

VMAX Management: Mainframe Tasks Simplified with Unisphere for VMAX and EzSM

Barry Snoots
EMC Corporation

August 14, 2013
Session Number 13983



Objectives

- Simplify management of your VMAX arrays with Unisphere and EzSM
- Use Unisphere for monitoring and reporting on VMAX array performance
- Describe latest enhancements to Unisphere and EzSM

Challenges of Managing Storage in Today's Mainframe Environments

- Operational complexity
- More requirements to provide replication to ensure security
- Increasing pressure to do more with fewer staff



Unisphere for VMAX

Powerful. Smart. Trusted.

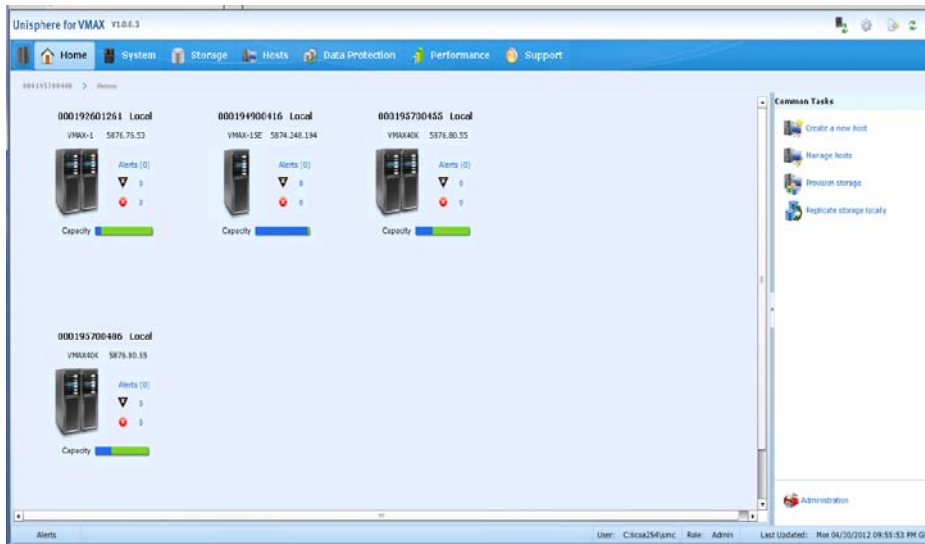
Unisphere for VMAX Overview

| Feature | Description |
|-----------------------------|--|
| Single pane of glass | Configuration, Performance, Alerting ... |
| Single eLicense entitlement | Array-based license for managing and monitoring |
| Big button design | Common tasks throughout all functions |
| Common Tasks | Configuration Wizards and dialogs simplify configuration changes and updates |

- Unisphere for VMAX supports:
 - ▶ Symmetrix VMAX 20K/VMAX Series systems
 - ▶▶ Enginuity 5874 or higher
 - ▶ Symmetrix VMAX 40K Series systems
 - ▶▶ Enginuity 5876 or higher
 - ▶ Symmetrix VMAX 10K/VMAXe Series systems
 - ▶▶ Enginuity 5875 or higher

Flexible Management Options and Tools

Unisphere for VMAX

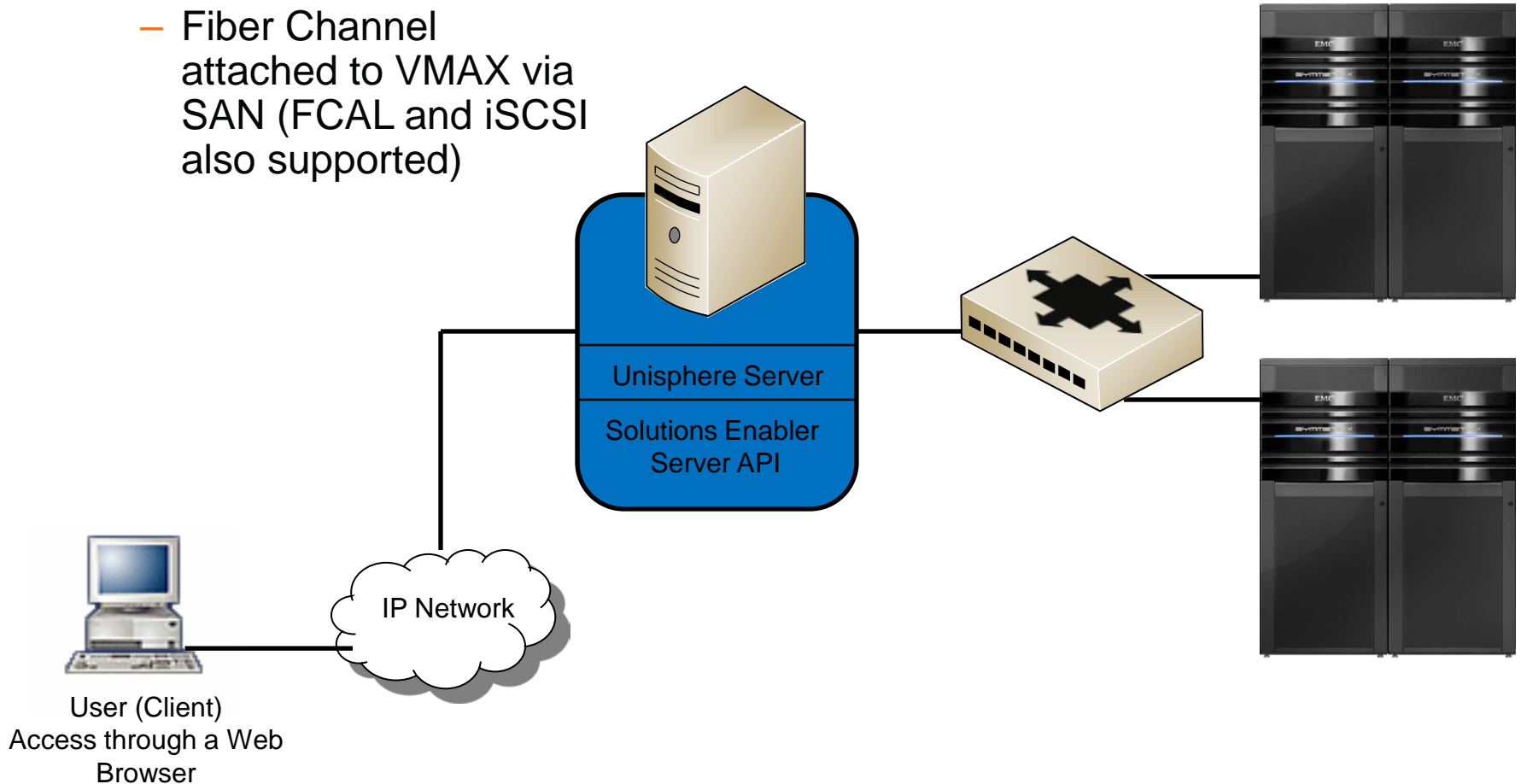


Unisphere for VMAX

- Array-based configuration and monitoring
- Accelerates Symmetrix setup and configuration
- Tiered storage management
- Replication management and monitoring
- Monitor key Symmetrix performance indicators
- Heat map functionality

