
AWS Elemental Conductor File

Upgrade Guide

Version 2.16



AWS Elemental Conductor File: Upgrade Guide

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This is version 2.16 of the AWS Elemental Conductor File documentation. This is the latest version. For prior versions, see the *Archive* section of [AWS Elemental Conductor File](#) and [AWS Elemental Server Documentation](#).

About This Guide

This guide is intended for engineers who will upgrade the software running on the nodes of an AWS Elemental Conductor File cluster with worker nodes.

The full suite of upgrade information for AWS Elemental Conductor File and AWS Elemental Server is described in the table:

Deployment	Description	Information
<ul style="list-style-type: none">• Single Conductor cluster• No backup workers	AWS Elemental Server nodes without backup in a cluster controlled by one Elemental Conductor.	Upgrading an AWS Elemental Conductor File Cluster (p. 2)
<ul style="list-style-type: none">• Two Conductor (high-availability) cluster• With or without backup workers	AWS Elemental Server nodes in a cluster controlled by redundant AWS Elemental Conductor File nodes (a primary and a backup). Workers might or might not have redundant nodes.	Upgrading an AWS Elemental Conductor File High Availability Cluster (p. 7)

Prerequisite Knowledge

We assume that you know how to:

- Connect to the AWS Elemental Conductor File web interface using your web browser.
- Log in to a remote terminal (Linux) session in order to work via the command line interface.

Note

To receive assistance with your AWS Elemental appliances and software products, see the forums and other helpful tools on the [AWS Elemental User Community](#).

Sending Commands

Tips for sending commands:

- Unless otherwise stated, enter all Linux shell commands from the home directory (/home/elemental).
- To ensure that the commands will be executed regardless of your user permissions, use "sudo" to run the command as superuser.

Cluster Upgrades in AWS Elemental Conductor File

In a Conductor cluster, upgrade the AWS Elemental Conductor File nodes first, and then upgrade each of the AWS Elemental Server nodes.

As part of the upgrade of the Conductor node, the Conductor software stops working. When this happens, all of the worker nodes go into "headless" mode. The following rules apply until you upgrade all of the worker nodes:

- You cannot control the worker nodes from the Conductor web interface.
- The web interfaces of the worker nodes will have limited functionality: you will only be able to stop and start existing jobs.

During headless mode, activity continues on the worker nodes, but you can't control the worker node.

Upgrade rules

The following rules apply when you're upgrading.

- Your system must be in a working state prior to the upgrade. If it's in a degraded state (such as not accepting jobs or not responding through the web interface), the upgrade will not work.
- You can upgrade to a version that's a maximum of two major versions above your current version, such as from 2.15.x to 2.16.x. The number of patches between the two versions is irrelevant. To upgrade over a bigger span, you must perform several upgrades, such as from 2.13.2 to 2.15.4, then to 2.16.0.
- You must stop the `elemental_se` service on all AWS Elemental Server nodes before upgrading any Conductor File or AWS Elemental Server nodes in the cluster. For instruction, see the procedures in the following sections.

The upgrade commands are the same, but the procedure around upgrades changes depending on your type of cluster. The following sections provide instructions for the different kinds of AWS Elemental Conductor File clusters.

Important

Plan to upgrade during a maintenance window. All activity on the nodes will stop during downgrade.

Topics

- [Upgrading an AWS Elemental Conductor File Cluster \(p. 2\)](#)
- [Upgrading an AWS Elemental Conductor File High Availability Cluster \(p. 7\)](#)
- [Sample Upgrade \(p. 14\)](#)

Upgrading an AWS Elemental Conductor File Cluster

This section describes how to upgrade a cluster with one AWS Elemental Conductor File node. All worker AWS Elemental Server nodes are active: there is no redundancy between worker nodes.

The procedure for upgrading any version of a single-Conductor cluster is the same; only the version numbers in the file name change. In this section, we show how to upgrade to version 2.16.0.123456 of the software.

Important

Refer to the AWS Elemental Conductor File 2.16 Release Notes to identify changes in requirements and behavior with the upgrade.

Quick reference

Here are the key upgrade commands. Use the actual filename of the `.run` file that you're using, rather than that provided in the example.

- For the Conductor node:

```
[elemental@hostname ~]$ sudo ./elemental_production_conductor_file_2.16.0.123456.run --skip-all --start
```

- For the AWS Elemental Server nodes:
 - For GPU and CPU versions of the software.

```
[elemental@hostname ~]$ sudo sh ./elemental_production_server_2.16.n.nnnnn.run --skip-all --start
```

- For CPU-only versions of the software.

```
[elemental@hostname ~]$ sudo sh ./elemental_production_server_cpu_2.16.n.nnnnn.run --skip-all --start
```

For more detailed instructions, see the following topics.

Topics

- [Step A: Stop Worker Node Service \(p. 3\)](#)
- [Step B: Locate the Software \(p. 4\)](#)
- [\(Conditional\) Step C: Enable CPU Passthrough \(p. 4\)](#)
- [Step D: Upgrade the AWS Elemental Conductor File Node \(p. 5\)](#)
- [Step E: Upgrade Any Worker Nodes \(p. 6\)](#)

Step A: Stop Worker Node Service

To avoid complications in your cluster, stop the `elemental_se` service on all AWS Elemental Server nodes in the cluster. This must be done before you upgrade any Conductor File or AWS Elemental Server nodes!

To stop the `elemental_se` service on AWS Elemental Server

1. Make sure that there are no jobs running on the worker nodes, as this command will cause any running jobs to go into a Error state.
2. From a Linux prompt, log in with the `elemental` user credentials.
3. Enter the following command to stop the node:

```
sudo service elemental_se stop
```

- Confirm that `elemental_se` is stopped. Run the following command:

```
sudo service elemental_se status
```

- Ensure that the status returned is as follows:

```
Not Running. [FAILED]
```

- Repeat steps 1 through 5 on each worker node until all worker nodes show that they have stopped running.

Step B: Locate the Software

1. From your regular workstation, open a web browser, go to the [AWS Elemental User Community](#), click **Downloads and Licenses**, and download the software for the version that you're going to.
2. Make a note of where downloads are stored on your workstation. For example:

```
h:/corporate/downloads/.
```

3. Make a note of the name of the download file. For example:
`elemental_production_conductor_file_2.16.0.123456.run`
4. Copy the download file from your workstation to `/home/elemental/` on one of the nodes. For example:
 - Use SFTP protocol and an FTP client application on your workstation computer. Connect to the IP address for AWS Elemental Delta on port 22 with the *elemental* user credentials and transfer the file.
 - Use SCP protocol and an SCP client application on your workstation computer. Copy the file with the *elemental* user credentials and transfer the file.
5. Repeat the download to any other nodes that are changing versions. If you're changing versions on several nodes, copy the download file to every hardware unit at once. Doing so reduces downtime on each node as you start installing the new software.

