



EMC VMAX SMI-S POWER-PACK

*INSTALLATION AND CONFIGURATION OF THE
EMC SMI-S POWER-PACK FOR EMC VMAX &
SYMMETRIX SYSTEMS*

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CHAPTER 1

INTRODUCTION

WHAT IS SMI-S?

Storage Management Interface Specification, SMI-S, was created by the Storage Networking Industry Association (SNIA) in conjunction with the Distributed Management Task Force (DMTF) to develop and standardize interoperable storage management technologies.

SMI-S is a common, standards-based management specification that permits third party applications the ability to configure and manage a storage array. Using the “provider” (the actual software library), a management application doesn’t require knowledge of the specific architecture or infrastructure requirements of the particular storage platform.

In the SMI-S architecture, client applications communicate with Storage Management Interface Specification (SMI-S) providers, or Common Information Model (CIM) agents, to obtain performance and configuration information from storage area networking components such as systems, fabric, and host elements.

SMI-S providers can report about asset, alerts, and performance information, as well as facilitate storage provisioning activities. SMI-S also provides reporting for switch and tape libraries. Each vendor provides a unique provider that facilitates SMI-S based reporting and management for their device.

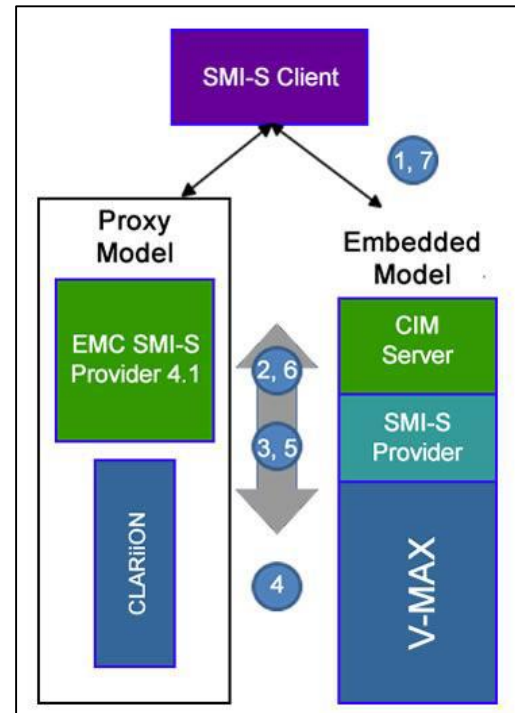
SMI-S providers can be implemented either as proxies to the devices or as embedded software within the actual storage platform. Most legacy storage platforms have implemented their SMI-S providers as proxies. The proxies are software libraries external from the storage platforms that accept SMI-S queries and commands, and translate them into vendor specific commands which they send to the storage platforms.

As the name implies, the embedded SMI-S providers are included on the storage platforms and do not require the installation or maintenance of a separate software package to provide an SMI-S interface to the storage platform. The trend for the newer platforms is to embed the SMI-S providers within the storage system as evidenced by the latest IBM DS8000 platforms and the EMC VMAX and VNX platforms.

HOW DOES SMI-S WORK?

SMI-S uses standard HTTP/HTTPS communication methods to facilitate data exchanges between the client application and the SMI-S provider. The illustration on the right shows how an SMI-S client communicates with a CIM Server in an EMC environment.

1. The SMI-S client (in this case ScienceLogic) sends management requests to the CIM server. In an EMC environment, the CIM Server and the SMI-S provider components are both included in the EMC SMI-S Provider.
2. The CIM Server receives these management requests from the client and communicates with the SMI-S provider.
3. In turn the provider communicates with the storage device using native commands. The provider translates the CIM-XML protocol originating from the CIM Client/CIM Server into commands understood by the storage platform. Upon the completion of a command, a confirmation message is returned to the provider, then to the server, and finally to the client.



In most implementations there is no need to be aware of the CIM Server layer, as it is almost always packaged with the vendor's provider software, and is often referred to as a part of the collective provider rather than a distinct layer. EMC's implementation is a perfect example of this transparency. To a storage administrator you just need to know that you are installing the SMI-S Provider, which includes both the CIMOM Server and the SMI-S provider.

STORAGE VENDORS THAT SUPPORT SMI-S

The following is a list of storage and storage product vendors that support one or more version of SMI-S. Each company listed below has certified one or more products with the SMI-S oversight organization, SNIA. Note that this Power-Pack is only designed to work with EMC VMAX and is specific to the “name spaces” associated with EMC VMAX and EMC VNX.

Vendor	Products	Device Type
Brocade Communications Systems, Inc.	Switches/McDATA/CNT	Fabric
Cisco Systems	Switches	Fabric
Dell Computer	Compellent/Power-Vault MD (EMC)	Storage
EMC Corporation	VNX/VMAX/Clariion/Symmetrix/ISILON	Storage
Emulex	HBA	Fabric
Fujitsu Limited	ETERNUS	Storage
Hewlett-Packard Company	3PAR/XP P9000/StorageWorks/SVP	Storage
Hitachi Data Systems	Command/UCP/HUS	Storage
Hitachi Limited	HUS	Storage
Huawei	HW	Fabric
IBM	Storwize/Flex System/SVC/XIV	Storage
LSI Corporation, Engenio Storage Group	MegaRaid	Storage
NEC Corporation	WebSAM	Storage
NetApp	Data Ontap	Storage
Oracle Corporation	StorageTek/SUNWISE/StoreEdge/DSP	Storage
Pillar Data Systems	Axiom	Storage
PMC-Sierra	maxRAID	Storage
QLogic	SANbox/HBA	Fabric
Quantum	ADIC	Storage
Silicon Graphics	SANtricity	Storage
Xyratex	Xyratex RAID	Storage

CHAPTER 2

EMC SMI-S PROVIDER

OVERVIEW

The ScienceLogic EMC SMI-S Power-Pack can be used with any VMAX storage array that has the SMI-S provider service enabled. This chapter provides a brief overview of the installation and configuration of the EMC SMI-S Provider software.

Requirements

- You must have a valid admin user name and password for the EMC system and Windows or Linux console system.
- You must download the EMC SMI-S provider from the EMC Community web site. This requires a username and password.

VMAX SMI-S PROVIDER INSTALLATION

The EMC SMI-S Provider is software that is free from EMC and is installed on the management console system of your VMAX array. Note that this software can be installed on a different system (VM or physical).

- 1.) First, log onto the EMC Community web site and search for the latest version of the EMC SMI-S Provider software packages. Our example uses the Windows version; however the Linux version may also be used.
- 2.) Save all files and exit all Windows applications. Launch the self-extracting executable. For example: To install the EMC SMI-S Provider V4.0 software on a Windows platforms, launch the self-extracting executable
- 3.) The EMC Solutions Enabler with SMI X86

EMC® SMI-S Provider Downloads
created by Zeeshan Khan on Oct 24, 2012 2:20 PM, last modified by Zeeshan Khan on Feb 6, 2013 11:43 AM

Abstract
EMC® SMI-S Provider supports the SNIA Storage Management Initiative (SMI), an ANSI standard for storage management. This initiative has developed a standard management interface that has culminated in a comprehensive specification (SMI-Specification or SMI-S). SMI-S defines the open storage management interface that enables the interoperability of multiple vendor's storage management technologies. These technologies are used to monitor and control storage resources in multivendor or SAN topologies.

Following downloads are provided:

SMI-S Version	OS Platform	Downloads
SMI-S Provider 4.0 for SMI-S 1.5	Windows x64	Click to download
	Windows x86	Click to download
	Linux (i386, ia64, and x86_64)	Click to download
SMI-S Provider 4.3.1.1 for SMI-S 1.4	Windows x64	Click to download
	Windows x86	Click to download
	Linux (i386, ia64, and x86_64)	Click to download

1445 Views Categories: Tags: smi-s

welcome page appears prompting you to install Solutions Enabler with SMI version x.x.
Click Next

- 4.) Click Next to begin the installation. The Destination Folder dialog box opens and prompts you to select an install directory for Solutions Enabler and EMC SMI-S Provider. It is recommended that you choose the default directory
- 5.) Click Next to continue. The Ready to Install the Program dialog box opens
- 6.) Click Install to begin installing files to your selected folder. This may take several minutes. The Installation Wizard Completed dialog box open
- 7.) Click Finish to complete the setup

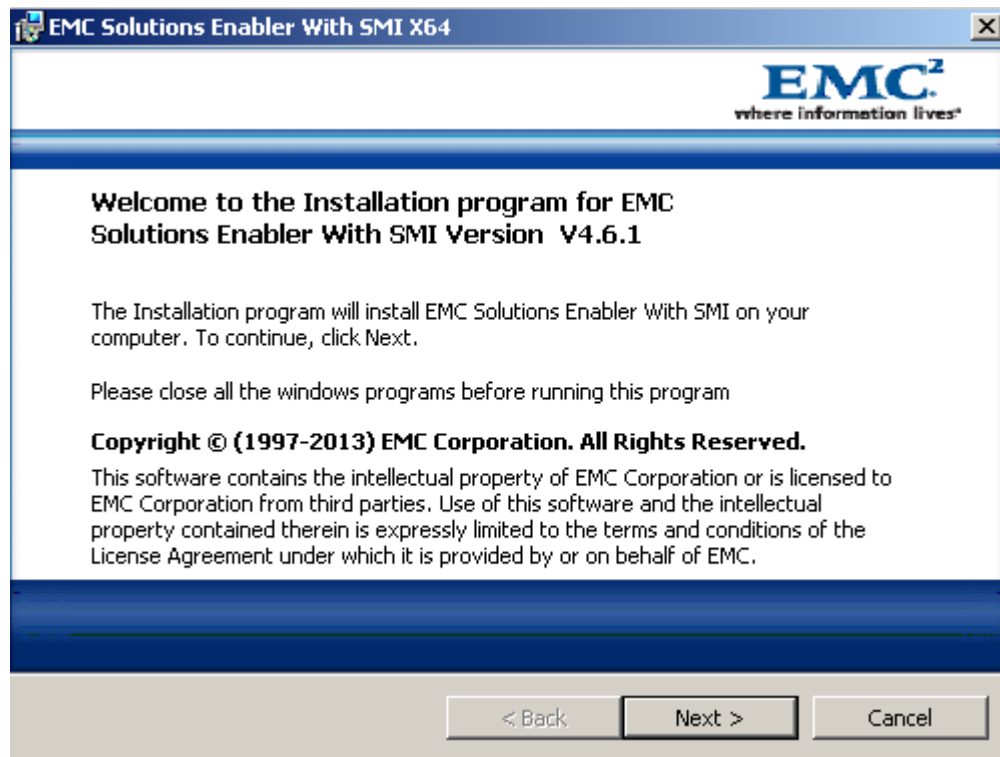
Account & Password

*The default SMI Provider account and password is as follows:
Username: admin, Password: #1Password*

