Asset Page Information

Data Infrastructure Insights

NetApp
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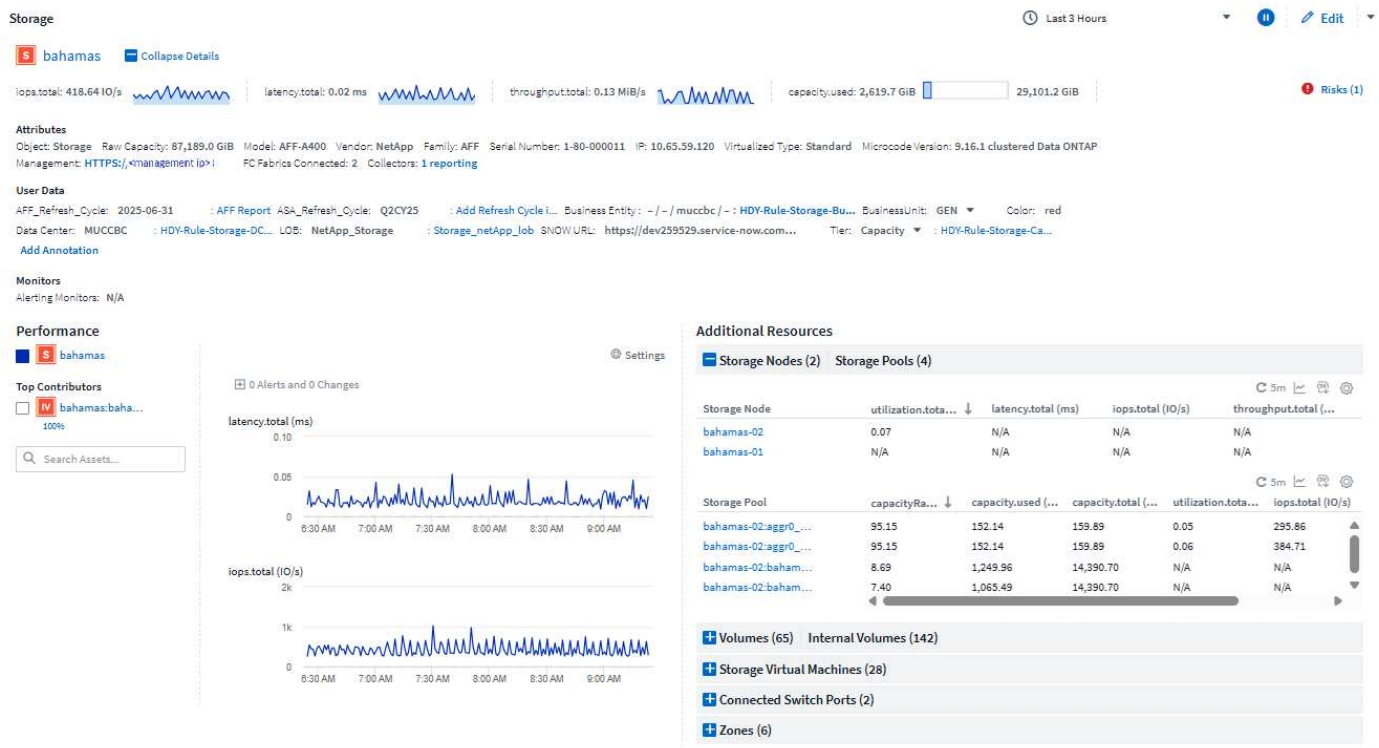
Asset Page Information

Asset Page Overview

Asset landing pages summarize the current status of an asset and contain links to additional information about the asset and its related assets.

Landing pages give you a single-page view of the object, with Summary, Performance, and Related Resource information.



Summary Section

At the top of a landing page is the expandible Summary section, which includes several sparkline graphs displaying recent data trends for things like throughput or latency, as well as object information and attributes, and any monitors that may be alerting for the object.

The Summary section also displays and enables you to change annotations assigned to the asset.

Performance Section

The Performance Section displays performance data for the object. Select *Settings* to add additional charts to the display like Throughput or Capacity, or select correlated or contributing resources to chart their data alongside the object's. Devices that may potentially be causing contention will also be listed in the Performance section. The data in the charts refreshes automatically as data collectors poll and updated data is acquired.

You can select the metrics you want to view in the performance chart for the time period selected. Click on the *Settings* drop-down and choose from the metrics listed.

In addition to performance data, any alerts that are or were active within the selected page time range will also

be shown.

