



Monitoring performance using the Performance Inventory pages

OnCommand Unified Manager 9.5

NetApp
February 12, 2024

This PDF was generated from <https://docs.netapp.com/us-en/oncommand-unified-manager-95/online-help/concept-object-monitoring-using-the-object-inventory-performance-pages.html> on February 12, 2024. Always check docs.netapp.com for the latest.

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Monitoring performance using the Performance Inventory pages

The object inventory performance pages display performance information, performance events, and object health for all objects within an object type category. This provides you with an at-a-glance overview of the performance status of each object within a cluster, for example, for all nodes or all volumes.

Object inventory performance pages provide a high-level overview of object status, enabling you to assess the overall performance of all objects and compare object performance data. You can refine the content of object inventory pages by searching, sorting, and filtering. This is beneficial when monitoring and managing object performance, because it enables you to quickly locate objects with performance issues and to begin the troubleshooting process.

Performance / Nodes

Last updated: 07:43 AM, 03 Nov

 Refresh

Latency, IOPS, MBps, Utilization are based on hourly samples averaged over the previous 72 hours

Search Node data

Filtering

Export

Assign Performance Threshold Policy

Clear Performance Threshold Policy

<input type="checkbox"/>	Status	Node	Latency	IOPS	MBps	Flash Cache F	Perf. Capacity	Utilization	Free Capacity	Total Capacity	Cluster	Policy	
<input type="checkbox"/>	<div><div></div><div></div></div>	opm-mobility-02	0.704 ms/op	5,011 IOPS	49.2 MBps	N/A	23%	21%	93,708 GB	103,748 GB	opm-m...lity		
<input type="checkbox"/>	<div><div></div><div></div></div>	opm-vitality-02	0.357 ms/op	< 1 IOPS	46.8 MBps	0%	N/A	20%	972 GB	3,563 GB	opm-vitality		
<input type="checkbox"/>	<div><div></div><div></div></div>	opm-longevity-01	0.523 ms/op	456 IOPS	20.9 MBps	N/A	N/A	6%	2,162 GB	2,953 GB	opm-lo...vity		
<input type="checkbox"/>	<div><div></div><div></div></div>	opm-mobility-01	61.3 ms/op	2,750 IOPS	25.7 MBps	N/A	9%	8%	80,175 GB	90,361 GB	opm-m...lity	headroom	
<input checked="" type="checkbox"/>	<div><div></div><div></div></div>	opm-vitality-01	15.2 ms/op	3,575 IOPS	146 MBps	0%	N/A	25%	2,835 GB	4,800 GB	opm-vitality		
<input type="checkbox"/>	<div><div></div><div></div></div>	opm-longevity-02	0.106 ms/op	< 1 IOPS	7.93 MBps	N/A	N/A	8%	5,743 GB	6,762 GB	opm-lo...vity		

By default, objects on the performance inventory pages are sorted based on object performance criticality. Objects with new critical performance events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. All performance data is based on a 72-hour average.

You can easily navigate from the object inventory performance page to an object details page by clicking the object name in the object name column. For example, on the Performance/Nodes inventory page, you would click a node object in the **Nodes** column. The object details page provides in-depth information and detail about the selected object, including side-by-side comparison of active events.

Object monitoring using the Performance object inventory pages

The Performance object inventory pages enable you to monitor object performance based on the values of specific performance counters or based on performance events. This is beneficial because identifying objects with performance events enables you to investigate the cause of cluster performance issues.

The Performance object inventory pages display the associated counters, associated objects, and performance threshold policies for all objects in all clusters. These pages also enable you to apply

performance threshold policies to objects. You can sort the page based on any column, and you can search across all object names or data.

You can export data from these pages to a comma-separated values (`.csv`) file by using the **Export** button, and then use the exported data to build reports.

Refining Performance inventory page contents

The inventory pages for performance objects contain tools to help you refine object inventory data content, enabling you to locate specific data quickly and easily.

Information contained within the Performance object inventory pages can be extensive, often spanning multiple pages. This kind of comprehensive data is excellent for monitoring, tracking, and improving performance; however, locating specific data requires tools to enable you to quickly locate the data for which you are looking. Therefore, the Performance object inventory pages contain functionality for searching, sorting, and filtering. Additionally, searching and filtering can work together to further narrow your results.

Searching on Object Inventory Performance pages

You can search strings on Object Inventory Performance pages. Use the **Search** field located at the top right of the page to quickly locate data based on either object name or policy name. This enables you to quickly locate specific objects and their associated data, or to quickly locate policies and view associated policy object data.

Steps

1. Perform one of the following options, based on your search requirements:

To locate this...	Type this...
A specific object	The object name into the Search field, and click Search . The object for which you searched and its related data is displayed.
A user-defined performance threshold policy	All or part of the policy name into the Search field, and click Search . The objects assigned to the policy for which you searched are displayed.

Sorting on the Object Inventory Performance pages

You can sort all data on Object Inventory Performance pages by any column in ascending or descending order. This enables you to quickly locate object inventory data, which is helpful when examining performance or beginning a troubleshooting process.

