EMC Unisphere: Unified Storage Management Solution

A Detailed Review

Abstract
This white paper provides an overview of EMC® Unisphere™, the single management interface for CLARiON®, Celerra®, and next-generation VNX™ unified systems. It discusses Unisphere features and lists the features supported by Unisphere versions 1.0 and 1.1.
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Executive summary

One of the biggest challenges facing storage administrators is the management of 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 environment. Storage administrators need a simple, intuitive, customizable cross-platform tool for managing storage environments.

To address these concerns, EMC® Unisphere™ provides simplicity, flexibility, and automation—all key requirements for optimal storage management. Unisphere provides a flexible, integrated experience for managing existing EMC CLARiiON® and EMC Celerra® storage systems as well as next-generation VNX™ series unified storage systems.

Unisphere’s unprecedented 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 midtier products from EMC such as Replication Manager, Atmos® VE, and Isilon. Unisphere is designed to be the universal element manager for EMC midtier products.

Introduction

This white paper begins with an overview of how to use EMC Unisphere to manage CLARiiON, Celerra, and next-generation VNX systems. It also describes the architecture of Unisphere and how Unisphere manages other EMC midrange products. It lists similarities with the existing management interfaces for CLARiiON and Celerra systems. The paper also points out the differences between Unisphere versions 1.1 and 1.0.

This white paper then discusses the new features of Unisphere when compared to Navisphere® Manager and Celerra Manager, including the new features introduced with Unisphere 1.1. It describes the benefits these features provide, and how to use Unisphere to efficiently perform common daily tasks. It does not list all of the steps for using these new features, but instead provides general guidelines. Step-by-step instructions can be found in Unisphere online help. Unisphere is very intuitive and performing tasks is straightforward.

The last sections describe the interoperability of Unisphere with existing components in the environment and any limitations. They also outline a step-by-step approach to implementing Unisphere in current environments. A Unisphere Support Matrix, which lists the features supported by Unisphere 1.1 and Unisphere 1.0, is provided in Table 3 on page 25.

Audience

This white paper is intended for EMC customers, partners, and employees who are considering the use of EMC Unisphere for managing their midrange storage environments. It is assumed that the reader is familiar with CLARiiON, Celerra and VNX storage systems and their management functionality.

Terminology

- **Celerra Manager** – The management interface that was used for managing Celerra systems
- **Legacy systems** – CLARiiON and Celerra systems
- **Multi-domains** – A group of storage domains that can be managed from a single Unisphere instance
- **Navisphere Manager** – The management interface that was used for managing CLARiiON storage systems
- **Storage domains** – A group of CLARiiON and Celerra systems that share the same global user accounts and can be managed and monitored centrally through Unisphere
- **Unisphere** – The management interface for managing CLARiiON, Celerra, and next-generation VNX systems
- **Unisphere 1.0** – The version of Unisphere used for managing CLARiiON and Celerra systems. Unisphere 1.0 cannot be used to manage VNX systems
- **Unisphere 1.1** – The version of Unisphere used for managing VNX systems. At the moment, Unisphere 1.1 cannot be used to manage CLARiiON and Celerra 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
- **VNX systems** – EMC’s next generation of midtier solutions, unifying Celerra and CLARiiON into a single product family

**Unisphere overview**

EMC had separate management interfaces for midrange block and file systems (Navisphere Manager for CLARiiON block-based storage systems and Celerra Manager for Celerra file-based systems). With FLARE® release 30 and DART release 6.0, EMC introduced Unisphere 1.0 as the single management interface for CLARiiON and Celerra systems. With Unisphere, all file and block systems can be managed through one simple interface. To support the next-generation unified VNX platforms, EMC is updating the unified management experience with Unisphere 1.1. This version of Unisphere provides a more cohesive user interface to manage all file and block functionalities.

Like Navisphere Manager and Celerra Manager, Unisphere is completely web-enabled for remote management of your storage environment. Unisphere Management Server runs on the storage processors (SPs) and the Control Station; it can be launched by pointing the browser to the IP address of either one of the SPs or to the Control Station. As an alternative, you can also use the Unisphere Client and Unisphere Server to manage the storage systems in your environment. The Unisphere Client and Unisphere Server are software packages that can be installed on a Windows workstation. They provide 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 very modular. Any new features or functionality can be added as modules or plug-ins to Unisphere’s interface and be completely integrated within Unisphere. The first release integrated RecoverPoint/SE into Unisphere. With future releases, more value-added products will be available. In terms of functionality, Unisphere is a “superset” of Navisphere Manager and Celerra Manager. It has all of the existing features and functionality of the previous interfaces, such as VMware-awareness, LDAP integration, Analyzer, and Quality of Service Manager. Unisphere also adds many new features, which are discussed next, and can manage existing environments, as described in the “Interoperability and backward compatibility” section on page 23.

