



# HP 3PAR SMI-S POWER-PACK

## *INSTALLATION AND CONFIGURATION OF THE HP 3PAR SMI-S POWER-PACK*

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# CHAPTER 1

## INTRODUCTION

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### 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.

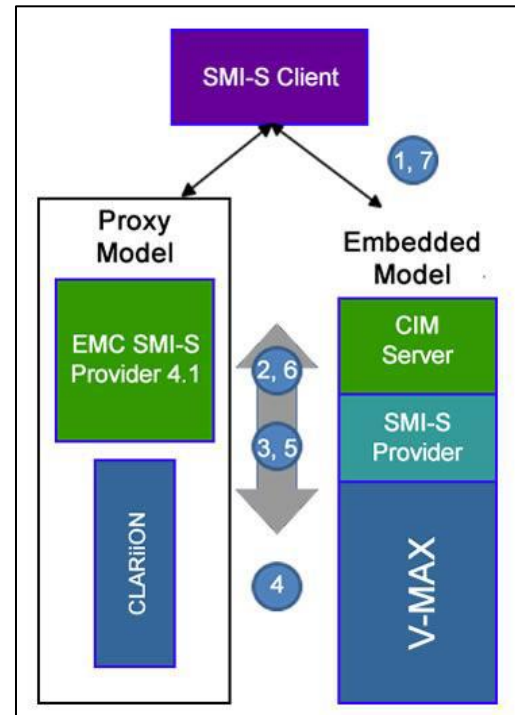
As the name implies, the embedded SMI-S providers are included on the storage platforms and do not require the installation or maintenance of a separate software package to provide an SMI-S interface to the storage platform. The trend for the newer platforms is to embed the SMI-S providers within the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

## HOW DOES SMI-S WORK?

SMI-S uses standard XML based communication methods to facilitate exchanges between the client application, the SMI-S provider, and the storage device.

Figure 2: SMI-S Communications illustrates how an SMI-S client communicates with a CIM Server in an EMC environment.

1. The SMI-S client 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 4.1.
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 (4), a confirmation message is returned to the provider (5), then to the server (6), and finally to the client (7).



In most implementations there is no need to be aware of the CIM Server layer. 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 HP 3PAR and is specific to the data name spaces associated with 3PAR.

| 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                | <b>3PAR</b> /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

## 3PAR SMI-S PROVIDER

### OVERVIEW

The ScienceLogic HP 3PAR SMI-S Power-Pack can be used with any 3PAR storage array that has the SMI-S provider service enabled. This chapter provides a brief overview of configuring the SMI-S provider on the HP 3PAR storage device.

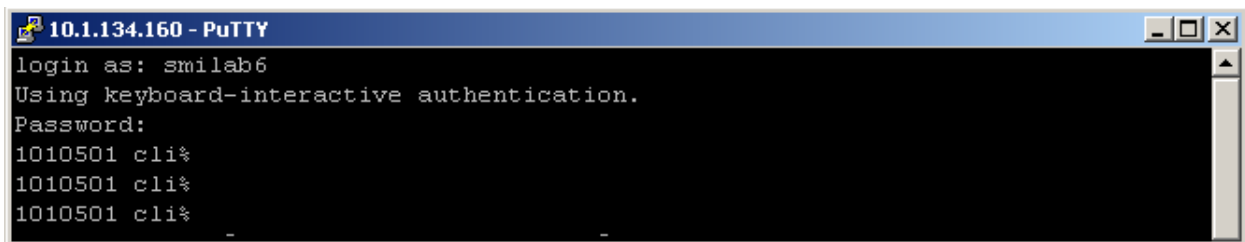
#### Requirements

*You must have a valid admin user name and password for 3PAR CLI*

### PROVIDER INSTALLATION

The 3PAR provider is embedded into the Storage Array, no need to install a Provider. Log into the HP 3PAR CLI using an SSH client such as Putty, use the username and password that was used to setup on the Array. The default username and passwords are 3paradm / 3pardata.

Once connected, you should see the following.



```
10.1.134.160 - PuTTY
login as: smilab6
Using keyboard-interactive authentication.
Password:
1010501 cli%
1010501 cli%
1010501 cli%
```

By default the SMI-S provider is disabled and must be enabled by an administrator. Type “setcim” command, which will enable the service. To stop the service type “stopcim”. For more information on different commands, type “help <command>”, where <command> is the command for help needed. Once complete, type “quit” to exit the 3PAR SSH shell.

