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# Monitoring Pure Storage

Pure Storage PowerPack version 100

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# Chapter

# 1

## Introduction

### Overview

This manual describes how to monitor Pure Storage FlashArrays in the ScienceLogic platform using the *Pure Storage PowerPack*.

The following sections provide an overview of Pure Storage FlashArrays and the *Pure Storage PowerPack*:

<i>What is Pure Storage?</i> .....	3
<i>What Does the Pure Storage PowerPack Monitor?</i> .....	4
<i>Installing the Pure Storage PowerPack</i> .....	4

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### What is Pure Storage?

Pure Storage is a Flash-based storage solution provider. Its FlashArray solution provides multi-level cell, high-performance Flash memory for applications such as server virtualization, desktop virtualization, database systems, and cloud computing.

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## What Does the Pure Storage PowerPack Monitor?

The *Pure Storage* PowerPack includes:

- Dynamic Applications to discover and collect configuration and performance data for Pure Storage FlashArrays and component devices
- Device Classes for each of the Pure Storage devices monitored
- Event Policies and corresponding alerts that are triggered when Pure Storage devices meet certain status criteria
- A sample Credential for discovering Pure Storage devices
- Dashboards that display information about Pure Storage devices

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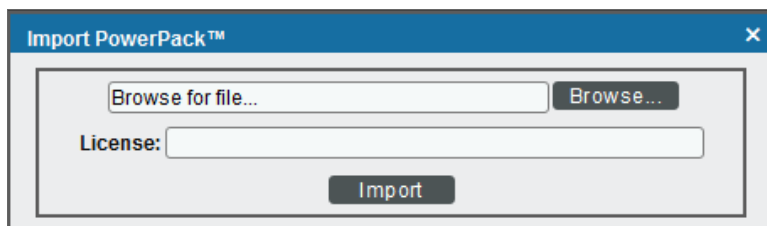
## Installing the Pure Storage PowerPack

Before completing the steps in this manual, you must import and install the latest version of the *Pure Storage* PowerPack.

To download and install a PowerPack:

**TIP:** By default, installing a new version of a PowerPack overwrites all content in that PowerPack that has already been installed on the target system. You can use the **Enable Selective PowerPack Field Protection** setting in the **Behavior Settings** page (System > Settings > Behavior) to prevent new PowerPacks from overwriting local changes for some commonly customized fields. (For more information, see the **System Administration** manual.)

1. Download the PowerPack from the [ScienceLogic Customer Portal](#).
2. Go to the **PowerPack Manager** page (System > Manage > PowerPacks).
3. In the **PowerPack Manager** page, click the **[Actions]** button, then select *Import PowerPack*.
4. The **Import PowerPack** dialog box appears:



5. Click the **[Browse]** button and navigate to the PowerPack file.
6. When the **PowerPack Installer** modal page appears, click the **[Install]** button to install the PowerPack.

**NOTE:** If you exit the **PowerPack Installer** modal page without installing the imported PowerPack, the imported PowerPack will not appear in the **PowerPack Manager** page. However, the imported PowerPack will appear in the **Imported PowerPacks** modal page. This page appears when you click the **[Actions]** menu and select *Install PowerPack*.

## Configuring Pure Storage Monitoring

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### Overview

The following sections describe how to configure and discover Pure Storage FlashArrays and their component devices for monitoring by the ScienceLogic platform using the *Pure Storage PowerPack*:

<i>Generating a Pure Storage API Token</i> .....	6
<i>Testing TCP Port Connectivity</i> .....	7
<i>Configuring a Pure Storage Credential</i> .....	7
<i>Discovering Pure Storage Components</i> .....	8
<i>Manually Aligning Dynamic Applications</i> .....	10
<i>Viewing Pure Storage Component Devices</i> .....	12

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### Generating a Pure Storage API Token

The *Pure Storage PowerPack* uses the Pure Storage REST API for collecting configuration and performance data. The Pure API uses port 443; therefore, you must have access to that port. You must also use an API Token, which you can create on the Pure FlashArray and then copy into the *Basic/Snippet credential* you create that enables the ScienceLogic platform to discover and monitor the FlashArray.