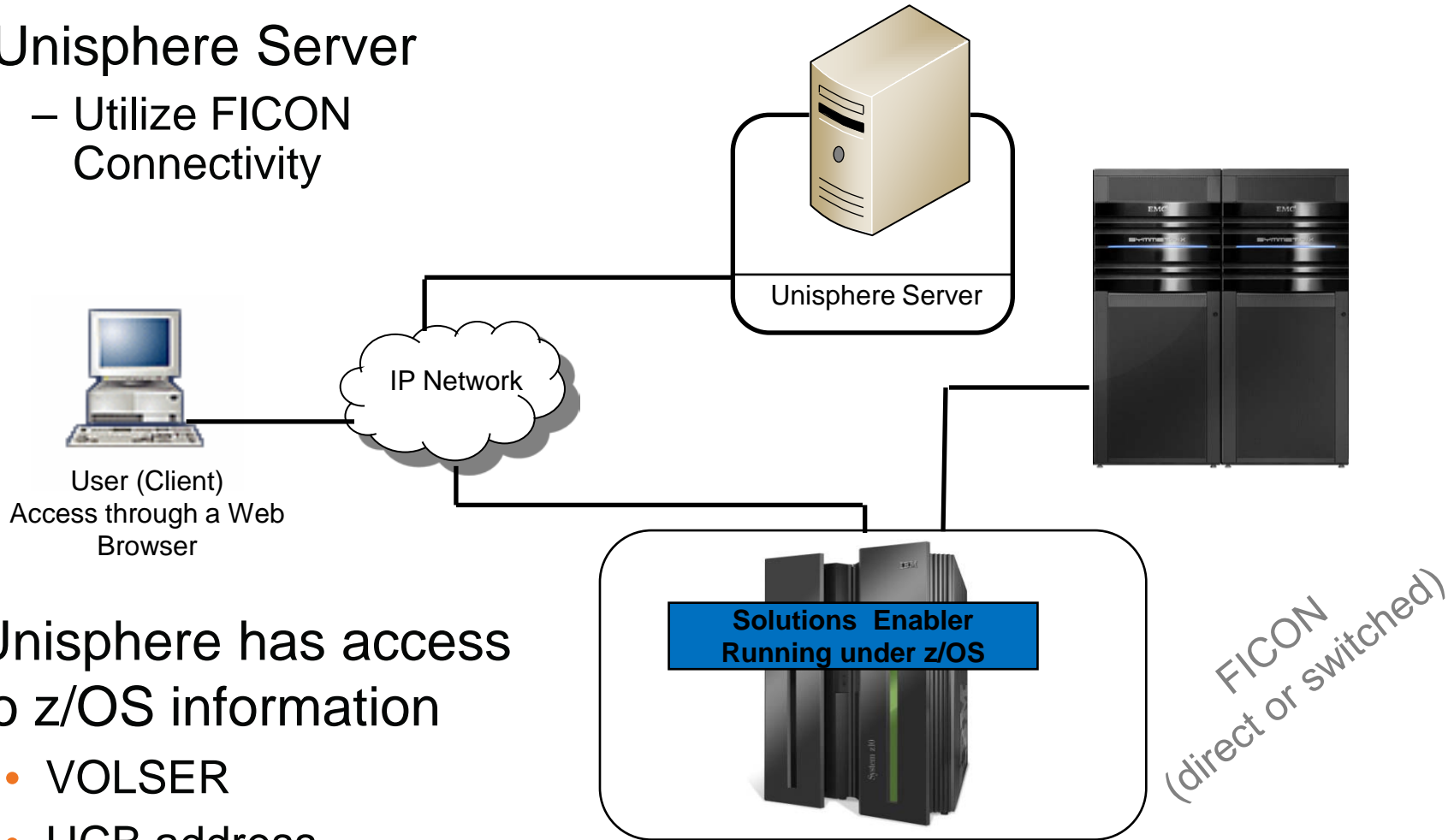
Flexible Deployment Options (recommended)

- Unisphere Server
 - Fiber Channel attached to VMAX via SAN (FCAL and iSCSI also supported)



Flexible Deployment Options

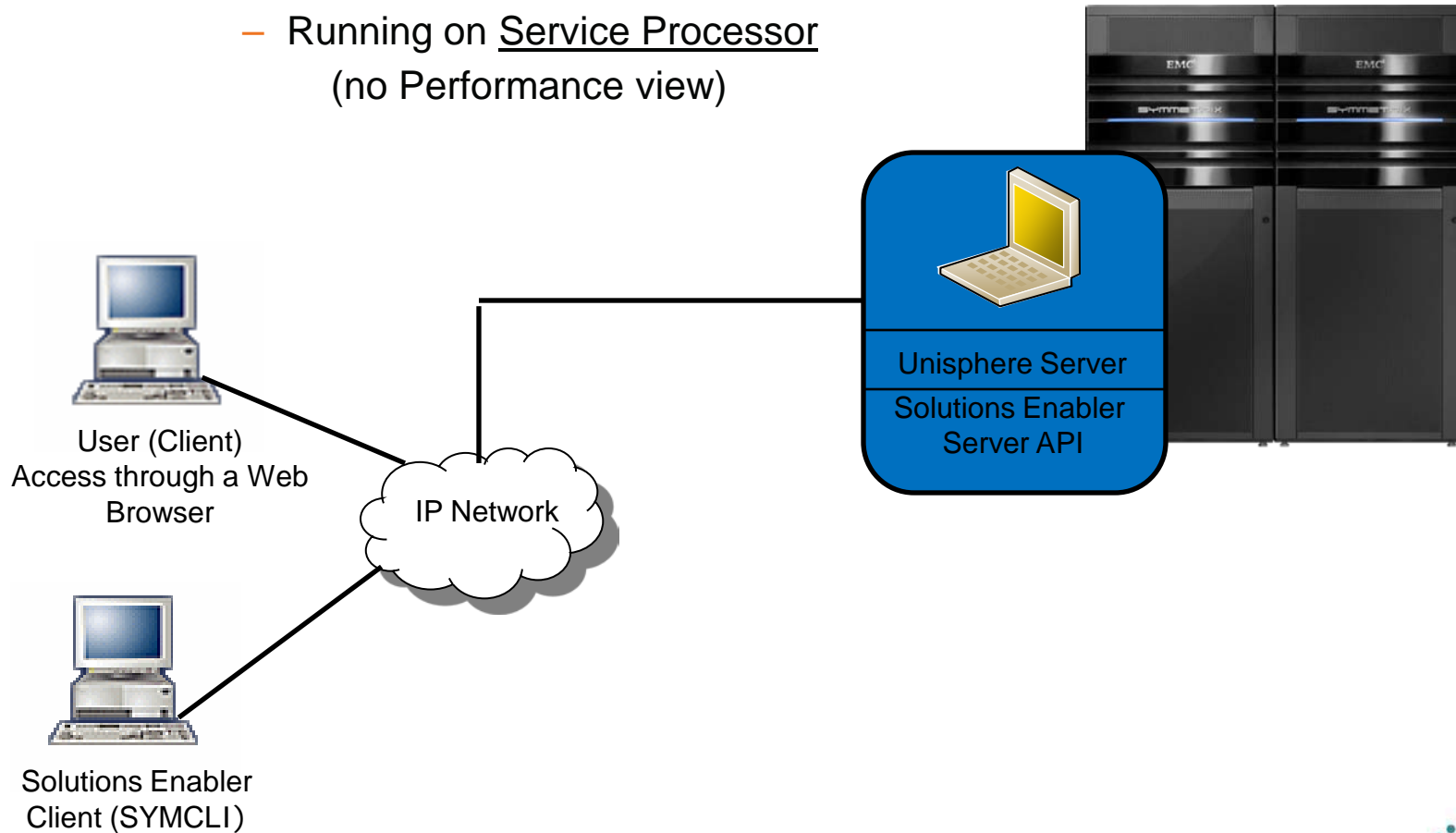
- Unisphere Server
 - Utilize FICON Connectivity



- Unisphere has access to z/OS information
 - VOLSER
 - UCB address

Flexible Deployment Options (not recommended)

- Unisphere Server
 - Running on Service Processor
(no Performance view)



Simplify Resource Provisioning

Create Volume ? □

Volume Type

Regular Virtual Private Template

* Configuration ▼

Emulation ▼

* Capacity

Number Of Volumes

Volume Capacity ▼ ▼

Total Capacity 7.93 GB / 10018 Cyl

SSID

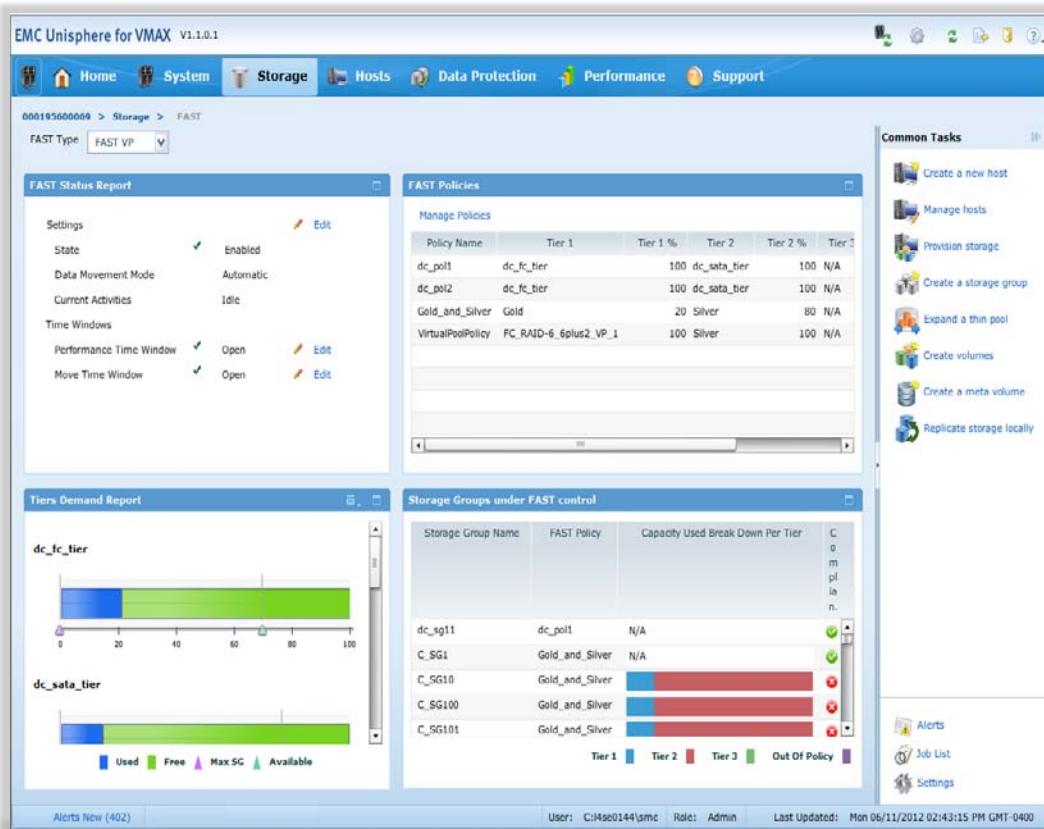
Bind to pool ▼

[Show Advanced>>](#)