# CHAPTER 3

## PREPARING NETWORK ENVIRONMENT

### TCP PORT

HP 3PAR SMI-S service runs on TCP port 5989 and is encrypted via SSL. In order for ScienceLogic management systems to communicate with the 3PAR 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 HP 3PAR device in ScienceLogic, perform a test command on the ScienceLogic collector or All-In-One server. Login as root on the collector and type the following, changing the IP address to the IP address of the 3PAR device.

```
nmap 192.168.1.1
```

If TCP port 5989 is open, the result should show the following message.

```
Nmap scan report for 192.168.1.1
Host is up (0.0024s latency).
Not shown: 994 filtered ports
PORT      STATE  SERVICE
22/tcp    open   ssh
5001/tcp   closed complex-link
5988/tcp   open   wbem-http
5989/tcp   open   wbem-https
8008/tcp   closed http
8080/tcp   open   http-proxy
```

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 3PAR SMI-S Power-Pack and then configure the credential for manual alignment of data collection.

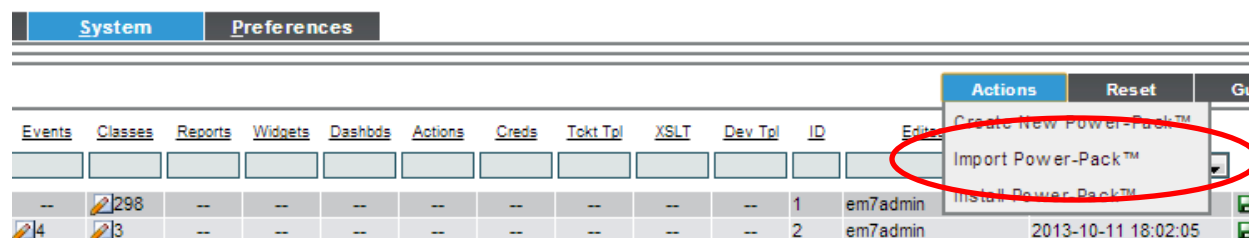
#### Requirements

A valid user name and password for 3PAR SMI-S

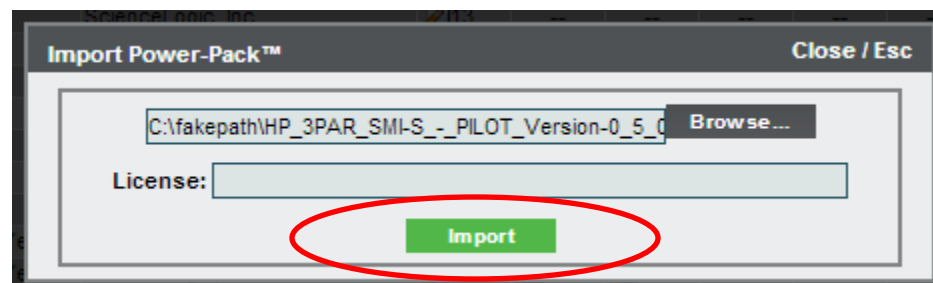
A valid admin user name and password for ScienceLogic

### INSTALLATION

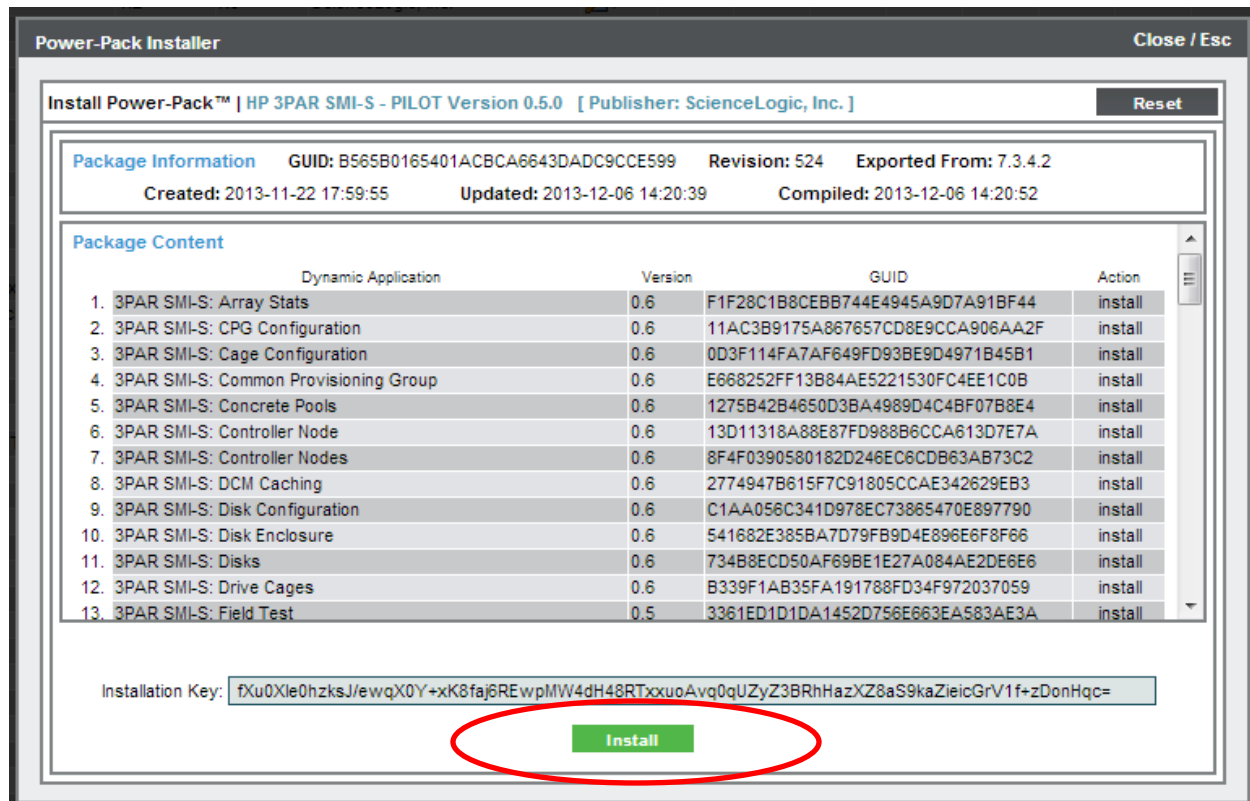
Obtain the latest copy of the 3PAR SMI-S Power-Pack. In this document we will be using version 0.5.x of the Power-Pack. Using normal Power-Pack installation procedures, go to the System tab, select Manage\Power-Packs, and then select the Action button, and select "Import Power-Pack".



