UNISPHERE FOR VMAX MAINFRAME DASHBOARD

ABSTRACT
This white paper describes the features and functionality of the Mainframe Dashboard component of Unisphere for VMAX.

May, 2017
# TABLE OF CONTENTS

## EXECUTIVE SUMMARY

AUDIENCE

4

## OVERVIEW

4

## MAINFRAME DASHBOARD

DESCRIPTION

5

HELP BUTTON

6

REFRESH BUTTONS

6

FILTER LIST BOX

6

## CKD COMPLIANCE

STORAGE GROUP LIST VIEW

7

## COMMON TASKS

PROVISION STORAGE TO MAINFRAME

18

CREATE CKD VOLUMES

19

## SUMMARY

SPLITS

21

CU IMAGES

23

CKD VOLUMES

28

## CONCLUSION

29
EXECUTIVE SUMMARY

EMC® Unisphere™ for VMAX™ is a web-based application for the configuration and management of VMAX storage systems. Unisphere for VMAX Version 8.2.0 introduced support for the creation, management and deletion of CKD devices, through the use of the new Mainframe Dashboard. The Mainframe Dashboard provides a single place to monitor and manage configured splits, CU images and CKD volumes.

With the release of HYPERMAX OS 5977.811.784, Unisphere for VMAX introduces service level provisioning for mainframe. Service level provisioning simplifies VMAX management by automating many of the tasks associated with provisioning storage. It eliminates the need for storage administrators to manually assign physical resources to their applications. Instead, storage administrators can specify the service level and capacity required for the application and the system provisions the storage group appropriately. CKD storage can be provisioned to a mainframe host using the Provision Storage wizard.

With the release of HYPERMAX OS 5977.xxx.xxx, Unisphere for VMAX introduces Support of CDK support on the VMAX 950F. This white paper details the additional functionality around this release.

AUDIENCE

This white paper is intended for information technology professionals, z/OS systems architects and IT storage administrators. It assumes that basic knowledge is known about EMC VMAX technologies, operating environments and EMC VMAX concepts, and that the reader is already familiar with the Storage, Data Protection and Performance dashboards of Unisphere for VMAX.

OVERVIEW

Unisphere for VMAX delivers a web-based graphical user interface that allows point-and-click selection of object and action sequences.

A mainframe attached VMAX must obey the configuration characteristics defined by the z/OS host operating system. Based on the evolution of mainframe hardware components, there are several key configuration structures associated with addressing devices on FICON directors.

Historically, a Control Unit (CU) managed commands from the Channel Subsystem to a particular disk drive. Although early CUs had less than 256 drives attached to them, this number 256 is today's maximum number of volumes that can be defined within each CU.

As storage arrays advanced to contain more than 256 volumes, arrays presented Logical Control Units (LCUs) to the Channel Subsystem. Each CU and each LCU had its own unique Subsystem Id (SSID), and the legacy of these structures remains in place today.

Addressing on FICON directors is divided into Logical Control Unit images that each have their own unique SSID and contain a maximum of 256 devices.

The VMAX storage array can emulate up to 255 LCUs per FICON director port. To support customer environments with greater than 255 LCUs (with 256 devices each), another logical abstraction was necessary. The VMAX can be defined to logically represent several arrays, each logical array being referred to as a Split. With Splits defined, the VMAX can contain the same LCU addresses several times (duplicates), but the SSIDs for each LCU are different.

Within an LCU, there are operating system restrictions for devices. Disk hardware evolution is responsible for requirements built into the VMAX configuration program. Disk-drive track formatting and disk-drive size has been standardized by the mainframe products of the past.

Normal configuration practices are to use the standard drive sizes such as 3390-1, 3390-3, 3390-9, 3390-27 and 3390-54.

Unisphere for VMAX has these definitions built into Configuration Wizards to make device creation as simple as possible. Both 3380 and 3390 devices are supported by the Configuration Wizards.
MAINFRAME DASHBOARD

To access the Mainframe Dashboard:

1. Select the storage system.
2. Select Hosts > Mainframe Dashboard

![Mainframe Dashboard Image]

**DESCRIPTION**

The Mainframe Dashboard consists of the following panels:

- **CKD Storage Compliance Panel**: This panel contains five tiles, each represents a different list of Storage Groups (SGs) categorized by their current level of compliance to their defined Service Level Objective, similar to the current Storage Group Dashboard. Each tile navigates to a list view for those SGs.

