Abstract
This white paper introduces EMC® Unisphere™ for VNXe™, a web-based management environment for creating storage resources; configuring and scheduling protection for stored data; and managing and monitoring 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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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. For customers who manage different storage products from different vendors, this becomes a real challenge, especially when different vendors use different terminology. Furthermore, in most cases, navigation is 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 is introducing Unisphere™ for VNXe™, a fundamentally different and new approach to storage management. VNXe allows you to manage storage within the context of an application using easy-to-understand language instead of arcane storage terms. It also embeds best practices into the user interface for a faster, 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, allowing the utilization of 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, making storage management easier than ever. The result is immediate productivity and efficiency.

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

Introduction

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

This paper also describes different features found in Unisphere VNXe, and provides general guidelines for using these features. Step-by-step instructions can be found in Unisphere online help.
Audience
This white paper is intended for EMC customers, partners, and employees who are considering the use of EMC® Unisphere for VNXe for managing EMC 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 new management interface for managing EMC VNXe storage systems.
- **Unisphere Remote** – The new monitoring interface for monitoring EMC VNXe storage systems.
- **Common Internet File System (CIFS)** – An access protocol that allows 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.
- **iSCSI protocol** – The internet small computer system interface (iSCSI) protocol 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. Once a connection is established between an iSCSI host and the iSCSI server, the host can request storage resources and services from the server.
- **iSCSI Server** – A VNXe 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 allows users to access files and folders from Linux/UNIX hosts located on a network.
- **Shared Folder Server** – A VNXe server that uses either the CIFS or NFS protocol to catalog, organize, and transfer files within designated shares. A shared-folder server is required to create shared folders that contain CIFS or NFS shares, or NFS VMware® datastores.
- **Snapshot** – A read-only, point-in-time copy of data stored on the storage system. You can recover files from snapshots or restore a storage element to a snapshot.
- **Storage pool** – A storage pool is a collection of disk drives configured with a particular storage profile. The storage profile defines the type of disks used to provide storage, as well as 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 manage a VNXe storage system, such as the example shown in Figure 1. Using Unisphere, you can easily configure storage resources to meet the specific needs of your applications, host operating systems, and users.

Unisphere wizards further simplify storage provisioning by automatically implementing best practices as you provision storage. Troubleshooting is also simplified; failed components are easily identified, and Unisphere provides direct access to EMC support options. Unisphere wizards automatically implement best practices to help you optimize system performance and minimize costs.

![Figure 1. Unisphere for VNXe easily manages diverse storage environments](image-url)
Getting started

Using the Connection Utility to configure connections

Before you can configure VNXe system settings or create VNXe storage resources, you need to establish an IP address for managing the VNXe system. To establish VNXe connection settings, run the Connection Utility from a Windows host on the network.

When you run the Connection Utility from a computer on the same subnet as the VNXe, the Connection Utility can automatically discover any unconfigured VNXe systems if you select Auto Discover as shown in Figure 2. If you run the Connection Utility on a different subnet (or a machine not on the network) select Manual Configuration, and save the configuration to a USB drive and transfer it to the VNXe.

The Connection Utility helps you configure the following VNXe system settings:

- **System name** – Name that identifies the VNXe storage system.
- **Network address** – Management IP address 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.

![Welcome to the VNXe Connection Utility](image)

Figure 2. Running the Connection Utility
Using the Configuration Wizard

After you run the Connection Utility, you can connect to the VNXe system through a web browser to launch Unisphere. The Configuration Wizard (shown in Figure 3) opens the first time that you connect to the VNXe. The Configuration Wizard helps you configure these settings:

- **Default system Admin and Service account passwords** – Passwords used to log in to Unisphere and the Service part 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. Configuring the DNS settings is optional for disconnected sites.

- **NTP server** – Protocol used to synchronize the VNXe system clock with other nodes on the network. Configuring the NTP 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. EMC Secure Remote Support (ESRS) allows EMC Support to perform remote troubleshooting which accelerates problem diagnosis and results in a fast and efficient time to resolution.

- **EMC Online Support credentials** – Username and password for a registered EMC Online Support account.

![Figure 3. Configuration Wizard](image)
You can register your VNXe through the EMC Online Support website. When you register, you gain instant access to easy-to-use tools that help you plan, install, maintain, and service your VNXe. Registration also entitles you to software updates, installation tools, and more.

After you register, EMC will email you licenses for the features that you purchased. To activate your licenses and features:

1. Open Unisphere.
2. Click the **Settings** tab in the menu bar to open the Settings landing page.
3. Select **More Configurations > Manage Licenses**.
4. Follow the instructions that appear.

