PURESTORAGE

FlashBlade User Guide (1.2.0)

purestorage.com

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Part 1:
Elasticity Overview

Chapter 1. Overview

Elasticity is the operating environment that queries and manages the FlashBlade hardware, networking, and storage components. The Elasticity software is distributed with the FlashBlade array.

Elasticity provides two ways to administer the FlashBlade: through the browser-based graphical user interface (Elasticity GUI), and through the command-driven interface (Elasticity CLI).

This chapter cover Elasticity conventions and troubleshooting issues that may arise.

Elasticity Conventions

Elasticity follows certain conventions.

Object Names

Valid characters are letters (A-Z and a-z), digits (0-9), and the hyphen (-) character. File system names can also include the underscore (_) character. The first and last characters of a name must be alphanumeric, and a name must contain at least one letter.

Most objects in Elasticity that can be named, including file systems, data vips, and subnets can be 1-63 characters in length.

Array names can be 1-56 characters in length. The array name length is limited to 56 characters so that the names of the individual controllers, which are assigned by Elasticity based on the array name, do not exceed the maximum allowed by DNS.

Array and File System Sizes

Array and file system sizes are specified as integers followed by one of the suffix letters **`K`**, **`M`**, **`G`**, **`T`**, **`P`**, representing **`KiB`**, **`MiB`**, **`GiB`**, **`TiB`**, and **`PiB`**, respectively, where "**`Ki`**" denotes 2^10, "**`Mi`**" denotes 2^20, and so on.

Time Zones

Elasticity GUI dates and times are displayed in the user's local time zone, which is determined by the browser's local time. The user's local time zone appears at the bottom of the navigation pane of the Elasticity GUI.

Elasticity CLI dates and times are displayed in the time zone of the array, which is set during FlashBlade installation. The array time zone appears in the Time panel of the **System > Settings** page.

Troubleshooting

Help! Who do I contact about problems with the FlashBlade Array?

Contact a member of your Pure Storage account team, visit us at http://support.purestorage.com, or email Pure Storage Support at **<support@purestorage.com>**.

If you are contacting Pure Storage Support about a technical issue, they may ask you to open an RA session so that they can help you diagnose the issue.

Error Messages

The following error messages may appear when you perform operations through the Elasticity GUI or CLI:

Service Temporarily Unavailable
: An internal service is currently unavailable. This is a temporary issue. Wait a few minutes and then try the Elasticity GUI or CLI operation again. If you still get the error message, contact Pure Storage Support at **<support@purestorage.com>**.

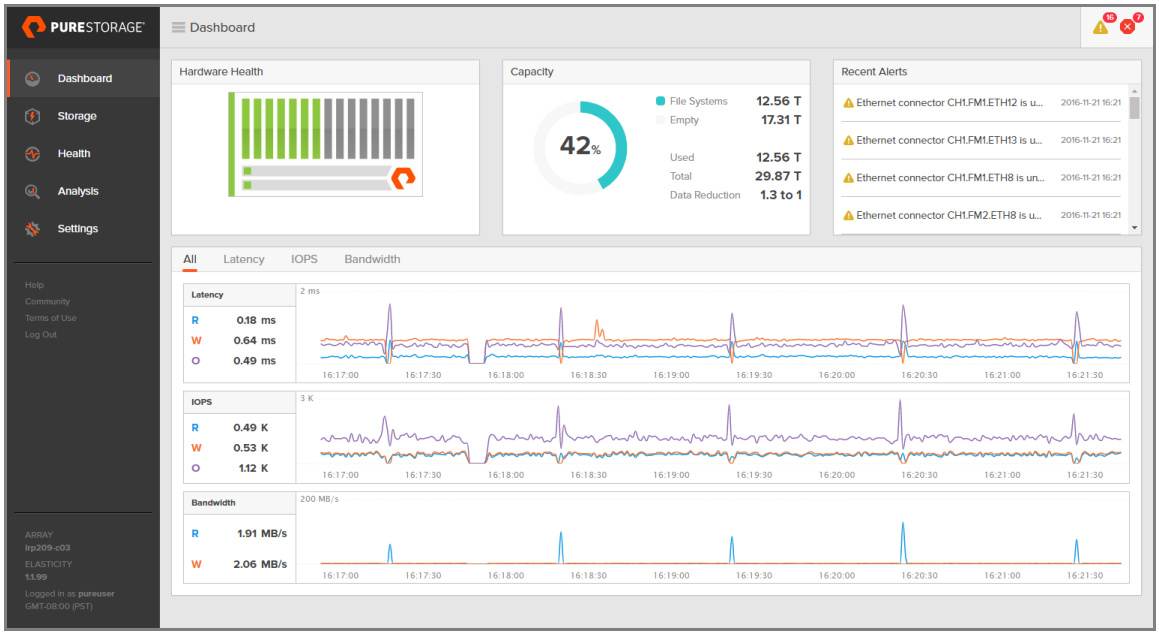
Unexpected Error
: The Elasticity GUI or CLI operation that you performed generated an unexpected error. Contact Pure Storage Support at **<support@purestorage.com>**.

Part 2:
Using the Elasticity GUI to Administer a FlashBlade Array

Chapter 2. Elasticity GUI Overview

The Elasticity graphical user interface (GUI) is a browser-based system used to view and administer the FlashBlade array.

Figure 2.1: Elasticity GUI



The Elasticity GUI contains the following pages:

Dashboard
Represents a graphical overview of the array, including hardware status, recent alerts, storage capacity, and input/output (I/O) performance metrics.

Storage
Displays a list of file systems on the array and its attributes, including provisioned size, capacity usage details, and export rules.

Health
Displays array health including alerts, hardware status, and parity.

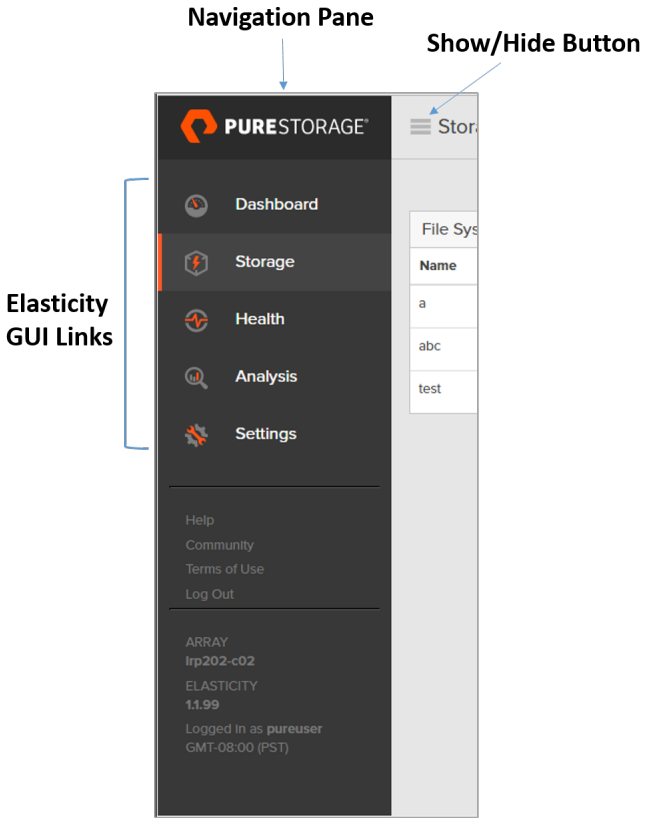
Analysis
Displays historical array information, including storage capacity and I/O performance metrics, from various viewpoints.

Settings
Displays array-wide system and network settings. Manage array-wide components, including network interfaces, system time, connectivity and connection configurations, and alert settings.

Elasticity GUI Navigation

The dark gray navigation pane that appears along the left side of the Elasticity GUI contains links to the Elasticity GUI pages.

Figure 2.2: Elasticity GUI - Navigation Pane



Click a link in the navigation pane to analyze or configure the information that appears in the page to its right. For example, click the Storage link to view information about the FlashBlade file systems.

Click the **show/hide** button to toggle between the expanded and collapsed views of the navigation pane. The show/hide button appears to the right of the Pure Storage logo and resembles three horizontal lines.

The navigation pane also includes links to the following external sites:

Help
Launches the FlashBlade user guide.

Community
Launches the Pure1 community portal at **<http://support.purestorage.com>**

Terms of Use
Launches the Pure Storage End User Agreement page.

Log Out

Logs the current user out of the Elasticity GUI.

The bottom of the navigation pane displays FlashBlade array and Elasticity version information, the name of the user who is currently logged into the Elasticity GUI, and the user's local time zone. The dates and times that appear in the Elasticity GUI are based on the user's local time zone, which is determined by the browser's local time.

The page to the right of the navigation pane displays the information and configuration options for the selected Elasticity GUI link. The information on each page is organized into panels, charts, and lists.

Figure 2.3: Elasticity GUI - Page and Buttons

The alert icons that appear to the far right of the title bar indicate the number of recent **Warning** and **Critical** alerts, respectively. A recent alert represents one that Elasticity saw within the past 24 hours or still considers an open issue that requires attention. To analyze the recent alerts in more detail, click the **Health** link.

Various panels, such as **Storage > File Systems** and **Health > Alerts**, contain lists of information. The total number of rows in a list output is displayed in the upper-right corner of the list. Some lists can be very large, extending beyond hundreds of rows.

Pagination divides a large list output into discrete pages. Pagination is enabled by default and is only in effect if the number of lines in the list output exceeds 25 rows. To move through a paginated list, click the **Previous** button, **Next** button, or any page number in between.

Elasticity GUI Login

Logging in to the Elasticity GUI requires a virtual IP address or fully-qualified domain name (FQDN) and an Elasticity login username and password; this information is provided during the FlashBlade installation.

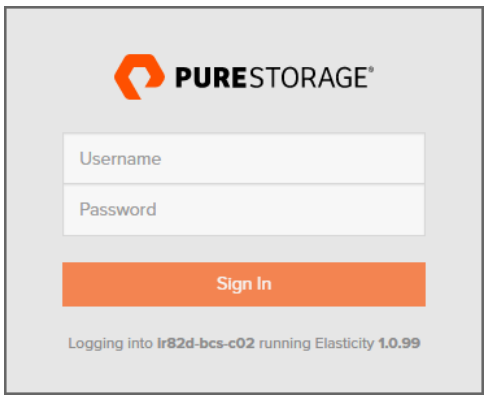
FlashBlade is installed with one administrative account with the username **`pureuser`**. The initial password for the account is **`pureuser`**. The password can be changed any time through the **`pureadmin`** CLI command.

Pure Storage tests the Elasticity GUI with the most recent versions of the following web browsers:

- Apple Safari
- Google Chrome
- Microsoft Edge
- Microsoft Internet Explorer (IE)
- Mozilla Firefox

To launch the Elasticity GUI login screen, open a browser and type the virtual IP address or FQDN into the address bar, and press **Enter**.

Figure 2.4: Elasticity GUI - Login Screen



Logging in to the Elasticity GUI

Log in to the Elasticity GUI to view and administer the FlashBlade array.

To log in to the Elasticity GUI:

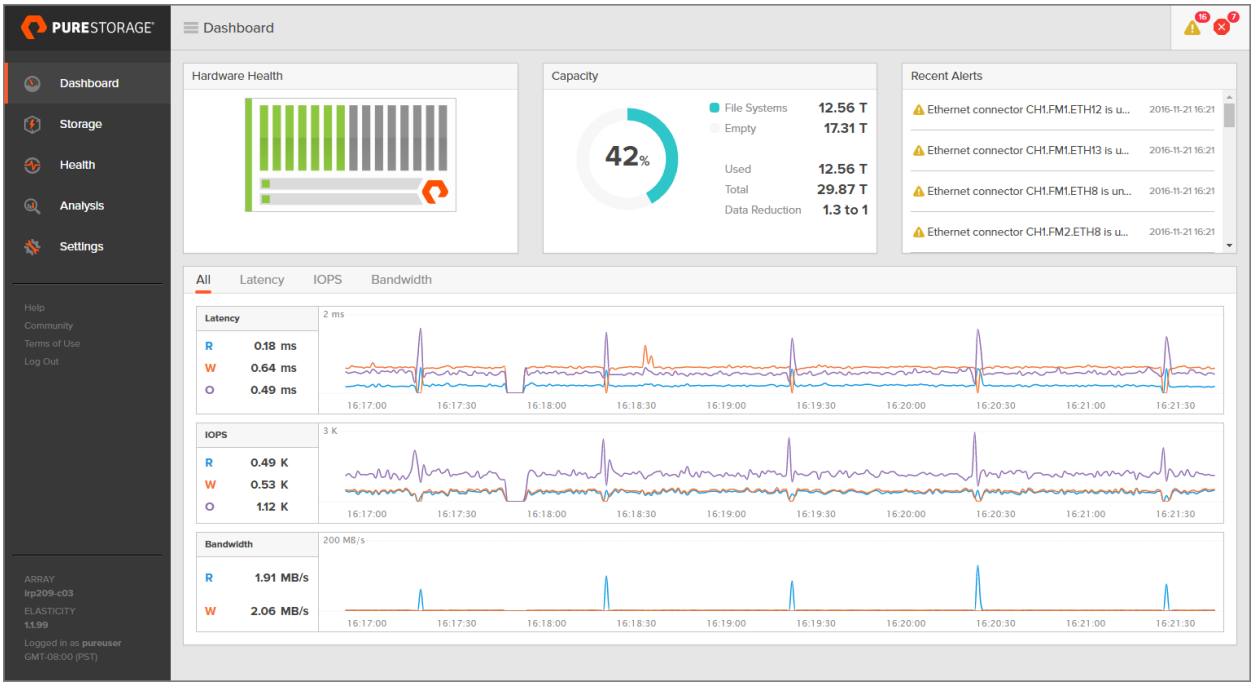
1. Open a web browser.
2. Type the virtual IP address or fully-qualified domain name of the FlashBlade in the address bar and press **Enter**. The Elasticity GUI login screen appears.
3. In the Username field, type the FlashBlade user name. For example, **`pureuser`**.
4. In the Password field, type the password for the FlashBlade user. For example, **`pureuser`**.

5. Click **Log In** to log in to the Elasticity GUI.

Chapter 3. Dashboard

The Dashboard page displays a running graphical overview of the array's storage capacity, performance, and hardware status.

Figure 3.1: Dashboard



The Dashboard page contains the following panels and charts:

- Hardware Health
- Capacity
- Recent Alerts
- Performance Charts

Hardware Health

The Hardware Health panel displays the operational state of the FlashBlade array chassis, blades, and fabric modules. Hover over the image to view the component details.

To analyze the hardware components in more detail, click the **Health** link.

Capacity

The Capacity panel displays array size and storage consumption details. All capacity values are rounded to two decimal places.

The capacity wheel displays the percentage of array space occupied by file system data. The percentage value in the center of the wheel is calculated as **`Used/Total`**.

The capacity data is broken down into the following components:

File Systems
: Amount of space that the written data occupies on the array after reduction via data compression.

Empty
: Unused space.

Used
: Amount of space that the written data occupies on the array after reduction via data compression.

Total
: Total usable capacity of the array.

Data Reduction
: Ratio of the size of the written data versus the amount of space the data occupies after data compression.

Recent Alerts

The Recent Alerts panel displays a list of alerts that Elasticity saw within the past 24 hours or still considers open issues that require attention. The list contains recent alerts of all severity levels.

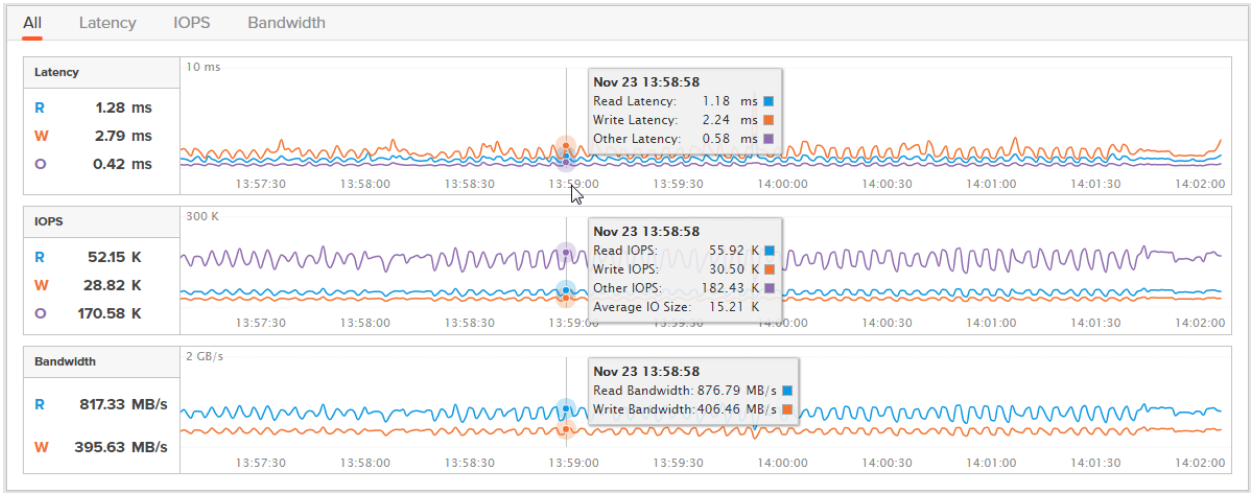
To view the details of an alert, click the alert message.