Unisphere 1.1 is the single management interface for the VNX systems and is shipped with all VNX systems. With this initial release, it is not backward-compatible to manage CLARiiON and Celerra systems. Due to this, Unisphere 1.0 should be used to manage existing CLARiiON and Celerra environments. Unisphere 1.1 also does not currently support multiple systems in a storage domain; you can only view and manage a single VNX system per Unisphere instance. Due to this, MirrorView™ and SAN Copy™ replication between two or more VNX systems or between VNX and legacy systems is available only through the CLI (GUI not supported).

The functionality to manage multiple VNX systems and previous generations of CLARiiON and Celerra systems within the same Unisphere instance will be added in the next maintenance release. Table 3 on page 25 provides a complete list of features that are supported by Unisphere 1.0 and Unisphere 1.1.
New features in Unisphere

**Integrated storage domains and single sign-on**

**NOTE:** Unisphere 1.1 does not support this feature yet. It is only available with Unisphere 1.0.

A storage domain is a collection of storage systems that can be centrally managed and monitored, and share user and security information. All systems in a domain are managed from within a single Unisphere management pane. Existing CLARiiON users are already familiar with the concepts of storage domains. With Unisphere, we extended the same concept to Celerra systems, so CLARiiON and Celerra systems can be part of the same domain. The Unisphere System Selector displays the systems in all domains in a convenient drop-down menu.

Single sign-on lets you access any system in a storage domain through a single authentication. There is no need to re-enter usernames and passwords each time you access a different storage system in the domain. Unisphere supports single sign-on for all CLARiiONs and Celerra systems in the domain by distributing global user account information to all storage systems in the domain. The global account information that is sent to the Celerra Control Station has the operator privileges by default. So a one-time additional step is required on Celerra systems to map a global user with operator privileges to any role of your choice. “Appendix: Mapping global users in Celerra” provides the step-by-step procedure for mapping global users on a Celerra.

With integrated domains and single sign-on, you can manage your entire file and block environment through a single Unisphere session.

It is important to note that at least one CLARiiON system must be present to create a domain. When you initialize security on a CLARiiON system, a default domain called “local domain” is created. The CLARiiON system is automatically added to the local domain, and the SP you pointed your browser to is designated as the domain master. Celerra systems can be added after the domain is created. The domain master has the master copy of all administrative data and distributes global accounts to all systems in the domain. Also note that a Celerra system cannot be a domain master.
Multi-domains

Unisphere 1.0 also supports multi-domains. Unisphere 1.1 does not support multi-domains at this time. A multi-domain is a group of domains that you can view and manage from a single management session. Each domain in the multi-domain configuration can have one or more systems. A particular system can only be in one domain and cannot be shared across domains in the multi-domain configuration.

As the number of storage systems increases, managing them through a single domain becomes increasingly complex. Therefore, it is common to have multiple domains in a storage environment. For example, an organization that has data centers in different geographies can choose to create a multi-domain configuration. The systems in each data center will be part of a domain in the multi-domain configuration. Multi-domains allow an organization to have a single view of their storage environment while accommodating a variety of login options. An organization can choose to have single sign-on by having the same global accounts across all domains. In this case, when a user logs in with a global account, he will be able to view as well as manage all systems in the multi-domain configuration. The other option is to have a separate global account for each domain. This provides additional security by allowing a user with a global account to view all systems in the multi-domain configuration but only manage the domain to which he is logged in.
A multi-domain configuration can be created by adding new domains to the local domain. A new domain can be created by adding the IP address of the system and providing a name for the domain to be created.

Dashboards

In Unisphere, a dashboard is like a home page; it is the first screen you see when you log in to your environment. Dashboards give you an aggregated view of your entire environment. All the information is laid out in different blocks of data called view-blocks. The Systems by severity view-block lists either the VNX systems or the CLARiiON and Celerra systems by the severity level. Alerts by severity lists the top 10 alerts in your environment. These alerts can be from VNX systems, legacy systems, or RecoverPoint/SE.
environments if you are managing them through Unisphere. This is very important for storage administrators who can get an instant update on what’s wrong in their environment.

