



# EMC<sup>®</sup> VNXe<sup>®</sup> Series

Version 3.1

## Upgrading the VNXe Software

302-002-410 REV 02

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Published December, 2015

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# CHAPTER 1

## Introduction

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## About this document

This document provides information that you can use to understand, plan, and upgrade the Operating Environment software, Disk Firmware, and Language Packs installed on your EMC® VNXe® storage system. It also includes information on some of the common issues that can interrupt the upgrade and associated troubleshooting procedures.

## VNXe overview

EMC® VNXe® is a simple, yet powerful hybrid-storage system that delivers enterprise class reliability and data availability. It provides a solution that is easy to install, manage, service, and support. The enterprise-level features include Unified Snapshots, Multicore Cache, Multicore RAID, FAST Cache, FAST VP, and many other provisioning and monitoring features that support a wide range of workloads such as databases, files, and virtual machines. Along with enhanced native iSCSI protocol support, the VNXe also supports Fibre Channel (FC) protocol, and expanded IPv6 functionality.

## Types of software updates

The storage system can have the following types of software updates:

- Operating Environment (OE) software (also called, Unisphere)
- Disk firmware
- Language packs

Note the following:

- Software updates are available in an encrypted binary file format (.gpg). The encryption ensures that the contents of the file are valid and not corrupted.
- OE software updates sometimes include disk firmware upgrades. Such upgrades may take a bit longer to complete.
- Language packs are associated to a relevant VNXe OE version.
- Disk firmware versions do not match the VNXe OE versions.

## Software update notifications

When a software update is available, an alert will appear in the Unisphere user interface. Go to the EMC Online Support website, and then visit the Downloads page for more information. To receive automatic email notifications about available software updates, select **Settings** > **More configuration** > **Alert Settings** and enter one or more email addresses and the network name or IP address of your SMTP server.

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### Note

You do not have to provide EMC Support credentials in order to discover what VNXe software is available on the EMC Online Support website. The storage system will automatically query on a weekly basis, or every time the management software restarts, and will provide the alert at that time when a newer version is available.

---

## Information on changes and new features in a release

The Release Notes document includes information on the enhancements, fixed issues, and known issues in a release. When applicable, it also includes information on specific upgrade instructions or considerations for a release.

### Locate the Release Notes

The Release Notes document is available on the EMC Online Support Web site. To view a Release Notes document:

1. Obtain the VNXe Operating Environment or software version for the Release Notes.
2. In Unisphere, click **Support** > **Need More Help?** > **Product Support Page**.
3. Under the **Search** bar, click **Documentation**.
4. On the **Documentation** page, click **Release Notes** under **Content Type** in the left navigation pane.
5. Scroll to the Release Notes document for the version you want.



# CHAPTER 2

## Plan the upgrade

This chapter includes information that you must review before performing an upgrade:

- [Upgrade readiness considerations](#)..... 10
- [Common issues that can interrupt an upgrade](#)..... 10
- [Time needed to complete an upgrade](#)..... 11
- [I/O activities during an upgrade](#)..... 11

## Upgrade readiness considerations

At this time, there is no back out plan from an upgrade. Once you start the upgrade process, you must finish it. Before you start the upgrade, consider the following:

- When you upload a new upgrade file onto your system, it replaces the previously uploaded version. There can only be one upgrade candidate on the system at a time.
- Do not use Unisphere or the CLI to change the VNXe configuration when an upgrade is in progress.
- Unisphere may be temporarily disconnected during the upgrade. Access to Unisphere is automatically re-established after the upgrade completes.
- EMC strongly suggests you perform a system health check about a week before installing an upgrade, to ensure that you have time to resolve underlying problems that may prevent a successful update.
- Ensure that all I/O routines are complete before committing to the upgrade operation. This may not be necessary for systems in a dual storage processor (SP) configuration because the failover and caches will take care of the uncommitted I/O routines.
- Any hot fixes installed prior to the upgrades are automatically removed during the upgrade. If the hot fix is not included in the upgrade, ensure that you install the hot fix again after the upgrade. Refer to the relevant Release Notes to ensure that the issue addressed by the hot fix is included as a fixed issue in the new VNXe OE software version.

