# Pure Storage FlashArray Management Pack for Microsoft System Center Operations Manager User Guide (Version 1.2)

purestorage.com

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# Chapter 1. Introduction

## Overview

The Microsoft® System Center is a suite of products that can be leveraged to monitor health, capacity, and usage to diagnose and troubleshoot issues across applications, workloads, and infrastructure before these result in costly downtime or slow performance.

This suite is widely used by large enterprise customers in various capacities. A component of this suite is System Center Operations Manager (SCOM), which provides IT monitoring and access to rich analytics and insights as well as alerting and notifications.

SCOM uses vendor-supplied management packs to talk to infrastructure components from various manufacturers. These management packs integrate manufacturer-specific APIs and product logic.

SCOM works naturally with other components of the System Center suite, such as SCVMM, SCO, and SCCM, to offer a complete solution to deploy, monitor and manage the whole infrastructure

Installing the management pack involves installing the Pure Storage® FlashArray solution and then configuring a Pure Storage FlashArray endpoint for each FlashArray to be monitored. Once the Pure Storage FlashArray endpoints are configured, FlashArray object data and alert information is collected.

After the data has been pulled into SCOM, the information can be used to analyze capacity and performance statistics, determine the health of the array objects, determine any risks, forecast growth, generate custom workloads, analyze alerts, and monitor FlashArrays' volumes, hosts, and host groups.

## About This Guide

This document provides an overview of the features available in the Pure Storage FlashArray Management Pack.

## Audience

This document is intended for administrators who use SCOM with virtual machines hosted on Pure Storage FlashArrays.

## Limitation

In this release, the management pack does not provide support for FlashBlade arrays.

# Chapter 2. Before You Begin

Before you install and configure the Pure Storage® FlashArray Management Pack for the Microsoft System Center Operations Manager (SCOM), review the release notes, verify that your system meets the minimum requirements, and verify that you have the appropriate privileges to perform the installation.

## Verify the System Requirements

☐ **Verify the Microsoft System Center Operations Manager version.**

SCOM 2012R2, 2016, or 2019 is required.

For more information about SCOM, refer to the *Microsoft System Center Operations Manager* website. Refer to Microsoft documentation for server size and other requirements.

☐ **Verify the Purity version installed on your FlashArray.**

Purity 4.7.0 or later version is required.

Determine the Purity version through the Purity GUI (System > Configuration > Array) or Purity CLI (**`purearray list`** command.)

For more information, refer to the Purity 4.x or 5.x FlashArray User Guide in Pure1 Knowledge at http://support.purestorage.com [http://support.purestorage.com].

## Verify the Administrator Privileges

### SCOM Credentials

You must have the following credentials to install and configure the management pack:

☐ On SCOM, verify that you have virtual infrastructure administrator privileges. These credentials are required to install and configure the management pack on the SCOM server.

You must have SCOM administrator privileges to view FlashArray information in the SCOM pages.

### FlashArray Credentials

☐ On each Pure Storage FlashArray, verify that you have a Purity account with at least Storage Administrator privileges.

The Purity account can be either a local FlashArray administrator such as **`pureuser`** or a Purity administrator enabled through a directory service such as Microsoft Active Directory or OpenLDAP.

Note about read-only FlashArray administrators: a read-only FlashArray administrator can successfully display data from the array in SCOM. However, a read-only administrator is not able to modify alerts on the array for alerts that are modified in SCOM.

# Chapter 3. Installation

## Installing the Pure Storage FlashArray Solution

Install the Pure Storage® FlashArray solution by adding the Pure Storage FlashArray Management Pack to your SCOM server.

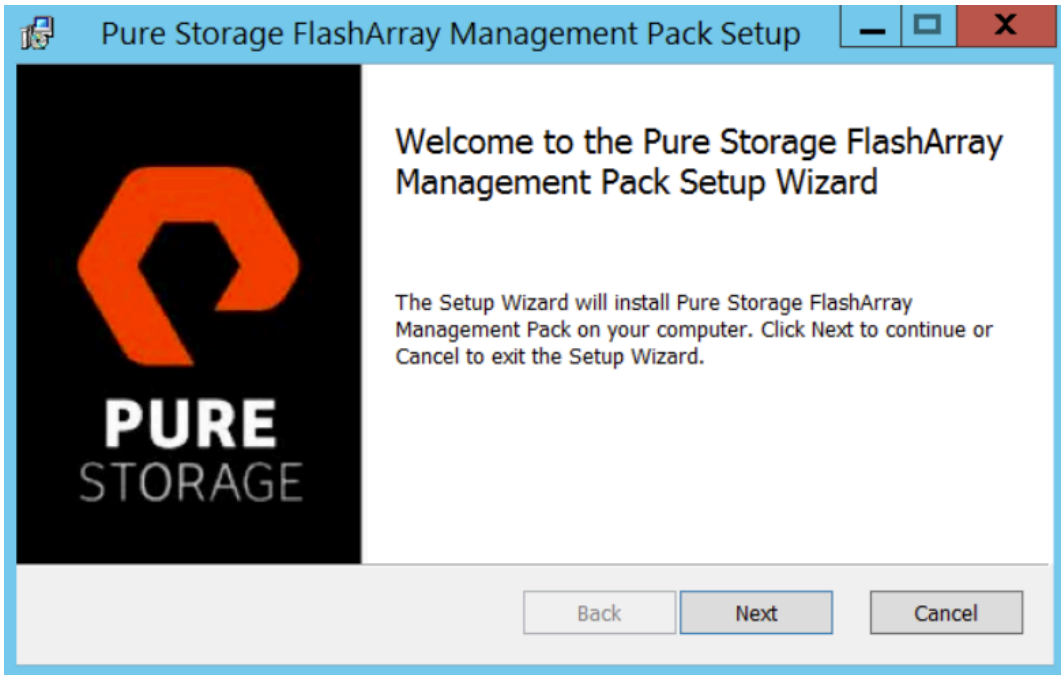
These steps require that the Pure Storage Management Pack installer file, **`SCOMManagementPackInstaller.msi`**, is either on your local machine or accessible from your local machine. Download the installer from one of the following locations:

- *Pure1 Support Microsoft Platform Guide System Center Suite* [https://support.purestorage.com/Solutions/Microsoft_Platform_Guide/System_Center_Suite]
- *Pure Storage Connect on GitHub* [https://github.com/PureStorage-Connect]

**Important**: If the Management Group contains multiple SCOM servers, you must run the MSI installer separately on each Management Server.

To install the Pure Storage Management Pack on a SCOM server:

1. If you are using a freshly-deployed SCOM server, under Administration, change the security settings to deselect **Reject new manual agent installations**.
2. Credentials with virtual infrastructure administrator privileges are required to install and configure the management pack on the SCOM server.
3. Double-click on the **`SCOMManagementPackInstaller.msi`** file. The Management Pack Setup Wizard welcome screen opens.



Click **Next**.

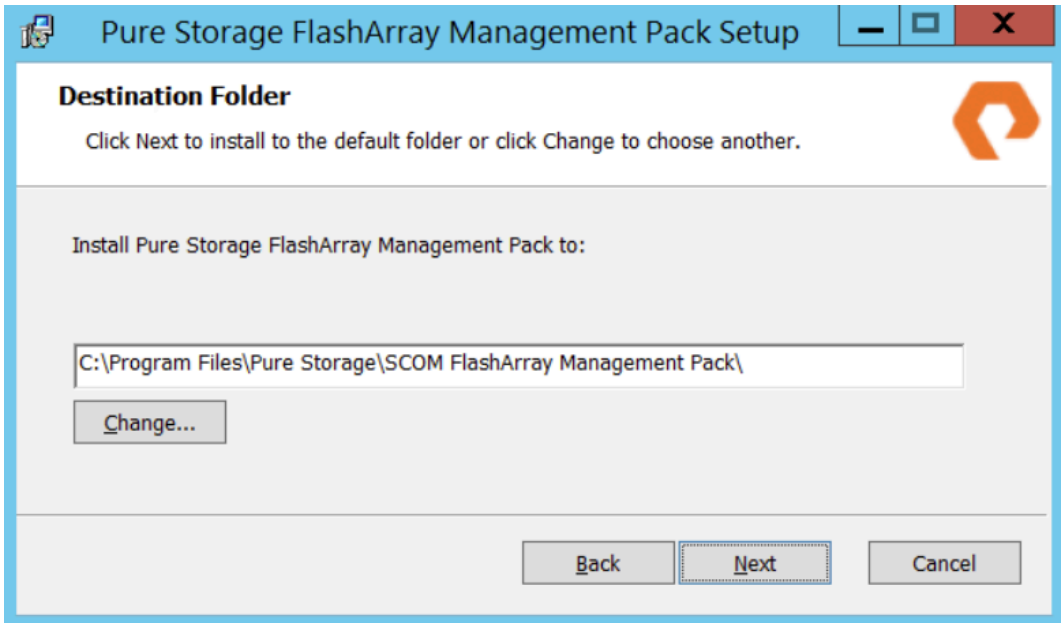
4. The End-User License Agreement opens.
   Scroll to read the End-User License Agreement in its entirety.

   If you accept the terms of the license agreement, click the **`I accept`** check box and click **Next**.

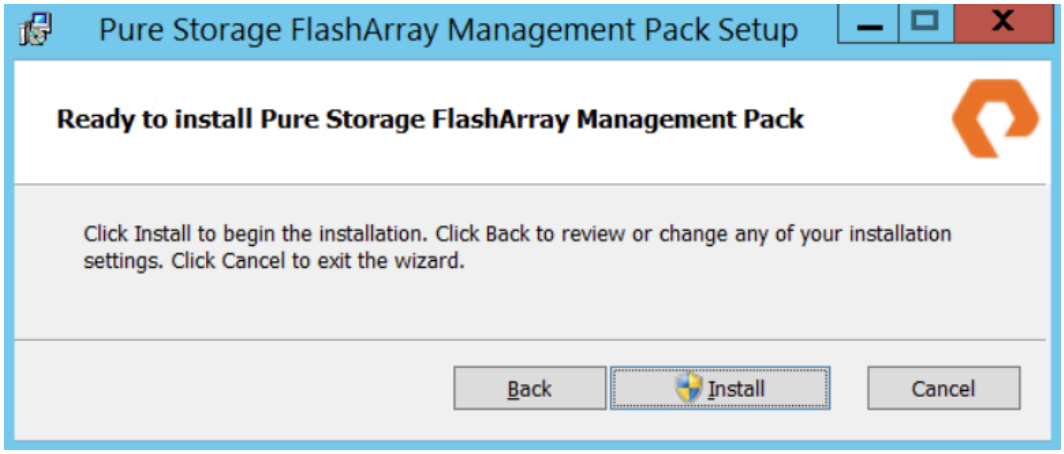
   If you do not accept the terms of the license agreement, click **Cancel** to exit the installer.

   Note: The version and date shown in your installer will be different.

5. In the Destination Folder screen, click **Next** to accept the default installation location (**`C:\Program Files\Pure Storage\SCOM FlashArray Management Pack`**) or click **Change** to choose a different location.

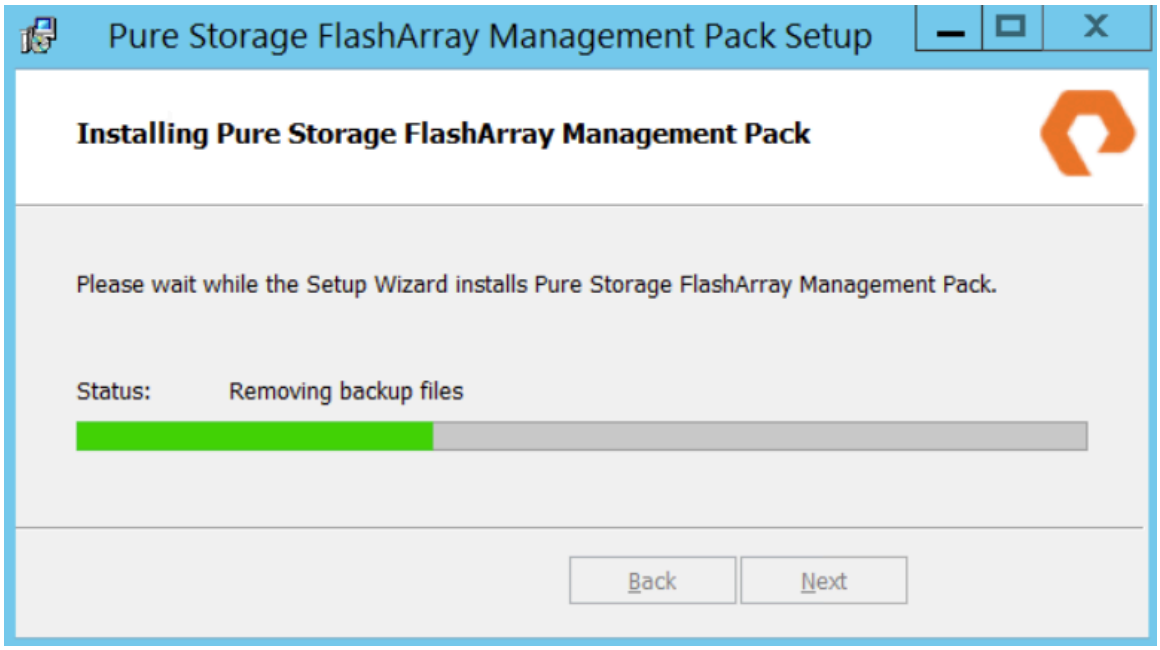



6. The Ready To Install screen opens.



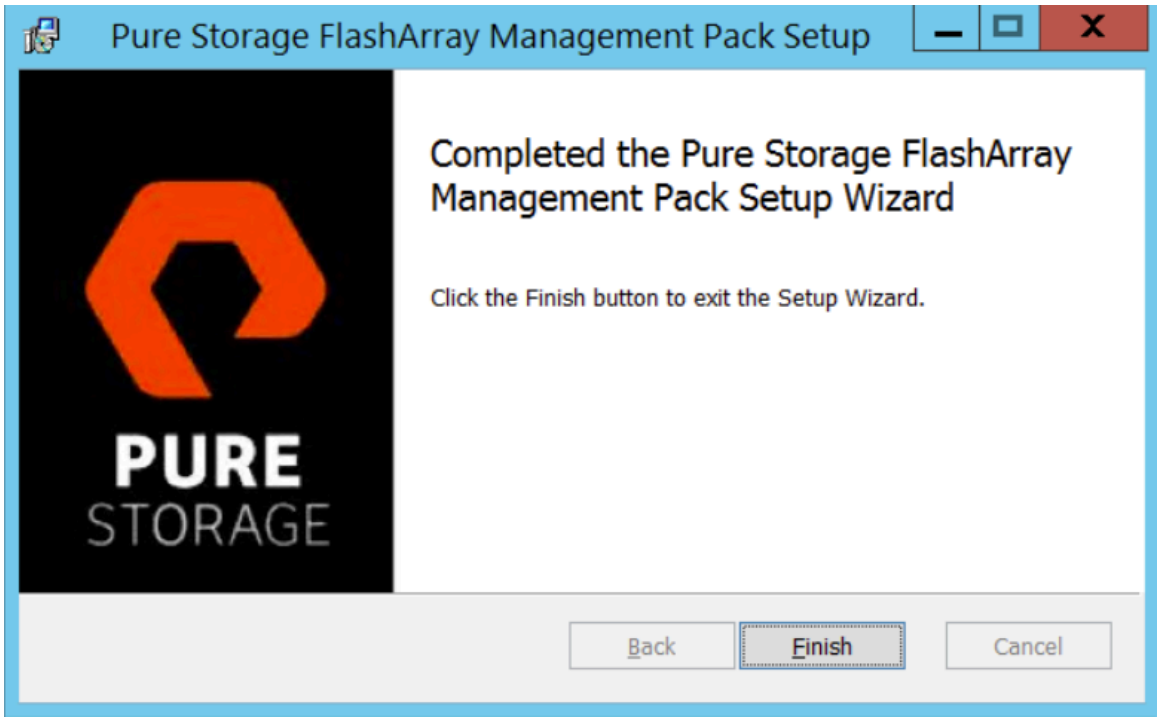

Click **Back** to review or change the installation location, or click **Install** to continue with the installation.

