must reconfigure the static routes that were set in the rc.conf file.</td>
<td>Back up the rc.conf file so that you can reconfigure the routes after you upgrade. For more information, see article 335890, How to add and delete static IP routes on OneFS 6.5.5 and later, and article 304458, How to add and delete static IP routes on OneFS 5.0 - 6.5.4. <strong>Note</strong> If you are upgrading a cluster running OneFS 6.5 or later, static routes that you set in the rc.conf file or through the isi networks modify pool &lt;subnet&gt;:&lt;pool&gt; --add-static-routes command should be preserved when you upgrade.</td>
</tr>
</tbody>
</table>
| **Aspera for Isilon** | You must reinstall and reconfigure Aspera after you upgrade. | Before you upgrade, back up the Aspera configuration files in the following directories:  
  - /ifs/.ifsvar/aspera/etc/  
  - /ifs/.ifsvar/aspera/www/  
  - /usr/local/aspera/var/aspera-prepost  
  If you upgrade to OneFS 8.0 or OneFS 7.2.1.5 or a later version of OneFS, you must download the Aspera install files from the Aspera web site after you upgrade. To determine which version of Aspera is compatible with the version of OneFS to which you are upgrading, see the Isilon Supportability and Compatibility Guide, and then visit the Aspera site. |
### Complete or stop jobs in progress

You should ensure that there are no jobs running on your Isilon cluster before beginning the OneFS upgrade.

Wait for jobs to fully complete or stop jobs before upgrading.

### Complete NDMP backup

Before you upgrade, you must wait for Network Data Management Protocol (NDMP) backups to finish so you have saved copies of your data.

If you cannot wait for the backups to finish, stop the active NDMP backups 30–60 minutes before the upgrade. The NDMP backup process requires this additional time to come to a halt.

For instructions on how to stop backup jobs, see the documentation for your backup application.

### Complete system jobs

Complete or cancel all system jobs running on your cluster before you upgrade the OneFS operating system.

OneFS performs system jobs through a service that runs in the background. Ensure that no system jobs are running during the upgrade or the upgrade process might fail. You can allow system jobs to finish before you begin the upgrade process or you can cancel them.

The following system jobs provide information that is useful in determining cluster readiness; Isilon recommends that you allow these jobs to run to completion before you upgrade the cluster:

**Upgrade**

You must allow upgrade-related jobs to run to completion before starting another upgrade. After an upgrade, a number of upgrade-related jobs will continue to run for a while. These jobs might include an important Upgrade job that re-stripes data more efficiently.
FlexProtect
Following a node failure, the FlexProtect job checks the file system to ensure that all files remain protected. FlexProtect is most efficient in clusters that contain only HDDs.

FlexProtectLin
Following a node failure, the FlexProtectLin job checks the file system to ensure that all files remain protected. FlexProtectLin is most efficient when file system metadata is stored on SSDs.

IntegrityScan
The IntegrityScan job, verifies the integrity of the file system.

Note
If an Upgrade, FlexProtect, FlexProtectLin, or IntegrityScan system job takes longer than expected to complete, contact Isilon Technical Support. Do not stop any of these system jobs unless instructed to do so by support. If any of these four system jobs is running, you cannot continue with the upgrade.

Procedure
1. To check for running system jobs, run the following command, and make a note of the job ID for any jobs that you want to cancel:

   isi job status

2. To cancel a job, run the following command where \(<job_id>\) is ID of the job you want to cancel:

   isi job jobs cancel \(<job_id>\)

Note
Do not cancel Upgrade, FlexProtect, FlexProtectLin, or IntegrityScan jobs. These jobs must run to completion before you upgrade OneFS.

Update drive firmware
You must make sure that the cluster is running Drive Firmware Package (DFP) 1.8 or later before upgrading the cluster.

After a cluster upgrade, OneFS might upgrade the file system, which causes nodes to experience higher levels of drive I/O than usual. If a node is running drive firmware package 1.7 or earlier, the increased I/O might trigger an issue that causes Mars-K+ drives to appear to have failed, which could result in the cluster becoming underprotected. For more information, see ETA 193819.

Procedure
1. For information about installing drive firmware, see the Isilon Drive Firmware Package Release Notes, available on the Online Support site.
**Disconnect IPMI ports**

If you have enabled IPMI ports, it is recommended that you change the IPMI port IP configuration to static in the BIOS settings for each affected node.

**Note**
Use of IPMI ports is not supported and we do not recommend connecting IPMI ports to a network.

**Procedure**
1. This procedure is documented in article 466057, *Unsupported IPMI port is active and uses DHCP on X200, S200, X400, and NL400 nodes.*

   If you change the IPMI port configuration during the upgrade process, and your workflow requires the IPMI ports to be enabled, you must manually re-enable the ports after the upgrade process is complete.

**EMC Secure Remote Services (ESRS)**

Enable ESRS to help Isilon Technical Support personnel troubleshoot issues with your cluster.

**Before you begin**

ESRS support is available only on clusters running OneFS 7.1.0 or later. Before ESRS is configured, at least one ESRS gateway server must be installed and configured, and at least one subnet that is configured for IPv4 IP addresses must be created on the cluster.

When ESRS is enabled, Isilon Technical Support personnel can run scripts to request log files on the cluster, and then upload the logs to a secure location. ESRS can enable remote access, which allows Isilon Technical Support personnel to troubleshoot the cluster remotely and run additional data-gathering scripts.

You must enable and configure ESRS support before Isilon Technical Support can gather data or access your cluster remotely.

See the OneFS CLI Administration Guide or the OneFS Web Administration Guide for more information about ESRS. See the ESRS product page for ESRS documentation.

**Note**

SupportIQ is no longer supported. You can no longer upload information about your cluster or provide Isilon Technical Support with remote access to the cluster through SupportIQ. For more information, see the Termination of Support announcement available on the Online Support site.
Completing pre-upgrade tasks
Perform the upgrade tasks.
Performing the tasks described in this chapter helps you to upgrade your cluster. Use the checklist to track your progress.