You can select from among the following devices that may be listed in the Performance section:

- Top correlated

  Shows the assets that have a high correlation (percentage) with one or more performance metrics to the base asset.

- Top contributors

  Shows the assets that contribute (percentage) to the base asset.

- Top Changes

  Assets related to recent changes.

- Workload Contentions

  Shows the assets that impact or are impacted by other shared resources, such as hosts, networks, and storage. These are sometimes called *greedy* and *degraded* resources.

Additional Resources Section

The Additional Resources section displays tables of data for resources related to the current object type. You can expand and collapse these tables in order to focus on specific resources. Select the gear icon to temporarily show additional metrics or attributes in a table.

Add Custom Widgets

You can add your own widgets to any asset page. Widgets you add will appear on asset pages for all objects of that type. For example, adding a custom widget to a storage asset page will display that widget on asset pages for all storage assets.

Custom widgets are placed at the bottom of a landing page, below the Performance and Resource sections.

Types of Asset Pages

Data Infrastructure Insights provides asset pages for the following assets:

- Virtual machine
- Storage Virtual Machine (SVM)
- Volume
- Internal volume
- Host (including Hypervisor)
- Storage pool
- Storage
- Datastore
- Application
- Storage node
- Qtree
- Disk
- VMDK
- Port
- Switch
- Fabric
- Host
- Zone

Changing the Time Range of Displayed Data

By default, an asset page displays the last 3 hours of data; however, you can change the time segment of displayed data by using an option that is located on every asset page, regardless of asset type. To change the time range, click the displayed time range in the top bar and choose from among the following time segments:

- Last 15 Minutes
- Last 30 Minutes
- Last 60 Minutes
- Last 2 Hours
- Last 3 Hours (this is the default)
- Last 6 Hours
- Last 12 Hours
- Last 24 Hours
- Last 2 Days
- Last 3 Days

- Last 7 Days
- Last 14 Days
- Last 30 Days
- Custom time range

The Custom time range allows you to select up to 31 consecutive days. You can also set the Start Time and End Time of day for this range. The default Start Time is 12:00 AM on the first day selected and the default End Time is 11:59 PM on the last day selected. Clicking Apply will apply the custom time range to the asset page.

The information on the page refreshes automatically based on the selected time range. The current refresh rate is displayed in the upper-right corner of the Summary section as well as on any relevant tables or widgets on the page.

Performance metric definitions

The Performance section can display several metrics based on the time period selected for the asset. Each metric is displayed in its own performance chart. You can add or remove metrics and related assets from the charts depending on what data you want to see; the metrics you can choose from vary depending on asset type.

Metric	Description
BB credit zero Rx, Tx	Number of times the receive/transmit buffer-to-buffer credit count transitioned to zero during the sampling period. This metric represents the number of times the attached port had to stop transmitting because this port was out of credits to provide.
BB credit zero duration Tx	Time in milliseconds during which the transmit BB credit was zero during the sampling interval.
Cache hit ratio (Total, Read, Write) %	Percentage of requests that result in cache hits. The higher the number of hits versus accesses to the volume, the better is the performance. This column is empty for storage arrays that do not collect cache hit information.
Cache utilization (Total) %	Total percentage of cache requests that result in cache hits
Class 3 discards	Count of Fibre Channel Class 3 data transport discards.
CPU utilization (Total) %	Amount of actively used CPU resources, as a percentage of total available (over all virtual CPUs).
CRC error	Number of frames with invalid cyclic redundancy checks (CRCs) detected by the port during the sampling period
Frame rate	Transmit frame rate in frames per second (FPS)
Frame size average (Rx, Tx)	Ratio of traffic to frame size. This metric enables you to identify whether there are any overhead frames in the fabric.