- **Common Tasks Panel**: A user-selected link which opens the appropriate wizard to perform the appropriate management operation.
  - Provision Storage for mainframe
  - Create CKD Volumes

- **Summary Panel**: A panel of three tiles detailing the number of a particular object. Each tile navigates to a list view for that object.
  - Splits
  - CU Images
  - CKD Volumes
HELP BUTTON
Each view has a Help Button at the top right which opens a separate Online Help wizard that explains the information shown and the functions available in that view.

Figure 2 Help Button

REFRESH BUTTONS
Each view has two Refresh Buttons at the bottom left that refresh either the data displayed in the console window, or all the storage system data.

Figure 3 Full Refresh Button

Figure 4 Partial Refresh Button

FILTER LIST BOX
Each view after the Mainframe Dashboard has a Filter list box at the top right, next to the Help Button. This opens a Filter box to search or filter by the name of the required object.

Figure 5 Filter List Box

The example below of the Storage Group List View shows all storage groups matching the filter for a prefix “SG_DEV_”

Figure 6 Storage Group List View(1)
CKD COMPLIANCE

Selecting one of the five CKD Compliance tiles (Total, Stable, Marginal, Critical or No Service Level) presents a Storage Group List View for the storage groups appropriate to that level of compliance.

STORAGE GROUP LIST VIEW

The first view shows the appropriate list of storage groups and the Create SG button in the footer is the only available option.

0 Selected 5 Items

Create SG Modify Provision Storage to Mainframe Protect Manage Protection Set Host I/O Limits View Details

Figure 7 Storage Group List View(2)

Selecting one of the storage groups presents all the options in the footer: Create SG, Modify, Provision Storage to Mainframe, Protect, Manage Protection, Set Host I/O Limits and View Details. Double clicking the storage group presents the View Details screen. For example:

Figure 8 Storage Group List View(3)
CREATE SG BUTTON

Click **Create SG** to create a new storage group, enter a new unique name for the group, the appropriate SRP and an emulation of CKD-3380 or CKD-3390. Select a service level of Optimized, Bronze or Diamond, with the number of new volumes and their model type.

![Figure 9 Create Storage Group(1)](image)

Hovering over the Service Level/Volumes/Model/Volume Capacity boxes brings up an Edit Pen icon to the right of the text "System Optimized". Clicking on the Edit Pen opens up further options for pre-allocating volume capacity and optionally making the allocated capacity persistent, as shown below:

![Figure 10 Create Storage Group(2)](image)
The **Add Service Level** button allows for multiple different service levels within the one storage group: creating cascaded storage groups. Here the cascaded groups have different number of volumes, different model types and different expected service levels.

![Figure 11 Add Service Level Button](image)

Click **Next** to Select CU Image:

![Figure 12 Select CU Image](image)
Then select one of the existing CU Images:

Figure 13 Select Existing CU Image

Click **Set Base Address** if you want to use a base address other than the first available address:

Figure 14 Select Base Address
Click **OK** and click **Next**.

Figure 15 Run Suitability Check

Click **Run Suitability Check** to check Front End, Back End and Cache resources and determine the suitability of the changes in terms of the expected availability on the storage system. In the first example below, the storage creation is expected to be within the defined service levels.

Figure 16 Suitability Check Results(1)
In this second example, the creation of 300 3390 model 27 volumes exceeds the defined service levels as the suitability graph indicates.

Figure 17 Suitability Check Results (2)

Figure 18 Suitability Check Results (3)
Click the list box of Add to Job List, and select either Add to Job List or Run Now.

When the Storage Group List View appears it includes the newly created cascaded storage group.

Figure 19 Cascaded Storage Group

**MODIFY BUTTON**

Use the Modify button to change Storage Resource Pool, Service Level and/or the defined volume capacity of the storage group.

Figure 10 Modify Button
PROVISION STORAGE TO MAINFRAME BUTTON

In a similar way to creating a Storage Group from scratch, use the **Provision Storage to Mainframe** button to create storage within an existing storage group, on either a new or existing CU Image.