This is shown in Figure 4.
The Unisphere VNXe interface

Menu bar and Dashboard tab

The Unisphere menu bar consists of six tabs, as shown in Figure 5. The first tab is the Dashboard tab. This is also the page that opens when you open Unisphere. You can use the Dashboard page to:

- View a comprehensive summary of system storage usage
- Monitor system alerts
- Choose common task controls
- View system and session status information such as alerts and login period

Dashboard panels

The Dashboard page is divided into the following panels:

- **Welcome** – A graphic 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.

- **System Alerts** – A chronological list of alerts and messages associated with storage operations, system processes, and user activity.
• **Common Tasks** – Shortcuts to frequently performed operations such as creating storage, viewing alerts, configuring system settings, and viewing system status information.

**System tab**

The System tab provides pages that help you monitor your VNXe system, as shown in Figure 6. You can also access these pages by allowing your mouse to hover over the Systems tab to open a pull-down menu that shows the System pages.

The System tab provides a central location for monitoring the status of the VNXe system. You can use the System tab 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

![Figure 6. Landing page for the System tab](image)
System pages

The pages accessible through the System tab are as follow:

- **System Capacity page** — Displays present utilization data in the following categories:
  - **Storage Resource View tab** — Utilization details and free space of all system storage resources.
  - **Utilization History View tab** — Utilization details for storage data of any kind.
  - **System Health page** — Provides an interactive graphic of your VNXe hardware. You can configure I/O modules as well as click on a component to bring it to the front. The carousel shows a front and rear view of each system component. This is shown in Figure 7.

![System Health page](image)

**Figure 7. Interactive graphic on the System Health page**

- **System Replications page** — Lists replication sessions, so you can modify, fail over, synchronize, pause, or delete replication sessions.

- **System Alerts page** — Displays any system alerts, along with alert information.

- **Storage Pools page** — Lists storage pools, so you can configure disks and view an individual storage pool’s status.

- **Storage Resource Health page** — Lists storage resources and their health, as well as the health of the associated storage pool.
• **System Performance page** — Displays graphs that plot CPU activity, network activity, and volume activity for each storage processor (SP) in the VNXe system. The statistics are color-coded for each SP. Mouse over a line graph to view the usage percentage and date when the statistics were collected. This is shown in figure 8.

![System Performance Graphs](image)

Figure 8. System Performance Graphs

• **Logs page** — The VNXe system monitors and reports on a variety of events that happen 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 level — indicated by an icon.
  - Date and time the event occurred.
  - Source of the event — software component that recorded the event.
  - Event ID — unique identifier for each type of event.
  - Description — text that describes the event.
Storage tab

You can access pages under the Storage tab by clicking the Storage tab to open a landing page (Figure 9), or you can allow your mouse to hover over the Systems tab to open a pull-down menu that shows the Storage pages.

Under the Storage tab, VNXe provides storage resources specially suited to the needs of different applications, host operating systems, and user requirements. The Storage tab provides pages that automatically implement best practices as you:

- 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 9. Landing page for the Storage tab](image)

Information displayed in Storage pages is organized into tables; this tabular format is very intuitive, so you can quickly assess storage resources, as shown in Figure 9. You can change the view of the tables to see storage resources listed in a tile view, icon view, or detailed view that allows you to sort and format columns.
Storage pages

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

- **Microsoft Exchange page** — 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.

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

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

- **VMware page** — Provides storage for VMware® virtual machines through datastores that are accessible through either the NFS protocol or VMFS (over iSCSI) protocol.
• **Hyper-V page** — Provides storage for Hyper-V virtual machines, including their virtual hard drives, configuration files, and snapshots, through datastores that are accessible to Windows Server 2008 hosts using the iSCSI protocol.

**Settings tab**

The Settings tab opens a landing page (Figure ) that allows you to configure system settings. Use the Settings tab to:

- Configure system settings, network settings, storage servers, and alert settings
- Create host configurations so that you can control access permissions for hosts that access system storage
- 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

![Figure 11. Landing page for the Settings tab](image-url)
Settings pages

The Settings page contains icons that open the following pages:

- **Management Settings page** – Set up and configure network and communication settings for the storage system. In the General tab, you can change system management connections, enter system information, and set up a failback policy. In the Network tab, you can set DNS and NTP settings, configure remote logging, and configure Unisphere Remote.

  For more information regarding Unisphere Remote, please see the *VNXe Series EMC Unisphere Remote Next-Generation Storage Monitoring* white paper located on EMC Online Support ([https://support.emc.com](https://support.emc.com)) > VNXe Product Page..

- **iSCSI Server Settings page** – Manage storage settings for iSCSI storage operations. You can configure and create iSCSI servers, as well as configure iSNS and CHAP settings from this page.

- **Preferences page** – Change user preferences, including language settings and account password.

