EMC Unisphere: Unified Storage Management Solution for the VNX2 Series
VNX5200, VNX5400, VNX5600, VNX5800, VNX7600, & VNX8000
A Detailed Review

Abstract
This white paper provides an overview of EMC Unisphere, the single management interface for the VNX2 Series. It discusses all the features and functionality supported in Unisphere.

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Executive Summary

One of the biggest challenges facing storage administrators is the management of their ever-growing storage environments. Managing numerous file and block systems to meet the constantly changing storage needs of applications is very complex. Storage administrators need to make quick provisioning decisions, generate reports, and ensure the health of all systems in the storage environment. As a result, storage administrators need a simple, intuitive, customizable tool for managing these environments.

EMC Unisphere addresses these concerns by providing simplicity, flexibility, and automation – all key requirements for optimal storage management. Unisphere provides a flexible, integrated experience for managing VNX series storage systems.

Unisphere’s ease of use is reflected in its intuitive task-based controls, customizable dashboards, and single-click “self-help” access to real-time support tools and online customer communities.

Unisphere has an extensible architecture. It provides management for RecoverPoint/SE environments from within its interface, and can launch other products, such as Replication Manager, Atmos VE, and Isilon.

Introduction

This white paper provides an overview of Unisphere 1.3 for the VNX2 series. It describes the architecture of Unisphere and how Unisphere manages other EMC solutions. It describes the benefits these features provide, and how to use Unisphere to efficiently perform common daily tasks. It does not list all the steps for using these new features, instead it provides general guidelines. Step-by-step instructions can be found in Unisphere online help.

This paper does not discuss Unisphere for VNXe or Unisphere for VMAX. White papers for these topics are located on EMC Online Support.
Audience
This white paper is intended for EMC customers, partners, and employees who are considering using EMC Unisphere to manage their storage environments. It is assumed that the reader is familiar with VNX storage systems and their management functionality.

Terminology
- **Unisphere for VNX** – The management interface for managing VNX systems
- **Unisphere Client** – Unisphere user interface software that can be installed on a Windows workstation
- **Unisphere Server** – Unisphere management server software that can be installed on a Windows server.
- **Unisphere Service Manager (USM)** – A collection of tools that help you update, install, and maintain your system hardware, as well as provide contact and system information to your service provider

Overview
Unisphere is completely web-enabled for remote management of your storage environment. With customizable view blocks and sortable tables, you are never more than a few clicks away from the information you need.

Unisphere Management Server runs on the Storage Processors (SPs) and the Control Station; launch it by pointing the browser to the IP address of either one of the SPs or the Control Station. As an alternative, you can also use the Unisphere Client to manage the storage systems in your environment. The Unisphere Client and Server are software packages that can be installed on a Windows workstation. The client provides faster startup times in remote locations because the Unisphere applet is directly installed on the workstation and does not need to be downloaded from the SPs or Control Station.

Unisphere’s architecture is modular. Any new features or functionality can be added as modules or plugins to Unisphere’s interface and be completely integrated. Unisphere has many features and functionalities, such as VMware awareness, LDAP integration, Analyzer, and Quality of Service Manager.
Enterprise Dashboard

When you first log in to Unisphere for VNX, the Enterprise Dashboard appears, which is the home page for your storage environment. The Enterprise Dashboard is shown in Figure 1 below.
Advanced Search

Unisphere for VNX has an Advanced Search feature which allows you to locate items within the storage environment based on the query entered. The Advanced Search link is available throughout Unisphere and provides predefined queries, or you can create your own custom queries. Figure 2 shows a predefined query looking for all the SAS drives in the Enterprise domain.

Figure 2. Advanced Search
Enterprise Dashboard View Blocks

The Enterprise Dashboard presents view blocks that provide an aggregated view of your entire storage environment. The view blocks can be added to or removed from the Enterprise Dashboard, allowing you to completely customize the Enterprise Dashboard to show you the important information you need for your entire storage environment. You also have the option to restore the Enterprise Dashboard to its default view as shown in Figure 3.