![Figure 21 Provision Storage to Mainframe](image)

PROTECT BUTTON

The **Protect** button invokes the Protect Storage Group wizard in the same way as selecting a storage group under the Data Protection Dashboard. It presents options to protect the storage group with either SnapVX local replication or SRDF remote replication.

![Figure 22 Protect Storage Group](image)
Point in Time Using SnapVX:

![Image of SnapVX interface showing point in time using SnapVX](image)

**Figure 23 SnapVX**

Remote Replication Using SRDF:

![Image of SRDF interface showing remote replication](image)

**Figure 24 SRDF(1)**
When a storage group has existing local or remote protection in place, you can use the `Manage Protection` button to change the level of protection. For example, where a storage group is protected locally, `Manage Protection` invokes the Data Protection Dashboard TimeFinder/SnapVX wizards for creating, linking and restoring snapshots.

**SET HOST I/O LIMITS BUTTON**

You can use the `Host I/O Limits` button to restrict a storage group’s Host I/O by MB/Sec or IO/Sec.
VIEW DETAILS BUTTON

To display compliance status, definition, and capacity information for a storage group, either:

- Double-click the name of the storage group in the Storage Group List view.
- Select the name of the storage group and click View Details.

The Related Objects list and Performance View contain links to view Volumes, CU Images, Snapshots and performance statistics under the Storage, Data Protection and Performance Dashboards.

![EMC Unisphere for VMAX UI](image)

**Figure 26 View Details**

**>> BUTTON**

The ">>" button (at the right hand end of the footer bar of options) reveals further actions for the highlighted storage group.

For example, the Start or Stop Allocate/Free/Reclaim functions can be started from here. Use these functions to manage track allocations prior to deletion of a storage group.

![EMC Unisphere for VMAX UI](image)

**Figure 27 >> Button**
COMMON TASKS

The Common Tasks tile on the Mainframe Dashboard has links to the Provision Storage wizard and the Create Volumes wizard.

PROVISION STORAGE TO MAINFRAME

The Provision Storage link invokes the same Provision Storage wizard as seen previously from the Create SG and Provision Storage to Mainframe buttons.

![Figure 28 Provision Storage](image-url)
CREATE CKD VOLUMES

You can use the Create CKD Volumes wizard to create a number of volumes, optionally within an existing storage group, and optionally with the full capacity pre-allocated and set to persistent. This example creates three new 3390 model 54 volumes.

Figure 29a Create Volumes Wizard

Figure 29b Successfully Created Volumes - TDEV range 001B0–001B2 is created.

The Volume List display (here using the filter options to display only model 54) shows the three newly-created TDEVs. It also shows they are not assigned to a Split or any CU Image.

Figure 30 Volume List Display
This example repeats the Create CKD Volume process, this time assigning the storage group at creation time. The resulting new TDEVs are part of the selected storage group, but as in the previous example, the devices are not associated to a Split or any CU Image until they are mapped (z/OS mapping).
SUMMARY
The Summary section of the Mainframe Dashboard has three tiles: Splits, CU Images and CKD Volumes

SPLITS
The Splits List View shows each defined split, its alpha serial, whether HYPERPAV is enabled and the number of associated CU Images and Ports.

<table>
<thead>
<tr>
<th>Split Name</th>
<th>Alpha Serial #</th>
<th>HyperPAV</th>
<th>CU Images</th>
<th>Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLIT</td>
<td>ALAXD</td>
<td>Enabled</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 33 Splits List View

Click a split or select it and click View Details to view a summary of its properties and a Related Objects tile with links to the associated Ports and CU Images.

Figure 34 View Details

RELATED OBJECTS: PORTS
Click the link to Ports to display a list view of the properties of each port and director within the split.

<table>
<thead>
<tr>
<th>Director</th>
<th>Port</th>
<th>Director Status</th>
<th>Port Status</th>
<th>Type</th>
<th>Port ID</th>
<th>Volumes</th>
<th>ACLX</th>
<th>Cores</th>
<th>Speed GB/..</th>
<th>Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF-1E</td>
<td>24</td>
<td>Online</td>
<td>ON</td>
<td>FICON</td>
<td>N/A</td>
<td>204</td>
<td>-</td>
<td>2</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>EF-2E</td>
<td>24</td>
<td>Online</td>
<td>ON</td>
<td>FICON</td>
<td>N/A</td>
<td>204</td>
<td>-</td>
<td>2</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

Figure 35 Ports View
Select a port and click **View Details** to display the properties information. The Related Objects and Performance Views tiles contain links Mapped Volumes, the Splits List view and the Analyze and Monitor functions of the Performance Dashboard.