## Common issues that can interrupt an upgrade

The following common issues may interrupt an upgrade:

- **Faulted component**

If a component has faulted, an alert may already be present in Unisphere. You can also check for any faulted components in the System Health page of Unisphere. Once you identify the component, make the necessary replacements, and then try running the upgrade again.

Before you start the upgrade process, it is recommended that you perform a pre-upgrade health check. It checks for any hardware faults and the health of the file system. Ensure that there are no issues reported. For more information on running the pre-upgrade health check, see [Perform a system health check on page 14](#).
- **Incompatible software update file**

Some software upgrades require that you are running on a specific version. Refer to the Release Notes document associated with the software update. For more information, see [Information on changes and new features in a release on page 7](#).
- **Corrupt software update file**

Use the MD5 checksum method to confirm whether the software update file is corrupt. For more information, see [Verify that the upgrade file is not corrupted on page 26](#)

If the file is corrupted, download the software update one more time, verify it using MD5 checksum, and then proceed with the upgrade.

It is recommended that you always verify that the software update file is valid and not corrupt using the MD5 checksum.

- **Large and complex configurations**

The pre-upgrade health check may fail if the system exceeds the total number of allowed file systems and snapshots. Refer to the Unisphere Online Help for more information on such limitations.

When this occurs, the system will recommend that users delete some of the snapshots to enable the upgrade.

## Time needed to complete an upgrade

The total estimated time for an upgrade is around 1 hour and 15 minutes. It may change based on the I/O activities and other factors specific to your environment. Do not take actions, such as closing and opening the Web browser or power cycling the SPs in the middle of an upgrade.

The upgrade retains your existing configuration settings. This includes the IP addresses you configured for the system (static or dynamic).

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### Note

OE software updates sometimes include disk firmware updates. In such cases, the upgrade may take a bit longer to complete.

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## I/O activities during an upgrade

Unisphere may be temporarily disconnected during the upgrade. Once the upgrade is complete, it will automatically be reconnected.

It is recommended that you quiesce all IO activity before you proceed with the upgrade. The upgrade may be disruptive in the following scenario. For the following cases, perform the upgrades during maintenance windows:

- Major software updates may include changes to the VNXe high availability and cluster services. When upgrading to such software versions, there may be some downtime required.
- In the case of large and complex configurations, the pre-upgrade health check may fail if the system exceeds the total number of allowed file systems and snapshots. When this occurs, the system will recommend that users delete some of the snapshots to enable the upgrade.
- In some cases, the ESX servers may require manual refreshes to reconnect to the datastores.

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### Note

Disk firmware and language pack upgrades are not disruptive.

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Plan the upgrade

# CHAPTER 3

## Perform the upgrade

This chapter contains the following topics:

- [Upgrade the OE software](#)..... 14
- [Upgrade the disk firmware](#)..... 15
- [Install a language pack](#)..... 16

## Upgrade the OE software

Complete the following steps:

1. [Perform a system health check on page 14](#)
  2. [Download the latest version of the software on page 14](#)
  3. [Upload the upgrade file on page 14](#)
  4. [Install the upgrade on page 15](#)
- 

### Note

Updates are needed when a new version or patch is released, or when new information is discovered. Any hot fixes installed prior to the upgrades are automatically removed during the upgrade. If the hot fix is not included in the upgrade, ensure that you install the hot fix again after the upgrade. Refer to the relevant Release Notes to ensure that the issue addressed by the hot fix is included as a fixed issue in the new VNXe OE software version.

---

## Perform a system health check

A health check is a series of checks on the state of your storage system. Performing a system health check helps ensure that no underlying problems exist that may prevent a successful update.

### Procedure

1. Click **Settings** > **More configuration** > **Update Software**.
2. Click the **Software** tab.
3. Click **Perform Health Check**. The **Health Check** dialog box appears.
4. Click **Run**. If the health check fails, you must resolve the problem before performing an update.
5. After the health check completes, click **Close**.