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 "HP 3PAR SMI-S - Example" credential and then click on the wrench to edit it.

Change the username and password to match that of your 3PAR device. The default username and passwords are 3paradm / 3pardata.

**Credential Editor [43]** Close / Esc

Edit Basic/Snippet Credential #43 | Credential Saved New Reset

**Basic Settings**

Credential Name  
HP 3PAR - Example

Hostname/IP: %D      Port: 5989      Timeout(ms): 30000

Username: 3paradm      Password: .....

Save Save As

The default username and passwords are 3paradm / 3pardata.

## CHAPTER 5

### FIELD TESTING DYNAMIC APP

#### OVERVIEW

In this chapter we will install the 3PAR SMI-S Field Testing Dynamic App which was designed to help deployment engineers and user validate settings and configurations before deployment of the corset of dynamic applications.

#### Requirements

*Existing 3PAR device model using SNMP or Ping*

## DEVICE PREPARATION

You will need to first model your 3PAR storage system using the ScienceLogic discovery engine. 3PAR supports SNMP natively and can be used to properly identify and discover the device. The 3PAR SMI-S Power-Pack also includes several 3PAR SNMP device models that will be aligned during discovery. If SNMP is not available, it is recommended that you model the device as an ICMP or pingable device type.

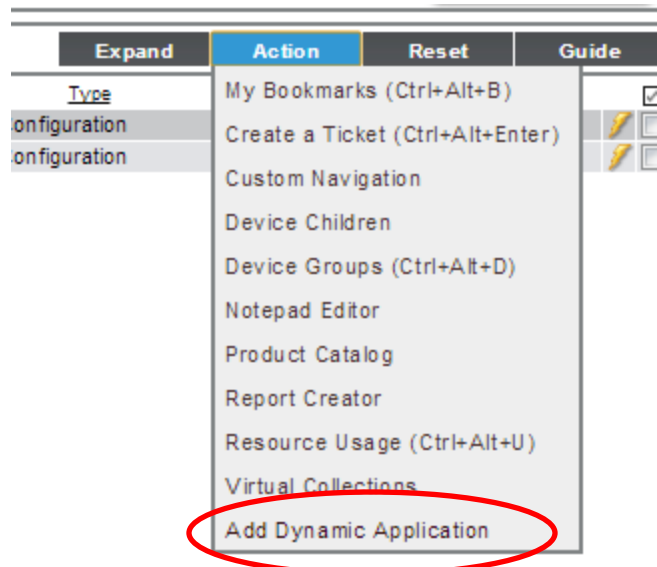
|                 |                                                                         |                   |                            |                                                                                     |
|-----------------|-------------------------------------------------------------------------|-------------------|----------------------------|-------------------------------------------------------------------------------------|
| Device Name     | hp3par_beauty04-smq                                                     | Managed Type      | Physical Device            |  |
| IP Address / ID | 64.106.165.180   326                                                    | Category          | Storage SAN                |                                                                                     |
| Class           | HP 3PAR                                                                 | Sub-Class         | InServ F400                |                                                                                     |
| Organization    | Datapipe                                                                | Uptime            | 320 days, 15:36:54         |                                                                                     |
| Collection Mode | Active                                                                  | Collection Time   | 2013-12-06 16:45:00        |                                                                                     |
| Description     | InServ F400, ID: 3471, Serial number: 1303471, InForm OS version: 3.1.1 | Group / Collector | CUG   uat-em7.datapipe.net |                                                                                     |