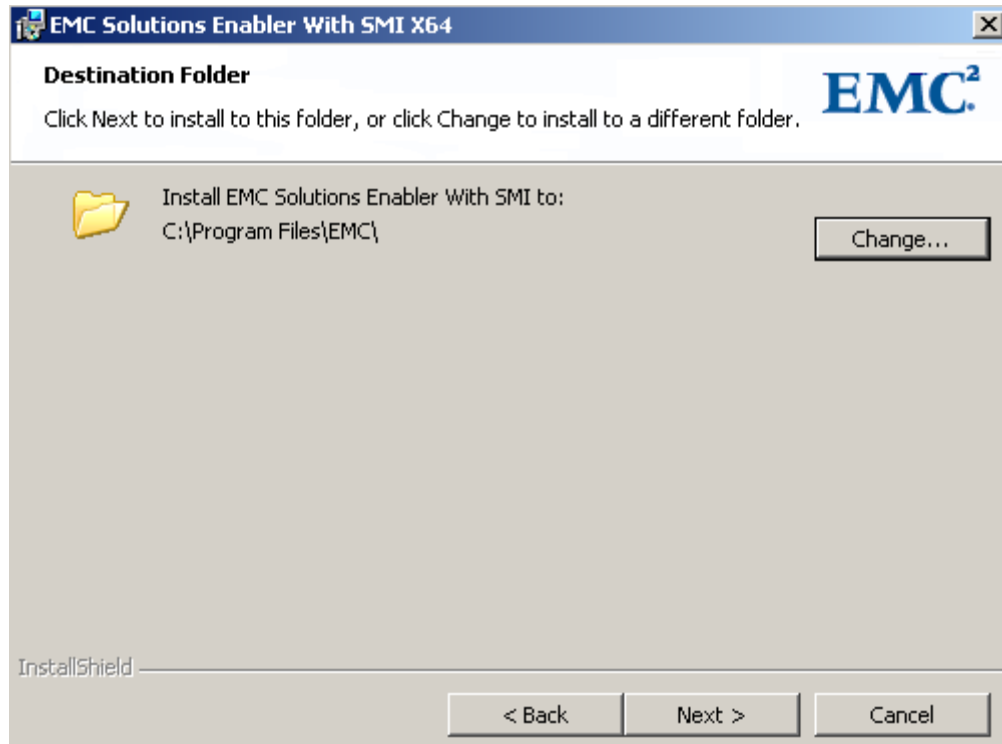
WMC SMI-S PROVIDER STEP-BY-STEP INSTALLATION

The EMC SMI-S Provider is software that is free from EMC and is installed on a Windows management console system. You can download the SMI-S provider through the [EMC Online Support website](#).

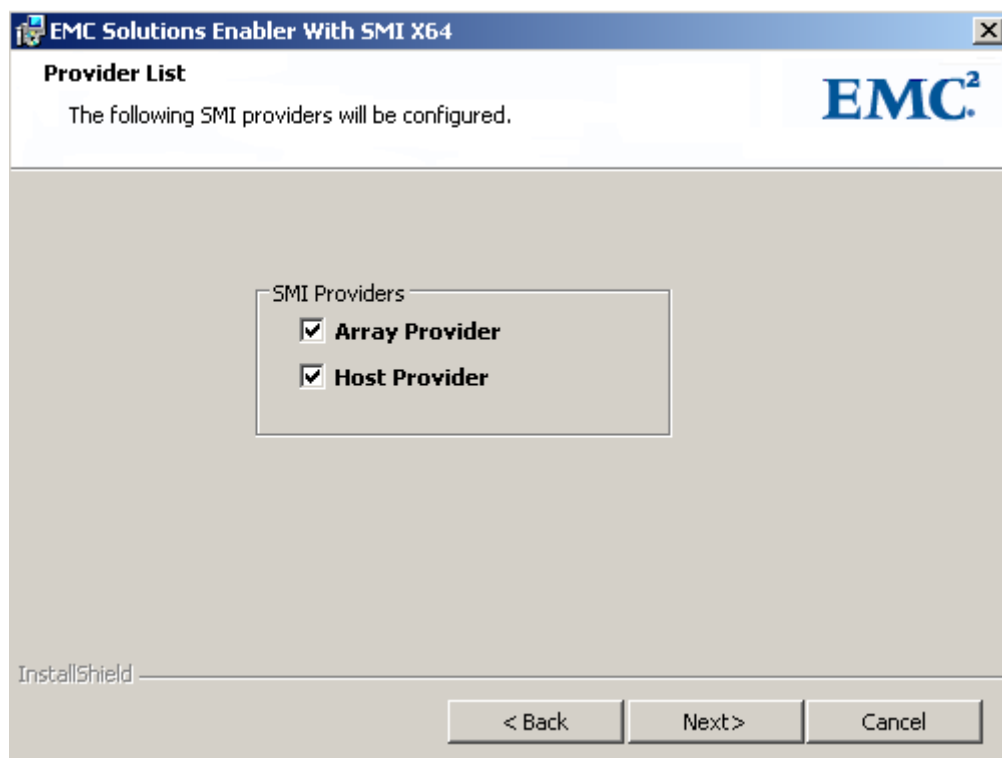
- Launch the exe file.
- A prompt will come up to prepare the Installation Program that will guide you through the install, press next when prompted.



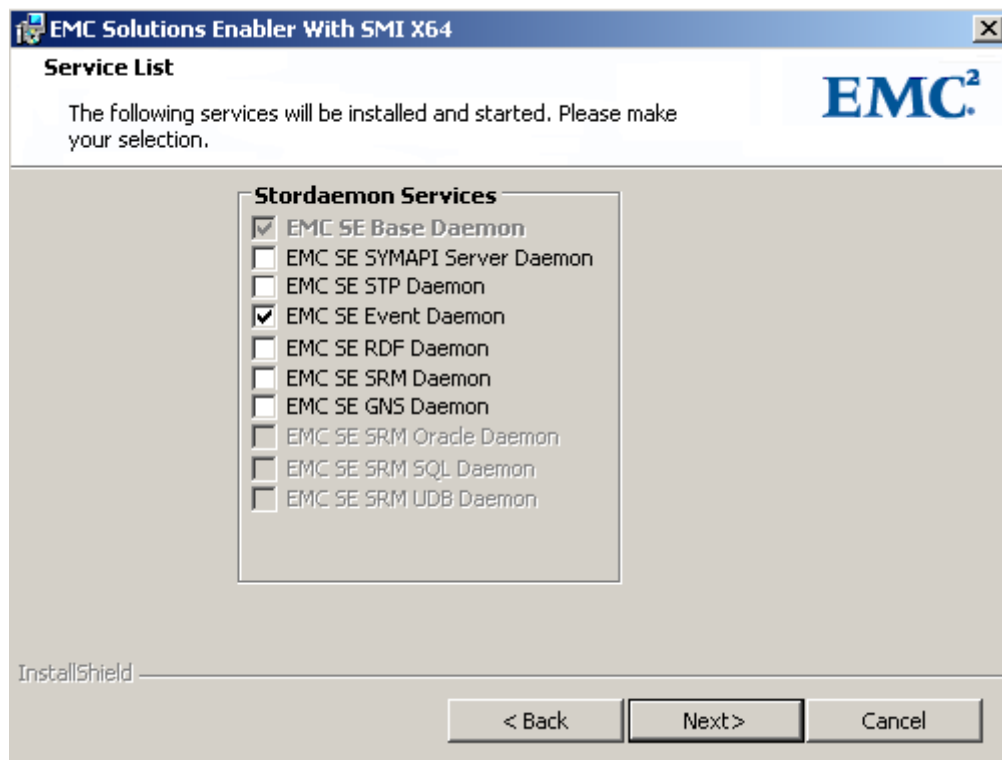
- Click Next to begin Installing. The *destination folder* dialog will prompt you to choose an install directory for EMC Solutions Enabler. (**Recommended:** Use the default directory)



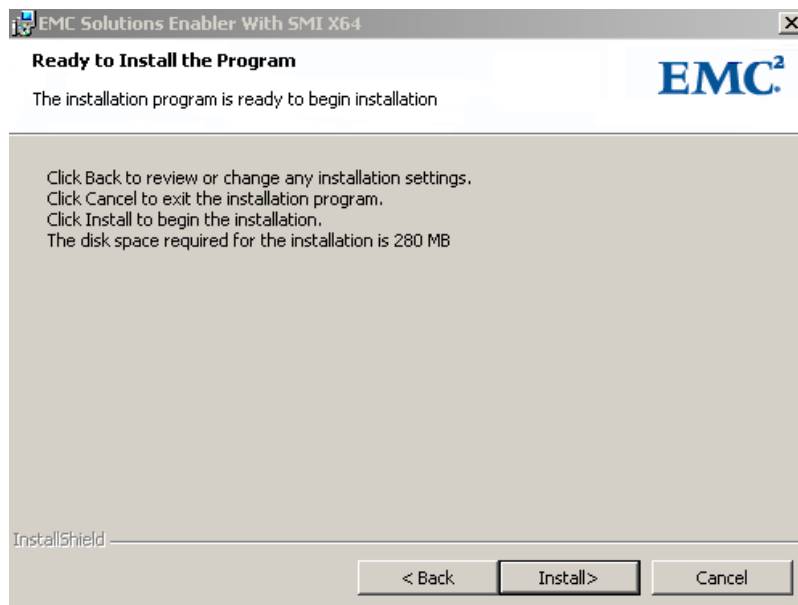
- The *Provider List* dialog box will now pop up, select both "Array Provider" and "Host Provider" and click Next



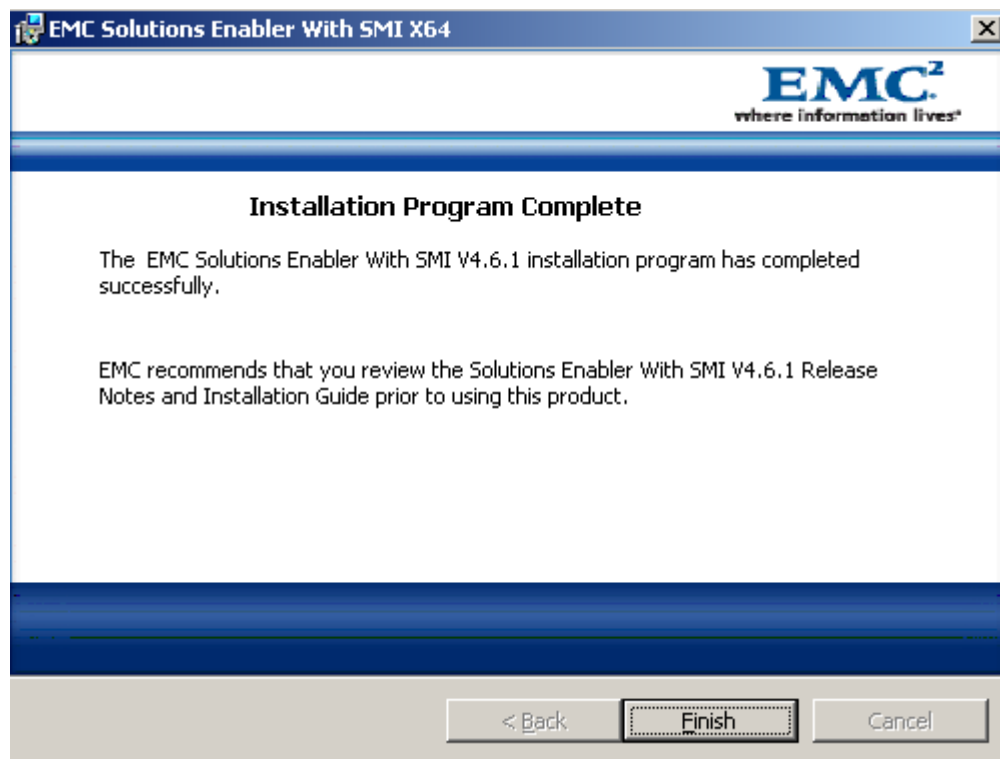
- You will be prompted with the *Service List* dialog box, leave the default settings and click Next



- You will be prompted with the *Install the Program* Dialog box



- You are finished with your Install. Time to move on to some post install tasks



You can update your environment variable for path to include the EMC Solutions Enabler installation directory. By default it is in the C:\Program Files\EMC\SYMCLI\bin. You can run the command line utilities from any directory.