- Perform the OneFS upgrade
- Verify the OneFS installation
- Troubleshoot your upgrade

- Upgrade process overview
- Completing a simultaneous upgrade of OneFS
- Completing a rolling upgrade of OneFS
- Committing an upgrade of OneFS
- Rolling back an upgrade of OneFS
- Adding a node to the cluster while an upgrade is in progress
- Verify the OneFS installation
Upgrade process overview

The OneFS upgrade process consists of installing the upgrade image, starting the upgrade, and verifying that the upgrade completed.

Download the installation image from the Online Support site. See the Download the OneFS image section for more information.

You can upgrade OneFS from the command-line interface or the web administration interface.

Before upgrading OneFS, be sure that you have completed all pre-upgrade tasks. See the Completing pre-upgrade tasks section.

Completing a simultaneous upgrade of OneFS

If you run a simultaneous upgrade, OneFS is upgraded and then all of the nodes in the cluster are restarted simultaneously. While the nodes are restarting, the cluster is unavailable for client connections.

You can perform a simultaneous upgrade through the web administration interface or the command-line interface.

Perform a simultaneous upgrade through the web interface

You can use the web administration interface to upgrade the OneFS version that is running on an cluster.

Before you begin

You must download the OneFS installation image from the Online Support site. The OneFS installation image is used to run compatibility checks. If you have not downloaded the image and run the checks, you must do so before upgrading OneFS. You must resolve any compatibility issues found by the checks before installing the new version of OneFS. See the Upgrade compatibility check utility section for more information.

Procedure

1. Log in to any node in the cluster through the web administration interface with the root account.
2. Click Cluster Management > Upgrade.
3. Click Upgrade OneFS.
4. Browse to the location of the installation image that you want to install. The file path must be accessible in an /ifs directory. Then click Select.
5. In the Upgrade Type list, select Simultaneous Upgrade.
6. To skip the pre-upgrade checks for compatibility issues, select Skip optional pre-upgrade checks.

Note

We recommend that you run the optional pre-upgrade checks. Before starting an upgrade, OneFS checks that your cluster is healthy enough to complete the upgrade process. Some of the pre-upgrade checks are mandatory, and will be performed even if you choose to skip the optional checks. All pre-upgrade checks contribute to a safer upgrade.
7. (Optional) Click **Start Upgrade**.  
The cluster might display several confirmation messages. Confirm each message to continue the upgrade process.

---

**Note**

The `isi upgrade cluster` command runs asynchronously. The command does not run the entire upgrade process; instead, it sets up the upgrade process, which nodes take turns controlling. For this reason, the command returns quickly. To view the progress of the upgrade, use the `isi upgrade view` command or the web administration interface.

---

**Results**

After the upgrade, a number of upgrade-related jobs may continue to run on the cluster for some time. During this time, the cluster is accessible, but you might experience a decrease in cluster performance. After the jobs complete, performance will return to normal. At this stage, the upgrade is complete, but is not committed. You can still roll back to the previous version of OneFS. Some new features in the upgrade might not be available until the upgrade is committed.

---

**Perform a simultaneous upgrade through the command-line interface**

You can use the command-line interface to upgrade the version of OneFS that is running on the cluster.

**Before you begin**

You must download the OneFS installation image from the Online Support site. The OneFS installation image is used to run compatibility checks. If you have not downloaded the image and run the checks, you must do so before upgrading OneFS. You must resolve any compatibility issues found by the checks before installing the new version of OneFS. See the **Upgrade compatibility check utility** section for more information.

**Procedure**

1. Open a secure shell (SSH) connection on the lowest-numbered node in the cluster and log in with the root account.

2. To perform a simultaneous upgrade, run the following command, where `<install-image-path>` is the file path of the upgrade install image. The file path must be accessible in an `/ifs` directory.

   ```
   isi upgrade cluster start <install-image-path> --simultaneous
   ```

---

**Note**

The `isi upgrade cluster` command runs asynchronously. The command does not run the entire upgrade process; instead, it sets up the upgrade process, which nodes take turns controlling. For this reason, the command returns quickly. To view the progress of the upgrade, use the `isi upgrade view` command or the web administration interface.

---

**Results**

After the upgrade, a number of upgrade-related jobs may continue to run on the cluster for some time. During this time, the cluster is accessible, but you might
experience a decrease in cluster performance. After the jobs complete, performance will return to normal. At this stage, the upgrade is complete, but is not committed. You can still roll back to the previous version of OneFS. Some new features in the upgrade might not be available until the upgrade is committed.

Completing a rolling upgrade of OneFS

A rolling upgrade upgrades OneFS and restarts each node in the cluster sequentially. You can perform a rolling upgrade through the web administration interface or the command-line interface.

When you perform a rolling upgrade between OneFS 8.x releases, you can upgrade all the nodes in the cluster, or you can select specific nodes to upgrade. Also, you can specify the upgrade order of the nodes. If you upgrade only some of the nodes, the remaining nodes in the cluster are not upgraded but can be upgraded later while the upgrade is in progress. Only one upgrade can be in progress at a particular time. Also, you cannot upgrade some nodes to one version of OneFS and then upgrade another group of nodes to a different version of OneFS.

Perform a rolling upgrade through the web interface

You can use the web administration interface to upgrade the version of OneFS that is running on the cluster.

Before you begin

You must download the OneFS installation image from the Online Support site. The OneFS installation image is used to run compatibility checks. If you have not downloaded the image and run the checks, you must do so before upgrading OneFS. You must resolve any compatibility issues found by the checks before installing the new version of OneFS. See the Upgrade compatibility check utility section for more information.

Procedure

1. Log in to any node in the cluster through the web administration interface with the root account.
2. Click Cluster Management > Upgrade.
3. Click Upgrade OneFS.
4. Browse to the location of the installation image that you want to install. The file path must be accessible in an /ifs directory. Then click Select.
5. In the Upgrade Type list, select Rolling Upgrade.
6. Under Nodes to Upgrade, specify an upgrade option:
   - To upgrade all the nodes in the cluster, click All nodes.
   - To upgrade specific nodes, click Specify nodes and reboot order.
We recommend that you upgrade all the nodes. If you upgrade some nodes, a weekly alert is sent to confirm that the upgrade is making progress. Do not leave the cluster in a partially upgraded state for a prolonged period. Some new features in the upgrade might not be available until all the nodes in the cluster have been upgraded and the upgrade is committed. Refer to the release notes for the OneFS version that you are upgrading to for information about features that require all the nodes to be upgraded.