For detailed downloading steps, see [Downloading AWS Elemental Conductor File Software \(p. 16\)](#).

(Conditional) Step C: Enable CPU Passthrough

Perform this step if you have Conductor File and AWS Elemental Server deployed on kernel-based virtual machines (KVMs).

Enable CPU passthrough so that the KVM can tell what CPU you're using. The AWS Elemental software installer could fail, or jobs remain in a pending state, if passthrough isn't enabled.

To enable CPU passthrough

1. At the Linux command line on the KVM host, use the following command to update the virtual machine configuration file.

```
sudo virsh edit hostname
```

where *hostname* is the name that you gave the virtual machine when you deployed it.

2. Go to the line that defines `cpu mode` and change it to **host-passthrough**.
3. Save and exit the editor.

4. Enable passthrough on all KVMs that you deployed.

Step D: Upgrade the AWS Elemental Conductor File Node

1. From a Linux prompt, log in with the *elemental* user credentials. Once you're logged in, the initial directory is `/home/elemental`.
2. Run the installer with the `skip-all` option:

```
[elemental@hostname ~]$ sudo ./elemental_production_conductor_file_2.16.0.123456.run --skip-all --start
```

The installer automatically stops the software, if it's still running. The following prompts are skipped:

- You are not prompted to change the network setup (eth0 and eth1) or the Ethernet partitioning (setup of eth0 as a management interface).
- You are not prompted to choose the time zone.
- You are not prompted to enable or disable user authentication.

You *are* prompted to accept the EULA (end user license agreement).

The new software is installed and all services except `elemental_se` are automatically be restarted.

3. Once installation is complete, you might be prompted to reboot.

```
Installation and configuration complete!  
.  
.  
.  
NOTE: You must reboot your system to finish the installation!
```

Enter this command to reboot:

```
[elemental@hostname ~]$ sudo reboot
```

The reboot takes approximately 5 minutes. When the reboot completes, the `elemental_se` service automatically starts. Look for this message on the command line:

```
Starting elemental_se: [ OK ]
```

4. If you're not prompted to reboot, you are prompted to start `elemental_se`:

```
Would you like to start the Elemental service now? [Y]
```

Enter **Y**.

The restart takes approximately 1 minute. When the restart is done, this message appears:

```
Installation and configuration complete!  
Please open a web browser and point it to http://xxx.xxx.xxx.xxx to get to the web  
interface.  
Enjoy!
```

5. Refresh your web browser to load the [AWS Elemental Conductor File web interface](#).

Step E: Upgrade Any Worker Nodes

Perform these steps on each backup worker node. Upgrade all the backup nodes before upgrading the active nodes.

Get Ready

If a worker node has any custom AWS Elemental assets such as scripts, locate them and if they are in `/opt/elemental_se`, then back them up to a safe location, so that they are not deleted during the upgrade. For detailed information on keeping backup files before the upgrade, see the article [Backup Files for Safekeeping/Upgrading/Downgrading](#).

To upgrade the worker nodes

1. From the Linux prompt, log in with the *elemental* user credentials.
2. Run the installer as follows. Use the actual filename of the `.run` file you downloaded, rather than the example below.

For GPU and CPU versions of the software.

```
[elemental@hostname ~]$ sudo ./elemental_production_server_2.16.x.xxxxx.run -xeula --start -z
```

For CPU-only versions of the software.

```
[elemental@hostname ~]$ sudo ./elemental_production_server_cpu_2.16.x.xxxxx.run -t -n -xeula --start -z
```

For more details about upgrading worker nodes, see [AWS Elemental Server Upgrade Guide](#).

3. Answer the prompts as follows:

Prompt	Response
Remove this node from the Conductor system? [N]	No
What is the hostname or IP address of the cluster management node?	Enter the IP address of the management interface (typically eth0 or bond 0) on the primary Conductor node.
Trust this public key? [Y]	Yes

4. If you had previously copied a script to a safe location, now copy it back to its location in `/opt/elemental_se`.

To reboot the worker nodes

1. As soon as the installation is complete, restart the node.

```
[elemental@hostname ~]$ sudo reboot
```

On the Conductor web interface, a message appears to indicate that the node is deactivated (offline).

2. Refresh your web browser in order to load the updated AWS Elemental Server web interface.

When the upgrade is complete, the backup node restarts.

Warning

Before going back into production, assure that all AWS Elemental Server nodes are running the same version of the AWS Elemental Server software. You will have problems if a node in the cluster is running a different version of the software.

Upgrading an AWS Elemental Conductor File High Availability Cluster

This section describes how to upgrade a cluster with two AWS Elemental Conductor File nodes - one primary and one secondary that provides high availability. All worker AWS Elemental Server nodes are active: there is no redundancy between worker nodes.

The procedure for upgrading any version of a high availability Conductor cluster is the same; only the version numbers in the file name change. In this section, we show how to upgrade to version 2.16.0.123456 of the software.

Important

Refer to the AWS Elemental Conductor File 2.16 Release Notes to identify changes in requirements and behavior with the upgrade.

Quick reference

Here are the key upgrade commands. Use the actual filename of the `.run` file that you're using, rather than that provided in the example.

- For the Conductor nodes:

```
[elemental@hostname ~]$ sudo ./elemental_production_conductor_file_2.16.0.123456.run --skip-all --start
```

- For the AWS Elemental Server nodes:
 - For GPU and CPU versions of the software.

```
[elemental@hostname ~]$ sudo sh ./elemental_production_server_2.16.n.nnnnn.run --skip-all --start
```

- For CPU-only versions of the software.

```
[elemental@hostname ~]$ sudo sh ./elemental_production_server_cpu_2.16.n.nnnnn.run --skip-all --start
```

Where `-l` is a letter, not a number.

For more detailed instructions, see the following topics.