To view a list of all alerts, including ones that are in no longer open, go to the **Health** page.

Performance

The performance panel displays latency, IOPS, and bandwidth values in real time.

Figure 3.2: Dashboard - Performance Charts



The performance metrics are displayed along a scrolling graph; incoming data appear along the right side of each graph every few seconds as older numbers drop off the left side. Each performance chart includes R, W, and O (if applicable) values, representing the most recent data samples.

Hover over any of the charts to display metrics for a specific point in time. The values that appear in the point-in-time tooltips are rounded to two decimal places.

The performance panel includes Latency, IOPS, and Bandwidth charts. The All chart displays all three performance charts in one view.

Latency

The Latency chart displays the average latency times for various operations.

- **Read Latency (R)** - Average arrival-to-completion time, measured in milliseconds, for a read operation.
- **Write Latency (W)** - Average arrival-to-completion time, measured in milliseconds, for a write operation.
- **Other Latency (O)** - Average arrival-to-completion time, measured in milliseconds, for all other metadata operations.

IOPS

The IOPS (Input/output Operations Per Second) chart displays I/O requests processed per second by the array. This metric counts requests per second, regardless of how much or how little data is transferred in each.

- **Read IOPS (R)** - Number of read requests processed per second.
- **Write IOPS (W)** - Number of write requests processed per second.
- **Other IOPS (O)** - Number of metadata operations processed per second.
- **Average IO Size** - Average I/O size per request processed. Requests include reads and writes.

Bandwidth

The Bandwidth chart displays the number of bytes transferred per second to and from all file systems. The data is counted in its expanded form rather than the reduced form stored in the array to truly reflect what is transferred over the storage network. Metadata bandwidth is not included in these numbers.

- **Read Bandwidth (R)** - Number of bytes read per second.
- **Write Bandwidth (W)** - Number of bytes written per second.

By default, the performance charts display performance metrics for the past 5 minutes. To display more than 5 minutes of historical data, select **Analysis > Performance**.

Note about the Performance Charts

The Dashboard and Analysis pages display the same latency, IOPS, and bandwidth performance charts, but the information is presented differently between the two pages.

In the Dashboard page:

- The performance charts are updated once every second.
- The performance charts display up to 5 minutes of historical data.

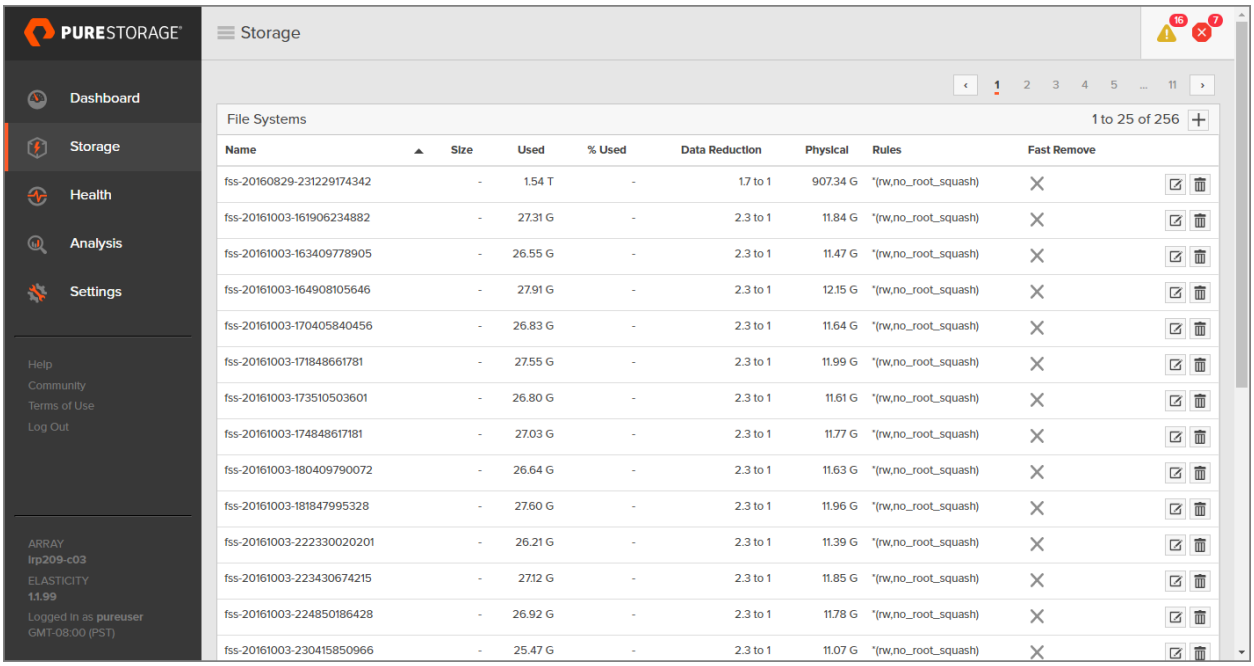
In the Analysis page:

- At its shortest range (5m), the performance charts are updated once every second. As the range increases, the update frequency (and resolution) decreases.
- The performance charts display up to 30 days of historical data.

Chapter 4. Storage

The Storage page displays and manages the file systems for NFS export. Exporting a file system requires at least one valid data virtual IP address (data vip). Data vips are configured through the Settings > Network page.

Figure 4.1: Storage



File Systems

The File Systems list displays the file systems that have been created on the FlashBlade array.

Each file system in the list includes the following information:

- **Name**: File system name.
- **Size**: Provisioned size of the file system.
- **Used**: Total amount of pre-compressed data written to the file system.
- **% Used**: Percentage of provisioned size occupied by file system data. The percentage value is calculated as **`Used/Size`**.
- **Data Reduction**: Ratio of the size of the written data versus the amount of space the data occupies after data compression.
- **Physical**: Amount of space that the written data occupies on the array after reduction via data compression.

- **Rules**: File system NFS export rules.
- **Fast Remove**: Status (enabled or disabled) of the fast remove feature.

The size and rules of each file system can be configured.

File System Size

File system size represents the provisioned size allocated to a file system. The size is a quota of space that is set to help gauge the fullness of a file system.

When the amount of data written to the file system reaches a certain percentage of its quota, alerts are generated notifying administrators of the threshold reached. For example, Elasticity generates an **`INFO`** alert when the amount of data written to the file system exceeds 100% of its provisioned size.

To view alert details, select **Health > Alerts**.

The file system size can be blank or set to any value between **`0`** and **`8191`** petabytes. If the field is left blank or set to **`0`**, the provisioned size will default to an unlimited size.

Elasticity does not enforce any restrictions nor does it take any further action when space consumption reaches or exceeds the provisioned size. To address the issue, decrease the percentage of storage space used by either deleting files or increasing the size of the file system.

File system sizes can be changed at any time.

File System Rules

Each FlashBlade file system can include a set of NFS export rules that define the access rights and privileges a client has to the file system.

Rules are in the format **`host(options)`**.

`host` represents one of the following categories:

- IPv4 address in the form **`xxx.xxx.xxx.xxx`**
- Netmask in the form **`xxx.xxx.xxx.xxx/xx`**
- Wildcard in the form **`*`** to represent all clients

`options` in parenthesis represents a comma-separated list of NFS export options.

Valid export options are **`rw`**, **`ro`**, **`root_squash`**, and **`no_root_squash`**.

If changes are being made to existing NFS export rules, the changes will be synchronously applied to all currently mounted clients.

If multiple rules are specified, separate each rule with a space. For example,

```
10.20.225.2(rw,root_squash) 1.2.0.0(ro)
```

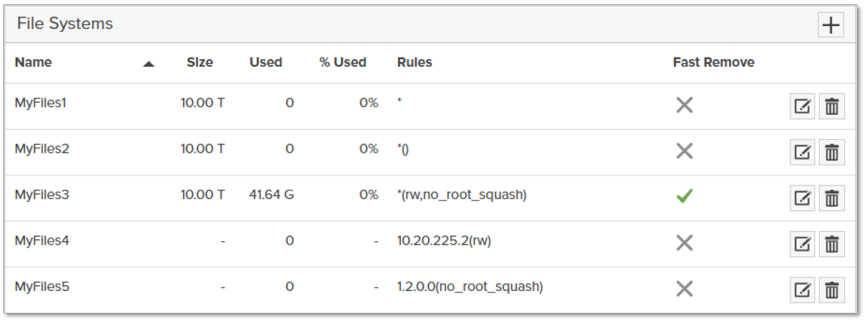
The following guidelines apply when creating NFS export rules:

- If rules are not defined during file system creation, then all clients will have **`rw`** access and **`no_root_squash`** privileges to the file system. This is equivalent to specifying export rule **`*(rw,no_root_squash)`**.

- Omitting the **(options)** portion of a rule is equivalent to specifying **(ro,root_squash)**. For example, an export rule that is defined as * will have **read-only, root_squash** access. This is equivalent to specifying export rule ***(ro,root_squash)**.
- If the rule is defined but one or more export options are not specified, then the undefined option(s) will default to **ro** access and **root_squash** privileges. For example, an export rule that is defined as ***(rw)** will have **root_squash** privileges. Likewise, an export rule that is defined as ***(no_root_squash)** will have **ro** access.
- A rule cannot include conflicting options. For example, **ro** and **rw** cannot be included in the same rule. Likewise, **root_squash** and **no_root_squash** cannot be included in the same rule.
- If a client IP address matches multiple rules, Elasticity uses the first rule it encounters in priority based on rule category. IP address rules have the highest priority. Specifically, the priority of matching rules is as follows: IP address > Netmask > Wildcard.
- If an address matches multiple rules in the same category, then the first (leftmost) rule applies.

Figure 4.2: Storage - Sample NFS Export Rules

Here is an example of a File System list output in the Storage page with various NFS export rules set for each file system created:



In the list output above, the NFS export rules are described as follows:

- * - All clients have default **ro** access and **root_squash** privileges to the file system.
- ***()** - All clients have default **ro** access and **root_squash** privileges to the file system.
- ***(rw,no_root_squash)** - All clients have **rw** access and **no_root_squash** privileges. This is the default rule used when creating a file system.
- **10.20.225.2(rw)** - All clients have **rw** access and **root_squash** (default) privileges.
- **1.2.0.0(no_root_squash)** - All clients have the **ro** (default) access and **no_root_squash** privileges.

File system rules can be changed at any time.

Fast Remove

When a directory and its contents are no longer required, they can be removed to reclaim space.

Removing the contents of a directory recursively by running the **rm -r** command causes the client to delete files one at a time. This can be a time consuming and expensive operation.

The fast remove feature allows you to quickly remove large directories by offloading this work onto the server. When the fast remove feature is enabled, a special pseudo-directory named **.fast-remove** is created in the root directory of the NFS mount. To remove a directory and its contents, run the **mv** command to move the directory into the **.fast-remove** directory.

In the following example, from the root directory of the NFS mount, a directory called **big_dir** is being moved into the **.fast-remove** directory.

```
mv big_dir/ .fast-remove/
```

Once a directory has been moved into the **.fast-remove** directory, it is immediately deleted, and through background operations, the space it occupied will be freed.

The fast remove feature can be enabled or disabled at any time. Fast remove is disabled by default.

After you enable the fast remove feature, view the contents of the root directory of the NFS mount to verify that the **.fast-remove** directory has been created.

For example,

```
//Run on the NFS mount to view the content of the root directory.
ls -al
drwxrwxrwx   1  root  root      0 Oct 30 10:46 .
drwxrwxrwx  25  root  root  12288 Jun 30 16:44 ..
drwxr-xr-x   1  root  root      0 Oct 30 11:27 .fast-remove
...
```

The **.fast-remove** directory cannot be renamed, deleted, or moved into other directories. The **.fast-remove** directory name is a reserved name, so you cannot create a regular directory named **.fast-remove**, regardless of the fast remove enabled/disabled status.

You cannot move individual files to the **.fast-remove** directory. To remove a file, either use the **rm** command or move the directory enclosing the file to the **.fast-remove** directory.

The **.fast-remove** directory can only be removed by disabling the fast remove feature.

The fast remove feature is powerful and comes with the following cautionary notes:

- Once a directory has been moved into the **.fast-remove** directory, it is no longer recoverable.
- With fast remove, users can remove any files that are contained in a directory that they can rename, even if they do not have read, write, or execute permissions on the child directories. This breaks from the standard UNIX permissions model. To restrict access to the **.fast-remove** directory, set the directory permissions.

By default, the **.fast-remove** directory permissions are set to **drwxr-xr-x**. These permissions can be changed to grant or restrict access to the **.fast-remove** directory. Disabling and then re-enabling the fast remove feature will reset the settings to the default permissions.

Process Steps

This section describes the steps on how to create and manage file systems through the Storage page of the Elasticity GUI.

Creating a file system

To create a file system for NFS export:

1. From the Settings > Network page, verify that a valid data virtual IP address (data vip) has been created. Exporting a file system requires at least one valid data virtual IP address (data vip).
2. From the Storage page, click **Add (+)** in the heading of the File Systems list. The Create File System pop-up window appears.
3. In the Name field, type the name of the directory to be exported.
4. In the Export Rules field, configure the NFS export rules to define the access rights and privileges a client has to the file system.
   The format is **`xxx.xxx.xxx.xxx(options)`** for IPv4 addresses, **`xxx.xxx.xxx.xxx/xx(options)`** for netmask, or **`*(options)`** to represent all clients. The **`options`** within parenthesis represents a comma-separated list of NFS export options. Valid export options are **`rw`**, **`ro`**, **`root_squash`**, and **`no_root_squash`**. For example, **`10.20.225.2(ro,root_squash)`**.

   For more information about export rules, refer to the *File System Rules* section.
5. In the Provisioned Size field, specify the provisioned size allocated to the file system. The size is a quota of space that helps gauge the fullness of the file system. If left blank, the provisioned size will default to an unlimited size.
6. To enable the ability to quickly remove large directories using the fast remove feature, click **Enable**.
7. Click **Create**.

Changing the NFS export rules of a file system

NFS export rule changes will be synchronously applied to all currently mounted clients.

To change the NFS export rules of a file system:

1. From the Storage page, click the **Edit** button in the row of the file system you want to edit. The Edit File System pop-up window appears.
2. In the Export Rules field, configure the NFS export rules to define the access rights and privileges a client has to the file system.
   The format is **`xxx.xxx.xxx.xxx(options)`** for IPv4 addresses, **`xxx.xxx.xxx.xxx/xx(options)`** for netmask, or **`*(options)`** to represent all clients. The **`options`** within parenthesis represents a comma-separated list of NFS export options. Valid export options are **`rw`**, **`ro`**, **`root_squash`**, and **`no_root_squash`**. For example, **`10.20.225.2(ro,root_squash)`**.

3. Click **Save**.

Changing the provisioned size of a file system

To change the provisioned size of a file system:

1. From the Storage page, click the **Edit** button in the row of the file system you want to edit. The Edit File System pop-up window appears.
2. In the Provisioned Size field, optionally set the size to any value between **`0`** and **`8191`** petabytes. If the field is left blank or set to **`0`**, the provisioned size will default to an unlimited size.
3. Click **Save**.

Enabling and disabling fast remove

Enable the fast remove feature to quickly remove large directories.

To enable or disable fast remove:

1. From the Storage page, click the **Edit** button in the row of the file system you want to edit. The Edit File System pop-up window appears.
2. Select one of the following options:
   - Click **Enable** to enable fast remove.
   - Click **Disable** to disable fast remove.
3. Click **Save**.
4. In the root directory of the NFS mount, confirm that a pseudo-directory named **`.fast-remove`** has been created.

   By default, the **`.fast-remove`** directory permissions are set to **`drwxr-xr-x`**. Optionally use **`chown`** or **`chmod`** to set the desired access permissions.

   To remove a directory, run the **`mv`** command to move the directory into the **`.fast-remove`** directory.

   Important note! Once a directory has been moved into the **`.fast-remove`** directory, it is immediately deleted and unrecoverable.

Deleting a file system

Once a file system has been deleted, it cannot be recovered, and all client connections to the file system are immediately terminated.