7. If you are upgrading specific nodes, select the node or nodes in the **Nodes Available for Upgrade** list, and then click **Add**.

   The selected node or nodes are added to the **Nodes Selected for Upgrade** section. To arrange the nodes in the preferred restart order, click the arrows next to the nodes in the **Nodes Selected for Upgrade** section.

8. (Optional) To skip the pre-upgrade checks for compatibility issues, select **Skip optional pre-upgrade checks**.

   We recommend that you run the optional pre-upgrade checks. Before starting an upgrade, OneFS checks that your cluster is healthy enough to complete the upgrade process. Some of the pre-upgrade checks are mandatory, and will be performed even if you choose to skip the optional checks. All pre-upgrade checks contribute to a safer upgrade.

9. Click **Start Upgrade**.

   The cluster might display several confirmation messages. Confirm each message to continue the upgrade process.

   The **isi upgrade cluster** command runs asynchronously. The command does not run the entire upgrade process; instead, it sets up the upgrade process, which nodes take turns controlling. For this reason, the command returns quickly. To view the progress of the upgrade, use the **isi upgrade view** command or the web administration interface.

**Results**

After the upgrade, a number of upgrade-related jobs may continue to run on the cluster for some time. During this time, the cluster is accessible, but you might experience a decrease in cluster performance. After the jobs complete, performance will return to normal. At this stage, the upgrade is complete, but is not committed. You can still roll back to the previous version of OneFS. Some new features in the upgrade might not be available until the upgrade is committed.

---

**Perform a rolling upgrade through the command-line interface**

You can use the command-line interface to upgrade the version of OneFS that is running on the cluster.

**Before you begin**

You must download the OneFS installation image from the [Online Support](#) site. The OneFS installation image is used to run compatibility checks. If you have not
downloaded the image and run the checks, you must do so before upgrading OneFS. You must resolve any compatibility issues found by the checks before installing the new version of OneFS. See the Upgrade compatibility check utility section for more information.

**Procedure**

1. Open a secure shell (SSH) connection on any node in the cluster and log in with the root account.

2. To perform a rolling upgrade, run the following command, where `<install-image-path>` is the file path of the upgrade install image. The file path must be accessible in an /ifs directory.

   ```bash
   isi upgrade cluster start <install-image-path>
   ```

   **Note**
   
   The *isi upgrade cluster* command runs asynchronously. The command does not run the entire upgrade process; instead, it sets up the upgrade process, which nodes take turns controlling. For this reason, the command returns quickly. To view the progress of the upgrade, use the *isi upgrade view* command or the web administration interface.

3. (Optional) You can specify the following rolling upgrade options:

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nodes to select for upgrade</strong></td>
<td>Upgrade specific nodes with the --nodes &lt;integer_range_list&gt; option. Specify the nodes in their upgrade order as a comma-separated list (for example, --nodes 7,3,2,5) or as a dash-separated range (for example, --nodes 1-7) of logical node numbers (LNNs).</td>
</tr>
</tbody>
</table>

   **Note**
   
   We recommend that you upgrade all the nodes. If you upgrade some nodes, a weekly alert is sent to confirm that the upgrade is making progress. Do not leave the cluster in a partially upgraded state for a prolonged period. Some new features in the upgrade might not be available until all the nodes in the cluster have been upgraded and the upgrade is committed. Refer to the release notes for the OneFS version that you are upgrading to for information about features that require all the nodes to be upgraded.

   The following example command starts a rolling upgrade on nodes 7,3,2,5, in that order:

   ```bash
   isi upgrade cluster start <install-image-path> --nodes 7,3,2,5
   ```

**Results**

After the upgrade, a number of upgrade-related jobs may continue to run on the cluster for some time. During this time, the cluster is accessible, but you might
experience a decrease in cluster performance. After the jobs complete, performance will return to normal. At this stage, the upgrade is complete, but is not committed. You can still roll back to the previous version of OneFS. Some new features in the upgrade might not be available until the upgrade is committed.

Configuration changes during a rolling upgrade

During a rolling upgrade, nodes in the Isilon cluster are upgraded and restarted one at a time. This can affect which configuration changes are allowed during the upgrade.

You can continue to manage data and can modify some cluster configurations during a rolling upgrade. For example, you can modify SMB shares and NFS exports. However, you can only make configuration changes from a node that has not yet been upgraded. If you attempt to make configuration changes from an upgraded node, the changes will not take effect.

Features that are new in the OneFS version to which you are upgrading are not functional until all of the nodes in the cluster have been updated. Attempts to enable or configure settings for new features on an upgraded node will fail until the upgrade is complete. You cannot activate software module licenses on a cluster while a rolling upgrade is in progress.

The last node that is upgraded and restarted is the node on which the upgrade script is running. Isilon recommends that you make configuration changes from this node to ensure that configuration changes are made from a node that has not yet been upgraded and to avoid being disconnected from the node when the node is restarted by the upgrade process.

Client connections during rolling upgrades

During a rolling upgrade, nodes in the Isilon cluster are upgraded and restarted one at a time. Restarting a node can affect client connections and access to data on the node.

Rolling upgrades allow users to access data before, during, and after the upgrade. However, as nodes are upgraded and restarted, users may experience brief pauses in the time it takes to complete a read or write operation.

If the cluster is configured for dynamic IP allocation through the licensed SmartConnect Advanced module, client connections to restarted nodes are automatically reconnected. When a node is restarted, the IP addresses assigned to the node is automatically moved to another node. The clients that are connected to the restarted node are automatically moved to the available node through the same IP addresses.

If a client is reconnected to a node that has not yet been upgraded and restarted, the client might be required to re-establish a connection to the cluster more than once.