STARTING/STOPPING EMC CIM SERVER

The EMC CIM Server would start automatically after the install. On Windows, CIM Server runs as a service and you can turn it off through the Services Control Panel. The service is *ECOM*.

You can also find the *ECOM.exe* file in C:/Program Files/EMC/ECIM/ECOM/bin directory.

- `sm_service start ecom.exe` (This command starts the EMC CIM Server)
- `sm_service stop ecom.exe` (This command stops the EMC CIM Server)

To test the EMC SMI-S Provider, run the *TestSmiProvider.exe* command from the command line. Validate that the following EMC Services are running.



ECOM		Started	Automatic	Local System
EMC storapid	EMC Solutions Enabler Base Daemon	Started	Automatic	Local System
EMC storevntd	EMC Solutions Enabler Event Daemon	Started	Automatic	Local System
EMC storgnsd	EMC Solutions Enabler GNS Daemon		Automatic	Local System
EMC storrdfd	EMC Solutions Enabler RDF Daemon		Automatic	Local System
EMC storsrmd	EMC Solutions Enabler SRM Daemon		Automatic	Local System
EMC storsrvd	EMC Solutions Enabler SYMAPI Server Daemon		Automatic	Local System
EMC storstdp	EMC Solutions Enabler STP Daemon		Manual	Local System

SERVICES ATTACHED TO THE SAN VIA HBA

The SMI-S provider will auto-discover locally attached storage arrays (An array in which at least one LUN is visible to the host on which the provider is running). However, you must add the authorization information for its storage processors.

SMI-S by default try to discover locally-attached storage arrays but if the discovery isn't being automatically performed, you can try checking that the variable is set to true:

"OSLSProvider/com.emc.cmp.osls.se.array.StorApi.database.discover". This variable can be found in the OSLSProvider.conf file, which is located in C:/Program Files/EMC/ECIM/ECOM/Providers directory.

If the discovery is successful, shut down the EMC CIM Service. Use the SYMCLI symcfg command to provide authentication information for each storage processor:

```
symcfg authorization add -host <hostname> -username <username> -password <password>
```

Each EMC array should have two storage processors. The authentication information should be provided for both using the command shown above: first storage processor A, and then storage processor B. Once this is been done, restart the EMC CIM Service (ECOM).

SERVICES NOT ATTACHED TO THE SAN VIA HBA

Out-of-band disk arrays are arrays which do not have any LUNs presented to the host where the provider is running. To enable the discovery of out-of-band EMC Disk Arrays follow the steps below.

Run the TestSmiProvider.exe (located at C:/Program Files/EMC/ECIM/ECOM/bin)

Accept the defaults for host, port, and connection type. (just press enter) You can also choose to

accept the default username/password which is "admin" and "#1Password" or you can set your own

```

C:\Program Files\EMC\ECIM\ECOM\bin\TestSmiProvider.exe
Connection Type <ssl,no_ssl,native> [no_ssl]:
Host [localhost]:
Port [5988]:
Username [admin]:
Password [#1Password]:
Log output to console [y/n <default y>]:
Log output to file [y/n <default y>]:
Logfile path [Testsmiprotider.log]:
Connecting to localhost:5988
Using user account 'admin' with password '#1Password'

#####
##
##          EMC SMI Provider Tester
## This program is intended for use by EMC Support personnel only.
## At any time and without warning this program may be revised
## without regard to backwards compatibility or be
## removed entirely from the kit.
##
#####
slp      - slp urls          slpv     - slp attributes
cn       - Connect          dc        - Disconnect
disco    - EMC Discover      rc        - RepeatCount
addsys   - EMC AddSystem     remsys  - EMC RemoveSystem
refsys   - EMC RefreshSystem

ec       - EnumerateClasses  ecn      - EnumerateClassNames
ei       - EnumerateInstances ein      - EnumerateInstanceNames
ens      - EnumerateNamespaces miner    - Mine classes

a        - Associators       an       - AssociatorNames
r        - References        rn       - ReferenceNames

gi       - GetInstance       gc       - GetClass

ci       - CreateInstance    di       - DeleteInstance
mi       - ModifyInstance    eq       - ExecQuery
gp       - GetProperty       sp       - SetProperty

tms      - TotalManagedSpace tp       - Test pools
ecap     - Extent Capacity   pd       - Profile Discovery

im       - InvokeMethod      active   - ActiveControls
ind      - Indications menu  tv       - Test views

st       - Set timeout value lc       - Log control
sl       - Start listener    dv       - Display version info
ns       - Namespace        vtl     - VTL menu

chp      - consolidated host provider menu

q        - Quit              h        - Help
#####
Built with EMC SMI-S Provider: V4.6.1
Namespace: root/emc
repeat count: 1
<localhost:5988> ?

```

- Run the **addsys** command
- Type "y" at the Add System prompt
- Choose Array Type "1" for VNX or Clariion
- Type in the IP address for Storage Processor A and Storage Processor B
- Type Address type 2 for both Storage Processors (default is 2)
- Type the Username/Password for a user with either Admin or Manager privileges on the Array

```

C:\Program Files\EMC\ECIM\ECOM\bin\TestSmiProvider.exe
in      - InvokeMethod          active  - ActiveControls
ind     - Indications menu      tv      - Test views

st      - Set timeout value      lc      - Log control
sl      - Start listener         dv      - Display version info
ns      - Namespace             vtl     - UTL menu

chp     - consolidated host provider menu

q       - Quit                  h       - Help
#####
Built with EMC SMI-S Provider: U4.6.1
Namespace: root/emc
repeat count: 1
<localhost:5988> ? addsys
Add System <yin> [n]: y

ArrayType <1=Clar, 2=Symm> [1]: 1
One or more IP address or Hostname or Array ID

Elements for Addresses
IP address or hostname or array id 0 <blank to quit>: 10.0.0.1
IP address or hostname or array id 1 <blank to quit>: 10.0.0.2
IP address or hostname or array id 2 <blank to quit>:
Address types corresponding to addresses specified above.
<1=URL, 2=IP/NodeName, 3=Array ID>
Address Type <0> [default=2]:
Address Type <1> [default=2]:
User [null]: admin
Password [null]: #1Password
++++ EMCAddSystem ++++

```

If the addition of the Array is successful, you will get an output of "0" if Array is discovered.

Sample output:

```
++++ EMCAddSystem +++++
```

OUTPUT : 0

Legend: 0=Success, 1=Not Supported, 2=Unknown, 3=Timeout, 4=Failed

5=Invalid Parameter

4096=Job Queued, 4097=Size Not Supported

Note: Not all above values apply to all methods - see MOF for the method.

System

```
//172.22.5.35/root/emc:Clar_StorageSystem.CreationClassName="Clar_StorageSystem",Name
="CLARiiON+CK100125103000"
```

In 7.084708 Seconds

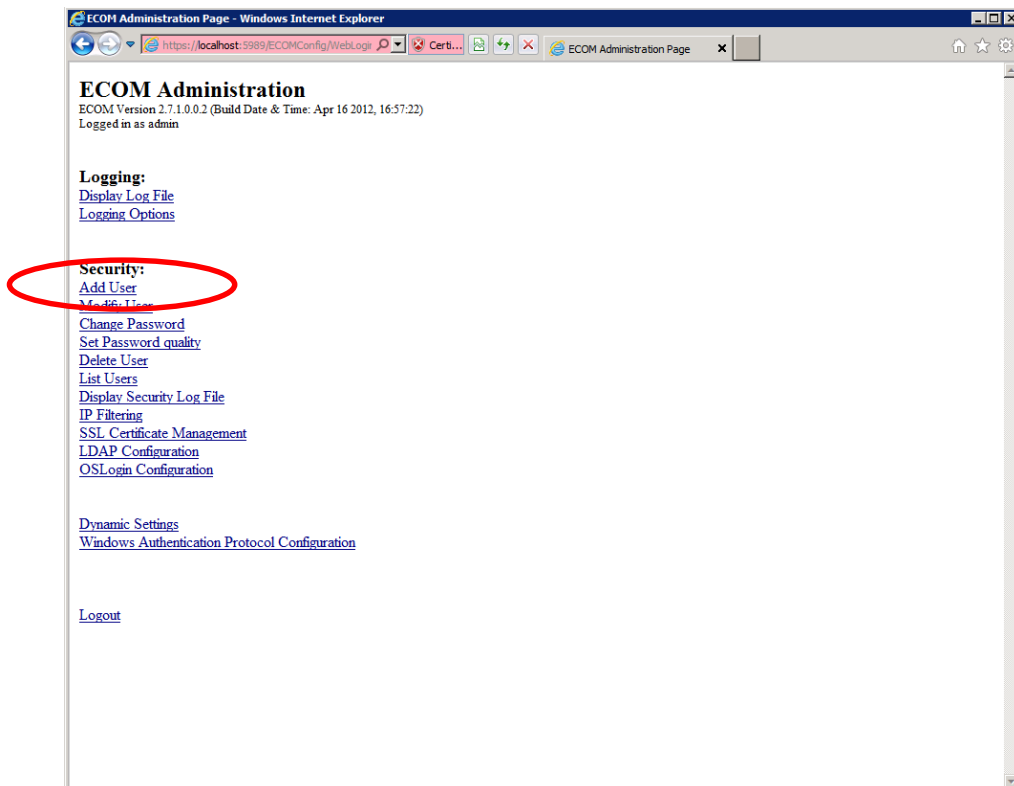
ADDING USER TO THE EMC SMI-S SOLUTIONS ENABLER

Account & Password

The default SMI-S Provider account and password is as follows:
Username: admin, Password: #1Password

To add a new user:

- Access <https://<ip-host>:5989/ecomconfig>, where <ip-host> is either the IP address or the name of the SMI-S Provider host
- Log in using the username *admin* and *#1Password* as password.