7. The Installing screen shows the progress of the installation.

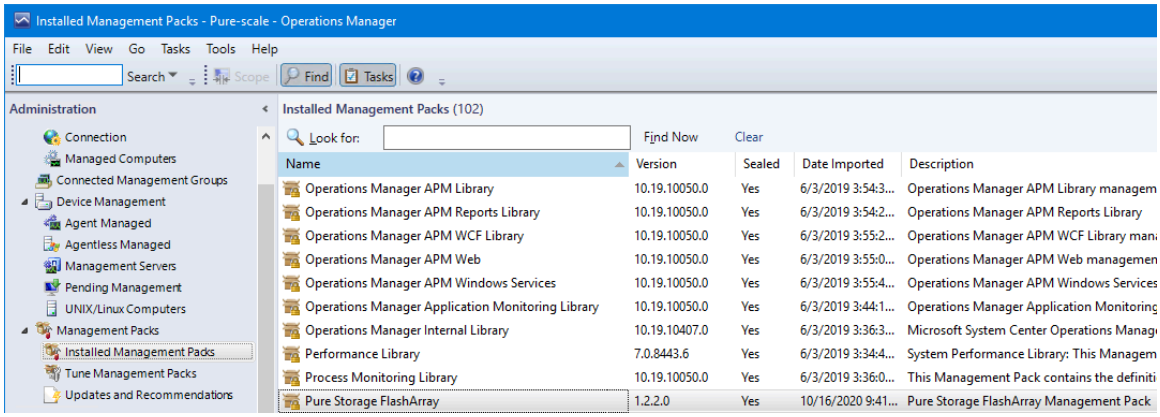



Wait until the **Next** button is enabled, then click **Next**.

8. In the Completed screen, click **Finish**.




9. To confirm that the solution has been successfully installed, open the SCOM console to **Administration** > **Management Packs**. Verify that the Pure Storage FlashArray Management Pack appears in the list of management packs.

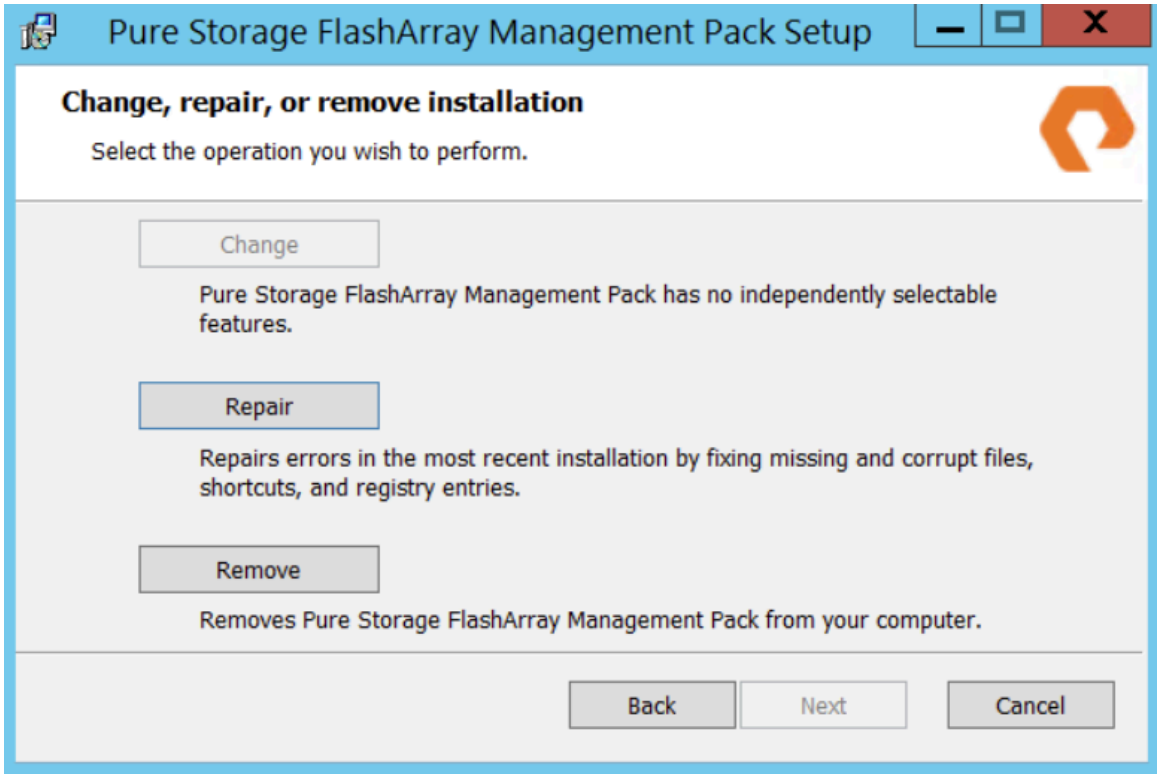



10. If the Management Group contains multiple SCOM servers, repeat the installation on each Management Server.

## Uninstalling or Reinstalling the Pure Storage FlashArray Solution

To uninstall or reinstall the Management Pack:

1. In the Start menu search bar, type **Apps**. Under the Settings section, select **Apps & Features**, and scroll down to **Pure Storage FlashArray Management Pack**.




2. To uninstall, click **Remove**. To reinstall, click **Repair**.
   Follow the steps in the Setup wizard.

# Chapter 4. Configuration

This chapter cover required configuration steps.

1. *Adding your Pure Storage FlashArray Endpoints*
2. *Configuring your SCOM Run As Credentials and Profiles*

## Adding your Pure Storage FlashArray Endpoints

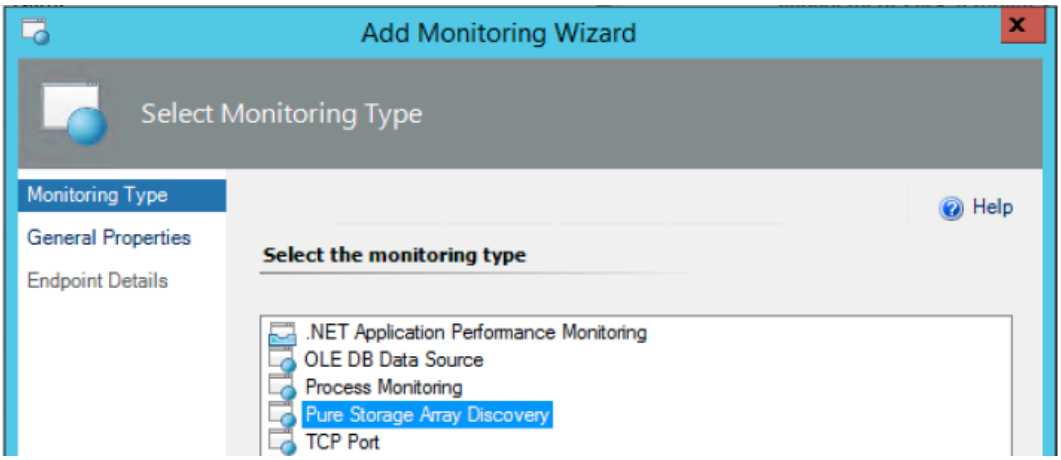
Configure a Pure Storage® FlashArray endpoint for each FlashArray you want to monitor in SCOM.

These steps require that you provide a Purity administrator username and password for each FlashArray endpoint.

**Important**: For the first endpoint, create a new management pack. Do not select an existing management pack from the dropdown menu.

To add and/or configure a Pure Storage FlashArray adapter instance in SCOM:

1. Log in to the SCOM Authoring console with Administrator credentials.
2. In the left pane, select **Authoring > Management Pack Templates**. Right-click and select **Add Monitoring Wizard...**.
3. Either right-click **Management Pack Templates** and select **Add Monitoring Wizard...**, or in the right pane, select **Add Monitoring Wizard...**.
   In the Add Monitoring Wizard Monitoring Type screen, select **Pure Storage Array Discovery**.




   Click **Next**.
4. In the General Properties screen, enter a name and description that will be meaningful to SCOM administrators.
   **Note**: The object name you specify here will be displayed in the Authoring > Management Pack Templates > Pure Storage Array Discovery screen. The Monitoring screens display the actual FlashArray names (as defined on the FlashArrays).

5. In the General Properties screen Management pack menu section, for the first endpoint only, create a management pack override that you will use for all FlashArray endpoints.

   *For the first endpoint only*:

   a. In the **Management pack** menu section, click the **New...** button.

   b. Skip the ID field. The wizard supplies this value.

   c. In the **Name** field, enter a name that is meaningful to SCOM administrators. For example: "PureStorageFlashArray_override".

   d. In the version field, leave the value **`1.0.0.0`**.

   e. In the description field, enter a description that is meaningful to SCOM administrators. For example: "Management pack override for Pure Storage FlashArray endpoints".

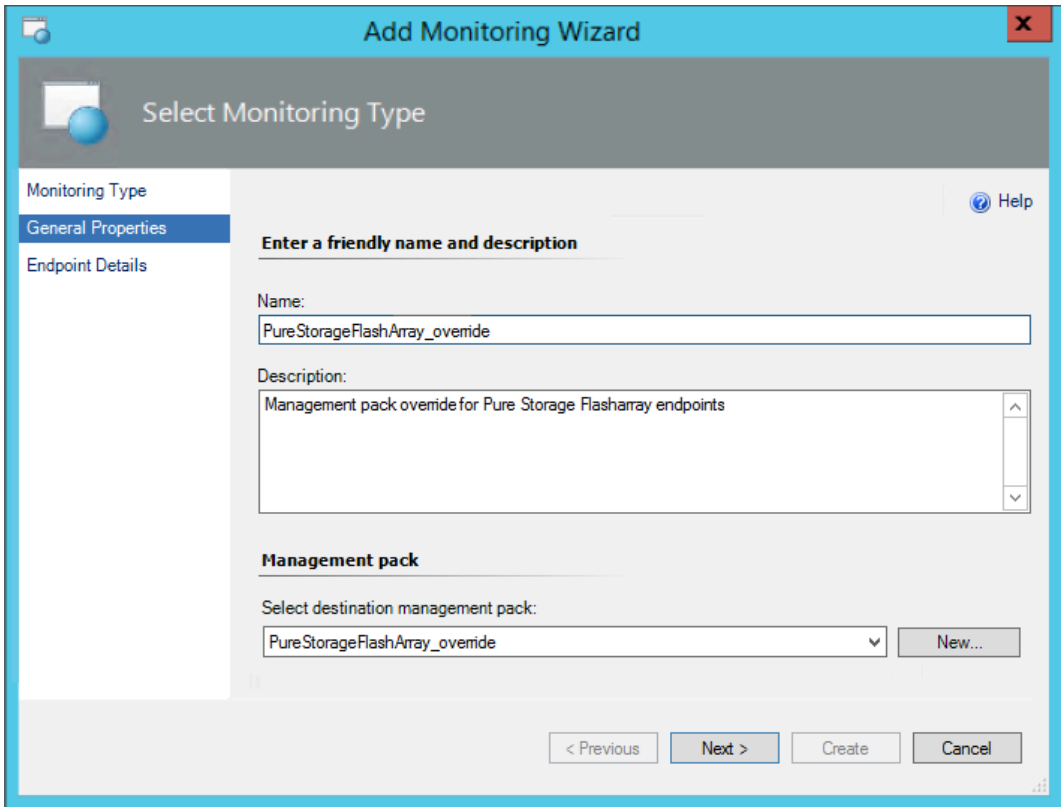
      Click **Next**.

   f. In the Knowledge tab, click **Create**.

      You return to the Add Monitoring Wizard.

   *For any subsequent endpoints*:

   a. in the **Management pack** menu, select the override management pack that you created for the first endpoint, such as **PureStorageFlashArray_override**.



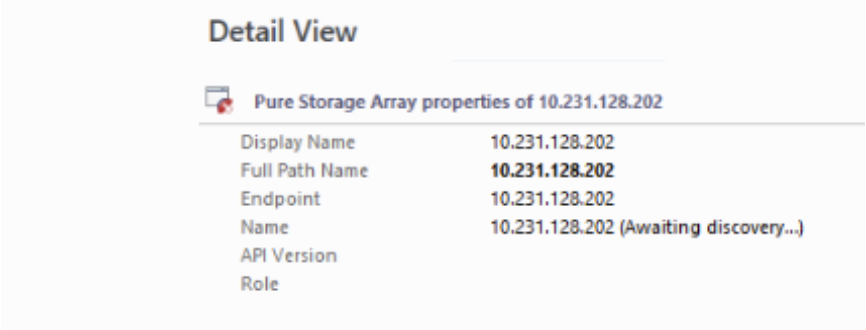

In the Add Monitoring Wizard, click **Next**.

6. In the Endpoint Details screen, enter IP address or fully-qualified domain name (FQDN) of the FlashArray to be monitored.

   **Note**: In IPv6 environments, if the IP address is used, it must be entered with square brackets. For example: **`[2015:0db8:85a3:0042:1000:8a2e:0360:2037]`**.

   Click **Create**.

**Note**: An added endpoint appears as **`Awaiting Discovery`** until a Run As profile with valid credentials is associated with the endpoint.




The profile can either be associated with all targeted objects or a specific array.

# Configuring your SCOM Run As Credentials and Profiles

This step creates a SCOM Run As account for each of your FlashArray administrators.

A separate SCOM Run As account is required for each unique Purity username/password combination used to monitor your FlashArrays.

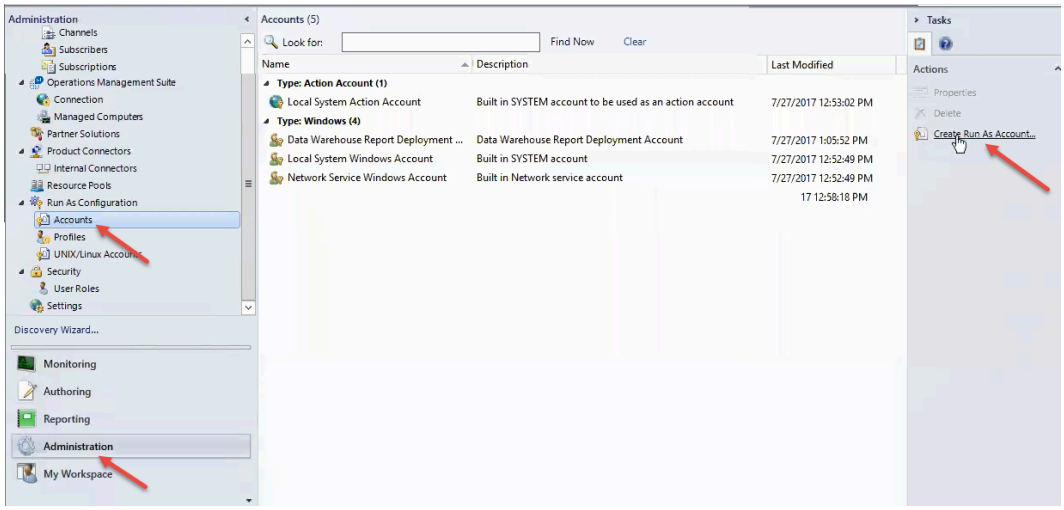
For example, if you have three FlashArrays monitored in SCOM, and each FlashArray has a **`pureuser`** account with the same password, one SCOM Run As account is used for all three FlashArrays. But if a fourth FlashArray has a different **`pureuser`** password, a separate SCOM Run As account is required for that FlashArray.

In a separate step, use SCOM profiles to tie your Run As accounts to your FlashArrays.

## Configuring your SCOM Run As Account

To create a SCOM Run As Account for your FlashArray administrator:

1. Log in to the SCOM console with Administrator credentials.
   Go to **Administration > Run As Configuration > Accounts**.
2. In the right pane, click the **Create Run As Account** link.




The Create Run As Account Wizard opens.