About this task

The selected column for sorting is indicated by a highlighted column heading name and an arrow icon indicating the sorting direction at the right of the name. An up arrow indicates ascending order; a down arrow indicates descending order. The default sort order is by **Status** (event criticality) in descending order, with the most critical performance events listed first.

Steps

1. You can click a column name to toggle the sort order of the column in ascending or descending order.

The Object Inventory Performance page contents are sorted in ascending or descending order, based on the selected column.

Filtering data in the Object Inventory Performance pages

You can filter data in the Object Inventory Performance pages to quickly locate data based on specific criteria. You can use filtering to narrow the contents of the Object Inventory Performance pages to show only the results you have specified. This provides a very efficient method of displaying only the performance data in which you are interested.

About this task

You can use the Filtering panel to customize the grid view based on your preferences. Available filter options are based on the correlated object type being viewed in the grid. If filters are currently applied, an asterisk (*) displays at the left of the Filtering control.

Four types of filter parameters are supported.

Parameter	Validation
String (text)	The operators are contains and starts with .
Number	The operators are greater than and less than .
Resource	The operators are name contains and name starts with .
Status	The operators are is and is not .

All three fields are required for each filter; the available filters reflect the filterable columns on the current page. The maximum number of filters you can apply is four. Filtered results are based on combined filter parameters. Filtered results apply to all pages in your filtered search, not just the page currently displayed.

You can add filters using the Filtering panel.

1. At the top of the page, click **Filtering**. The Filtering panel displays.
2. In the Filtering panel, click the left drop-down list, and select an object name: for example, *Cluster*, or a performance counter.
3. Click the center drop-down list, and select the boolean operator **name contains** or **name starts with** if the first selection was an object name. If the first selection was a performance counter, select **greater than** or **less than**. If the first selection was **Status**, select **is** or **is not**.
4. If your search criteria requires a numeric value, up and down arrow buttons display in the field at the right. You can click the up and down arrow buttons to display your desired numeric value.
5. If required, type your non-numeric search criteria in the text field at the right.

6. To add filters, click **Add Filter**. An additional filter field displays. Complete this filter using the process described in the preceding steps. Note that upon adding your fourth filter, the **Add Filter** button no longer displays.
7. Click **Apply Filter**. The filter options are applied to the grid and an asterisk (*) is displayed in the Filtering button.
8. Use the Filtering panel to remove individual filters by clicking the trash icon at the right of the filter to be removed.
9. To remove all filters, click **Reset** at the bottom of the filtering panel.

Filtering example

The illustration shows the Filtering panel with three filters. The **Add Filter** button displays when you have fewer than the maximum of four filters.

The screenshot shows a filtering panel with three filter rows. Each row has a field type dropdown, a comparison operator dropdown, a value input field, and a trash icon. The first row is 'MBps' with 'greater than' and '5'. The second row is 'Node' with 'name starts with' and 'test'. The third row is 'Type' with 'is' and 'FCP Port'. Below the filters is a '+ Add Filter' button. At the bottom right are 'Cancel' and 'Apply Filter' buttons.

After clicking **Apply Filter**, the Filtering panel closes and applies your filters.



Understanding the Unified Manager recommendations to tier data to the cloud

The Performance/Volumes inventory page displays information related to the size of the user data stored on the volume that is inactive (cold). In some cases, Unified Manager identifies certain volumes that would benefit by tiering the inactive data to the cloud tier (cloud provider or StorageGRID) of a FabricPool-enabled aggregate.



FabricPool was introduced in ONTAP 9.2, so if you are using a version of ONTAP software prior to 9.2, the Unified Manager recommendation to tier data requires upgrading your ONTAP software. Additionally, the `auto` tiering policy was introduced in ONTAP 9.4, so if the recommendation is to use the `auto` tiering policy, you must upgrade to ONTAP 9.4 or greater.

The following three fields on Performance/Volumes inventory page provide information about whether you can improve your storage system's disk utilization and save space on the performance tier by moving inactive data to the cloud tier.

- **Tiering Policy**

The tiering policy determines whether the data on the volume remains on the performance tier or whether some of the data is moved from the performance tier to the cloud tier.

The value in this field indicates the tiering policy set on the volume, even if the volume does not currently reside on a FabricPool aggregate. The tiering policy takes effect only when the volume is on a FabricPool aggregate.

- **Cold Data**

The cold data displays the size of the user data stored on the volume that is inactive (cold).

A value is displayed here only when using ONTAP 9.4 or greater software because it requires that the aggregate on which the volume is deployed has the `inactive data reporting` parameter set to `enabled`, and that the minimum number of cooling days threshold has been met (for volumes that use the `snapshot-only` or `auto` tiering policy). Otherwise the value is listed as “N/A”.

- **Cloud Recommendation**

After enough information has been captured about the data activity on the volume, Unified Manager may determine there is no action required, or that you could save space on the performance tier by tiering inactive data to the cloud tier.



The Cold Data field is updated every 15 minutes, but the Cloud Recommendation field is updated every 7 days when the cold data analysis is performed on the volume. Therefore, the exact amount of cold data may differ between the fields. The Cloud Recommendation field displays the date when the analysis was run.