## Download the latest version of the software

### Procedure

1. In Unisphere, click **Settings** > **More configuration** > **Update Software**.
2. In the **Software** tab, click **Obtain Candidate Version Online**. This link takes you to the EMC Online Support website where you can download an update to your local system.
3. Save the upgrade file to the computer from which you are running Unisphere.

### Note

Do not change the name of the file.

## Upload the upgrade file

### Procedure

1. Click **Settings** > **More configuration** > **Update Software**.

2. Click the **Software** tab.
3. Click **Upload Candidate Version**.
4. Locate the update file on your local machine and click **Open**. The update file is uploaded from the client where you are accessing Unisphere to the storage system.  
At this time, the update file has only been saved to the storage system but has not been installed.

## Install the upgrade

### Procedure

1. Click **Settings** > **More configuration** > **Update Software**.
2. In the **Software** tab, click **Install Candidate Version**.

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#### Note

This button appears only if you have already uploaded an update file to VNXe. The Software Update dialog box appears.

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3. Click **Install**. VNXe performs a health check to ensure that the update can occur.

---

#### Note

If the pre-update health check fails, you need to resolve the problem before performing the installation.

---

4. After VNXe has finished installing the update, click **Close**.

## Upgrade the disk firmware

Complete the following steps:

1. [Download the disk firmware on page 15](#)
2. [Install the disk firmware on page 15](#)

## Download the disk firmware

### Procedure

1. In Unisphere, click **Settings** > **More configuration** > **Update Software**.
2. Click the **Disk Firmware** tab.
3. Click **Obtain Disk Firmware Online**. This link takes you to the EMC Online Support website where you can download a disk firmware file to your local system.

## Install the disk firmware

### Procedure

1. Click **Settings** > **More configuration** > **Update Software**.
2. Click the **Disk Firmware** tab.
3. Click **Install Disk Firmware**. A **Browse** dialog box appears.
4. Select the disk firmware file that you downloaded from the EMC Online Support website.

5. Click **Upload**. The disk firmware is uploaded to the VNXe storage system and installed on the system.

## Install a language pack

Complete the following steps:

1. [Download the language pack on page 16](#)
2. [Install the language pack on page 16](#)

## Download the language pack

### Procedure

1. In Unisphere, click **Settings** > **More configuration** > **Update Software**.
2. Click the **Languages** tab.
3. Click **Obtain Language Pack Online**. This link takes you to the EMC Online Support website where you can download a language pack file to your local system.
4. Click a language pack file displayed on the EMC Online Support website and save the file to the computer from which you are running Unisphere.

## Install the language pack

### Procedure

1. Click **Settings** > **More configuration** > **Update Software**.
2. Click the **Languages** tab.
3. Click **Install Languages**. A browse box opens.
4. Select the language pack file that you downloaded from the EMC Online Support website.
5. Click **Upload**. The language pack is uploaded to the VNXe storage system and installed on the system.
6. Click **Settings** > **Preferences** to enable the new language pack on your system.
7. In the **General Preferences** section, select the preferred language from the Language list.
8. Click **Apply**.

# CHAPTER 4

## Unisphere CLI commands

This chapter describes the following upgrade-related CLI commands:

- [Upgrade the system software](#)..... 18
- [Associated CLI command](#)..... 22

## Upgrade the system software

Create an upgrade session to upgrade the system software or view existing upgrade sessions. The upgrade session installs an upgrade candidate file that was uploaded to the system. Download the latest upgrade candidate from the support website. Use the `-upload` switch to upload it to the system before creating the upgrade session.

The latest software upgrade candidate contains all available hot fixes. If you have applied hot fixes to your system, the hot fixes will be included in the latest upgrade candidate.

### Note

All system components must be healthy, prior to upgrading the system software. If any system components are degraded, the software update will fail. [Perform a system health check on page 19](#) explains how to run a health check on the system.

The following table lists the attributes for upgrade sessions.