There are two ways to create the API Token:

- Generate the API token through the Purity user interface (System > Users > Create API Token)
- Generate the API token through the Purity command line interface (`pureadmin create --api-token`)

You can also view existing API tokens in the Purity user interface by navigating to System > Users > API Tokens, clicking the gear icon next to the username, and then selecting *Show API Token*.

After the API Token has been generated, copy and save it for use in the credential.

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## Testing TCP Port Connectivity

The Pure Storage REST API service runs on TCP port 443 from the primary IP address assigned to the Pure FlashArray. This IP address should be the same one used to access the Purity user interface. To enable the ScienceLogic platform to communicate with the Pure API, your ScienceLogic Data Collector or All-In-One Appliance must have access to TCP port 443.

To test TCP port connectivity, log in to the command line interface of your Data Collector or All-In-One Appliance as the root user and type the following command:

```
nmap -p 443 10.1.1.10
```

If TCP port 443 is open, the following message displays:

```
Starting Nmap 5.51 ( http://nmap.org ) at 2015-10-01 18:42 UTC
Nmap scan report for purestorage-001.mydomain.net (204.110.219.37)
Host is up (0.027s latency).
PORT      STATE SERVICE
443/tcp   open  https

Nmap done: 1 IP address (1 host up) scanned in 0.36 seconds
```


If the port does not appear, or it appears with the state of "filtered", check your firewall settings. If there is a firewall between the ScienceLogic Data Collector or All-In-One Appliance and the Pure Storage REST API, ensure that it can communicate over TCP port 443.

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## Configuring a Pure Storage Credential

To configure the ScienceLogic platform to monitor Pure Storage, you must first create a Basic/Snippet credential that allows the Dynamic Applications in the *Pure Storage PowerPack* to connect with the Pure Storage FlashArray. An example Basic/Snippet credential that you can edit for your own use is included in the *Pure Storage PowerPack*.

To create a Basic/Snippet credential to access Docker hosts and swarms:

1. Go to the **Credential Management** page (System > Manage > Credentials).
2. Locate the example **Pure Storage Example** credential, and then click its wrench icon (). The **Edit Basic/Snippet Credential** modal page appears.

3. Complete the following fields:

The screenshot shows a window titled "Credential Editor [86]". Inside, there's a sub-window "Edit Basic/Snippet Credential #86" with "New" and "Reset" buttons. Below is a "Basic Settings" section with the following fields:

- Credential Name:** Pure Storage Example
- Hostname/IP:** %D
- Port:** 443
- Timeout(ms):** 5000
- Username:** ADD\_TOKEN\_TO\_PASSWORD
- Password:** Masked with asterisks

At the bottom are "Save" and "Save As" buttons.

- **Credential Name.** Type a new name for the Pure Storage credential.
  - **Hostname/IP.** Type "%D".
  - **Port.** Type "443".
  - **Timeout(ms).** Type a value greater than or equal to "5000".
  - **Username.** Type your Pure Storage username.
  - **Password.** Type or paste the Pure Storage API token.
4. Click the **[Save As]** button.
  5. When the confirmation message appears, click **[OK]**.

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## Discovering Pure Storage Components

To discover and model your Pure Storage FlashArray and component devices for monitoring, you must run a discovery session. Several minutes after the discovery session has completed, the Dynamic Applications in the Pure Storage PowerPack will automatically align to the FlashArray root device. These Dynamic Applications will discover, model, and monitor the remaining Pure Storage components.

To discover Pure Storage components:



1. Go to the **Discovery Control Panel** page (System > Manage > Discovery), and then click the **[Create]** button. The **Discovery Session Editor** page appears.