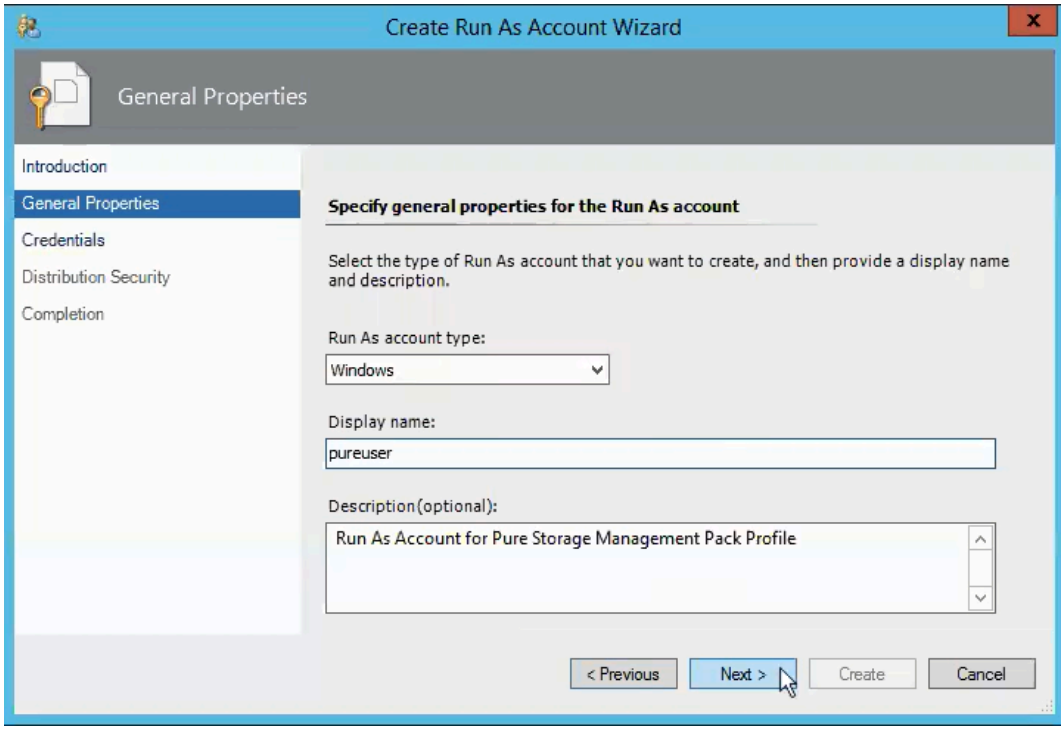
Depending on your settings, the wizard may open to an Introduction page. If so, read the information and click **Next**.

3. Enter the following information in the Create Run As Account Wizard General Properties page:

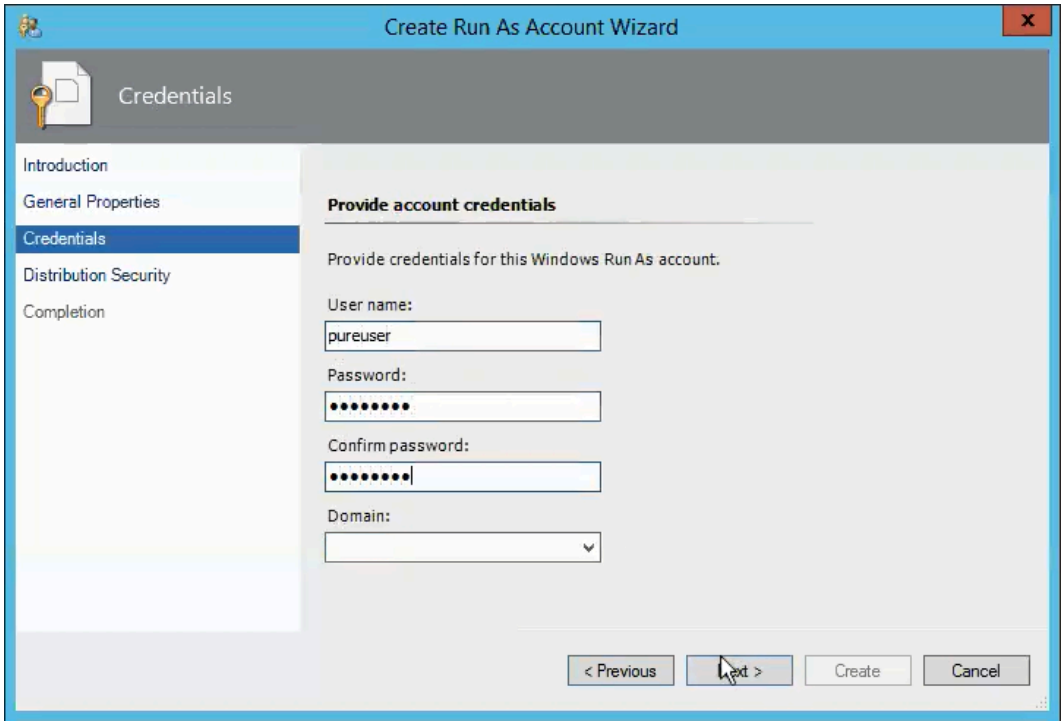
   a. **Run As account type:** Select **`Windows`**.

   b. **Display name:** Enter a meaningful name. This name will be shown in the SCOM console and used by SCOM administrators to select the appropriate FlashArray administrator credentials.

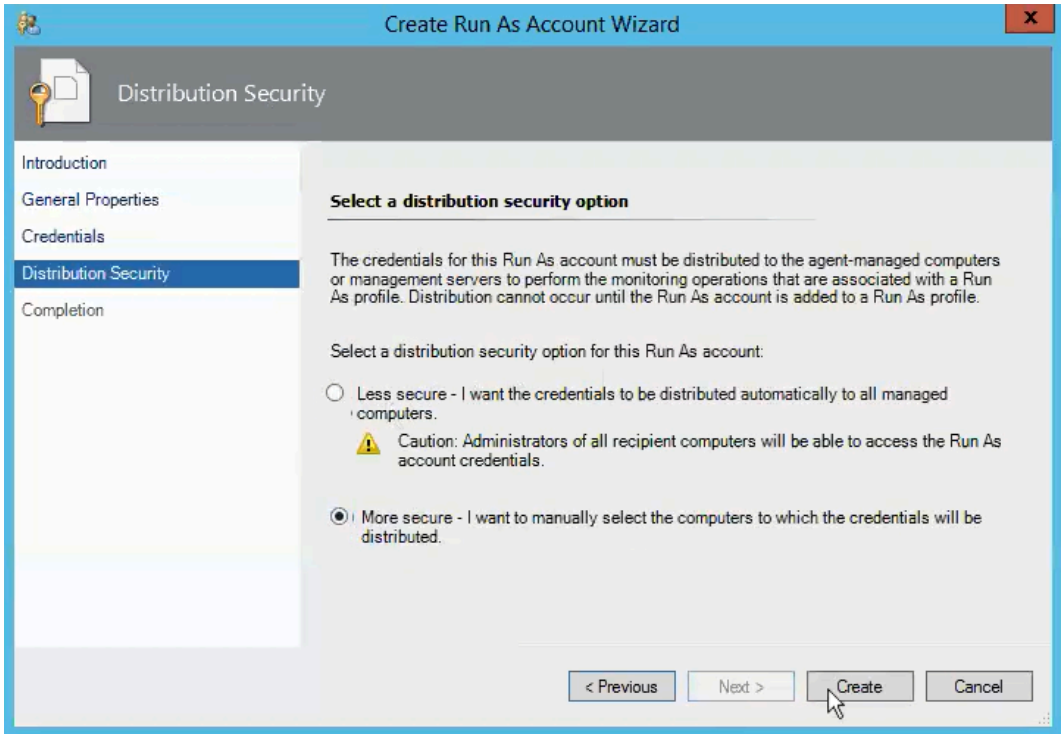
   c. **Description:** Enter a description that is meaningful to SCOM administrators.



4. In the Credentials tab, enter the credentials of a FlashArray administrator. SCOM will use these credentials to connect to the FlashArray and to gather array metrics.
   With SCOM 2019, the **Domain** field is required.



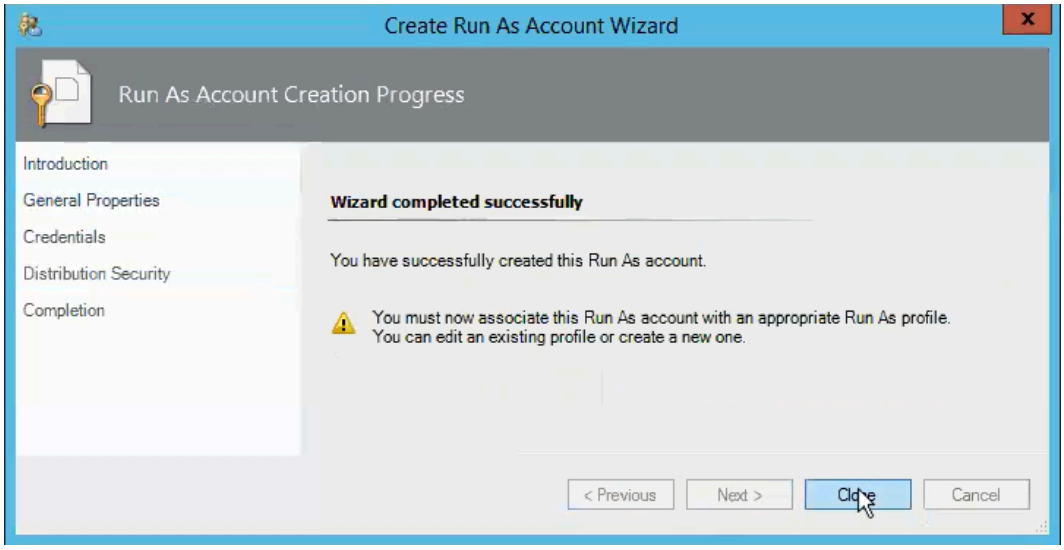

5. Select a more secure or less secure distribution option for the new Run As account.




   The **More secure** option is recommended.

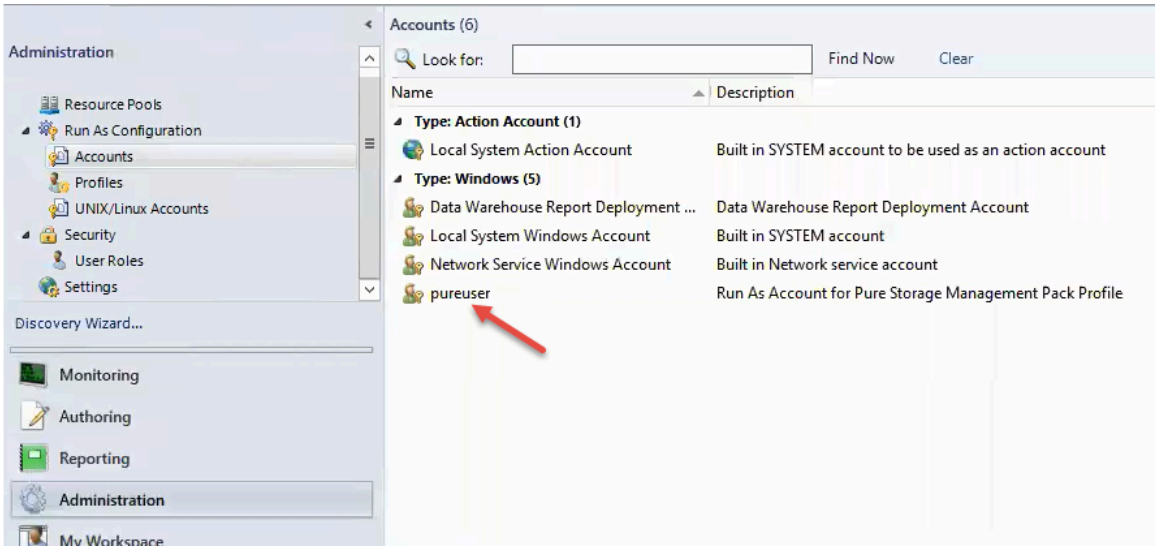
Click **Create**.

6. On the wizard Completion tab, note the requirement to associate the new Run As account with an appropriate SCOM Run As profile.




Click **Close**.

7. Confirm that the new Run As account (**`pureuser`** in this example) appears in the SCOM console.




8. Add the appropriate SCOM management or gateway servers to the new user account.

   This step applies only to accounts with the "More secure" distribution option. Skip this step for other accounts.

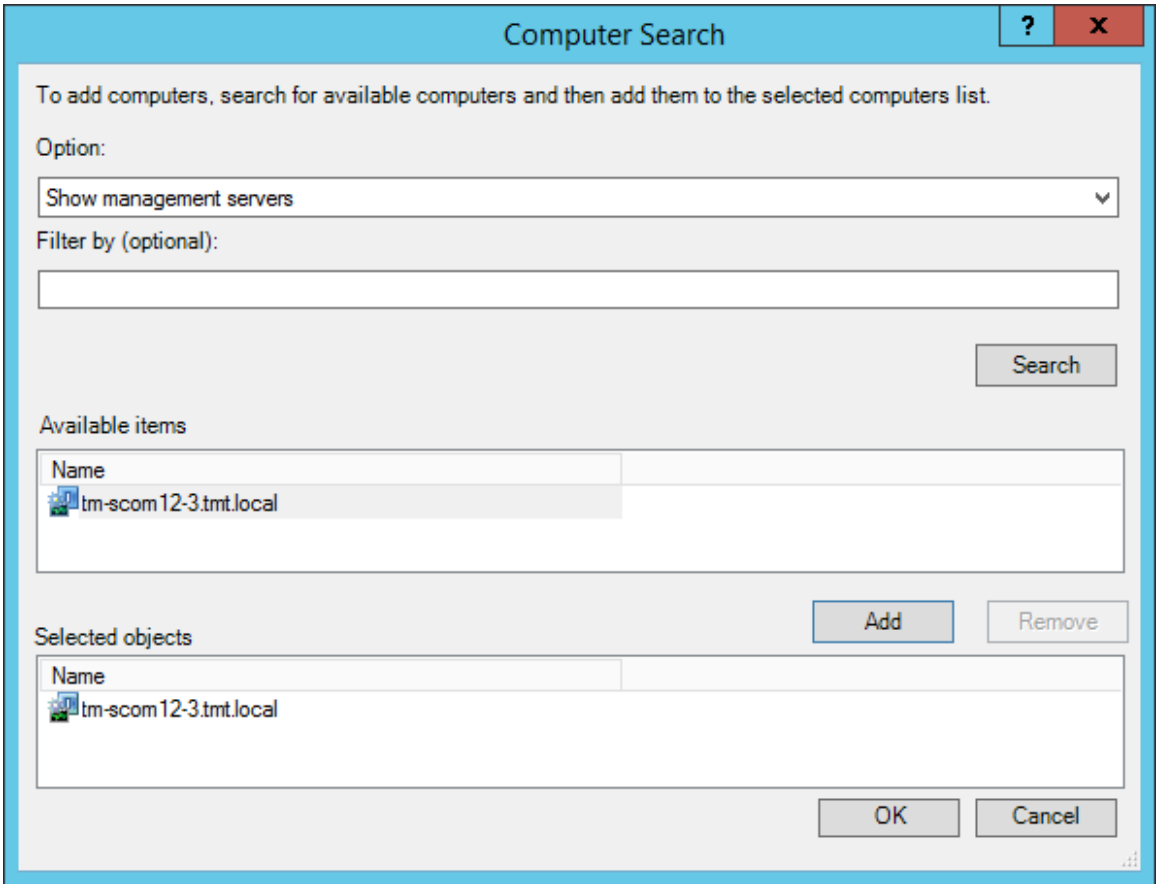
   a. In the SCOM Administration view, double-click on the account, such as **`pureuser`**.

   b. In the Run As Account Properties wizard, click the **Distribution** tab.

   c. In the "Selected computers" area, click the Add... button.

d. In the Computer Search screen, under the "Available items" section, highlight the appropriate SCOM server or servers and click **Add**.

The SCOM server or servers are listed under "Selected objects".




Click **OK** to exit the Computer Search screen.

e. You are returned to the Run As Account Properties Distribution tab.

Click **Apply**, then click **OK** to exit the wizard.