When Inactive Data Reporting is enabled, the Cold Data field displays the exact amount of inactive data. Without the inactive data reporting capability Unified Manager uses performance statistics to determine if data is inactive on a volume. The amount of inactive data is not displayed in the Cold Data field in this case, but it is displayed when you hover your cursor over the word **Tier** to view the cloud recommendation.

The cloud recommendations you will see are:

- **Learning.** Not enough data has been collected to make a recommendation.
- **Tier.** Analysis has determined that the volume contains inactive (cold) data and that you should configure the volume to move that data to the cloud tier. In some cases this may require that you move the volume to a FabricPool-enabled aggregate first. In other cases where the volume is already on a FabricPool aggregate, you just have to change the tiering policy.
- **No Action.** Either the volume has very little inactive data, the volume is already set to the “auto” tiering policy on a FabricPool aggregate, or the volume is a data protection volume. This value is also displayed when the volume is offline or when it is being used in a MetroCluster configuration.

To move a volume, or to change the volume tiering policy or the aggregate inactive data reporting settings, use OnCommand System Manager, the ONTAP CLI commands, or a combination of these tools.

If you are logged in to Unified Manager with the OnCommand Administrator or Storage Administrator role, the **Configure Volume** link is available in the cloud recommendation when you hover your cursor over the word **Tier**. Click this button to open the Volumes page in System Manager to make the recommended change.

Descriptions of the Performance inventory pages

You use the Performance inventory pages to see a summary of performance information about each of the available storage objects, such as clusters, aggregates, volumes, and so on. You can link to the Performance object detail pages to view detailed information for a particular object.

Performance/Clusters inventory page

The Performance/Clusters inventory page displays an overview of the performance events, data, and configuration information for each cluster that is monitored by an instance of Unified Manager. This page enables you to monitor the performance of your clusters, and to troubleshoot performance issues and threshold events.

Depending on how you navigate to this page, a different title may be displayed on the page to indicate whether the list has been filtered. For example, when displaying all clusters, the title is “Clusters”. When displaying a subset of clusters that are returned from the Threshold Policies page, the title is “Clusters on which policy XYZ is applied”.

The buttons along the top of the page enable you to perform searches to locate specific data, create and apply filters to narrow the list of displayed data, export the data on the page to a `.csv` file, and add or remove columns from the page.

By default, objects on the object inventory pages are sorted based on object performance event criticality. Objects with critical events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. The values of the performance counters are based on an average from the previous 72 or more hours of data, as indicated on the page. You can click the refresh button to update the object inventory data.

You can assign performance threshold policies to, or clear threshold policies from, any object on the object inventory pages using the **Assign Performance Threshold Policy** and **Clear PerformanceThreshold Policy** buttons.

Clusters inventory page columns

The Performance/Clusters inventory page contains the following columns for each cluster.

- **Status**

A healthy object with no active events displays a green check mark icon (✓). If the object has an active event, the event indicator icon identifies the event severity: critical events are red (✗), error events are orange (⚠), and warning events are yellow (⚠).

- **Cluster**

The name of the cluster. You can click the cluster name to navigate to that cluster's performance details page.

- **IOPS**

The input/output operations per second on the cluster.

- **MBps**

The throughput on the cluster, measured in megabytes per second.

- **Free Capacity**

The unused storage capacity for this cluster, in gigabytes.

- **Total Capacity**

The total storage capacity for this cluster, in gigabytes.

- **Node Count**

The number of nodes in the cluster. You can click the node count number to navigate to the Performance/Nodes inventory page.

- **Host Name or IP Address**

The host name or IP address (IPv4 or IPv6) of the cluster management LIF.

- **Serial #**

The unique identification number of the cluster.

- **OS Version**

The version of ONTAP software that is installed on the cluster.



If different versions of ONTAP software are installed on the nodes in the cluster, the lowest version number is listed. You can view the ONTAP version that is installed on each node from the Performance/Nodes inventory page.

- **Threshold Policy**

The user-defined performance threshold policy, or policies, that are active on this storage object. You can position your cursor over policy names containing an ellipsis (...) to view the full policy name or the list of assigned policy names. The **Assign Performance Threshold Policy** and **Clear Performance Threshold Policy** buttons remain disabled until you select one or more objects by clicking the check boxes located at the far left.

Performance/Nodes inventory page

The Performance/Nodes inventory page displays an overview of the performance events, data, and configuration information for each node that is being monitored by an instance of Unified Manager. This enables you to quickly monitor the performance of your nodes, and to troubleshoot performance issues and threshold events.

Depending on how you navigate to this page, the top of the page may display a different title to indicate whether the list has been filtered. For example, when displaying all nodes, the title is “Nodes”. When displaying a subset of nodes that is returned from the Cluster Inventory page, the title is “Nodes on cluster: opm-cluster2”.

The buttons along the top of the page enable you to perform searches to locate specific data, create and apply

filters to narrow the list of displayed data, export the data on the page to a .csv file, and add or remove columns from the page.