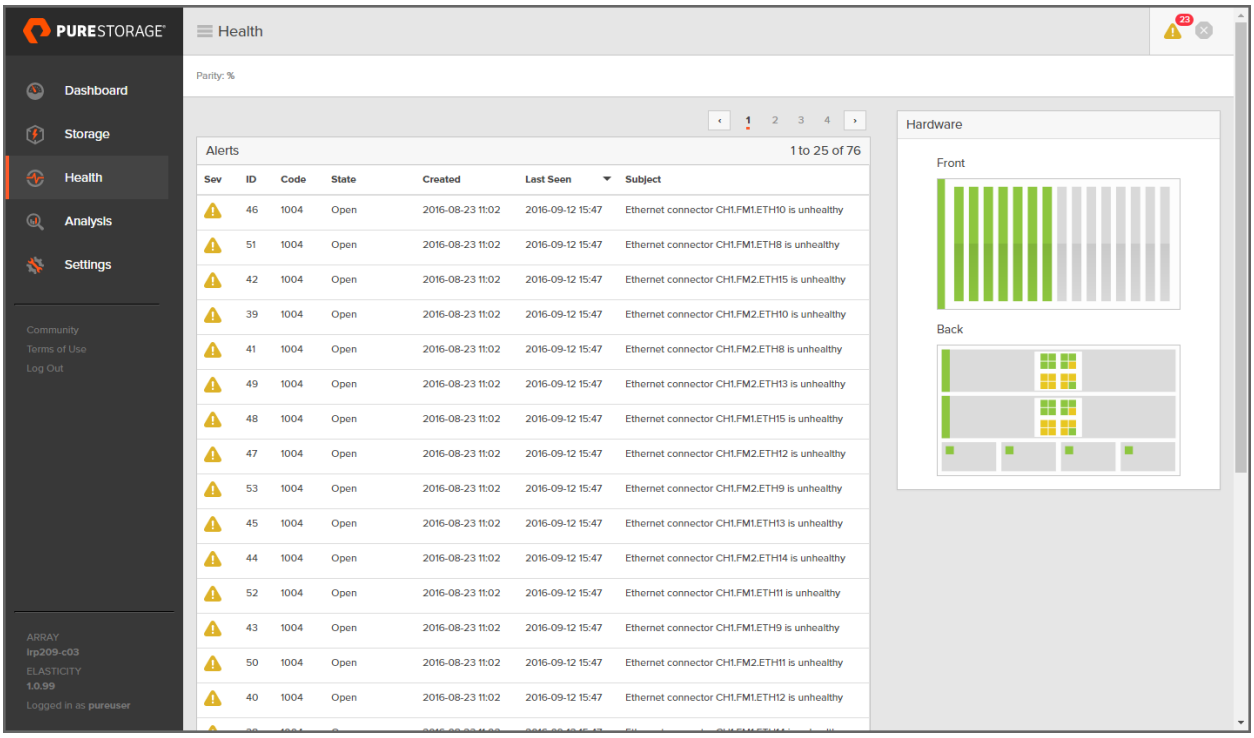
To delete a file system:

1. From the Storage page, click the **Delete** button in the row of the file system you want to delete. The Delete File System pop-up window appears.
2. Click **Delete**.

Chapter 5. Health

The Health page displays information to help gauge the health of the array.

Figure 5.1: Health



The Health page displays the following information:

- Parity
- Alerts
- Hardware

Parity

The parity value represents the percentage of data that is fully protected. The value will drop below 100% if the data isn't fully protected, such as when a blade is pulled and the array is rebuilding the data to bring it back to full parity.

Alerts

Elasticity generates an alert when there is a change to the array or to one of the Elasticity hardware or software components. The Alerts list displays a list of alerts that have been generated on the array. To conserve space, Elasticity stores a reasonable number of alert records on the array. Older entries are

deleted from the log as new entries are added. To access the complete list of messages, contact Pure Storage Support.

Elasticity assigns a unique numeric ID to each alert as it is created. By default, alerts are sorted in chronological descending order by "Last Seen" date.

The icons that appear along the left side of each alert in the list output represent the alert severity level:

- **Blue (INFO)** icons represent informational messages generated due to a change in state. INFO messages can be used for reporting and analysis purposes. No action is required.
- **Yellow (WARNING)** icons represent important messages warning of an impending error if action is not taken.
- **Red (CRITICAL)** icons represent urgent messages that require immediate attention.

Click any of the column headings to change the sort order.

Each alert in the list output includes the following information:

- **Severity**: Alert severity, categorized as **`critical`**, **`warning`**, or **`info`**.
  Critical alerts are typically triggered by service interruptions, major performance issues, or risk of data loss, and require immediate attention. For example, Elasticity triggers a critical alert if a FlashBlade has been removed from the chassis.

  Warning alerts are of low to medium severity and require attention, though not as urgently as critical alerts. For example, Elasticity triggers a warning alert if it detects an unhealthy FlashBlade.

  Informational (Info) alerts inform users of a general behavior change and require no action. For example, Elasticity triggers an informational alert if the NFS service is unhealthy.
- **ID**: Unique number assigned by the array to the alert. ID numbers are assigned to alerts in chronological ascending order.
- **Code**: Pure Storage alert code number that identifies the type of alert event.
- **State**: Current state of the alert. Possible states include: **`open`**, **`closed`**, **`closing`**, and **`waiting to downgrade`**.
  An alert goes from **`open`** state to **`close`** state when the issue is completely resolved, such as when a blade has been removed from the chassis. If the blade is then reinserted and pulled again, a new alert will be generated.

  Certain alerts are generated due to intermittent issues. Examples include temperature sensors reporting values outside of normal operating range and space usage exceeding certain capacity thresholds. These types of alerts can go from **`open`** state to **`closing`** or **`waiting to downgrade`** states.

  And alert goes from **`open`** state to **`closing`** state when it is no longer an issue. After the alert remains in **`closing`** state for 24 hours without change, it goes into **`closed`** state.

  An alert goes from **`open`** state to **`waiting to downgrade`** state when the issue becomes less severe. After the alert remains in **`waiting to downgrade`** state for 24 hours without change, the alert severity is downgraded. For example, when array capacity reaches 100%, a critical

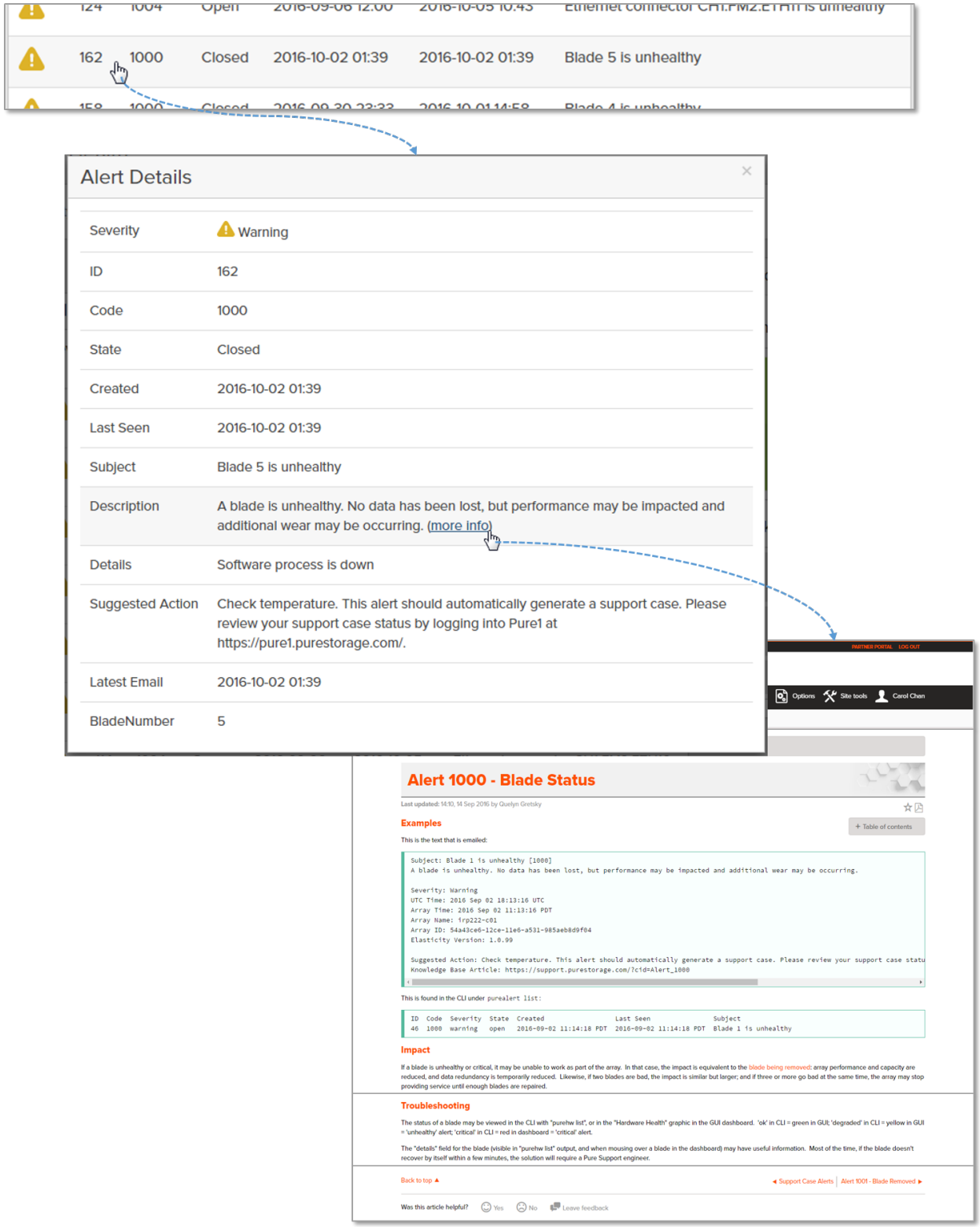
alert is issued with an **open** state. When array capacity drops below 100%, the alert changes to **`waiting to downgrade`** state. After the array has remained at less than 100% but more than 90% capacity for 24 hours, the alert severity is downgraded to **`warning`**.

- **Created**: Date and time the alert was first generated and initial alert email notifications were sent to alert watchers.
- **Last Seen**: Most recent date and time Elasticity saw the issue that generated the alert.
- **Subject**: Alert details.

Click anywhere in an alert row to display the alert details.

Figure 5.2: Health - Alerts - Alert Details

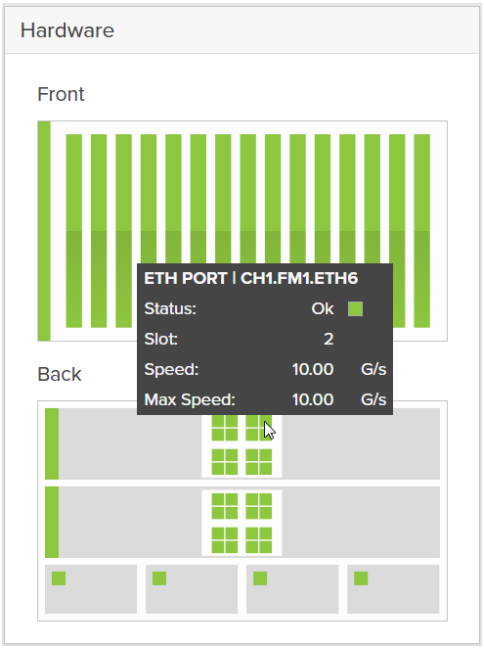
Click an alert row to display a detailed description of the alert and suggested actions. Some alert detail descriptions, such as the one in the following example, include a "more info" link providing additional information about the alert through the Pure Storage Knowledge Base.



Hardware

The Hardware Health panel graphically displays the status of the array hardware components. The view is a schematic representation of the array with colored indicators of each component's status.

Figure 5.3: Health - Hardware Panel (Front and Back Views)



The colors within each hardware component represent the component status:

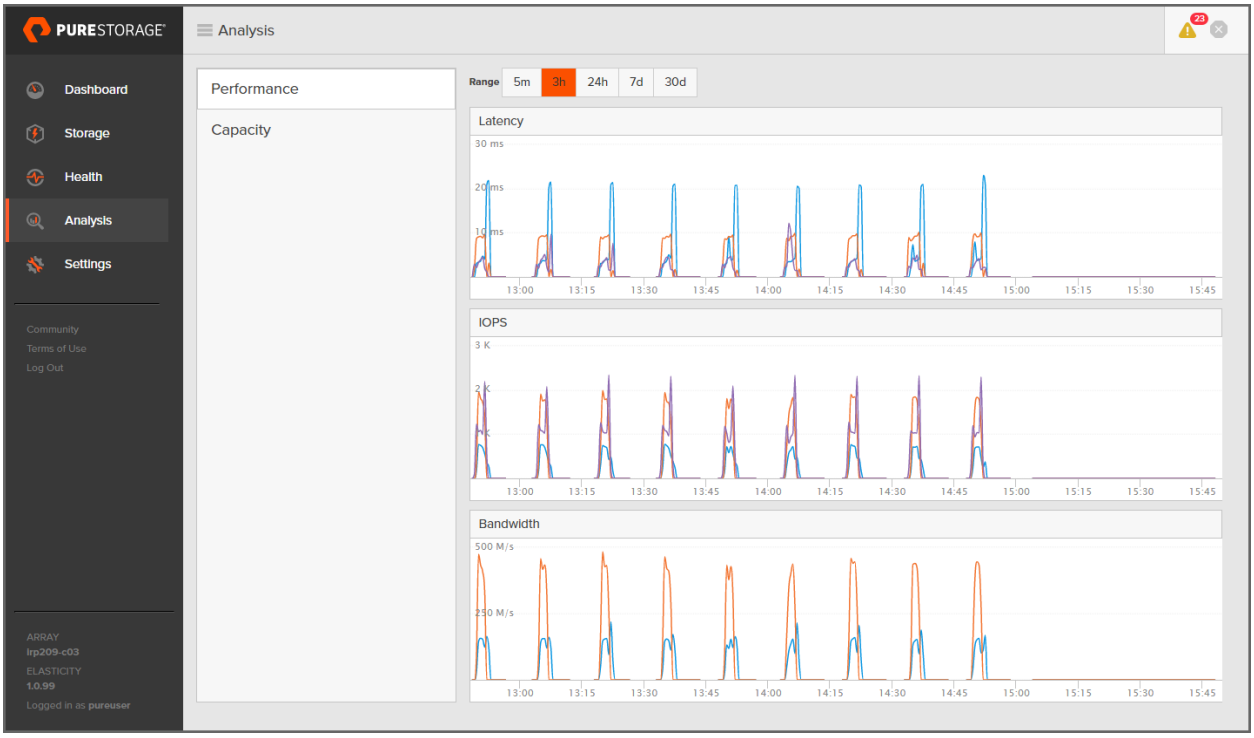
- **Green**: Healthy and functioning properly.
- **Yellow**: Unhealthy, identifying, or unrecognized.
- **Red**: Critical or unknown.
- **Gray**: Disconnected, unsed, or unclaimed.

Hover the mouse over a hardware component to display its status and details.

Chapter 6. Analysis

The Analysis page displays historical array data, such as I/O performance trends and storage capacity and consumption data.

Figure 6.1: Analysis



Performance

The Performance panel displays a series of rolling charts consisting of real-time capacity and performance metrics; the incoming data appear along the right side of each graph as older numbers drop off the left side.

The curves in each chart are comprised of a series of individual data points. Hover over any part of a chart to display values for a specific point in time. The values that appear in the point-in-time tooltips are rounded to two decimal places.

By default, the performance charts display data for the past 3 hours. Click the range buttons to view performance data from as recently as 5 minutes to as far back as 30 days. To further zoom into a time range, from inside the chart, click and drag from the desired start time to the desired end time.

The following example displays the IOPS statistics on the array at precisely **`1:46:00`** on **`September 26`**.

The Performance panel includes the Latency, IOPS, and Bandwidth charts.

Latency

The Latency chart displays the average latency times for various operations.

- **Read Latency (R)** - Average arrival-to-completion time, measured in milliseconds, for a read operation.
- **Write Latency (W)** - Average arrival-to-completion time, measured in milliseconds, for a write operation.
- **Other Latency (O)** - Average arrival-to-completion time, measured in milliseconds, for all other metadata operations.

IOPS

The IOPS (Input/output Operations Per Second) chart displays I/O requests processed per second by the array. This metric counts requests per second, regardless of how much or how little data is transferred in each.

- **Read IOPS (R)** - Number of read requests processed per second.
- **Write IOPS (W)** - Number of write requests processed per second.
- **Other IOPS (O)** - Number of metadata operations processed per second.
- **Average IO Size** - Average I/O size per request processed. Requests include reads and writes.

Bandwidth

The Bandwidth chart displays the number of bytes transferred per second to and from all file systems. The data is counted in its expanded form rather than the reduced form stored in the array to truly reflect what is transferred over the storage network. Metadata bandwidth is not included in these numbers.

- **Read Bandwidth (R)** - Number of bytes read per second.
- **Write Bandwidth (W)** - Number of bytes written per second.