▼

- Intuitive Wizards
 - Create Volumes
 - FAST VP Environment
 - Replication
 - Performance
 - Expand Pools

Simplified FAST Management Dashboard



Quick Access to

FAST Status

View and Manage Policies

Virtual Pool (Tiers) Demand

Tier Usage by Storage Group

FAST Management – Create Policy

EMC Unisphere for VMAX - Windows Internet Explorer

https://10.12.160.254:8443/univmax/#0xzsbfcv0366

EMC Unisphere for VMAX v1.5.0.6

Home System **Storage** Hosts Data Protection Performance Support

000195700455 > Storage > FAST > Manage Policies

FAST Policies

| Policy Name | Tier 1 | Tier 1 % | Tier 2 | Tier 2 % |
|-------------|------------|----------|-----------|----------|
| FBA_Initial | Jim_EFDR53 | 3 | Jim_FCR1 | 100 |
| FBA_LOG | Jim_EFDR53 | 3 | multipool | 75 |
| Gold | Jim_EFDR53 | 3 | Jim_FCR1 | 20 |
| paul_test | zOS_SD_R3 | 50 | zOS_FC_2M | 50 |
| SAP | Jim_EFDR53 | 2 | Jim_FCR1 | 27 |
| test | multipool | 100 | N/A | 0 |
| zos_bronze | zOS_FC_2M | 65 | zOS_AT_R3 | 35 |
| zos_gold | zOS_SD_R3 | 25 | zOS_FC_2M | 100 |
| zOS_OPT | zOS_SD_R3 | 100 | zOS_FC_2M | 100 |
| zos_silver | zOS_SD_R3 | 1 | zOS_FC_2M | 79 |

Create FAST Policy

* Policy Name:

* Emulation:

Tier * %

Tier %

Tier %

Tier %

Associated Storage Groups

| # Associated Storage Groups |
|-----------------------------|
| 1 |
| 1 |
| 0 |
| 0 |
| 0 |
| 0 |
| 0 |
| 0 |
| 2 |
| 1 |
| 0 |

Common Tasks

- Create a new host
- Manage hosts
- Provision storage
- Create a storage group
- Expand a thin pool
- Create volumes
- Create a meta volume
- Replicate storage locally