By default, objects on the object inventory pages are sorted based on object performance event criticality. Objects with critical events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. The values of the performance counters are based on an average from the previous 72 or more hours of data, as indicated on the page. You can click the refresh button to update the object inventory data.

You can assign performance threshold policies to, or clear threshold policies from, any object on the object inventory pages using the **Assign Performance Threshold Policy** and **Clear PerformanceThreshold Policy** buttons.

Nodes inventory page columns

The Performance/Nodes inventory page contains the following columns for each node:

- **Status**

A healthy object with no active events displays a green check mark icon (✓). If the object has an active event, the event indicator icon identifies the event severity: critical events are red (✗), error events are orange (!), and warning events are yellow (⚠).

- **Node**

The name of the node. You can click the node name to navigate to that node's performance details page.

- **Latency**

The average response time for all I/O requests on the node, expressed in milliseconds per operation.

- **IOPS**

The average input/output operations per second on the node.

- **MBps**

The throughput on the node, measured in megabytes per second.

- **Flash Cache Reads**

The percentage of read operations on the node that are satisfied by cache, instead of being returned from the disk.



Flash Cache data is displayed only for nodes, and only when a Flash Cache module is installed in the node.

- **Performance Capacity Used**

The percentage of performance capacity that is being consumed by the node.



Performance capacity data is available only when the nodes in a cluster are installed with ONTAP 9.0 or later software.

- **Utilization**

Indicates whether the CPU or memory on the node is being overused.

- **Free Capacity**

The unused storage capacity of the node, in gigabytes.

- **Total Capacity**

The total storage capacity of the node, in gigabytes.

- **Cluster**

The cluster to which the node belongs. You can click the cluster's name to navigate to that cluster's details page.

- **Threshold Policy**

The user-defined performance threshold policy, or policies, that are active on this storage object. You can position your cursor over policy names containing an ellipsis (...) to view the full policy name or the list of assigned policy names. The **Assign Performance Threshold Policy** and **Clear Performance Threshold Policy** buttons remain disabled until you select one or more objects by clicking the check boxes located at the far left.

Performance/Aggregates inventory page

The Performance/Aggregates inventory page displays an overview of the performance events, data, and configuration information for each aggregate that is monitored by an instance of Unified Manager. This page enables you to monitor the performance of your aggregates, and to troubleshoot performance issues and threshold events.

Depending on how you navigate to this page, a different title may be displayed on the page to indicate whether the list has been filtered. For example, when displaying all aggregates, the title is "Aggregates". When displaying a subset of aggregates that are returned from the Threshold Policies page, the title is "Aggregates on which policy aggr_IOPS is applied".

The buttons along the top of the page enable you to perform searches to locate specific data, create and apply filters to narrow the list of displayed data, export the data on the page to a .csv file, and add or remove columns from the page.

By default, objects on the object inventory pages are sorted based on object performance event criticality. Objects with critical events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. The values of the performance counters are based on an average from the previous 72 or more hours of data, as indicated on the page. You can click the refresh button to update the object inventory data.

You can assign performance threshold policies to, or clear threshold policies from, any object on the object inventory pages using the **Assign Performance Threshold Policy** and **Clear PerformanceThreshold Policy** buttons.



Root aggregates are not displayed on this page.

Aggregates inventory page columns

The Performance/Aggregates inventory page contains the following columns for each aggregate.

- **Status**

A healthy object with no active events displays a green check mark icon (✓). If the object has an active event, the event indicator icon identifies the event severity: critical events are red (✗), error events are orange (!), and warning events are yellow (⚠).

- **Aggregate**

You can click the aggregate name to navigate to that aggregate's performance details page.

- **Aggregate Type**

The type of aggregate:

- HDD
- Hybrid

Combines HDDs and SSDs, but Flash Pool has not been enabled.

- Hybrid (Flash Pool)

Combines HDDs and SSDs, and Flash Pool has been enabled.

- SSD
- SSD (FabricPool)

Combines SSDs and a cloud tier

- VMDisk (SDS)

Virtual disks within a virtual machine

- VMDisk (FabricPool)

Combines virtual disks and a cloud tier

- LUN (FlexArray) This column displays "Not Available" when the monitored storage system is running a version of ONTAP earlier than 8.3.

- **Latency**

The average response time for all I/O requests on the aggregate, expressed in milliseconds per operation.

- **IOPS**

The input/output operations per second on the aggregate.

- **MBps**

The throughput on the aggregate, measured in megabytes per second.

- **Performance Capacity Used**

The percentage of performance capacity that is being used by the aggregate.



Performance capacity data is available only when the nodes in a cluster are installed with ONTAP 9.0 or later software.

- **Utilization**

The percentage of the aggregate's disks that are currently being used.

- **Free Capacity**

The unused storage capacity for this aggregate, in gigabytes.

- **Total Capacity**

The total storage capacity for this aggregate, in gigabytes.

- **Inactive Data Reporting**

Whether the inactive data reporting capability is enabled or disabled on this aggregate. When enabled, volumes on this aggregate display the amount of cold data in the Performance/Volumes inventory page.