![Enterprise Dashboard View Blocks Customize Menu](image)

Figure 3. Enterprise Dashboard View Blocks Customize Menu

The Systems by Severity view block lists all the systems in your storage environment by the alert severity level. The Alerts by Severity view block lists the alerts in your storage environment. These alerts can be from storage systems or RecoverPoint/SE environments if you are managing them through the Unisphere for VNX interface. This allows you to get an instant update on all the components of your storage environment, which helps to locate issues quickly and efficiently.

Capacity information for your storage environment is also available through the Enterprise Dashboard view blocks. This information is presented using bar graphs that list the Overall Capacity and the Capacity for File for the systems in your storage environment. This information is helpful when you need to take into account the current capacity information before making storage provisioning decisions.
**Enterprise Dashboard System List**

The System List provides details for all the storage systems in your storage environment, including IP address, serial number, health status, software revision, and more. From this page, you can add, remove, or view the properties of systems in your storage environment. There are also options available to login and logout of systems.

![Enterprise Dashboard System List](image)

**Figure 4. Enterprise Dashboard System List**

**One-Button Shutdown**

As of Unisphere for VNX v1.3, the Enterprise Dashboard System List page includes the option to shut down your VNX2 Series Storage Systems. Select the VNX2 system from the list and click **Power Off**. Unisphere reaches out to the storage system and initiates the shutdown sequence. For more information regarding the shutdown sequence, refer to the Unisphere Online Help or the System Operations Guide located on EMC Online Support.

---

1 The one-button shutdown feature is only available for VNX2 Series Storage Systems.
Enterprise Dashboard Domains

Unisphere for VNX includes built-in integrated storage domains that make administering of large environments easier by enabling multi-system access from a single instance of Unisphere. Using the integrated storage domains, you can easily add multiple systems to a storage domain and view that storage domain immediately from a single Unisphere instance.

Unisphere for VNX includes a single sign-on feature that enables you to access any system in a storage domain using a single authentication. This eliminates the need to re-enter usernames and passwords every time you access a different storage system in the domain.

Figure 5. Enterprise Dashboard Domains Page

Unified Network Services

Unisphere includes unified support for network services (LDAP, NTP, and DNS) across VNX Unified, File, and Block platforms in a VNX domain. From the Domains tab of the Enterprise Dashboard, the task pane provides easy access to network services. You can now make domain-wide changes to LDAP, NTP, and DNS settings from this convenient location.
Enterprise Dashboard Alerts

The Alerts page provides a centralized location to view all the current alerts and their details in the storage environment. You can filter through the entries in the list to locate a specific alert and you have the ability to export the list as well.

![Enterprise Dashboard Alerts Page](image)

**Figure 6. Enterprise Dashboard Alerts Page**
Navigation and User Interface

The simple, intuitive Unisphere user interface has a common look and feel for VNX systems. The interface consists of three main components:

- Top navigation bar
- Task pane
- Main pane

Figure 7. Navigation and User Interface
Top Navigation Bar

The top navigation bar consists of:

- **Previous and Next Buttons** – Navigate back and forth with the previous (left arrow) and next (right arrow) buttons
- **Home Button** – When you click this button, the Enterprise Dashboard appears
- **System Drop-Down Menu** – Quickly switch between the systems in your storage environment
- **Menu Bar** – Main tasks for storage management. The menu bar has drop-down menus wherever applicable. For example, a mouse-over of the Storage menu shows a submenu with storage-related options, such as Storage Pools, File Systems, LUNs, CIFS, and NFS.

![Figure 8. Top Navigation Bar](image)

Task Pane

Unisphere uses task-based navigation. Common tasks and wizards are provided in a separate pane of the interface for easy access. The task pane is also context-sensitive, so different tasks appear depending on the menu item selected. For example, if you select the Storage menu, the task pane contains wizards that perform tasks, such as LUN provisioning and File System creation. If you switch to the Data Protection menu, the task pane contains wizards that perform tasks, such as LUN Snapshot creation and File Replication configuration.

![Figure 9. Task Pane of the Storage Menu](image)
Main Pane

The main pane displays detailed information about a particular menu or submenu. It presents the different objects and the operations that can be performed on the objects. Most of the information in this pane is presented in tables or summary charts which can be filtered and exported into a CSV file if needed.