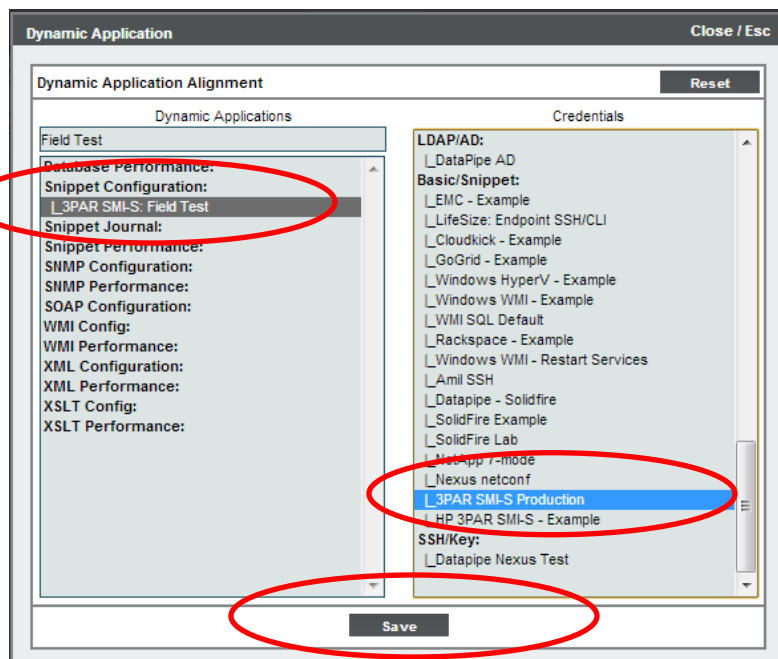
## ALIGNING THE APP

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".

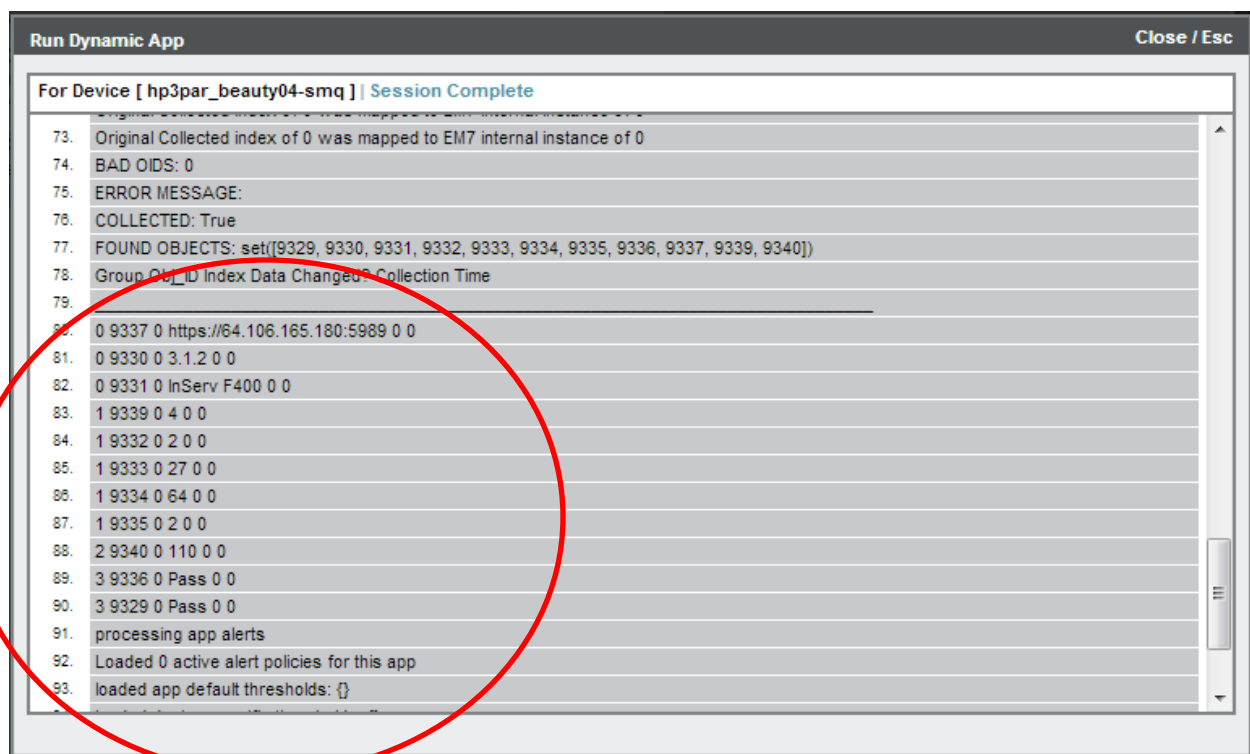
Once in the Dynamic Application modal, type "Field Test" in the search box, then select the "3PAR SMI-S Field Test" application. Select the credential you configured in the previous chapter.