How a client connection behaves when a node is restarted depends on several factors including the protocol over which the client connects to the cluster, and how the client is configured—for example, the mount type and configured timeout settings. The following table describes the expected client behavior when a client is connected to a node that is restarted on a cluster that is configured for dynamic IP allocation:

<table>
<thead>
<tr>
<th>Client</th>
<th>Expected client behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMB2</td>
<td>Client quickly re-establishes a connection to a new node after the connection to the restarting node is disrupted.</td>
</tr>
<tr>
<td>SMB3</td>
<td>Client transitions from the restarted node to a new node without disruption.</td>
</tr>
<tr>
<td>Client</td>
<td>Expected client behavior</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>NFSv2 and NFSv3</td>
<td>Client transitions from the restarting node to a new node without disruption. For soft mounts, if the transition times out, the client continues to transition the connection until successful. The client may display a timeout notification. No action is required.</td>
</tr>
<tr>
<td>NFSv4</td>
<td>Clients that are connected to the cluster using static IP addresses wait for NFS serviceability to resume on the nodes that they are connected to. Clients that are connected to the cluster using dynamic IP addresses use NFSv4 failover support. The NFSv4 state is maintained. The clients transition from the restarting node to a new node without disruption. For soft mounts, if the transition times out, the client continues to transition the connection until successful. The client may display a timeout notification. No action is required.</td>
</tr>
</tbody>
</table>

**Note**

For more information, see article 457328, *Best practices for NFS client settings*, for more information.

---

## Committing an upgrade of OneFS

Committing an upgrade completes the upgrade process.

You can commit an upgrade through the web administration interface or the command-line interface.

### Commit an upgrade through the web interface

You can use the web interface to commit an upgrade of OneFS.

Once you commit the upgrade, you cannot roll back to the previous version of OneFS. After the upgrade is committed, all the new features in the upgrade are available.

**Procedure**

1. Log in to any node in the cluster through the web administration interface with the root account.
2. Click **Cluster Management > Upgrade**.
3. Click the **Commit Upgrade to OneFS <version>** button.

   The cluster might display several confirmation messages. Confirm each message to continue the commit process.

### Commit an upgrade through the command-line interface

You can use the command-line interface to commit an upgrade of OneFS.

Once you commit the upgrade, you cannot roll back to the previous version of OneFS. After the upgrade is committed, all the new features in the upgrade are available.

**Procedure**

1. Open a secure shell (SSH) connection on the lowest-numbered node in the cluster and log in with the root account.
2. To commit the upgrade, run the following command:

```
isi upgrade cluster commit
```

## Rolling back an upgrade of OneFS

The upgrade rollback feature allows you to stop the upgrade that is in progress and restore all the upgraded nodes to the previous committed version of OneFS.

You can roll back an upgrade through the web administration interface or the command-line interface. You can roll back an upgrade only if the upgrade process is still active and the upgrade has not been committed. A committed upgrade cannot be rolled back.

### Roll back an upgrade through the web interface

You can use the web administration interface to stop an upgrade and return to the previous committed version of OneFS.

**Note**

The rollback process must restart all the upgraded nodes simultaneously. This will temporarily disrupt cluster services and data availability.

**Procedure**

1. Log in to any node in the cluster through the web administration interface with the root account.
2. Click **Cluster Management > Upgrade**.
3. Click the **Roll Back to OneFS <version>** button.
   - The cluster might display several confirmation messages. Confirm each message to continue the rollback process.
   - The cluster displays the rollback progress.

**Results**

The rollback process must restart all the upgraded nodes simultaneously. This will temporarily disrupt cluster services and data availability. After the OneFS image is updated on the final node and the node restarts, the web administration interface login page appears. If the login page does not appear, clear the web browser cache and reload the page. A number of upgrade-related jobs may continue to run on the cluster for some time. During this time, the cluster is accessible, but you might experience a decrease in cluster performance. After the jobs complete, performance will return to normal.
Roll back an upgrade through the command-line interface

You can use the command-line interface to stop an upgrade and return to the previous committed version of OneFS.

**Note**

The rollback process must restart all the upgraded nodes simultaneously. This will temporarily disrupt cluster services and data availability.

**Procedure**

1. Open a secure shell (SSH) connection on the lowest-numbered node in the cluster and log in with the root account.
2. To roll back the upgrade, run the following command:

   ```
   isi upgrade cluster rollback
   ```

**Results**

The rollback process must restart all the upgraded nodes simultaneously. This will temporarily disrupt cluster services and data availability. After the OneFS image is updated on the final node and the node restarts, the web administration interface login page appears. If the login page does not appear, clear the web browser cache and reload the page. A number of upgrade-related jobs may continue to run on the cluster for some time. During this time, the cluster is accessible, but you might experience a decrease in cluster performance. After the jobs complete, performance will return to normal.

Adding a node to the cluster while an upgrade is in progress

In some circumstances, you might need to add a node to the cluster while an upgrade is in progress and before the upgrade has been committed.

When a new node is added to the cluster during an upgrade, the system images the new node with the previously committed version of OneFS. Then as the cluster upgrade continues, the new node is upgraded to the target version of OneFS. If the cluster upgrade is stopped and rolled back, all the nodes in the cluster are returned to the previously committed version of OneFS.

For OneFS 8.0.1.0 and later, to add a node during an upgrade, at least one node in the cluster must have been successfully upgraded to the target version of OneFS before you can add a node. This upgraded node acts as the coordinator when new nodes are added during the upgrade.

**Note**

Before adding new hardware to the cluster, first confirm that the hardware is compatible with the version of OneFS that is installed and the version of OneFS that you are upgrading to. See the *Isilon Supportability and Compatibility Guide* for more information.
Verify the OneFS installation

After you install OneFS, verify that the installation was successful.

Procedure

1. Confirm that the health of all the nodes in the cluster is **OK** by running the following command:

   ```
   isi stat
   ```

2. Remove the installation files from the `/ifs/data` directory by running the following command where `<installation_file_name>` is the name of the installation file:

   ```
   rm /ifs/data/<installation_file_name>
   ```

3. Collect information about the cluster by running the following command:

   ```
   isi_gather_info
   ```
Performing the OneFS upgrade
Completing post-upgrade tasks

Performing the tasks described in this chapter helps to ensure that your upgrade is successful and minimizes down-time. Use the checklist to track your progress.