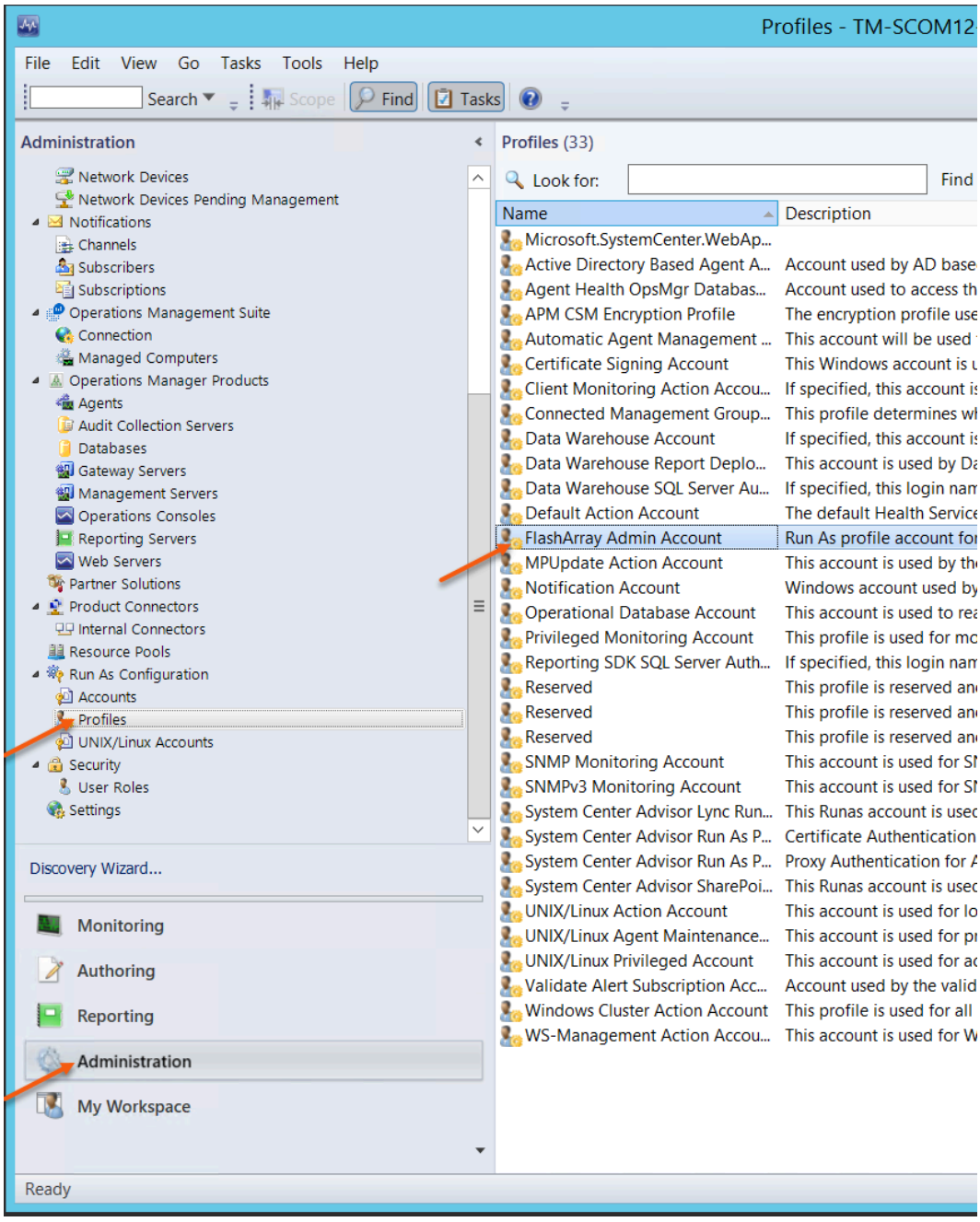
Now the credentials for this FlashArray administrator will be shared with the specified SCOM server or servers.

9. Repeat these steps for each distinct FlashArray administrator account you will use with SCOM.

## Configuring your SCOM Run As Profiles

These steps connect your new SCOM Run As accounts to your FlashArray objects, using the **`FlashArray Admin Account`** profile that is created when the Pure Storage Management Pack is installed.

1. Log in to the SCOM console with Administrator credentials. Go to **Administration > Run As Configuration > Profiles**. In the center Profiles pane, click on **FlashArray Admin Account**.




2. The Run As Profile Wizard opens.
   In the Run As Profile Wizard, the following information is filled in automatically:

- **Display name:**
  FlashArray Admin Account
- **Select destination management pack:**
  PureStorageFlashArray

3. Skip the **Description:** field.
   Click **Next**.

4. The Run As Accounts tab opens.

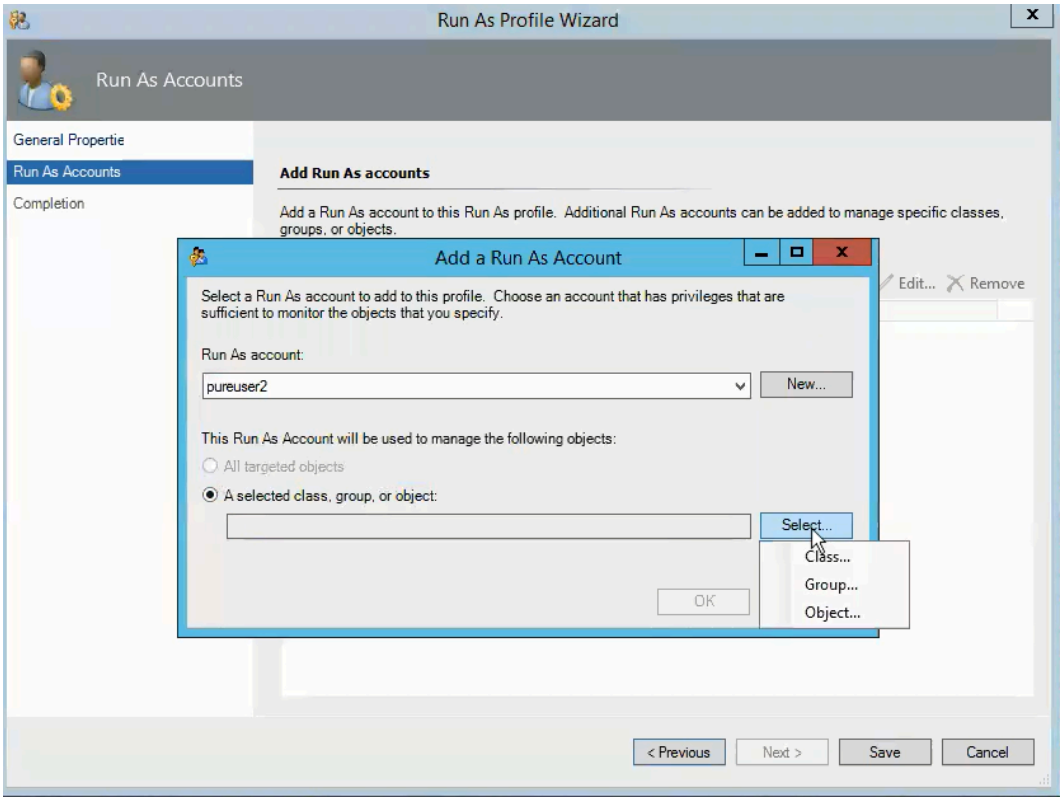
   Click the **Add...** button

. In the Add a Run As Account pop-up, in the **Run As account** menu, select the **`pureuser`** account. The **`pureuser`** account is identified by the display name you provided previously in the Run As Account wizard.

   To apply the Run As Account to all FlashArrays, select **All targeted objects**.

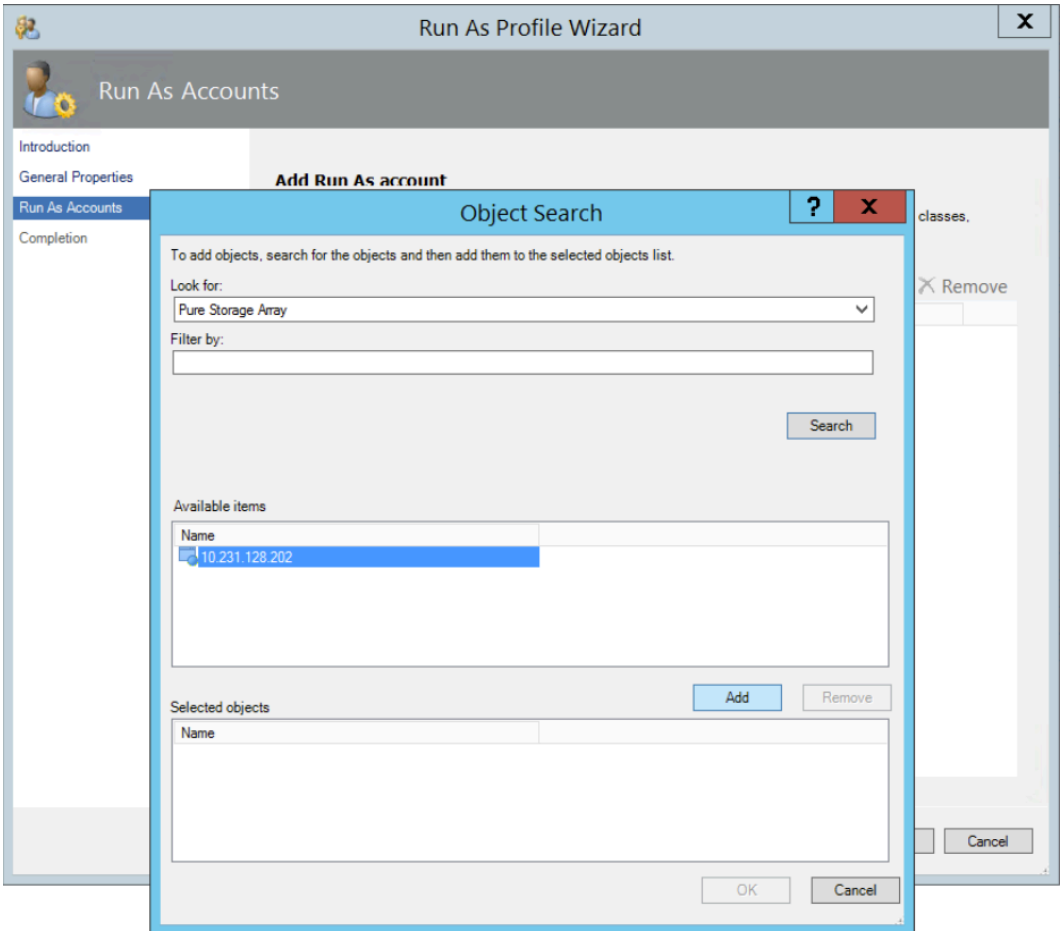
   To instead associate the Run As account to a specific FlashArray:

   a. Under the **`This Run As account that will be used to manage the following objects:`** section, select **A selected class, group, or object:**.

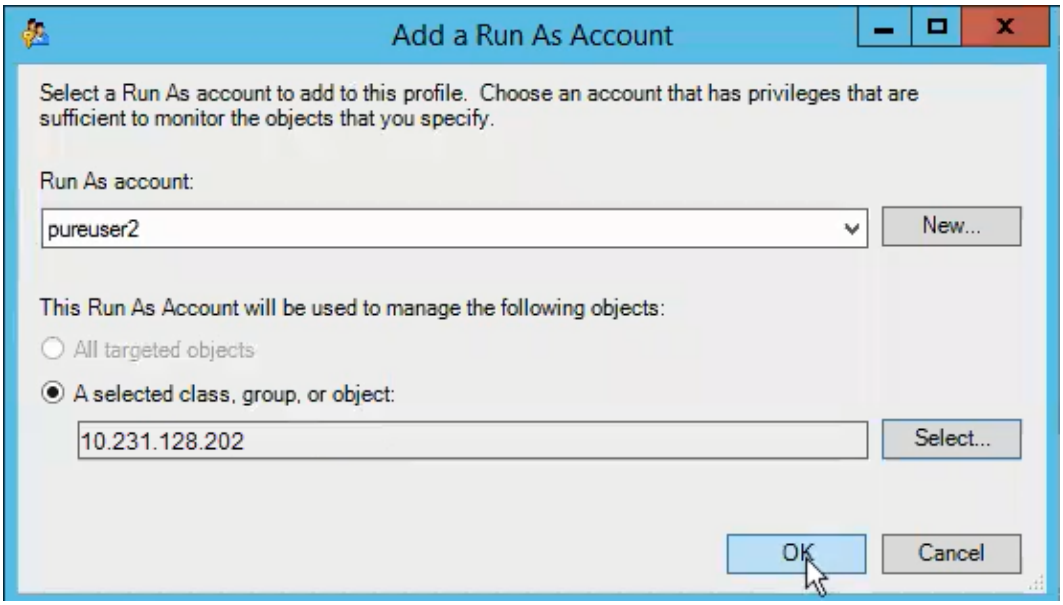



   Click **Select > Object...**.

   b. In the Object Search page, find the FlashArray to be associated with this Run As account. The FlashArray object can be found in the **`Available Items`** field as a Pure Storage Array object.




c. The Add a Run As Account page shows the Run As account and the specific FlashArray that it will be associated with.




Click **OK** to exit the pop-up.

Click **SAVE** to complete the wizard.

5. This example Run As Accounts page shows two Run As accounts to be used in this profile. The account named **`pureuser`** is used for all FlashArrays. The account named **`pureuser2`** is used for a specific FlashArray (**`10.231.128.202`**).

Click **Save**.

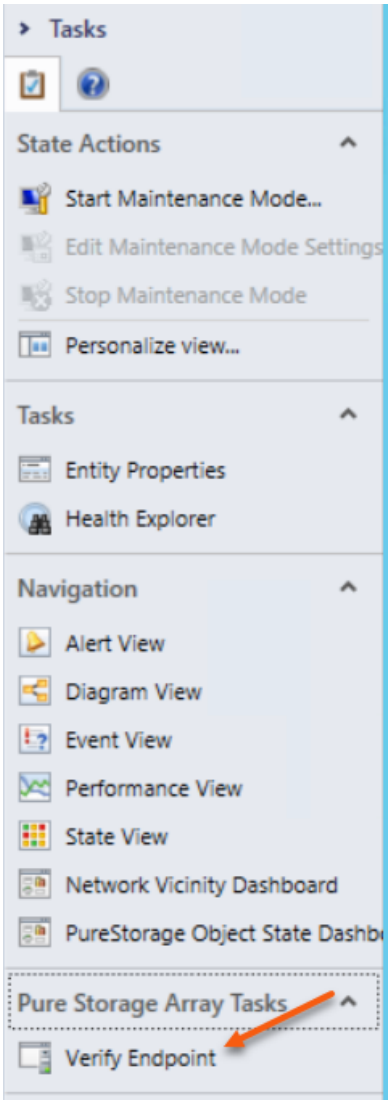
6. Wait while SCOM discovers the FlashArrays and creates the profile.
On the completion tab, click **Close** to exit the wizard.

## Verifying your SCOM Run As Credentials

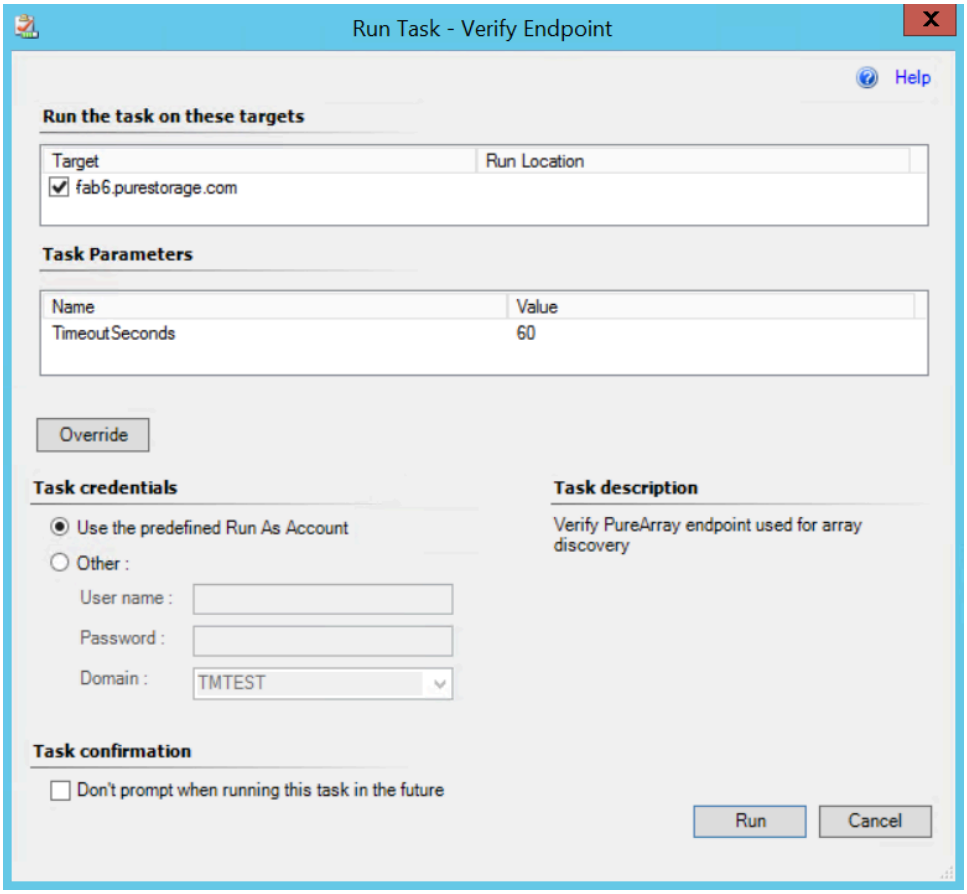
Use the Verify Endpoints link to verify that you can connect to a FlashArray successfully using your Run As credentials.

