EMC UNISPHERE FOR VNXe: NEXT-GENERATION STORAGE MANAGEMENT
A Detailed Review

Abstract
This white paper introduces EMC® Unisphere™ for VNXe™, a web-based management environment to create storage resources, configure and schedule protection for stored data, and manage and monitor other storage operations on VNXe platforms. This paper provides a detailed description of how to use this new leading-edge interface to manage your VNXe storage system.

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# Table of Contents

**Executive summary**.................................................................................................................. 4  
**Introduction** ................................................................................................................................. 4  
  Audience ........................................................................................................................................... 5  
  Terminology ...................................................................................................................................... 5  
**Management with Unisphere for VNXe** ....................................................................................... 6  
**Getting started** ............................................................................................................................... 6  
  Using the Connection Utility to configure connections ................................................................. 6  
  Using the Configuration Wizard ...................................................................................................... 8  
**The Unisphere VNXe interface** .................................................................................................... 10  
  Dashboard menu ............................................................................................................................... 10  
  Dashboard widgets ............................................................................................................................ 11  
  System menu ...................................................................................................................................... 13  
  System pages .................................................................................................................................... 14  
  Storage menu .................................................................................................................................... 18  
  Storage pages .................................................................................................................................... 19  
  Hosts menu ....................................................................................................................................... 19  
  Host pages ........................................................................................................................................ 20  
  Settings menu .................................................................................................................................... 23  
  Settings pages ................................................................................................................................... 23  
  Support menu .................................................................................................................................... 27  
  Status information ............................................................................................................................ 29  
  Unisphere Online Help .................................................................................................................... 29  
  System Health page alerts ................................................................................................................ 30  
**Conclusion** .................................................................................................................................... 31  
**References** ..................................................................................................................................... 32
Executive summary

In today’s world of storage management, administrators are constantly looking for ways to simplify the management process. This can be very difficult, because many storage-management operating environments assume an in-depth knowledge of storage concepts. Managing becomes a real challenge especially for customers who manage different storage products from different vendors and when vendors use different terminology. Furthermore, navigation is mostly based on storage concepts rather than management tasks, which makes it very hard for the IT generalist to manage storage.

To address these concerns, EMC has introduced Unisphere® for VNXe™, a fundamentally different and new approach to storage management. Unisphere for VNXe enables one to manage storage within the context of an application using easy-to-understand language instead of arcane storage terms. Unisphere for VNXe also embeds best practices into the user interface for a faster and simpler experience when completing everyday administrative tasks.

Unisphere for VNXe is a graphical, application-oriented model with a web-familiar look and feel. Management of VNXe storage systems is simplified, enabling advanced features such as thin provisioning, file deduplication, and compression, without requiring an in-depth understanding of these technologies. A support ecosystem provides access to learning materials and support resources that make storage management easier than ever. This results in a more efficient and more productive environment.

EMC has also introduced Unisphere Remote™, a centralized network application that enables administrators to remotely monitor the status, activity, and resources on multiple VNX™ and VNXe storage systems. The EMC Unisphere Remote: Next-Generation Storage Monitoring white paper available on EMC Online Support (https://support.emc.com) > Unisphere Remote Product Page, provides more information on Unisphere Remote.

Introduction

This white paper discusses Unisphere for VNXe. It describes the Unisphere for VNXe interface, and explains how an IT generalist easily completes storage-related tasks using this intuitive, easy-to-use interface.

This paper also describes different features of Unisphere for VNXe, and provides general guidelines for using these features. Step-by-step instructions are found in Unisphere online help.
Audience

This white paper is intended for EMC customers, partners, and employees who are considering the use of Unisphere for VNXe for managing VNXe storage systems. It is assumed that the reader is at least an IT generalist who has experience as a system or network administrator.