Capacity information on VNX or legacy systems is also available through the view-blocks. The information is presented via bar graphs that list the overall capacity and file capacity for the systems. This information is helpful to administrators who need to make quick storage provisioning decisions. With the Tools button, administrators can list the systems with the least free capacity, or they can choose the systems for which they want to have the capacity information.

The view-blocks are also customizable so that you can arrange them according to your preference on the dashboard. You can also choose which view-blocks you want to see and not see. For this release, there are four view-blocks to choose from, but more will be added in future releases.

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**Figure 4. Dashboard in Unisphere**

**Navigation and user interface**

The user interface in Unisphere has a common look and feel for VNX and legacy systems. Navigation through the user interface is very simple and intuitive. The interface consists of these three main components:

**Top navigation bar**

The top navigation bar consists of:

- **Previous and next icons** - You can navigate back and forth with the previous (left arrow) and next (right arrow) icons.
- **Home icon** - The home icon brings you to the Dashboards screen from wherever you are in the interface.
- **System drop-down menu** - With the system drop-down menu, you can seamlessly switch between the systems in your environment.
- **Menu bar** - The menu bar presents the main options for block and file storage management.

The menu bar has drop-down submenus 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, NFS, and so forth. The drop-down submenu also has links to the most common tasks performed such as Create a LUN or Create a CIFS share.

**Task pane**

With Unisphere, EMC is moving away from *object-based* navigation to *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 has wizards such as LUN Provisioning wizard and File System wizard. If you switch to the Data Protection menu, the task pane has tasks such as LUN Snapshot wizard and File Replication wizard.

**Main pane**

The main pane is where detailed information about a particular menu or submenu is presented. It presents the different objects and the operations that can be performed on the objects. In this pane, most of the information is presented in tables or summary charts.

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**Figure 5. Navigation and user interface**

**System Dashboard**

The System Dashboard is a feature introduced with Unisphere 1.1. It is the first screen presented when a particular system is selected and it provides an aggregated view of the system. It consists of view-blocks that provide quick and easy access to the vital information you need to make everyday storage provisioning decisions. There are numerous view-blocks that can be selected and you can customize the ones that are most useful for your environment. The different view-blocks available in the System Dashboard are as follows:

- **System Information** – Provides information such as status, name, model, IPs, serial number, and software revision of a particular VNX system.
- **System Alerts** – Provides a list of the top 10 alerts for that particular VNX system.
- **Storage Capacity Summary** – Provides a pie-chart breakdown of the Free Raw Disk space, Used space, Free Space for File, and Free Storage Pool space.
- **Storage Pools for File** – Provides a bar graph of all file storage pools based on most free capacity.
- **Storage Pool Capacity** – Provides a bar graph of all storage pools based on most free capacity.
- **RAID Group Capacity** – Provides a bar graph of all RAID groups based on most free capacity.
- **Storage Status** – Provides information about the status of the LUNs for the system, that is, LUNs that are used by the host, LUNs that are trespaised, and so forth.
- **Storage Resources** – Provides aggregated information about the number of disks, storage pools, LUNs, and so on for the system.
- **Tiering Summary** – Provides auto-tiering information such as quantity of data to be moved up, moved down, estimated relocation time, and so on.
- **Host Allocation** – Provides a bar graph of all hosts based on the most allocated space.
- **Operating Systems** – Provides a list of the different operating systems on the hosts connected to the system.
- **Hosts** – Provides information such as the name and IP of the hosts connected to the system.
- **Connectivity Issues** – Provides a list of connectivity issues with the hosts.
- **Virtualization** – Provides information such as name and IP address of the VMware® Virtual Center servers or ESX® servers connected to the system.
- **Replication Summary** – Provides a pie-chart breakdown of the LUNs that are being used for local and remote replication.
- **Data Protection Resources** – Provides information about the objects being used for replication such as number of snapshot sessions, number of clones, and so forth.
- **Reserved LUN Resources** – Provides a pie-chart breakdown of the LUNs allocated for the reserved LUN pool.
- **Mirror Connections** – Provides a graphical depiction of the MirrorView connections from the particular system.

**Figure 6. System Dashboard**
Tables

The main pane in Unisphere presents most of the information in tables. Data presented in tabular format is very intuitive, and the filtering, sorting, and exporting capabilities make it easy to work with your data and present it elsewhere.