- In the **Discovery Session Editor** page, complete the following fields:


The screenshot shows the 'Discovery Session Editor' window with the following configuration details:

- Identification Information:** Name: Pure Storage; Description: (empty)
- IP and Credentials:** IP Address/Hostname Discovery List: 10.2.117.3; Other Credentials: [ Pure Storage ]
- Detection and Scanning:** Initial Scan Level: [ 5 Deep discovery ]; Scan Throttle: [ System Default (recommended) ]; Port Scan All IPs: [ System Default (recommended) ]; Port Scan Timeout: [ System Default (recommended) ]; Detection Method & Port: [ TCP: 443 - https ]; Interface Inventory Timeout (ms): 600000; Maximum Allowed Interfaces: 10000; Bypass Interface Inventory:
- Basic Settings:** Discover Non-SNMP: ; Model Devices: ; DHCP: ; Device Model Cache TTL (h): 2; Collection Server PID: 3; Organization: [ Pure Storage ]; Add Devices to Device Group(s): [ None Servers ]; Apply Device Template: [ Choose a Template ]

- **Name.** Type a name for your discovery session.
  - **IP Address/Hostname Discovery List.** Type the IP address for the Pure Storage FlashArray that you want to discover.
  - **Other Credentials.** Select the **Basic/Snippet credential** you created for Docker.
  - **Initial Scan Level.** Select **5. Deep discovery**.
  - **Detection Method & Port.** Select **TCP 443 - https**.
  - **Discover Non-SNMP.** Select this checkbox.
  - **Model Devices.** Select this checkbox.
- Optionally, you can enter values in the other fields on this page. For more information about the other fields on this page, see the **Discovery & Credentials** manual.
  - Click the **[Save]** button to save the discovery session, and then close the **Discovery Session Editor** window.
  - The discovery session you created displays at the top of the **Discovery Control Panel** page. Click its lightning-bolt icon (  ) to run the discovery session.
  - The **Discovery Session** window appears. When a root device is discovered, click its device icon (  ) to view the **Device Properties** page for that device.

## Manually Aligning Dynamic Applications

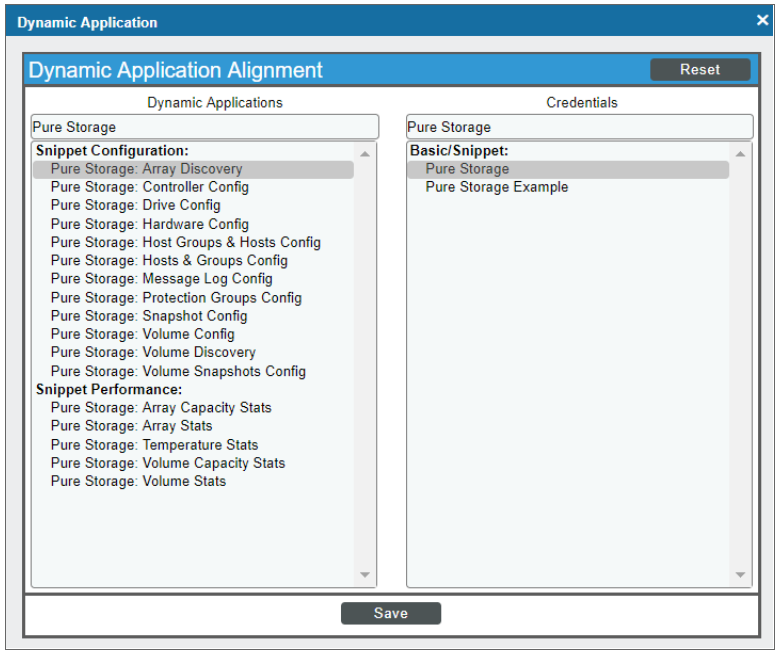
To verify that the ScienceLogic platform has automatically aligned the correct Dynamic Applications during discovery:

1. From the **Device Properties** page (Registry > Devices > wrench icon ()) for the Pure Storage FlashArray, click the **[Collections]** tab. The **Dynamic Application Collections** page appears.
2. The following Dynamic Applications should appear in the list of aligned Dynamic Applications:
  - Pure Storage: Array Capacity Stats
  - Pure Storage: Array Discovery
  - Pure Storage: Array Stats
  - Pure Storage: Controller Config
  - Pure Storage: Drive Config
  - Pure Storage: Hardware Config
  - Pure Storage: Hosts & Groups Config
  - Pure Storage: Message Log Config
  - Pure Storage: Protection Groups Config
  - Pure Storage: Temperature Stats
  - Pure Storage: Volume Discovery
  - Pure Storage: Volume Snapshots Config

**NOTE:** It can take several minutes after discovery for Dynamic Applications to display on the **Dynamic Application Collections** page. If the listed Dynamic Applications do not display on this page, try clicking the **[Reset]** button.

If the Dynamic Applications have not been automatically aligned, you can align them manually. To do so, perform the following steps:

1. Go to the **Device Properties** page (Registry > Devices > wrench icon (🔧)) for the Pure Storage FlashArray and click the **[Collections]** tab. The **Dynamic Application Collections** page appears.
2. On the **Dynamic Application Collections** page, click the **[Action]** button and then select *Add Dynamic Application* from the menu. The **Dynamic Application Alignment** page appears.

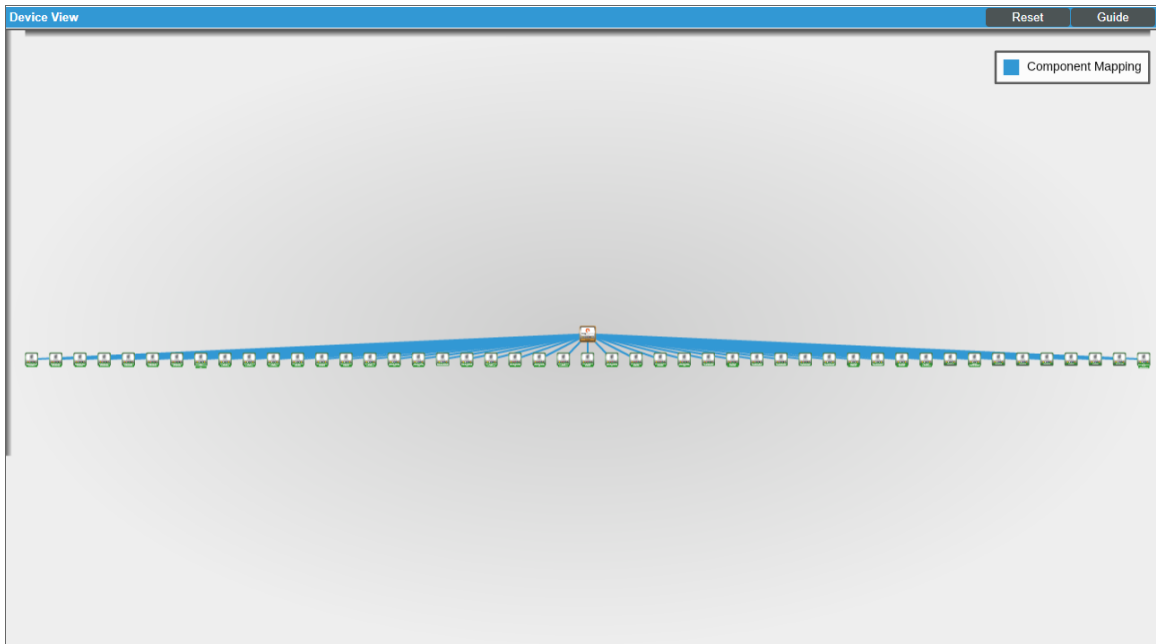


3. In the **Dynamic Applications** field, select a Dynamic Application to align.
4. In the **Credentials** field, select the **Basic/Snippet credential** you created for Pure Storage.
5. Click the **[Save]** button.
6. Repeat steps 2-5 as needed to align any additional Dynamic Applications.