To verify your Run As credentials:

1. Log in to the SCOM Monitoring console with Administrator credentials.
   In the right panel, under Pure Storage Array Tasks, click **Verify Endpoint**.

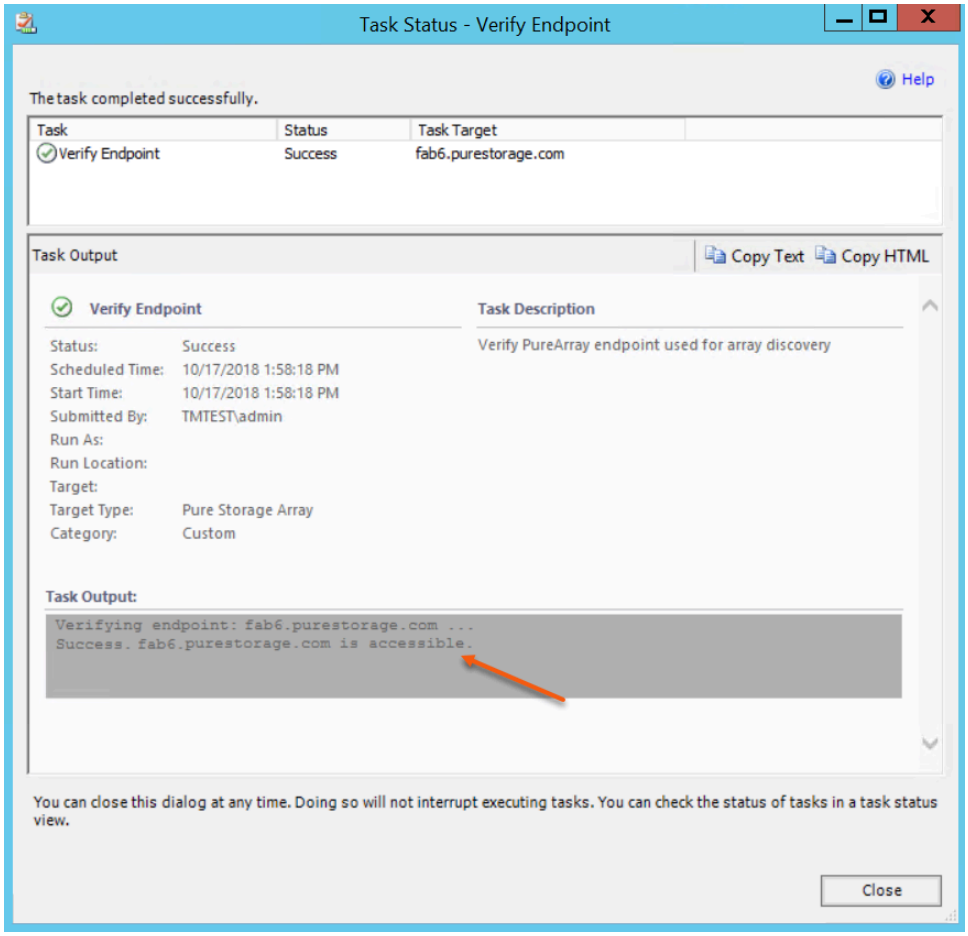



2. The Run Task - Verify Endpoint screen opens.
   a. In the Target section, select the FlashArray (or FlashArrays) on which the credentials will be verified.
   b. In the Task credentials section, select **Use the predefined Run As Account**.




c. Click **Run**.

3. The Task Status - Verify Endpoint screen reports success or failure of the connection attempt. A success example is shown here.


Task Status - Verify Endpoint
Help
The task completed successfully.
Task
Status
Task Target
Verify Endpoint
Success
fab6.purestorage.com
Task Output
Copy Text
Copy HTML
Verify Endpoint
Task Description
Status: Success
Scheduled Time: 10/17/2018 1:58:18 PM
Start Time: 10/17/2018 1:58:18 PM
Submitted By: TMTEST\admin
Run As:
Run Location:
Target:
Target Type: Pure Storage Array
Category: Custom
Verify PureArray endpoint used for array discovery
Task Output:
Verifying endpoint: fab6.purestorage.com ...
Success. fab6.purestorage.com is accessible.
You can close this dialog at any time. Doing so will not interrupt executing tasks. You can check the status of tasks in a task status view.
Close

# Chapter 5. Optional Configuration Steps

- *Overriding Rules*
  Optionally change what FlashArray data is collected by SCOM, change parameters such as collection frequency, or ignore port health warnings.
- *Removing a FlashArray from SCOM Monitoring*
  Remove an array from SCOM monitoring.

## Overriding Rules

SCOM rules control the content and frequency of data collection from monitored FlashArrays and also control the option to suppress port health warnings.

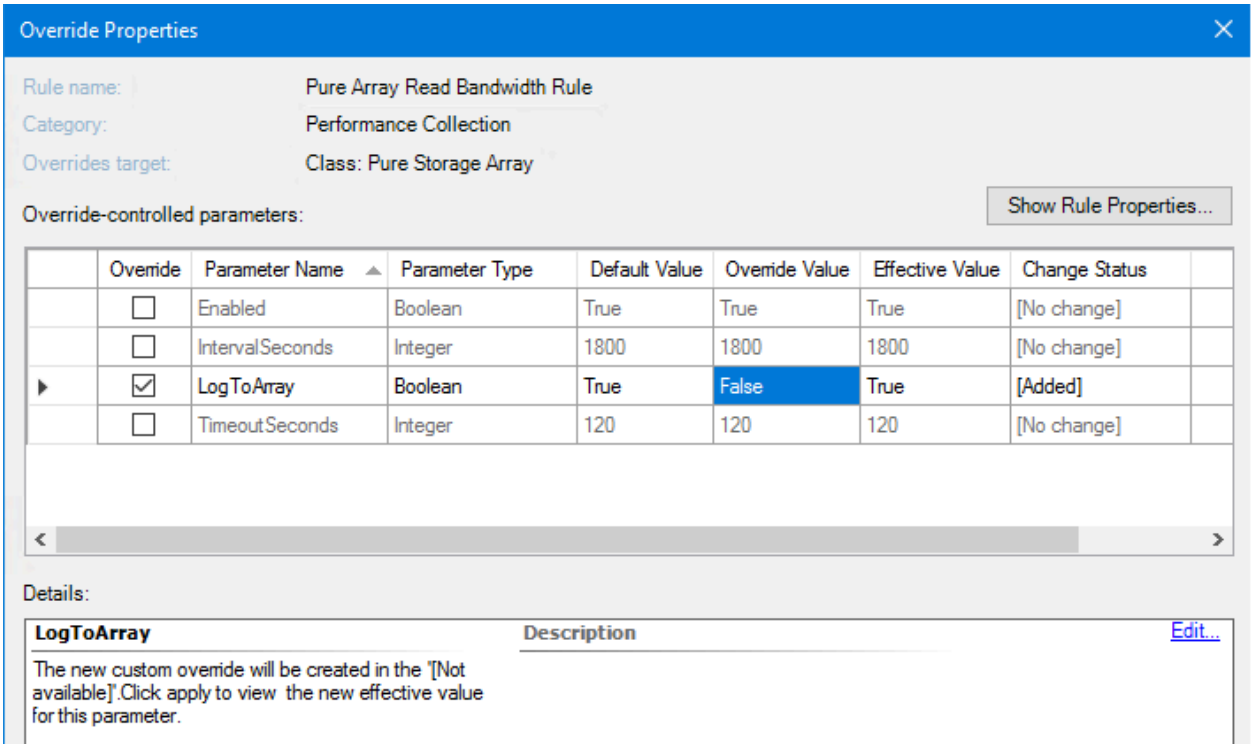
Changing a rule involves overriding it, identifying the scope for the change (in terms of which objects will by affected), and saving the change into a management pack.

### Overriding Logging to the FlashArray

These steps show the example of overriding the LogToArray parameter of the Pure Array Read Bandwidth Rule. Setting the LogToArray parameter to False overrides the Management Pack's default logging behavior.

To override the LogToArray parameter:

1. In the SCOM console, go to **Authoring > Management Pack Objects > Rules**.
   Under **Type: Pure Storage Array**, right click **`Pure Array Total Bandwidth Rule`** and select **Overrides > Override the Rule > For all object of class: Pure Storage Array**.
2. The **`Override Properties`** screen opens for **`Pure Array Read Bandwidth Rule Properties`** screen opens.
   Make the following changes in the **Override-controlled parameters** table:
   a. In the **`LogToArray`** row, click the check box in the Override column to select that row.
   b. Change the setting in the Override Value column from its default of **`True`** to **`False`**.




Changing LogToArray from **`True`** to **`False`** means no detailed logging information will be sent to the array from this specific rule.

c. In the **`Management Pack`** section, set the **`Select destination management pack`** menu to **`PureOverrides`**.
Click **Apply**.

Click **OK** to close the **Override-controlled parameters** table.

Click **Close** to close the pop-up.

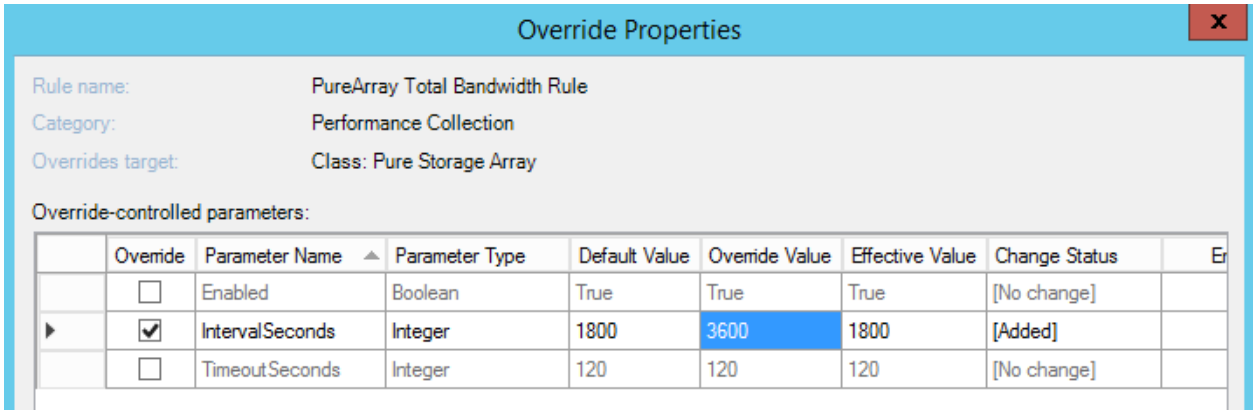
## Overriding a Total Bandwidth Rule

These steps show the example of overriding a parameter of the Pure Array Total Bandwidth Rule.

To override the Pure Array Total Bandwidth Rule:

1. In the SCOM console, go to **Authoring > Management Pack Objects > Rules**.
In the **Look for** field, enter **`Pure`** and click **Find now**.
2. Scroll to find the **`Pure Array Total Bandwidth Rule`** entry and double click it.
3. The **`Pure Array Total Bandwidth Rule Properties`** screen opens.
In the Overrides tab, click **Override...** and select **For all objects of class: Pure Storage Array**.
4. The **`Override Properties`** screen opens.
Make the following changes in the **Override-controlled parameters** table:
   a. In the **`IntervalSeconds`** row, click the check box in the Override column to select that row.

b. Change the setting in the Override Value column from its default (**1800**) to its new value, for instance **3600**.




Changing IntervalSeconds from 1800 to 3600 means the rule will run every hour instead of every half-hour.

c. When the override settings are correct, click **Apply**.
Click **OK** to close the **Override-controlled parameters** table.

Click **Close** to close the pop-up.

**Note**: Override for discovery frequency can also be created at **Authoring > Management Pack Objects > Object Discoveries**. Right click the appropriate object and select **Overrides**.

## Overriding FlashArray Port Warnings

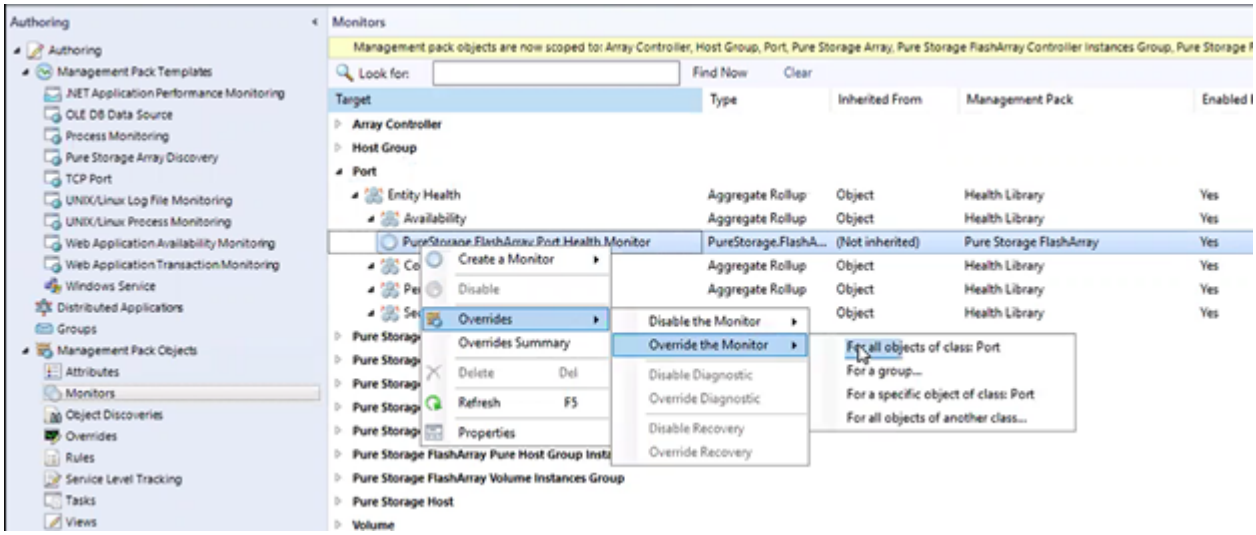
By default, the FlashArray Management Pack issues warnings for disabled or disconnected ports.

The Management Pack supports optionally overriding FlashArray port health warnings. This override allows SCOM administrators to ignore port warnings and also causes any ports that have been overridden to display as having a healthy status instead of warning status.

Administrators can override warnings for all FlashArray ports or for only selected ports.