Figure 10. Main Pane Displaying File Systems
System Dashboard

From the Enterprise Dashboard, you can navigate to individual storage systems in your environment. At this System level, you can manage the selected storage system, provision storage resources, configure replication, and more.

System Dashboard View Blocks

In the System Dashboard, you can quickly view the status of a storage system in your environment. There are many view blocks that are available and you can customize the ones that are most useful for your environment. View blocks can be quickly added to or removed from the System Dashboard using the Customize menu, and you have the option to restore the System Dashboard to its default view.

Figure 11. System Dashboard Page

Figure 12. System Dashboard View Blocks
The different view blocks available in the System Dashboard are:

- **System Information** – Information about the VNX system, such as Status, Name, Model, IP Addresses, Serial Number, and Software Revision
- **System Alerts** – List of the top 10 alerts for the active VNX system
- **Storage Capacity Summary** – Pie chart breakdown of the Free Raw Disk space, used space, Free Space for File, and Free Storage Pool Space.
- **Storage Pools for File** – Bar graph of all File Storage Pools sorted by capacity
- **Storage Pool Capacity** – Bar graph of all Storage Pools sorted by capacity
- **RAID Group Capacity** – Bar graph of all RAID Groups sorted by capacity
- **Storage Status** – Information about the status of the LUNs for the system (i.e. LUNs that are used by Host, LUNs that are trespass, and so on)
- **Storage Resources** – Aggregated information about the system, such as the number of disks, Storage Pools, LUNs, and so on
- **Tiering Summary** – Auto Tiering information, such as the quantity of data to be moved up or down and estimated relocation time
- **Host Allocation** – Bar graph of all Hosts sorted by allocated space
- **Operating Systems** – A list of the operating systems running on the hosts connected to the storage system
- **Hosts** – Information about the hosts connected to the storage system, such as the host names and IP addresses
- **Connectivity Issues** – A list of connectivity issues with the hosts
- **Virtualization** – Information about the VMware vCenter and ESX servers connected to the storage system, such as server names and IP addresses
- **Replication Summary** – Pie chart view of the LUNs that are used for local and remote replication
- **Data Protection Resources** – Information about the objects used for replication, such as the number of snapshot session and clones
- **Reserved LUN Pool Usage** – Pie chart view of the LUNs allocated for the Reserved LUN Pool
- **Mirror Connections** – Graphical view of the MirrorView connections from the selected storage system to other systems
System Page

The Unisphere System page allows you to configure and service your storage system hardware components, monitor system health and configure event notifications, as well as view and generate system reports.

Figure 13. System Page: SP Cache Section of Storage System Properties Window

Unisphere allows you to launch certain applications directly from its interface. From the System page, you can launch Unisphere Service Manager (USM) as long as it is installed on your client machine. If you try to launch the program in Unisphere and it is not installed, Unisphere asks if you want to download the program.
When you launch USM from the System page in Unisphere, the login credentials pass from Unisphere and bring you to the appropriate page for your VNX system.

![Launch USM](image)

**Figure 14. System Page: Launch USM Link**

The Data at Rest Encryption (D@RE) Activation Wizard can also be launched from the Systems page in Unisphere (**Figure 15**). With VNX Block OE 05.33.000.5.072 and VNX File OE 8.1.3.72 and later, controller-based D@RE can be activated from this wizard as seen in **Figure 15**.

![D@RE Activation Wizard](image)

**Figure 15. System Page: Data at Rest Encryption Activation Link**
This wizard begins the encryption process on existing data, while encrypting any new writes to the array (Figure 16).
**System Page – Storage Hardware page**

The Storage Hardware page is located in the System section of Unisphere (System › Hardware › Storage Hardware). This page displays a list and provides graphical depictions of the storage hardware components of your VNX system. The left pane lists the different components of the selected system and the right pane displays the graphical view of the components. When you select a component in the left pane, that component is highlighted in the right pane so you can see where it is physically located on the hardware. For storage administrators with various levels of experience, these storage hardware views provide a way to understand the location of hardware components of the VNX systems.