Frame size too long	Count of Fibre Channel data transmission frames that are too long.
Frame size too short	Count of Fibre Channel data transmission frames that are too short.
I/O density (Total, Read, Write)	Number of IOPS divided by used capacity (as acquired from the most recent inventory poll of the data source) for the Volume, Internal Volume or Storage element. Measured in number of I/O operations per second per TB.
IOPS (Total, Read, Write)	Number of read/write I/O service requests passing through the I/O channel or a portion of that channel per unit of time (measured in I/O per sec)
IP throughput (Total, Read, Write)	Total: Aggregated rate at which IP data was transmitted and received in megabytes per second.
Read: IP Throughput (Receive):	Average rate at which IP data was received in megabytes per second.
Write: IP Throughput (Transmit):	Average rate at which IP data was transmitted in megabytes per second.
Latency (Total, Read, Write)	Latency (R&W): Rate at which data is read or written to the virtual machines in a fixed amount of time. The value is measured in megabytes per second.
Latency:	Average response time from the virtual machines in a data store.
Top Latency:	The highest response time from the virtual machines in a data store.
Link failure	Number of link failures detected by the port during the sampling period.
Link reset Rx, Tx	Number of receive or transmit link resets during the sampling period. This metric represents the number of link resets that were issued by the attached port to this port.
Memory utilization (Total) %	Threshold for the memory used by the host.
Partial R/W (Total) %	Total number of times that a read/write operation crosses a stripe boundary on any disk module in a RAID 5, RAID 1/0, or RAID 0 LUN Generally, stripe crossings are not beneficial, because each one requires an additional I/O. A low percentage indicates an efficient stripe element size and is an indication of improper alignment of a volume (or a NetApp LUN). For CLARiiON, this value is the number of stripe crossings divided by the total number of IOPS.
Port errors	Report of port errors over the sampling period/given time span.

Signal loss count	Number of signal loss errors. If a signal loss error occurs, there is no electrical connection, and a physical problem exists.
Swap rate (Total Rate, In rate, Out rate)	Rate at which memory is swapped in, out, or both from disk to active memory during the sampling period. This counter applies to virtual machines.
Sync loss count	Number of synchronization loss errors. If a synchronization loss error occurs, the hardware cannot make sense of the traffic or lock onto it. All the equipment might not be using the same data rate, or the optics or physical connections might be of poor quality. The port must resynchronize after each such error, which impacts system performance. Measured in KB/sec.
Throughput (Total, Read, Write)	Rate at which data is being transmitted, received, or both in a fixed amount of time in response to I/O service requests (measured in MB per sec).
Timeout discard frames - Tx	Count of discarded transmit frames caused by timeout.
Traffic rate (Total, Read, Write)	Traffic transmitted, received, or both received during the sampling period, in mebibytes per second.
Traffic utilization (Total, Read, Write)	Ratio of traffic received/transmitted/total to receive/transmit/total capacity, during the sampling period.
Utilization (Total, Read, Write) %	Percentage of available bandwidth used for transmission (Tx) and reception (Rx).
Write pending (Total)	Number of write I/O service requests that are pending.

Filtering for Objects In-Context

When configuring a widget on an asset's landing page, you can set *in-context* filters to show only objects directly related to the current asset. By default, when you add a widget, *all* objects of the selected type on your tenant are displayed. In-context filters allow you to display only the data relevant to your current asset.

On most asset landing pages, widgets allow you to filter for objects related to the current asset. In filter drop-downs, object types that display a link icon can be filtered in-context to the current asset.

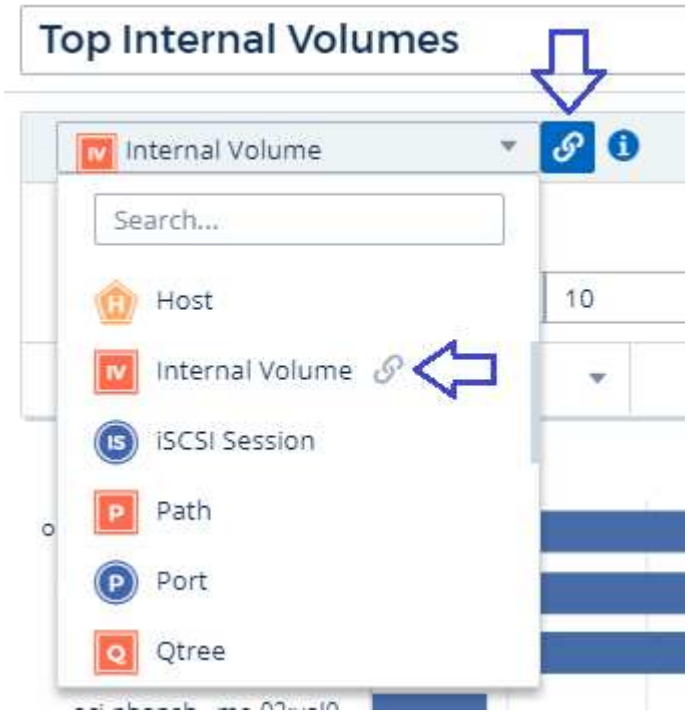
For example, on a Storage asset page, you can add a Bar Chart widget to show the top IOPS on internal volumes only on that storage. By default, when you add a widget, *all* internal volumes on your tenant are displayed.