Terminology

- **Unisphere for VNXe** — The management interface for creating, managing, and monitoring VNXe storage resources and protection.
- **Unisphere Remote** — The interface for monitoring VNX and VNXe storage systems.
- **Common Internet File System (CIFS)** — An access protocol that enables users to access files and folders from Windows hosts located on a network. User authentication is maintained through Active Directory and file access is determined by directory access controls.
- **Internet Small Computer System Interface (iSCSI)** — A protocol that provides a mechanism for accessing raw block-level data storage over network connections. The iSCSI protocol is based on a network-standard client/server model with iSCSI initiators (hosts) acting as storage clients and iSCSI targets acting as storage servers. After a connection is established between an iSCSI host and the iSCSI server, the host requests storage resources and services from the server.
- **iSCSI server** — A VNXe storage server that uses the iSCSI protocol to manage Microsoft Exchange storage groups, generic storage virtual disks, Hyper-V datastores, and VMFS-based VMware® datastores.
- **Network File System (NFS)** — An access protocol that enables users to access files and folders from Linux/UNIX hosts located on a network.
- **Shared folder server** — A VNXe storage server that uses the CIFS or NFS protocol to catalog, organize, and transfer files within designated shares. It is required to create shared folder storage resources such as CIFS or NFS shares, or NFS VMware datastores.
- **Snapshot** — A read-only, point-in-time copy of data stored on the storage system. Users recover files from snapshots or restore a storage element to a snapshot.
- **Storage pool** — A collection of disk drives configured with a particular storage profile. The storage profile defines the type of disks used to provide storage and the type of RAID configured on the disks. The storage pool’s configuration defines the number of disks and quantity of storage associated with the pool.
- **Storage Processor (SP)** — A hardware component that performs VNXe storage operations such as creating, managing, and monitoring storage resources.
Management with Unisphere for VNXe

Unisphere for VNXe provides tools to configure system settings, view system status, and to manage a VNXe storage system, such as the example shown in Figure 1. Unisphere enables administrators to configure storage resources easily to meet the specific needs of their applications, host operating systems, and all users.

Unisphere wizards simplify storage provisioning by automatically implementing best practices as administrators provision storage. This optimizes system performance and minimizes costs. Troubleshooting is also simplified by easily identifying failed components and by providing direct access to EMC support options.

Getting started

Using the Connection Utility to configure connections

Before one configures VNXe system settings or creates VNXe storage resources, an IP address to manage the VNXe system needs to be established. To establish VNXe connection settings, run the Connection Utility from a Windows host on the network.
Use one of the following methods to configure your system as shown in Figure 2:

- If the Connection Utility is run from a computer that is on the same subnet as the VNXe, select **Auto Discover** method to automatically discover any unconfigured VNXe systems.

- If the Connection Utility is run on a different subnet (or a machine not on the network), select **Manual Configuration** to save the configuration to a USB drive and transfer it to the VNXe.

The Connection Utility helps configure the following VNXe system settings:

- **System name** — Name that identifies the VNXe storage system.

- **Network address** — Management IP address (IPv4 or IPv6) assigned to the system and used to access Unisphere.

- **Subnet mask** — Mask used to determine which subnet the management IP address belongs to.

- **Gateway address** — Default address of the network; this provides a single point of entry to the site.

![VNXe Connection Utility](image)

*Figure 2: VNXe Connection Utility*
Using the Configuration Wizard

After you run the Connection Utility, connect to the VNXe system through a web browser to launch Unisphere. The **Unisphere Configuration Wizard** (as shown in **Figure 3**) appears the first time when the VNXe is connected. It helps configure the following settings:

- **Default system Admin and Service account passwords** — Passwords used to log in to Unisphere and the Service section of Unisphere.
- **Disk pools** — A group of storage disks configured with the same storage profile.
- **DNS server** — Network service that converts domain names to their corresponding IP addresses. This setting is optional for disconnected sites.
- **EMC Online Support credentials** — Username and password for a registered EMC Online Support account.
- **iSCSI or Shared folder server options** — Configure an iSCSI or shared folder server to manage storage resources for applications and hosts that use the storage resource. You can configure the iSCSI or shared folder server at a later time using Unisphere.
- **Network Time Protocol (NTP) server** — Protocol used to synchronize the VNXe system clock with other nodes on the network. Configuring the NTP server settings is optional for disconnected sites.
- **Product support options** — Enables ConnectEMC and EMC Secure Remote Support (ESRS). ConnectEMC provides faster service response, time, expedited part replacement, and enhanced diagnostic feedback. ESRS enables EMC Support to perform remote troubleshooting which accelerates problem diagnosis and results in a fast and efficient time to resolution.
The VNXe is registered using EMC Online Support. When registering, access is gained instantly to easy-to-use tools that help plan, install, maintain, and service the VNXe. Registration also enables for software updates, installation tools, and more.