VMAX Performance Dashboards

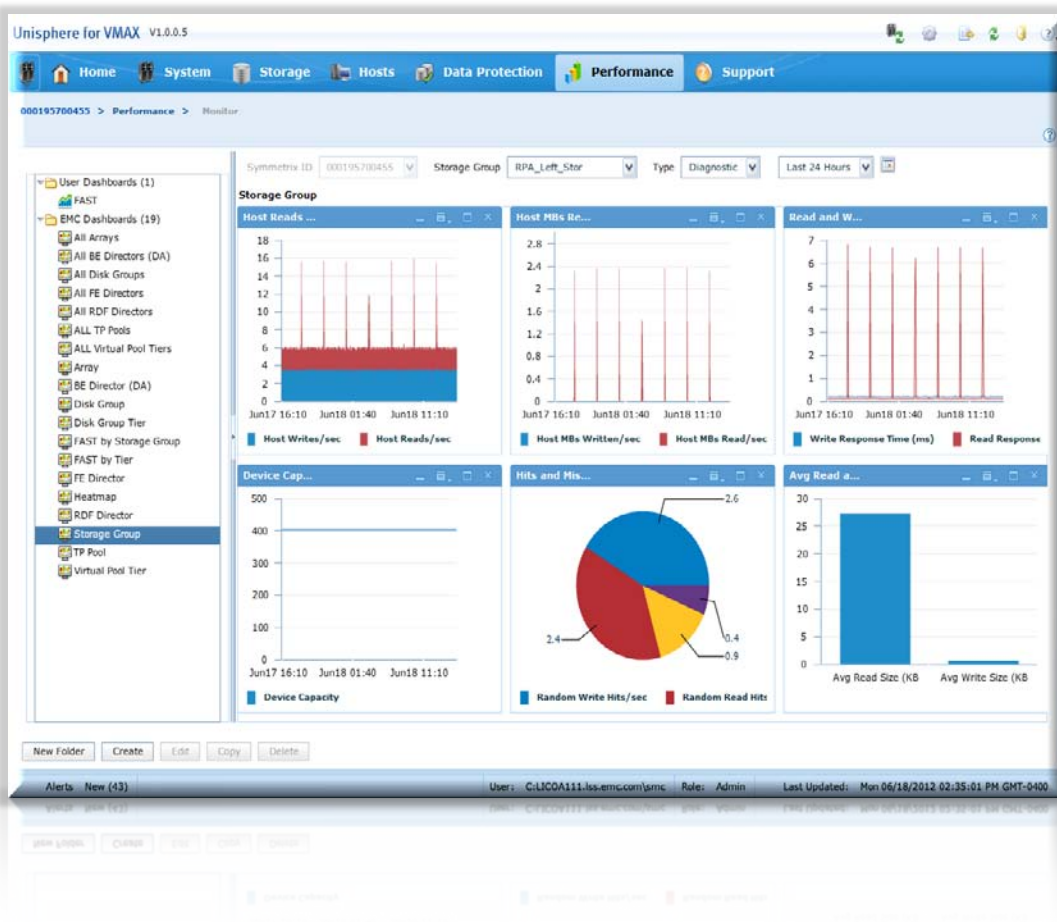
Customizable Dashboard Views

Dashboards

Standard, Pre-defined

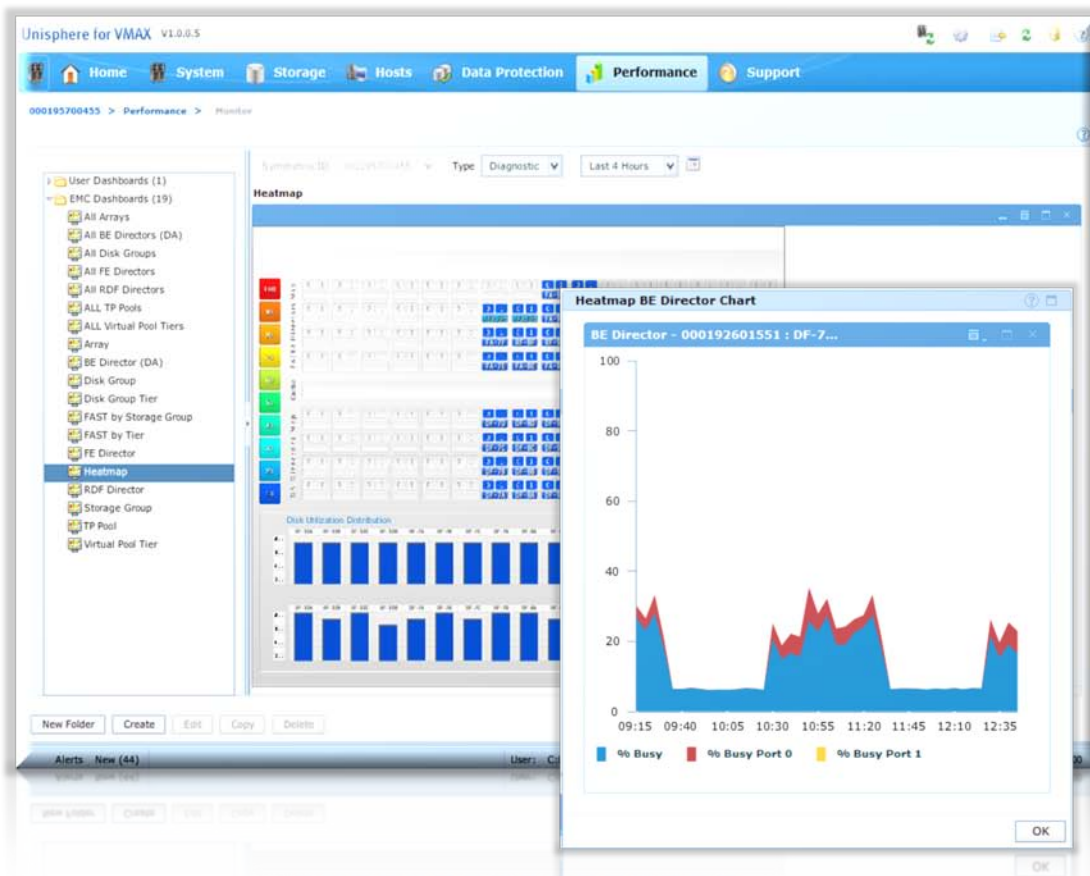
Customizable User-defined

— FAST Environment, SRDF, FE



Performance Capabilities

Quick Summary of Array Performance with Drill Down Capability



Heatmaps

Diagnostic, Historical, or Real Time

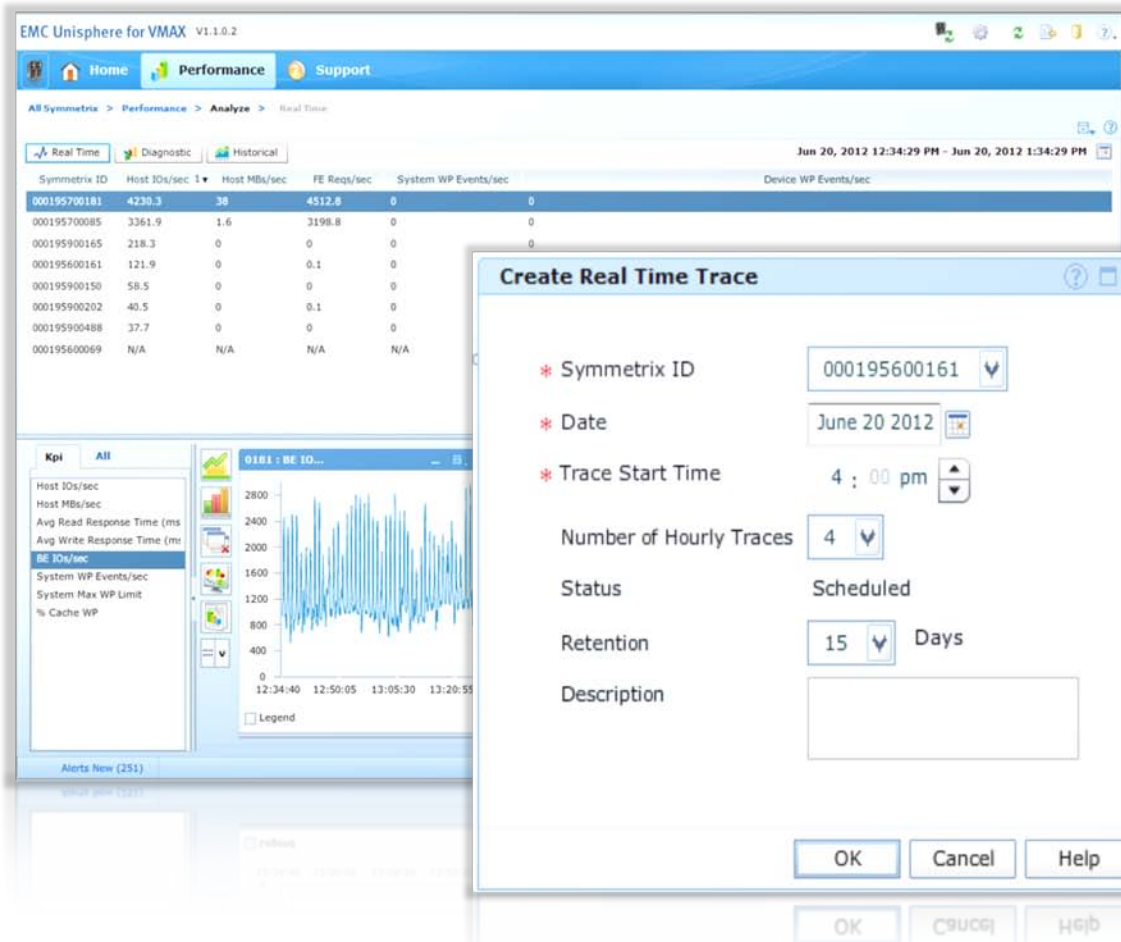
Categorized by:

- Front-end
- Cache
- Back-end
- Drives

Drill down to component level

Real-Time Monitoring

Schedule and Analyze Real-Time Performance Traces











The screenshot displays the EMC Unisphere for VMAX v1.1.0.2 interface. The main window shows a performance table with columns for Symmetrix ID, Host I/Os/sec, Host MBs/sec, FE Reqs/sec, System WP Events/sec, and Device WP Events/sec. A 'Create Real Time Trace' dialog box is overlaid on the interface, allowing users to configure a trace. The dialog includes fields for Symmetrix ID (000195600161), Date (June 20 2012), Trace Start Time (4:00 pm), Number of Hourly Traces (4), Status (Scheduled), Retention (15 Days), and a Description field. The background interface also shows a KPI dashboard with a line graph for 'BE I/Os/sec' and a list of alerts.

| Symmetrix ID | Host I/Os/sec | Host MBs/sec | FE Reqs/sec | System WP Events/sec | Device WP Events/sec |
|--------------|---------------|--------------|-------------|----------------------|----------------------|
| 000195700181 | 4230.3 | 38 | 4512.8 | 0 | 0 |
| 000195700085 | 3361.9 | 1.6 | 3198.8 | 0 | 0 |
| 000195900165 | 218.3 | 0 | 0 | 0 | 0 |
| 000195600161 | 121.9 | 0 | 0.1 | 0 | 0 |
| 000195900150 | 58.5 | 0 | 0 | 0 | 0 |
| 000195900202 | 40.5 | 0 | 0.1 | 0 | 0 |
| 000195900488 | 37.7 | 0 | 0 | 0 | 0 |
| 000195600069 | N/A | N/A | N/A | N/A | N/A |

- Capture real-time trace
 - Capture a period of 1 hour
 - Schedule up to 7 days into the future
 - Retention period up to 30 days
- Components monitored
 - Symmetrix
 - Front-end directors
 - Back-end directors
 - Remote Data Facility (RDF) directors

Enhanced Alert Notification

| Component | Alerts |
|-----------------|---|
| Array |  |
| FE Director |  |
| BE Director |  |
| Cache Partition |  |
| SRDF Groups |  |
| Device Groups |  |
| Storage Groups |  |
| Virtual Pools |  |

Rich Set of Alerts




Monitor Key Performance Indicators (KPIs)

Establish Threshold Levels

— Informational, Warning, Critical

Method of Notification

Notification Types

| | | |
|---|---|---|
| <input type="checkbox"/> Enable Syslog | <input type="checkbox"/> Enable Email | <input type="checkbox"/> Enable SNMP |
| Status:  | Status:  | Status:  |
| <input type="button" value="Apply"/> | <input type="button" value="Cancel"/> | |

Syslog

Email

SNMP

What's New in Unisphere 1.5



- Includes almost all SMC legacy functionality
- Supports new Enginuity features
- Adds more ease-of-use and Unisphere-specific enhancements

SMC (Symmetrix Management Console) Legacy Support

- Optimizer Management
- TF Mirror View and Management
- Health Check
- Duplicate Volume