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 applications aligned. This will run the Dynamic Applications and provide you with the results. If the credential and 3PAR device is configured correctly, you will see valid results.



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 3PAR SMI-S: Field Test.

| Configuration Report   3PAR SMI-S: Field Test |                               | Actions                     | Reset                | Guide             |                       |                         |
|-----------------------------------------------|-------------------------------|-----------------------------|----------------------|-------------------|-----------------------|-------------------------|
| Snap-Shot Date [2013-12-10 15:20:00]          |                               |                             | Snap-Shots           |                   |                       |                         |
| Version Check                                 |                               | 3.1.2                       |                      |                   |                       |                         |
| System Type                                   |                               | InServ F400                 |                      |                   |                       |                         |
| Target URL (CIM/SMI-S)                        |                               | https://64.106.165.180:5989 |                      |                   |                       |                         |
| Inventory Counts                              |                               |                             |                      |                   |                       |                         |
|                                               | Main Storage System (license) | Total CPG Pools             | Total Disk Cages     | Total Disk Drives | Total Nodes (license) | Total Volumes (license) |
| 1.                                            | 1                             | 9                           | 4                    | 64                | 2                     | 27                      |
| DCM Components                                |                               |                             |                      |                   |                       |                         |
|                                               | Licensed Components           |                             | Total DCM Components |                   |                       |                         |
| 1.                                            | 30                            |                             | 117                  |                   |                       |                         |
| Checks                                        |                               |                             |                      |                   |                       |                         |
|                                               | Connection Check              |                             | Credential Check     |                   |                       |                         |
| 1.                                            | Pass                          |                             | Pass                 |                   |                       |                         |

The results of the application will provide useful information that can be used to validate configuration of the 3PAR storage system and the approximate number of DCM devices that will be created once the device is fully managed with the 3PAR SMI-S solution.

Note the DCM Total field for total number of DCM devices. Make sure your ScienceLogic collector and system has the capacity to allow for all the new DCM devices before proceeding to the next chapter.

Once you have validated the 3PAR system is configured correctly, it is recommended to remove the Dynamic Application as it is not needed for production.

# CHAPTER 6

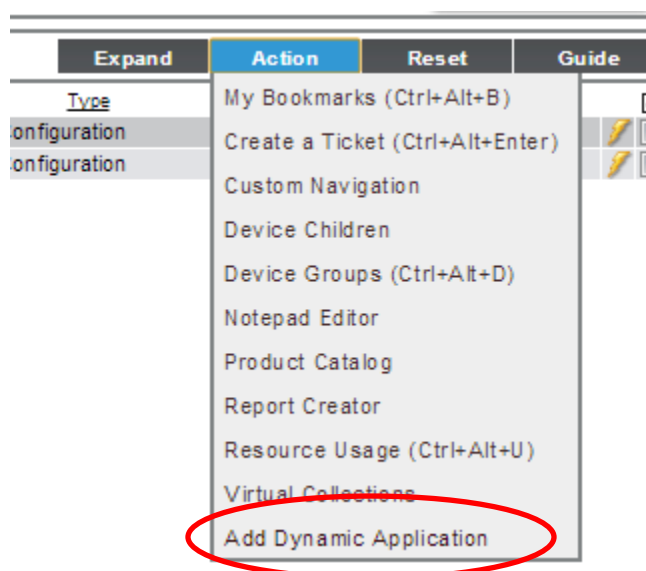
## ALIGNING DCM DYNAMIC APPS

### ALIGNING THE APP

With the device modeled, 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 “3PAR SMI-S: DCM Caching” in the search box, then select the “3PAR SMI-S DCM Caching” application. Next, select the credential you configured in the previous chapter.

Click “Save” to save your settings and you will be returned to the Collections page. Perform the same steps to add the “3PAR SMI-S Storage System” Dynamic Application.