After registering, EMC emails licenses for the features that were purchased. To activate the licenses and features, complete the following steps:

1. From a Web browser, open the URL to the VNXe management address. The login screen for VNXe appears.
2. Log on to Unisphere.
3. Click **Settings** menu. The **Settings** landing page appears.
4. Select **More Configurations > Manage Licenses**. The **Manage Licenses** page appears as shown in Figure 4.
5. Follow the instructions that appear on **Manage Licenses** page.

When managing the licenses, you can view information on the installation, the version number, and the license issue date and expiry date.
10

EMC Unisphere for VNXe: Next-Generation Storage Management

The Unisphere VNXe interface

The Unisphere menu bar consists of six menus as shown in Figure 5.

- **Dashboard** — Displays widgets with shortcuts to the VNXe system functionalities.
- **System** — Enables to configure and view system information
- **Storage** — Enables to provision storage.
- **Settings** — Enables to view and configure system and storage settings.
- **Hosts** — Enables to view and configure host for the VNXe storage array.
- **Support** — Provides access help and customer support options.

Figure 5: Menu bar

Dashboard menu

The Dashboard menu is selected by default when users log in to Unisphere as shown in Figure 6. The Dashboard menu contains customizable dashboards. Each dashboard appears as a tab in the Dashboard window and displays a set of widgets. Users can add, modify, and delete dashboards. There is always at least one dashboard tab present on the page as users cannot delete the last dashboard. Users can rename a dashboard by double-clicking its name.
Each dashboard is used to:
- View a summary of system storage usage
- Monitor system alerts
- Choose common task controls
- View system and session status information, such as alerts and login period
- View storage information
- Configure storage pools
- Provision storage

Figure 6: Dashboard page

Dashboard widgets

Each Dashboard contains some widgets. Click **Customize** to add widgets to the current dashboard or a newly created dashboard, then drag and drop the widgets to the Dashboard window as shown in Figure 7.

The default dashboard includes the following widgets:

- **System Information** — Information about the VNXe system, such as the name, model, product ID, software version, and system health status.

- **System Capacity** — A graphical view of available storage resources, storage allocated for different types of storage resources (for example, Microsoft Exchange Server and generic iSCSI storage), and storage used for snapshot data protection.

- **Storage Pools** — A graphical view that highlights the storage pool allocations.
• **Common Tasks** — Shortcuts to frequently performed operations, such as create storage, view alerts, configure system settings, and view system status information.

• **System Alerts** — List of alerts and messages associated with storage operations, system processes, and user activity.

• **Microsoft Exchange** — List of allocated Microsoft Exchange storage resources. This is similar to the Details view in the Microsoft Exchange Storage screen (Storage > Microsoft Exchange).

• **VMware Storage** — List of allocated VMware data stores. This is similar to the Details view in the VMware Storage screen (Storage > VMware).

• **Shared Folder Storage** — List of allocated shared folders. This is similar to the Details view in the Shared Folder Storage screen (Storage > Shared Folders).

• **Generic Storage** — List of allocated generic storage resources. This is similar to the Details view in the Generic Storage screen (Storage > Generic iSCSI Storage).

• **Hyper-V Storage** — List of allocated Hyper-V data stores. This is similar to the Details view in the Hyper-V Storage screen (Storage > Microsoft Hyper-V).

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**Figure 7: Customize dashboard**

Every dashboard widget has the following icons on the top right corner:

• **Help** — Displays the appropriate section in Unisphere Online Help.

• **Maximize/Restore** — Maximize icon increases the widget to fill screen and Restore icon restores the widget to its original state.
• **Close** — Removes the widget from the dashboard.