**Table 1** Upgrade session attributes

Attribute	Description
Status	Current status of the upgrade session. Value is one of the following: <ul style="list-style-type: none"> <li><code>running</code> — Session is upgrading the system software.</li> <li><code>completed</code> — Session has completed upgrading the system software.</li> <li><code>failed</code> — Upgrade session has failed.</li> </ul>
Progress	Current progress of the upgrade session.
Creation time	Date and time when the upgrade session was created.
Elapsed time	Amount of time that the upgrade session has been running.
Estimated time left	Estimated time required to complete the upgrade session.

## View system software versions

Display details about the version of the installed system software and the software upgrade candidate that has been uploaded to the system. [Upgrade the system software on page 18](#) explains how to upgrade the system software. The following table lists the system software attributes.

**Table 2** System software attributes

Attribute	Description
ID	ID of the system software.
Type	System software type. Value is one of the following: <ul style="list-style-type: none"> <li><code>installed</code> — System software that is currently installed on the system.</li> </ul>

**Table 2** System software attributes (continued)

Attribute	Description
	<ul style="list-style-type: none"> <li>candidate — Upgrade candidate uploaded to the system for upgrading the system software.</li> </ul>
Version	Software version.
Release date	Software release date.
Image filename	Filename of the software image.

**Note**

The [show action command on page 22](#) explains how to change the output format.

**Format**

```
/sys/soft/ver [{"-id <value>|-type {installed|candidate}}] show
```

**Object qualifier**

Qualifier	Description
-id	Type the ID of the system software.
-type	Type the software type. Value is one of the following: <ul style="list-style-type: none"> <li>installed — View the version of the system software that is installed.</li> <li>candidate — View the version of the system software upgrade candidate that was uploaded to the system.</li> </ul> <hr/> <b>Note</b> Values are case-insensitive.

**Example**

The following command displays details about the installed system software and an uploaded upgrade candidate:

```
uemcli -d 10.0.0.1 -u Local/joe -p MyPassword456! /sys/soft/ver show
```

```
Storage system address: 10.0.0.1
Storage system port: 443
HTTPS connection

1:      ID          = INST_1
        Type         = installed
        Version      = 0.1.0.1487
        Release date = 2009-04-30

2:      ID          = CAND_1
        Type         = candidate
        Version      = 0.1.0.2187
        Release date = 2009-11-14
```

## Perform a system health check

Perform a health check of the entire system. A health check is a series of checks on the state of your system to ensure that no underlying problems exist.

**Note**

Before upgrading the system software, a system health check must be performed. All system components must be healthy prior to upgrading the system software. If any of the system components are degraded, the software update will fail.

**Format**

```
/sys/general healthcheck
```

**Example**

The following command performs a health check of the system:

```
uemcli -d 10.0.0.1 -u Local/joe -p MyPassword456! /sys/general healthcheck
```

```
Storage system address: 10.0.0.1
Storage system port: 443
HTTPS connection

1:      Error code = tform::check_for_mirror_rebuild_3

2:      Error code = flr::check_for_transitions_3

Operation failed. Error code: 0x6000cbc
One or more of the health checks failed. Please refer to Knowledge
Base for information on how to resolve these error(s). (Error Code:
0x6000cbc)
```

## Upload and upgrade candidate

To upgrade the system software, upload an upgrade candidate file that you download from the support website and use the `-upload` qualifier. Once you upload the candidate file to the system, use an upgrade session to start the upgrade process. [Create upgrade sessions on page 21](#) explains configuring upgrade sessions.

**Prerequisites**

Download the latest system software upgrade candidate from the support website.

**Format**

```
uemcli -d 10.0.0.1 -u Local/joe -p MyPassword456! -upload -f <file> upgrade
```

**Options**

Qualifier	Description
<code>-f</code>	Type the path and file name of the upgrade candidate file to upload. Wrap the path and file name in quotes.

**Example**

The following example upload a upgrade candidate file to the system:

```
uemcli -d 10.0.0.1 -u Local/joe -p MyPassword456! -upload -f "\
\upgrade_image\upgrade-2.0.0.12190-MAGNUM-RETAIL.tgz.bin" upgrade
```

```
Storage system address: 10.0.0.1
Storage system port: 443
HTTPS connection
```

```
Operation completed successfully.
```

## Create upgrade sessions

Create a session to upgrade the system software with an uploaded upgrade candidate.