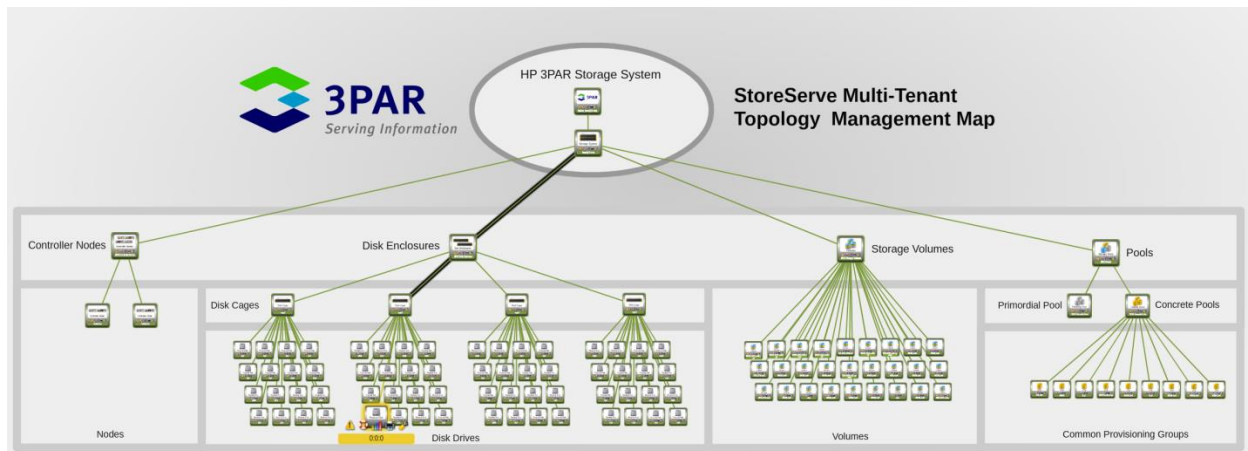


**Note: ONLY align the below defined Dynamic Applications. All other applications will be automatically aligned for you!**

#### Manually Aligned Dynamic Applications

|                            |
|----------------------------|
| 3PAR SMI-S: DCM Caching    |
| 3PAR SMI-S: Storage System |

All 3-PAR SMI-S Dynamic Applications operating on a collection frequency of 5 minutes, as a result it will 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 35 different Events and matching Dynamic Application alerts included with the 3PAR SMI-S Power-Pack. The following review the different Event policies.

#### SNMP TRAP EVENTS

There are 5 generic SNMP Trap events for 3PAR. These events provide a catch all for any SNMP trap received from a 3PAR device.

|                           |      |         |     |          |
|---------------------------|------|---------|-----|----------|
| 3PAR Trap: Critical Alert | Trap | Enabled | Yes | Critical |
| 3PAR Trap: Degraded Alert | Trap | Enabled | Yes | Minor    |
| 3PAR Trap: Info Alert     | Trap | Enabled | Yes | Notice   |
| 3PAR Trap: Major Alert    | Trap | Enabled | Yes | Major    |
| 3PAR Trap: Minor Alert    | Trap | Enabled | Yes | Minor    |

#### DYNAMIC APP TEMPERATURE EVENTS

There are 2 threshold-based temperature events for 3PAR, each with a matching clearing event.

|                                                           |         |         |     |         |
|-----------------------------------------------------------|---------|---------|-----|---------|
| 3PAR: Disk Temperature Exceeded Threshold                 | Dynamic | Enabled | Yes | Minor   |
| 3PAR: Disk Temperature Returned Below Threshold           | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Drive Cage Temperature Has Exceeded Threshold       | Dynamic | Enabled | Yes | Minor   |
| 3PAR: Drive Cage Temperature Has Returned Below Threshold | Dynamic | Enabled | Yes | Healthy |

## DYNAMIC APP HEALTH EVENTS

There are 12 health-based events for 3PAR, each with a matching clearing event. Each of these events relies on state-based data collected every 5 minutes by a corresponding configuration dynamic application.

|                                                                      |         |         |     |         |
|----------------------------------------------------------------------|---------|---------|-----|---------|
| 3PAR: Common Provisioning Group Health State Has Degraded            | Dynamic | Enabled | Yes | Major   |
| 3PAR: Common Provisioning Group Health State Has Returned to Healthy | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Controller Node Health State Has Degraded                      | Dynamic | Enabled | Yes | Major   |
| 3PAR: Controller Node Health State Has Returned to Healthy           | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Drive Cage Health State Has Degraded                           | Dynamic | Enabled | Yes | Major   |
| 3PAR: Drive Cage Health State Has Returned to Healthy                | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Node Battery Life is Now Healthy                               | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Node Ethernet Port Health State Has Degraded                   | Dynamic | Enabled | Yes | Minor   |
| 3PAR: Node Ethernet Port Health State Has Returned to Healthy        | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Node Fan Health State Has Degraded                             | Dynamic | Enabled | Yes | Major   |
| 3PAR: Node Fan Health State Has Returned to Healthy                  | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Node FC Port Health State Has Degraded                         | Dynamic | Enabled | Yes | Minor   |
| 3PAR: Node FC Port Health State Has Returned to Healthy              | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Node Power Supply Health State Has Degraded                    | Dynamic | Enabled | Yes | Major   |
| 3PAR: Node Power Supply Health State Has Returned to Healthy         | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Physical Disk Health State Has Degraded                        | Dynamic | Enabled | Yes | Major   |
| 3PAR: Physical Disk Health State Has Returned to Healthy             | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Power Supply AC Status Has Returned to Healthy                 | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Power Supply DC Status Has Returned to Healthy                 | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Primordial Pool Health State Has Degraded                      | Dynamic | Enabled | Yes | Major   |
| 3PAR: Primordial Pool Health State Has Returned to Healthy           | Dynamic | Enabled | Yes | Healthy |
| 3PAR: Volume Health State Has Degraded                               | Dynamic | Enabled | Yes | Major   |
| 3PAR: Volume Health State Has Returned to Healthy                    | Dynamic | Enabled | Yes | Healthy |