Topics

- [Step A: Locate the Software \(p. 8\)](#)
- [Step B: Prepare to Upgrade the AWS Elemental Conductor File Nodes \(p. 8\)](#)
- [\(Conditional\) Step C: Enable CPU Passthrough \(p. 9\)](#)
- [Step D: Disable High Availability on the AWS Elemental Conductor File Nodes \(p. 9\)](#)
- [Step E: Stop Services \(p. 10\)](#)

- [Step F: Upgrade the Conductor File Nodes \(p. 10\)](#)
- [Step G: Re-enable High Availability on the AWS Elemental Conductor File Nodes \(p. 11\)](#)
- [Step H: Upgrade the Worker Nodes \(p. 13\)](#)

Step A: Locate the Software

1. From your regular workstation, open a web browser, go to the [AWS Elemental User Community](#), click **Downloads and Licenses**, and download the software for the version that you're going to.
2. Make a note of where downloads are stored on your workstation. For example:

```
h:/corporate/downloads/.
```

3. Make a note of the name of the download file. For example:
`elemental_production_conductor_file_2.16.0.123456.run`
4. Copy the download file from your workstation to `/home/elemental/` on one of the nodes. For example:
 - Use SFTP protocol and an FTP client application on your workstation computer. Connect to the IP address for AWS Elemental Delta on port 22 with the *elemental* user credentials and transfer the file.
 - Use SCP protocol and an SCP client application on your workstation computer. Copy the file with the *elemental* user credentials and transfer the file.
5. Repeat the download to any other nodes that are changing versions. If you're changing versions on several nodes, copy the download file to every hardware unit at once. Doing so reduces downtime on each node as you start installing the new software.

For detailed downloading steps, see [Downloading AWS Elemental Conductor File Software \(p. 16\)](#).

Step B: Prepare to Upgrade the AWS Elemental Conductor File Nodes

Upgrade the Conductor nodes before upgrading the worker nodes.

Back up the Database

We strongly recommend that you make a backup database.

1. On the AWS Elemental Conductor File web interface, choose **Configuration** (gear icon) on the main menu.

The **Conductor Configuration** screen appears showing the **General** tab.

2. Change the Minutes between database backups to **10** and choose **Save**.

A database backup will automatically be made in 10 minutes from now. The backup process takes less than 1 minute.

3. Make a note of the current time, so that you know when 10 minutes have passed.

Move Files

If the primary Conductor node has any custom AWS Elemental assets such as scripts, locate them and if they are in `/opt/elemental_se/web/public/script`, then back them up to a safe location, so that they are not deleted during the upgrade.

For detailed information on keeping backup files before the upgrade, see the article [Backup Files for Safekeeping/Upgrading/Downgrading](#).

(Conditional) Step C: Enable CPU Passthrough

Perform this step if you have Conductor File and AWS Elemental Server deployed on kernel-based virtual machines (KVMs).

Enable CPU passthrough so that the KVM can tell what CPU you're using. The AWS Elemental software installer could fail, or jobs remain in a pending state, if passthrough isn't enabled.

To enable CPU passthrough

1. At the Linux command line on the KVM host, use the following command to update the virtual machine configuration file.

```
sudo virsh edit hostname
```

where *hostname* is the name that you gave the virtual machine when you deployed it.

2. Go to the line that defines `cpu mode` and change it to **host-passthrough**.
3. Save and exit the editor.
4. Enable passthrough on all KVMs that you deployed.

Step D: Disable High Availability on the AWS Elemental Conductor File Nodes

Disable high availability prior to performing any changes on the Conductor nodes.

To disable high availability on the primary Conductor

1. From the Linux prompt, log in to the primary Conductor node with the *elemental* user credentials.
2. Enter the following command to configure the primary Conductor node for HA.

```
[elemental@hostname ~]$ sudo /opt/elemental_se/.support_utils/dbrepl disable
```

3. Restart the service using the following commands.

```
[elemental@hostname ~]$ sudo /etc/init.d/postgresql-9.4 restart  
[elemental@hostname ~]$ sudo /etc/init.d/elemental_se restart
```

4. Enter the following command to verify that Conductor high availability is disabled.

```
[elemental@hostname ~]$ tail -F /opt/elemental_se/web/log/conductor.output
```

The `conductor.output` log starts to scroll on the screen and shows messages as they are occurring. Watch for the following INFO lines on the primary Conductor node.

```
CONDUCTOR: Initializing environment  
I, [2015-11-13T04:37:54.491204 #4978] INFO -- : HA environment not enabled  
[2015-11-13 04:39:03 UTC SERVICE]: Elemental Conductor File 2.15.x.x
```

5. Type **Ctrl-C** to exit the `tail` command.
6. Enter the following commands.

```
[elemental@hostname ~]$ sudo -s
```

```
[elemental@hostname ~]$ cd /data/pgsql/logs
```

```
[elemental@hostname ~]$ tail -F postgresql-<day>.log
```

Where <day> is today (the day you are upgrading), typed with an initial capital letter: Mon, Tue, Wed, Thu, Fri, Sat, Sun

7. Confirm that you see this line.

```
database system is ready to accept connections.
```

Note

If the `elemental_se` or `postgres` process has already started when you starting tailing the logs, you might not see the `ready to accept connections` message. Instead, you could see `rejects connection for host` messages until you upgrade the worker nodes.

8. Type **Ctrl-C** to exit the tail command.
9. Type the following command to exit the session as the sudo user.

```
[elemental@hostname ~]$ exit
```

To disable high availability on the secondary Conductor

Repeat the high-availability steps on the secondary Conductor node, logged into the secondary Conductor node.

Step E: Stop Services

1. Stop two of the services on both of the Conductor nodes. Start a remote session on the secondary Conductor and enter these commands:

```
[elemental@hostname ~]$ sudo service elemental_se stop
```

As soon as you stop `elemental_se`, the Conductor node becomes de-activated (offline) so it isn't communicating with the worker nodes.

```
[elemental@hostname ~]$ sudo service httpd stop
```

As soon as you stop `httpd`, the Conductor web interface becomes unavailable.

2. Repeat on the primary Conductor.
3. Use the commands in step 1 to stop the services on all AWS Elemental Server nodes.

You have now stopped all nodes in the cluster. The web interface, REST API and scheduling features are stopped.

Step F: Upgrade the Conductor File Nodes

Upgrade the Primary

On the primary Conductor File node, upgrade the software.

1. From a Linux prompt, log in with the *elemental* user credentials. Once you're logged in, the initial directory is `/home/elemental`.
2. Run the installer with the skip-all option:

```
[elemental@hostname ~]$ sudo ./elemental_production_conductor_file_2.16.0.123456.run --skip-all --start
```

The installer automatically stops the software, if it's still running. The following prompts are skipped:

- You are not prompted to change the network setup (eth0 and eth1) or the Ethernet partitioning (setup of eth0 as a management interface).
- You are not prompted to choose the time zone.
- You are not prompted to enable or disable user authentication.