## Viewing Pure Storage Component Devices

In addition to the **Device Manager** page (Registry > Devices > Device Manager), you can view the Pure Storage FlashArray and all of its component devices in the following places in the user interface:

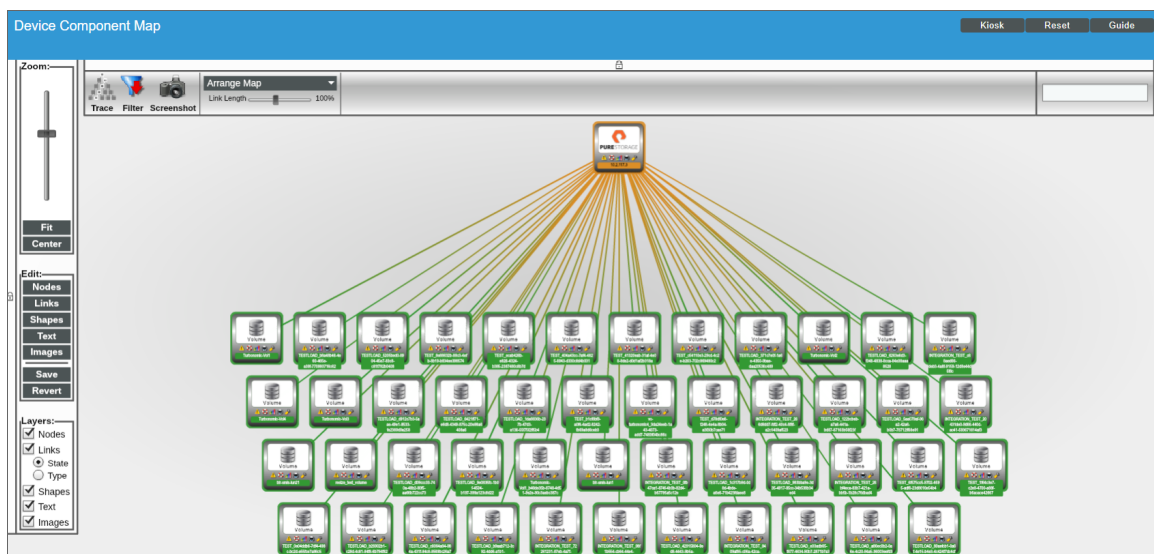
- The **Device View** modal page (Registry > Devices > Device Manager > graph icon > Topology) displays a map of a particular device and all of the devices with which it has parent-child relationships. Double-clicking any of the devices listed reloads the page to make the selected device the primary device:



- The **Device Components** page (Registry > Devices > Device Components) displays a list of all root devices and component devices discovered by the ScienceLogic platform in an indented view, so you can easily view the hierarchy and relationships between child devices, parent devices, and root devices. To view the component devices associated with Pure Storage, find the Pure Storage FlashArray device and click its plus icon (+):

Device Name	IP Address	Device Category	Device Class   Sub-class	IID	Organization	Current State	Collection Group	Collection State																																																																																																																																																																											
10.2.117.3	10.2.117.3	Array	Pure Storage   FlashArray Storage System	125	Pure Storage	Major	CUG_Automation	Unavailable																																																																																																																																																																											
<table border="1"> <thead> <tr> <th>Device Name</th> <th>IP Address</th> <th>Device Category</th> <th>Device Class   Sub-class</th> <th>IID</th> <th>Organization</th> <th>Current State</th> <th>Collection Group</th> <th>Collection State</th> </tr> </thead> <tbody> <tr><td>1. dir-sms-lun1</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>155</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>2. dir-sms-lun21</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>150</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>3. INTEGRATION_TEST_0f47c41-874f-4b3b-8...</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>156</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>4. INTEGRATION_TEST_204310a0-9356-440d-...</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>149</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>5. INTEGRATION_TEST_26505007-402-40c4-8...</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>146</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>6. INTEGRATION_TEST_26b4eeca-83b7-4219-...</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>159</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>7. INTEGRATION_TEST_72261231-37eb-4a7f-...</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>166</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>8. 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TESTLOAD_122bcbcb-a7a6-441a-bd87-57f6...</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>147</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>13. TESTLOAD_1c317b9d-09d3-4bde-9e6e-71b...</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>157</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>14. TESTLOAD_1da8835b-237b-47d3-a136-55f7...</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>142</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>15. TESTLOAD_371c7e0f-1a6e-4350-9bae-daa2...</td><td>--</td><td>LUN</td><td>Pure Storage   FlashArray LUN</td><td>134</td><td>Pure Storage</td><td>Healthy</td><td>CUG_Automation</td><td>Unavailable</td></tr> <tr><td>16. 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16. TESTLOAD_42919804-9e3b-4443-9e6a-fd3...	--	LUN	Pure Storage   FlashArray LUN	168	Pure Storage	Healthy	CUG_Automation	Unavailable																																																																																																																																																																											
17. TESTLOAD_5205bcd0-8904-45e7-83c8-c81f...	--	LUN	Pure Storage   FlashArray LUN	128	Pure Storage	Healthy	CUG_Automation	Unavailable																																																																																																																																																																											
18. TESTLOAD_5aa079af-96a2-42a6-b0b7-787f...	--	LUN	Pure Storage   FlashArray LUN	148	Pure Storage	Healthy	CUG_Automation	Unavailable																																																																																																																																																																											