☐ Allow upgrade-related jobs to run
☐ Verify operational status
☐ Re-establish user privileges
☐ Restore client connections and test your workflow
☐ Restore custom settings
☐ Configure base directories for access zones
☐ Reconfigure SMB shares within access zones
☐ Reconfigure home directory templates within access zones
☐ Reconfigure HDFS settings within access zones
☐ Verify Kerberos migration
☐ Migrate to L3 cache
☐ Update SMB auditing
☐ Reinstall Aspera
☐ Modify custom scripts
☐ Install recommended patches
☐ Implement the OneFS API

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- Allow upgrade-related jobs to run...................................................................... 58
- Verify operational status.................................................................................... 59
- Re-establish user privileges................................................................................60
- Restore client connections and test your workflow.............................................. 61
- Reapply custom settings.....................................................................................61
- Configuring base directories for access zones ................................................... 61
- Reconfiguring SMB shares within access zones.................................................63
- Reconfiguring home directory templates within access zones........................... 64
- Reconfiguring HDFS settings within access zones.............................................65
- Verify Kerberos migration.................................................................................. 66
- Migration to L3 cache........................................................................................ 67
- Update SMB auditing......................................................................................... 67
- Reinstall Aspera..................................................................................................67
- Modify custom scripts....................................................................................... 68
- Install recommended patches.............................................................................68
- Implement the OneFS API..................................................................................68
About post-upgrade tasks

After an upgrade, you should perform a number of restoration and change management tasks to ensure that your cluster performs and behaves as expected.

Once the cluster has been upgraded, the system will run a series of upgrade jobs that must be allowed to finish, and then you should verify that your cluster is operational.

It is important that you build time into your upgrade plan to re-establish custom settings and privileges, and re-enable connections and features. You should also make time to modify settings for new and changed features.

Allow upgrade-related jobs to run

You must allow upgrade-related jobs to run to completion.

After the upgrade, a number of upgrade-related jobs will continue to run for a while. These jobs might include an important Upgrade job that redistributes, or re-stripes, data more efficiently.

The Upgrade job runs when you upgrade to a version of OneFS that has significant changes to storage pools. The Upgrade job has three phases. First, the Upgrade job scans all logical inodes (LINs) and restripes the files to which the LINs are related, and then repeats the process on all shadow store inodes (SINs). Finally, the Upgrade job scans all of the blocks on all of the drives in the cluster.

The following table shows which upgrades cause the Upgrade job to run.

<table>
<thead>
<tr>
<th>Upgrading from</th>
<th>7.1.0</th>
<th>7.1.1</th>
<th>7.2.0</th>
<th>7.2.1</th>
<th>8.0.0</th>
<th>8.0.1</th>
<th>8.1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1.0</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.1.1</td>
<td></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>7.2.0</td>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>7.2.1</td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>8.0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8.0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8.1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Although the cluster remains accessible while the upgrade jobs are running, the jobs might temporarily decrease the cluster's performance.

Procedure

- To check for running system jobs, run the following command:

  ```bash
  isi job status
  ```
Verify operational status

You can run a series of commands as root to help verify that the Isilon cluster is working correctly after an upgrade.

If you find an unresolvable issue, contact Isilon Technical Support.

Procedure

1. Check the new version number of the cluster:
   
   ```
   isi_for_array -s uname -a
   ```

2. View the status of the cluster and ensure all the nodes are operational:
   
   ```
   isi status
   ```

3. Ping all the cluster's internal and external interfaces to verify network connectivity and to help verify that SmartConnect works correctly.

4. Review the list of events and address any critical events:
   
   ```
   isi event events list
   ```

5. Check the status of jobs and resume the jobs that you paused for the upgrade:
   
   ```
   isi job status
   ```

6. Verify the network interfaces:
   
   ```
   isi network interfaces list
   ```

7. Verify the subnets:
   
   ```
   isi network subnets list --verbose
   ```

8. Verify the pools:
   
   ```
   isi network pools list --verbose
   ```

9. Review the cluster's other log files to check for stray problems:
   
   ```
   cat /var/log/messages
   ```
Completing post-upgrade tasks

10. Review the list of SyncIQ jobs:

   ```
   isi sync jobs list
   ```

11. Check the SyncIQ job reports:

   ```
   isi sync reports list
   ```

12. Review the list of the scheduled snapshots:

   ```
   isi snapshot schedules list
   ```

13. Check the cluster's input and output:

   ```
   isi statistics system
   ```

14. Check the devices in the nodes to validate the status of the drives:

   ```
   isi_for_array -s "isi devices list"
   ```

15. Check the global SMB settings:

   ```
   isi smb settings global view
   ```

16. Check the status of the firmware to ensure that the firmware is consistent across nodes:

   ```
   isi upgrade firmware devices
   ```

17. Ensure that all the licenses carried over and remain up-to-date:

   ```
   isi license licenses list
   ```

18. Check the status of the authentication providers to ensure that they remain active:

   ```
   isi auth status --verbose
   ```

---

**Re-establish user privileges**

After you upgrade, re-establish user privileges and roles.

OneFS includes role-based access control (RBAC) for administration. In place of a root or administrator account, RBAC lets you manage administrative access by role. A
role limits privileges to an area of administration. For example, you can create separate administrator roles for security, auditing, storage, and backup. Administrative RBAC helps improve security and compliance.

If the system administered the user roles through RBAC before the upgrade, any custom roles that existed are still in place. However, if the privileges assigned to built-in roles have changed in the new version, the users who are assigned to those built-in roles will have those new privileges.

After upgrading, you can log in to the cluster through SSH as root or though an administrator account if that role has been assigned to any users.

See the OneFS CLI Administration Guide or the OneFS Web Administration Guide for more information.

**Restore client connections and test the workflow**

After an upgrade, ensure that the Isilon cluster works correctly, and then restore client connections and confirm that all the users, clients, and applications can access the cluster.

Test your workflows to ensure that they function as expected.

**Reapply custom settings**

Reapply the custom settings that you backed up and recorded during the pre-upgrade phase of the upgrade.