Information retrieval from VNX and legacy systems is optimized so that only the data that can fit a particular table is fetched. More information is fetched from the systems as needed. This results in faster access to the data for the user. After the data is fetched from the system, it is cached locally on the client, which provides faster access to the data the next time it is requested. The user can also re-fetch the data from the systems by clicking the refresh icon on the table.

You can move columns to change their position in the table and change the width of columns. Using the Tools options, you can select which columns to see and which to hide. You can also use the Filter dialog box to filter objects in the table. The Filter’s drop-down menu lists the different options you can use to filter, such as a property of the object, wild-card filtering, and case-sensitive filtering. The objects are filtered proactively as you type. There are also predefined filters for the most common filtering criteria.

Another valuable feature provided with tables is the ability to export the tabular data to a comma separated value (.csv) format. The “csv” file can be exported to the client desktop and opened in a spreadsheet like Microsoft Excel.

The features supported by tables can be used as a quick and effective reporting tool. For example, assume a storage administrator has a large configuration on a VNX system and needs to generate a quick report of the LUNs on the system. He can quickly arrange and select the columns, filter the LUNs on which he wants to report, and generate a report by exporting the data to a .csv file.

Figure 7. Tables
**Summary views**

This feature is only available with Unisphere 1.0. In Unisphere 1.1, the Summary views have been consolidated into a System Dashboard that supports a lot more view-blocks. Summary views display the key information on CLARiiON systems in the form of charts and graphs. Summary views are available for the Storage, Hosts, and Replicas. These summary views provide quick and easy access to the vital information you need to make everyday storage provisioning decisions. For example, if you wish to add more disks to the pool with the least free capacity, you can open the storage summary page and look at the **Pool Capacity** view-block to see how much capacity each pool has.

![Summary view showing the pools with the least free capacity](image)

Summary views are also customizable; you can decide which view-blocks are the most important for your environment and customize the summary views to only show those view-blocks.
Figure 9. Summary view displaying customizable view-blocks

Another feature of the summary views is the ability to drill down to detailed information about a particular object with a single click. For example, after finding the pool with the least free capacity, you may want to check the RAID protection level on that pool. You can just click on that pool and it will bring up the properties page for that particular pool.

**Hardware views**

Hardware views provide graphical depictions of the back-end components on VNX and CLARiiON systems. The left pane lists the different components on the back end of the selected system, and the right pane displays a 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 the component is located on the back end. These hardware views can be very helpful for inexperienced storage administrators, as well as experienced storage administrators. For inexperienced storage administrators, these hardware views are a good way to understand the back-end architecture of their VNX or CLARiiON systems. For experienced storage administrators who are managing multiple systems, this makes it easier for them to identify the back-end layout of a particular system rather than physically going to the back of each storage system in the data center.
System and state information about the various components are also tracked in real time on the **Hardware** page. The **State** column in the left pane displays information about the state of the components, for example, if a particular I/O module is present or the slot is empty, if a drive is unbound or enabled, or if a drive is part of a RAID group or storage pool.

Fault status information is also displayed next to each component. If a back-end component fails, is removed, or is not working, a fault displays next to the faulted component. For example, if a drive fails, then fault icons appear next to the drive and the drive’s enclosure. In this case, if you navigate to the drive, the hardware view in the right pane displays the drive in red, so that you know exactly which drive to replace. This reduces the chance of pulling the wrong drive, which can lead to a data unavailable situation for your application. If you right-click the faulted drive in the left pane, it displays the **Replace Drive** option. This option opens Unisphere Service Manager (USM), automatically logs in to USM through the credentials provided for the Unisphere session, and brings you to the drive replacement wizard. The wizard determines which drive failed and displays the drive information (type and serial number) that you need to open a service request. You can then choose to open a service request on EMC’s Powerlink® portal by pasting all of the information into the service request.

**Figure 10. A VNX5500 with SPs highlighted**
Figure 11. Hardware view showing a faulted drive

**RecoverPoint/SE management in Unisphere**

Unisphere’s architecture allows modules to be seamlessly integrated into its management interface. Because of this architecture, related EMC products can be managed from the same Unisphere session. With FLARE release 30, Unisphere 1.0 provided RecoverPoint/SE management. If you are using RecoverPoint/SE 3.3 or later for replication on your CLARiiON arrays, you can manage replication as well as the storage environment from Unisphere. The same management functionality is also available with RecoverPoint/SE 3.4 and Unisphere 1.1 to support block replication on VNX systems. Management of file replication on VNX systems is available only through CLI at this time.