- The **Component Map** page (Views > Device Maps > Components) allows you to view devices by root node and view the relationships between root nodes, parent components, and child components in a map. This makes it easy to visualize and manage root nodes and their components. The ScienceLogic platform automatically updates the **Device Component Map** as new component devices are discovered. The platform also updates each map with the latest status and event information. To view the map for Pure Storage, go to the **Device Component Map** page (Views > Device Maps > Components) and select the map from the list in the left NavBar. To learn more about the **Device Component Map** page, see the **Views** manual.



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# Chapter

# 3

## Pure Storage Dashboards

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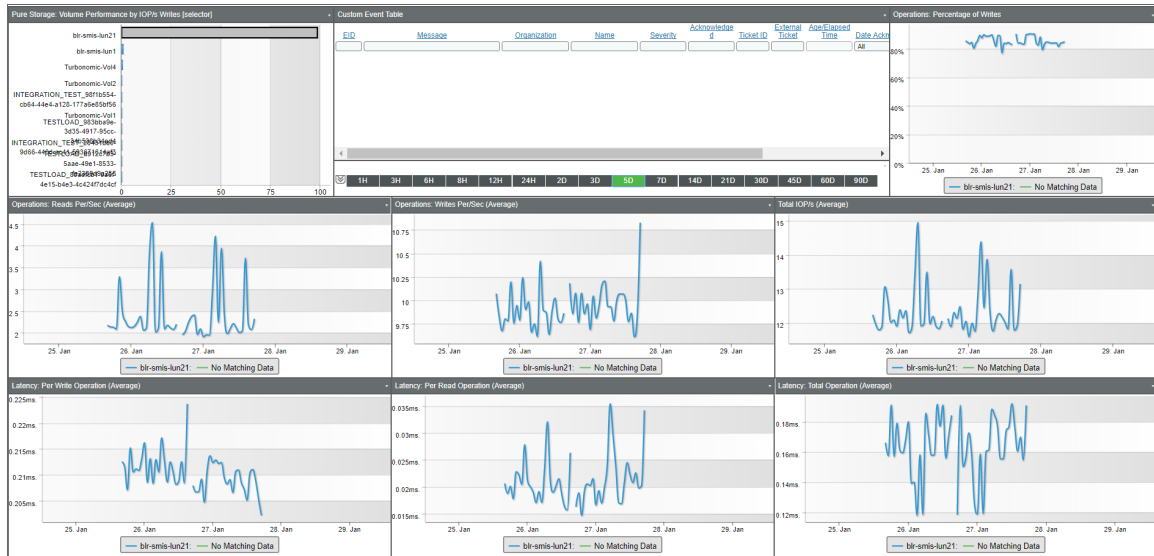
### Overview

The following sections describe the dashboards that are included in the *Pure Storage PowerPack*:

<i>Pure Volume: Performance</i> .....	15
<i>Device Dashboards</i> .....	15
<i>Pure Storage: Array Performance &amp; Usage</i> .....	16
<i>Pure Storage: Volume Performance &amp; Usage</i> .....	17

# Pure Volume: Performance

The *Pure Storage* PowerPack includes one built-in dashboard for viewing an overview of Pure Storage volume performance metrics.