Some widgets have the following additional icons:

- **Filter** — This is found in System Alerts and all storage resource widgets (Microsoft Exchange, VMware Storage, Shared Folder Storage, Generic Storage and Hyper-V Storage), and enables users to search through the entries in the widget.

- **Tools** — This is found in all storage resource widgets (Microsoft Exchange, VMware Storage, Shared Folder Storage, Generic Storage and Hyper-V Storage). It enables users to select the columns to display in the widget, and to reset the widget’s display.

- **Export** — This is found in all storage resource widgets (Microsoft Exchange, VMware Storage, Shared Folder Storage, Generic Storage and Hyper-V Storage), and enables users to export all or selected entries in the widget to a comma-separated value format (.csv) file.

**System menu**

The System menu provides pages that help monitor the VNXe system, as shown in Figure 8. These pages are also accessed from a drop-down that is displayed by moving the cursor over the Systems menu.

The System menu provides a central location for monitoring the status of the VNXe system. Use this menu to:

- View graphical information about current system, capacity, health, and status
- View system alerts, messages, and notifications
- Monitor system and storage processes
- Display log information about system activity
- Manage replication sessions
- View jobs list and status
System pages

The System menu displays the following pages:

- **System Capacity** — Displays present data utilization in the following categories:
  
  - **Storage Resource View** — Displays storage utilization details and free space of all system storage resources.
  
  - **Utilization History View** — Displays utilization history for storage data of any type.

- **System Health** — Provides an interactive graphic of your VNXe hardware. Click System Health icon configure I/O modules and bring components to the front. The carousel displays a front and rear view of each system component as shown in Figure 9.

*Figure 8: System page*
System Replications — Lists replication sessions. Users can modify, fail over, synchronize, pause or delete sessions.

System Alerts — Displays system alerts with information.

Jobs — The VNEx system runs multiple jobs concurrently and also queues the jobs when there are not enough system resources to run all the jobs at once as shown in the Figure 10. The Jobs page is divided into two areas.

- Jobs — Displays a list of jobs that are completed, running and in queue on the VNEx system in a tabular format. The table also includes the description, status, start time of the job, and the user that launched the job.

- Jobs Description — Displays the description and status of the job selected in the Jobs area. If any critical step fails, the job fails and a system alert is displayed to notify the user of the error.
Figure 10: Jobs page

**Note:** Not all tasks in Unisphere run concurrently.

- **Storage Pools** — Lists storage pools. Users can configure disks and view the status of individual storage pool.

- **Storage Resource Health** — Lists the health details of storage resources and associated storage pool.

- **System Performance** — Displays graphs that plot CPU, network, and volume activities for each Storage Processor (SP) in the VNXe system. The statistics are color-coded for each SP. Move the cursor over a line graph to view the usage percentage and the date when the statistics were collected. This is shown in Figure 11.
Figure 11: System Performance graphs

- Logs page — The VNXe system monitors and reports a variety of events on the VNXe system. These events are collected and written to the user log. The user log lists the following information for each event:
  - **Severity (!)** — Icon indicating the severity of the error or event that has occurred. Table 1 shows the severity levels:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Label</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="red.png" alt="Critical" /></td>
<td>Critical</td>
<td>An error has occurred that has a significant impact on the VNXe and must be remedied immediately.</td>
</tr>
<tr>
<td><img src="yellow.png" alt="Error" /></td>
<td>Error</td>
<td>An error has occurred that has a minor impact on the VNXe and must be remedied at some point. It does not have to be fixed immediately.</td>
</tr>
<tr>
<td><img src="orange.png" alt="Warning" /></td>
<td>Warning</td>
<td>An error has occurred that you should be aware of but has not had a significant impact on the VNXe.</td>
</tr>
<tr>
<td><img src="blue.png" alt="Information" /></td>
<td>Information</td>
<td>Some events have occurred that do not have an impact on the functioning of the VNXe.</td>
</tr>
</tbody>
</table>