Some custom settings might not be preserved during the upgrade. Reapply the custom settings that you backed up and recorded when you performed the pre-upgrade tasks. The custom settings include:

- SMB audit logging
- Passwords for local user accounts
- Changes to system controls
- Certificates
- Static routes
- Aspera
- Cron jobs

**Configuring base directories for access zones**

If you upgrade to OneFS 7.1.1 or later, you cannot create new access zones until you reconfigure any zones that were migrated during the OneFS upgrade.

In OneFS 7.1.1 and later, access zone functionality changed in the following ways:

- A base directory must be specified for each access zone.
- Each base directory cannot overlap with another base directory.
- The base directory of the default System access zone is /ifs and cannot be modified.

If you have upgraded to OneFS 7.1.1 or later, each migrated access zones now specifies /ifs as the base directory. Connections to access zones and data will continue to work as normal. However, this configuration is not recommended, and you will not be able to create new access zones until you reconfigure the base directories.
However, the migrated configuration in which /ifs is the base directory for all of the access zones is not recommended, and you will not be able to create new access zones until you reconfigure each zone with a unique base directory.

**Access zones upgrade example**

The following example illustrates access zones before and after upgrading to OneFS 7.1.1 or later.

<table>
<thead>
<tr>
<th>Before upgrading</th>
<th>After upgrading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global List of Shares:</strong></td>
<td><strong>ZoneA:</strong></td>
</tr>
<tr>
<td>• Finance = /ifs/data/Finance</td>
<td>• Base directory = /ifs</td>
</tr>
<tr>
<td>• Engineering = /ifs/data/Engineering</td>
<td>• Shares:</td>
</tr>
<tr>
<td>• Human Resources = /ifs/data/Human Resources</td>
<td>• Finance = /ifs/data/Finance</td>
</tr>
<tr>
<td><strong>ZoneA:</strong></td>
<td>• Home directory template:</td>
</tr>
<tr>
<td>• Shares:</td>
<td>• local-provider:ZoneA = /ifs/home/%U</td>
</tr>
<tr>
<td>• Home directory template:</td>
<td><strong>ZoneB:</strong></td>
</tr>
<tr>
<td>• Finance</td>
<td>• Base directory = /ifs</td>
</tr>
<tr>
<td>• local-provider:ZoneA = /ifs/home/%U</td>
<td>• Shares:</td>
</tr>
<tr>
<td><strong>ZoneB:</strong></td>
<td>• Human Resources = /ifs/data/Human Resources</td>
</tr>
<tr>
<td>• Shares:</td>
<td>• Engineering = /ifs/data/Engineering</td>
</tr>
<tr>
<td>• Human Resources</td>
<td>• Home directory template:</td>
</tr>
<tr>
<td>• Engineering</td>
<td>• local-provider:ZoneB = /ifs/home/%U</td>
</tr>
<tr>
<td>• Home directory template:</td>
<td><strong>ZoneA:</strong></td>
</tr>
<tr>
<td>• local-provider:ZoneB = /ifs/home/%U</td>
<td></td>
</tr>
</tbody>
</table>

After the upgrade, both ZoneA and ZoneB point to /ifs as the base directory and the home directory template in each zone points to the same directory.

**Configure base directories in access zones**

You can configure the base directory for each access zone that was migrated upon upgrading to OneFS 7.1.1 or later.

**Before you begin**

Before modifying base directories, you should complete the following actions:

- Create new directories, if needed.
- Move data to the new directories. It is recommended that you move directories, rather than files, through the `mv` command.
- Modify the home directory template path of the local provider for each access zone.
- Modify the SMB share paths in each access zone to point to the directories that data was moved to.

**Procedure**

1. Run the `isi zone zones modify` command.
The following example command changes the base directory for ZoneA to `/ifs/ZoneA`:

```
isi zone zones modify ZoneA --path=/ifs/ZoneA
```

---

**Reconfiguring SMB shares within access zones**

OneFS 7.1.1 introduced changes to access zones that affect SMB shares. In OneFS 7.1.1 and later, SMB share functionality changed in the following ways:

- Shares are not stored in a global list; shares are stored in access zones.
- A share path must match or fall under the base directory path of the access zone.
- Share names must be unique only within an access zone, not on the cluster.

The following configuration changes occur upon upgrade to OneFS 7.1.1 or later:

- If an SMB share was listed in multiple access zones before you upgraded, the upgrade process makes duplicate copies of the share and places them in their respective zones. Each share references the same directory. This is not a recommended configuration. Reconfigure the shares after you upgrade.
- OneFS 7.1.0 enabled you to assign a display name to an SMB share. This feature is not supported in OneFS 7.1.1 and later. During the upgrade, display names are replaced with the SMB share name.

---

**SMB shares upgrade example**

The following example illustrates SMB shares before and after upgrading to OneFS 7.1.1 or later.

<table>
<thead>
<tr>
<th>Before upgrading</th>
<th>After upgrading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global List of Shares:</td>
<td>ZoneA:</td>
</tr>
<tr>
<td>• Finance = /ifs/data/Finance</td>
<td>• Base directory = /ifs</td>
</tr>
<tr>
<td>• Engineering = /ifs/data/Engineering</td>
<td>• Shares:</td>
</tr>
<tr>
<td>• Human Resources = /ifs/data/Human Resources</td>
<td></td>
</tr>
<tr>
<td>ZoneA:</td>
<td></td>
</tr>
<tr>
<td>• Shares:</td>
<td></td>
</tr>
<tr>
<td>• Human Resources</td>
<td></td>
</tr>
<tr>
<td>• Finance</td>
<td></td>
</tr>
<tr>
<td>ZoneB:</td>
<td></td>
</tr>
<tr>
<td>• Shares:</td>
<td></td>
</tr>
<tr>
<td>• Human Resources</td>
<td></td>
</tr>
<tr>
<td>• Engineering</td>
<td></td>
</tr>
</tbody>
</table>

---

Reconfiguring SMB shares within access zones

63
Reconfigure SMB shares

If you upgrade to OneFS 7.1.1 or later, SMB shares are assigned to access zones. An SMB share path must match or fall under the base directory path of the access zone. You can modify SMB shares to adhere to zone requirements. Modify SMB share paths prior to reconfiguring home directory template paths and access zone base directories.