New Enginuity Support

- FAST VP Compression

Details : Thin Pool : Compress

Properties

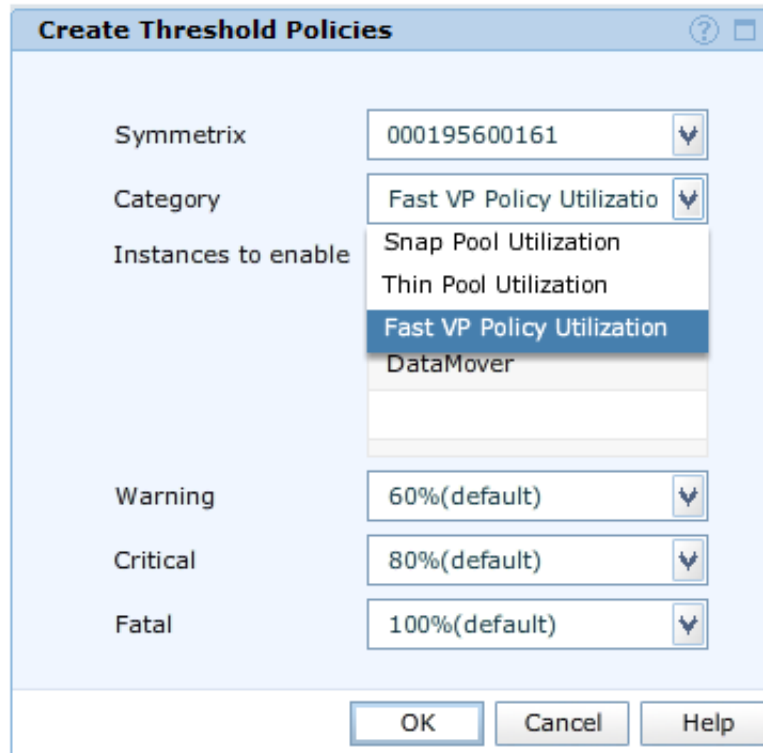
| | |
|-------------------------------|-------------------------------------|
| Enable VP Pool Compression | <input checked="" type="checkbox"/> |
| Saved By Compression (Tracks) | 125952 |
| Pool Compressed Ratio (%) | 47.71 |

◀ | ▶

Create Expand Bind >> | Apply Cancel

New Enginuity Support

- Utilization Thresholds for FAST VP policies



Create Threshold Policies

Symmetrix: 000195600161

Category: Fast VP Policy Utilizatio

Instances to enable:

- Snap Pool Utilization
- Thin Pool Utilization
- Fast VP Policy Utilization**
- DataMover

Warning: 60%(default)

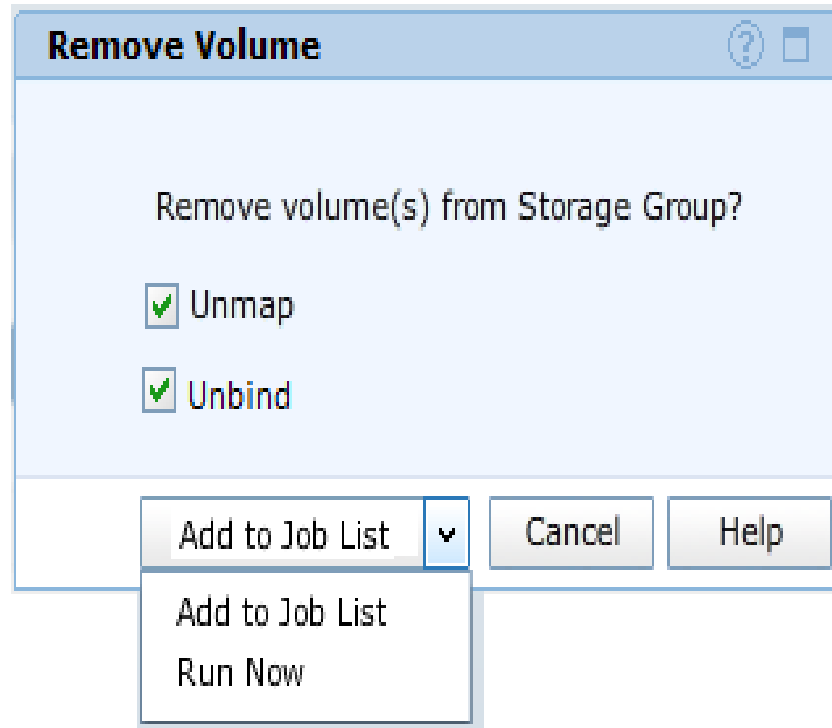
Critical: 80%(default)

Fatal: 100%(default)

OK Cancel Help

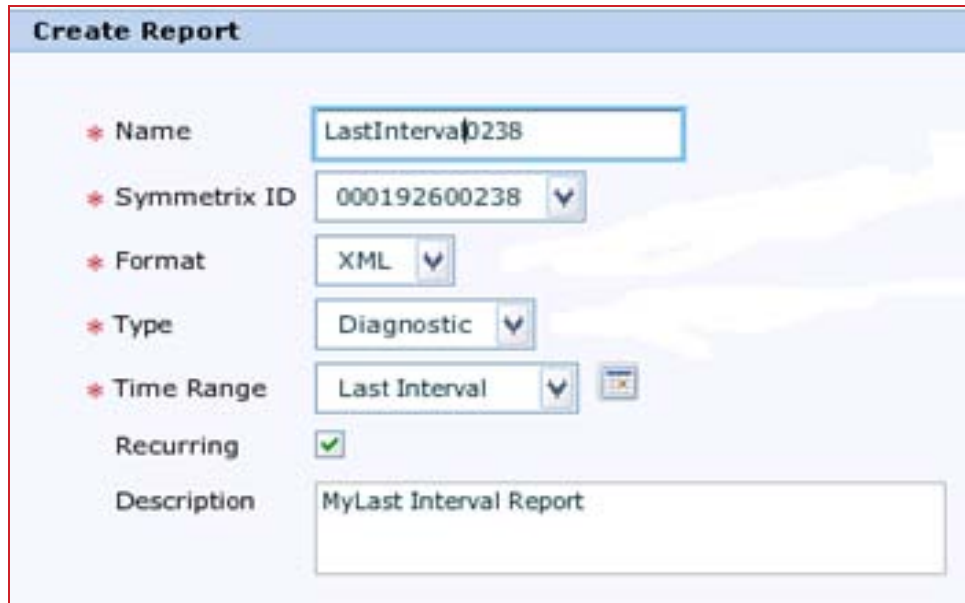
Unisphere Management Enhancements

- Add Unbind and scheduling to Remove Volume



Unisphere Performance Enhancements

- Exporting of last interval for array & director metrics
 - Only Diagnostic data



Create Report

* Name: LastInterval0238

* Symmetrix ID: 000192600238

* Format: XML

* Type: Diagnostic

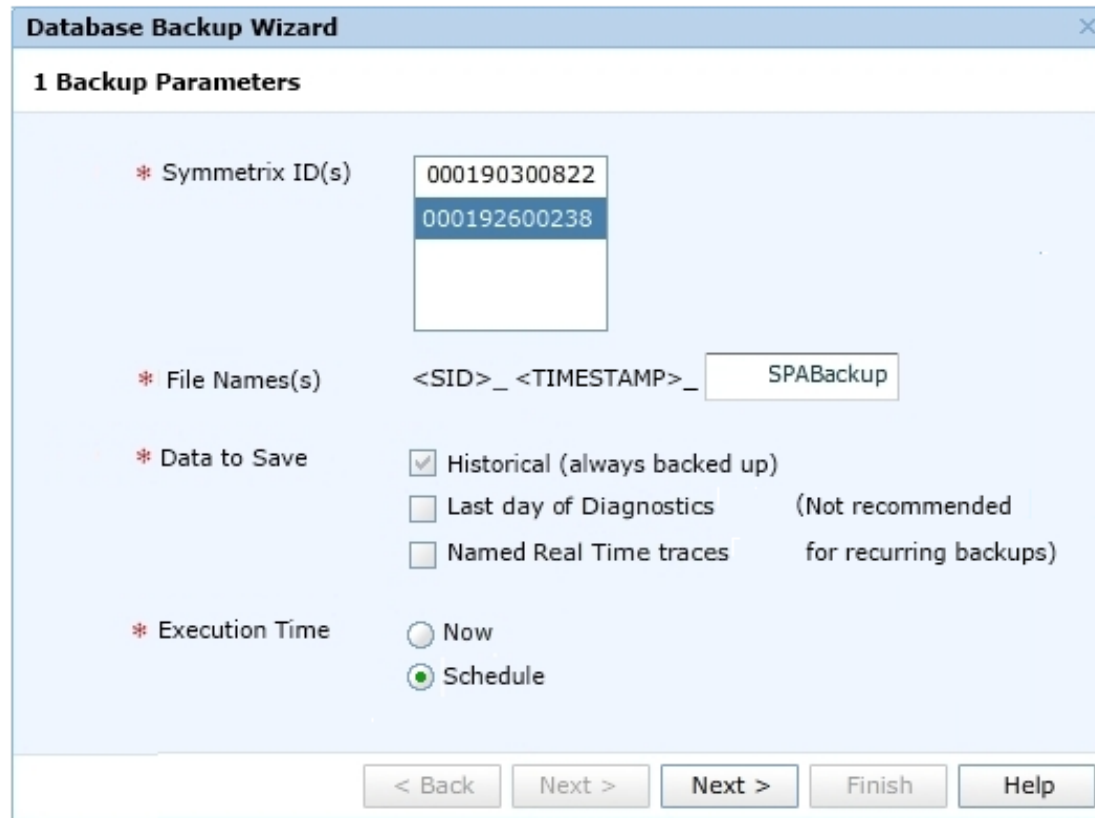
* Time Range: Last Interval

Recurring:

Description: MyLast Interval Report

Unisphere Performance Enhancements

- Recurring backups of Performance Database



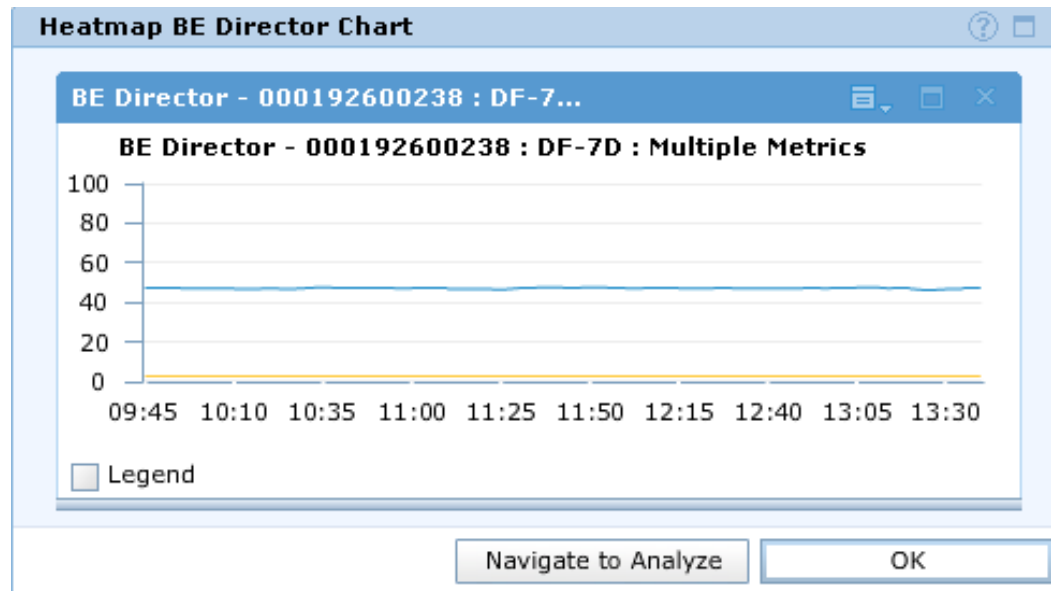
The screenshot shows the 'Database Backup Wizard' dialog box, specifically the '1 Backup Parameters' step. The dialog has a title bar with a close button. The main area contains several fields and options:

- * Symmetrix ID(s)**: A text box containing two IDs: '000190300822' and '000192600238'. The second ID is highlighted in blue.
- * File Names(s)**: A text box containing the template '<SID>_ <TIMESTAMP>_' followed by a button labeled 'SPABackup'.
- * Data to Save**: Three checkboxes:
 - Historical (always backed up)
 - Last day of Diagnostics (Not recommended)
 - Named Real Time traces for recurring backups
- * Execution Time**: Two radio buttons:
 - Now
 - Schedule

At the bottom of the dialog, there are five buttons: '< Back', 'Next >', 'Next >', 'Finish', and 'Help'.

Unisphere Performance Enhancements

- Import/Export of settings
 - Non-instance metric thresholds
 - User-defined template dashboards
- Navigate from Heatmap drilldown charts to Analyze