The value in this field is "N/A" when the version of ONTAP does not support inactive data reporting.

- **Cluster**

The cluster to which the aggregate belongs. You can click the cluster name to navigate to that cluster's details page.

- **Node**

The node to which the aggregate belongs. You can click the node name to navigate to that node's details page.

- **Threshold Policy**

The user-defined performance threshold policy, or policies, that are active on this storage object. You can position your cursor over policy names containing an ellipsis (...) to view the full policy name or the list of assigned policy names. The **Assign Performance Threshold Policy** and **Clear Performance Threshold Policy** buttons remain disabled until you select one or more objects by clicking the check boxes located at the far left.

Performance/Volumes inventory page

The Performance/Volumes inventory page displays an overview of the performance events, counter data, and configuration information for each FlexVol volume and FlexGroup volume that is being monitored by an instance of Unified Manager. This enables you to quickly monitor the performance of your volumes, and to troubleshoot performance issues and threshold events.

Depending on how you navigate to this page, the top of the page may display a different title to indicate whether the list has been filtered. For example, when displaying all volumes, the title is "Volumes". When displaying a subset of volumes that is returned from the Threshold Policies page, the title is "Volumes on which

policy: vol_IOPS is applied”.

The buttons along the top of the page enable you to perform searches to locate specific data, create and apply filters to narrow the list of displayed data, export the data on the page to a .csv file, and add or remove columns from the page.

By default, objects on the object inventory pages are sorted based on object performance event criticality. Objects with critical events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. The values of the performance counters are based on an average from the previous 72 or more hours of data, as indicated on the page. You can click the refresh button to update the object inventory data.



For data protection (DP) volumes, only counter values for user-generated traffic are displayed. When the cluster is installed with a version of ONTAP software prior to 8.3, no counter values are displayed.

You can assign performance threshold policies to, or clear threshold policies from, any object on the object inventory pages using the **Assign Performance Threshold Policy** and **Clear PerformanceThreshold Policy** buttons.



Root volumes are not displayed on this page.

Volume inventory page columns

The Performance/Volumes inventory page contains the following columns for each volume:

- **Status**

A healthy object with no active events displays a green check mark icon (✓). If the object has an active event, the event indicator icon identifies the event severity: critical events are red (✗), error events are orange (!), and warning events are yellow (⚠).

- **Volume**

The volume name. You can click the volume name to navigate to the volume's performance details page.

- **Style**

The style of volume; either FlexVol or FlexGroup.

- **Latency**

For FlexVol volumes, this is the average response time of the volume for all I/O requests, expressed in milliseconds per operation. For FlexGroup volumes, this is the average latency of all constituent volumes.

- **IOPS**

For FlexVol volumes, this is the number of input/output operations per second for the volume. For FlexGroup volumes, this is the sum of IOPS for all constituent volumes.

- **MBps**

For FlexVol volumes, this is the throughput on the volume, measured in megabytes per second. For FlexGroup volumes, this is the sum of MBps for all constituent volumes.

- **Free Capacity**

The unused storage capacity of the volume, expressed in gigabytes.

- **Total Capacity**

The total storage capacity of the volume, expressed in gigabytes.

- **Tiering Policy**

The tiering policy set on the volume. The policy takes effect only when the volume is deployed on a FabricPool aggregate. The available policies are:

- None. The data for this volume always remains on the performance tier.
- Snapshot Only. Only Snapshot data is moved automatically to the cloud tier. All other data remains on the performance tier.
- Backup. On data protection volumes, all transferred user data starts in the cloud tier, but later client reads can cause hot data to move back to the performance tier.
- Auto. Data on this volume is moved between the performance tier and the cloud tier automatically when ONTAP determines that the data is “hot” or “cold”.

- **Cold Data**

The size of the user data stored on the volume that is inactive (cold).

The value is listed as “N/A” in the following situations:

- When “inactive data reporting” is disabled on the aggregate on which the volume resides.
- When “inactive data reporting” is enabled, but the minimum number of days for collecting data has not been reached.
- When using the “backup” tiering policy, or when using a version of ONTAP prior to 9.4 (when inactive data reporting is not available).

- **Cloud Recommendation**

Unified Manager runs capacity analysis on each volume to determine if you can improve your storage system’s disk utilization and save space on the performance tier by moving inactive (cold) data to the cloud tier. When the recommendation is “Tier”, hover your cursor over the word **Tier** to view the recommendation. Possible recommendations are:

- Learning. Not enough data has been collected to make a recommendation.
- Tier. Analysis has determined that the volume contains inactive (cold) data and that you should configure the volume to move that data to the cloud tier.
- No Action. Either the volume has very little inactive data, or the volume is already set to the “auto” tiering policy, or the version of ONTAP does not support FabricPool. If you are logged in to Unified Manager with the OnCommand Administrator or Storage Administrator role, when you hover your cursor over the word **Tier** the **Configure Volume** link is available to launch System Manager so you can make the recommended change.

- **Cluster**

The cluster to which the volume belongs. You can click the cluster name to navigate to that cluster’s details page.