Note about the Performance Charts

The Dashboard and Analysis pages display the same latency, IOPS, and bandwidth performance charts, but the information is presented differently between the two pages.

In the Dashboard page:

- The performance charts are updated once every second.
- The performance charts display up to 5 minutes of historical data.

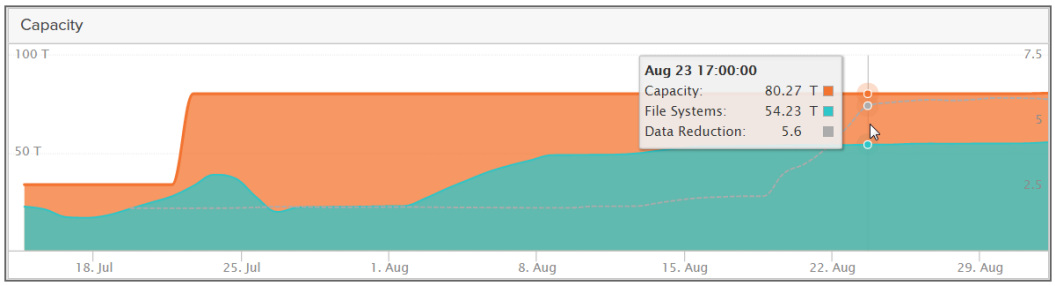
In the Analysis page:

- At its shortest range (5m), the performance charts are updated once every second. As the range increases, the update frequency (and resolution) decreases.
- The performance charts display up to 30 days of historical data.

Capacity

The Capacity graph displays the following array-wide capacity and consumption information:

- **Capacity**: Total usable capacity of the array.
- **File Systems**: Amount of space that the written data occupies on the array after reduction via data compression.
- **Data Reduction**: Ratio of the size of the written data versus the amount of space the data occupies after data compression.



Hover over any part of a chart to display values for a specific point in time. The size values that appear in the point-in-time tooltips are rounded to two decimal places.

Chapter 7. Settings

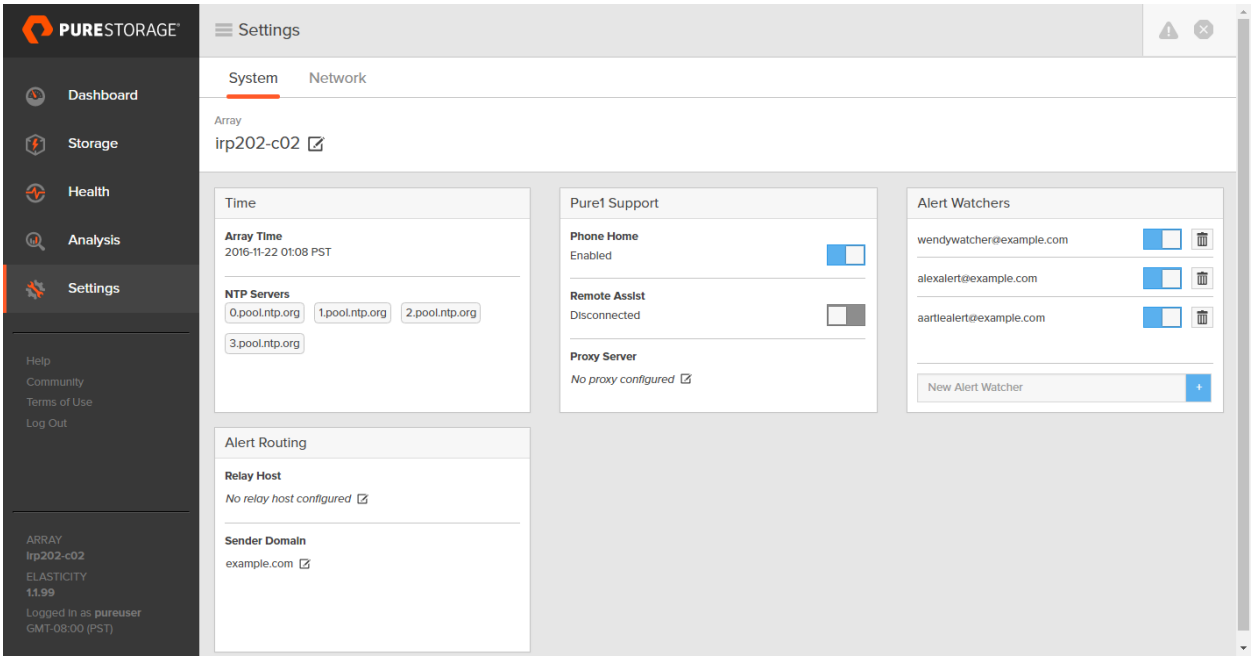
The Settings page displays and manages the general attributes and network settings of an array.

System

The **Settings > System** page displays and manages the general attributes of the FlashBlade array.

The page is made up of panels to view and configure NTP servers, Pure Storage support settings, and alert settings.

Figure 7.1: Settings - System Page



Time

The Time panel displays and manages the time settings for the array.

Array Time

The array time is based on the time zone of the array, which is set during FlashBlade installation.

The array time zone is not related to the user's local time zone that appears in the bottom-left corner of the Navigation pane. The user's local time zone is determined by the browser's local time.

Elasticity CLI dates and times are displayed in the time zone of the array, while Elasticity GUI dates and times are displayed in the local user's time zone.

NTP Servers

The NTP Servers panel displays the hostnames or IP addresses of the Network Time Protocol (NTP) servers that are currently being used by the array to maintain reference time. The installation technician sets the proper time zone for an array when it is installed. During operation, arrays maintain time synchronization by interacting with the NTP server (by default, time.purestorage.com). Up to four (4) NTP server IP addresses or hostnames can be assigned to the array.

To change the NTP servers on the array, contact a member of the Pure Storage account team or email Pure Storage Support at **<support@purestorage.com>**.

Pure1 Support

The Pure1 Support panel displays and manages the features used to communicate with Pure Storage Support.

Phone Home Facility

The phone home facility allows the array to transmit log and diagnostic information to Pure Storage Support via a secure network connection.

The phone home facility can be enabled and disabled at any time. The current phone home status appears just below the Phone Home label.

Remote Assistance (RA) Sessions

In some cases, the most efficient way for Pure Storage Support to service a FlashBlade array or diagnose problems is through direct access to the array. A remote assistance (RA) session grants Pure Storage Support direct and secure access to the array through a reverse tunnel which you, the administrator, open. This is a two-way communication.

Opening an RA session gives Pure Storage Support the ability to log into the array, effectively establishing an administrative session. Once the RA session is successfully established, the array returns connection details, including the date and time when the session was opened, the date and time when the session expires, and the proxy status (true, if configured).

After the Pure Storage Support team has performed all of the necessary diagnostic or maintenance functions, close the RA session to terminate the connection.

RA sessions can be opened and closed at any time. The current status of the Remote Assistance session appears just below the Remote Assistance label.

An open RA session automatically terminates (closes) after two days have lapsed.

Proxy Hostnames

The proxy hostname, if set, represents the server to be used as the HTTP or HTTPS proxy. The format for the proxy host name is **`http(s)://hostname:port`**, where **`hostname`** is the name of the proxy host, and **`port`** is the TCP/IP port number used by the proxy host.

Alert Watchers

Elasticity generates an alert whenever the health of a component degrades or a capacity threshold is reached. Alerts can also be sent as email notifications to designated alert watchers.

The Alert Watchers panel displays the email addresses of designated alert watchers and the alert status of each watcher. The sending account name for Elasticity alert email notifications is the array name at the configured sender domain.

Once added, an alert watcher will start receiving alert email notifications.

Alert watchers can be in enabled or disabled status. Alert watchers who are in enabled status receive alert email notifications. When an alert watcher is created, its watcher status is automatically set to enabled status. Alert watchers who are in disabled status do not receive alert email notifications. Disabling an alert watcher does not delete the recipient's email address - it only stops the watcher from receiving alert notifications. Alert watchers can be enabled and disabled at any time. The current alert watcher status is determined by the color of the toggle button that appears next to the alert watcher email address, where blue represents an enabled alert watcher and gray represents a disabled alert watcher.

Deleting an alert watcher completely removes the watcher from the list. Once an email address has been deleted, the corresponding alert watcher will no longer receive alert notifications.

Alert Routing

The Alert Routing panel displays the ways in which alerts and logs are managed.

Relay Host

The relay host represents the hostname or IP address of the email relay server currently being used as a forwarding point for alert email notifications generated by the array. If a relay host is not configured, Elasticity sends all alert email notifications directly to the recipient addresses rather than route them via the relay (mail forwarding) server.

Sender Domain

The sender domain determines how logs are parsed and treated by Pure Storage Support and Escalations. The domain name is also used in the "from" address of outgoing alert email notifications. The domain name must be set to your company's domain name. For example, **`mydomain.com`**

Process Steps

Renaming the array

1. Select **Settings > System**.
2. Click the edit icon next to the current array name. The array name becomes an editable box.
3. In the editable box, type the new array name.
4. Click the check mark icon to confirm the change.

Enabling and disabling phone home

1. Select **Settings > System**.

2. In the Phone Home section of the Pure1 Support panel, click the toggle button to switch between enabled (blue) and disabled (gray) status. Enabling phone home allows the array to transmit log and diagnostic information to Pure Storage Support.

Opening and closing a remote assistance (RA) session

1. Select **Settings > System**.
2. In the Remote Assistance section of the Pure1 Support panel, click the toggle button to open (blue) and close (gray) an RA session. Opening an RA session gives Pure Storage Support direct and secure access to the array.

Configuring the proxy host name

1. Select **Settings > System**.
2. Click the edit icon next to the current proxy host name. If a proxy host name has not been configured, double click the text, *No proxy configured*. The field becomes an editable box.
3. In the editable box, type the proxy host name.
   The format for the host name is **`http(s)://hostname:port`**, where **`hostname`** is the name of the proxy host, and **`port`** is the TCIP/IP port number used by the proxy host.
4. Click the check mark icon to confirm the change.

Deleting the proxy host name

1. Select **Settings > System**.
2. In the Proxy Server section of the Pure1 Support panel, click the edit icon next to the current proxy host name. The proxy host name becomes an editable box.
3. Delete the proxy host name.
4. Click the check mark icon to confirm the deletion.

Adding an alert watcher

1. Select **Settings > System**.
2. In the Alert Watchers panel, type the email address of the alert watcher.
3. Click the Add button to add the email address to the list of alert watchers. Once added, the alert watcher immediately starts receiving alert email messages.

Enabling and disabling an alert watcher

1. Select **Settings > System**.
2. In the Alert Watchers panel, click the toggle button to enable (blue) and disble (gray) an alert watcher. Once enabled, an alert watcher starts receiving alert email notifications.

Deleting an alert watcher

1. Select **Settings > System**.

2. In the Alert Watchers panel, click the delete icon next to the alert watcher you want to delete.

Configuring the SMTP relay host

1. Select **Settings > System**.
2. In the Alert Routing panel, click the edit icon next to the current relay host name or IP address. If the relay host name has not been configured, double click the text, *No relay host configured*. The field becomes an editable box.
3. In the editable box, type the host name or IP address of the email relay server that is to be used as the forwarding point for alert email notifications generated by the array.
4. Click the check mark icon to confirm the change.

Deleting the SMTP relay host

1. Select **Settings > System**.
2. In the Alert Routing panel, click the edit icon next to the relay host name or IP address. The host name or IP address becomes an editable box.
3. Delete the host name or IP address.
4. Click the check mark icon to confirm the deletion.

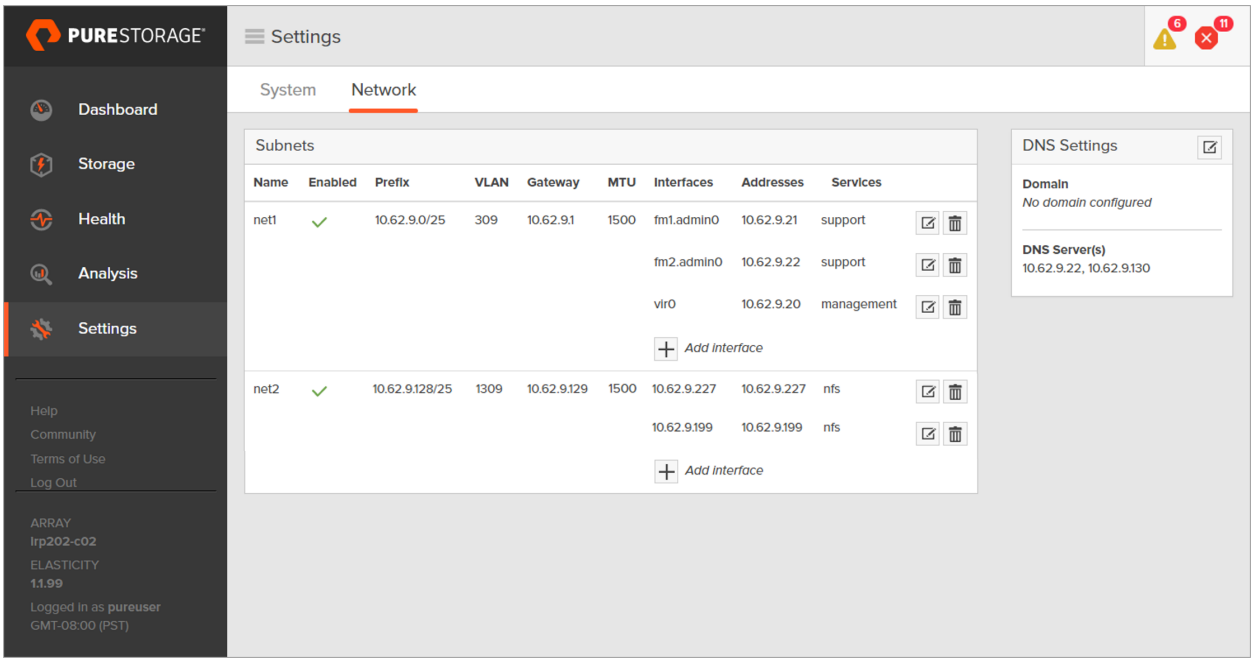
Configuring the sender domain

1. Select **Settings > System**.
2. In the Alert Routing panel, click the edit icon next to the current sender domain name. The field becomes an editable box.
3. In the editable box, type the sender domain name. The domain name must be set to your company's domain name. For example, **`mydomain.com`**.
4. Click the check mark icon to confirm the change.

Network

The **Settings > Network** page displays and manages the subnets and data vips required for file system export.

Figure 7.2: Settings - Network Page

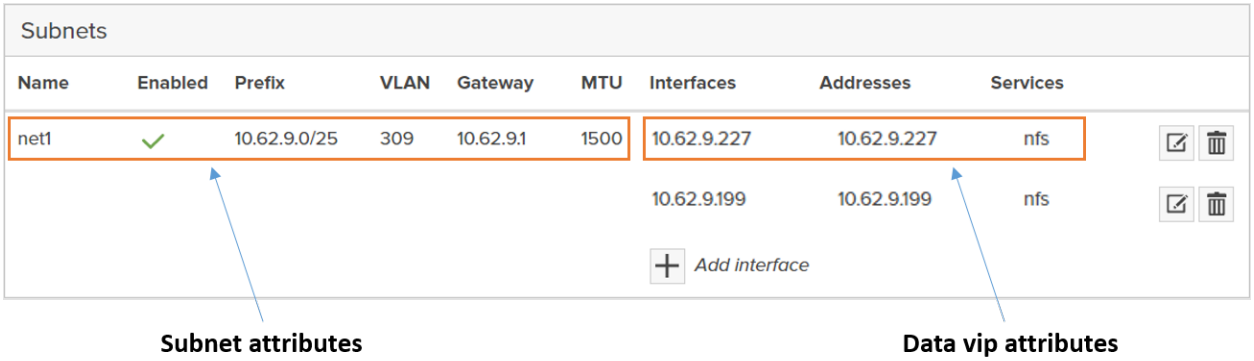


Subnets

In the FlashBlade array, data virtual IP addresses (data vips) are organized into subnetworks (subnets). Exporting a file system requires a data vip which, in turn, must be attached to a subnet. Data vips that share the same network prefix and gateway, if any, are grouped into the same subnet.

The Subnets list displays the subnets on the array. Attached to each subnet are the data virtual IP addresses (data vips) that are used to export file systems.

In the following example, data vips **`10.62.9.277`** and **`10.62.9.199`** are attached to subnet **`net2`**.