To override the port health warnings:

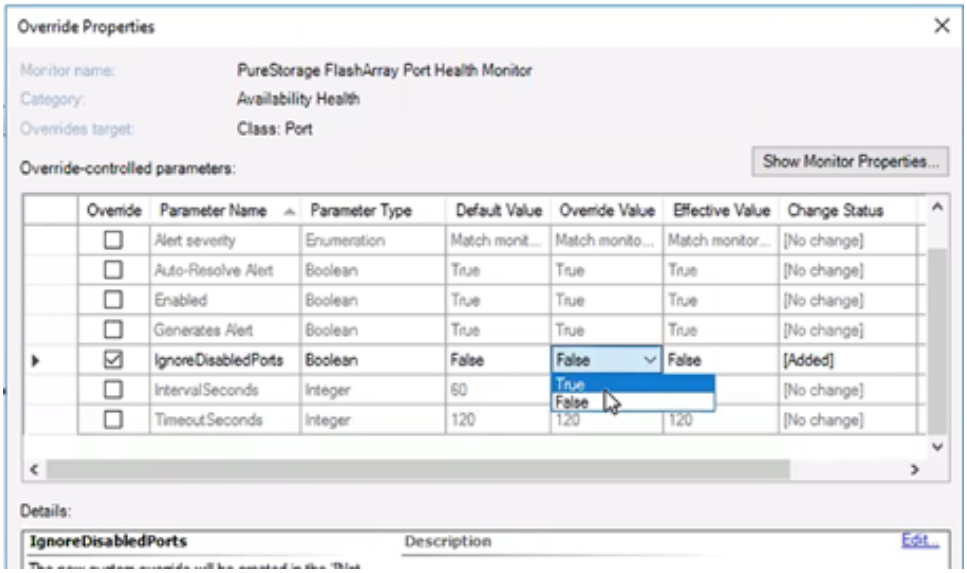
1. In the SCOM console, go to **Authoring > Management Pack Objects > Monitoring**.
2. In the Monitors pane, select **Ports > Entity Health > PureStorage FlashArray Port Health Monitor**.
   Right-click **PureStorageFlashArray Port Health Monitor** and select **Overrides > Override the Monitor > For all objects of the class: Port**.



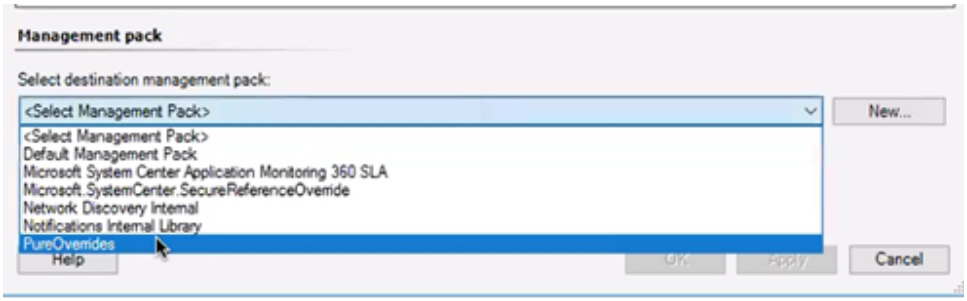

3. The **`Override Properties`** screen opens.
   Make the following changes in the **Override-controlled parameters** table:

   a. In the **`IgnoreDisabledPorts`** row, click the check box in the Override column to select that row.

   b. Change the setting in the Override Value column from its default **`False`** to **`True`**.




   c. In the **`Management Pack`** section, set the **`Select destination management pack`** menu to **`PureOverrides`**.




d. When the override settings are correct, click **Apply**.
Click **OK** to close the **Override-controlled parameters** table.
Click **Close** to close the pop-up.

## Removing a FlashArray from SCOM Monitoring

To stop monitoring a FlashArray:

1. Go to **Authoring > Management Pack Templates > Pure Storage Array Discovery**.
2. In the middle pane, select the FlashArray, right click, and select **Delete**.
3. If you are sure, in the Delete Monitoring confirmation pop-up, click **Yes**.

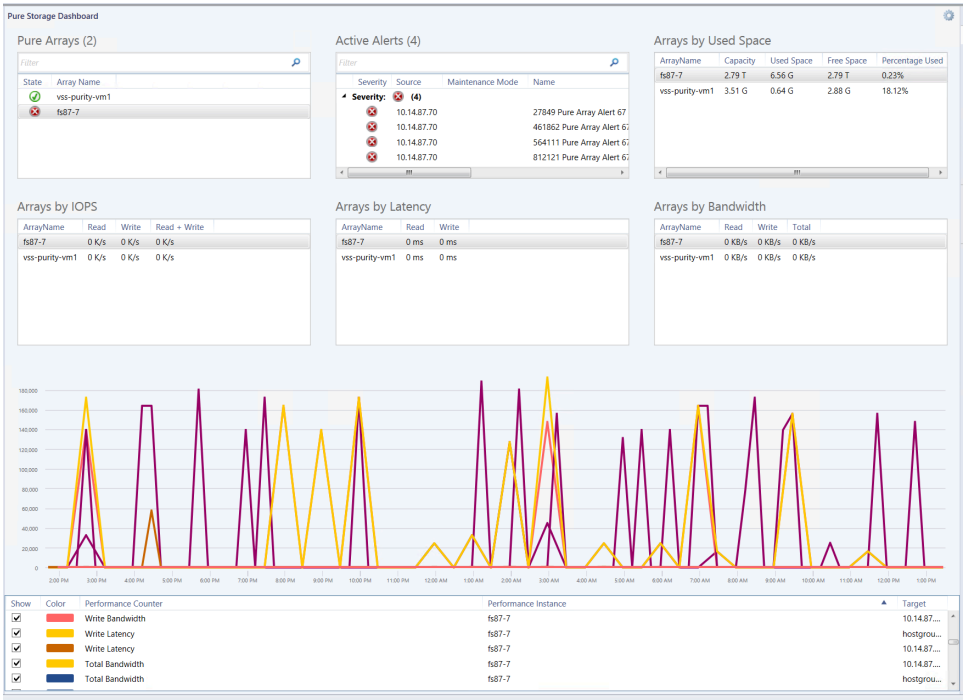
# Chapter 6. The Pure Storage Dashboard

The Pure Storage Dashboard provides a birds-eye view into the capacity, performance, and alert details of various FlashArrays that are integrated with SCOM, giving administrators the ability to monitor trends and troubleshoot any issues with FlashArray resources.

Through the dashboard, administrators can monitor trends and troubleshoot problems with the FlashArray resources and quickly determine if an issue is isolated to, say, a particular virtual machine, or one that is more wide-scale across the environment.

To see the Pure Storage dashboard, log in to the SCOM Monitoring console with Administrator credentials. Select **Monitoring > Pure Storage FlashArray > Pure Storage Dashboard**.

The Pure Storage Dashboard opens.




This example displays graphed read and write latency information in the lower part of the SCOM console, for the FlashArray selected in the Pure Arrays table.

**Notes about dashboard data**:

- The Latency, Bandwidth, and IOPS tables display the average data for the past hour.
- The Used Space tables displays current data every time the dashboard is loaded or refreshed.
- The performance graph, when selected, displays data from the past 24 hours.
- Data collections from FlashArrays into SCOM is configurable through SCOM Rules. Whatever the collection frequency is set to, the FlashArray information displayed in SCOM lags by that amount of time behind the real-time data displayed in the Purity GUI.

# Pure Storage Dashboard Tables

The following tables of FlashArrays and FlashArray metrics appear in the Pure Storage Dashboard.

Click on any column header to sort the table by that column.

- **Pure Arrays**
  Displays FlashArrays that are monitored by SCOM.

  Select a FlashArray in this table in order to display its performance graph or to select a task in the right Task pane.

- **Active Alerts**
  Displays all active alerts for monitored FlashArrays.

  Click the **Severity** column header to sort the list by alert severity.

  Information in the Active Alerts table:

  - **Severity**: The alert level
  - **Source**: The FlashArray or FlashArray component issuing the alert
  - **Maintenance Mode**: Whether or not the array is in maintenance mode
  - **Name**: The name of the alert
  - **Resolution State**: The current state of the alert
  - **Created:** Creation date of the alert
  - **Age:** How old the alert is currently

- **Arrays by Used Space**
  Displays FlashArrays' capacity and storage metrics.

  The Used Space table displays current data every time the dashboard is loaded or refreshed. Space metrics are typically shown in gigabytes or terabytes.

  Information in the Arrays by Used Space table:

  - **ArrayName**: FlashArray name
  - **Capacity**: The FlashArray's physical storage capacity
  - **Used Space**: Physical storage space occupied by volume, snapshot, shared space, and system data
  - **Free Space**: Unused space available for allocation
  - **Percentage Used**: Used Space divided by Capacity

- **Arrays by IOPS**
  Displays the FlashArrays' average I/Os per second metrics for the last hour.

  Information in the Arrays by IOPS table:

- **ArrayName**: FlashArray name
- **Read**: The number of read I/Os per second, in thousands
- **Write**: The number of write I/Os per second, in thousands
- **Read + Write**: The number of read and write I/Os per second, in thousands

- **Arrays by Latency**
  Displays the FlashArrays' average read and write latency metrics for the last hour.

  Information in the Arrays by Latency table:

  - **ArrayName**: FlashArray name
  - **Read**: Read latency, in milliseconds
  - **Write**: Write latency, in milliseconds

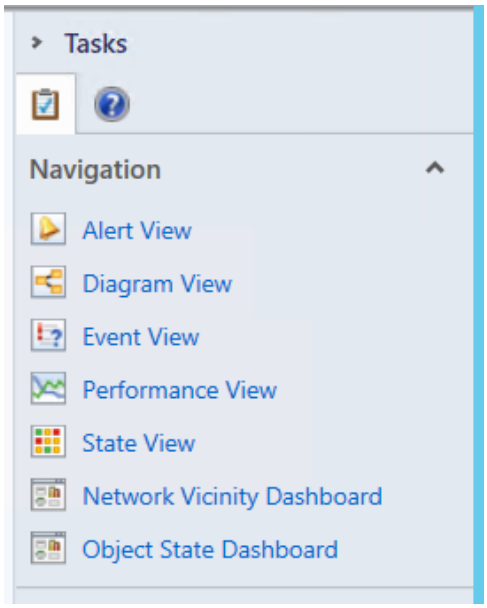
- **Arrays by Bandwidth**
  Displays the FlashArrays' average read and write metrics for the last hour.

  Information in the Arrays by Bandwidth table:

  - **ArrayName**: FlashArray name
  - **Read**: The number of read I/Os per second, in kilobytes
  - **Write**: The number of write I/Os per second, in kilobytes
  - **Read + Write**: The number of read and write I/Os per second, in kilobytes

## Pure Storage Dashboard Task Pane

The Task pane appears to the right of the Pure Storage Dashboard.

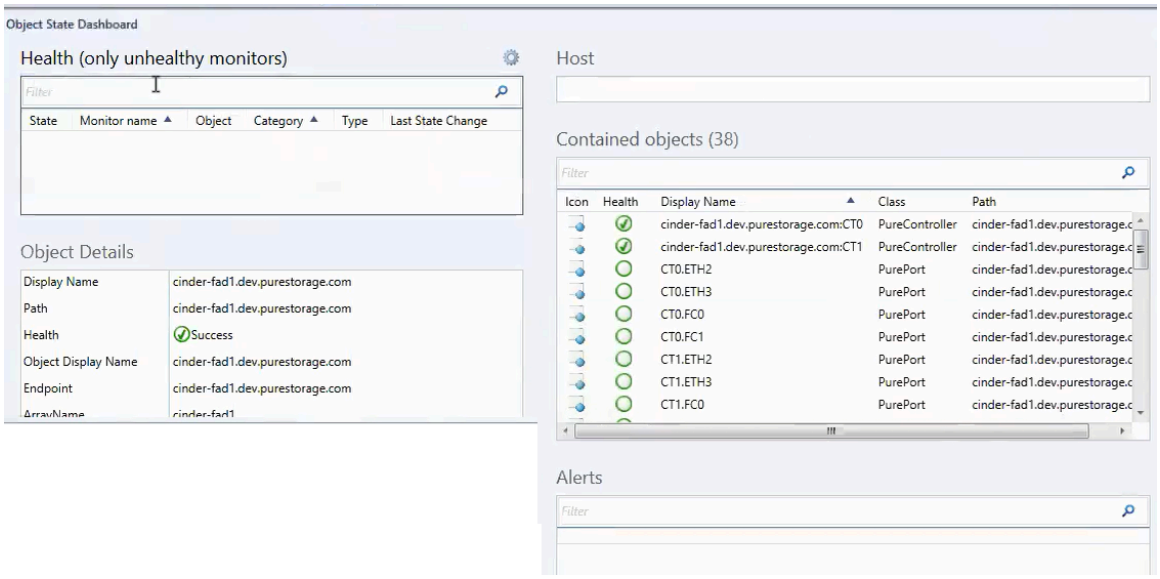


Click any of the Task or Navigation links to open that view for the FlashArray that is selected in the Pure Arrays table.

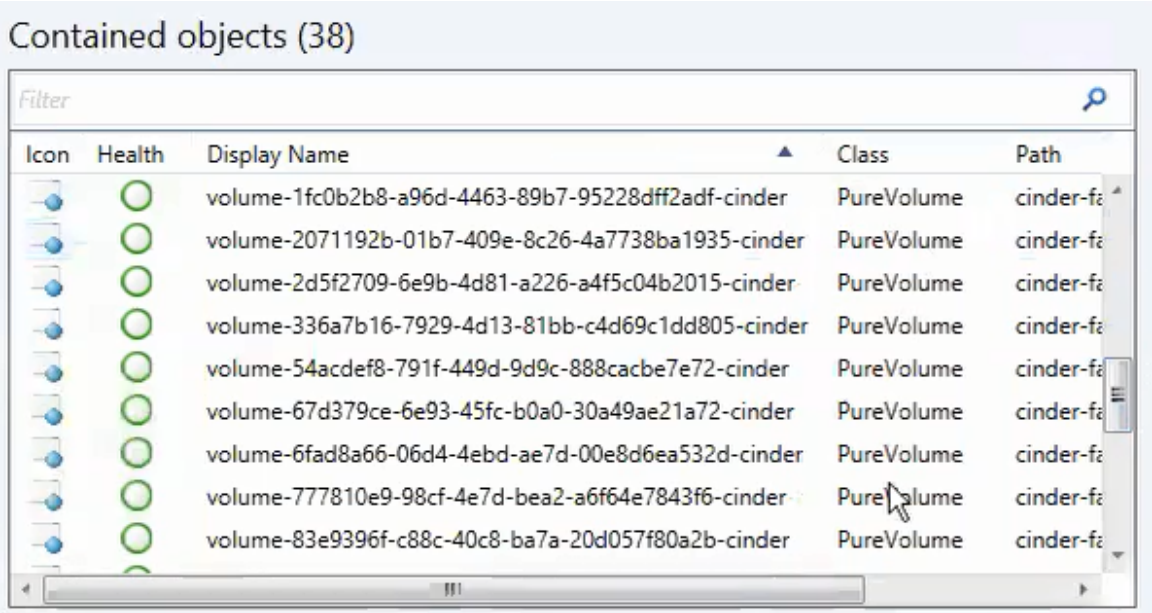
## To View the Volumes for a Specific FlashArray

To view the volumes for a FlashArray:

1. In the Pure Storage Dashboard, select the FlashArray in the Pure Arrays table.
2. Either click the **Object State Dashboard** link in the Tasks pane on the right, or right-click the FlashArray in the Pure Arrays table and select **Navigation > Object State Dashboard**.
   The Object State Dashboard opens.




3. Scroll down the **Contained objects** table to view the volumes on the selected FlashArray.



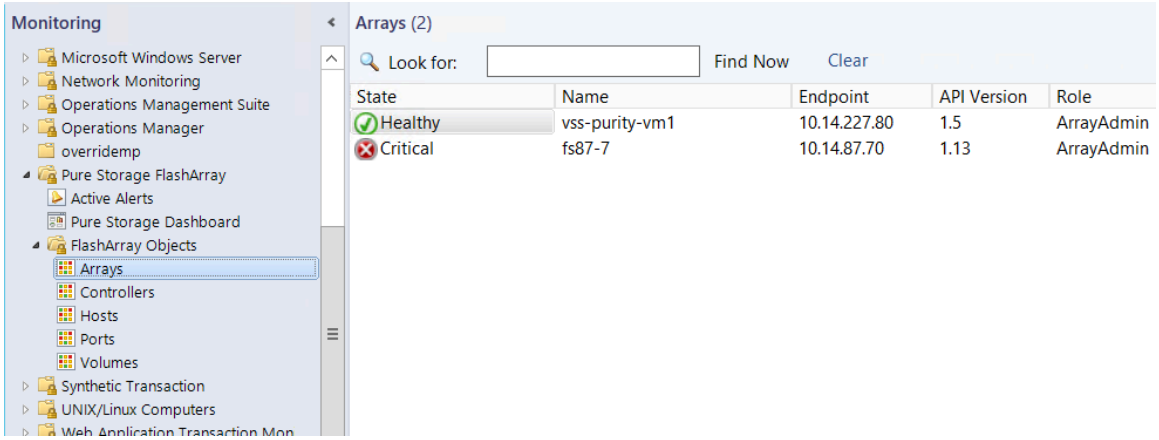
To instead view all volumes on any FlashArray, go to the **Monitoring > PureStorage FlashArray > FlashArray Objects > Arrays** view (see *The FlashArray Objects Views*).