- **Node**

The name of the node on which the FlexVol volume resides, or the number of nodes on which the FlexGroup volume resides.

For FlexVol volumes, you can click the name to display node details in the Node details page. For FlexGroup volumes, you can click the number to display the nodes that are used in the FlexGroup in the Nodes inventory page.

- **SVM**

The storage virtual machine (SVM) to which the volume belongs. You can click the SVM name to navigate to that SVM's details page.

- **Aggregate**

The name of the aggregate on which the FlexVol volume resides, or the number of aggregates on which the FlexGroup volume resides.

For FlexVol volumes, you can click the name to display aggregate details in the Aggregate details page. For FlexGroup volumes, you can click the number to display the aggregates that are used in the FlexGroup in the Aggregates inventory page.

- **Threshold Policy**

The user-defined performance threshold policy, or policies, that are active on this storage object. You can position your cursor over policy names containing an ellipsis (...) to view the full policy name or the list of assigned policy names. The **Assign Performance Threshold Policy** and **Clear Performance Threshold Policy** buttons remain disabled until you select one or more objects by clicking the check boxes located at the far left.

Performance/Ports inventory page

The Performance/Ports inventory page displays an overview of the performance events, data, and configuration information for each port that is being monitored by an instance of Unified Manager. This enables you to quickly monitor the performance of your ports, and to troubleshoot performance issues and threshold events.



Performance counter values are displayed for physical ports only. Counter values are not displayed for VLANs or interface groups.

Depending on how you navigate to this page, the top of the page may display a different title to indicate whether the list has been filtered. For example, when displaying all ports, the title is “Ports”. When displaying a subset of ports that is returned from the Threshold Policies page, the title is “Ports on which policy: port_IOPS is applied”.

The buttons along the top of the page enable you to perform searches to locate specific data, create and apply filters to narrow the list of displayed data, export the data on the page to a .csv file, and add or remove columns from the page.

By default, objects on the object inventory pages are sorted based on object performance event criticality. Objects with critical events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. The values of the performance counters are

based on an average from the previous 72 or more hours of data, as indicated on the page. You can click the refresh button to update the object inventory data.

You can assign performance threshold policies to, or clear threshold policies from, any object on the object inventory pages using the **Assign Performance Threshold Policy** and **Clear PerformanceThreshold Policy** buttons.

Ports inventory page columns

The Performance/Ports inventory page contains the following columns for each port:

- **Status**

A healthy object with no active events displays a green check mark icon (✓). If the object has an active event, the event indicator icon identifies the event severity: critical events are red (✗), error events are orange (!), and warning events are yellow (⚠).

- **Port**

You can click the port name to navigate to that port's performance details page.

- **Type**

The port type is either Network or Fibre Channel Protocol (FCP).

- **MBps**

The throughput on the port, measured in megabytes per second.

- **Utilization**

The percentage of the port's available bandwidth that is currently being used.

- **Cluster**

The cluster to which the port belongs. You can click the cluster name to navigate to that cluster's details page.

- **Node**

The node to which the port belongs. You can click the node name to navigate to that node's details page.

- **Speed**

The maximum data transfer rate for the port.

- **Role**

The network port function: either Data or Cluster. FCP ports cannot have a role, and the role is displayed as N/A.

- **Threshold Policy**

The user-defined performance threshold policy, or policies, that are active on this storage object. You can position your cursor over policy names containing an ellipsis (...) to view the full policy name or the list of assigned policy names. The **Assign Performance Threshold Policy** and **Clear Performance Threshold**

Policy buttons remain disabled until you select one or more objects by clicking the check boxes located at the far left.

Performance/SVMs inventory page

The Performance/SVMs inventory page displays an overview of the performance events, data, and configuration information for each storage virtual machine (SVM) that is being monitored by an instance of Unified Manager. This enables you to quickly monitor the performance of your SVMs, and to troubleshoot performance issues and threshold events.

Depending on how you navigate to this page, the top of the page may display a different title to indicate whether the list has been filtered. For example, when displaying all SVMs, the title is “SVMs”. When displaying a subset of SVMs that is returned from the Threshold Policies page, the title is “SVMs on which policy: SVM_IOPS is applied”.

The buttons along the top of the page enable you to perform searches to locate specific data, create and apply filters to narrow the list of displayed data, export the data on the page to a .csv file, and add or remove columns from the page.

By default, objects on the object inventory pages are sorted based on object performance event criticality. Objects with critical events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. The values of the performance counters are based on an average from the previous 72 or more hours of data, as indicated on the page. You can click the refresh button to update the object inventory data.

You can assign performance threshold policies to, or clear threshold policies from, any object on the object inventory pages using the **Assign Performance Threshold Policy** and **Clear PerformanceThreshold Policy** buttons.



The SVMs that are listed on this page include only Data and Cluster SVMs. Unified Manager does not use or display Admin or Node SVMs.

SVMs inventory page columns

The Performance/SVMs inventory page contains the following columns for each SVM:

- **Status**

A healthy object with no active events displays a green check mark icon (✓). If the object has an active event, the event indicator icon identifies the event severity: critical events are red (✗), error events are orange (!), and warning events are yellow (⚠).