### ⚠ CAUTION

**Do not use Unisphere or Unisphere CLI to manage or configure the system during a software upgrade.**

#### Format

```
/sys/soft/upgrade create -candId <value>
```

#### Action qualifiers

Qualifier	Description
-candId	Type the ID of the uploaded upgrade candidate. <a href="#">View system software versions on page 18</a> explains how to view the ID of the uploaded software candidate.

#### Example

The following command creates a session to upgrade the system software to upgrade candidate CAND\_1:

```
uemcli -d 10.0.0.1 -u Local/joe -p MyPassword456! /sys/soft/upgrade create -candId CAND_1
```

```
Storage system address: 10.0.0.1
Storage system port: 443
HTTPS connection
```

```
ID = UPGSES_1
Operation completed successfully.
```

#### Note

All warning messages, if any, appear the first time you run the upgrade process. When a potential issue results in a warning message, the upgrade process stops. Once you review the warning message, run the upgrade command again to continue with the upgrade process. This time the upgrade process will run the checks again, but it will not stop for any warnings. The upgrade process will only stop when an error occurs.

## View upgrade sessions

View details for an existing software upgrade session.

#### Note

[The show action command on page 22](#) explains how to change the output format.

#### Format

```
/sys/soft/upgrade show
```

#### Example

The following command displays details about the system software upgrade session:

```
uemcli -d 10.0.0.1 -u Local/joe -p MyPassword456! /sys/soft/upgrade
show
```

```
Storage system address: 10.0.0.1
Storage system port: 443
HTTPS connection

1:      Status           = Running
      Status message    =
      Creation time     = 2009-11-09 19:43:08
      Elapsed time      = 01h 43m 08s
      Estimated time left = 01h 10m 00s
      Progress          = Task 5 of 25 (Stopping c4 stack on SPA)
      Percent complete   = 15%

2:      Status           = Failed
      Status message    = Stopping c4 stack on SPA timeout expired
      Creation time     = 2009-11-09 18:04:12
      Elapsed time      = 00h 20m 08s
      Estimated time left =
      Progress          = Task 5 of 25 (Stopping c4 stack on SPA)
      Percent complete   = 15%
```

## Associated CLI command

### The show action command

The `show` action command displays a list of objects that exist on the system and the attributes of those objects. You can specify an object qualifier to view the attributes for a single object. The `show` action command provides qualifiers for changing the display of the output, including the format and the attributes to include. The available output formats are name-value pair (NVP), table, and comma-separated values (CSV).

#### Format

```
uemcli [<switches>] <object> [<object qualifier>] show [{-
detail | -brief | -filter <value>}] [-output {nvp | table [-
wrap] | csv}]
```

#### Action qualifier

Qualifier	Description
-output   -o	<p>Specify the output format. Value is one of the following:</p> <ul style="list-style-type: none"> <li><code>nvp</code> — The name-value pair (NVP) format displays output as <code>name=value</code>. <a href="#">Name-value pair format on page 23</a> provides an example of the NVP format.</li> <li><code>table</code> — The table format displays output as a table, with column headers and rows. By default, values that are too long to fit in a column are cut off. Add <code>-wrap</code> after the table qualifier, separated by a space, so that the values wrap. <a href="#">Table format on page 23</a> provides an example of the table format.</li> <li><code>csv</code> — The comma-separated values (CSV) format is similar to the table format, but the names and values are separated by commas. <a href="#">Comma-separated values format on page 23</a> provides an example of the CSV format.</li> </ul>

Qualifier	Description
-detail	Display all attributes.
-brief	Display only the basic attributes (default).
-filter	Comma-separated list of attributes which are included into the command output.