- Click *Add User* and create a user with the role of Administrator. This newly created username can now be used to obtain access to the Array Provider. (This interface will also allow you to change the default admin password)
- Accept defaults for host, connection type, port, username and password.

CHAPTER 3

TESTING THE NETWORK

TCP PORT

The EMC SMI-S Provider service runs on **TCP port 5989** and is encrypted via SSL. In order for ScienceLogic management systems to communicate with the EMC SMI-S service, TCP port 5989 must be accessible from either the ScienceLogic collector, or a ScienceLogic All-In-One server.

Required Network Port Access

Protocol	Port
TCP	5989

Before attempting to model the EMC VMAX device in ScienceLogic, perform the following test on the command on the ScienceLogic collector or All-In-One server. Note that the EMC SMI-S Provider must be installed and operating for this test to work. Login as root on the collector and type the following command, changing the IP address to the IP address of the SMI-S provider device.

```
nmap <SMI-S Provider IP>
```

Note: if you have configured your SMI-S CIM service to use on a non standard port, use the following:

```
nmap -Pn -p <port number> <SMI-S Provider IP>
```

If TCP port 5989 (or your custom TCP port) is open, the result should show the following message.

```
Nmap scan report for 192.168.1.1
Host is up (0.00021s latency).
Not shown: 989 closed ports
PORT      STATE SERVICE
135/tcp    open  msrpc
139/tcp    open  netbios-ssn
427/tcp    open  svrloc
445/tcp    open  microsoft-ds
3389/tcp   open  ms-term-serv
5988/tcp   open  wbem-http
5989/tcp   open  wbem-https
```

If the port does not appear, or it appears with the state of “filtered” check your firewall settings.

CHAPTER 4

INSTALLING THE POWER-PACK

OVERVIEW

In this chapter we will install the EMC SMI-S Power-Pack and then configure the credential for manual alignment of data collection.

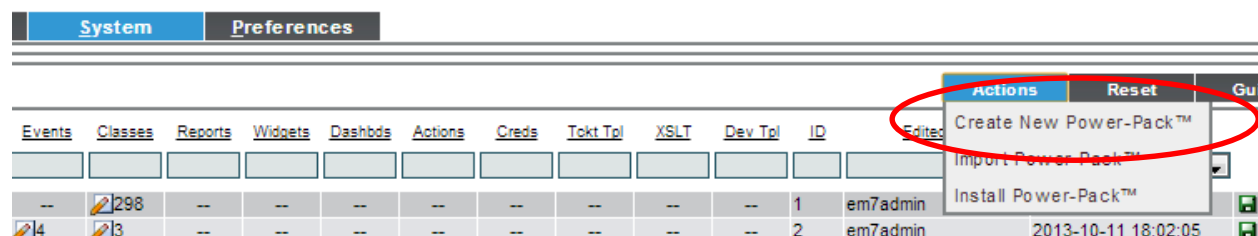
Requirements

A valid user name and password for EMC SMI-S Provider

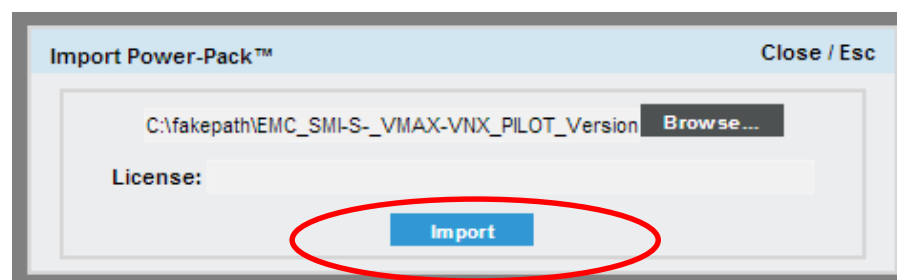
A valid admin user name and password for ScienceLogic

INSTALLATION

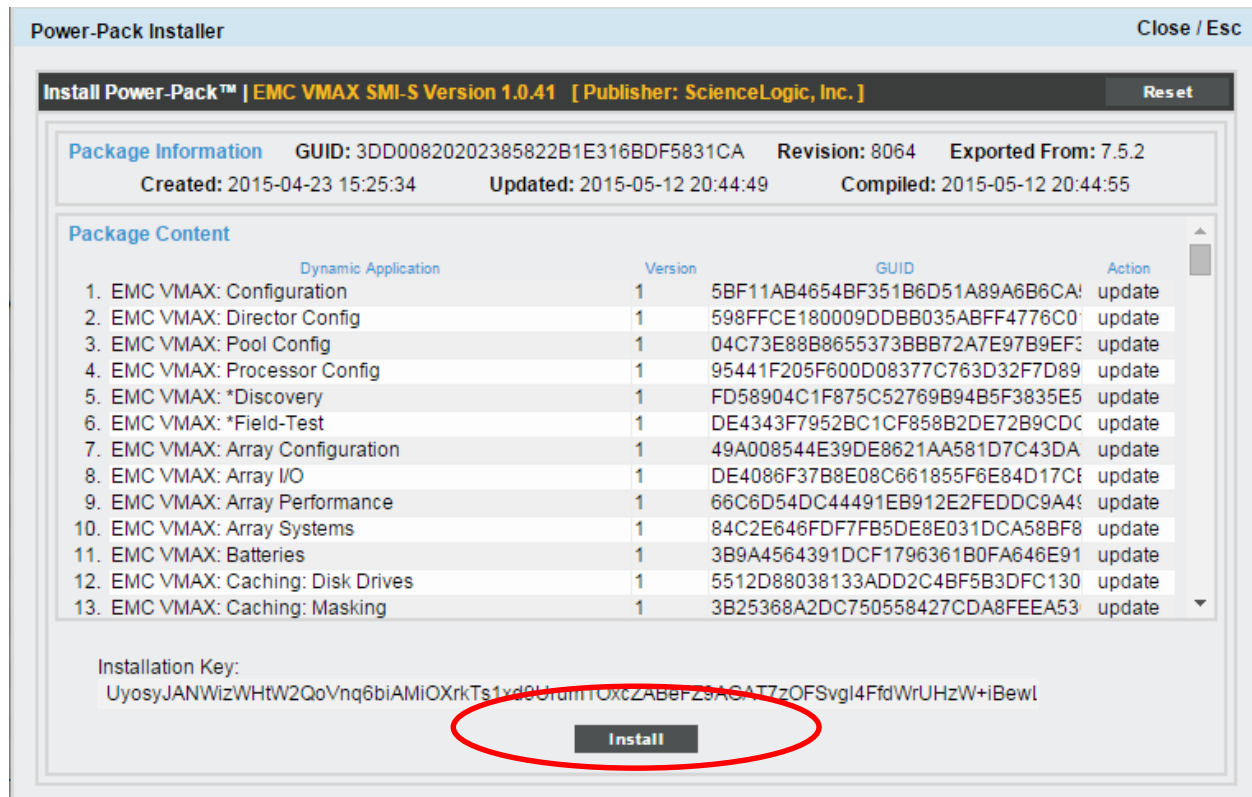
Obtain the latest copy of the EMC VMAX SMI-S Power-Pack. In this document we will be using version **1.0.41** of the Power-Pack. Using normal Power-Pack installation procedures, got the System tab, select Manage\Power-Packs, and then select the Action button, and select "Import Power-Pack".



Locate the Power-Pack file, and then select the Import button.



Click “Install” to begin the import process.



Once the Power-Pack is installed, proceed to the next section to configure the credential.

CREDENTIAL

With the Power-Pack installed, we can now configure our credential. Navigate to the System tab, select Manage\Credentials. Locate the “**EMC VMAX SMI-S - Example**” credential and then click on the wrench to edit it.

Change the username and password to match that of your EMC SMI-S Provider.

Account & Password

The default SMI Provider account and password is as follows:
 Username: admin, Password: #1Password

Credential Editor [118] Close / Esc

Edit Basic/Snippet Credential #118 New Reset

Basic Settings

Credential Name			
Hostname/IP	Port	Timeout(ms)	
%D	5989	60000	
Username		Password	
admin		*****	

Save Save As

Note: Do **NOT** change the Hostname/IP or the Port. Timeout should be > 60000. The default username and passwords are: **admin** / **#1Password**.

CHAPTER 5

FIELD-TEST DYNAMIC APP

OVERVIEW

In this chapter we will install the EMC VMAX SMI-S Field-Test Dynamic App, which was designed to help deployment engineers and users validate settings and configurations before deployment of Power-Pack. In addition to validating connectivity and ensuring proper protocol communication exists between ScienceLogic and the EMC SMI-S Provider, the Field Test application also provides information for the number of DCM items that will be discovered and managed by the EMC SMI-S Power-Pack. This helps engineers determine how many additional devices will be created on their ScienceLogic system, while gauging the number of elements that will be collected against. It's important that for larger EMC systems, or collectors that are nearing their maximum capacity, that the EMC SMI-S Power-Pack not be deployed on ScienceLogic systems that are overburdened.

Requirements

Existing Windows or Linux device using SNMP or Ping.

DEVICE PREPARATION

You will first need to discover your EMC SMI-S Provider server (Windows or Linux) using the ScienceLogic discovery engine. If your EMC SMI-S Provider is installed on Windows or Linux, it is recommended that you enable Windows SNMP or Net-SNMP. However, if SNMP is not available, it is recommended that you model the device as an ICMP or pingable device type.