You *are* prompted to accept the EULA (end user license agreement).

The new software is installed and all services except `elemental_se` are automatically be restarted.

3. Make sure the `elemental_se` restarts on this node, otherwise you will not be able to upgrade the secondary Conductor node. Look for this prompt on the primary Conductor File command line:

```
Starting elemental_se:      [ OK ]
```

4. Refresh your web browser in order to load the updated web interface.
5. If you had previously copied a script to a safe location, now copy it back to its location in `/opt/elemental_se`.

Upgrade the Secondary

Repeat the upgrade steps on the secondary Conductor node, logged into the secondary Conductor node.

The command is:

```
[elemental@hostname ~]$ sudo ./elemental_production_conductor_file_2.16.0.123456.run --skip-all --start
```

Reset the Backup Schedule

If you changed the schedule for backups, change the schedule back to the previous value.

Step G: Re-enable High Availability on the AWS Elemental Conductor File Nodes

You must re-enable high availability on the Conductor nodes, to put the nodes back into a redundant configuration.

To enable high availability on the primary Conductor

1. From the Linux prompt, log in to the primary Conductor node with the *elemental* user credentials.
2. Enter the following command to configure the primary Conductor node for high availability.

```
[elemental@hostname ~]$ sudo /opt/elemental_se/.support_utils/dbrepl configure <dbrepl_config_file_name> primary
```

Where `<dbrepl_config_file_name>` is your `dbrepl_config.yml` file.

- Restart the `elemental_se` service.

```
[elemental@hostname ~]$ sudo /etc/init.d/elemental_se restart
```

- Enter the following command to verify that the service is running.

```
[elemental@hostname ~]$ tail -F /opt/elemental_se/web/log/conductor.output
```

The `conductor.output` log starts to scroll on the screen and shows messages as they are occurring. Watch for the following three INFO lines on the primary Conductor node.

```
CONDUCTOR: Initializing environment
I, [2015-11-13T04:37:54.491204 #4978] INFO -- : Configuring the HA environment
I, [2015-11-13T04:37:54.660644 #4978] INFO -- : configuring keepalived
I, [2015-11-13T04:38:03.905069 #4978] INFO -- : Preparing database as replication
  master
[2015-11-13 04:39:03 UTC SERVICE]: Elemental Conductor File 2.16.x.x
```

- Type **Ctrl-C** to exit the `tail` command.
- Enter the following commands.

```
[elemental@hostname ~]$ sudo -s
```

```
[elemental@hostname ~]$ cd /data/pgsql/logs
```

```
[elemental@hostname ~]$ tail -F postgresql-<day>.log
```

Where `<day>` is today (the day you are upgrading), typed with an initial capital letter: Mon, Tue, Wed, Thu, Fri, Sat, Sun

- Confirm that you see this line.

```
database system is ready to accept connections.
```

Note

If the `elemental_se` or `postgres` process has already started when you starting tailing the logs, you might not see the `ready to accept connections` message. Instead, you could see `rejects connection for host` messages until you upgrade the worker nodes.

- Enter **Ctrl-C** to exit the `tail` command.
- Type the following command to exit the session as the `sudo` user.

```
[elemental@hostname ~]$ exit
```

On the secondary Conductor

Repeat high availability steps on the secondary Conductor but use the following command instead.

```
[elemental@hostname ~]$ sudo /opt/elemental_se/.support_utils/dbrepl configure
<dbrepl_config_file_name> secondary
```


Step H: Upgrade the Worker Nodes

If you are running a cluster without backup worker nodes, upgrade your active worker nodes during a maintenance period. All activity on the node stops during an upgrade.

To upgrade the worker nodes

1. From the Linux prompt, log in with the *elemental* user credentials.
2. Run the installer as follows. Use the actual filename of the `.run` file you downloaded, rather than the example below.

For GPU and CPU versions of the software.

```
[elemental@hostname ~]$ sudo ./elemental_production_server_2.16.x.xxxxx.run -xeula --start -z
```

For CPU-only versions of the software.

```
[elemental@hostname ~]$ sudo ./elemental_production_server_cpu_2.16.x.xxxxx.run -t -n -xeula --start -z
```

For more details about upgrading worker nodes, see [AWS Elemental Server Upgrade Guide](#).

3. Answer the prompts as follows:

Prompt	Response
Remove this node from the Conductor system? [N]	No
What is the hostname or IP address of the cluster management node?	Enter the IP address of the management interface (typically eth0 or bond 0) on the primary Conductor node.
Trust this public key? [Y]	Yes

4. If you had previously copied a script to a safe location, now copy it back to its location in `/opt/elemental_se`.

To reboot the worker nodes

1. As soon as the installation is complete, restart the node.

```
[elemental@hostname ~]$ sudo reboot
```

On the Conductor web interface, a message appears to indicate that the node is deactivated (offline).

2. When the node has rebooted, the Conductor web interface displays a message to indicate the node is back online.
3. Refresh your web browser on the AWS Elemental Server node in order to load the updated web interface.
4. Repeat these steps on each worker node.

Sample Upgrade

Following is a screen printout of a typical upgrade, showing the prompts and possible responses.

```
[elemental@hostname ~]$ sudo sh ./elemental_production_conductor_file_2.16.0.12345.run --
skip-all
Verifying archive integrity... All good.
Uncompressing Elemental Installer.....
Network device eth0 already initialized...
Stopping Apache..
Checking Elemental System Update
Starting system update
New system update version: 25101
Skipping System Update, version 25101 has already been applied
Installing AWS Elemental Conductor File 2.16.1.12345
Network device eth0 already initialized...

Welcome to the product installation utility!
Version information:
  AWS Elemental Conductor File (CPU) 2.16.0.12345
  -----
  ruby 1.9.3p484 (2013-11-22 revision 43786) [x86_64-linux]
  Rails 3.2.17
  mysql Ver 14.14 Distrib 5.1.73, for redhat-linux-gnu (x86_64) using readline 5.1
  Elemental Git revision 543f5b87

Checking license files.
IMPORTANT INFORMATION
.
.
.
Continue? [Y] y

2. LICENSE AND RESTRICTIONS.
.
.
.
Continue? [Y] y

TERM AND TERMINATION. This Agreement is effective until terminated. This
.
.
.
Continue? [Y] y

.
.
.
Do you agree to these terms? [N] y
```

The AWS Elemental Conductor File services and the database are stopped.

```
Stopping services...
Starting mysqld: [ OK ]

Stopping mysqld: [ OK ]
Starting mysqld: [ OK ]
```