![Storage Hardware Page](image)

**Figure 17. Storage Hardware Page**

System and state information about the various components are also tracked in real time on the Storage Hardware page. The **State** column in the left pane displays information about the state of the components. For example, if a particular slot is empty or an I/O module is present, or if a drive is unbound or enabled.

Fault status information is also displayed next to each component. If a hardware component fails, is removed, or is not working, a fault is displayed next to the component in the list.

For example, if a drive fails in your VNX system, a fault icon appears next to the drive and the drive’s enclosure. In this case,

- If you select the drive from the component list in the left pane, the hardware view in the right pane highlights the drive so you know exactly which drive to
replace. This reduces the chance of pulling the wrong drive from the Disk Array Enclosure (DAE).

- If you right-click the faulted drive in the left pane,
  1. The Replace Drive option displays,
  2. Opens Unisphere Service Manager (USM),
  3. Automatically logs you in through the credentials provided for the Unisphere session,
  4. Brings you to the drive replacement wizard. The wizard determines which drive failed and displays the drive information (drive type and serial number) that you need to open a service request. You can then open a service request on EMC Online Support and include this information in the request.

System Page – Monitoring and Alerts Page

The Monitoring and Alerts page is located in the System section of Unisphere (System > Monitoring and Alerts). This page allows you to view all alerts, events, and tasks on your VNX system, configure notifications for events, view performance and storage resource statistics, and access the Unisphere Quality of Service (QoS) Manager.

![Monitoring and Alerts Page](image-url)
System Page – Storage System Configuration Display

Unisphere also includes a storage system configuration display feature that provides an easy-to-understand view of the system configuration data generated by the storage system. The output is displayed in a web browser in XML format. The Report Wizard used to generate this storage system configuration can be launched from the Reports section of the System tab in Unisphere, and from the Unisphere Service Manager (USM).

![Storage System Configuration XML - Physical Disk Details Page](image)
Storage Page

The Storage page in Unisphere allows you to create and manage storage for your VNX system. From this page, you can create and manage your Shared Folders (CIFS shares and NFS exports), LUNs, virtual tape devices, data migration sessions, File Systems, Storage Pools, and Volumes for your VNX system.

Figure 20. Storage Page
From the Storage page in Unisphere, you can configure and launch Atmos Management and Isilon Administration interfaces. EMC Atmos is an object-based cloud storage platform used to store, archive, and access unstructured content at scale. An EMC Isilon cluster provides scale-out NAS storage by creating a unified pool of highly efficient storage which leverages a single file system architecture built to handle a variety of file-based data applications and workflows. For more information regarding Atmos or Isilon, refer to their respective product pages on EMC Online Support.

Figure 21. Storage Page: Launch Atmos and Isilon
Hosts Page

The Hosts page in Unisphere allows you to manage hosts connected to your VNX system. From this page, you can create and manage storage groups as well as manage and view host initiators connected to the VNX system. You can view the properties of all VMware servers and virtual machines (VMs) connected to the system. You can also view the properties of all hosts connected to your VNX system and view the connectivity and assigned LUNs as well.

Figure 22. Hosts Page

Host List Page

The Host List page allows you to connect, manage, and view the details for the hosts connected to your VNX system. Host details, such as IP address, Operating System (OS), protocol, and capacity information are examples of data included in tabular format. Selecting a host from the list populates the details section below. This section displays information, such as LUNs, Snapshot Mount Points, and Initiators for the selected host.

Figure 23. Hosts Page: Host List
**Data Protection Page**

The Data Protection page in Unisphere provides you with a central location to create and manage data protection services on your VNX system. From this page, you can create and manage LUN Snapshots, File System Checkpoints, Clones, Mirrors, and Replications. You can also view details of the Reserved LUN Pool on the VNX system.

From Unisphere, you can configure the IP address and launch EMC Data Protection Advisor (DPA), which is a comprehensive monitoring, analytics, alerting and reporting platform that supports a wide range of data protection products and infrastructure.

A link to launch EMC Replication Manager is also available, which can provide application consistent replication for your VNX storage resources. Replication Manager provides a single management console that allows you to manage replication of environments deployed on a wide range of EMC storage technologies. In addition, Replication Manager offers deep integration with many applications that reside in these environments, including Oracle, Microsoft SQL Server, Microsoft SharePoint and Microsoft Exchange application integration.