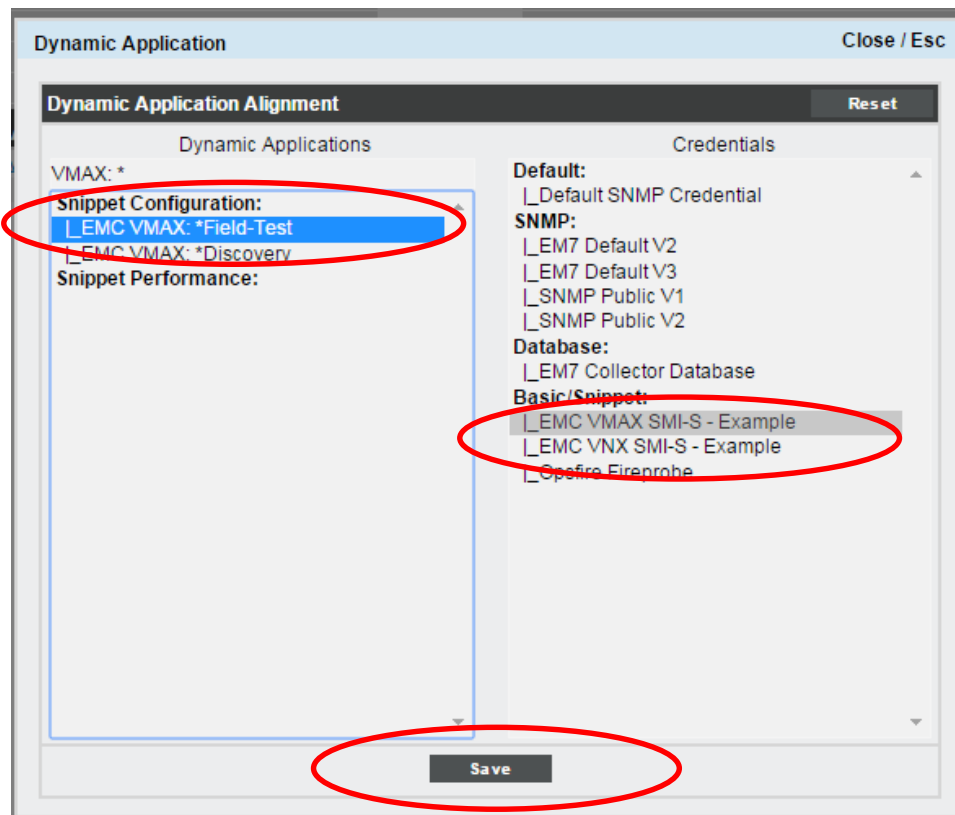
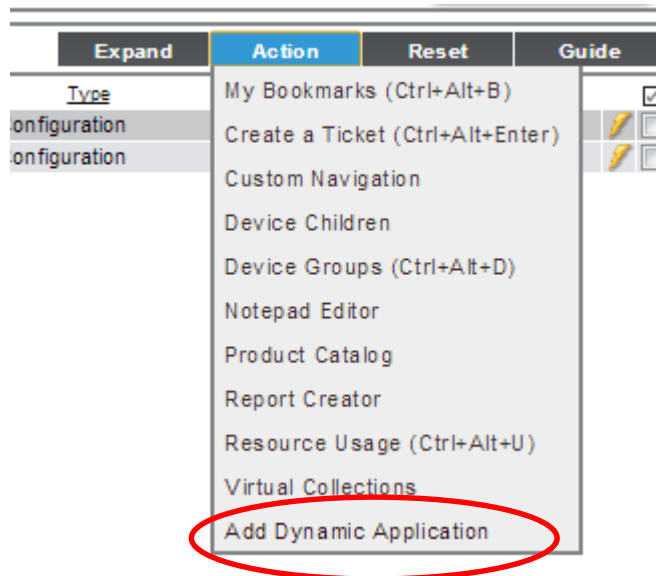
Device Name	win2k8-64bit-89	Managed Type	Physical Device	
IP Address / ID	192.168.2.89 2	Category	Servers	
Class	Microsoft	Sub-Class	Windows 2008 Server R2	
Organization	System	Uptime	66 days, 18:04:49	
Collection Mode	Active	Collection Time	2014-01-24 11:25:00	
Description	Hardware: Intel®4 Family 6 Model 42 Stepping 7 AT/AT COMPATIBLE	Group / Collector	CUG em7_devbox	

ALIGNING THE APP

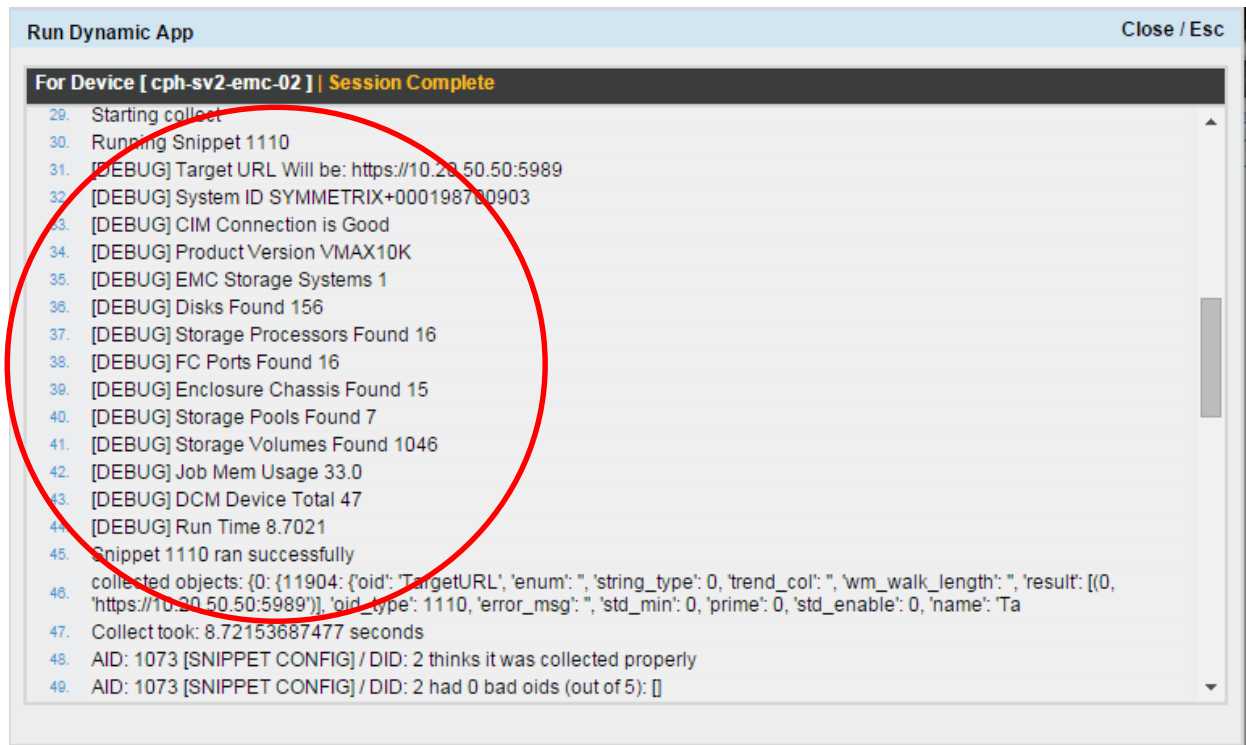
With the device discovered and modeled in ScienceLogic, navigate to the device properties page and then click on the Collections tab. Next, click on the Actions button, then select “Add Dynamic Application”.

Once in the Dynamic Application modal, type “VMAX: *” in the search box, then select the “EMC VMAX: *Field Test” application. Select the credential you configured in the previous chapter.

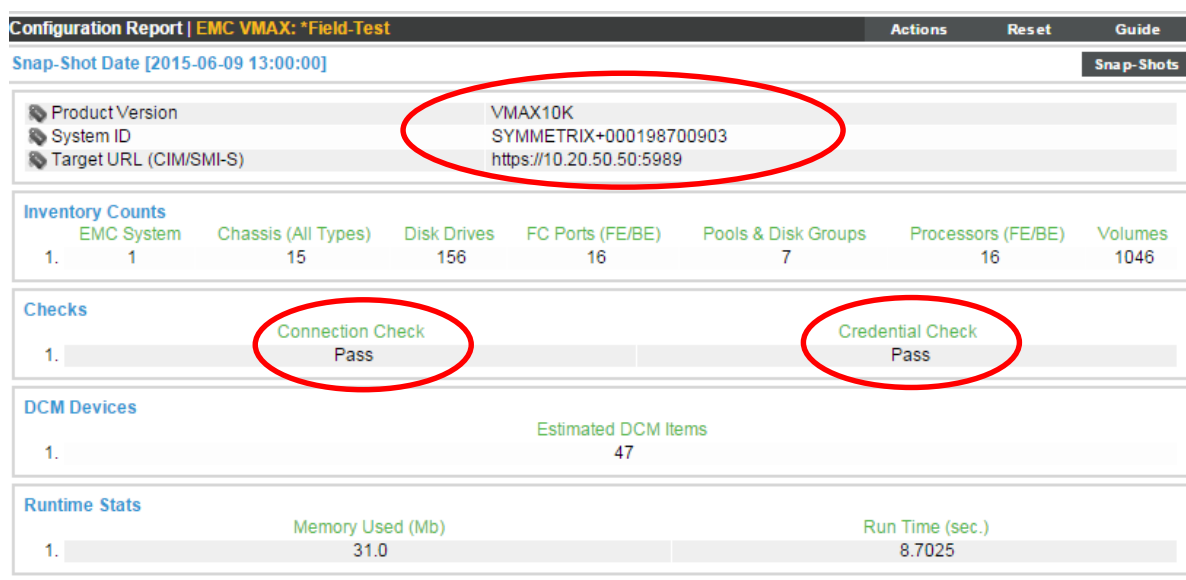
Click “Save” to save your settings and you will be returned to the Collections page. Click on the lightning bolt icon on the row with the application aligned. This will run the application and provide you with the results.



If the credential and SMI-S Provider are configured correctly, you will see valid results in the Run window.



If it is not working correctly, there will be verbose error messages indicating the problem. After allowing the Application to run on its normal 5 minute collection cycle, navigate to the device Config page, and then select EMC VMAX Field Test.



The results of the application will provide useful information that can be used to validate configuration of the EMC VMAX storage system and the approximate number of DCM devices that will be created once the Power-Pack has been fully deployed.

Note: The “DCM Items” field is the total number of DCM devices that will be created once the application is fully deployed. Make sure your ScienceLogic database and collector have sufficient capacity to allow for all the new DCM devices before proceeding to the next chapter.

It is recommended to remove all “Field Test” Dynamic Applications once validation is complete. The application is not required for the other components of the Power-Pack to function. It is recommend that you remove Field Test application or change the polling frequency to 6 hours once the power-pack has been fully deployed.

Close	Properties	Thresholds	Collections	Monitors																						
Schedule	Logs	Toolbox	Interfaces	Relationships	Tickets	Redirects	Notes																			
Device Name	cph-sv2-emc-02	Managed Type	Physical Device					 Ping Device																		
IP Address / ID	10.20.50.50 2	Category	Pingable																							
Class	Ping	Sub-Class	ICMP																							
Organization	EMC VMAX	Uptime	0 days, 00:00:00																							
Collection Mode	Active	Collection Time	2015-06-09 12:52:00																							
Description		Group / Collector	CUG cph-em7lab-01																							
Device Hostname																										
Dynamic Application™ Collections Poll frequency updated to Every 12 Hours																										
<table border="1"> <thead> <tr> <th>Dynamic Application</th> <th>ID</th> <th>Frequency</th> <th>Type</th> <th>Credential</th> <th></th> </tr> </thead> <tbody> <tr> <td>+ EMC VMAX: *Discovery</td> <td>1074</td> <td>2 mins</td> <td>Snapshot Configuration</td> <td>EMC VMAX SMI-S - Example</td> <td>☐</td> </tr> <tr> <td>+ EMC VMAX: *Field-Test</td> <td>1073</td> <td>720 mins - override</td> <td>Snapshot Configuration</td> <td>EMC VMAX SMI-S - Example</td> <td>☒</td> </tr> </tbody> </table>									Dynamic Application	ID	Frequency	Type	Credential		+ EMC VMAX: *Discovery	1074	2 mins	Snapshot Configuration	EMC VMAX SMI-S - Example	☐	+ EMC VMAX: *Field-Test	1073	720 mins - override	Snapshot Configuration	EMC VMAX SMI-S - Example	☒
Dynamic Application	ID	Frequency	Type	Credential																						
+ EMC VMAX: *Discovery	1074	2 mins	Snapshot Configuration	EMC VMAX SMI-S - Example	☐																					
+ EMC VMAX: *Field-Test	1073	720 mins - override	Snapshot Configuration	EMC VMAX SMI-S - Example	☒																					