**Figure 36 Port View Details**

This is the Mapped Volumes List View from Related Objects:

**Figure 37 Mapped Volumes List View**
**RELATED OBJECTS: CU IMAGES**
Click the link to CU Images to see the CU Image List View.

**CU IMAGES**
Click the CU Images tile of the Mainframe Dashboard to see the CU Images List View that contains the properties of each CU Image in the each defined split.

![Image](EMC_unisphere_for_VMAX_V826S.png)

**Figure 38 CU Images**

Select a CU Image to view the z/OS map and unmap, Assign and Remove Alias and View Details functions in the footer bar.

**Z/OS MAP BUTTON**
The z/OS Map button maps volumes to a particular CU Image. First enter criteria for finding the volumes to map.

Select the TDEVs/volumes to be mapped, and click Summary to proceed:

![Image](CU_Image_Map.png)

**Figure 39 CU Image Map**
Figure 40 Select TDEVs to Map

**SET THE BASE ADDRESS IF REQUIRED AND PROCEED WITH ADD TO JOB LIST OR RUN NOW**

Figure 41 Mainframe Volumes Mapping Successful
Z/OS UNMAP BUTTON

The z/OS Unmap function removes a mapped TDEV from the selected CU Image.

Select Add to Job List or Run Now.

Figure 42 z/OS Unmap

Figure 43 Mainframe Volumes Unmapping Successful
**ASSIGN ALIAS RANGE BUTTON**

This allows for adding PAV address ranges to a range of volumes already mapped to a CU Image. Typically the alias address range is started at the end of the volume range, working backwards for the number of aliases to be defined.

Figure 44 Assign Alias Range

After running the command, the CU Image List View shows the Number of Aliases populated for the CU Image.

Figure 45 CU Image List View

**REMOVE ALIAS RANGE BUTTON**

The **Remove Alias Range** button removes assigned alias address ranges from the definition of the CU Image.

Figure 46 Remove Alias Range
To display the properties of CU images along with an Objects tile that contains links to the Splits List View, the Storage Groups List View, and the Mapped Volumes List View, either:

- Double-click the name of a CU image.
- Select a CU image and then click View Details.
**CKD VOLUMES**

Click the CKD Volumes tile on the Mainframe Dashboard to view a list of the CKD TDEVs. This list includes both those mapped and unmapped to CU Images. Use the Filter list box to display particular volumes or ones of a specific type.

---

**CREATE VOLUMES BUTTON**

Use the **Create Volumes** button to display the Create CKD Volumes wizard also available from the Common Tasks link on the Mainframe Dashboard.

**CREATE SG BUTTON**

Use the **Create SG** button to start the Create Storage Group wizard also available from the Storage Group List View on the CKD Compliance tiles of the Mainframe Dashboard.

**DELETE BUTTON**

Use the **Delete** button to remove TDEVs/Volumes. Before you can delete a TDEV:

- Unmap the TDEV from any CU Image.
- Set the Volume Status to Not Ready.
- Free the back-end track allocations.

**>> BUTTON**

The ">>" button provides further actions for CKD Volumes. Here the track allocations for a volume can be freed. You can change volume status and map a volume to, or unmapped one from, a CU Image.
CONCLUSION

Unisphere for VMAX is an operating system storage management tool that delivers easy and intuitive VMAX array management. Intelligence is built into Unisphere to guide the user towards selecting the appropriate object within the array hierarchy before initiating a command sequence. Array properties can be viewed and array configuration changes can be initiated and managed. Users of all experience levels will find this tool helpful as configuration wizards streamline parameter entry and make tasks easy and efficient.

Mainframe specific configuration tasks are available under the Mainframe Dashboard. These Mainframe items are intended to allow storage administrators to perform Count Key Data (CKD) specific configuration changes on VMAX arrays. Enabling authorized storage administrators to directly perform array modifications will reduce complexity and improve time frames for activities administered under change control systems.

Unisphere for VMAX provides ease and simplicity for current functionality and it will deliver the same intuitive constructs for any future functionality, lessening the learning curve when implementing new technology.