# Chapter 7. The FlashArray Objects Views

The **Monitoring > Pure Storage FlashArray > FlashArray Objects** section contains pages with more details about Arrays, Controllers, Hosts, Ports, and Volumes.

The following views are available: *Arrays*, *Controllers*, *Hosts*, *Ports*, and *Volumes*.

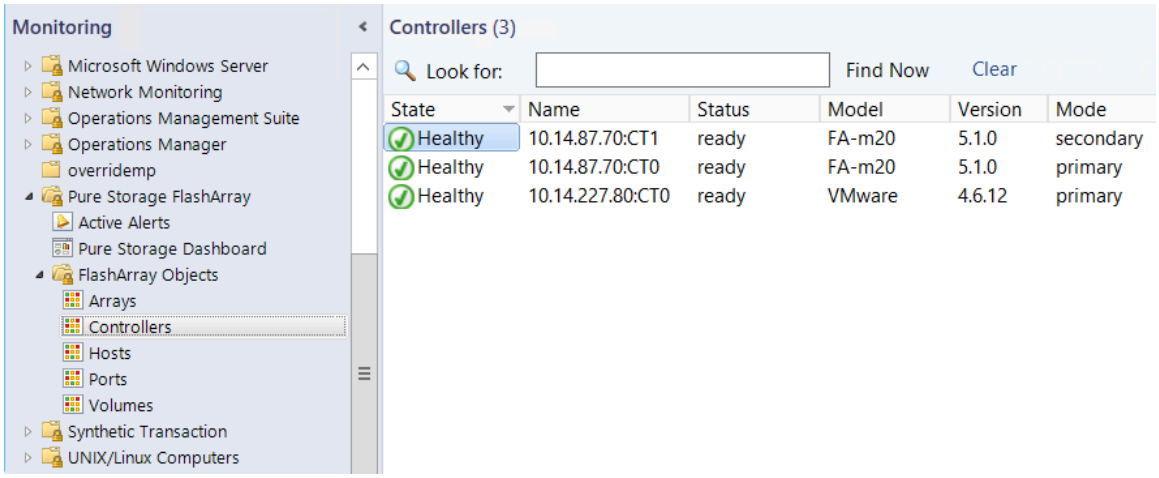
## Arrays




The following information is displayed in the Arrays view:

- **State**:
  The highest alert level, if any, active on the FlashArrays
- **ArrayName**:
  The FlashArray name
- **Endpoint**:
  The FlashArray's IP address or FQDN
- **ApiVersion**:
  The highest Purity REST API version supported on the FlashArray
- **Role**:
  The role associated with the Purity credentials used to connect to the FlashArray

# Controllers

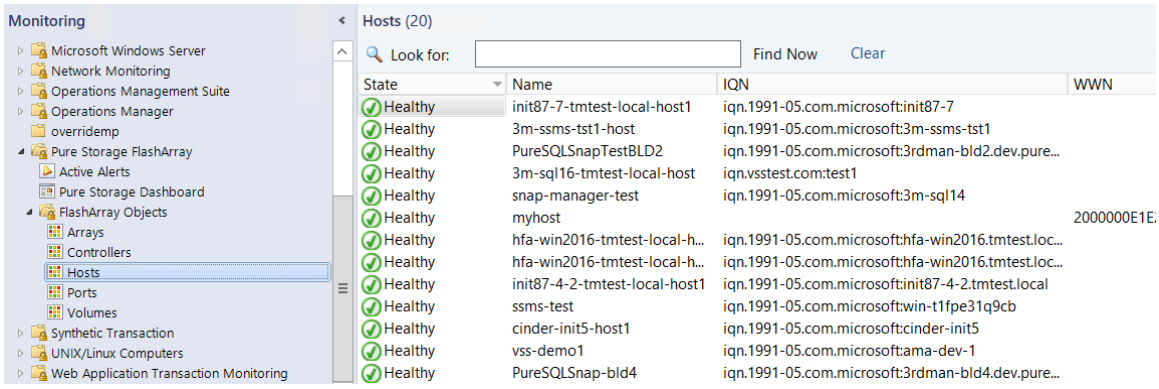



The following information is displayed in the Controllers view:

- **Name**:
  The controller name
- **Status**:
  The controller's current status (**`ready`**, **`not ready`**, etc.)
- **Model**:
  The FlashArray model number, or **`VMware`** in the case of a virtual machine (VM)
- **Version**:
  The version of Purity running on the controller
- **Mode**:
  The controller's current mode (primary or secondary)

**Note**: For virtual machines, one controller is displayed. For actual FlashArrays, two controllers are displayed.

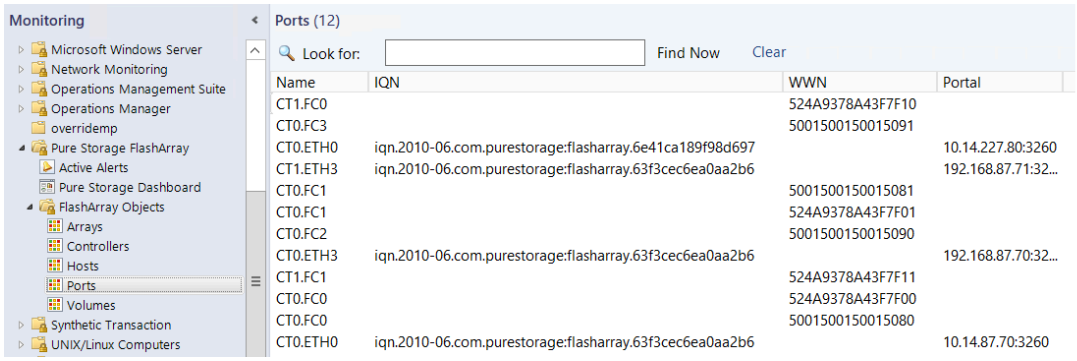
# Hosts



The following information is displayed in the Hosts view:

- **Name**:
  The host name
- **IQN**:
  The iSCSI qualified names (IQNs), if any, that identify the host computer initiators
- **WWN**:
  The Fibre Channel worldwide names (WWNs), if any, that identify the host computer initiators
- **Hostgroup**:
  The name of the host group the host belongs to, if any

## Ports

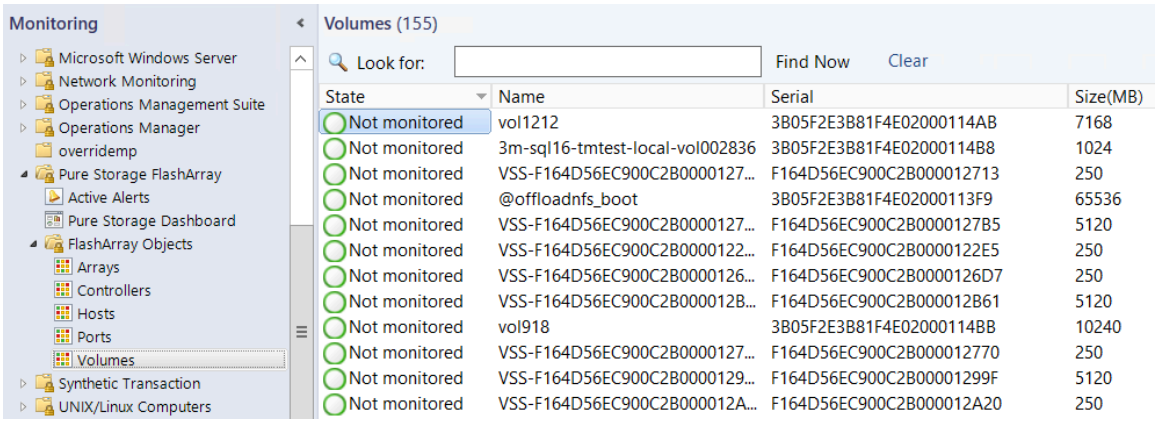



The following information is displayed in the Ports view:

- **Name**:
  The port name
- **IQN**:
  The IQNs, if any, that communicate on this port
- **WWN**:
  The WWNs, if any, that communicate on this port
- **Portal**:
  The IP address and port number of a controller's Ethernet interface

# Volumes

Select a volume in the center Volumes pane to have its details displayed in the lower Detail View.

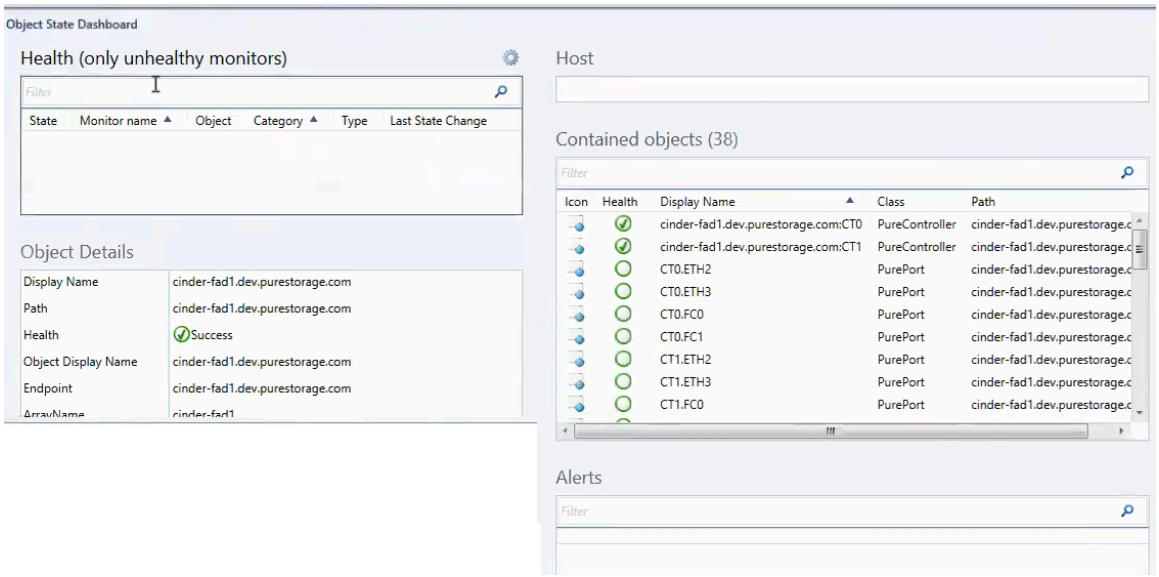



The following information is displayed in the Volumes view:

- **Name**:
  The volume name
- **Serial**:
  The serial number for the volume
- **Size (MB)**:
  The volume's size, in megabytes

# Chapter 8. The Object State Dashboard

The Object State Dashboard displays details for a specific FlashArray.




The **`Health (only unhealthy monitors)`** table is empty when the FlashArray is in a healthy state.

The **`Contained Objects`** table shows the FlashArray's controllers, ports, hosts, and volumes.

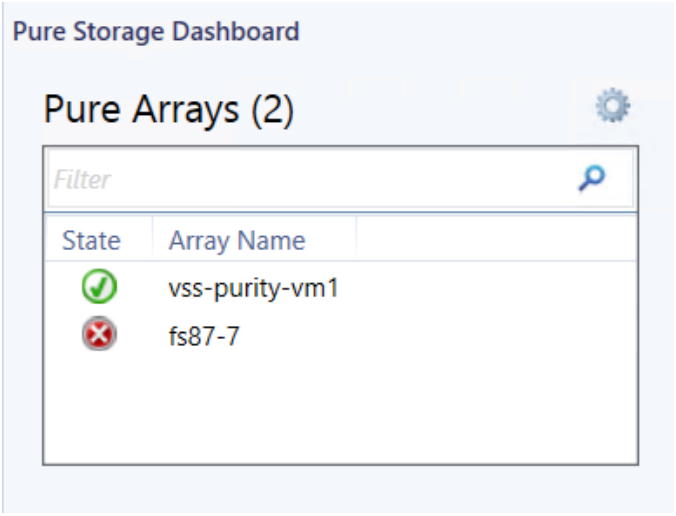
To open the Object State Dashboard:

1. In the Pure Storage Dashboard, select the FlashArray in the Pure Arrays table.
2. Either click the **Object State Dashboard** link in the Tasks pane on the right, or right-click the FlashArray in the Pure Arrays table and select **Navigation > Object State Dashboard**.
   The Object State Dashboard opens.

# Chapter 9. Health Monitoring

## Dashboard Summary

A summary of the health of monitored FlashArrays is displayed in the Pure Arrays table in the Pure Storage Dashboard.

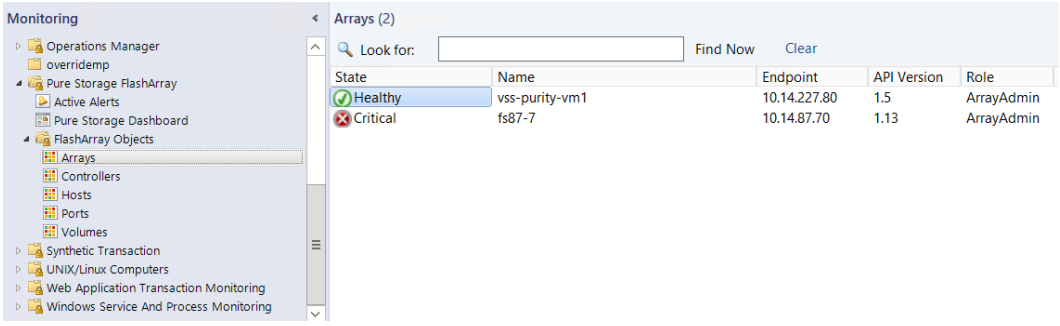



The State column shows the highest alert level for each FlashArray.

- **CRITICAL** (red): Urgent messages that require immediate attention.
- **WARNING** (yellow): Important messages that warn of an impending error if action is not taken.

## The Health Explorer

The Health Explorer shows more detailed information about a FlashArray with health issues.

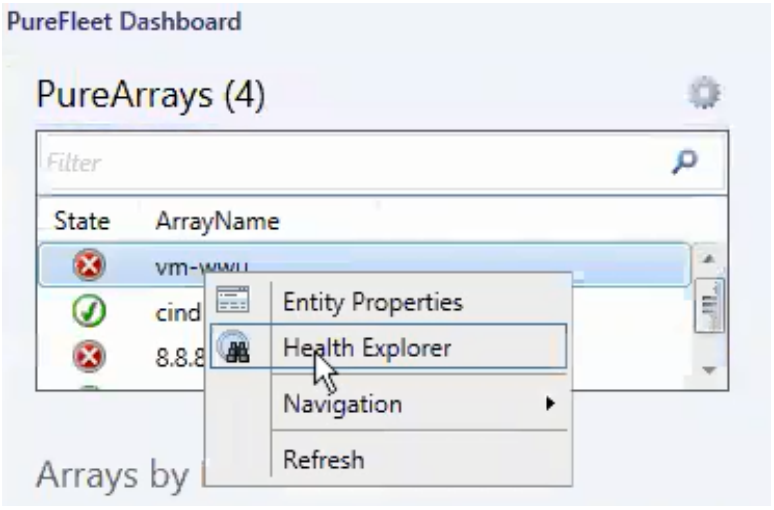



Alerts propagate up from the most granular to higher levels. The last alert listed in this example is a PureStorage FlashArray Controller Health Monitor alert, indicating a problem with the controller's status or connectivity.