- **SVM**

You can click the SVM name to navigate to that SVM's performance details page.

- **Latency**

The average response time for all I/O requests, expressed in milliseconds per operation.

- **IOPS**

The input/output operations per second for the SVM.

- **MBps**

The throughput on the SVM, measured in megabytes per second.

- **Free Capacity**

The unused storage capacity of the SVM, in gigabytes.

- **Total Capacity**

The total storage capacity of the SVM, in gigabytes.

- **Cluster**

The cluster to which the SVM belongs. You can click the cluster name to navigate to that cluster's details page.

- **Threshold Policy**

The user-defined performance threshold policy, or policies, that are active on this storage object. You can position your cursor over policy names containing an ellipsis (...) to view the full policy name or the list of assigned policy names. The **Assign Performance Threshold Policy** and **Clear Performance Threshold Policy** buttons remain disabled until you select one or more objects by clicking the check boxes located at the far left.

Performance/LUNs inventory page

The Performance/LUNs inventory page displays an overview of the performance events, data, and configuration information for each LUN that is being monitored by an instance of Unified Manager. This enables you to quickly monitor the performance of your LUNs, and to troubleshoot performance issues and threshold events.

Depending on how you navigate to this page, the top of the page may display a different title to indicate whether the list has been filtered. For example, when displaying all LUNs, the title is "LUNs". When displaying a subset of LUNs that is returned from the Threshold Policies page, the title is "LUNs on which policy: LUN_IOPS is applied".

The buttons along the top of the page enable you to perform searches to locate specific data, create and apply filters to narrow the list of displayed data, export the data on the page to a .csv file, and add or remove columns from the page.

By default, objects on the object inventory pages are sorted based on object performance event criticality. Objects with critical events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. The values of the performance counters are based on an average from the previous 72 or more hours of data, as indicated on the page. You can click the refresh button to update the object inventory data.

You can assign performance threshold policies to, or clear threshold policies from, any object on the object inventory pages using the **Assign Performance Threshold Policy** and **Clear PerformanceThreshold Policy** buttons.

LUNs inventory page columns

The Performance/LUNs inventory page contains the following columns for each LUN:

- **Status**

A healthy object with no active events displays a green check mark icon (✓). If the object has an active event, the event indicator icon identifies the event severity: critical events are red (✗), error events are orange (!), and warning events are yellow (⚠).

- **LUN**

You can click the LUN name to navigate to that LUN's performance details page.

- **Latency**

The average response time for all I/O requests, expressed in milliseconds per operation.

- **IOPS**

The input/output operations per second for the LUN.

- **MBps**

The throughput on the LUN, measured in megabytes per second.

- **Free Capacity**

The unused storage capacity of the LUN, in gigabytes.

- **Total Capacity**

The total storage capacity of the LUN, in gigabytes.

- **Cluster**

The cluster to which the LUN belongs. You can click the cluster name to navigate to that cluster's details page.

- **Node**

The node to which the LUN belongs. You can click the node name to navigate to that node's details page.

- **SVM**

The storage virtual machine (SVM) to which the LUN belongs. You can click the SVM name to navigate to that SVM's details page.

- **Aggregate**

The aggregate to which the LUN belongs. You can click the aggregate name to navigate to that aggregate's details page.

- **Volume**

The volume to which the LUN belongs. You can click the volume name to navigate to that volume's details

page.

- **Threshold Policy**

The user-defined performance threshold policy, or policies, that are active on this storage object. You can position your cursor over policy names containing an ellipsis (...) to view the full policy name or the list of assigned policy names. The **Assign Performance Threshold Policy** and **Clear Performance Threshold Policy** buttons remain disabled until you select one or more objects by clicking the check boxes located at the far left.

Namespaces inventory page

The Namespaces inventory page displays an overview of the performance events, data, and configuration information for each Namespace that is being monitored by an instance of Unified Manager. This enables you to quickly monitor the performance and health of your Namespaces, and to troubleshoot issues and threshold events.

Depending on how you navigate to this page, the top of the page may display a different title to indicate whether the list has been filtered. For example, when displaying all Namespaces, the title is “Namespaces”. When displaying a subset of Namespaces that is returned from the Threshold Policies page, the title is “Namespaces on which policy: Namespace_IOPS is applied”.

The buttons along the top of the page enable you to perform searches to locate specific data, create and apply filters to narrow the list of displayed data, export the data on the page to a .csv file, and add or remove columns from the page.

By default, objects on the object inventory pages are sorted based on object performance event criticality. Objects with critical events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. The values of the performance counters are based on an average from the previous 72 or more hours of data, as indicated on the page. You can click the refresh button to update the object inventory data.

You can assign performance threshold policies to, or clear threshold policies from, any object on the object inventory pages using the **Assign Performance Threshold Policy** and **Clear PerformanceThreshold Policy** buttons.

Namespaces inventory page columns

The Namespaces inventory page contains the following columns for each Namespace:

- **Subsystem**

The subsystem of the Namespace.