Performance Heatmap – Dashboard

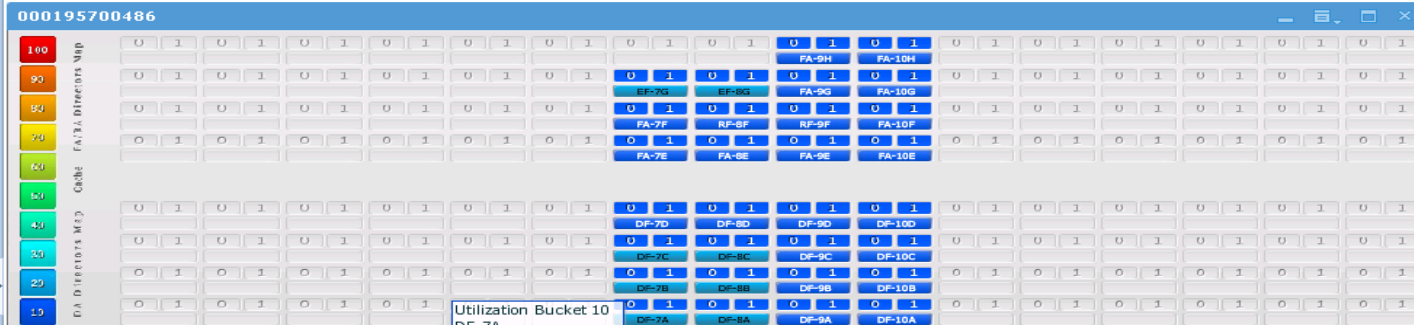
EMC Unisphere for VMAX v1.5.0.6

Home Performance Support

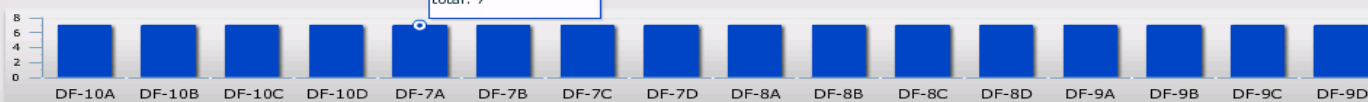
All Symmetrix > Performance > Monitor

Symmetrix ID: 000195700486 Type: Diagnostic Last 4 Hours

Heatmap



Director Utilization Distribution Port 0

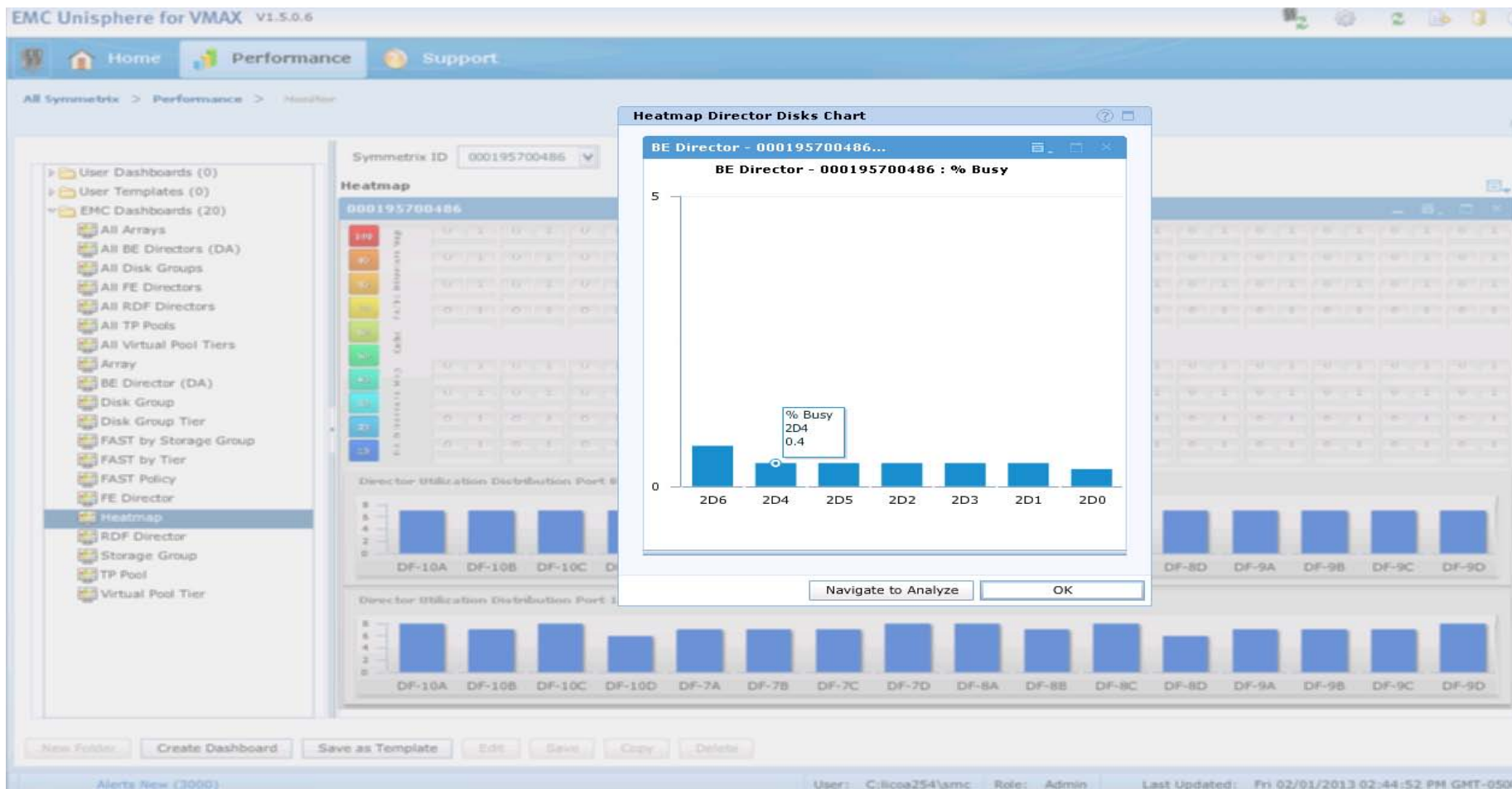


Director Utilization Distribution Port 1



New Folder Create Dashboard Save as Template Edit Save Copy Delete

Performance Heatmap – BE Director



Unisphere – Analyze



EMC Unisphere for VMAX V1.5.0.6



Home Performance Support

All Symmetrix > Performance > Analyze > Diagnostic > 000195700486 > DF-7A



Real Time Diagnostic Historical

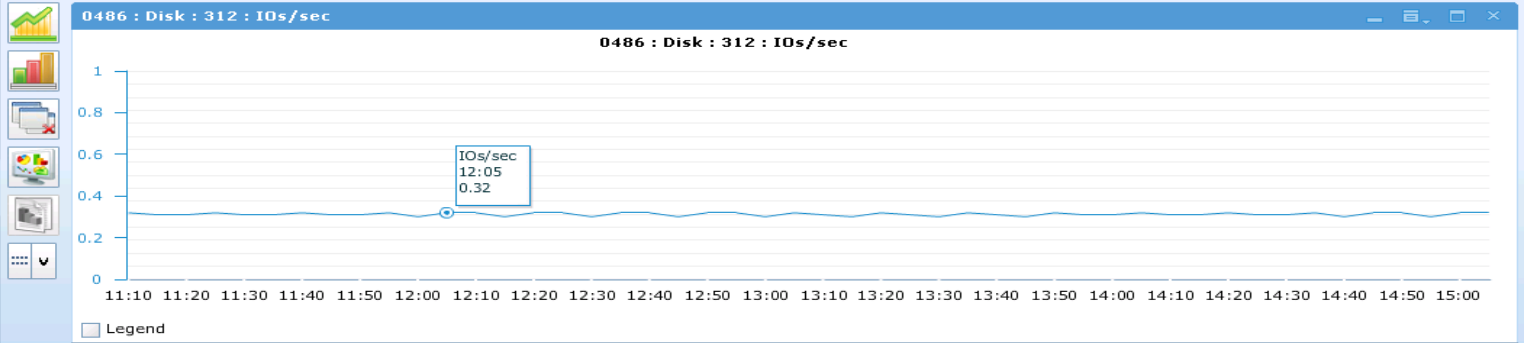
Feb 2, 2013 11:10 AM - Feb 2, 2013 3:10 PM

Alert Disk

| ID | Name | % Busy | IOs/sec | MBs/sec | Avg Queue Depth | Reads/sec | Avg Read Response Time (ms) | Writes/sec | Avg Write Response Time (ms) | Total Capacity (GB) |
|-----|-----------|--------|---------|---------|-----------------|-----------|-----------------------------|------------|------------------------------|---------------------|
| 312 | DF-7A:D D | 0.8 | 0.3 | 0 | 1 | 0.3 | 5.1 | 0 | 0 | 1780.0 |
| 2D6 | DF-7A:C C | 0.7 | 0.2 | 0 | 1 | 0.2 | 7.6 | 0 | 0 | 1780.0 |
| 2D4 | DF-7A:C 8 | 0.4 | 0.2 | 0 | 1 | 0.2 | 0.7 | 0 | 0 | 545.0 |
| 2D5 | DF-7A:C A | 0.4 | 0.2 | 0 | 1.1 | 0.2 | 2.1 | 0 | 0 | 545.0 |
| 2D3 | DF-7A:C 6 | 0.4 | 0.3 | 0 | 1 | 0.3 | 0.8 | 0 | 7.2 | 545.0 |
| 310 | DF-7A:D 9 | 0.4 | 0.2 | 0 | 1 | 0.2 | 0.6 | 0 | 0 | 545.0 |
| 311 | DF-7A:D B | 0.4 | 0.2 | 0 | 1.1 | 0.2 | 1.9 | 0 | 0 | 545.0 |
| 30F | DF-7A:D 7 | 0.4 | 0.2 | 0 | 1.1 | 0.2 | 1.6 | 0 | 0 | 545.0 |

Kpi All

- % Busy
- IOs/sec
- Reads/sec
- Writes/sec
- MBs/sec
- MBs Read/sec
- MBs Written/sec
- Avg Read Response Time (ms)
- Avg Write Response Time (ms)



Alerts New (3000)

User: C:\icoa254\smc Role: Admin Last Updated: Fri 02/01/2013 02:44:52 PM GMT-0500



Unisphere – Real Time



EMC Unisphere for VMAX V1.5.0.6



Home Performance Support

All Symmetrix > Performance > Analyze > Real Time > 000195700486

Real Time Diagnostic Historical Feb 2, 2013 2:43:26 PM - Feb 2, 2013 3:43:26 PM

| ID | % Busy | IOs/sec | Reqs/sec | Read Reqs/sec | Write Reqs/sec |
|-------|--------|---------|----------|---------------|----------------|
| DF-8A | 20.5 | 3.8 | 0 | 0 | 0 |
| DF-7A | 17.8 | 3.5 | 0 | 0 | 0 |
| DF-7C | 14.9 | 3.4 | 0 | 0 | 0 |
| DF-8C | 14.8 | 3.6 | 0 | 0 | 0 |
| DF-7B | 14.4 | 3.6 | 0 | 0 | 0 |
| DF-8B | 14.3 | 3.5 | 0 | 0 | 0 |
| DF-9A | 10.2 | 3.5 | 0 | 0 | 0 |
| DF-8D | 9.8 | 3.2 | 0 | 0 | 0 |

Kpi All

% Busy
IOs/sec

Alerts New (3000) User: C:\icoa254\smc Role: Admin Last Updated: Fri 02/01/2013 02:44:52 PM GMT-0500



What's New in Unisphere 1.6



- Usability enhancements for Storage Provisioning
- Support for Clone Ease of Use
- Support Audit Log
- Offline support with Performance Viewer

EzSM (EMC z/OS Storage Manager)

Overview and What's New

Flexible Management Options and Tools



```
Utilities
-----
(H15-ECORL60N) EMC z/OS Storage Manager Product Home      Select One Item
Command ==>                                               Scroll ==> CSR
=====
                               Select a function category

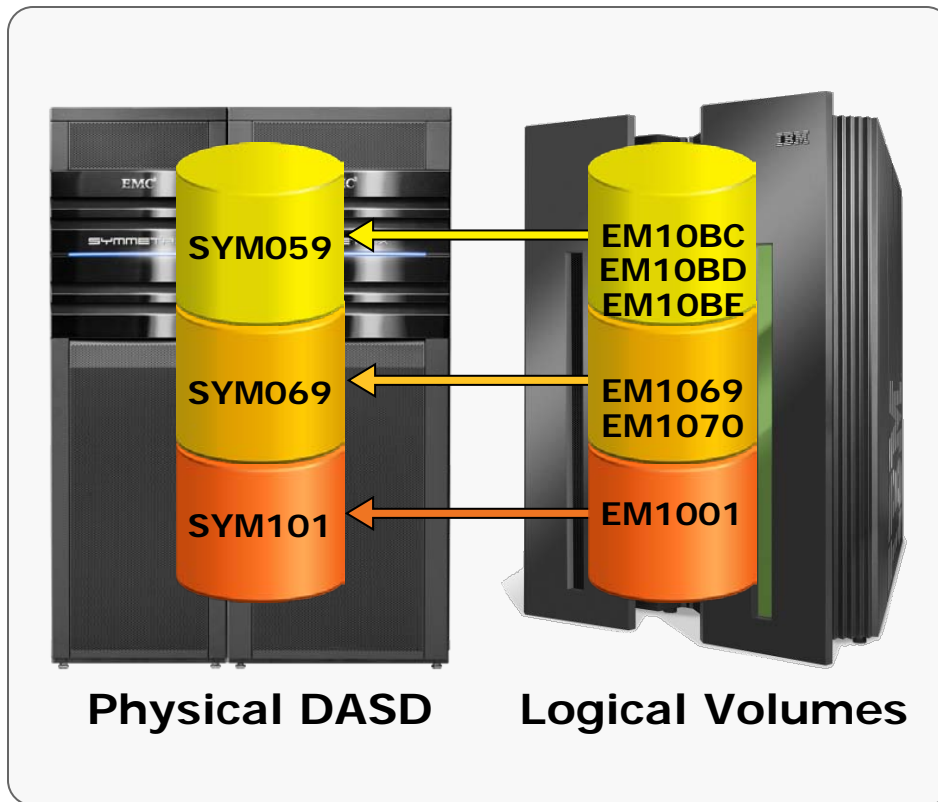
o 1 Symmetrix Device Management
o 2 DLm Management
o 3 Logical Devices
o 4 Data Sets
o 5 Current Alert Messages
o 6 z/OS Commands
o 7 HSM (n/a)
o 8 SMS Information

o 25 Framework Administration
o 26 Batch API JCL Generator
```