For information regarding Data Protection Advisor (DPA) or Replication Manager, refer to their respective product pages on EMC Online Support.

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**Figure 24. Data Protection Page**
Data Protection – LUN Snapshots Page

In the Data Protection section of Unisphere, the LUN Snapshots page allows you to view and manage all of your VNX Snapshots and SnapView Snapshots on your VNX system.

EMC VNX Snapshots enables you to create and manage snapshots, which are point-in-time copies of a LUN. For VNX Snapshots, you can attach and detach snapshots as well as create Snapshot Consistency Groups from this page.

EMC SnapView allows you to create a point-in-time copy of a LUN. For SnapView Snapshots, you can manage your Source LUNs, SnapView Sessions, and Snapshot LUNs.

For more information on EMC VNX Snapshots or EMC SnapView, refer to the latest white papers and documentation available on EMC Online Support.

Figure 25. Data Protection: LUN Snapshots Page
RecoverPoint/SE Management in Unisphere

Unisphere allows modules to be integrated into its management interface. Because of this, related EMC products, such as RecoverPoint/SE can be managed from the same Unisphere session. RecoverPoint/SE helps customers with homogenous VNX/CLARiiON environments implement a single unified solution for data protection, simplifying management, reducing costs, and avoiding data loss due to server failures or data corruption.

RecoverPoint/SE management capabilities are available under the Data Protection section in Unisphere and are built into the VNX Operating Environment (OE) for Block. The RecoverPoint/SE management capability in Unisphere provides all the functionality that is available through the standard RecoverPoint management console. The following prerequisites must be met for the plug-in to work in Unisphere:

- Use the Deployment Manager Tool to set up the RecoverPoint/SE environment.
- The management ports on the VNX must be able to communicate with the management ports of the RecoverPoint Appliances (RPAs).

![RecoverPoint/SE Management in Unisphere](image)

Figure 26. RecoverPoint/SE Management in Unisphere

An existing global user can perform RecoverPoint management tasks in Unisphere without requiring a second login. The user will not have access rights to the RecoverPoint GUI or CLI unless the user is configured in RecoverPoint with the same credentials or uses the LDAP server for authentication. If the VNX system and the RecoverPoint cluster are configured to use the same LDAP server, then a user on that server has access to the RecoverPoint management in Unisphere and the RecoverPoint GUI and CLI.
The role of the VNX global user determines the corresponding RecoverPoint role based on the values shown in **Table 1**.

**Table 1.  VNX to RecoverPoint/SE Role Mapping**

<table>
<thead>
<tr>
<th>VNX User Roles</th>
<th>RecoverPoint Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>RecoverPoint/SE Administrator and Security Administrator</td>
</tr>
<tr>
<td>Storage Administrator</td>
<td>RecoverPoint/SE Administrator</td>
</tr>
<tr>
<td>Operator</td>
<td>RecoverPoint/SE Monitor</td>
</tr>
<tr>
<td>Data Recovery</td>
<td>RecoverPoint/SE Administrator</td>
</tr>
<tr>
<td>Data Protection</td>
<td>RecoverPoint/SE Monitor</td>
</tr>
<tr>
<td>Local Data Protection</td>
<td>RecoverPoint/SE Monitor</td>
</tr>
</tbody>
</table>
**Settings Page**

The Settings page in Unisphere allows you to configure network settings and manage users, server certificates, and Data Mover parameters for your VNX system. On this page, you can create interfaces and devices, as well as manage the Network Services, DNS, Routes, and iSCSI Management on the selected VNX system.

![Figure 27. Settings Page](image-url)
Support Page

The Support page in Unisphere is the central location for all of your support needs. It provides quick links to product pages, documentation, and help resources for your VNX system. EMC Online Support credentials and access to an outside network are required. There are two levels of user entitlement, Partner Enabled and Customer Enabled, which are determined by the EMC Online Support credentials.