Each subnet in the list includes the following information:

- **Name**: Subnet name.
- **Enabled**: Subnet status. When a subnet is enabled, the data vips within the subnet that are enabled are automatically available and ready to connect. Data vips within the subnet that are in disabled status remain disabled and cannot be reached. Newly created subnets are automatically enabled.
- **Prefix**: IP address of the subnet prefix, and subnet prefix length. The subnet prefix is in the format **`ddd.ddd.ddd.ddd`**. The subnet prefix length defaults to 24.
- **VLAN**: VLAN ID number.
- **Gateway**: IP address of the gateway through which the data vip communicates with the network. The IP address is in the format **`ddd.ddd.ddd.ddd`**.
- **MTU**: Maximum transmission unit (MTU) for the data vip, in bytes.
- **Interfaces**: Data virtual IP address (data vip).
- **Addresses**: Management address associated with the data vip. The IP address is in the format **`ddd.ddd.ddd.ddd`**.
- **Services**: Service types for which the data vip is configured. The supported service for data vips is **`nfs`**.

Subnets are created, configured, and deleted by Pure Storage representatives. To create, modify, or delete a subnet, contact a member of the Pure Storage account team or email Pure Storage Support at **`<support@purestorage.com>`**. Creating a subnet requires a prefix and VLAN interface, so have this information ready in advance.

Before creating a data vip, verify the subnet with the correct network prefix, VLAN ID, and gateway, if any, appears in the list output. To be reachable, a data vip requires an address, which represents the management address to be associated with the data vip. The data vip must also be configured with the service type **`nfs`**.

Once the data vip is created, it inherits the gateway, if any, and VLAN ID from the subnet. Likewise, the subnet inherits the **`nfs`** service type from the data vip.

After the data vip has been created, the next step is to export and mount the file systems. Files systems are created and configured through the Storage page.

DNS Settings

The DNS Settings panel displays and manages the DNS attributes for an array's administrative network.

Domain

The DNS domain represents the domain suffix to be appended by the array when performing DNS lookups. For example, **`mydomain.com`**.

DNS Server(s)

The DNS servers manages the DNS domains that are configured for the array. Each DNS domain can include up to three static DNS server IP addresses. Elasticity queries the DNS servers in the order in which the IP addresses are listed in this option.

Process Steps

Creating a data vip

1. Select **Settings > Network**.
2. In the Subnets list, find the subnet with the correct network prefix, VLAN ID, and gateway, if any. The data vip will be attached to this subnet for file export purposes. If none of the subnets meet your requirements, contact a member of the Pure Storage account team or email Pure Storage Support at **<support@purestorage.com>**.
3. Click the Add interface button (under the Interfaces column) belonging to the subnet to which the data vip will be attached. The Create Network Interface pop-up window appears.
4. In the Name field, type the name of the data vip.
5. In the Address field, type the management address to be associated with the data vip.
6. In the Services field, leave the service type as **nfs**.
7. In the Subnet field, leave the subnet name as the default.
8. Click **Create**.

Deleting a data vip

1. Select **Settings > Network**.
2. In the Subnets list, click the Delete Interface button next to the data vip you want to delete.

Configuring the DNS domain

1. Select **Settings > Network**.
2. In the DNS Settings panel, click the Edit button. All of the fields in the DNS Settings panel become editable boxes.
3. In the Domain field, type the domain suffix to be appended by the array when doing DNS lookups. For example, **mydomain.com**.
4. Click **Save**.

Configuring the DNS servers

The DNS servers manage the DNS domains that are configured for the array.

1. Select **Settings > Network**.

2. In the DNS Settings panel, click the Edit button. All of the fields in the DNS Settings panel become editable boxes.
3. In the DNS # fields, specify up to three DNS server IP addresses for Elasticity to use to resolve hostnames to IP addresses. Enter one IP address in each DNS # field. Elasticity queries the DNS servers in the order that the IP addresses are listed.
4. Click **Save**.

Part 3:
Using the Elasticity CLI to Administer a FlashBlade Array

Chapter 8. Overview

Elasticity is the operating environment that queries and manages the FlashBlade hardware, networking, and storage components. The Elasticity software is distributed with the FlashBlade array.

Elasticity provides two ways to administer the FlashBlade: through the browser-based graphical user interface (Elasticity GUI), and through the command-driven interface (Elasticity CLI).

The Elasticity command line interface (CLI) is a non-graphical, command-driven interface used to query and administer the FlashBlade.

This chapter covers general Elasticity CLI concepts and conventions.

CLI Command Syntax

The Elasticity CLI is comprised of built-in commands specific to the Elasticity operating environment.

Elasticity CLI commands have the general form:

```
command subcommand --options OBJECT-LIST
```

The parts of a command are:

COMMAND
Type of FlashBlade object to be acted upon, prefixed by "pure". For example, the **purefs** command acts on Elasticity file systems. Run the **purehelp** command to see a list of Elasticity CLI commands.

SUBCOMMAND
Action to be performed on the specified object. Most CLI subcommands are common to some or all object types. For example, **puresubnet list** lists all subnets on the array.

OPTIONS
Options that specify attribute values or modify the action performed by the subcommand.
For example, in the following command, the **--size** option sets the provisioned size of file system **MyFiles** to 100 gigabytes.

```
purefs setattr --size 100G MyFiles
```

OBJECT-LIST
Object or list of objects upon which the command is to be operated. If a subcommand changes the object state, then at least one object must be specified. Examples of subcommands that change the object state include **create**, **delete**, and **setattr**. For example, **purefs create MyFiles** creates file system **MyFiles**. In the command synopses, OBJECT specifications that are not enclosed in square brackets (for example, ***NAME*** in **purenetwork** commands) represent ones that are required.
Passive subcommands, such as **list**, which do not change object state, do not require object specification. Leaving out the object is equivalent to specifying all objects of the type. For

example, **purefs list** with no file systems specified displays information about all file systems in an array. In the command synopses, OBJECT specifications enclosed in square brackets (for example, ***[NAME]***) represent ones that are optional.

Most subcommands act on a single object. For example, in the following command, the **create** subcommand can only be run on a single file system to change the attributes of that file system.

```
purefs setattr --size 10T MyFiles
```

Certain subcommands can operate on multiple objects. For example, the following command creates two alert watchers.

```
purealert create watcher wendywatcher@example.com walterwatcher@example.com
```

In the command synopses, OBJECT specifications that take in a list of objects are appended with ellipses (for example, ***ADDRESS...***).

The following list describes the conventions used in CLI documentation:

- Text in fixed-width (Courier) font must be entered exactly as shown. For example, **puresubnet list**.
- Text not enclosed in brackets represents mandatory text.
- Text inside square brackets ("[ ]") represents optional items. Do not type the brackets.
- Text inside curly braces ("{ }") represents text, where one (and only one) item must be specified. Do not type the braces.
- The vertical bar (|) separates mutually exclusive items.
- Uppercase italic text represents entered text whose value is based on the nature of the subcommand or option. For example, **--size *SIZE***, where SIZE represents the value to be entered, such as **10T**.

CLI Login

Log in to the Elasticity CLI to query and administer the FlashBlade. Logging in to the Elasticity CLI requires a virtual IP address or fully-qualified domain name (FQDN) and a login username and password; this information is determined during the FlashBlade installation.

The Elasticity release comes with a single *pureuser* administrative account, which is installed with the array. The *pureuser* account is password protected and cannot be renamed or deleted. If you do not know the password to your *pureuser* account, contact a member of the Pure Storage account team or email Pure Storage Support at **<support@purestorage.com>**.

Logging in to the Elasticity CLI

To log in to the Elasticity CLI, select one of the following two options:

- **UNIX.** Start a secure shell (SSH) session and connect to the array IP address provided by your Pure Storage account team. Log in to Elasticity with the *pureuser* username/password combination.

- **Windows.** Start a remote terminal emulator (such as PuTTY) and connect to the array IP address provided by your Pure Storage account team. Log in to Elasticity with the *pureuser* username/password combination.

Type `exit` or `logout` to log out of Elasticity and exit the shell or terminal emulator.

CLI Command Help

CLI command help is available at both the command and subcommand levels. To use it, type the Elasticity CLI command or subcommand followed by `-h` or `--help`. The command with the **`-h`** or **`--help`** switch displays usage information, supported syntax, and a list of subcommands for the specified command. To get help information for an Elasticity command, type:

```
COMMAND -h
```

For example,

```
$ purefs -h
usage: purefs [-h] {create,delete,list,setattr} ...
positional arguments:
  {create,delete,list,setattr}
    create              create a file system
    setattr             modify a file system
    delete              delete one or more file system(s)
    list                list file systems
```

The command with the **`-h`** or **`--help`** switch displays usage information, supported syntax, and a list of options for the specified subcommand. To get help information for an Elasticity subcommand, type:

```
COMMAND SUBCOMMAND -h
```

For example,

```
$ purefs list -h
usage: purefs list [-h] [--cli | --csv | --nvp] [--notitle] [FILE-SYSTEM ...]
positional arguments:
  FILE-SYSTEM  file system name(s)
optional arguments:
  -h, --help   show this help message and exit
  --cli        display as CLI commands
  --csv        display as comma-separated values
  --nvp        display as name-value pairs
  --notitle    hide column titles
```

Elasticity CLI Commands

This section describes each of the Elasticity CLI commands.

pureadmin

pureadmin, pureadmin-setattr — manages the administrative accounts

Synopsis

```
pureadmin setattr [--password] [USER...]
```

Arguments

USER
User login name.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

`--password`
Changes the user password.

Description

The current Elasticity release comes with a single local, password-protected administrative account named *pureuser*.

Run the **`pureadmin setattr --password`** command to change the user password. The old (current) and new passwords are entered interactively. Press **`Enter`** after typing each password.

The CLI prompts once for the old password, and then twice for the new password. The password can be a maximum of 100 characters in length and include any character that is entered from a US keyboard.

Examples

Example 1

```
pureadmin setattr --password pureuser
```

Changes the password for the pureuser administrative account. Type the old (current) password, and then press **`Enter`**. Type the new password, and then press **`Enter`**. Type the new password again, and then press **`Enter`**.

See Also

purearray(1) [61], puresupport(1) [92]

Author

Pure Storage Inc. **`<documentfeedback@purestorage.com>`**

purealert

purealert, purealert-create, purealert-delete, purealert-disable, purealert-enable, purealert-list, purealert-test — manages alert history and the list of designated alert watchers to which Elasticity sends email notifications when significant events occur in an array

Synopsis

```
purealert create { watcher } ADDRESS...
purealert delete { watcher } ADDRESS...
purealert disable { watcher } ADDRESS...
purealert enable { watcher } ADDRESS...
purealert list [ --csv | --nvp ] [--notitle] [--watcher] [ID...]
purealert test { watcher } [ADDRESS...]
```

Arguments

ADDRESS
Any valid email address.

ID
Unique, numeric ID assigned by the array to each alert.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

Options that control display format:

`--csv`
Lists information in comma-separated value (CSV) format. The **`--csv`** output can be used for scripting purposes and imported into spreadsheet programs.

`--notitle`
Lists information without column titles.

`--nvp`
Lists information in name-value pair (NVP) format, in the form **`ITEMNAME=VALUE`**. Argument names and information items are displayed flush left. The **`--nvp`** output is designed both for convenient viewing of what might otherwise be wide listings, and for parsing individual items for scripting purposes.

`--watcher`
Displays the email addresses of designated alert watchers and the alert status (enabled or disabled) of each watcher.

Description

Elasticity generates an alert whenever the health of a component degrades or a capacity threshold is reached. Alerts can also be sent as email notifications to designated alert watchers.

The `purealert` command displays and manages the alerts that are generated by Elasticity.

Viewing Alerts

The `purealert list` command displays a list of all alerts on the FlashBlade array that have been generated by a hardware, software, or array event. Each alert in the list output includes the following information:

- **ID**: Unique number assigned by the array to the alert. ID numbers are assigned to alerts in chronological ascending order.
- **Code**: Pure Storage alert code number that identifies the type of alert event.
- **Severity**: Alert severity, categorized as **`critical`**, **`warning`**, or **`info`**.
  Critical alerts are typically triggered by service interruptions, major performance issues, or risk of data loss, and require immediate attention. For example, Elasticity triggers a critical alert if a FlashBlade has been removed from the chassis.

  Warning alerts are of low to medium severity and require attention, though not as urgently as critical alerts. For example, Elasticity triggers a warning alert if it detects an unhealthy FlashBlade.

  Informational (Info) alerts inform users of a general behavior change and require no action. For example, Elasticity triggers an informational alert if the NFS service is unhealthy.
- **State**: Current state of the alert. Possible states include: **`open`**, **`closed`**, **`closing`**, and **`waiting to downgrade`**.
  An alert goes from **`open`** state to **`close`** state when the issue is completely resolved, such as when a blade has been removed from the chassis. If the blade is then reinserted and pulled again, a new alert will be generated.

  Certain alerts are generated due to intermittent issues. Examples include temperature sensors reporting values outside of normal operating range and space usage exceeding certain capacity thresholds. These types of alerts can go from **`open`** state to **`closing`** or **`waiting to downgrade`** states.

  And alert goes from **`open`** state to **`closing`** state when it is no longer an issue. After the alert remains in **`closing`** state for 24 hours without change, it goes into **`closed`** state.

  An alert goes from **`open`** state to **`waiting to downgrade`** state when the issue becomes less severe. After the alert remains in **`waiting to downgrade`** state for 24 hours without change, the alert severity is downgraded. For example, when array capacity reaches 100%, a critical alert is issued with an **`open`** state. When array capacity drops below 100%, the alert changes to **`waiting to downgrade`** state. After the array has remained at less than 100% but more than 90% capacity for 24 hours, the alert severity is downgraded to **`warning`**.

- **Created**: Date and time the alert was first generated and initial alert email notifications were sent to alert watchers.
- **Last Seen**: Most recent date and time Elasticity saw the issue that generated the alert.
- **Subject**: Alert details.

Add the `--watcher` option to display a list of email recipients that have been designated as alert watchers.

Creating Alert Watchers

An alert watcher is an email recipient who has been designated to receive email notifications every time an alert is generated on the array. The sending account name for Elasticity alert email notifications is the array name at the configured sender domain.

Run the `purealert create watcher` command to add alert watchers. The **ADDRESS** argument that must be included in the command represents the alert watcher's email address. Before adding an alert watcher, verify that alert notifications can reach the watcher's destination email address by sending a test message using the `purealert test watcher` command with the **ADDRESS** argument.

Once added, an alert watcher start receiving alert email notifications.

To view a list of alert watchers, run the `purealert list --watcher` command.

Sending Test Messages

The `purealert test watcher` command tests an array's ability to send email notifications to alert watchers, designated or not. Two types of test messages can be issued:

- Before creating an alert watcher, send a test message to the alert watcher's email address to ensure alert notifications can reach the intended destination. To do this, run `purealert test watcher` with the **ADDRESS** argument.
- At any time, send a test message to all of the enabled alert watchers to ensure alert notifications reach their intended destinations. To do this, run `purealert test watcher`.

Running the `purealert test watcher` command returns the following information for each alert watcher:

- **Accepted**: Indicates whether the test message has successfully left the array. An Accepted status of `True` indicates that the test message has successfully left the array. If the Accepted status is `False`, see the Error column for the reason why the test message failed.
- **Error**: Reason why the test message failed to leave the array.

Enabling and Disabling Alert Watchers

Alert watchers can be in enabled or disabled status.

Alert watchers who are in enabled status receive alert email notifications. When an alert watcher is created, its watcher status is automatically set to enabled status.

Alert watchers who are in disabled status do not receive alert email notifications. Disabling an alert watcher does not delete the recipient's email address - it only stops the watcher from receiving alert notifications.

Enable and disable alert watchers at any time by running the respective **`purealert enable watcher`** and **`purealert disable watcher`** commands.

To view a list of alert watchers and their enabled/disabled statuses, run the **`purealert list --watcher`** command.

Deleting Alert Watchers

The **`purealert delete watcher`** command deletes an alert watcher's email address. Once an email address has been deleted, the corresponding alert watcher will no longer receive alert notifications.

Examples

Example 1

```
purealert list
```

Displays a list of all alerts on the FlashBlade array that have been generated by a hardware, software, or array event.

Example 2

```
purealert list --watcher
```

Displays a list of alert watchers that have been created on the array and the enabled/disabled status of each watcher.

Example 3

```
purealert test watcher walterwatcher@example.com
purealert create watcher walterwatcher@example.com
purealert test watcher
```

Sends a test message to **walterwatcher@example.com**. After verifying receipt of the test message by **walterwatcher@example.com**, designates **walterwatcher@example.com** as a watcher to receive Elasticity alert notifications. Sends a test message to all enabled watchers, including **walterwatcher@example.com**.

Example 4

```
purealert delete watcher wendywatcher@example.com alexalert@example.com
```

Removes **wendywatcher@example.com** and **alexalert@example.com** as alert watchers. Alert notifications will no longer be sent to **wendywatcher@example.com** and **alexalert@example.com**.

Example 5

```
purealert disable watcher aartiealert@example.com
```

Prevents Elasticity from sending alert notifications to alert watcher **aartiealert@example.com**.