The software is updated.

```
Creating/Updating database...
```

```
Running migrations - this could take a while.
Database updated!
Database creation complete!
Loading Rails environment...
Adding node to database...
Saving settings...
Adding cluster stat monitors...
Adding node stat monitors...
Adding cluster scheduled tasks...
Adding node scheduled tasks...
Adding licensing scheduled tasks...
```

Files are verified.

```
Checking hardware and license files...
[2014-08-29 22:24:31 +0000 SERVICE]: 8 CPU cores available, max CPU load: 21.12

Hardware and license check complete
Creating default directory structures and data
Setting server defaults...
Checking user presets...
Checking user profiles...
Changing permissions and ownership...
Cleaning elemental_ipc...
Removing tmp...
Removing cached files
Configuring Apache...
Adding Elemental service...
Configuring log rotation...
Configuring SNMP...
Configuring dynamic libraries...
Configuring NTP...
Setting sysctl configuration and adding to /etc/rc.local...
Configuring Avahi...
```

Services are started.

```
Shutting down SMB services:           [ OK ]
Starting SMB services:                 [ OK ]

Setting CPU scaling governorStarting services...
Starting system logger:                 [ OK ]
Starting httpd:                         [ OK ]
Starting ntpd:                          [ OK ]
Shutting down Avahi daemon:             [ OK ]
Starting Avahi daemon...                 [ OK ]
Starting snmpd:                          [ OK ]
```

The user is prompted to start elemental_se.

```
Would you like to start the Elemental service now? [Y] y
Starting elemental_se:                   [ OK ]
Starting elemental-issue:                 [ OK ]

Installation and configuration complete!
Please open a web browser and point it to http://10.4.136.91 to get to the web
interface.
Enjoy!
[elemental@hostname ~]$
```

Downloading AWS Elemental Conductor File Software

These are the detailed steps for downloading files from the [AWS Elemental User Community](#).

1. Log in to the [AWS Elemental User Community](#) with the email address that you used to receive your activation email and your password. If you have not used your AWS Elemental user account before, set your password at <https://sso.elementaltechnologies.com/PasswordReset>.
2. From the home page, click **Software and Licenses** on the right.
3. From the **Download Central Home**, choose **Your Entitlements** from the **Software & Entitlements** menu.
4. On **Your Entitlements**, your orders are listed from newest to oldest. In the **Activation Key** column, choose the link for the product that you're downloading.
5. On **Order Detail**, choose the plus sign for the package listed in the **Product Description** column to expand the order details.
6. In the expanded details, choose the product and version that you wish to download.
7. In the list of available files, choose the file you wish to download.
8. On **Product Download**, select the check box next to the file you want to download. Then click **Download Selected Files**.
9. If you are prompted to install the NetSession Interface download manager, click **download the installer** and run the executable.
10. Select a location and save the files. Note the file location for later.

Cluster Downgrades in AWS Elemental Conductor File

In a Conductor cluster, downgrade the AWS Elemental Conductor File nodes first, and then downgrade each of the AWS Elemental Server nodes.

Downgrade rules

The following rules apply when you're downgrading.

- Your system must be in a working state prior to the downgrade. If it's in a degraded state (such as not accepting jobs or not responding through the web interface), the downgrade will not work.
- You can downgrade to a version that's a maximum of two major versions below your current version, such as from 2.16.x to 2.15.x. The number of patches between the two versions is irrelevant. To downgrade over a bigger span, you must perform several downgrades, such as from 2.16.0 to 2.15.4, then 2.13.2.

In a high availability deployment, you cannot downgrade back to version 2.6 or earlier. To return your cluster to 2.6 or earlier, perform a clean install.

The downgrade commands are the same, but the procedure around upgrades changes depending on your type of cluster. The following sections provide instructions for the different kinds of AWS Elemental Conductor File clusters.

Important

Plan to downgrade during a maintenance window. All activity on the nodes stops during the downgrade.

Summary

- [Step A: Locate the Software \(p. 17\)](#)
- [Step B: Disable High Availability on the AWS Elemental Conductor File Nodes \(p. 18\)](#)
- [Step C: Stop Services \(p. 19\)](#)
- [Step D: Downgrade the AWS Elemental Conductor File Nodes \(p. 20\)](#)
- [Step E: Re-enable High Availability on the AWS Elemental Conductor File Nodes \(p. 22\)](#)
- [Step F: Downgrade the Worker Nodes \(p. 23\)](#)

Step A: Locate the Software

1. Find the version of the software that you're downgrading to.

Follow these steps:

- a. From a Linux prompt, log in to the hardware until with the *elemental* user credentials.
- b. Look for the desired installer as shown here.

```
[elemental@hostname ~] ls
```

Look for the file named similar to this

```
...elemental_production_conductor_file_2.15.0.123456.run...
```

2. If you find the software, skip to [Step B: Disable High Availability on the AWS Elemental Conductor File Nodes \(p. 18\)](#).

If the software isn't on the hardware unit, go to the next step.

3. From your regular workstation, open a web browser, go to the [AWS Elemental User Community](#), click **Downloads and Licenses**, and download the software for the version that you're going to.
4. Make a note of where downloads are stored on your workstation. For example:

```
h:/corporate/downloads/.
```

5. Make a note of the name of the download file. For example:
`elemental_production_conductor_file_2.15.0.123456.run`
6. Copy the download file from your workstation to `/home/elemental/` on one of the nodes. For example:
 - Use SFTP protocol and an FTP client application on your workstation computer. Connect to the IP address for AWS Elemental Delta on port 22 with the *elemental* user credentials and transfer the file.
 - Use SCP protocol and an SCP client application on your workstation computer. Copy the file with the *elemental* user credentials and transfer the file.
7. Repeat the download to any other nodes that are changing versions. If you're changing versions on several nodes, copy the download file to every hardware unit at once. Doing so reduces downtime on each node as you start installing the new software.

Step B: Disable High Availability on the AWS Elemental Conductor File Nodes

If you have only one Conductor File node, skip to [Step C: Stop Services \(p. 19\)](#).

Disable high availability prior to performing any changes on the Conductor nodes.