The Partner Enabled Support tab includes six categories:

- **How To's** – Opens a landing page for technical information, how to documents, and how to videos that explain how to manage and service your systems
- **Community** – Opens the interactive support forum where users share their experiences with other customers
- **Downloads** – Launches the Unisphere Service Manager (USM) and points to the appropriate wizard to help identify and download the latest software patch for your VNX system
- **Check for New Support Options** – Checks EMC Online Support and updates the available options of the Support Page based on the entitlement of the credentials provided by the user
- **Unisphere Help** – Opens the local Unisphere Online Help
- **Search EMC Support** – Opens the Search page where you can search for service requests, documents, and so on
- **Product Support Page** – Provides access to system-specific product documentation, best practices, white papers, and can manage service requests and participate in live chat
Figure 28. Support Page: Partner Enabled View

The Customer Enabled Support tab includes a few additional options, such as Live Chat, Service Center, and Customer Replaceable Parts.

- **Live Chat** – Participate in live chat sessions with qualified technical support representatives
- **Service Center** – Access information regarding support requests
- **Customer Replaceable Parts** – Order or return a part for your new VNX storage system
Conclusion

EMC Unisphere is a simple, intuitive, yet powerful tool for managing VNX storage environments that provides the following benefits:

- A single management tool for managing VNX storage environments
- Integration with existing environments
- Aggregated alerts for all systems in the environment
- A customizable user interface
- Quick access to summary information
- The ability to filter, sort, and export data to generate quick reports
- Ecosystems for all your support needs

References

- Unisphere Online Help
- Security Configuration Guide on VNX for Block
- Security Configuration Guide on VNX for File
- Domain Management with VNX Storage Systems
Appendix A: Unisphere Link and Launch with VNX Gateway and VMAX

Unisphere 1.3 and later allows storage administrators the ability to link and launch from Unisphere for VNX (on VNX Gateway systems) directly to Unisphere for VMAX (UVMAX) for storage-related operations. The link and launch feature allows storage administrators working in Unisphere for VNX Gateway to go directly to Unisphere for VMAX when they need to perform storage operations on their VMAX systems. You do not need to log in when launching to Unisphere for VMAX because the information is registered by the user ahead of time.

The Unisphere link and launch feature is available on VNX Gateway systems (with VNX Operating Environment for File 8.1 and later) that are connected to Symmetrix® VMAX® Family arrays with Enginuity™ version 5876 Q2 2013 Service Release (or later) and Unisphere for VMAX version 1.6.0.8 (or later). This section provides an overview of the Link and Launch functionality; it does not include prerequisites or steps needed to configure the environment.
Configure Unisphere Link and Launch

Configuring the Unisphere Link and Launch functionality is quick and simple. Navigate to **Storage > Storage Configuration > Storage Systems** in Unisphere for your VNX Gateway system. In the Wizards section on the right, you will find an option to Register Unisphere for VMAX. This wizard walks you through the steps to setup the Unisphere Link and Launch functionality between your VNX Gateway and VMAX systems.

![Figure 29. Unisphere for VNX: Storage Systems Page](image-url)
Using Unisphere Link and Launch

Once you have configured link and launch between your VNX Gateway and VMAX systems, you can use Unisphere for VNX to launch directly into Unisphere for VMAX to view the system dashboard, view alerts, view performance metrics, and provision storage on your VMAX system.

NOTE: Log into Unisphere for VNX as a Global user.

The Link and Launch functionality is available from several pages within Unisphere for VNX. One page is the Storage Systems page, which you can find in Unisphere for VNX by navigating to:

Storage > Storage Configuration > Storage Systems

![Navigating to the Storage Systems Page in Unisphere for VNX](image-url)
Another page is the File Systems page, which you can find in Unisphere for VNX by navigating to:

**Storage › Storage Configuration › File Systems**

![Navigating to the File Systems Page in Unisphere for VNX](image-url)

**Figure 31.** Navigating to the File Systems Page in Unisphere for VNX
Storage Systems Page

The Storage Systems page in Unisphere for VNX displays all the storage systems connected to your VNX Gateway system. You can also see the version and current status of your VMAX system(s).