- **Service System page** – Diagnose, troubleshoot, and repair the storage system. To access this page, you must enter the Service Password. The Service System page provides tools for servicing your storage system (including repairing or troubleshooting the system), servicing the SP(s), 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. This page is used to attempt to resolve minor or moderate issues, such as a component failure, a system boot problem, or when a problem persists. From this page, you can enter service mode, reboot, or reimage either SP, as well as restart the management software, enable SSH, and shut down the system.

  The Service System page is shown in Figure.
**Shared Folder Server Settings page** – Manage settings for shared folder storage access for Windows shares (CIFS) using the Active Directory or Standalone option and Linux/UNIX shares (NFS). You can configure and create shared folder servers, as well as configure Advanced Storage Access (ASA), enable NDMP, Antivirus, and NIS from this page. This is shown in Figure.
Figure 13. Shared Folder Server Settings page
• **More Configuration page** – View additional configuration options for the storage system, such as updating the software, and managing users, licenses, alerts, and EMC Secure Remote Support (ESRS). This page is shown in Figure.

![EMC Unisphere](image)

**Figure 14. More configuration... page**

This page helps you:

- **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 EMC Secure Remote Support (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. From this page, you can open the Health
Check Wizard shown in Figure.

Figure 15. 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.

**Hosts tab**

The Hosts tab landing page, shown in Figure, allows you to control 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. Host configurations 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 for enabling multiple hosts to access system storage
Unisphere Host Configuration Wizards create configurations for individual hosts, subnets, or netgroups. After a host configuration is created, it can be associated with one or more storage resources.
Host tab panels

The Hosts page contains the following three panels:

- **Hosts** – View and manage all hosts known to the system. This may include Windows, Linux, ESX, Hyper-V, and Sun hosts.

- **Replication Connections** – Manage system-to-system connections for replication. This may include other VNXe storage systems, as well as VNX™ and Celerra storage systems.

- **VMware** – 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.
Information displayed in the Hosts pages is organized into tables, as shown in Figure 18. You can change the view of the tables, so you can see the hosts listed in a tile or icon view, as well as in a detailed view that allows column formatting and sorting. In the detailed view of the virtualization hosts table, you can click on a VMware host and expand to show its associated virtual machines and details about each of the virtual machines.

![Virtualization hosts table](image)

**Figure 18. Virtualization hosts table**

Unisphere’s API integration with VMware enables you to fully configure and manage VMware storage from within Unisphere. Unisphere can discover existing VMware datastores hosted on the VNXe, and it also automatically creates and configures datastores on the VMware host that are created through Unisphere.

Hosts and host subnets can be configured according to 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, you can 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 19. Associating hosts to storage resources**

**Support tab**

Unisphere is designed with the entire support ecosystem in mind. The integrated Support page, shown in Figure , 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 landing page, you can:

- 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
- Order customer-replaceable parts
- Participate in live chat sessions

**Figure 20. Support page**

The Need more help? page is shown in Figure 20. It contains links to these pages:

- **Product Support page** – Access all of the system support needs.
- **Customer Replaceable Parts page** – Order or return a part for the storage system.
- **Service Center page** – Access information regarding open support requests.
- **Update User Profile page** – Update your online user profile.
- **Live Chat page** – Participate in live chat sessions with qualified technical support representatives who are ready to answer technical questions or questions about ordering parts.
The Unisphere online help tool is the central repository for all help topics, guides, and procedures. From this tool, you can locate a wide variety of information, including instructions for creating storage resources, detailed explanations, part replacement procedures, and instructions for servicing the VNXe system.
Wherever you are in Unisphere, you can click the online help icon (Figure 23). Because Unisphere online help is context-sensitive, clicking this icon launches the Unisphere online help tool in the section that is relative to what you are doing, saving time and making it easier to complete tasks.

Figure 23. Unisphere online help icon

System Health page alert pop-up

If a hardware fault occurs on the VNXe, the System Health page displays the fault with a pop-up message, as shown in Figure 24. This message displays a general fault message written in easy-to-understand language. From the pop-up, you can directly access the appropriate document containing the procedure for replacing the part from within the Unisphere online help tool, or search the knowledgebase for solutions.

Figure 24. System Health page alert pop-up
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. You can shift from managing shared folders to creating application storage without missing a beat. Application-driven management enables you to easily consolidate storage. The bottom line: Unisphere for VNXe saves you time and steps.

A click on the Unisphere Support tab puts a world of resources at your fingertips. Comprehensive online documentation, help, training, and even how-to-videos are there to expand your knowledge and answer questions. All these features make Unisphere for VNXe a powerful and easy-to-use tool for managing VNXe storage systems.

Storage. Click. Done.

References

The following white papers can be 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
- EMC VNXe High Availability
- EMC Unisphere Remote: Next-Generation Storage Monitoring