- **Status**

A healthy object with no active events displays a green check mark icon (✓). If the object has an active event, the event indicator icon identifies the event severity: critical events are red (✗), error events are orange (!), and warning events are yellow (!).

- **Namespace**

You can click the Namespace name to navigate to that Namespace's performance details page.

- **State**

The current state of the Namespace.

- Offline - Read or write access to the Namespace is not allowed.
- Online - Read and write access to the Namespace is allowed.
- NVFail - The Namespace was automatically taken offline due to an NVRAM failure.
- Space Error - The Namespace has run out of space.

- **SVM**

The storage virtual machine (SVM) to which the Namespace belongs. You can click the SVM name to navigate to that SVM's details page.

- **Cluster**

The cluster to which the Namespace belongs. You can click the cluster name to navigate to that cluster's details page.

- **Volume**

The volume to which the Namespace belongs. You can click the volume name to navigate to that volume's details page.

- **Total Capacity**

The total storage capacity of the Namespace, in gigabytes.

- **Free Capacity**

The unused storage capacity of the Namespace, in gigabytes.

- **IOPS**

The input/output operations per second for the Namespace.

- **Latency**

The average response time for all I/O requests on the Namespace, expressed in milliseconds per operation.

- **MBps**

The throughput on the Namespace, measured in megabytes per second.

- **Threshold Policy**

The user-defined performance threshold policy, or policies, that are active on this storage object. You can position your cursor over policy names containing an ellipsis (...) to view the full policy name or the list of assigned policy names. The **Assign Performance Threshold Policy** and **Clear Performance Threshold Policy** buttons remain disabled until you select one or more objects by clicking the check boxes located at the far left.

Performance/LIFs inventory page

The Performance/LIFs inventory page displays an overview of the performance events, data, and configuration information for each LIF that is being monitored by this instance of Unified Manager. This page enables you to quickly monitor the performance of your LIFs, and to troubleshoot performance issues and threshold events.

Depending on how you navigate to the Performance/LIFs inventory page, the top of the page may display a different title to indicate whether the list has been filtered. For example, when displaying all LIFs, the title is “LIFs”. When displaying a subset of LIFs that is returned from the Threshold Policies page, the title is “LIFs on which policy: LIF_IOPS is applied”.

The buttons along the top of the page enable you to perform searches to locate specific data, create and apply filters to narrow the list of displayed data, export the data on the page to a .csv file, and add or remove columns from the page.

By default, objects on the object inventory pages are sorted based on object performance event criticality. Objects with critical events are listed first, and objects with warning events are listed second. This provides an immediate visual indication of issues that must be addressed. The values of the performance counters are based on an average from the previous 72 or more hours of data, as indicated on the page. You can click the refresh button to update the object inventory data.

You can assign performance threshold policies to, or clear threshold policies from, any object on the object inventory pages using the **Assign Performance Threshold Policy** and **Clear PerformanceThreshold Policy** buttons.



The LIFs that are listed on the Performance/LIFs inventory page include Data LIFs, Cluster LIFs, Node Management LIFs, and Intercluster LIFs. Unified Manager does not use or display System LIFs.

LIFs inventory page columns

The Performance/LIFs inventory page contains the following columns for each LIF.

- **Status**

A healthy object with no active events displays a green check mark icon (✓). If the object has an active event, the event indicator icon identifies the event severity: critical events are red (✗), error events are orange (!), and warning events are yellow (⚠).

- **LIF**

You can click the LIF name to navigate to the performance details page of that LIF.

- **Type**

The LIF type: Network (iSCSI, NFS, CIFS), FCP, or NVMf FCP.

- **Latency**

The average response time for all I/O requests, expressed in milliseconds per operation. Latency is not applicable to NFS LIFs and CIFS LIFs, and is displayed as N/A for these types.

- **IOPS**

The input/output operations per second. IOPS is not applicable to NFS LIFs and CIFS LIFs, and is displayed as N/A for these types.

- **MBps**

The throughput on the LIF, measured in megabytes per second.

- **Cluster**

The cluster to which the LIF belongs. You can click the cluster's name to navigate to that cluster's details page.

- **SVM**

The storage virtual machine to which the LIF belongs. You can click the SVM name to navigate to that SVM's details page.

- **Home Location**

The home location for the LIF, displayed as node name and port name, separated by a colon (:). If the location is displayed with an ellipsis (...), you can position your cursor over the location name to view the full location.

- **Current Location**

The current location for the LIF, displayed as node name and port name, separated by a colon (:). If the location is displayed with an ellipsis (...), you can position your cursor over the location name to view the full location.

- **Role**

The LIF role: Data, Cluster, Node Management, or Intercluster.

- **Threshold Policy**

The user-defined performance threshold policy, or policies, that are active on this storage object. You can position your cursor over policy names containing an ellipsis (...) to view the full policy name or the list of assigned policy names. The **Assign Performance Threshold Policy** and **Clear Performance Threshold Policy** buttons remain disabled until you select one or more objects by clicking the check boxes located at the far left.

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