- **Date/Time** — Day and time when the event occurred.
- **Source** — The VNXe component associated with the event.
- **User** — User account (if any) associated with the specific alert.
- **Event ID** — An ID associated with the event.
- **Description** — Short description of the cause or effects of the event.
Storage menu

Under the Storage menu (as shown in Figure 12), Unisphere for VNXe provides storage resources especially suited to the needs of different applications, host operating systems, and user requirements. The Storage menu provides pages that automatically implement best practices to:

- Create storage for application-specific files and data from network hosts.
- Configure and manage storage resources accessed by applications, hosts, and workgroups.
- Protect data manually or automatically by creating and managing snapshots.
- Configure and manage replication for specific storage resources.
- Restore data protected by snapshots.

Figure 12: Storage page

The information in each Storage page is organized into tables. This tabular format (as shown in Figure 13) is very intuitive, so that the storage resources are assessed quickly. The storage resources can be listed in the following views: Tile, Icon, or Detailed. These views enable the sorting and formatting of columns.
Storage pages

The Storage menu provides pages to create, configure, and monitor the following types of storage resources:

- **Microsoft Exchange** — Provides a resource for storing Microsoft Exchange databases, log files, and public folders based on simple parameters, such as the number of users and the average user mailbox size.

- **VMware** — Provides storage for VMware virtual machines through datastores that are accessible through either the NFS or VMFS (over iSCSI) protocols.

- **Microsoft Hyper-V** — Provides storage for Hyper-V virtual machines, including their virtual hard drives, configuration files, and snapshots, through datastores that are accessible to Windows Server hosts with Hyper-V using the iSCSI protocol.

- **Shared Folders** — Enables clients to store data, and easily access shared folders and shares that integrate seamlessly into:
  - Windows environments that use CIFS protocol for file sharing, Microsoft Active Directory for authentication, and Windows directory access for folder permissions.
  - Linux/UNIX environments that use NFS protocol for file sharing and POSIX access control lists for folder permissions.

- **Generic iSCSI Storage** — Provides generic block-level storage to hosts and applications that use iSCSI protocol to access storage in the form of virtual disks.

Hosts menu

The Hosts menu, as shown in Figure 14, enables control of host access to storage resources by creating and managing host configurations. Host configurations provide the VNXe with network profiles of the hosts that use storage resources. Host configurations consist of a friendly name and a host network address (IP or iSCSI), subnet mask, or netgroup. They are used to control specific access to most storage resources.
Use the Hosts page to:

- Discover VMware vCenter™/ESX® hosts
- View all hosts configured for the system
- Create individual host configurations for accessing system storage
- Create subnet and netgroup host configurations to enable multiple hosts to access system storage

**Figure 14: Hosts page**

**Host pages**

The Hosts menu contains the following pages:

- **Hosts** — Enables users to view and manage all hosts known to the system. This includes Windows, Linux, ESX, Hyper-V, and Sun hosts.

- **Replication Connections** — Enables users to manage system-to-system connections for replication. This includes other VNXe storage systems, and VNX™ and Celerra® storage systems.

- **VMware** — Enables users to view and manage all VMware hosts known to the system. The Add ESX Hosts Wizard creates the VMware host configuration and adds it to the Unisphere list of VMware hosts.

The Host Wizard (as shown in **Figure 15**) creates configurations for individual hosts, subnets, or netgroups. After a host configuration is created, it can be associated with one or more storage resources.
The Hosts page presents information on the virtualization hosts as shown in Figure 16. The hosts can be arranged in the following views: Tiles, Icon, or Detailed. These views enable the sorting and formatting of columns.
Unisphere’s API integration with VMware enables users to configure and manage VMware storage within Unisphere. Unisphere discovers existing VMware datastores hosted on the VNXe, and it automatically creates and configures datastores on the VMware host created in Unisphere. Also, a VMware host can be expanded to view the details of each virtual machines associated with it.

Hosts and host subnets are configured based on the following criteria:

- **iSCSI address (initiator IQN)** — Access to Microsoft Exchange or generic iSCSI storage, VMware VMFS datastores, or Hyper-V storage.
- **IP address or network host name** — Access to NFS shared folders or VMware NFS datastores.
- **IP subnet range** — Access to NFS shared folders, or NFS datastores by hosts within a specific subnet range.
- **Netgroup** — Access to NFS shared folders or VMware NFS datastores by hosts or users in a specific netgroup.