# CHAPTER 8

## DASHBOARDS AND PERFORMANCE DATA

### PERFORMANCE METRICS

The 3PAR SMI-S implementation uses the Block Server Performance Profile (BSP) to define performance metrics. All available performance data for volumes and block devices are incorporated in the Power-Pack. The metrics defined in SMI-S provide much more detailed information about the storage systems than what is available from native distributed platform tools, however they do not provide performance information from a server perspective.

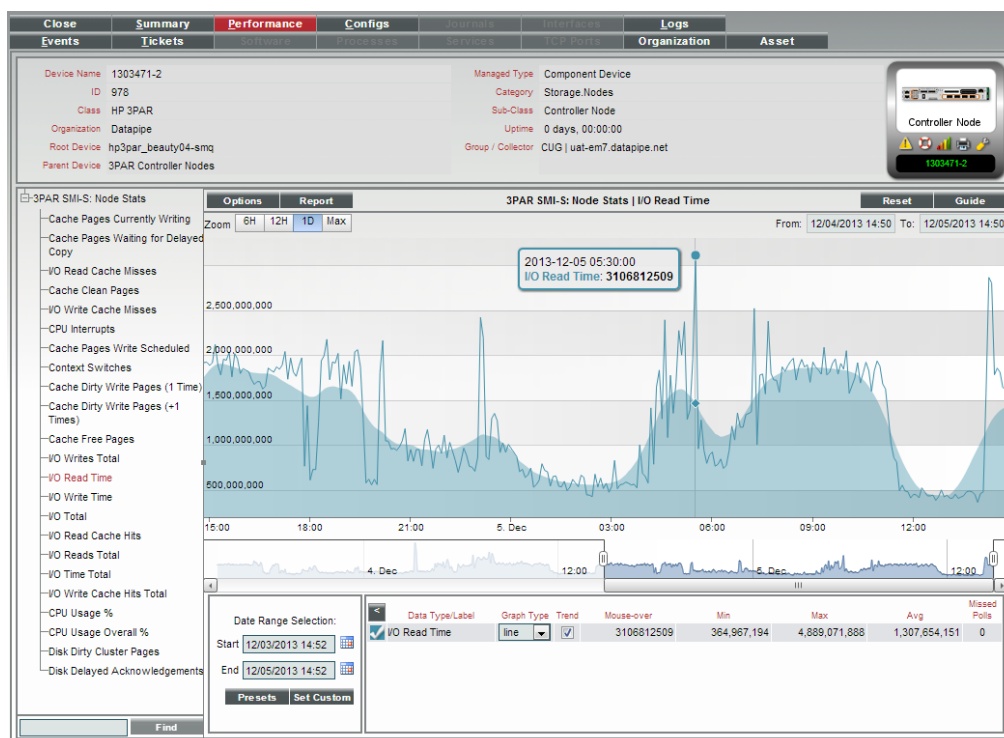
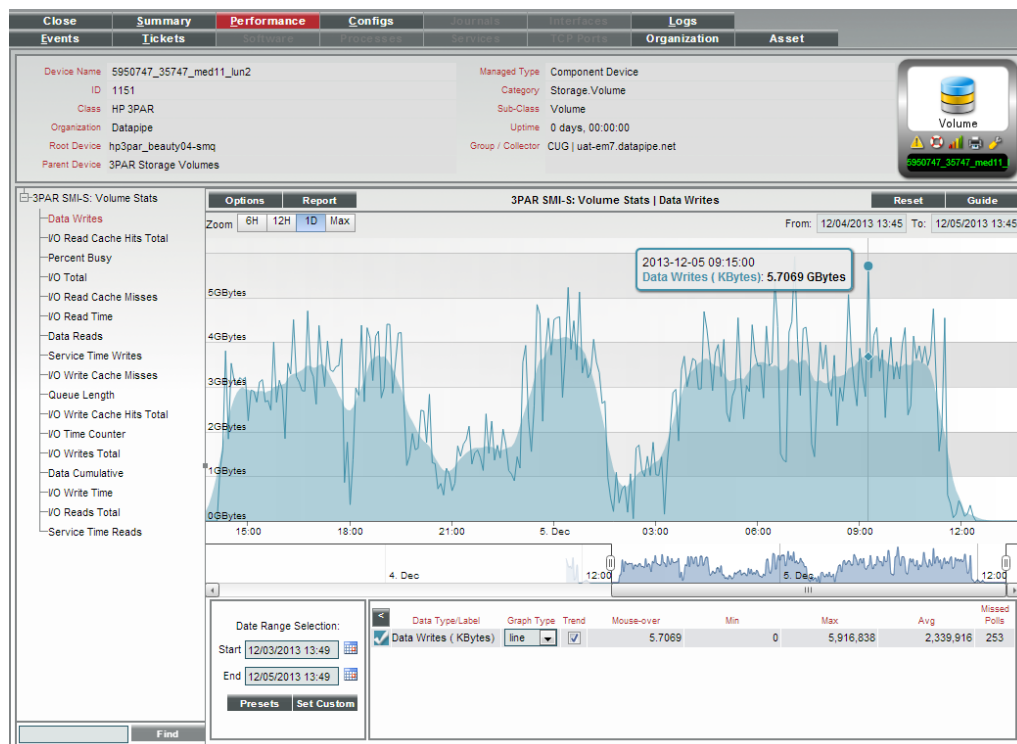
The 3PAR SMI-S Power-Pack includes support for 48 different performance metrics. Only Controller Nodes, Volumes, and the Array itself have SMI-S metrics. For data pertaining to networking bandwidth usage and other performance metrics, SNMP should be leveraged where possible. The following list provides an overview of available SMI-S metrics included in the Power-Pack.