CHAPTER 6

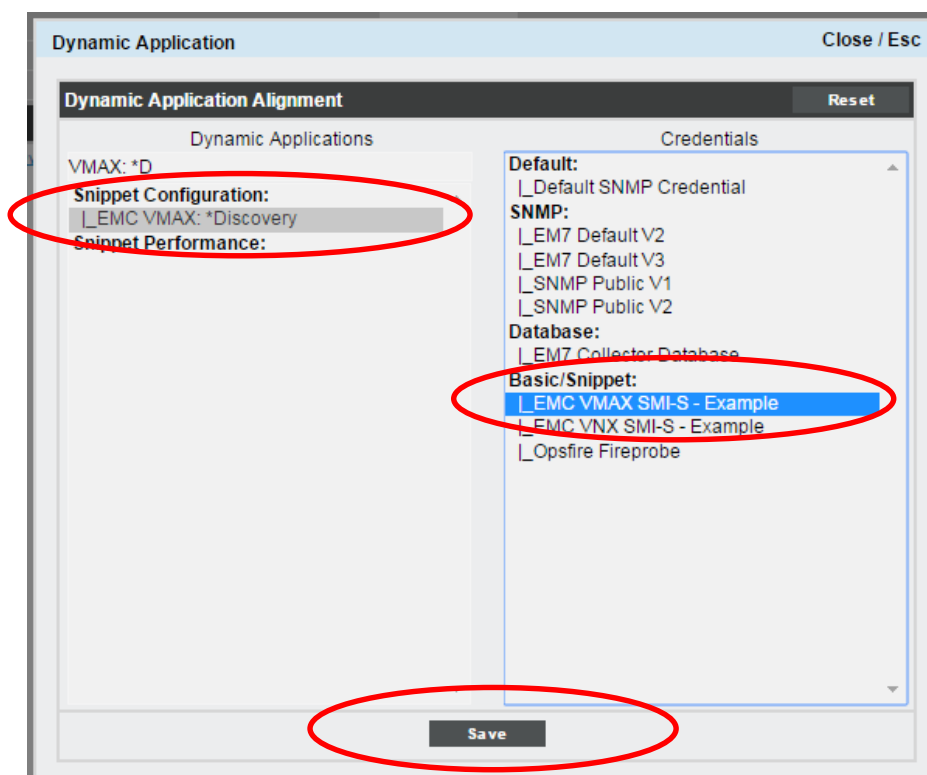
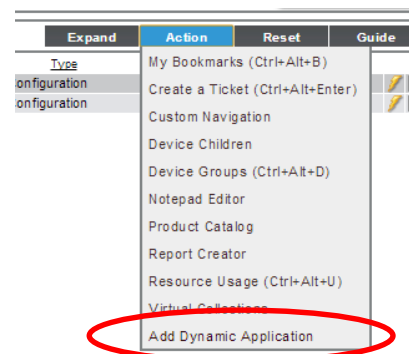
ALIGNING DISCOVERY APPLICATION

ALIGNING THE DISCOVERY APP

With the root device discovered (Windows or Linux), click on the device properties page, then select the Collections tab. Next, click on the Actions button, then select Add Dynamic Application.

In the Dynamic Application modal, type "EMC VMAX: *Discovery" in the search box. Click on the application, then in the right selector window, select appropriate the credential. Click "Save" to save your settings and you will be returned to the Collections page.

Note: ONLY manually align the "EMC VMAX: *Discovery" application - All other applications will be automatically aligned for you!



While still in the root device (Windows or Linux) collection tab, manually run the "EMC VMAX: *Discovery" application by clicking on the lightning bolt icon.

Close	Properties	Thresholds	Collections	Monitors	Tickets	Redirects	Notes
Schedule	Logs	Toolbox	Interfaces	Relationships			
Device Name	bd-win2k8r2			Managed Type	Physical Device		
IP Address / ID	10.0.6.69 / 185			Category	Servers		
Class	Microsoft			Sub-Class	Windows Server 2008 R2		
Organization	System			Uptime	76 days, 17:33:45		
Collection Mode	Active			Collection Time	2014-04-25 14:55:00		
Description	Hardware: Intel®4 Family 6 Model 44 Stepping 2 AT/AT COMPATIBLE - S			Group / Collector	CUG / bd_em7_aio		

Dynamic Application™ Collections						Expand	Action	Reset	Guide
	ID	Poll Frequency	Type	Credential					
+ Host Resource: CPU Config	330	1440 mins	SNMP Configuration	Default SNMP Credential					
+ Host Resource: Software	327	120 mins	SNMP Configuration	Default SNMP Credential					
+ EMC VMAX: *Discovery	1307	3 mins	Snippet Configuration	EMC SMI-S - Example					
+ EMC VMAX: *Field Test	1300	5 mins	Snippet Configuration	EMC SMI-S - Example					
+ Host Resource: Memory Config	329	1440 mins	Snippet Configuration	Default SNMP Credential					

This will force the application to run immediately and create the first tier of the DCM tree. Although this step is not required, it helps speed up the initial discovery and provide a validation that collection is working as desired.

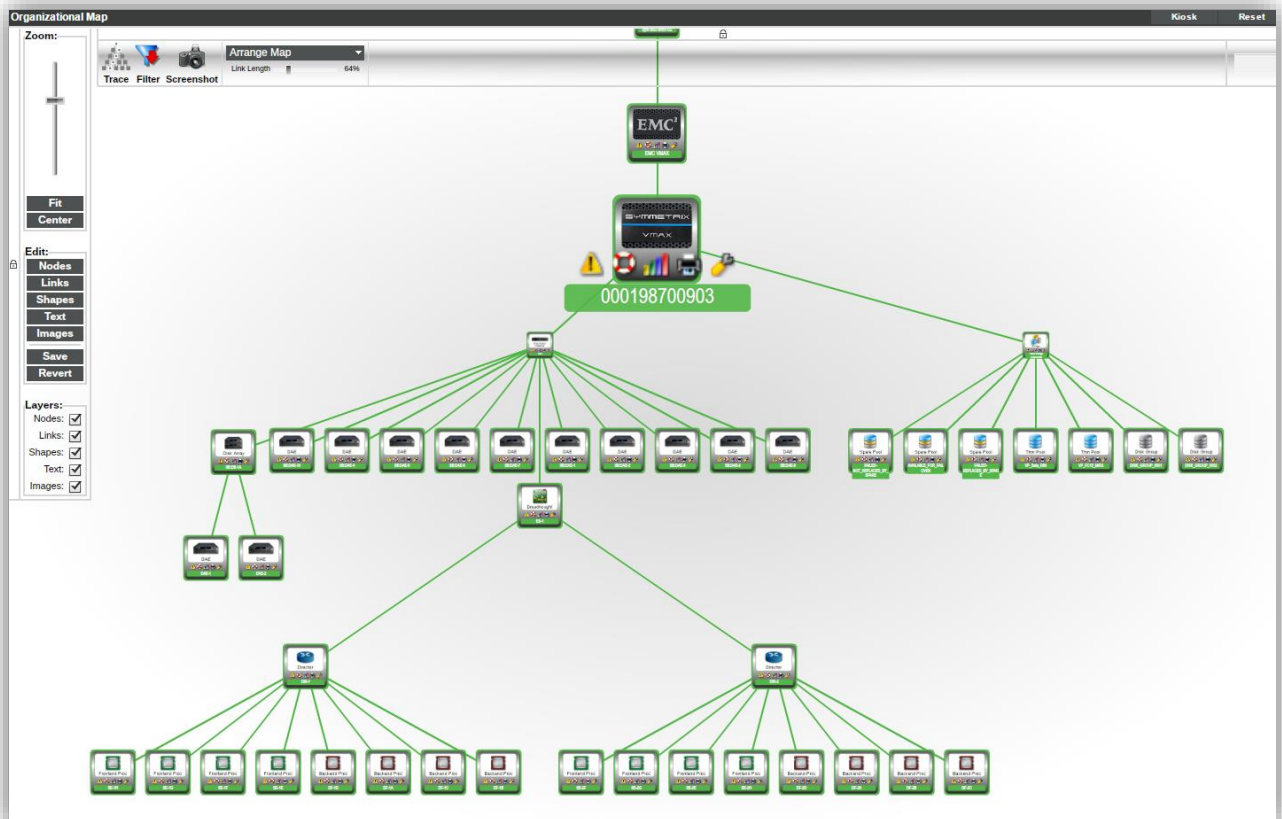
Run Dynamic App Close / Esc

For Device [cph-sv2-emc-02] | Session Complete

```

21. AID: 1074 [SNIPPET CONFIG] / DID: 2 thinks it was collected properly
22. AID: 1074 [SNIPPET CONFIG] / DID: 2 had 0 bad oids (out of 1): []
23. Original Collected index of 0 was mapped to EM7 internal instance of 0
24. Original Collected index of 0 was mapped to EM7 internal instance of 0
25. BAD OIDS: 0
26. ERROR MESSAGE:
27. COLLECTED: True
28. FOUND OBJECTS: set([11906, 11908])
29. Group Obj_ID Index Data Changed? Collection Time
30.
31. 1 11906 0 EMC VMAX 0 0
32. 1 11908 0 EMC+VMAX+STORAGE+10.20.50.0 0 0
33. processing app alerts
34. Loaded 0 active alert policies for this app
35. loaded app default thresholds: {}
36. loaded device specific thresholds: {}
37. Final alert thresholds for this collection: {}
38. Loaded currently active alerts: {}
39. No internal alerts (app errors).
40. Done!
41. Process Completed on Collector
  
```

All EMC SMI-S Dynamic Applications operating on varying collection frequency, as a result it may take about 10 minutes for all DCM devices to be modeled and discovered. Once complete, you may view the Component tree in the Views tab.



CHAPTER 7

ALERTS AND EVENTS

OVERVIEW

There are over 60 health-based events definitions with the EMC VMAX Power-Pack, each with a matching clearing event. Each of these events relies on state-based data collected every 5 to 10 minutes by a corresponding configuration or performance dynamic application.