To show only internal volumes on the current storage asset, do the following:

Steps

1. Open an asset page for any **Storage** asset.
2. Click **Edit** to open the asset page in Edit mode.

3. Click **Add Widget** and select *Bar Chart*.
4. Select **Internal Volume** for the object type to display on the bar chart. Notice that the internal volume object type has a link icon beside it. The "linked" icon is enabled by default.



5. Choose *IOPS - Total* and set any additional filters you like.
6. Collapse the **Roll Up** field by clicking the [X] beside it. The **Show** field is displayed.
7. Choose to show Top 10.
8. Save the widget.

   The bar chart shows only the internal volumes that reside on the current storage asset.

The widget will be displayed on the asset pages for all storage objects. When the in-context link is enabled in the widget, the bar chart shows data for internal volumes related only to the currently-displayed storage asset.

To unlink the object data, edit the widget and click the link icon next to the object type. The link becomes disabled and the chart displays data for *all* objects on your tenant.

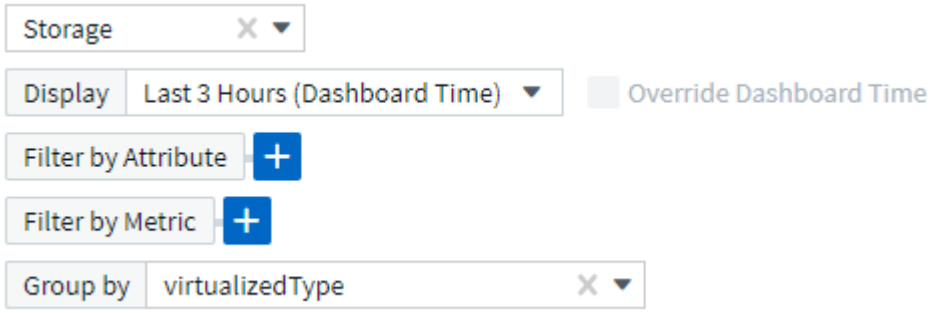
You can also use **special variables in widgets** to display asset-related information on landing pages.

Storage Virtualization

Data Infrastructure Insights can differentiate between a storage array having local storage or virtualization of other storage arrays. This gives you the ability to relate cost and distinguish performance from the front-end all the way to the back-end of your infrastructure.

Virtualization in a Table Widget

One of the easiest ways to begin looking at your storage virtualization is to create a dashboard table widget showing Virtualized type. When building the query for the widget, simply add "virtualizedType" to your grouping or filter.



The resulting table widget shows you the *Standard*, *Backend*, and *Virtual* storages on your tenant.

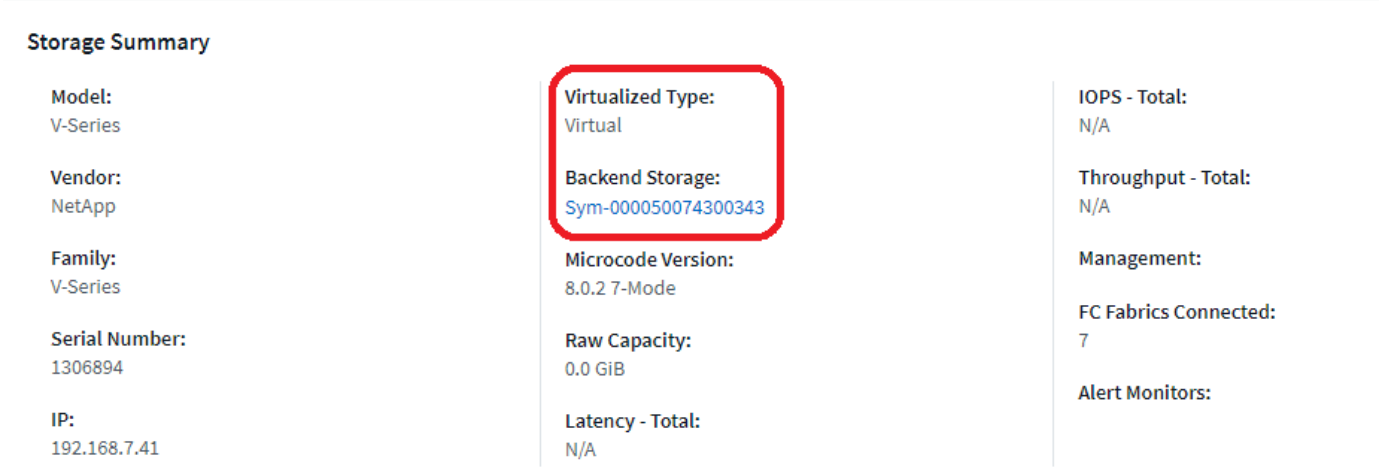
Storage by virtualizedType

50 items found in 4 groups

virtualizedType	Storage
Backend (5)	--
Backend	Sym-Perf
Backend	Sym-000050074300343
Backend	CX600_26_CK00351029326
Backend	VNX8000_46_CK00351029346
Backend	Sym-000050074300324
Standard (36)	--
Virtual (8)	--