| DCM Element   | Performance Metric                   |
|---------------|--------------------------------------|
| Storage Array | Data Cumulative (KBytes)             |
| Storage Array | Data Reads (KBytes)                  |
| Storage Array | Data Writes (KBytes)                 |
| Storage Array | I/O Cumulative Total                 |
| Storage Array | I/O Reads Total                      |
| Storage Array | I/O Time Cumulative                  |
| Storage Array | I/O Write Time                       |
| Storage Array | I/O Writes Total                     |
| Nodes         | Cache Clean Pages                    |
| Nodes         | Cache Dirty Write Pages (+1 Times)   |
| Nodes         | Cache Dirty Write Pages (1 Time)     |
| Nodes         | Cache Free Pages                     |
| Nodes         | Cache Pages Currently Writing        |
| Nodes         | Cache Pages Waiting for Delayed Copy |
| Nodes         | Cache Pages Write Scheduled          |
| Nodes         | Context Switches                     |
| Nodes         | CPU Interrupts                       |
| Nodes         | CPU Usage %                          |

|        |                               |
|--------|-------------------------------|
| Nodes  | CPU Usage Overall %           |
| Nodes  | Disk Delayed Acknowledgements |
| Nodes  | Disk Dirty Cluster Pages      |
| Nodes  | I/O Read Cache Hits           |
| Nodes  | I/O Read Cache Misses         |
| Nodes  | I/O Read Time                 |
| Nodes  | I/O Reads Total               |
| Nodes  | I/O Time Total                |
| Nodes  | I/O Total                     |
| Nodes  | I/O Write Cache Hits Total    |
| Nodes  | I/O Write Cache Misses        |
| Nodes  | I/O Write Time                |
| Nodes  | I/O Writes Total              |
| Volume | Data Cumulative               |
| Volume | Data Reads                    |
| Volume | Data Writes                   |
| Volume | I/O Read Cache Hits Total     |
| Volume | I/O Read Cache Misses         |
| Volume | I/O Read Time                 |
| Volume | I/O Reads Total               |
| Volume | I/O Time Counter              |
| Volume | I/O Total                     |
| Volume | I/O Write Cache Hits Total    |
| Volume | I/O Write Cache Misses        |
| Volume | I/O Write Time                |
| Volume | I/O Writes Total              |
| Volume | Percent Busy                  |
| Volume | Queue Length                  |
| Volume | Service Time Reads            |
| Volume | Service Time Writes           |

## METRICS ON DEVICE PERFORMANCE

Once data collection has begun, you can view performance metrics by navigating to the “Performance” page on any 3PAR Storage System, Controller Node, or Volume DCM device.



## EXAMPLE DASHBOARD

The 3PAR SMI-S Power-Pack also contains an example dashboard for 3PAR Volumes.