To open the Health Explorer:

1. In the Pure Storage Dashboard Pure Arrays table, select the FlashArray.

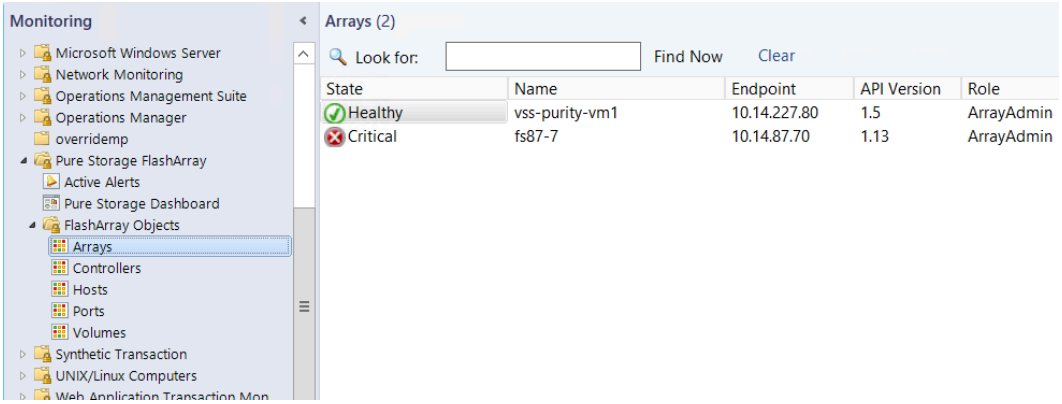
2. Either click the **Health Explorer** link in the Tasks pane, or right-click the FlashArray in the Pure Arrays table and select **Health Explorer**.



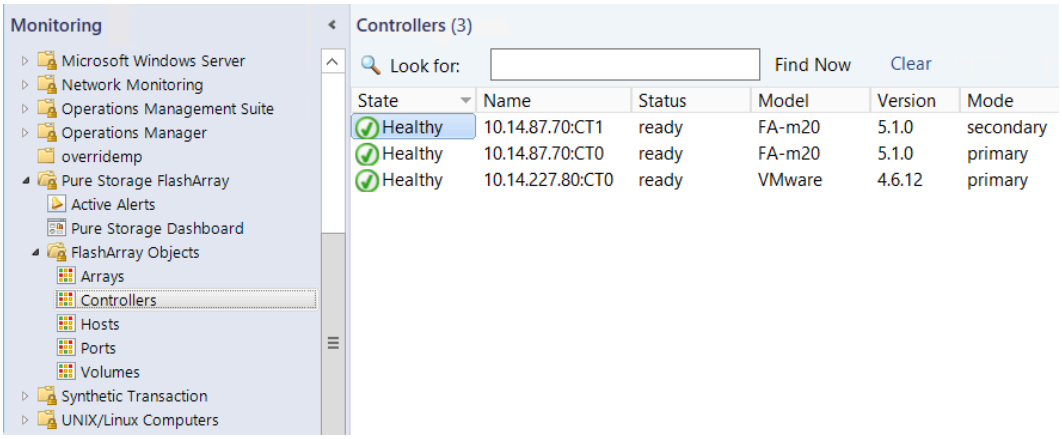

## FlashArray Objects Views

The FlashArray Objects Arrays and Controllers views also show array and controller health.

The Arrays view shows the health status for each array.




The Controllers view shows the Status of each controller.

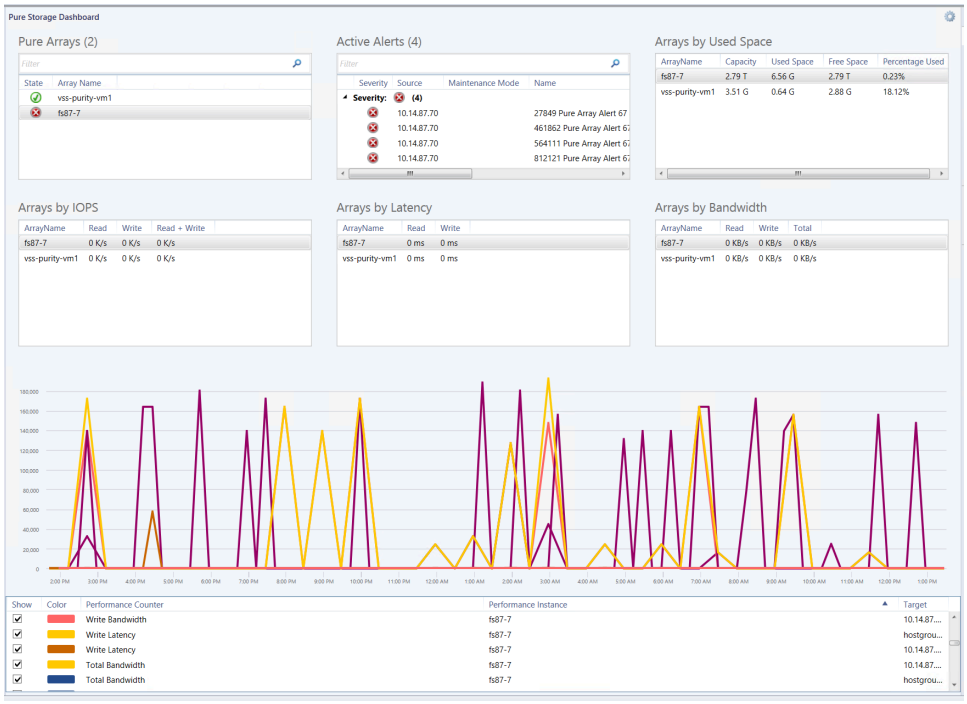


To open the FlashArray Objects Arrays or Controllers view:

1. In the SCOM console, go to **Monitoring > PureStorage FlashArray > FlashArray Objects**.
2. Then select **Arrays** or **Controllers**.

# Chapter 10. Performance Monitoring

A summary of FlashArray IOPS, latency, and bandwidth information is shown in the Pure Storage Dashboard (go to **Monitoring > Pure Storage FlashArray > Pure Storage Dashboard**).




In the lower part of the SCOM console, you can graph selected performance metrics for the FlashArray selected in the Pure Arrays table.

The performance graph displays data from the past 24 hours.

1. In the Pure Storage Dashboard Pure Arrays table, select the FlashArray.
2. In the Show column at the bottom of the console, select the check boxes for the metrics you want to graph.
   The following metrics can be graphed:
   - Reads per second
   - Writes per second
   - Total IOPS (read and write combined)
   - Write latency
   - Read latency
   - Read bandwidth
   - Write bandwidth

- Total bandwidth
- Capacity
- Used Space

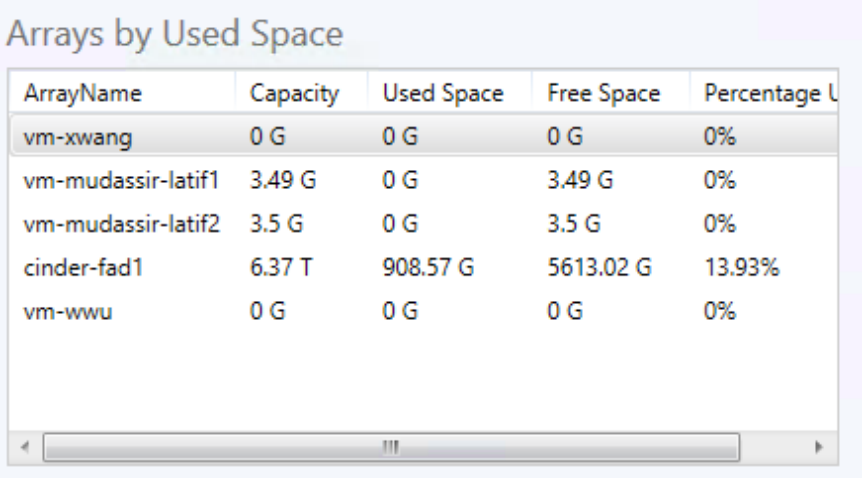
The performance graph is not shown until both a FlashArray is selected in the Pure Arrays table and at least one metric is selected at the bottom of the console.

For a larger graph, open the Performance View:

1. Go to **Monitoring > Pure Storage FlashArray > FlashArray Objects or FlashArray Objects > Arrays**.
2. Select the array of interest. Right click and select **Open > Performance View.**
3. In the Legends area (lower section of the page), select the performance metrics to be displayed.

# Chapter 11. Capacity Monitoring

The Pure Storage dashboard provides a birds-eye view into the capacity metrics of monitored FlashArrays.




The **`Arrays by Used Space`** graph displays the following capacity metrics:

- **ArrayName**: FlashArray name
- **Capacity**: The FlashArray's physical storage capacity
- **Used Space**: Physical storage space occupied by volume, snapshot, shared space, and system data
- **Free Space**: Unused space available for allocation
- **Percentage Used**: Used Space divided by Capacity

Double click on a FlashArray in order to open details for that array.

# Chapter 12. Alerts

Alerts help identify problem areas in the SCOM operations environment.

The Pure Storage FlashArray management pack includes preconfigured alerts, many of which are closely mapped to the alerts generated through the Purity array. SCOM leverages these alerts to analyze the all monitored FlashArray objects and to generate health alerts for problems areas.

Critical alerts mainly focus on FlashArray problems and require immediate attention.

Warning alerts mainly focus on capacity. For example, a warning alert is generated when SCOM detects that storage consumption has reached a high percentage of usable capacity.

Alerts are further organized by criticality levels which indicate the current operational state of each object and whether any problems must be addressed.

Alert criticality is quickly identifiable based on badge color and is divided into the following levels:

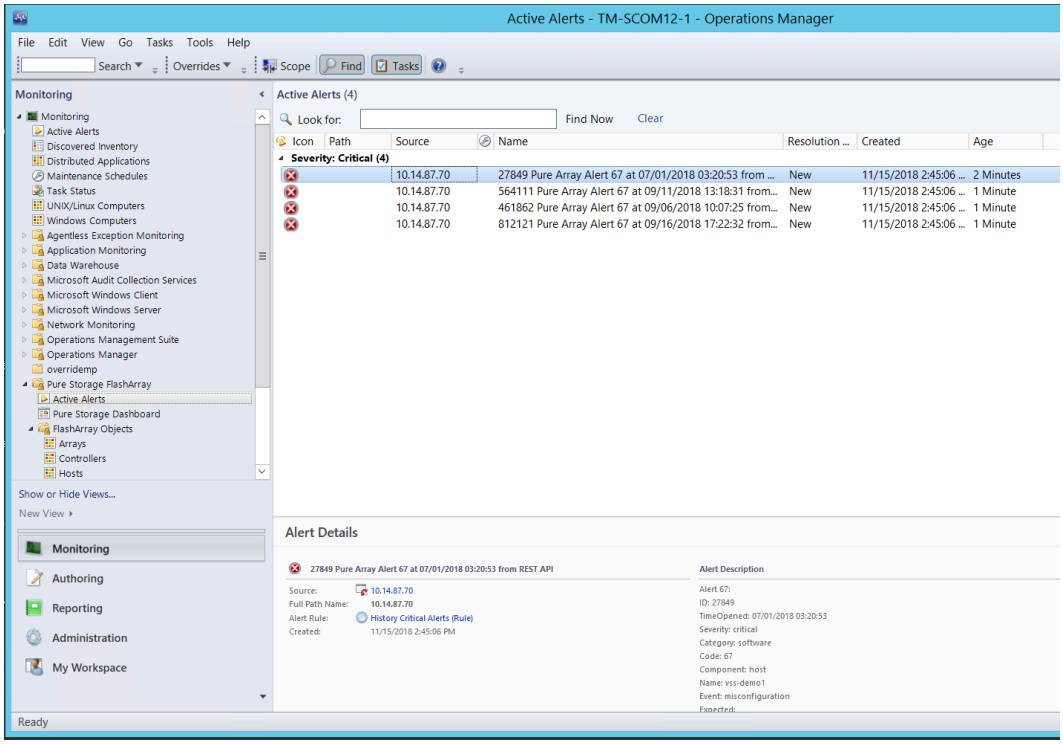
- **CRITICAL (red):** Urgent messages that require immediate attention.
- **WARNING (yellow):** Important messages that warn of an impending error if action is not taken.
- **INFO (no badge color):** Informational messages that are generated due to a change in state. INFO messages can be used for reporting and analysis purposes. No action is required.

## Alerts Views and Information

FlashArray-related alerts can be seen in the following views:

- **Monitoring > Pure Storage FlashArray > Pure Storage Dashboard**
- **Monitoring > Pure Storage FlashArray > Active Alerts**
- **Monitoring > Active Alerts**

The following is an example of the **Monitoring > Pure Storage FlashArray > Active Alerts** view:




Information listed in alerts views includes:

- **Path:**
  The FlashArray or FlashArray component that issued the alert
- **Source:**
  The FlashArray IP address or FQDN
- **Wrench Icon:**
  Whether the object is in maintenance mode or not (currently not supported)
- **Name:**
  Name of the alert
- **Resolution State:**
  Current state of the alert
- **Created:**
  Creation date of the alert
- **Age:**
  How old the alert is currently

## Open Alerts Details

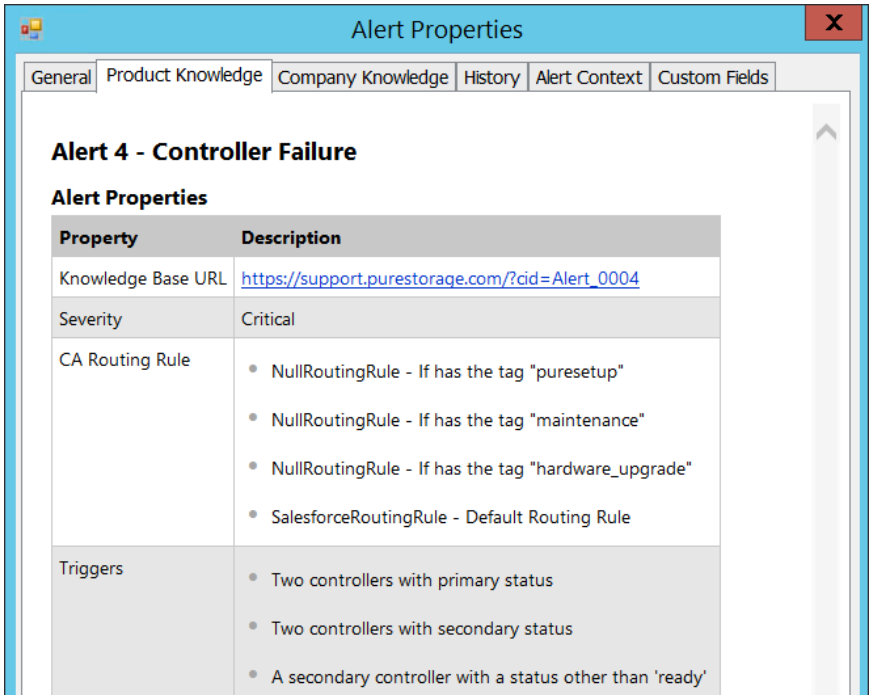
A summary of an alert's details is available in the **Monitoring > Pure Storage FlashArray > Active Alerts** view. Complete information for critical alerts, including possible impact and troubleshooting tips, is available in Pure1 Knowledge http://support.purestorage.com [http://support.purestorage.com].

To view the summary for an alert:

1. In the **Monitoring > Pure Storage FlashArray > Active Alerts** view, click on the alert to highlight it.
2. View the alert information in the Alert Details section (toward the bottom of the page).

To open the Pure Storage knowledge base article for an alert:

1. In the **Monitoring > Pure Storage FlashArray > Active Alerts** view, double click on the critical alert.
   The Alert Properties pop-up opens:




2. Go to the Knowledge tab and double click on the Knowledge Base URL, or copy the URL to a browser. The alerts page describes the impact of the issue as well as troubleshooting tips.

# Appendix A. Resources

## Pure Storage Documentation

The Purity documentation resources are available in Pure1 Knowledge at ***Pure1 Knowledge*** [http://support.purestorage.com]

Documentation for the Pure Storage SCOM Management Pack is available under ***System Center Operations Manager (SCOM)*** [https://support.purestorage.com/Solutions/Microsoft_Platform_Guide/System_Center_Suite/System_Center_Operations_Manager_(SCOM)].

The FlashArray User Guides are available under ***Purity FlashArray User Guide*** [https://support.purestorage.com/FlashArray/PurityFA/FlashArray_User_Guide].

Additional support scripts and helper utilities are available on GitHub at ***PureStorage-OpenConnect/SCOM-Mgmt-Pack*** [https://github.com/PureStorage-OpenConnect/SCOM-Mgmt-Pack].

Links are subject to change without notice.

## Documentation Feedback

We welcome your feedback about Pure Storage documentation and encourage you to send your questions and comments to **<DocumentFeedback@purestorage.com>**. We would love to hear from you.

# Appendix B. Legal Information

## End-User License Agreement

End User License Agreement [http://www.purestorage.com/content/dam/pdf/en/legal/pure-enduser-agreement.pdf]

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