To disable high availability on the primary Conductor

1. From the Linux prompt, log in to the primary Conductor node with the *elemental* user credentials.
2. Enter the following command to configure the primary Conductor node for HA.

```
[elemental@hostname ~]$ sudo /opt/elemental_se/.support_utils/dbrepl disable
```

3. Restart the service using the following commands.

```
[elemental@hostname ~]$ sudo /etc/init.d/postgresql-9.4 restart  
[elemental@hostname ~]$ sudo /etc/init.d/elemental_se restart
```

4. Enter the following command to verify that Conductor high availability is disabled.

```
[elemental@hostname ~]$ tail -F /opt/elemental_se/web/log/conductor.output
```

The `conductor.output` log starts to scroll on the screen and shows messages as they are occurring. Watch for the following INFO lines on the primary Conductor node.

```
CONDUCTOR: Initializing environment  
I, [2015-11-13T04:37:54.491204 #4978] INFO -- : HA environment not enabled  
[2015-11-13 04:39:03 UTC SERVICE]: Elemental Conductor File 2.15.x.x
```

5. Type **Ctrl-C** to exit the tail command.
6. Enter the following commands.

```
[elemental@hostname ~]$ sudo -s
```

```
[elemental@hostname ~]$ cd /data/pgsql/logs
```

```
[elemental@hostname ~]$ tail -F postgresql-<day>.log
```

Where <day> is today (the day you are upgrading), typed with an initial capital letter: Mon, Tue, Wed, Thu, Fri, Sat, Sun

7. Confirm that you see this line.

```
database system is ready to accept connections.
```

Note

If the elemental_se or postgres process has already started when you starting tailing the logs, you might not see the ready to accept connections message. Instead, you could see rejects connection for host messages until you upgrade the worker nodes.

8. Type **Ctrl-C** to exit the tail command.
9. Type the following command to exit the session as the sudo user.

```
[elemental@hostname ~]$ exit
```

To disable high availability on the secondary Conductor

Repeat the high-availability steps on the secondary Conductor node, logged into the secondary Conductor node.

Step C: Stop Services

Stop two of the services on both of the Conductor File nodes.

1. Start a remote session on the secondary Conductor File and enter these commands:

```
[elemental@hostname ~]$ sudo service elemental_se stop
```

As soon as you stop elemental_se, the Conductor node becomes de-activated (offline) so it isn't communicating with the worker nodes.

```
[elemental@hostname ~]$ sudo service httpd stop
```

As soon as you stop httpd, the Conductor web interface becomes unavailable.

2. Repeat on the primary Conductor File node.

You have now stopped both Conductor File nodes. The web interface, REST API and scheduling features are stopped.

Impact on Worker Nodes

As soon as the Conductor nodes stop, all the worker nodes will go into “headless” mode. Until the worker nodes get upgraded:

- You cannot control the worker nodes from the Conductor web interface.
- The web interfaces of the worker nodes will have limited functionality: you will only be able to start and stop existing events.

So, during headless mode, activity will continue on the worker nodes, but you will not be able to control the node.

Step D: Downgrade the AWS Elemental Conductor File Nodes

Choose clean database or restore previous database

When you downgrade, you must either clear your database entirely or provide a backup of a database created with the version of the software you are downgrading to.

For example, if you were running version 2.14 and created several profiles, then upgraded to 2.16 and now want to downgrade to 2.14 again, you can restore your 2.14 database when you downgrade. New profiles created in 2.16 will be lost, but those created in 2.14 will remain.

To use a database backup, locate the most recent backup of the version you are downgrading to. Backups are made on a regular basis (as specified in Settings > General on the Conductor web interface). The file has this syntax: `/home/elemental/database_backups/elemental-db-backup_<product_name>_n.n.n_yyy-mm-dd_hh-mm-ss.tar`

Example

```
elemental-db-backup_conductor_file_2.14.0_2016-12-02_21-01-36.tar
```

Perform the following steps on the AWS Elemental Conductor File hardware unit.

Downgrade the primary Conductor

1. From the Linux prompt, log in with the *elemental* user credentials. Once you are logged in, the initial directory is `/home/elemental`.
2. Enter the following command.

```
[elemental@hostname ~]$ chmod 755 elemental_production_conductor_file_2.14.n.nnnnn.run
```

3. Run the prepare for downgrade script.

```
[elemental@hostnmae ~]$ sudo /opt/elemental_se/web/script/prepare_for_downgrade.sh -i ./elemental_production_conductor_file_2.14.n.nnnnn.run
```

4. Run the installer.

- If you are restoring a previous database, use this command.

```
[elemental@hostname ~]$ sudo ./elemental_production_conductor_file_2.14.n.nnnnn.run -n -xeula --start --downgrade --restore-db-backup <path>
```


Where <path> is the path to the backup database, described above.

- If you are creating a new, empty database, use this command.

```
[elemental@hostname ~]$ sudo ./elemental_production_conductor_file_2.14.n.nnnnn.run -n -xeula --start --downgrade -c
```

Switches are as follows:

- -n: Skips the prompts to configure the network.
- -xeula: Skips the prompts to read through the EULA. You are prompted once to accept it.
- --start: Specifies to start the services without being prompted.
- --external-db: Make absolutely sure to include this option.
- -c: Clears the database.
- --restore-db-backup <path>: Installs the version old version of the database backup file. Provide the path and filename in the following format.

```
/home/elemental/elemental-db-backup_<date>_<version>.tar
```

Example

```
[elemental@hostname ~]$ sudo ./elemental_production_conductor_file_2.14.3.36542.run --downgrade --restore-db-backup /home/elemental/database_backups/elemental-db-backup_conductor_file_2.14.3.36542_2016-12-22_19-05-29.tar
```

5. Prompts appear to configure the cluster:

Prompt	Response
Configure this node as a secondary Elemental Conductor in an existing cluster?	Type No.
What is the database to use on the external database server?	Press Enter to accept the default.

6. Make sure the elemental_se restarts on this node, otherwise you will not be able to downgrade the secondary Conductor node. Look for this prompt on the primary Conductor command line.

```
Starting elemental_se: [ OK ]
```

7. Refresh your web browser in order to load the updated web interface.

When the install is complete, the primary Conductor restarts.

If you have only one Conductor node, skip to [Step F: Downgrade the Worker Nodes \(p. 23\)](#).

Downgrade the secondary Conductor

Repeat the downgrade steps on the secondary Conductor node, logged into the secondary Conductor node. The steps are identical to the steps for the primary node. The command is as follows. Use the actual filename of the .run file, rather than the example below.

```
[elemental@hostname ~]$ sudo ./elemental_production_conductor_file_2.14.n.nnnnn.run -n -  
xeula --start
```

Step E: Re-enable High Availability on the AWS Elemental Conductor File Nodes

If you have only one Conductor File node, skip to [Step F: Downgrade the Worker Nodes \(p. 23\)](#).

You must re-enable high availability on the Conductor nodes, to put the nodes back into a redundant configuration.