Event Policy Manager Policies Found [61]									
Event Policy Name		Type	State	P-Pack	Severity	Weight	ID	Expiry	Time
VMAX									
1.	EMC VMAX: Array Health State Has Degraded	Dynamic	Enabled	Yes	Critical	0	3345	0 Min.	0 Min.
2.	EMC VMAX: Array Health State Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3346	15 Min.	0 Min.
3.	EMC VMAX: Battery Health State Has Degraded	Dynamic	Enabled	Yes	Minor	0	3335	0 Min.	0 Min.
4.	EMC VMAX: Battery Health State Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3336	15 Min.	0 Min.
5.	EMC VMAX: Chassis Health State Has Reported a Degraded or Minor Failure	Dynamic	Enabled	Yes	Notice	0	3367	0 Min.	0 Min.
6.	EMC VMAX: Chassis Health State Has Reported a Major Failure, Critical Failure, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3333	0 Min.	0 Min.
7.	EMC VMAX: Chassis Health State Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3334	15 Min.	0 Min.
8.	EMC VMAX: Disk Group Operational State Has Returned to OK	Dynamic	Enabled	Yes	Healthy	0	3320	15 Min.	0 Min.
9.	EMC VMAX: Disk Group Operational State Is Reporting a Degraded or Stressed State	Dynamic	Enabled	Yes	Notice	0	3355	0 Min.	0 Min.
10.	EMC VMAX: Disk Group Operational State Is Reporting a Predictive Failure, Error, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3319	0 Min.	0 Min.
11.	EMC VMAX: Disk Group Volume Health State has Major Failure, Critical Failure, Non-Recoverable Error, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3357	0 Min.	0 Min.
12.	EMC VMAX: Disk Group Volume Health State is Degraded or has Minor Failure	Dynamic	Enabled	Yes	Notice	0	3356	0 Min.	0 Min.
13.	EMC VMAX: Disk Group Volume Health State is OK	Dynamic	Enabled	Yes	Healthy	0	3358	15 Min.	0 Min.
14.	EMC VMAX: Disk Health State Has Degraded	Dynamic	Enabled	Yes	Major	0	3317	0 Min.	0 Min.
15.	EMC VMAX: Disk Health State Has Degraded: Major	Dynamic	Enabled	Yes	Major	0	3351	0 Min.	0 Min.
16.	EMC VMAX: Disk Health State Has Degraded: Minor	Dynamic	Enabled	Yes	Notice	0	3352	0 Min.	0 Min.
17.	EMC VMAX: Disk Health State Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3318	15 Min.	0 Min.
18.	EMC VMAX: Disk Health State Has Returned to Normal	Dynamic	Enabled	Yes	Healthy	0	3353	15 Min.	0 Min.
19.	EMC VMAX: Dreadnought Health State Has Degraded	Dynamic	Enabled	Yes	Critical	0	3323	0 Min.	0 Min.
20.	EMC VMAX: Dreadnought Health State Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3324	15 Min.	0 Min.
21.	EMC VMAX: Ethernet Port State Has Reported a Degraded or Minor Failure	Dynamic	Enabled	Yes	Notice	0	3349	0 Min.	0 Min.
22.	EMC VMAX: Ethernet Port State Has Reported a Major Failure, Critical Failure, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3372	0 Min.	0 Min.
23.	EMC VMAX: Ethernet Port State Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3350	15 Min.	0 Min.
24.	EMC VMAX: Fan Health State Has Degraded	Dynamic	Enabled	Yes	Minor	0	3331	0 Min.	0 Min.
25.	EMC VMAX: Fan Health State Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3332	15 Min.	0 Min.
26.	EMC VMAX: Fibre Channel BE Port Health State Has Reported a Degraded or Minor Failure	Dynamic	Enabled	Yes	Notice	0	3370	0 Min.	0 Min.
27.	EMC VMAX: Fibre Channel BE Port Health State Has Reported a Major Failure, Critical Failure, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3327	0 Min.	0 Min.
28.	EMC VMAX: Fibre Channel BE Port Health State Has Returned to OK	Dynamic	Enabled	Yes	Healthy	0	3328	15 Min.	0 Min.
29.	EMC VMAX: Fibre Channel FE Port Health State Has Reported a Degraded or Minor Failure	Dynamic	Enabled	Yes	Notice	0	3371	0 Min.	0 Min.
30.	EMC VMAX: Fibre Channel FE Port Health State Has Reported a Major Failure, Critical Failure, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3325	0 Min.	0 Min.
31.	EMC VMAX: Fibre Channel FE Port Health State Has Returned to OK	Dynamic	Enabled	Yes	Healthy	0	3326	15 Min.	0 Min.
32.	EMC VMAX: Link Control Card Health State Has Reported a Degraded or Minor Failure	Dynamic	Enabled	Yes	Notice	0	3368	0 Min.	0 Min.
33.	EMC VMAX: Link Control Card Health State Has Reported a Major Failure, Critical Failure, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3341	0 Min.	0 Min.
34.	EMC VMAX: Link Control Card Health State Has Returned to OK	Dynamic	Enabled	Yes	Healthy	0	3369	15 Min.	0 Min.
35.	EMC VMAX: Management Enclosure Health State Has Degraded	Dynamic	Enabled	Yes	Critical	0	3321	0 Min.	0 Min.
36.	EMC VMAX: Management Enclosure Health State Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3322	15 Min.	0 Min.
37.	EMC VMAX: Memory Operational State Has Reported a Degraded or Minor Failure	Dynamic	Enabled	Yes	Minor	0	3366	0 Min.	0 Min.
38.	EMC VMAX: Memory Operational State Has Reported Major Failure, Critical Failure, Non-Recoverable Error, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3347	0 Min.	0 Min.
39.	EMC VMAX: Memory Operational State Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3348	15 Min.	0 Min.
40.	EMC VMAX: Pool Data Device Health State has Degraded or has Minor Failure	Dynamic	Enabled	Yes	Notice	0	3360	0 Min.	0 Min.
41.	EMC VMAX: Pool Data Device Health State has Major Failure, Critical Failure, Non-Recoverable Error, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3359	0 Min.	0 Min.
42.	EMC VMAX: Pool Data Device Health State is OK	Dynamic	Enabled	Yes	Healthy	0	3361	15 Min.	0 Min.
43.	EMC VMAX: Pool Operational State Has Returned to OK	Dynamic	Enabled	Yes	Healthy	0	3304	15 Min.	0 Min.
44.	EMC VMAX: Pool Operational State Is Reporting a Degraded or Stressed State	Dynamic	Enabled	Yes	Notice	0	3303	0 Min.	0 Min.
45.	EMC VMAX: Pool Operational State Is Reporting a Predictive Failure, Error, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3354	0 Min.	0 Min.
46.	EMC VMAX: Pool Thin Device has has Major Failure, Critical Failure, Non-Recoverable Error, or Non-Recoverable Error	Dynamic	Enabled	Yes	Major	0	3315	0 Min.	0 Min.
47.	EMC VMAX: Pool Thin Device Health State Has Degraded or Minor Failure	Dynamic	Enabled	Yes	Notice	0	3362	0 Min.	0 Min.
48.	EMC VMAX: Pool Thin Device Health State Has Returned to OK	Dynamic	Enabled	Yes	Healthy	0	3316	15 Min.	0 Min.
49.	EMC VMAX: Pool Usage Exceeded Critical Threshold	Dynamic	Enabled	Yes	Critical	0	3307	0 Min.	0 Min.
50.	EMC VMAX: Pool Usage Exceeded Major Threshold	Dynamic	Enabled	Yes	Major	0	3309	0 Min.	0 Min.
51.	EMC VMAX: Pool Usage Exceeded Minor Threshold	Dynamic	Enabled	Yes	Minor	0	3311	0 Min.	0 Min.
52.	EMC VMAX: Pool Usage Exceeded Notify Threshold	Dynamic	Enabled	Yes	Notice	0	3313	0 Min.	0 Min.
53.	EMC VMAX: Pool Usage Has Returned to Healthy	Dynamic	Enabled	Yes	Healthy	0	3312	0 Min.	0 Min.

CHAPTER 8

DASHBOARDS AND PERFORMANCE DATA

PERFORMANCE METRICS

The EMC VMAX SMI-S Power-Pack includes support for over 250 different performance metrics for volumes, pools, fibre channel devices, and aggregate data for the entire array. All performance metrics that are made available from the EMC SMI-S Provider have been included in this power-pack, excluding performance data for individual disk drives. The following tables provide an overview of available SMI-S metrics included in the Power-Pack. (Note that VMAX and VNX have a slightly different subset of data that is available from the EMC SMI-S provider. As a result the VMAX pack differs slightly from the VNX Power-Pack)

The following is a list of available VMAX performance metrics.

EMC VMAX: Array I/O
Deferred Writes
Deferred Writes (IO/s)
Delayed Deferred Writes
Delayed Deferred Writes (IO/s)
LRU Locks
LRU Locks (IO/s)
LRU Reads
LRU Reads (IO/s)
LRU Total Cache Hits
LRU Total Cache Hits (IO/s)
LRU Writes
LRU Writes (IO/s)
Sequential Writes
Sequential Writes (IO/s)
Total Cache Hits
Total Cache Hits (IO/s)
Total IO (IO/s)
Total Reads
Total Reads (%)
Total Reads (IO/s)
Total Reads/Writes

Total Reads/Writes (IO/s)
Total Writes
Total Writes (%)
Total Writes (IO/s)

EMC VMAX: Array Performance
Pending Flush Limit
PermaCache Slots Free
PermaCache Slots Free (per/sec)
PermaCache Slots Used
PermaCache Slots Used (per/sec)
Prefetched
Prefetched (kB/s)
Total Reads
Total Reads (%)
Total Reads (kB/s)
Total Reads/Writes
Total Reads/Writes (kB/s)
Total Writes
Total Writes (%)
Total Writes (kB/s)
Write Cache Flushed
Write Cache Flushed (kB/s)
Write Pending Flush
Write Pending Flush (kB/s)

EMC VMAX: Component Health
Battery Health
Battery Health %
Chassis Health
Chassis Health %
Director Health
Director Health %
Disk Health
Disk Health %
Fan Health
Fan Health %
FC Backend Health
FC Backend Health %
FC Frontend Health

FC Frontend Health %
Pool Health
Pool Health %
Power Supply Health
Power Supply Health %
Processor Health
Processor Health %

EMC VMAX: Disk Group Performance
DA Prefetched
DA Prefetched (kB/s)
DA Prefetched Used
DA Prefetched Used (kB/s)
DA Reads
DA Reads (IO/s)
DA Reads (kB/s)
DA Reads/Writes (IO/s)
DA Reads/Writes (kB/s)
DA Writes
DA Writes (IO/s)
DA Writes (kB/s)
Writes Pending Flush
Writes Pending Flush (kB/s)

EMC VMAX: Disk Group Usage
Available Capacity
Available Capacity (%)
Remaining Managed Space
Used Capacity
Used Capacity (%)

EMC VMAX: FC Adapter (BE) Performance
Availability (%)
Long Misses
Long Misses (IO/s)
Prefetched Not Used
Prefetched Not Used (kB/s)
Prefetched Used
Prefetched Used (kB/s)
Prefetched
Prefetched (kB/s)

Processor Utilization (%)
Short Misses
Short Misses (IO/s)
Total IO
Total IO (IO/s)
Total Reads
Total Reads (%)
Total Reads (IO/s)
Total Reads/Writes
Total Reads/Writes (IO/s)
Total Transferred
Total Transferred (kB/s)
Total Transferred (MB/s)
Total Writes
Total Writes (%)
Total Writes (IO/s)