Select the VMAX system from the storage system list to highlight it; the buttons at the bottom of the page become available. The available link and launch buttons are:

- Dashboard
- Alerts
- Performance
- Provision Storage

Figure 32. Storage Systems Page
Dashboard Button

Click Dashboard to launch the Unisphere for VMAX window and bring you to the System Dashboard page.

It is important to remember to properly log out of Unisphere for VMAX by clicking Logout in the top right of the window. If you close the browser page without clicking Logout, wait for 1 minute (timeout from Unisphere for VMAX) before using another Link and Launch button.
Alerts Button

Click **Alerts** to launch the Unisphere for VMAX window and bring you to the Alerts page. This is useful if you see any alerts while working on your VNX Gateway and you want to see if there are any related alerts triggered in Unisphere for VMAX during the same time.

![Figure 36. Storage Systems Page: Alerts](image1)

Clicking **Alerts** takes you to the **System Alerts Page**.

![Figure 37. Unisphere for VMAX: System Alerts Page](image2)
Performance Button

Click **Performance** to launch the Unisphere for VMAX window and bring you to the Diagnostics page. From this page, you can view VMAX diagnostic data from the previous 4 hours. The Diagnostic view collects data every 5 minutes for root cause analysis. In the Real Time view, you can view diagnostic data from the previous 1 hour, and it collects data between 2 and 5 seconds for a limited group of metrics. In the Historical view, you can view diagnostic data from the previous 24 hours. It also collects data in 15 minute intervals for trending and planning. Real Time data is available for the previous hour, Diagnostic data is available for the previous 7 days, and Historical data is available for the previous year. For more information, reference the Unisphere for VMAX Online Help.

**NOTE:** **Performance** does not work when Unisphere for VMAX is used on the VMAX Storage Processor (SP). Unisphere for VMAX must be installed on a host to view the performance information.
Provision Storage Button

![Dashboard | Alerts | Performance | Provision Storage]

**Figure 40. Storage Systems Page: Provision Storage**

Click **Provision Storage** to launch the Unisphere for VMAX window and automatically open the Host Management – Create Host Wizard.

![Unisphere for VMAX: Host Management – Create Host Wizard]

**Figure 41. Unisphere for VMAX: Host Management – Create Host Wizard**
After configuring the host options, the Provision Storage Wizard appears.

Figure 42. Unisphere for VMAX: Provision Storage Wizard
After provisioning storage on the VMAX system for your VNX Gateway, return to the Unisphere for VNX Storage page and rescan the storage systems. This allows the VNX Gateway to see the newly provisioned VMAX Volumes.

Figure 43. Unisphere for VNX: Storage Page with Rescan Storage Systems Option Highlighted

Figure 44. Unisphere for VNX: Rescan Storage Systems Option
**File Systems Page**

The File Systems page in Unisphere for VNX displays all the file systems available on your VNX Gateway system. You can also see the storage capacity, the percentage of storage used, the Data Mover it is using, and if there are any replication sessions associated with it.

Select a file system from the File Systems list to highlight it and the buttons at the bottom of the page will become available. The available link and launch button is:

- Symmetrix LUN View

![Figure 45. File Systems Page](image)
Symmetrix LUN View

Click **Symmetrix LUN View** to launch the Unisphere for VMAX window and open the Volumes page that displays the Host page. From this view, you can access all the volumes on the VMAX system by using the Masking View.

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**Figure 46. File System Page: Symmetrix LUN**

**Figure 47. Unisphere for VMAX: Storage Volumes Page**
Appendix B: Certificate Validation

SSL X.509 certificates are validated when communicating with the management server that is running on the Storage Processors (SPs) or Control Station. This ensures that the management server you are connecting to is genuine and not a malicious host trying to hijack the communication. Each time Unisphere is launched from a client workstation, it checks for the certificate of the management server. The management server could be running on SPA, SPB, or the Control Station, depending on where you launch Unisphere. For more information on how certificate validation works, refer to the EMC VNX Security Configuration Guides.