RecoverPoint/SE management capabilities are available under the **Data Protection** tab in Unisphere. The capability is built into the FLARE code, and the RecoverPoint/SE splitter is auto-enabled on a VNX or CLARiiON system. The RecoverPoint/SE management capability in Unisphere provides all of the functionality that is available through the normal RecoverPoint management console. The following prerequisites need to be met for the plug-in to work in Unisphere:

- You must use the Deployment Manager Tool to set up the RecoverPoint/SE environment.
- The management ports on the VNX or CLARiiON must be able to communicate with the management ports of the RecoverPoint appliances (RPAs).
Figure 12. 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 or CLARiiON 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>

Link and launch capabilities

Unisphere allows you to launch certain applications directly from its interface. You can launch Unisphere Service Manager (USM) and Replication Manager from Unisphere as long as they are installed on your client machine. Unisphere 1.1 also allows you to configure and launch Atmos and Isilon Management interfaces. If you try to launch one of these programs in Unisphere and it is not installed, Unisphere will ask if you want to download the program from Powerlink. You launch USM from the System page in...
Unisphere. The login credentials are used to automatically log in to USM and bring you to the appropriate page.

Figure 13. USM launch from Unisphere

You can launch Replication Manager from the Data Protection page. In a future release, Replication Manager will be completely integrated within Unisphere.
Atmos and Isilon Management can be launched from the Storage page in Unisphere 1.1.

Support ecosystem

The Support tab in Unisphere is a one-stop shop for all your support needs. It provides quick links to product pages, documentation, and help resources for VNX, CLARiiON, and Celerra systems. Depending
on the system selected, it brings up the appropriate online resources. EMC Powerlink credentials and access to an outside network are required. The Support tab has six categories:

- **How To’s** – Opens a landing page for technical information, how-to docs, 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 Unisphere Service Manager and points to the appropriate wizard to help identify and download the latest software patch for your system.
- **Unisphere Help** – Opens local Unisphere online help.
- **Product Support Page** – Provides access to system-specific product documentation, best practices, and white papers, as well as the ability to manage service requests and participate in live chat.
- **Search EMC Support** – Opens the Search Page where you can search for service requests, documents, and other items. This functionality is available only with Unisphere 1.1.

![Support page in Unisphere](image)

**Figure 16. Support page in Unisphere**

**Persistent settings**

Any customizations made to tables, dashboards, or summary views during a Unisphere session are saved and **persisted** to your next login. The settings are automatically saved in the persistence.ser file in the user directory of the client machine. For example, on a Windows client, it would be stored at this path:

```
C:\Documents and Settings\<user directory>\emc\Unisphere
```

This is helpful when there are multiple users in an environment; each user can customize views based on their own preferences and the customization persists each time they log on.
Certificate validation

Unisphere 1.0 client software introduced a security enhancement where SSL X.509 certificates are validated when communicating with the management server that is running on the 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 CLARiiON Security Configuration Guide.

The first time Unisphere is launched from a client, the user is provided with the following options plus a Help button:

- **Details** – This provides details about the certificate from the connecting SP or Control Station.
- **Accept for Session** – This accepts the certificate for the user’s session so that the user can manage the system. The user will be prompted with the certificate the next time they log in.
- **Accept Always** – By selecting this option, the certificate is stored on the client and the certificate is validated as a background task. The user will not be prompted again.
- **Reject** – If the user does not trust the certificate, they can opt to reject the certificate and the communication will be stopped.

![Certificate Warning](image)

**Figure 17. Options for certificate validation**

Once the user accepts the certificate, he will be able to manage the system from which he launched Unisphere. However, he will not be able to manage other systems in the domains until he accepts the certificates for them. A lock icon is displayed next to the systems whose certificates have not been accepted. To accept the certificates for the rest of the systems, he must right-click each system and select the option in the right-click menu to accept the certificate. If he selects the **Accept Always** option, he will not be prompted for certificates during subsequent logins; the certificate validation will automatically occur in background.
The global user roles in Unisphere 1.1 have been updated to support the block and file functionalities of VNX unified systems. These new user roles are not supported on legacy systems. The new roles are described in Table 2.