To enable high availability on the primary Conductor

1. From the Linux prompt, log in to the primary Conductor node with the *elemental* user credentials.
2. Enter the following command to configure the primary Conductor node for high availability.

```
[elemental@hostname ~]$ sudo /opt/elemental_se/.support_utils/dbrepl configure  
<dbrepl_config_file_name> primary
```

Where **<dbrepl_config_file_name>** is your `dbrepl_config.yml` file.

3. Restart the `elemental_se` service.

```
[elemental@hostname ~]$ sudo /etc/init.d/elemental_se restart
```

4. Enter the following command to verify that the service is running.

```
[elemental@hostname ~]$ tail -F /opt/elemental_se/web/log/conductor.output
```

The `conductor.output` log starts to scroll on the screen and shows messages as they are occurring. Watch for the following three INFO lines on the primary Conductor node.

```
CONDUCTOR: Initializing environment  
I, [2015-11-13T04:37:54.491204 #4978] INFO -- : Configuring the HA environment  
I, [2015-11-13T04:37:54.660644 #4978] INFO -- : configuring keepalived  
I, [2015-11-13T04:38:03.905069 #4978] INFO -- : Preparing database as replication  
master  
[2015-11-13 04:39:03 UTC SERVICE]: Elemental Conductor File 2.16.x.x
```

5. Type **Ctrl-C** to exit the `tail` command.
6. Enter the following commands.

```
[elemental@hostname ~]$ sudo -s
```

```
[elemental@hostname ~]$ cd /data/pgsql/logs
```

```
[elemental@hostname ~]$ tail -F postgresql-<day>.log
```

Where **<day>** is today (the day you are upgrading), typed with an initial capital letter: Mon, Tue, Wed, Thu, Fri, Sat, Sun

7. Confirm that you see this line.

```
database system is ready to accept connections.
```

Note

If the `elemental_se` or `postgres` process has already started when you starting tailing the logs, you might not see the `ready to accept connections` message. Instead, you could see `rejects connection for host` messages until you upgrade the worker nodes.

8. Enter **Ctrl-C** to exit the tail command.
9. Type the following command to exit the session as the sudo user.

```
[elemental@hostname ~]$ exit
```

On the secondary Conductor

Repeat high availability steps on the secondary Conductor but use the following command instead.

```
[elemental@hostname ~]$ sudo /opt/elemental_se/.support_utils/dbrepl configure  
<dbrepl_config_file_name> secondary
```

Step F: Downgrade the Worker Nodes

Downgrade

1. Enter the following command.

```
[elemental@hostname ~]$ chmod 755 elemental_production_server_2.14.n.nnnnn.run
```

2. Run the prepare for downgrade script.

```
[elemental@hostname ~]$ sudo /opt/elemental_se/web/script/prepare_for_downgrade.sh  
elemental_production_server_2.13.n.nnnnn.run
```

3. Downgrade the active worker nodes following these steps. See the [AWS Elemental Server Upgrade Guide](#).

Run the installer with the `skip-all` option. Use the following commands with the actual filename of the `.run` file, rather than the example below.

```
[elemental@hostname ~]$ sudo ./elemental_production_server_2.14.x.xxxxx.run --skip-all  
-xeula --start --cleandb --downgrade
```

Where:

- `--skip-all`: Skips the configuration prompts you followed the first time you installed. The existing configuration is unchanged.
- `-xeula`: Skips the prompts to read through the EULA. You are prompted once to accept it.
- `--start`: Specifies to start the services without being prompted.
- `--cleandb`: Deletes the existing database from the node. When the node is brought back into the cluster, it will start using the Conductor node's database. It is essential to include this switch in order to force the worker node to use that database!
- `--downgrade`: Tells the installer that an earlier version is being installed.

4. Answer the prompts as follows:

Prompt	Response
Remove this node from the Conductor system?	Type No .
What is the hostname or IP address of the cluster management node?	Type the IP address of the management interface (typically eth0 or bond 0) on the primary Conductor node.

Downgrade the AJA Card Firmware

Follow this step only if you have worker nodes that have the 8-port SDI card (AJA Corvid 4000 or AJA Corvid 8000 card). Use the actual filename of the `.run` file, rather than the example below.

```
[elemental@hostname ~]$ sudo ./elemental_production_server_2.14.x.xxxxx.run --skip-all -  
xeula --start --cleandb --downgrade
```

Reboot

1. As soon as the installation is complete, restart the node.

```
[elemental@hostname ~]$ sudo reboot
```

On the Conductor web interface a message appears to indicate the node is deactivated (offline).

2. When the node has rebooted, the Conductor web interface displays a message to indicate the node is back online.
3. Refresh your web browser on the worker node in order to load the updated web interface.
4. Repeat these steps on each worker node.

Performing a Clean Install of AWS Elemental Conductor File

This appendix describes how to perform a clean install of the software. This type of downgrade involves re-installing the kickstart on all of the nodes.

Plan to downgrade during a maintenance period because all activity on the nodes will stop during downgrade.

Same procedure to install AWS Elemental Server and AWS Elemental Conductor File

The procedure for downgrading AWS Elemental Server and AWS Elemental Conductor File is the same; only the file name is different. The procedure for downgrading the version of the product is also the same for every version; only the version numbers in the file name change.

It does not matter whether you install AWS Elemental Server or AWS Elemental Conductor File first.

In this procedure, we illustrate how to downgrade to AWS Elemental Conductor File version 2.14.0.12345.

Summary

- [Step A: Get Ready for the Install \(p. 25\)](#)
- [Step B: Install \(Kickstart\) the Operating System Software \(p. 26\)](#)
- [Step C: Install the AWS Elemental Software \(p. 27\)](#)
- [Step D: Restore Saved Files \(p. 29\)](#)
- [Step E: Configure the Node \(p. 29\)](#)

Step A: Get Ready for the Install

Save Your Files

During the kickstart part of a clean install, all the files on the node are permanently deleted. Before you begin, you must first copy important files to another location.

1. Locate the following files on the node, in the `/home/elemental` directory:

- The installer for the Elemental software version you are downgrading to.

Example: `elemental_production_conductor_file_2.14.0.12345.run`

If you do not have this file, you can download it again on the [AWS Elemental User Community](#) as described below.

- Your license file or files. They will either be a set of `.lic` files or a single `.tgz` file.
- Any custom scripts or other assets you wish to keep.

2. Copy these files to a directory on another system. For example:
 - Use Windows Share protocol: Connect to `\\<node IP>\elemental` on a PC.
 - Use Samba: Connect to `smb://<node IP>/elemental` on a Mac.