The first time Unisphere is launched from a client, you receive the following options:

- **Details** – Details about the certificate from the connecting SP or Control Station.
- **Accept Always** – Stores the certificate on the client and then validates the certificate as a background task. You will not be prompted again from that client.
- **Reject** – If you do not trust the certificate, you can reject the certificate, and the communication will be stopped.
- **Help** – Displays the Help page with additional information regarding the Certificate Warning message.

![Certificate Warning](image_url)

Figure 48. Options for Certificate Validation
Once you accept the certificate, you can manage the system from which you launched Unisphere. However, you cannot manage other systems in the domain until you accept the certificates for each system. In the Domains tab of the Enterprise Dashboard, a lock icon appears next to the systems whose certificates have not been accepted. To accept the certificates for the rest of the systems, right-click each system and select the option in the menu to accept the certificate. If you select the Accept Always option, you will not be prompted for certificates during subsequent logins; the certificate validation automatically occurs in the background.

Figure 49. Systems with Unaccepted Certificates
### Appendix C: User Roles

The global user roles support the block and file functionalities of Unified VNX systems. These user roles are not supported on legacy systems, which is one of the reasons that VNX systems cannot join Legacy domains. The roles are described in Table 2 below.

**Table 2. Global User Roles**

<table>
<thead>
<tr>
<th>Global User Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Read-only privilege for storage and domain operations; no privilege for security operations</td>
</tr>
<tr>
<td>Network Administrator</td>
<td>All operator privileges and privileges to configure DNS, IP settings, and SNMP</td>
</tr>
<tr>
<td>NAS Administrator</td>
<td>Full privileges for file operations; Operator privileges for block and security operations</td>
</tr>
<tr>
<td>SAN Administrator</td>
<td>Full privileges for block operations; Operator privileges for file and security operations</td>
</tr>
<tr>
<td>Storage Administrator</td>
<td>Full privileges for file and block operations; Operator privileges for security operations</td>
</tr>
<tr>
<td>Security Administrator</td>
<td>Full privileges for security operations including domains; Operator privileges for file and block operations</td>
</tr>
<tr>
<td>Administrator</td>
<td>Full privileges for file, block, and security operations</td>
</tr>
<tr>
<td>Local Data Protection</td>
<td>Privileges only to do SnapView (snapshots and clones) and SnapSure (Checkpoints) tasks; however, data recovery operations like rollback a snapshot or reverse synchronize a clone are not allowed; no privilege to create new storage objects</td>
</tr>
<tr>
<td>Data Protection</td>
<td>All local data protection privileges, MirrorView, and SanCopy operations; however, data recovery operations, such as promoting a secondary and fracturing a mirror, are not allowed; no privilege to create new storage objects</td>
</tr>
<tr>
<td>Data Recovery</td>
<td>All local data protection and data-protection role privileges and the ability to do data recovery operations; however, no privilege to create new storage objects</td>
</tr>
</tbody>
</table>
Appendix D: Unisphere Server and Client

Unisphere Server and Client are Unisphere software packages that can be installed on a Windows workstation. Unisphere Client is a complete standalone version of the Unisphere UI applet. Unisphere Server is an “off-array” management system running the Unisphere management server.

You can choose to install on the Unisphere Client on a Windows server. This launches Unisphere locally from the Windows machine and then you can point to any system in your environment. You can also choose to install both (Unisphere Client and Server) on a Windows server that can then become a storage domain member. The Unisphere Server accepts requests from a client station and processes those requests locally through the Windows server. The client station can point to the IP address of the Windows server, download the UI applet, and start managing the storage environment. The Windows server can be assigned as the domain master.

Unisphere Server and Client packages provide the following advantages:

- **You can use Unisphere without upgrading any systems** – Sometimes upgrading systems in the storage environment is not possible. You can get Unisphere by just installing Unisphere Server and/or Client on a Windows machine. For new revisions of Unisphere, you will only need to upgrade the Unisphere Server and Client packages on the Windows machine.

- **Faster startup time** – Unisphere Server and Client packages provide a much faster startup time because the Unisphere applet does not need to be downloaded from the Storage Processors (SPs) or Control Station. This can be helpful when systems are in different geographical locations.

- **Less management overhead on storage system** – Running Unisphere Server on a Windows server helps to offload certain management CPU cycles from the Storage Processors (SPs).