### 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) operations; however data recovery operations like rolling back a snapshot or reverse-synchronizing a clone are not allowed. Also, there is no privilege to create new storage objects</td>
</tr>
</tbody>
</table>
Data Protection | All local data protection privileges, and MirrorView and SAN Copy operations. However, data recovery operations such as promoting a secondary and fracturing a mirror are not allowed. Also, there is no privilege to create new storage objects
---|---
Data Recovery | All local data protection and data protection role privileges and the ability to do data recovery operations. However, there is no privilege to create new storage objects

**Unisphere Client and Server**

Unisphere Client and Unisphere Server are Unisphere software packages that can be installed on a Windows workstation. CLARiiON users might be familiar with Off-array Navisphere. Unisphere Client and Server provide the same functionality as Off-array Navisphere.

You can choose to install only the Unisphere Client on a Windows server. This will launch 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 client stations and processes those requests locally through the Windows server. Client stations can point to the IP address of the Windows server, download the UI applet, and start managing the environment. The Windows server can be assigned as the domain master.

Unisphere Client and Server packages provide the following advantages:

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

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

- **Less management overhead on the storage system** – With Unisphere Server running on a Windows server, it will help to offload certain management CPU cycles from the SPs.

**Interoperability and backward compatibility**

This section describes the considerations for your existing infrastructure when implementing Unisphere 1.0.

**NOTE:** At this time, this section is not applicable to Unisphere 1.1 for managing VNX systems.

- **CLARiiON systems with older FLARE versions** – Unisphere can manage legacy CLARiiONs systems running FLARE code as early as release 19. However, Unisphere will not be able to display capacity information on the dashboard for these systems.

- **Celerra systems with older DART versions** – Unisphere can only manage Celerra systems running DART release 6.0. Future versions of DART will also be compatible with Unisphere. Celerra systems running older versions of DART can be added to the System list and made visible in Unisphere. However when you click the icon for these Celerra systems, Unisphere will launch Celerra Manager to perform management operations.

- **AX4 systems** – Unisphere can manage AX4 systems running FLARE release 23 if they have the full Navisphere Manager license installed. AX4 customers with Navisphere Express can have their systems managed by Unisphere by upgrading to Navisphere Manager. However, Unisphere will not be able to display capacity information on the dashboard for AX4 systems.

- **NX4 systems** – For existing NX4 systems, the NAS portion can be upgraded to Celerra release 6.0. Unisphere is the default management interface on the Celerra 6.0 release. For an NX4 system with a Fibre Channel portion, the management interface will remain Navisphere Express. The FC
back end can also be managed by Unisphere once Navisphere Express is upgraded to a full Navisphere Manager license.

- **CLARiiON global user accounts** – All existing CLARiiON global accounts will work with Unisphere.

- **Celerra user accounts** – All existing Celerra user accounts will work in Unisphere; these accounts will automatically be assigned a “local” scope.

- **Command line interface** – The CLIs for CLARiiON and Celerra systems are still separate and unchanged. Existing installations of CLI clients and any scripts that you have on your hosts will continue to work as before. The Navisphere 7.30 CLI client, which is releasing with FLARE release 30, can be set to enforce certificate validation with any CLARiiON running FLARE release 19 or later.

- **Host software** – The earlier versions of a Navisphere host agent running on your servers will continue to work and no changes are required to make it work with Unisphere. However, you may want to install Unisphere 1.0 host software (releasing with FLARE release 30) to secure connections with certificate validation. Unisphere 1.0 software is backward-compatible to FLARE release 19 and later.

- **Domains** – Your existing domain setup will not require any changes for Unisphere. You do not need to change your current domain master. You can add CLARiiON systems running FLARE 30 and Celerra systems running DART 6.0 to your current domain setup. However, to manage all of the systems, you will need to launch Unisphere by pointing your browser to either the Celerra Control Station running DART 6.0 or the CLARiiON SPs running FLARE 30.

- **Off-array packages** – Older versions of the off-array UI and management server will not be able to manage CLARiiON systems running FLARE 30. You need to upgrade to release 30 Unisphere Client and Server. With the Unisphere Client, you will be able to manage DART 6.0 Celerra systems and CLARiiON systems running FLARE release 19 or later.

- **Licenses and enablers** – Existing licenses and enablers for Celerra Manager and Navisphere Manager and optional products like NQM and Analyzer are supported and will continue to work with Unisphere.