Download Files

Download the installation files for each unique AWS Elemental product that you're using.

To download installation files

1. Log in to the [AWS Elemental User Community](#) and follow the prompts to navigate to your files. For detailed steps to download installation files, see [Downloading AWS Elemental Conductor File Software \(p. 16\)](#).
2. Download your files.

You need the following files for each unique piece of AWS Elemental software that you're installing.

- A kickstart (`.iso`) file for creating a USB boot drive. For example, `centos-20161028T12270-production-usb.iso`.

You use this file to put a preconfigured installation of your operating system on your physical machine.

- An installation (`.run`) file for the AWS Elemental software itself. For example, `elemental_production_conductor_file_2.15.3.44452.run`.

Make sure that you download the right version of software for the processing architecture that you need, either CPU-only or GPU-enabled.

For example, if you're installing AWS Elemental Conductor File on two systems and AWS Elemental Server on five systems, you need to download two `.iso` files and two `.run` files.

Step B: Install (Kickstart) the Operating System Software

You must install a configured operating system from an `.iso` file onto each physical machine that will be running AWS Elemental software. Doing so is referred to as “kickstarting the system”.

Make sure that you install the right version of the operating system with each piece of software. The correct `.iso` file is always provided with the `.run` file on the [AWS Elemental User Community](#).

Create a Boot USB Drive or DVD

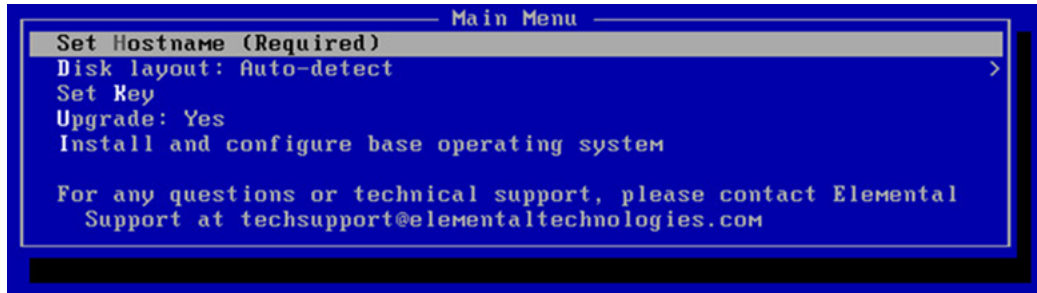
Do this from your workstation.

Use a third-party utility (such as PowerISO or ISO2USB) to create a bootable DVD or USB drive from your `.iso` file. Instructions for using these utilities can be found in the [AWS Elemental User Community](#) knowledge base.

Install the Operating System at Each Node

Do this from each Elemental node.

1. Insert the DVD or USB thumb drive into the hardware unit.
2. Boot up or reboot the system. The installer automatically starts.



3. Use the arrow keys to select each option and do the following:

Menu Option	Instructions
Set Hostname	Change the hostname to a useful name such as conductor-file-01 or conductor-file-chicago-01 . Do not use localhost as the hostname! Do not use periods or underscores in the hostname
Disk layout: Auto-detect	Leave this set at Auto-detect.
Set Key	Press the down arrow to skip this option.
Upgrade	Choose No . Choosing No deletes all data from the hardware unit. Never choose Yes when doing a new install.
Install and configure base operating system	Press Enter to begin the OS installation.

The operating system is installed. From now on, the system runs this customized version of your Linux operating system.

4. Repeat the above steps on each system, using the `.iso` file that goes with the AWS Elemental software you are installing on each system.

Step C: Install the AWS Elemental Software

1. At the Linux command line, log in with the user `elemental` user credentials.

Run the installer as follows. Use the actual file name of your `.run` file, rather than as shown in the example which follows.

```
[elemental@hostname ~]$ sudo sh ./elemental_production_conductor_file_2.15.nnnnn.run -l  
-z -t
```

where `-l` is a letter, not a number.

2. You are prompted as described in the table below.

Prompt	Action
Do you agree to these terms?	This prompt appears after you have paged through the EULA (End User License Agreement). Enter Yes or No . (You must enter Yes to continue.)
Enter this server's Hostname	Type the hostname of this hardware unit. For example, conductor-file-01
Is eth0 a management interface?	Type Yes .
Does eth0 use DHCP to get its IP address?	Type Yes to use DHCP or type No to enter a static IP address. If you plan to bond eth0 and eth1 (which you will set up in a later phase), we recommend that you enter a static IP address and set up eth0, eth1, and bond0 all on the same subnet.
Enter eth0's IP address:	If you chose static, type the IP address for this hardware unit.
Enter eth0's NETMASK:	If you chose static, type the netmask for this hardware unit.
Enter eth0's Gateway (or type none):	If you chose static, type none or type the gateway for this hardware unit.
Keep this configured nameserver: 10.6.16.10?	Skip; you set up a nameserver in the next phase of configuration.
Would you like to configure eth1?	Type No ; you can configure eth1 in the next phase of the configuration.
The firewall for this system is currently disabled. Would you like to enable it?	Skip; you set up the firewall in the next phase of configuration.
Select time zone ('n' for more)	Enter the time zone you want to show on the web interface of the nodes. This setting does not affect activity via SSH or via the REST API.
Would you like to start the Elemental service now?	Type Yes .

Then the software is installed. Finally, this message appears and confirms that installation and configuration are complete:

```
Installation and configuration complete!
Please open a web browser and point it to http://xxx.xxx.xxx.xxx to get to the web
interface.
Enjoy!
```

3. Start a web browser and start the AWS Elemental Conductor File web interface by typing:


```
http://<hostname>
```

Make sure the web interface displays.

Step D: Restore Saved Files

Now that you have a clean install of the operating system and AWS Elemental software on each node, copy the files that you saved in [Step A: Get Ready for the Install \(p. 25\)](#) back to their original locations on the nodes.

Step E: Configure the Node

Now that each system has the appropriate software installed, see [AWS Elemental Conductor File Configuration Guide](#) for instructions on bringing your worker nodes into a cluster controlled by the Conductor.

Document History for Upgrade Guide

The following table describes the documentation for this release of AWS Elemental Conductor File.

- **API version:** 2.16
- **Release notes:** [AWS Elemental Conductor File Release Notes](#)

The following table describes the documentation for this release of AWS Elemental Conductor File. For notification about updates to this documentation, you can subscribe to an RSS feed.

update-history-change	update-history-description	update-history-date
Version 2.16 release (p. 1)	Changes to support the 2.16 software release.	January 2, 2020