### Name-value pair format

```

1:      ID          = la0_SPA
        SP          = SPA
        Ports       = eth0_SPA,eth1_SPA
        Health state = OK (5)

2:      ID          = la0_SPB
        SP          = SPB
        Ports       = eth0_SPB,eth1_SPB
        Health state = OK (5)

```

### Table format

```

ID      | SP  | Ports                | Health state
-----+----+-----+-----
la0_SPA | SPA | eth0_SPA,eth1_SPA | OK (5)
la0_SPB | SPB | eth0_SPB,eth1_SPB | OK (5)

```

### Comma-separated values format

```

ID,SP,Ports,Health state
la0_SPA,SPA,"eth0_SPA,eth1_SPA",OK (5)
la0_SPB,SPB,"eth0_SPB,eth1_SPB",OK (5)

```

### Example

The following command modifies the set of attributes in the show action output. For example, if you add `-filter "ID,ID,ID,ID"` to the command, in the output you will see four lines with the "ID" attribute for each listed instance:

```

1:  ID = la_0
    ID = la_0
    ID = la_0
    ID = la_0

```

```
uemcli /net/nas/server show -filter "ID, SP, Health state, ID, Name"
```

### Filter format

```

Storage system address: 10.0.0.1
Storage system port: 443
HTTPS connection

1:      ID          = nas_1
        SP          = SPA
        Health state = OK (5)
        ID          = nas_1
        Name        = Mynas1

2:      ID          = nas_2
        SP          = SPA
        Health state = OK (5)

```

## Unisphere CLI commands

```
ID          = nas_2  
Name       = Mynas2
```

# CHAPTER 5

## Troubleshooting upgrade issues

This chapter contains the following topics:

- [Unable to upload the upgrade file](#)..... 26
- [Verify that the upgrade file is not corrupted](#)..... 26
- [Upgrade failed. What next?](#).....26

## Unable to upload the upgrade file

### Procedure

- Ensure that the upgrade file name is correct.  
The upgrade file name must match the name of the upgrade file listed on the EMC Online Support website. If you tried to download the file more than once, it may have a [1] suffix in the file name. This may lead to VNXe recognizing it as an invalid file.
- Log on to Unisphere in a different Web browser and try uploading the file again.
- If this does not work, try restarting the Unisphere software by doing the following:
  - In Unisphere, go to **Settings** > **Service System** > **Restart Management Software**.

## Verify that the upgrade file is not corrupted

You can verify the upgrade file using the checksum available with each upgrade file on the EMC Online Support website. To verify that the downloaded upgrade file is not corrupt:

### Procedure

1. Note the checksum value for the upgrade file from the EMC Online Support website.

---

#### Note

The checksum value appears when you click the Checksum link that appears with each downloadable upgrade file listed on the Downloads page of the EMC Online Support website for VNXe series.

---

2. On the system where the upgrade file is downloaded, do one of the following:
  - On a Linux-based system, run the command: `md5sum <downloaded upgrade file name>`.
  - On a Windows-based system, use one of the open source or freeware applications to calculate the checksum value.
3. Compare the checksum value generated for the upgrade file with the one you noted in [Step 1 on page 26](#).

Matching values indicate the upgrade file is intact and not corrupt.

## Upgrade failed. What next?

### Procedure

- Review [Common issues that can interrupt an upgrade on page 10](#).
- For upgrades that failed to start – A corrupted upgrade image may have caused this problem. Download a new image from the EMC Online Support website and run the upgrade again.
- For upgrades that terminated unexpectedly – Go to **Settings** > **More configuration** > **Update Software** and review information about the upgrade candidate. Try running the upgrade again.

- For upgrades that failed – The **Software Update** dialog box lists the errors the system encountered during the update. Go to **Settings > More configuration > Update Software** and review information about the upgrade candidate. Try running the upgrade again.
- If you recently added new hardware, new disks and other similar hardware components, they may be on an incompatible image. Plan downtime and restart the entire system. When system starts up, during the power-on self test, it will check for new firmware images and update all or any parts to latest images as required, self-healing the box. Once this is complete, try running the upgrade again.

### **After you finish**

Before contacting support, access the Unisphere Online Help (click the Help icon in the top-right corner of the Unisphere screen) or the knowledge base in the EMC Online Support website for more information on steps you can take to fix the issue.

If none of the options above help resolve the issue, do not apply in your scenario, or if you are not sure about the issue causing the failure, go to **Support > Need more help? > Live Chat** to chat with support personnel. If this option is not available, contact your service provider.