Procedure

1. If it does not exist, create the directory the SMB share will reference.
2. Move SMB share data from the current directory to the new directory by running the `mv` command.
   
   It is recommended that you move entire directories rather than directory contents. Moving entire directories results in a single node update and is very fast; moving contents only might affect permission inheritance and takes a very long period of time.
   
   The following example command moves data from the `/ifs/data/Finance` directory to a new `/ifs/ZoneA/Finance` directory:

   ```
   mv /ifs/data/Finance /ifs/ZoneA/Finance
   ```

3. Run the `isi smb shares modify <share name>` command.
   
   The following example command changes the directory of the Finance share in ZoneA to `/ifs/ZoneA/Finance`:

   ```
   isi smb shares modify Finance --path=/ifs/ZoneA/Finance --zone=ZoneA
   ```

Reconfiguring home directory templates within access zones

OneFS 7.1.1 introduced changes to access zones that affect home directory templates.

Each access zone that is configured with the local authentication provider contains a home directory template. In OneFS 7.1.1 and later, the path of the home directory template must match or fall under the base directory path of the access zone.

Home directory template upgrade example

The following example illustrates the home directory template before and after upgrading to OneFS 7.1.1 or later.

<table>
<thead>
<tr>
<th>Before upgrading</th>
<th>After upgrading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global List of Shares:</td>
<td>ZoneA:</td>
</tr>
<tr>
<td>• HOMEDIR = /ifs/home/%U</td>
<td>• Base directory = /ifs</td>
</tr>
<tr>
<td>ZoneA:</td>
<td>• Shares: HOMEDIR = /ifs/home/%U</td>
</tr>
<tr>
<td>• Shares: HOMEDIR</td>
<td>• local-provider:ZoneA = /ifs/home/%U</td>
</tr>
</tbody>
</table>
Before upgrading | After upgrading
---|---
- local-provider:ZoneA = /ifs/home/%U
ZoneB:  
- Shares: HOMEDIR  
- local-provider:ZoneB = /ifs/home/%U  
  
ZoneB:  
- Base directory: /ifs  
- Shares: HOMEDIR = /ifs/home/%U  
- local-provider:ZoneB = /ifs/home/%U

Reconfigure home directory templates

If you have upgraded to OneFS 7.1.1 or later, home directory templates are assigned to local provider access zones. This procedure is available only through the command-line interface (CLI).

A home directory template path must match or fall under the base directory path of the access zone. You can modify the template path to adhere to zone requirements. Modify home directory template paths prior to reconfiguring SMB share paths and access zone base directories.

**Procedure**

1. If it does not exist, create the directory the home directory template will reference.  
2. Run the `isi auth local modify <zone name>` command to change the template path.  
   The following example command changes the template directory in ZoneA to `/ifs/ZoneA/home/%U`:
   ```bash
   isi auth local modify ZoneA --home-directory-template=/ifs/ZoneA/home/%U
   ```
3. Run the `isi smb shares modify HOMEDIR` command to change the HOMEDIR path to the template path.  
   The following example command changes the HOMEDIR directory in ZoneA to `/ifs/ZoneA/home/%U`:
   ```bash
   isi smb shares modify HOMEDIR --path=/ifs/ZoneA/home/%U --zone=ZoneA
   ```
4. Move all home directories for users in the specified zone to the new HOMEDIR path.

Reconfiguring HDFS settings within access zones

OneFS 7.1.1 introduced changes to access zones that affect HDFS.  
In OneFS 7.1.1 and later, HDFS functionality changed to allow you to configure the following settings within each access zone instead of globally on the cluster:

- HDFS root directory  
- Authentication  
- WebHDFS  

The following configuration changes occur when you upgrade to OneFS 7.1.1 or later:
By default, the HDFS root directory of each migrated access zone is set to the base directory of the zone. This is not a recommended configuration and should be reconfigured.

Settings for authentication and keytab files are copied and applied to each migrated access zone.

WebHDFS is enabled by default in each access zone.

Reconfigure HDFS settings

If you have upgraded to OneFS 7.1.1 or later, HDFS settings are no longer global; they are configured in each access zone. This procedure is available only through the command-line interface (CLI).

You can specify values for the following HDFS attributes within each access zone:

- HDFS root directory
- Authentication method
- WebHDFS support

Procedure

1. Run the `isi zone zones modify <zone name>` command.

   The following example command sets the root directory to `/ifs/ZoneA/Hadoop`, sets the authentication method to simple only, and disables WebHDFS in ZoneA:

   ```
   isi zone zones modify ZoneA \
   --hdfs-root-directory=/ifs/ZoneA/Hadoop \
   --hdfs-authentication=simple_only --webhdfs-enabled=no
   ```

Verify Kerberos migration

If you upgrade to OneFS 7.2 or later, Kerberos authentication can be configured through the OneFS web administration interface and OneFS command-line interface. You must verify that Kerberos providers and settings have been migrated to the web administration interface and command-line interface successfully.

Procedure

1. Verify that Kerberos authentication settings and providers are correctly represented.

   - To verify through the web administration interface, perform the following procedure:
     a. Click Access > Authentication Providers > Kerberos Provider.
     b. In the Kerberos Realms, Kerberos Domains, and Kerberos Providers tables, view Kerberos providers.
     c. Click Access > Authentication Providers > Kerberos Provider.
     d. In the Kerberos Settings area, view Kerberos settings.

   - To verify through the command-line interface, run the following commands:
     - `isi auth krb5 realm list`
     - `isi auth krb5 domain list`
Migration to L3 cache

L3 cache is enabled by default on new nodes. If you are upgrading your cluster from OneFS 7.1.0 or earlier, you must enable L3 cache manually on node pools that contain SSDs. When you enable L3 cache, OneFS migrates data that is stored on the SSDs to HDD storage disks and then begins using the SSDs as cache.

You can enable L3 cache as the default for all new node pools or manually for a specific node pool, either through the command line or from the web administration interface. L3 cache can be enabled only on node pools with nodes that contain SSDs.