Landing Pages show Virtualized information

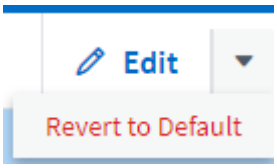
On a storage, volume, internal volume, or disk landing page, you can see relevant virtualization information. For example, looking at the storage landing page below, you can see that this is a Virtual storage, and which backend storage system applies. Any relevant tables on landing pages will also show virtualization information as applicable.



Existing landing pages and dashboards

Be aware that if you currently have customized landing pages or dashboards on your tenant, these will not automatically show all virtualization information by default. However, you can *Revert to Default* any customized dashboard or landing page (you will have to re-implement your customizations), or modify the relevant widgets to include the desired virtualization attributes or metrics.

Revert to Default is available in the upper-right corner of a custom dashboard or landing page screen.



Hints and Tips to Search for Assets and Alerts

Multiple search techniques can be used to search for data or objects in your monitored environment.

- **Wildcard search**

  You can perform multiple character wildcard search using the * character. For example, *applic*n* would return *application*.

- **Phrases used in search**

  A phrase is a group of words surrounded by double quotation marks; for example, "VNX LUN 5". You can use double quotes to search for documents that contain spaces in their names or attributes.

- **Boolean Operators**

  Using Boolean operators OR, AND, and NOT, you can combine multiple terms to form a more complex query.

  OR

  The OR operator is the default conjunction operator.

If there is no Boolean operator between two terms, the OR operator is used.

The OR operator links two terms and finds a matching document if either of the terms exists in a document.

For example, *storage OR netapp* searches for documents that contain either *storage* or *netapp*.

High scores are given to documents that match most of the terms.

AND

You can use the AND operator to find documents in which both the search terms exist in a single document. For example, *storage AND netapp* searches for documents that contain both *storage* and *netapp*.

You can use the symbol **&&** instead of the word AND.

NOT

When you use the NOT operator, all the documents that contain the term after NOT are excluded from the search results. For example, *storage NOT netapp* searches for documents that contains only *storage* and not *netapp*.

You can use the symbol **!** instead of the word NOT.

Search is case-insensitive.

Search using indexed terms

Searches that match more of the indexed terms result in higher scores.

The search string is split into separate search terms by space. For example, the search string "storage aurora netapp" is split into three keywords: "storage", "aurora", and "netapp". The search is performed using all three terms. The documents that match most of these terms will have the highest score. The more information you provide, the better are the search results. For example, you can search for a storage by its name and model.

The UI displays the search results across categories, with the three top results per category. If you did not find an object that you were expecting, you can include more terms in the search string to improve the search results.

The following table provides a list of indexed terms that can be added to the search string.

Category	Indexed terms
Storage	"storage" name vendor model

Category	Indexed terms
StoragePool	"storagepool" name name of the storage IP addresses of the storage serial number of the storage storage vendor storage model names for all associated internal volumes names for all associated disks
Internal Volume	"internalvolume" name name of the storage IP addresses of the storage serial number of the storage storage vendor storage model name of the storage pool names of all associated shares names of all associated applications
Volume	"volume" name label names of all internal volumes name of the storage pool name of the storage IP addresses of the storage serial number of the storage storage vendor storage model
Storage Node	"storagenode" name name of the storage IP addresses of the storage serialnumber of the storage storage vendor storage model
Host	"host" name IP addresses names of all associated applications
Datastore	"datastore" name virtual center IP names of all volumes names of all internal volumes

Category	Indexed terms
Virtual Machines	"virtualmachine" name DNS name IP addresses name of the host IP addresses of the host names of all datastores names of all associated applications
Switches (regular and NPV)	"switch" IP address wwn name serial number model domain ID name of the fabric wwn of the fabric
Application	"application" name tenant line of business business unit project
Tape	"tape" IP address name serial number vendor
Port	"port" wwn name
Fabric	"fabric" wwn name
Storage Virtual Machine (SVM)	"storagevirtualmachine" name UUID

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