- **EMC z/OS Storage Manager**
 - 3270 interface
 - Replication management and monitoring
 - Mainframe constructs—security, messages, SMP/E install
 - DLm Management

Logical Device Management

Ability to display a list of logical volumes that reside on same physical device



View logical to physical representation

Ability to query by –
VOLSER
z/OS device address
SYMM Device Number
Data Set Name

SRDF Management

```
Utilities
-----
(V118-ECHRDFHP) RDF Group Management          Select One Item
Command ===>                               Scroll ===> CSR
=====
                                     Select a function

o 1 List RDF Groups
o 2 Create a new RDF Group
o 3 Create RDF Volume Pairs - by z/OS CUU
o 4 Create RDF Volume Pairs - by Symmetrix device
o 5 Create Cascaded Volume Pairs - by Symmetrix device
o 6 Discover Symmetrix Topology
```

Perform SRDF Tasks

List SRDF Groups

Create Volume Pairs
by CUU or Symdev

SRDF Management



```

Function Utilities
-----
 1. Display Primary Devices
 2. Display Secondary Devices
 3. RDF Replication Status
 4. SRDF/A Local Detail
 5. SRDF/A Remote Detail
 6. Define a New RDF Group
 7. Delete the RDF Group
 8. Define Volume Pairs by Symm Dev
 9. Set SynchDir for selected group
10. Add RDF Directors
11. Remove RDF Directors
12. Filter Display
13. Sort Display
14. Archive Report
15. Reshow All as CSV

055 Row 1 to 7 of 15
Scroll ==> PAGE
roup IDs =====
_____Secondary_____
nl PC SynchDir Symmetrix

F G(R1>R2) 000194901053
F G(R1>R2) 000194901060
F G(R1>R2) 000194901053
F G(R1>R2) 000194901053

S 000194901055 11 RSCAS Y F G(R1>R2) 000194901060
 11 - Active
o 000194901055 20 JFTEST20 Y F G(R1>R2) 000194901053
 20 - n/a
o 000194901055 23 DBSNS Y F G(R1>R2) 000194901053
 23 - n/a
    
```

Display local and remote devices

SRDF Replication Status

Set attributes

Add or Remove Directors



Pool Management Services



Utilities

(V118-ECHRHOME) Symmetrix Device Management

Command ==>

Select One Item

Scroll ==> CSR

Select a function

- 1 Explore Symmetrix Controllers
- 2 Logical Device Mapping
- 3 Symmetrix / Host Selection
- 4 RDF Group Management
- 5 GNS Group Definitions
- 6 Display Group Memberships
- 7 Pool Management Services
- 8 Host Component Commands & Utilities
- 9 RPB & TimeFinder Functions
- 10 Maintain GDDR Managed RDF Groups
- 11 Discover Symmetrix Topology

Pools supported by Enginuity code levels

- SNAPPOOLS are available with Enginuity level 5x71 and higher.
- DSEPOOLS are available with Enginuity level 5772 and higher.
- CKD THINPOOLS are available with Enginuity level 5876 and higher.

Pool Management Services

```
Utilities
(V119-ECHRPMSM) Pool Management Services Commands          Select One Item
Command ==>                                                Scroll ==> PAGE
-----
Select a function                                          More: +
o 1 Add
o 2 Allocate
o 3 Bind
o 4 Compress
o 5 Create
o 6 Decompress
o 7 Delete
o 8 Disable
o 9 Display
o 10 Drain
o 11 Enable
o 12 Hdrain
o 13 Move
o 14 Poolattr
o 15 Query
```

- Add Devices to a Pool
- Display Pools
- Rebalance Pools
- Bind Devices to a Pool
- Query Devices
- Drain Pools

DLm Management



Utilities

(H15-ECLRHOME) DLm z/OS Functions Home

Select One Item

Command ==>

Scroll ==> CSR

Select a function

- o 1 Display DLm Devices
- o 2 Export Virtual Tape
- o 3 Import Virtual Tape
- o 4 Find a Virtual Tape Volume
- o 5 Help Information
- o 6 Initialize Virtual Tape Volumes
- o 7 Load a Virtual Tape Volume
- o 8 Query Commands
- o 9 Reset Channel Adapter
- o 10 Save Trace
- o 11 Set Configuration Options
- o 12 Show Detailed Configuration Information
- o 13 Stop Channel Adapter

- Display DLm Devices
- Export and Import Tapes
- Initialize Tape Volumes
- Display & Set Configuration Options

What's new in EzSM 4.2

- Federated Tiered Storage Externally Provisioned volumes
- VP Compression for Thin Pools
- Discover Symmetrix Topology in the background
- SRDF/A MSC can now monitor SRDF/A
- SRDF/AR Monitor accessible via TimeFinder panels
- TimeFinder BASE Commands panel has been redesigned

Federated Tiered Storage Externally Provisioned volumes



- Support for FTS Externally Provisioned (EP) volumes has been added through a new EzSM function that retrieves FTS EP volumes with Mainframe Enablers V7.5 and higher.
- Information on FTS EP volumes is now available on the following displays
 - Devices in primary and secondary RDF groups.
 - Symmetrix Summary Report
 - Symmetrix Summary by Type
 - EPVOL (FTS) Configuration Information



VP Compression

- With Enginuity 5876 and higher, you can compress thin device data to save space and decompress when desired.
- EzSM now supports the VP compression functionality available in Mainframe Enablers 7.5 and higher.
- Options for VP compression and decompression commands have been added to the EzSM Pool Management Services menu.
- Allows configuration, management and reporting on the VP compression state for thin devices.

Discovering Symmetrix Topology

- Now you can choose to discover Symmetrix topology in the background without locking your active EzSM session until the process completes.
- When finished, you receive a e-mail containing the discovery result.

SRDF/AR Monitor

- The EzSM RPB & TimeFinder Functions panel now provides access to the SRDF/AR (SAR) Monitor.
- The SAR Monitor functionality allows you to monitor and manage SRDF/AR (Automated Replication) processes.
- To take advantage of SRDF/AR Monitor, Mainframe Enablers 7.6 is required.

SRDF/A MSC Monitor

- The SRDF/A MSC (Multi-Session Consistency) Monitor feature from the Host is now available on the Component Commands and Utilities panel of EzSM.
- You can now monitor the current status of your SRDF/A (Asynchronous) configuration, including SRDF group and link status, and invalid track synchronization.

EzSM Configuration Utility

- The SRDF Host Component plug-in configuration panels of the EzSM Configuration Utility have been enhanced to accommodate SRDF/AR Monitor and SRDF/A MSC Monitor configuration parameters.

```
----- EMC z/OS Storage Manager MFE Host Component Configuration --  
Command ==> _ Scroll ==  
  
Enter the Option to be Executed.  
  
1 Configure MFE Host Component Done by: BSN00T1 on: 8 Aug 2013  
2 Configure SRDF/A MSC Monitor  
3 Configure SRDF/AR Monitor  
  
X Terminate.
```

Summary



- EzSM and Unisphere both demonstrate Ease of Use
 - VP MANAGEMENT – EzSM AND UNISPHERE
 - FAST Management – UNISPHERE
 - Local and Remote Replication – EzSM AND UNISPHERE
 - DLM MANAGEMENT - EzSM
- Benefits
 - All Management and Control contained in two, easy to use products.

Additional Resources



- <http://support.emc.com>
- Unisphere White Paper: Using Unisphere for VMAX to Manage Symmetrix CKD Devices in a z/OS Environment.

<http://www.emc.com/collateral/white-papers/h11631-using-unisphere-vmax-manage-symmetrix-ckd-devices-os-environment-wp.pdf>

EMC²®