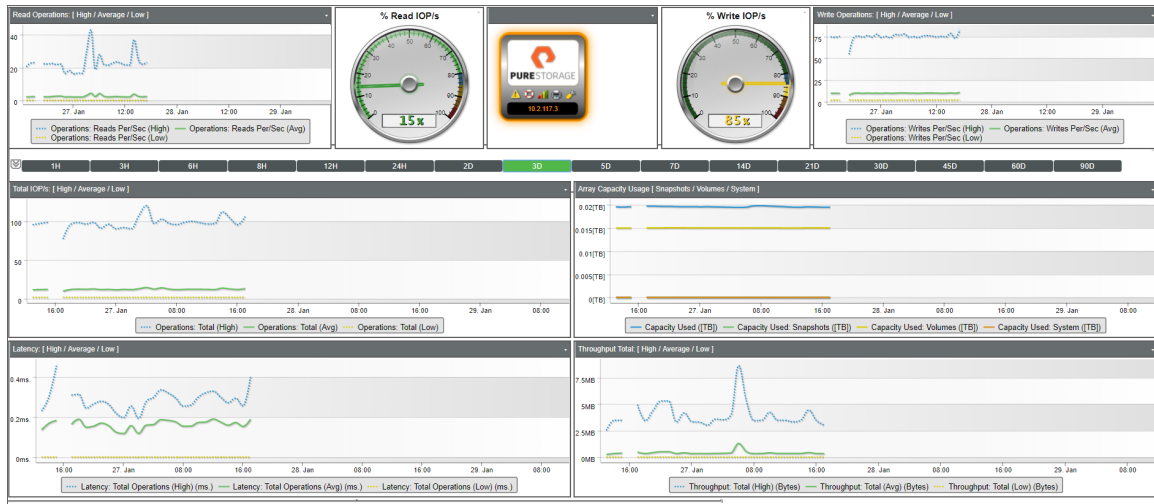
The "Pure Volume: Performance" dashboard displays the following information:

- A list of volumes with their write input/output operations per second over a specified period of time. This widget acts as the dashboard selector; when you click the bar for one of the listed volumes, the other widgets in the dashboard are updated to reflect metrics specific to that volume.
- A list of events over a specified period of time
- Write operations over a specified period of time, expressed as a percentage
- Read operations per second over a specified period of time
- Write operations per second over a specified period of time
- Total input/output operations per second over a specified period of time
- Write latency over a specified period of time
- Read latency over a specified period of time
- Total latency over a specified period of time

## Device Dashboards

The *Pure Storage* PowerPack includes device dashboards that provide summary information for Pure Storage component devices. Each of the device dashboards in the *Pure Storage* PowerPack is set as the default device dashboard for the equivalent device class.

# Pure Storage: Array Performance & Usage



3

The "Pure Storage: Array Performance & Usage" device dashboard displays the following information:

- Read operations per second over a specified period of time
- Read input/output operations per second over a specified period of time, expressed as a percentage
- Write input/output operations per second over a specified period of time, expressed as a percentage
- Write operations per second over a specified period of time
- Total input/output operations per second over a specified period of time
- Array capacity usage over a specified period of time
- Latency over a specified period of time
- Throughput over a specified period of time



## Pure Storage: Volume Performance & Usage



The "Pure Storage: Volume Performance & Usage" device dashboard displays the following information:

- Read operations per second over a specified period of time
- Write operations per second over a specified period of time
- Latency over a specified period of time
- Total input/output operations per second over a specified period of time
- Throughput over a specified period of time
- Volume usage over a specified period of time

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