See Also

purearray(1) [61], puresupport(1) [92]

Author

Pure Storage Inc. **<documentfeedback@purestorage.com>**

purearray

purearray, purearray list, purearray rename, purearray setattr — displays and manages the array attributes
purearray-monitor — monitors array I/O performance

Synopsis

```
purearray list [ --ntpserver | --relayhost | --senderdomain | --space ] [ --cli | --csv | --nvp ]
```

```
purearray monitor [ --historical { 5m | 3h | 1d | 7d | 30d } | [--interval SECONDS] [--repeat REPEAT-COUNT] [--size] ] [--csv] [--notitle]
```

```
purearray rename NEW-NAME
```

```
purearray setattr { --relayhost RELAY-HOST | --senderdomain SENDER-DOMAIN }
```

Arguments

NEW-NAME
Name by which the array is to be known after the command executes.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

`--historical` ***TIME***
Displays historical performance data over the specified range of time. Valid time range options include: 5 minutes, 3 hours, 1 day, 7 days, and 30 days.

`--interval` ***SECONDS***
Sets the number of seconds between displays of real-time performance data. At each interval, the system displays a point-in-time snapshot of the performance data. If omitted, the interval defaults to every 5 seconds.

`--ntpserver`
Displays the hostnames or IP addresses of the NTP servers used by the array to maintain reference time.

`--relayhost [`***RELAY-HOST***`]`
Displays or sets the hostname or IP address of the email relay server currently being used as a forwarding point for alert email notifications generated by the array. Set to an empty value (**""**) to clear the configured hostname or IP address.

`--repeat` ***REPEAT-COUNT***
Sets the number of times to display real-time performance data. If omitted, the repeat count defaults to 1.

`--senderdomain [`***`SENDER-DOMAIN`***`]`
Displays or sets the domain name. The domain name determines how logs are parsed and treated by Pure Storage Support and Escalations. The domain name is also used in the "from" address of outgoing alert email notifications. The domain name must be set to your company's domain name. For example, **`mydomain.com`**

`--size`
Displays the average I/O sizes per read, write, and all operations. The information appears in the **B/op** columns of the output.

`--space`
Displays array size and storage consumption details, including usable capacity and physical storage consumption, and array parity.

Options that control display format:

`--cli`
Displays output in the form of CLI commands that can be issued to reproduce the current configuration. The **`--cli`** output is not meaningful when combined with immutable attributes.

`--csv`
Lists information in comma-separated value (CSV) format. The **`--csv`** output can be used for scripting purposes and imported into spreadsheet programs.

`--notitle`
Lists information without column titles.

`--nvp`
Lists information in name-value pair (NVP) format, in the form **`ITEMNAME=VALUE`**. Argument names and information items are displayed flush left. The **`--nvp`** output is designed both for convenient viewing of what might otherwise be wide listings, and for parsing individual items for scripting purposes.

Description

The **`purearray`** command displays and manages the FlashBlade array attributes.

Viewing Array Attributes

The **`purearray list`** command displays FlashBlade array attributes, including array name, array ID, and Elasticity version and revision numbers.

Include the **`--ntpserver`** option to display the Network Time Protocol (NTP) servers used by the array to maintain reference time. The installation technician sets the proper time zone for an array when it is installed. During operation, arrays maintain time synchronization by interacting with the NTP server (by default, time.purestorage.com). Up to four (4) NTP server IP addresses or hostnames can be assigned to the array. To change the NTP servers on the array, contact a member of the Pure Storage account team or email Pure Storage Support at **`<support@purestorage.com>`**.

Include the **`--relayhost`** option to display the hostname or IP address of the email relay server that is currently being used as a forwarding point for alert email notifications generated by the array.

Include the `--senderdomain` option to display the sender domain name.

Include the `--space` option to display the following array size and storage consumption details:

- **Capacity**: Total usable capacity of the array.
- **Parity**: Percentage of data that is fully protected. The percentage value will drop below 100% if the data isn't fully protected, such as when a blade is pulled and the array is rebuilding the data to bring it back to full parity.
- **Data Reduction**: Ratio of the size of the written data versus the amount of space the data occupies after data compression.
- **File Systems**: Amount of space that the written data occupies on the array after reduction via data compression.

Monitoring Array Performance

The `purearray monitor` command displays real-time and historical I/O performance information for the whole array. The output includes the following data about bandwidth, IOPS, and latency:

- **Time**: Current time.
- **B/s**: Number of bytes read/written.
- **op/s**: Number of read/write requests processed per second.
- **us/op**: Average arrival-to-completion time, measured in microseconds, for a host read/write operation.
- **B/op**: Average I/O size per read, write, and all operations. Include the **`--size`** option to see the **B/op** columns.

Include the `--historical` option to display historical performance data over any of the following ranges of time: 5 minutes, 3 hours, 1 day, 7 days, or 30 days.

By default, the **`purearray monitor`** command displays real-time performance data. Include the `--repeat` option to specify the number of times to repeat the real-time update. If not specified, the repeat value defaults to 1. Include the `--interval` option to specify the number of seconds between each real-time update. At each interval, the system displays a point-in-time snapshot of the performance data. If not specified, the interval value defaults to every 5 seconds. The **`--interval`** and **`--repeat`** options can be combined.

Configuring the SMTP Relay Host

The `purearray setattr --relayhost` command sets the hostname or IP address of the email relay server that is to be used as a forwarding point for alert email notifications generated by the array. To clear the configured hostname or IP address, set **`--relayhost`** to an empty value (**`""`**). Once cleared, Elasticity sends all alert email notifications directly to the recipient addresses rather than route them via the relay (mail forwarding) server.

Configuring the Sender Domain

The `purearray setattr --senderdomain` command sets the domain name.

Set the domain name to your company's domain name. For example, **mydomain.com**.

The domain name determines how logs are parsed and treated by Pure Storage Support and Escalations. The domain name is also used in the "from" address of outgoing alert email notifications. For example, **purearray-c01-1@mydomain.com**.

Renaming the Array

The **purearray rename** command changes the current name of the array to the new name (**NEW-NAME**). The name change is effective immediately and the old name is no longer recognized in CLI or GUI interactions. In the Elasticity GUI, the new name appears upon page refresh.

Examples

Example 1

```
purearray list --csv
```

Displays a CSV output of the array attributes, including the FlashBlade array name, array ID, and Elasticity version and revision numbers.

Example 2

```
purearray list --space
```

Displays array size and storage consumption details.

Example 3

```
purearray list --ntpserver
```

Lists the hostnames or IP addresses of the NTP servers that are currently configured on the array.

Example 4

```
purearray monitor --historical 5m --csv
```

Displays a CSV output of historical performance data for the local array over the past five (5) minutes.

Example 5

```
purearray monitor --repeat 20 --interval 10
```

Displays real-time performance data for the whole array. Twenty (20) point-in-time updates are displayed, with each update taken every ten (10) seconds.

Example 6

```
purearray setattr --relayhost fake.relay.purestorage.com
```

Sets the email relay server to host **fake.relay.purestorage.com**, which will be used as a forwarding point for alert email notifications generated by the array.

Example 7

```
purearray setattr --senderdomain mydomain.com
```

Sets the sender domain **mydomain.com** to be used as the forwarding point for alert email notifications generated by the array.

See Also

purealert(1) [56], purearray(1) [61], puredns(1) [69], purefs(1) [71], purehw(1) [79], purenetwork(1) [86], puresubnet(1) [89], puresupport(1) [92]

Author

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pureblade

pureblade, pureblade-list — displays the atttributes of the blades

Synopsis

```
pureblade list [ --csv | --nvp ] [--notitle] [--total] [BLADE...]
```

Arguments

BLADE
Blade name.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

`--total`
Follows output lines with a single line containing column totals in columns where they are meaningful.

Description

Run the `pureblade list` command to list all of the blades on the array and their attributes, including the status of each blade. Each blade in the list output includes the following information:

- **Name**: Blade name.
- **Status**: Blade status. Possible blade statuses include:

  `critical`
  Component requires immediate attention. Contact Pure Storage Support at support@purestorage.com.

  `healthy`
  Component is performing as expected.

  `identifying`
  Component is functioning, but not yet initialized.

  `unhealthy`
  Component is not performing as expected.

  `unknown`
  Insufficient information to determine a state for this device.

  `unused`
  Slot is currently empty, as expected.

- **Capacity**: Provisioned size.
- **Details**: Blade creation date.

Include the **--total** option to display the raw size of all blades.

Examples

Example 1

```
pureblade list
```

Displays the attributes of each blade component in the chassis.

Example 2

```
pureblade list CH1.FB15
```

Displays the attributes of blade **CH1.FB15**.

See Also

purearray(1) [61], puresupport(1) [92]

Author

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pureconfig

pureconfig — displays the commands required to reproduce an array's current object and system configuration

Synopsis

```
pureconfig list [ --object | --system ]
```

Options

None

Description

Displays an array's current configuration of array parameters, alert watchers, files systems, network settings, and support configurations in the form of CLI commands that would be required to reproduce the configuration on a newly-installed or unconfigured array. The output does not contain delete or destroy subcommands.

Run the **`pureconfig list`** command to list all object and system configurations. The output of the command can be as used a script to configure a previously unconfigured array so that it is identical to the array on which the command is executed.

Running the **`pureconfig list`** command is roughly equivalent to running the following commands in sequence:

```
purefs list --cli
purealert list --watcher --cli
purearray list --cli
puredns list --cli
purenetwork list --cli
puresupport list --cli
```

Include the **`--object`** option to list only file system configurations.

Include the **`--system`** option to list only the array, network, alert watcher, and support configurations.

See Also

purealert(1) [56], purearray(1) [61], puredns(1) [69], purefs(1) [71], purenetwork(1) [86], puresupport(1) [92]

Author

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puredns

puredns, puredns-list, puredns-setattr — displays and manages the DNS attributes of the array

Synopsis

```
puredns list [ --cli | --csv | --nvp ] [--notitle]
puredns setattr [--domain DOMAIN] [--nameservers NAMESERVERS]
```

Arguments

None.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

`--domain` ***DOMAIN***
Domain suffix to be appended by the array when performing DNS lookups. To remove the domain suffix from Elasticity DNS queries, set to an empty string (**""**).

`--nameservers` ***NAMESERVERS***
Comma-separated list of up to three DNS server IP addresses. To unassign the DNS server IP addresses, set to an empty string (**""**). Once the DNS server IP addresses have been unassigned, Elasticity stops making DNS queries.

Options that control display format:

`--cli`
Displays output in the form of CLI commands that can be issued to reproduce the current configuration. The **`--cli`** output is not meaningful when combined with immutable attributes.

`--csv`
Lists information in comma-separated value (CSV) format. The **`--csv`** output can be used for scripting purposes and imported into spreadsheet programs.

`--notitle`
Lists information without column titles.

`--nvp`
Lists information in name-value pair (NVP) format, in the form **`ITEMNAME=VALUE`**. Argument names and information items are displayed flush left. The **`--nvp`** output is designed both for convenient viewing of what might otherwise be wide listings, and for parsing individual items for scripting purposes.

Description

The **puredns** command displays and manages the DNS attributes for an array's administrative network.

Viewing DNS Attributes

The **puredns list** command displays the current DNS parameters, including domain suffix and name servers, of the array. Include the **--cli** option to display the CLI command line that would reproduce the array's current DNS configuration. This can, for example, be copied and pasted to create an identical DNS configuration in another array, or saved as a backup.

Setting DNS Parameters

The **puredns setattr** command sets the DNS parameters of the array. The **--domain** option sets the domain suffix to be appended to DNS queries. The **--nameservers** option sets the list of DNS name server IP addresses. The new list of DNS name servers replaces any name servers that are currently configured on the array. Elasticity queries the DNS servers in the order in which the name server IP addresses are listed in this option.

Examples

Example 1

```
puredns list
```

Displays the domain suffix and name servers that are configured on the array.

Example 2

```
puredns setattr --domain mydomain.com --nameservers 192.168.0.125,192.168.1.125
```

Sets the domain suffix **mydomain.com** for DNS searches. Also sets the IP addresses of two DNS servers for Elasticity to use to resolve hostnames to IP addresses.

See Also

purearray(1) [61], puresupport(1) [92]

Author

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purefs

purefs, purefs-create, purefs-delete, purefs-disable, purefs-enable, purefs-list, purefs-setattr — displays and manages the file systems

Synopsis

```
purefs create [--rules RULES] [--size SIZE] FILE-SYSTEM...
purefs delete FILE-SYSTEM...
purefs disable { --fast-remove } FILE-SYSTEM...
purefs enable { --fast-remove } FILE-SYSTEM...
purefs list [ --cli | --csv | --nvp ] [--notitle] [--space] [--total] [FILE-SYSTEM...]
purefs setattr [--rules RULES] [--size SIZE] FILE-SYSTEM...
```

Arguments

FILE-SYSTEM
File system name. Represents the name of the directory to be exported.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

`--fast-remove`
Enables or disables the fast remove feature.

`--rules` ***RULES***
Defines the NFS export rules for the given file system.
Format is **`'xxx.xxx.xxx.xxx(options)'`** for IPv4 address, **`'xxx.xxx.xxx.xxx/xx(options)'`** for netmask, or **`'*(options)'`** to represent all clients. The **`options`** within parenthesis represents a comma-separated list of NFS export options. Valid export options are **`rw`**, **`ro`**, **`root_squash`**, and **`no_root_squash`**. For example, **`'10.20.225.2(ro,root_squash)'`**.

`--size` ***SIZE***
Sets the provisioned size of the file system.

Options that control display format:

`--cli`
Displays output in the form of CLI commands that can be issued to reproduce the current configuration. The **`--cli`** output is not meaningful when combined with immutable attributes.

`--csv`
Lists information in comma-separated value (CSV) format. The **`--csv`** output can be used for scripting purposes and imported into spreadsheet programs.

`--notitle`
Lists information without column titles.

`--nvp`
Lists information in name-value pair (NVP) format, in the form **`ITEMNAME=VALUE`**. Argument names and information items are displayed flush left. The **`--nvp`** output is designed both for convenient viewing of what might otherwise be wide listings, and for parsing individual items for scripting purposes.

`--total`
Follows output lines with a single line containing column totals in columns where they are meaningful.

`--space`
Displays size and storage consumption details for each file system.

Description

The **`purefs`** command displays and manages the file systems for NFS export.

Exporting a file system requires at least one valid data virtual IP address (data vip), which are configured through the **`purenetwork`** command.

Viewing File Systems

The **`purefs list`** command lists all of the file systems that have been created on the FlashBlade array and the export rules that accompany each file system. Each file system in the list output includes the following information:

- **Name**: File system name.
- **Size**: Provisioned size of the file system.
- **Used**: Total amount of pre-compressed data written to the file system.
- **% Used**: Percentage of provisioned size occupied by file system data. The percentage value is calculated as **`Used/Size`**.
- **Created**: File system creation date.
- **Rules**: File system NFS export rules.
- **Fast Remove**: Status (enabled or disabled) of the fast remove feature.

Include the **`--space`** option to display the following size and storage consumption details for each file system:

- **Name**: File system name.
- **Size**: Provisioned size of the file system.
- **Used**: Total amount of data written to the file system.

- **% Used**: Percentage of provisioned size occupied by file system data. The percentage value is calculated as **`Used/Size`**.
- **Data Reduction**: Ratio of the size of the written data versus the amount of space the data occupies after data compression.
- **Physical**: Amount of space that the written data occupies on the array after reduction via data compression.

Include the **`--total`** option to display the totals for the following columns:

- **Size**: Provisioned size of all file systems.
- **Used**: Total amount of pre-compressed data written to all file systems.
- **% Used**: Percentage of provisioned size of all file systems occupied by all file system data. The percentage value is calculated as **`(Total Used)/(Total Size)`**, where **`Total Used`** is the total value of the Used column, and **`Total Size`** is the total value of the Size column.

  The total value in the % Used column is only calculated if all file system sizes are set. If even one file system size is blank, the total % Used column will also be blank, as indicated by the dash (-) symbol.

Creating File Systems

The **`purefs create`** command creates file systems as NFS shares for export. Once a file system has been created, it is visible through any of the data vips configured on the subnet, ready to be mounted on the clients.

Each FlashBlade file system can include a set of NFS export rules that define the access rights and privileges a client has to the file system. The **`--rules`** option configures the NFS export rules. The **`RULES`** argument represents the export rules that apply to the file system and is entered in the form **`'host(options)'`**.

`host` represents one of the following categories:

- IPv4 address in the form **`'xxx.xxx.xxx.xxx(options)'`**
- Netmask in the form **`'xxx.xxx.xxx.xxx/xx(options)'`**
- Wildcard in the form **`'*(options)'`** to represent all clients

`options` in parenthesis represents a comma-separated list of NFS export options. Valid export options are **`ro`**, **`rw`**, **`no_root_squash`**, and **`root_squash`**.