### Implementing Unisphere 1.0 for existing environments

**NOTE:** At this time, this section is not applicable for Unisphere 1.1 for managing VNX systems.

The following is a step-by-step procedure for installing Unisphere 1.0 to manage your file and block environments:

1. Install Unisphere in your existing CLARiiON environment. You do not need to change your existing CLARiiON domain setup. There are two options for installing Unisphere into your existing environment:
   - **Option 1:** Install an off-array Unisphere Client on a Windows workstation and point it to a CLARiiON system in the domain. You don’t need to upgrade any systems to FLARE release 30 with this option.
   - **Option 2:** Add a FLARE release 30 CLARiiON to your existing domain setup or upgrade any existing CLARiiON system in the domain to FLARE release 30. After doing that, point your browser to the FLARE release 30 system to launch Unisphere.

2. Log in with your existing global accounts or LDAP accounts.

3. Accept the certificates from all systems in the domain.

4. Add the Celerra systems to the domain. You will need to provide existing local credentials for the Celerra and accept the certificates for it to be added to the domain.

Note that only Celerra systems on DART 6.0 can be managed by Unisphere. Older version DART systems will be visible in Unisphere, but Unisphere will launch Celerra Manager for management operations.
5. Map the global accounts to the appropriate role in Celerra. “Appendix: Mapping global users in Celerra” explains how to map the global accounts.

That’s it! If all your systems are in the same domain, with a single sign-in, you will get access to your entire file and block environment.

**Unisphere feature support matrix**

Table 3 lists the new features in Unisphere and the version in which they are supported. The features that are not shown in this matrix are supported in both versions of Unisphere.

**Table 3. Unisphere feature support matrix**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Unisphere 1.0</th>
<th>Unisphere 1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management of previous-generations systems</td>
<td>✔ *</td>
<td>✗**</td>
</tr>
<tr>
<td>Integrated storage domains, multi-domains, and single sign-on</td>
<td>✔</td>
<td>✗**</td>
</tr>
<tr>
<td>Aggregated alerting</td>
<td>✔</td>
<td>✗**</td>
</tr>
<tr>
<td>Dashboard</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Navigation and user interface</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>System dashboard</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Tables</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Summary views</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Hardware views</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>RecoverPoint/SE integration</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Link and launch products</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Support ecosystem</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Persistent settings</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Certificate validation</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Updated global user roles</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Unisphere Client and Unisphere Server packages</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>MirrorView and SAN Copy management from GUI</td>
<td>✔</td>
<td>✗**</td>
</tr>
</tbody>
</table>

* Unisphere 1.0 can only manage Celerra systems with DART 6.0 and all CLARiiON systems from FLARE 19 to FLARE 30.

** The feature is currently not available with Unisphere 1.1. It will be added in the next maintenance release.
Conclusion

EMC Unisphere is a simple, intuitive yet powerful tool for managing midrange storage environments. Unisphere provides:

- A single management tool for managing midrange storage environments
- Integration with existing environments
- All of the previous functionality of Navisphere Manager and Celerra Manager
- 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 support needs

References

- Unisphere Online Help
- EMC CLARiiON Security Configuration Guide
- Security Configuration Guide on VNX for File
- Domain Management with EMC CLARiiON Storage Systems

Appendix: Mapping global users in Celerra

NOTE: This section is not applicable for Unisphere 1.1 for managing VNX systems.

All global users created in Unisphere 1.0 are propagated to the Celerra Control Station with “operator” privileges. If the storage administrator wants to provide the global user a different role for Celerra system settings, he can map the user by following the steps listed below. This is a one-time operation; the global user will continue to have the new privileges for subsequent logins.

1. Create global users with the appropriate roles from the Domains tab in Unisphere. If you already have global users from your CLARiiON environment, you do not need to create new users; you can map the existing users to the Celerra system.
2. For each Celerra system that is an added domain, log in with root credentials. Make sure you select the scope as “local”.
3. Navigate to the Celerra system from the dashboards.
4. Display the newly created global users or the existing global users by selecting Settings > User Management.
5. For each user who needs to be mapped, select the properties of the user.
6. From the Properties page, select the appropriate role for the user.

To assign nasadmin (administrative) privileges to a user, you need to assign fullnas and Control Station shell allowed permissions to that user.

7. Follow the same procedure for all Celerra systems in the domain.

The new mapped role for the user will be active the next time you log in to Unisphere with a global scope.