EMC VMAX: FC Adapter (BE) Performance (Aggregate)
Long Misses
Long Misses (IO/s)
Prefetched Not Used
Prefetched Not Used (kB/s)
Prefetched Used
Prefetched Used (kB/s)
Prefetched
Prefetched (kB/s)
Processor Utilization (%)
Short Misses
Short Misses (IO/s)
Total IO
Total IO (IO/s)
Total Reads
Total Reads (%)
Total Reads (IO/s)
Total Reads/Writes
Total Reads/Writes (IO/s)
Total Transferred
Total Transferred (kB/s)
Total Transferred (MB/s)
Total Writes
Total Writes (%)

Total Writes (IO/s)

EMC VMAX: FC Adapter (FE) Performance
--

Availability (%)

Device Flush Pending Events

Device Flush Pending Events (per/sec)

Processor Utilization (%)

Slot Collisions

Slot Collisions (per/sec)

System Flush Pending Events

System Flush Pending Events (per/sec)

Total Hits

Total Hits (IO/s)

Total IO

Total IO (IO/s)

Total Reads

Total Reads (%)

Total Reads (IO/s)

Total Reads/Writes

Total Reads/Writes (IO/s)

Total Transferred

Total Transferred (kB/s)

Total Transferred (MB/s)

Total Writes

Total Writes (%)

Total Writes (IO/s)

EMC VMAX: FC Adapter (FE) Performance (Aggregate)
--

Device Flush Pending Events

Device Flush Pending Events (per/sec)

Processor Utilization (%)

Slot Collisions

Slot Collisions (per/sec)

System Flush Pending Events

System Flush Pending Events (kB/s)

Total Hits

Total Hits (IO/s)

Total IO

Total IO (IO/s)

Total Reads

Total Reads (%)

Total Reads (IO/s)
Total Reads/Writes
Total Reads/Writes (IO/s)
Total Transferred
Total Transferred (kB/s)
Total Transferred (MB/s)
Total Writes
Total Writes (%)
Total Writes (IO/s)

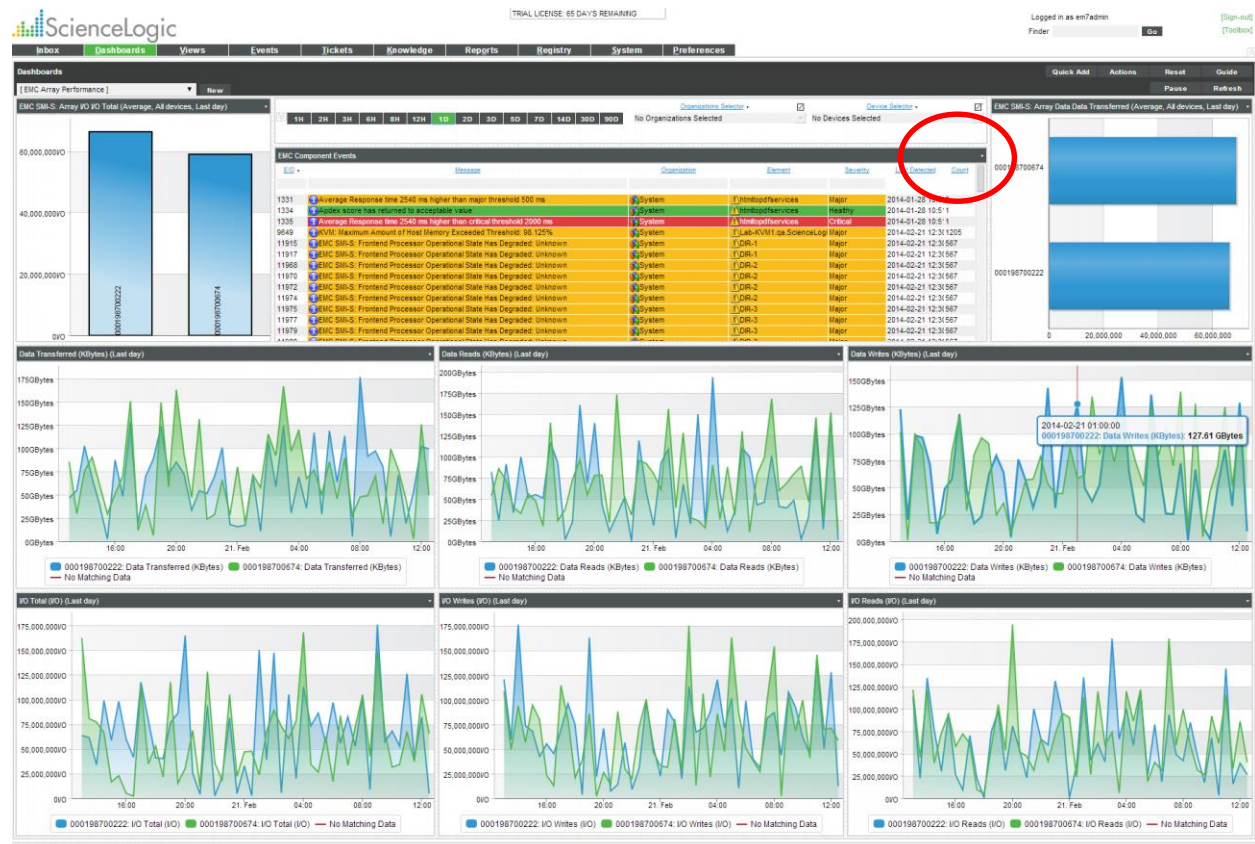
EMC VMAX: Pool I/O
DA Reads
DA Reads (IO/s)
DA Reads/Writes
DA Reads/Writes (IO/s)
DA Writes
DA Writes (IO/s)
Read Cache Hits
Read Cache Hits (IO/s)
Sequential Read Hits
Sequential Read Hits (IO/s)
Sequential Reads
Sequential Reads (IO/s)
Sequential Write Hits
Sequential Write Hits (IO/s)
Sequential Writes
Sequential Writes (IO/s)
Snap Cache Reads
Snap Cache Reads (IO/s)
Total IO (IO/s)
Total Reads
Total Reads (IO/s)
Total Reads/Writes
Total Reads/Writes (IO/s)
Total Writes
Total Writes (IO/s)
Write Cache Hits
Write Cache Hits (IO/s)

EMC VMAX: Pool Performance
DA Prefetched Not Used

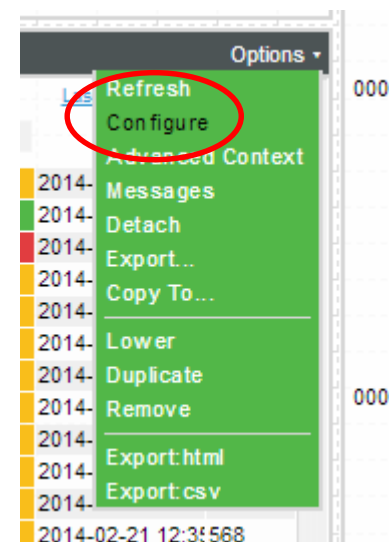
DA Prefetched Not Used (kB/s)
DA Prefetched
DA Prefetched (kB/s)
DA Reads
DA Reads (kB/s)
DA Reads/Writes
DA Reads/Writes (kB/s)
DA Writes
DA Writes (kB/s)
Pending Flushes
Pending Flushes (kB/s)
Sampled Reads
Sampled Reads (per/sec)
Sampled Writes
Sampled Writes (per/sec)
Total Reads
Total Reads (%)
Total Reads (kB/s)
Total Reads/Writes
Total Reads/Writes (kB/s)
Total Writes
Total Writes (%)
Total Writes (kB/s)

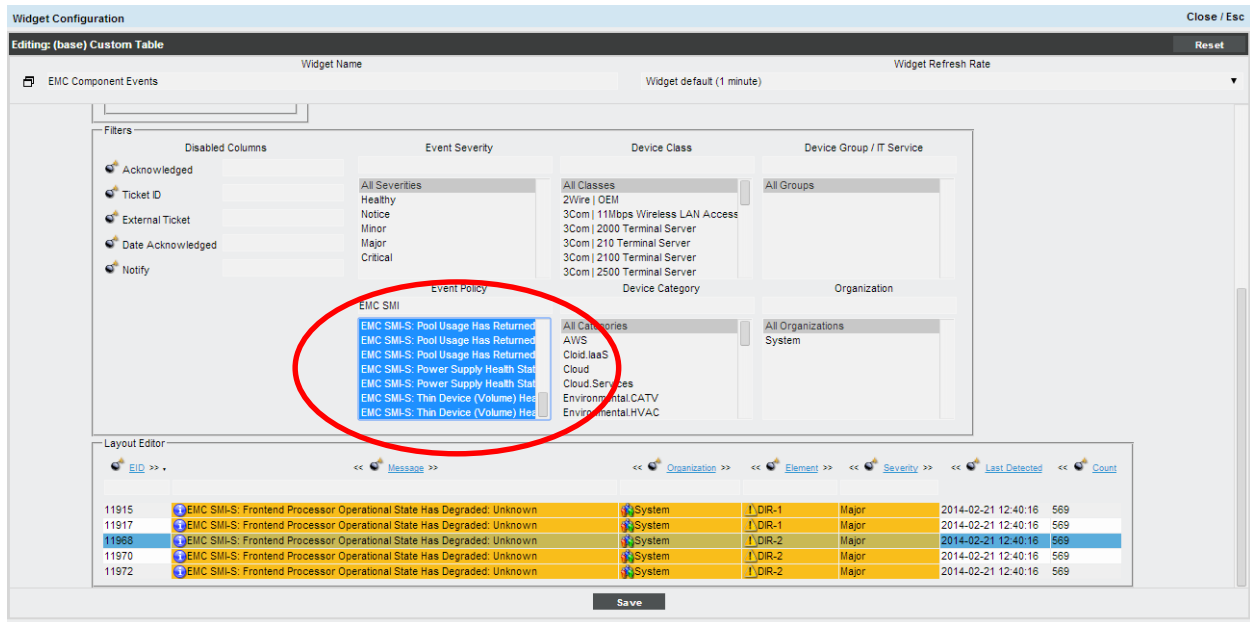
DASHBOARDS

The EMC SMI-S Power-Pack includes several built-in dashboards, both for VMAX and VNX. By default, Dashboards don't retain Event filters, so the filter on EMC only events, you will need to edit each Event Widget and select the criteria you want to see in the widget.



Click the top right of the Event Widget, click the down arrow icon, and select "Configure". In the Widget Configuration window, select the Filter criteria you want to see. In our example, we will select all EMC SMI-S Event Policies.





Enter “EMC SMI-S” in the Event Policy text search box, and then select all policies. Select save the save the settings.

DASHBOARD CAVEATS

Dashboards use normalized data and require the ScienceLogic normalization process to run at least once to begin populating dashboard data. This process runs every hour and can take up to 2 hours before you begin seeing dashboard data. If you see the following message in the Top left most widget, then either the normalization process has not yet run, or data is not being collected for the specified device. Allow at least 2 hours for the normalization process to populate initial data.