After creating hosts, specify host access permissions individually for each storage resource. These permissions determine the access privileges permitted for individual hosts or subnets with network connectivity to the storage resource. Figure 17 displays the association between hosts and storage resources.

**Figure 17: Associate hosts to storage resources**
Unisphere also provides an easy way to create and manage replication connections between multiple VNXe storage systems or connections between VNXe storage system and a VNX or Celerra storage system. Users can add, modify, update or remove connections.

**Settings menu**

The Settings menu allows system settings to be configured as shown in Figure 18. Use the Settings menu to:

- Configure system settings, network settings, storage servers, and alert settings.
- Use tools for servicing and troubleshooting the system.
- Manage user access to Unisphere.
- Update system software.
- Manage licenses for system features and functionality.
- Change user preferences, set language settings, and reset the password for the current login account.

![Settings page menu](image)

**Figure 18: Settings page menu**

**Settings pages**

The **Settings** page contains the following sections:

- **Management Settings** — Enables users to set up and configure network and communication settings for the storage system. The **General** tab enables users to change system management connections, enter system information, and set up a failback policy. The **Network** tab enables users to modify DNS and NTP settings, configure remote logging, and configure connection to Unisphere Remote.
The VNXe Series EMC Unisphere Remote Next-Generation Storage Monitoring white paper, available on EMC Online Support (https://support.emc.com) › Unisphere Remote Product page, provides more information on Unisphere Remote.

If the VNXe system is a secure array (which means that it is populated with Self-Encrypting Drives), Unisphere provides an area within the General tab of the Management Settings that displays the Self-Encrypting Drive Key Management as shown in Figure 19. The VNXe Series EMC Data-at-Rest Encryption for VNXe: Self-Encrypting Drives white paper, available on EMC’s Online Support (https://support.emc.com) provides more information on EMC Data-at-Rest Encryption for VNXe.

![Self-Encrypting Drive Key Management](image)

Figure 19: Backup Authentication Key

- **iSCSI Server Settings** — Enables users to manage storage settings for iSCSI storage operations. Users can create and configure iSCSI servers, and modify iSNS and CHAP settings.

- **Preferences** — Enables users to change user preferences, including language settings and account password.

- **Service System** — To access this page, users must enter the service password. This page provides tools for servicing the storage system, including repairing or troubleshooting the system, servicing the SPs, collecting system/configuration information to assist the service provider with a service request, and changing the service password.
  - The System Components list shows the storage system SPs. In this page, users attempt to resolve minor or moderate issues such as a component failure, a system boot problem, or other persistent problems. From this page, users can access the service mode, either reboot or reimage SP, restart the management software, enable SSH, and shut down the system.
Figure 20 shows the Service System page.

Figure 20: Service System page

- **Shared Folder Server Settings** — Enables users to manage settings for Shared Folder storage access for Windows shares (CIFS) using the Active Directory or Standalone option and Linux/UNIX shares (NFS). Users configure and create Shared Folder Servers, configure Advanced Storage Access (ASA), enable NDMP, Antivirus, and Network Information Service (NIS) from this page.

Figure 21 shows the Shared Folder Server Settings page.

Figure 21: Shared Folder Server Settings page
• **More Configuration** — Enables users to view additional configuration options for the storage system, such as updating the software, managing users, licenses, alerts, and EMC Secure Remote Support (ESRS).

Figure 22 shows the More Configuration page.

![Figure 22: More Configuration page](image)

This page helps:

- **Manage Licenses** — Acquire, install, and update licenses to add features and services to the storage system.
- **Manage Administration** — Create and manage user accounts, user access, and permissions.
- **Alert Settings** — Configure settings for tracking and reporting system alerts and notifications, including ConnectEMC, SMTP, and SNMP settings, and email alerts.
- **View Schedules** — Maintain various schedules configured on the storage system.
- **EMC Secure Remote Support** — Manage your ESRS configuration.
- **Manage Support Contracts** — View the current support contracts for the storage system.
- **Update Software** — Acquire and install software updates and disk firmware updates for your storage system.
Figure 23 shows the Health Check wizard displayed from this page.