Enclose the entire rule set with single quotes. For example,

```
purefs create --rules '10.20.225.2(rw,root_squash)' MyFiles
```

If multiple rules are specified, separate each rule with a space, enclosing the entire rule set with single quotes. For example,

```
purefs create --rules '10.20.225.2(rw,root_squash) 1.2.0.0(ro)' MyFiles
```

For each client request, the file system will check every export rule, find the matching IP filter, and apply the options from the rule. If the IP address of a client does not match any rules in a given export, the client will not be able to mount the server. To create a file system without NFS export rules and, therefore, be inaccessible to any client, set **`--rules`** to an empty value (**`""`**).

The following guidelines apply when creating NFS export rules:

- If rules are not defined during file system creation, then all clients will have **`rw`** access and **`no_root_squash`** privileges to the file system. For example,

  ```
  purefs create MyFiles
  ```

  This is equivalent to specifying export rule **`'*(rw,no_root_squash)'`**.

- Omitting the **`(options)`** portion of a rule is equivalent to specifying **`(ro,root_squash)`**. In the following example, the rule **`'*'`** will grant all clients **`read-only`**, **`root_squash`** access to the **`MyFiles`** file system.

  ```
  purefs create --rules '*' MyFiles
  ```

  This is equivalent to specifying export rule **`'*(ro,root_squash)'`**.

- If the rule is defined but one or more export options are not specified, then the undefined option(s) will default to **`ro`** access and **`root_squash`** privileges. For example, an export rule that is defined as **`'*(rw)'`** will have **`root_squash`** privileges. Likewise, an export rule that is defined as **`'*(no_root_squash)'`** will have **`ro`** access.
- A rule cannot include conflicting options. For example, **`ro`** and **`rw`** cannot be included in the same rule. Likewise, **`root_squash`** and **`no_root_squash`** cannot be included in the same rule.
- If a client IP address matches multiple rules, Elasticity uses the first rule it encounters in priority based on rule category. IP address rules have the highest priority. Specifically, the priority of matching rules is as follows: IP address > Netmask > Wildcard.
- If an address matches multiple rules in the same category, then the first (leftmost) rule applies.

Here is an example of the **purefs list** output with various rules set for each file system created:

```
purefs list
Name      Size  Used     % Used  Created                  Rules
MyFiles1  10T   3.56T    0%      2016-08-16 14:10:52 PDT  *
MyFiles2  10T   8.99T    0%      2016-08-16 14:16:16 PDT  *()
MyFiles3  10T   5.65T    0%      2016-08-16 14:16:47 PDT  -
MyFiles4  10T   9.50T    0%      2016-08-16 14:18:36 PDT  *(rw,no_root_squash)
MyFiles5  -     0.00     -       2016-08-16 14:56:02 PDT  10.20.225.2(rw)
MyFiles6  -     0.00     -       2016-08-16 14:56:02 PDT  1.2.0.0(no_root_squash)
```

In the list output above, the NFS export rules are described as follows:

- ***** - All clients have default **ro** access and **root_squash** privileges to the file system.
- ***()** - All clients have default **ro** access and **root_squash** privileges to the file system.
- **-** - Export rules have been delete, rendering the file system inaccessible.
- ***(rw,no_root_squash)** - All clients have **rw** access and **no_root_squash** privileges. This is the default rule used when creating a file system.
- **10.20.225.2(rw)** - All clients have **rw** access and **root_squash** (default) privileges.
- **1.2.0.0(no_root_squash)** - All clients have the **ro** (default) access and **no_root_squash** privileges.

The **--size** option represents the provisioned size allocated to the file system. The size is a quota of space that is set to help gauge the fullness of a file system.

When the amount of data written to the file system reaches a certain percentage of its quota, alerts are generated notifying administrators of the threshold reached. For example, Elasticity generates an **INFO** alert when the amount of data written to the file system exceeds 100% of its provisioned size.

The file system size can be blank, as indicated by the dash (-) symbol, or set to any value between **0** and **8191** petabytes. If the size is not set (blank) or if it is set to **0**, the provisioned size will default to an unlimited size.

Elasticity does not enforce any restrictions nor does it take any further action when space consumption reaches or exceeds the provisioned size. To address the issue, administrators must decrease the percentage of storage space used by either deleting files or increasing the size of the file system.

Configuring File Systems

The **purefs setattr** command changes the attributes of a file system. Include the **--rules** option to set the NFS export rules for the file system, replacing any export rules that currently exist. NFS export rule changes will be synchronously applied to all currently mounted clients.

Include the **--size** option to change the provisioned size of the file system.

Deleting File Systems

The **purefs delete** command deletes a file system, permanently cutting off access to its contents. Once a file system has been deleted, it cannot be recovered, and all client connections to the file system are immediately terminated.

Enabling and Disabling Fast Remove

When a directory and its contents are no longer required, they can be removed to reclaim space.

Removing the contents of a directory recursively by running the **rm -r** command causes the client to delete files one at a time. This can be a time consuming and expensive operation.

The fast remove feature allows you to quickly remove large directories by offloading this work onto the server. When the fast remove feature is enabled, a special pseudo-directory named **.fast-remove** is created in the root directory of the NFS mount. To remove a directory and its contents, run the **mv** command to move the directory into the **.fast-remove** directory.

In the following example, from the root directory of the NFS mount, a directory called **big_dir** is being moved into the **.fast-remove** directory.

```
mv big_dir/ .fast-remove/
```

Once a directory has been moved into the **.fast-remove** directory, it is immediately deleted, and through background operations, the space it occupied will be freed.

The fast remove feature can be enabled or disabled at any time. Fast remove is disabled by default.

Run the **purefs enable --fast-remove** command to enable the fast remove feature. Enabling fast remove creates a **.fast-remove** directory in the root directory of the NFS mount.

For example, run the following commands to 1) enable the fast remove feature on file system MyFiles, and 2) view the contents of the root directory of the NFS mount to verify that the **.fast-remove** directory has been created.

```
//Run on the array to enable the fast remove feature.
purefs enable --fast-remove MyFiles
```

```
//Run on the NFS mount to view the content of the root directory.
ls -al
drwxrwxrwx   1  root  root      0 Oct 30 10:46 .
drwxrwxrwx  25  root  root  12288 Jun 30 16:44 ..
drwxr-xr-x   1  root  root      0 Oct 30 11:27 .fast-remove
...
```

The **.fast-remove** directory cannot be renamed, deleted, or moved into other directories. The **.fast-remove** directory name is a reserved name, so you cannot create a regular directory named **.fast-remove**, regardless of the fast remove enabled/disabled status.

You cannot move individual files to the **.fast-remove** directory. To remove a file, either use the **rm** command or move the directory enclosing the file to the **.fast-remove** directory.

The **.fast-remove** directory can only be removed by disabling the fast remove feature. To disable the fast remove feature, run **purefs disable --fast-remove**.

The fast remove feature is powerful and comes with the following cautionary notes:

- Once a directory has been moved into the **.fast-remove** directory, it is no longer recoverable.
- With fast remove, users can remove any files that are contained in a directory that they can rename, even if they do not have read, write, or execute permissions on the child directories. This breaks from the standard UNIX permissions model. To restrict access to the **.fast-remove** directory, set the directory permissions.

By default, the **.fast-remove** directory permissions are set to **drwxr-xr-x**. These permissions can be changed to grant or restrict access to the **.fast-remove** directory. Disabling and then re-enabling the fast remove feature will reset the settings to the default permissions.

Examples

Example 1

```
purefs list
```

Displays a list of file systems that have been created on the FlashBlade array for export, and the rules that accompany each file system.

Example 2

```
purefs create --rules '*(rw,no_root_squash) 10.20.225.2(ro,root_squash)' MyFiles
```

Creates file system **MyFiles**, granting **rw** access and **no_root_squash** privileges for all clients except client **10.20.225.2**, which has **ro** access and **root_squash** privileges.

Example 3

```
purefs create --size 10T --rules '*(rw,no_root_squash)' MyFiles
```

or

```
purefs create --size 10T MyFiles
```

Creates file system **MyFiles** with a provisioned size of 10 tebibytes. All clients have **rw** access and **no_root_squash** privileges to the file system.

Example 4

```
purefs create --rules '10.20.225.2() 1.2.0.0/16(rw,no_root_squash)' MyFiles
```

Creates file system **MyFiles** with two export rules. The first export rule grants **ro** access and **root_squash** privileges to clients with IP address **10.20.225.2**. The second export rule grants **rw** access and **no_root_squash** privileges to clients with IP address **1.2.0.0.***.

Example 5

```
purefs setattr --rules '*(ro,root_squash)' MyFiles
```

or

```
purefs setattr --rules '*' MyFiles
```

or

```
purefs setattr --rules '*()' MyFiles
```

Sets the export rule for file system **MyFiles** to **ro** access and **root_squash** privileges for all clients, replacing any existing rules.

Example 6

```
purefs setattr --rules "" MyFiles
```

Deletes all export rules from file system **MyFiles**, rendering the file system inaccessible to any client.

Example 7

```
purefs disable --fast-remove MyFiles
```

Disables the fast remove feature for file system **MyFiles**.

Example 8

```
purefs delete MyFiles
```

Deletes file system **MyFiles**.

See Also

purealert(1) [56], purearray(1) [61], purenetwork(1) [86], puresubnet(1) [89], puresupport(1) [92]

Author

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purehw

purehw, purehw-list — displays the hardware components of the array

Synopsis

```
purehw list [--type COMPONENT-TYPE] [ --csv | --nvp ] [--notitle] [COMPONENT...]
```

Arguments

COMPONENT
Hardware component whose information is to be displayed or whose attribute is to be set to the specified value.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

`--type` ***COMPONENT-TYPE***
Type of component for which information is to be displayed. When this option is specified, information is displayed for all components of the specified type.

Options that control display format:

`--csv`
Lists information in comma-separated value (CSV) format. The **`--csv`** output can be used for scripting purposes and imported into spreadsheet programs.

`--notitle`
Lists information without column titles.

`--nvp`
Lists information in name-value pair (NVP) format, in the form **`ITEMNAME=VALUE`**. Argument names and information items are displayed flush left. The **`--nvp`** output is designed both for convenient viewing of what might otherwise be wide listings, and for parsing individual items for scripting purposes.

Description

In the FlashBlade array, the chassis contains the blades and the bays that host the fabric modules. The FlashBlade chassis name has the form **`CH1`**. The chassis status is generated from a combination of software conditions and the status of its components.

The names of the other components within the chassis have the form **`CH1.XXm`** or **`CH1.XXm.YYYn`** where:

XX
Denotes the type of component within the chassis. Possible components include: **`FB`** (Blade), **`FM`** (Fabric Module), and **`PWR`** (Power Supply Unit).

`m`
: Identifies the specific component by its index (its relative position within the chassis, starting at 1).

`YYY`
: Denotes the type of component within the fabric module. The fabric module contains one component named **`ETH`** (Ethernet port).

`n`
: Identifies the specific port by its index (its relative position within the fabric module, starting at 1.

The following table lists the FlashBlade array components that report status:

Component Name	Identify Light	Component Type
`CH1`	Chassis	Chassis
`CH1.FBm`	Flash blade	Flash blade server.
`CH1.FMm`	Fabric module	I/O modules (IOMs) within the chassis.
`CH1.PWRm`	Power module	Power supplies within the chassis.
`CH1.FMm.ETHn`	Ethernet port	Ethernet ports to the blades.

Displaying Hardware Components

The **`purehw list`** command displays information about array hardware components that are capable of reporting their status. The display is primarily useful for diagnosing hardware-related problems.

The **`purehw list`** output includes the following columns:

- **Status**: Component status. Possible hardware statuses include:

  `critical`
  : Component requires immediate attention. Contact Pure Storage Support at support@purestorage.com.

  `healthy`
  : Component is performing as expected.

  `identifying`
  : Component is functioning, but not yet initialized.

  `unhealthy`
  : Component is not performing as expected

  `unknown`
  : Insufficient information to determine a state for this device.

  `unused`
  : Slot is currently empty, as expected.

- **Identify**: State (on or off) of an LED used to visually identify the component. (Relevant only for controllers, NVRAM bays, storage bays, and storage shelves.)

- **Slot**: Slot number occupied by the PCI Express card that hosts the component. (Relevant only for ports hosted by PCI Express cards in controller chassis.)
- **Index**: Number that identifies the relative position of a hardware component within the array.
- **Speed**: Speed (in Gb/s) at which the component is operating.
- **Temperature**: Temperature reported by the component. (Relevant only for temperature sensors.)

Include the `--type` option to display information for all components of the specified type.

Examples

Example 1

```
purehw list --csv
```

Displays hardware component information for all components in the FlashBlade array. The output is displayed in CSV format.

Example 2

```
purehw list --type FB
```

Displays information for all blades.

Example 3

```
purehw list CH1.FB4
```

Displays hardware component information for the blade in slot 4 of the chassis.

See Also

purealert(1) [56], purearray(1) [61], puresupport(1) [92]

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pureman

pureman — displays man pages for Elasticity commands

Synopsis

```
pureman { purealert | purearray | puredns | purefs | purehw | purenetwork |
puresubnet | puresupport }
```

Description

Enter the command **pureman** with one of the arguments listed in the synopsis to display the man page for that Elasticity command.

Help on Elasticity subcommands is also supported.

Enter the subcommand preceded with a hyphen. For example:

```
pureman purearray-list
```

Elasticity Conventions

Elasticity follows certain naming and numbering conventions.

Object Names

Valid characters are letters (A-Z and a-z), digits (0-9), and the hyphen (-) character. File system names can also include the underscore (_) character. The first and last characters of a name must be alphanumeric, and a name must contain at least one letter.

Most objects in Elasticity that can be named, including file systems, data vips, and subnets can be 1-63 characters in length.

Array names can be 1-56 characters in length. The array name length is limited to 56 characters so that the names of the individual controllers, which are assigned by Elasticity based on the array name, do not exceed the maximum allowed by DNS.

Array and File System Sizes

Array and file system sizes are specified as integers followed by one of the suffix letters **K**, **M**, **G**, **T**, **P**, representing **KiB**, **MiB**, **GiB**, **TiB**, and **PiB**, respectively, where "**Ki**" denotes 2^10, "**Mi**" denotes 2^20, and so on.

Time Zones

Dates and times appear throughout the Elasticity GUI and CLI to mark when an event occurred or when a change was made to the array.

Elasticity GUI dates and times are displayed in the user's local time zone, which is determined by the browser's local time. The user's local time zone appears at the bottom of the navigation pane of the Elasticity GUI.

Elasticity CLI dates and times are displayed in the time zone of the array, which is set during FlashBlade installation. The array time zone appears in the Time panel of the **System > Settings** page.

CLI Command Syntax

Elasticity CLI commands have the general form:

```
command subcommand --options OBJECT-LIST
```

The parts of a command are:

COMMAND
: Type of FlashBlade object to be acted upon, prefixed by "pure". For example, the **purefs** command acts on Elasticity file systems. Run the **purehelp** command to see a list of Elasticity CLI commands.

SUBCOMMAND
: Action to be performed on the specified object. Most CLI subcommands are common to some or all object types. For example, **puresubnet list** lists all subnets on the array.

OPTIONS
: Options that specify attribute values or modify the action performed by the subcommand.
For example, in the following command, the **--size** option sets the provisioned size of file system **MyFiles** to 100 gigabytes.

```
purefs setattr --size 100G MyFiles
```

OBJECT-LIST
: Object or list of objects upon which the command is to be operated. If a subcommand changes the object state, then at least one object must be specified. Examples of subcommands that change the object state include **create**, **delete**, and **setattr**. For example, **purefs create MyFiles** creates file system **MyFiles**. In the command synopses, OBJECT specifications that are not enclosed in square brackets (for example, ***NAME*** in **purenetwork** commands) represent ones that are required.
Passive subcommands, such as **list**, which do not change object state, do not require object specification. Leaving out the object is equivalent to specifying all objects of the type. For example, **purefs list** with no file systems specified displays information about all file systems in an array. In the command synopses, OBJECT specifications enclosed in square brackets (for example, ***[NAME]***) represent ones that are optional.

Most subcommands act on a single object. For example, in the following command, the **create** subcommand can only be run on a single file system to change the attributes of that file system.

```
purefs setattr --size 10T MyFiles
```

Certain subcommands can operate on multiple objects. For example, the following command creates two alert watchers.

```
purealert create watcher wendywatcher@example.com walterwatcher@example.com
```

In the command synopses, OBJECT specifications that take in a list of objects are appended with ellipses (for example, ***ADDRESS...***).

The following list describes the conventions used in CLI documentation:

- Text in fixed-width (Courier) font must be entered exactly as shown. For example, **puresubnet list**.
- Text not enclosed in brackets represents mandatory text.
- Text inside square brackets (“[ ]”) represents optional items. Do not type the brackets.
- Text inside curly braces (“{ }”) represents text, where one (and only one) item must be specified. Do not type the braces.
- The vertical bar (|) separates mutually exclusive items.
- Uppercase italic text represents entered text whose value is based on the nature of the subcommand or option. For example, **--size *SIZE***, where SIZE represents the value to be entered, such as **10T**.