When you enable L3 cache, OneFS displays the following message:

WARNING: Changes to L3 cache configuration can have a long completion time. If this is a concern, please contact Isilon Technical Support for more information.

You must confirm whether OneFS should proceed with the migration. After you confirm the migration, OneFS handles the migration as a background process, and, depending on the amount of data stored on your SSDs, the process of migrating data from the SSDs to the HDDs might take a long time.

Note

You can continue to administer your cluster while the data is being migrated.

Update SMB auditing

SMB auditing changed in OneFS 7.1. If you are upgrading from OneFS 7.0 or earlier and if the environment is configured for SMB auditing, after you upgrade, you must reconfigure the cluster to use the new auditing tool.

For more information, see the Auditing section in the OneFS CLI Administration Guide or the OneFS Web Administration Guide.

Reinstall Aspera

If you were running Aspera for Isilon before you upgraded your cluster, you might need to reinstall Aspera after you upgrade.

Procedure

1. Download a compatible version of Aspera from the Aspera Enterprise Server for Isilon website.
   - For information about downloading and installing Aspera for OneFS, see article 493022, How to download Aspera for OneFS.
   - For information about which versions of Aspera are compatible with your version of OneFS, see the Isilon Supportability and Compatibility Guide.

2. Install Aspera on all nodes in the cluster or on a single node.
To install Aspera on all the nodes in the cluster, open an SSH connection to any node in the cluster, log in using the root account, and then run the following command:

```
isi_for_array /usr/local/aspera/var/install.sh
```

To install Aspera on a single node, open an SSH connection to the desired node, log in using the root account, and then run the following command:

```
/usr/local/aspera/var/install.sh
```

3. Run the following command to verify that the installation script enabled the Aspera Central service and the Aspera node daemon:

```
isi services
```

Modify custom scripts

Modify custom scripts that are affected by OneFS command syntax changes. Review Isilon OneFS CLI Mappings to confirm whether any command syntax changes were implemented in the version of OneFS to which you upgraded. If command syntax changes were implemented, your custom scripts might not work.

If your workflow depends on custom scripts and if there were syntax changes that affect them, update and then test your custom scripts.

Install recommended patches

Install the patches that are recommended for the version of OneFS to which you upgraded.

Procedure

1. See Current Isilon OneFS Patches to view a list of patches that are available for your version of OneFS.
2. Install the recommended patches and any patches that address issues that might affect your environment.

Implement the OneFS API

You can implement the latest version of the OneFS application programming interface (API).

The OneFS RESTful application programming interface was introduce in OneFS 7.0 to automate access, configuration, and monitoring. For example, you can retrieve performance statistics, provision users, and create SMB shares in an access zone. In addition, the OneFS API, which requires no license, integrates with OneFS role-based access control to improve security.

See the Isilon SDK Info Hub and OneFS 8.0.0 API Reference guide for more information.
CHAPTER 6

Troubleshooting your upgrade

This section contains the following topics:

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- Review the upgrade log files ............................................................. 70
- Common issues ................................................................................. 70
Troubleshooting overview

If you experience problems with the upgrade, check the upgrade logs and review common upgrade issues.

You can search for OneFS documentation, troubleshooting guides, and knowledge base articles on the Online Support site. See Isilon Customer Troubleshooting Guide: Troubleshoot failures when upgrading from OneFS 6.5.x, 7.0.x, 7.1.x, or 7.2.x for troubleshooting information that is related to upgrade failures and upgrade error messages.

If you need help with troubleshooting, contact Isilon Technical Support.

Review the upgrade log files

You can check the upgrade log files for errors that occurred during the upgrade process.

After you upgrade to OneFS 8.0.0 or later, you can run the `isi_upgrade_logs` command to retrieve errors that were logged during the upgrade. If no errors were logged, the following message appears on the console:

```
No Upgrade Process Errors Found, if you ran an assessment please use the -a option
```

Common issues

Check to see if problems with your upgrade are due to common issues.

Check for a dropped node

OneFS might stay in an upgrade state if a node does not come reboot when the cluster is rebooted after a simultaneous upgrade. You cannot make changes to certain features such as SMB shares and NFS exports while OneFS is in an upgrade state.

Procedure

1. Smartfail the node that did not come back after rebooting.
2. Check to ensure that the name of the smartfailed node is removed from the cluster node list.
   
   This operation might take some time depending on the amount of data that is migrated off of the node.
3. Reboot any node in the cluster.

Adjust the SMB client-credit minimum

SMB2 client connections might stop responding because of an increase in the client-credit minimum.

Adjust the SMB client-credit minimum if the following errors occur:

- The SMB clients show system "error 51" or "error 0x80070033."
The Microsoft Windows event log contains the following entry:

Operating system error 64 (The specified network name is no longer available.)

An error similar to the following appears in the packet captures on the servers:

See article 460492, SMB2 connections stop responding because client credit minimum value is too high, for more information.

Adjust NFS performance

Fix the system controls for Network File System (NFS) server threads.
NFS performance might be lower than expected because of a configuration change. The default number of NFS server threads was changed from 64 to 16 in OneFS 7.0 to address a potential issue in which the NFS server monopolizes node resources.
It is recommended that you set threads_min and threads_max to the same value. Increasing the number of threads can improve performance at the expense of stability. Before you change the number of threads, contact Isilon Technical Support to determine the values that work best for your cluster; the values vary by CPUs, memory, the number of nodes, and other factors.
After you determine the number of threads for your cluster by consulting with Isilon Technical Support, you can adjust the number of NFS threads by running the following commands, where x is an integer. These commands require you to log in as a root user.

Procedure

1. To modify the minimum number of threads, run the following command:

   isi_sysctl_cluster vfs.nfsrv.rpc.threads_min=x

2. To modify the maximum number of threads, run the following command:

   isi_sysctl_cluster vfs.nfsrv.rpc.threads_max=x

Check for 64-bit requirement to run custom applications

Beginning in OneFS 7.0 the system user space is 64-bit. If you are running any custom tools that require a 32-bit user space, you must recompile them after you upgrade.

Note

Running your own applications on an Isilon cluster is neither recommended nor supported.
Troubleshooting your upgrade