**Figure 23 : Health Check wizard of the Update Software page**

- **Advanced Configuration** — Manage advanced system settings, such as link aggregation and link transmission rate.
- **Routing Configuration** — Manage routing settings.

**Support menu**

Unisphere for VNXe is designed with the entire support ecosystem in mind. The integrated Support page, as shown in Figure 24, provides instant access to online support information and communities. It is the central location for self-help resources. This page provides links to resources for learning about and getting assistance with the storage system. From the Support page:

- Watch how-to product videos.
- View the online help and documentation library.
- Access the EMC Online Support page for the latest product information and updates.
- Participate in online forums or live chat about the latest tools, tips, and best practices.
- Search the online community for information posted by other users.
- Read white papers and access training about product features and use cases.
- Download software for your storage system.
- Access the Technical Advisory for your storage system.
• Access the online EMC store and request a quote for disk drives, software and more.

Figure 24: Support page

Figure 25 shows the Need more help? page. It contains links to the following pages:

• **Product Support Page** — Access the system-support links from the Product Support page.

• **Customer Replaceable Parts** — Order or return a part for the storage system.

• **Service Center** — Access information regarding open support requests.

• **Update User Profile** — Update online user profiles.

• **Live Chat** — Participate in live chat sessions with qualified technical support representatives who are ready to answer technical questions or questions about ordering parts.
**Status information**

There is a solid blue bar displayed at the bottom of every Unisphere page as shown in Figure 26. The bar contains the following:

- **Name** — Displays the current system name.
- **Alerts** — Shows the number of system alerts. This is also a shortcut to the System Alerts page (System > System Alerts).
- **Jobs** — Shows the number of concurrent jobs running in Unisphere. This is also a shortcut to the Job page (System > Jobs).
- **User** — Displays the current user
- **System time** — Displays the system time.

**Unisphere Online Help**

The Unisphere Online Help (as shown in Figure 27) is the central repository for all help topics, guides, and procedures. In this tool, a wide variety of information is available, including instructions for creating storage resources, detailed explanations, part replacement procedures, and instructions for servicing the VNXe system.
In Unisphere for VNXe, each page contains a question mark in the top right (as shown in Figure 28) that provides to access online help. Unisphere Online Help is context-sensitive. Therefore clicking this icon launches the Unisphere Online Help based on the relative section that the icon is located in.

**Figure 27: Unisphere Online Help**

**Figure 28: Unisphere online help icon**

**System Health page alerts**

If a hardware fault occurs on the VNXe, the System Health page displays the fault with a pop-up message, as shown in Figure 29. This message displays a general fault message in an easy-to-understand explanation. From the pop-up, relative documentation containing the procedure for replacing a faulted part can be directly accessed. This documentation is found within the Unisphere Online Help or in the Knowledge base.
Conclusion

Unisphere for VNXe was designed with a simple philosophy in mind: keep it simple. It provides storage from the application’s point of view with one clear way to handle any task – from initial installation to creating storage resources for virtual servers. An administrator can shift from managing shared folders to creating application storage without missing a beat. Application-driven management enables one to easily consolidate storage.

A click on the Unisphere Support menu puts a world of resources at the administrator’s fingertips. Comprehensive online documentation, help, training, and even how-to-videos are available to expand one’s knowledge and answer questions. All these features make Unisphere for VNXe a powerful and easy-to-use tool for managing VNXe storage systems.
References
The following white papers are found on the VNXe page on EMC Online Support (https://support.emc.com) > VNXe Product Page:

- **EMC VNXe Series Storage Systems — A Detailed Review**
- **EMC VNXe Data Protection — Overview**
- **EMC VNXe High Availability**
- **EMC Unisphere Remote: Next-Generation Storage Monitoring**
- **VNXe Series EMC Data-at-Rest Encryption for VNXe: Self-Encrypting Drives**