CLI Command Help

CLI command help is available at both the command and subcommand levels. To use it, type the Elasticity CLI command or subcommand followed by **-h** or **--help**. The command with the **-h** or **--help** switch displays usage information, supported syntax, and a list of subcommands for the specified command. To get help information for an Elasticity command, type:

```
COMMAND -h
```

For example,

```
$ purefs -h
      usage: purefs [-h] {create,delete,list,setattr} ...
      positional arguments:
        {create,delete,list,setattr}
          create              create a file system
          setattr             modify a file system
          delete              delete one or more file system(s)
          list                list file systems
```

The command with the **-h** or **--help** switch displays usage information, supported syntax, and a list of options for the specified subcommand. To get help information for an Elasticity subcommand, type:

```
COMMAND SUBCOMMAND -h
```

For example,

```
$ purefs list -h
      usage: purefs list [-h] [--cli | --csv | --nvp] [--notitle] [FILE-SYSTEM ...]
      positional arguments:
        FILE-SYSTEM  file system name(s)
      optional arguments:
```

```
        -h, --help   show this help message and exit
        --cli        display as CLI commands
        --csv        display as comma-separated values
        --nvp        display as name-value pairs
        --notitle    hide column titles
```

Troubleshooting

Help! Who do I contact about problems with the FlashBlade Array?

Contact a member of your Pure Storage account team, visit us at http://support.purestorage.com, or email Pure Storage Support at **<support@purestorage.com>**.

If you are contacting Pure Storage Support about a technical issue, they may ask you to open an RA session so that they can help you diagnose the issue.

Error Messages

The following error messages may appear when you perform operations through the Elasticity GUI or CLI:

`Service Temporarily Unavailable`
: An internal service is currently unavailable. This is a temporary issue. Wait a few minutes and then try the Elasticity GUI or CLI operation again. If you still get the error message, contact Pure Storage Support at **<support@purestorage.com>**.

`Unexpected Error`
: The Elasticity GUI or CLI operation that you performed generated an unexpected error. Contact Pure Storage Support at **<support@purestorage.com>**.

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purenetwork

purenetwork, purenetwork-create, purenetwork-delete, purenetwork-list, purenetwork-setattr — manages the network interfaces used to connect a FlashBlade system to a network

Synopsis

```
purenetwork create {vip} --address ADDRESS --servicelist SERVICELIST NAME
purenetwork delete NAME...
purenetwork list [ --cli | --csv | --nvp | --service SERVICE | --vlan VLAN ] [--notitle]
purenetwork setattr [--address ADDRESS] NAME
```

Arguments

NAME
Data virtual IP address (data vip). In CLI commands, data vip names are case-sensitive.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

`--address` ***ADDRESS***
Management address to be associated with the specified data vip. Specify the IPv4 address in the format **`ddd.ddd.ddd.ddd`**.

`--service` ***SERVICE***
Lists only the interfaces configured with the specified service. The supported service for data vips is **`nfs`**.

`--servicelist` ***SERVICELIST***
Assigns the specified service to the data vip. The supported service for data vips is **`nfs`**.

`--vlan`
Lists only the interfaces configured with the specified VLAN ID.

Options that control display format:

`--cli`
Displays output in the form of CLI commands that can be issued to reproduce the current configuration. The **`--cli`** output is not meaningful when combined with immutable attributes.

`--csv`
Lists information in comma-separated value (CSV) format. The **`--csv`** output can be used for scripting purposes and imported into spreadsheet programs.

`--notitle`
Lists information without column titles.

--nvp
Lists information in name-value pair (NVP) format, in the form **ITEMNAME=VALUE**. Argument names and information items are displayed flush left. The **--nvp** output is designed both for convenient viewing of what might otherwise be wide listings, and for parsing individual items for scripting purposes.

Description

The **purenetwork** command displays and manages the data virtual IP addresses (data vips) on the FlashBlade array.

Viewing Data Vips

The **purenetwork list** command lists all the network interfaces on the array. Include the **--service nfs** option to display all of the data vips that have been created on the array. Include the **--vlan** option to display only the interfaces that are configured with the specified VLAN ID.

Creating Data Vips

Exporting a file system requires a data vip which, in turn, must be attached to a subnet. To create a data vip:

1. Verify that a subnet with the correct network prefix, VLAN ID, and gateway, if any, has been created. To view subnet details, run **puresubnet list**. For more information about subnets, refer to puresubnet(1) [89].
2. Create the data vip and attach it to the subnet. To create a data vip, run **purenetwork create vip**.

The **purenetwork create vip** command creates a data vip and attaches it to a subnet. Include the required **--address** option to create a reachable data vip. Specify the IPv4 address of the client in the format **ddd.ddd.ddd.ddd**, making sure it matches the network prefix of the subnet. Include the required **--servicelist nfs** option to assign the **nfs** service to the data vip. Once the data vip is created, it inherits the gateway (if any) and VLAN ID from the subnet. Likewise, the subnet inherits the **nfs** service type from the data vip.

After a data vip has been created, the next step is to export and mount the file systems. For more information about file systems, refer to purefs(1) [71].

Setting Data Vip Attributes

The **purenetwork setattr** command changes the attributes of the specified data vip, completely replacing any existing configurations. Include the **--address** option to change the management IP address of the data vip.

Deleting Data Vips

The **purenetwork delete** command deletes a data vip. Once a data vip has been deleted, any clients connected through the data vip will lose their connection to the file system.

Examples

Example 1

```
purenetwork list --service nfs
```

Displays a list of data vips created for file system export.

Example 2

```
purenetwork create vip --address 10.10.200.10 --servicelist nfs DataVip01
```

Creates data vip **DataVip01** using address IP **10.10.200.10** to export the file system.

Example 3

```
purenetwork setattr --address 10.255.9.101 DataVip03
```

Changes the IP address of **DataVip03** from **10.255.9.100** to **10.255.9.101**. Note that both addresses belong to the same subnet.

Example 4

```
purenetwork delete DataVip01 DataVip02
```

Deletes data vips **DataVip01** and **DataVip02** from the FlashBlade array.

See Also

purearray(1) [61], purefs(1) [71], puresubnet(1) [89], puresupport(1) [92]

Author

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puresubnet

puresubnet, puresubnet-list — displays the subnets used to create data vips for file system export purposes

Synopsis

```
puresubnet list [--service SERVICE] [ --cli | --csv | --nvp ] [--notitle]
[SUBNET...]
```

Arguments

SUBNET
Subnet name.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

`--service` ***SERVICE***
Lists only the interfaces configured with the specified service. For FlashBlade, the single supported service is **`nfs`**.

Options that control display format:

`--cli`
Displays output in the form of CLI commands that can be issued to reproduce the current configuration. The **`--cli`** output is not meaningful when combined with immutable attributes.

`--csv`
Lists information in comma-separated value (CSV) format. The **`--csv`** output can be used for scripting purposes and imported into spreadsheet programs.

`--notitle`
Lists information without column titles.

`--nvp`
Lists information in name-value pair (NVP) format, in the form **`ITEMNAME=VALUE`**. Argument names and information items are displayed flush left. The **`--nvp`** output is designed both for convenient viewing of what might otherwise be wide listings, and for parsing individual items for scripting purposes.

Description

In the FlashBlade array, data virtual IP addresses (data vips) are organized into subnetworks (subnets). Exporting a file system requires a data vip which, in turn, must be attached to a subnet. Data vips that share the same network prefix and gateway, if any, are grouped into the same subnet.

The **puresubnet** command displays the subnets on the FlashBlade array.

Viewing Subnets

The **puresubnet list** command displays a list of subnets on the array and the attributes of each subnet. For example,

```
puresubnet list
Name   Enabled  Prefix          VLAN  Gateway      MTU  Services  Interfaces
SUB01  True     10.10.200.0/24  100   10.10.200.1  -    -         -
```

Before creating a data vip, verify the subnet with the correct network prefix, VLAN ID, and gateway, if any, appears in the list output. For more information about creating data vips, refer to purenetwork(1) [86].

After the data vip has been created and attached to the subnet, the subnet inherits the **nfs** service type from the data vip.

The **puresubnet list --service nfs** command displays a list of subnets on the array to which data vips are attached for file system export. For example,

```
puresubnet list --service nfs
Name   Enabled  Prefix          VLAN  Gateway      MTU   Services  Interfaces
SUB01  True     10.10.200.0/24  100   10.10.200.1  1500  nfs       DataVip01
```

Creating, Modifying, and Deleting Subnets

Subnets are created, configured, and deleted by Pure Storage representatives. To create, modify, or delete a subnet, contact a member of the Pure Storage account team or email Pure Storage Support at **<support@purestorage.com>**.

Creating a subnet requires a prefix and VLAN interface, so have this information ready in advance.

Examples

Example 1

```
puresubnet list
```

Displays a list of all subnets on the FlashBlade array and the attributes of each subnet.

Example 2

```
puresubnet list SUB01
```

Displays the attributes of subnet **SUB01**.

Example 3

```
puresubnet list --service nfs
```

Displays a list of subnets to which data vips are attached for file system export.

See Also

purearray(1) [61], purefs(1) [71], purenetwork(1) [86], puresupport(1) [92]

Author

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puresupport

puresupport, puresupport-connect, puresupport-disable, puresupport-disconnect, puresupport-enable, puresupport-list, puresupport-setattr, puresupport-test — manage the phone home facility and remote assistance sessions

Synopsis

```
puresupport connect
puresupport disable { phonehome }
puresupport disconnect
puresupport enable { phonehome }
puresupport list [ --connect ] [ --cli | --csv | --nvp ] [--notitle]
puresupport setattr { --proxy HTTPS-PROXY }
puresupport test { --connect | --phonehome }
```

Arguments

None.

Options

`-h | --help`
Can be used with any command or subcommand to display a brief syntax description.

`--connect`
For **`puresupport list`**, displays remote assistance connection details. For **`puresupport test`** used by Pure Storage Support to troubleshoot remote assistance issues.

`--phonehome`
Used by Pure Storage Support to troubleshoot phone home issues.

`--proxy` ***`HTTPS-PROXY`***
Server to be used as the HTTP or HTTPS proxy. Specify the server name, including the scheme and proxy port number. For example, **`<http://proxy.example.com:8080>`**. To clear the proxy setting, set to an empty string (**`""`**).

Options that control display format:

`--csv`
Lists information in comma-separated value (CSV) format. The **`--csv`** output can be used for scripting purposes and imported into spreadsheet programs.

`--notitle`
Lists information without column titles.

--nvp
Lists information in name-value pair (NVP) format, in the form **ITEMNAME=VALUE**. Argument names and information items are displayed flush left. The **--nvp** output is designed both for convenient viewing of what might otherwise be wide listings, and for parsing individual items for scripting purposes.

Description

The **puresupport** command manages the phone home facility, remote assistance (RA) sessions, and proxy settings.

Phone Home Facility

The phone home facility allows the array to transmit log and diagnostic information to Pure Storage Support via a secure network connection. Optionally configure the proxy host.

The phone home facility can be enabled and disabled at any time.

To enable the phone home facility, run the **puresupport enable phonehome** command. Once enabled, the phone home facility immediately begins to transmit logs to Pure Storage Support. The logs are transmitted on a regular basis until the phone home facility is disabled.

To disable the phone home facility and thereby stop log transmission, run the **puresupport disable phonehome** command.

To view the phone status (enabled or disabled), run the **puresupport list** command.

Remote Assistance (RA) Sessions

In some cases, the most efficient way for Pure Storage Support to service a FlashBlade array or diagnose problems is through direct access to the array. A remote assistance (RA) session grants Pure Storage Support direct and secure access to the array through a reverse tunnel which you, the administrator, open. This is a two-way communication. Optionally configure the proxy host.

RA sessions can be opened and closed at any time.

The **puresupport connect** command opens an RA session, giving Pure Storage Support the ability to log into the array, effectively establishing an administrative session. Once the RA session is successfully established, the array returns connection details, including the date and time when the session was opened, the date and time when the session expires, and the proxy status (true, if configured). To view the details of an open RA session, run the **puresupport list --connect** command.

After the Pure Storage Support team has performed all of the necessary diagnostic or maintenance functions, run the **puresupport disconnect** command to terminate the RA session. A disconnected status of true confirms that the sessions has successfully closed.

An open RA session automatically terminates (closes) after two days have lapsed.

To view the connection status of the RA session, run the **puresupport list** command.

Proxy Hostnames

The **`puresupport setattr --proxy`** command configures the proxy hostname. The format for the proxy host name is **`http(s)://hostname:port`**, where **`hostname`** is the name of the proxy host, and **`port`** is the TCP/IP port number used by the proxy host.

To view the current proxy settings, run the **`puresupport list`** command.

Displaying Support Connection Details

The **`puresupport list`** command displays the following support connection details:

- Remote assistance session status as open (RA Active is True) or closed (RA Active is False). Include the **`--connect`** option to view the details of an open RA session.
- Proxy host setting.
- Phonehome status as enabled or disable.

Troubleshooting

The **`puresupport test`** command displays information to help Pure Storage Support troubleshoot connection issues.

If you are experiencing connection issues, contact a member of the Pure Storage account team or email Pure Storage Support at **`<support@purestorage.com>`**.

Examples

Example 1

```
puresupport list
```

Displays the remote assistance (RA), proxy, and phone home settings for the array.

Example 2

```
puresupport list --connect
```

Displays the connection details and status of a remote assistance (RA) session.

Example 3

```
puresupport connect
```

Opens a remote assistance (RA) session between the current array and Pure Storage Support, giving Pure Storage Support the ability to establish an administrative session.

Example 4

```
puresupport enable phonehome
```

Enables the automatic transmission of array logs and diagnostic information to Pure Storage Support.

Example 5

```
puresupport setattr --proxy http://proxy.example.com:8080
```

Sets the proxy host for HTTPS communication between the array and Pure Storage Support.

See Also

purealert(1) [56], purearray(1) [61],

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Chapter 9. Elasticity CLI Process Steps

Creating a File System

To create a file system, add a data virtual IP address (data vip) to an existing subnet, and then create and export the file system.

1. Find the subnet to which the data vips will be added.
   `puresubnet list`
2. Add data virtual IP addresses (data vips) to the subnet. These data vips will be used to export the file system. Make sure the IP addresses of the data vips match the network prefix of the subnet.
   `purenetwork create vip --address ADDRESS --service nfs NAME`

   Optionally run **`purenetwork list`** to verify that the new data vip has been properly created and configured.
3. Create and export the file system. Define the NFS export rules so the file system is accessible to the appropriate clients.
   `purefs create [--rules RULES] [--size SIZE] FILE-SYSTEM`

   Optionally run **`purefs list`** to verify that the new file system and its export rules have been properly configured.

The file system is now visible through any of the data vips configured on the subnet, and ready to be mounted on the clients.

For example, run the following commands to:

- Export the **`MyFiles`** file system. Client **`192.168.1.0/24`** should be able to access the exported files with **`read-only access`** and **`root_squash`** privileges. Client **`1.2.0.0/16`** should also be able to access the exported files with **`read-write`** access and **`root`** privileges.
- Mount the exported **`MyFiles`** file system via data vip **`10.10.200.10`** to the **`/mnt`** directory of the local host.

On the server…

```
puresubnet list
//Finds the subnet, named SUB01, to which the data vip will be added.
purenetwork create vip --address 10.10.200.10 --service nfs DataVip01
purefs create --rules '192.168.1.0/24(ro) 1.2.0.0/16(rw,no_root_squash)' MyFiles
```

On the client…

```
mkdir -p ~/mnt
mount 10.10.200.10:/MyFiles ~/mnt
```

Adding an Alert Watcher

1. Send a test message to an email address to ensure alert notifications can reach the intended destination.
   `purealert test watcher ADDRESS`
2. Verify the test message reached the destination email address.
3. Create an alert watcher to which alert email notifications are sent.
   `purealert create watcher ADDRESS`
   Newly added alerts watchers are by default enabled to receive alert email notifications.
4. Verify the new email address has been added to the alert watcher list.
   `purealert list --watcher`
   Optionally run **`purealert test`** to send a test message to the email addresses of all enabled alert watchers - including the newly added watcher - to ensure alert notifications reach the intended destinations.

The file system is now visible through any of the data vips configured on the subnet, ready to be mounted on the clients.

For example, run the following commands to:

- Send a test message to Aartie Alert's email address aartiealert@example.com.
- After verifying that Aartie Alert received the email notification, add Aartie Alert as an alert watcher.
- Verify Aartie Alert's email address has been added to the list of alert watchers.

```
purealert test watcher aartiealert@example.com
purealert create watcher aartiealert@example.com
purealert list --watcher
```

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