Descriptions of the Performance Explorer pages

Active IQ Unified Manager 9.9

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Descriptions of the Performance Explorer pages

You use the Performance Explorer pages to view detailed performance information about each of the available storage object; such as clusters, aggregates, volumes, and so on. These pages enable you to assess the overall performance of all objects and compare object performance data in a side-by-side format.

Cluster/Performance Explorer page

The Cluster/Performance Explorer page provides a detailed performance overview of all the clusters that are managed by Unified Manager.

The Cluster/Performance Explorer page enables you to track cluster performance and compare the objects within that cluster during a specific time period, which helps in troubleshooting and fine-tuning the performance of a cluster.

Using the View and Compare functionality you can compare the performance of the cluster with:

- the nodes on this cluster
- the storage VMs of this cluster
- the aggregates on this cluster

The Cluster/Performance Explorer page enables you to:

- View threshold-related issues and their details
- Track cluster performance data
- Investigate and troubleshoot threshold-related issues
- Investigate and troubleshoot performance issues

Node/Performance Explorer page

The Node/Performance Explorer page provides a detailed performance overview of all nodes within a cluster.

The Node/Performance Explorer page enables you to track and compare node performance during a specific time period, which helps you to troubleshoot and fine-tune the performance of your nodes.

Using the View and Compare functionality you can compare the performance of this node with:

- other nodes on the same cluster
- the aggregates on the node
- the ports on the node

The Node/Performance Explorer page enables you to:

- View threshold-related issues and their details
- Track and compare node performance data

- Investigate and troubleshoot threshold-related issues
- Investigate and troubleshoot performance issues

Aggregate/Performance Explorer page

The Aggregate/Performance Explorer page provides a detailed performance overview of all the aggregates in a cluster.

The Aggregate/Performance Explorer page enables you to track and compare aggregate performance during a specific time period, which helps in troubleshooting and fine-tuning the performance of an aggregate.

Root aggregates are not displayed on this page.

Using the View and Compare functionality you can compare the performance of this aggregate with:

- other aggregates on the same node
- other aggregates on the same cluster
- the node on which the aggregate resides
- all nodes on the cluster that is using this aggregate
- the volumes that reside on this aggregate

The Aggregate/Performance Explorer page enables you to:

- View threshold-related issues and their details
- Track and compare aggregate performance data
- Investigate and troubleshoot threshold-related issues
- Investigate and troubleshoot performance issues

Storage VM/Performance Explorer page

The Storage VM/Performance Explorer page provides a detailed performance overview of all the storage virtual machines (SVMs) in a cluster.

This page enables you to track and compare storage VM performance during a specific time period, which helps you to troubleshoot and fine-tune your SVM performance.

Using the View and Compare functionality you can compare the performance of this storage VM with:

- other SVMs on the same cluster
- the volumes on this SVM
- the network interfaces on this SVM

The Storage VM/Performance page enables you to:

- View threshold-related issues and their details
- Track and compare SVM performance data

- Investigate and troubleshoot threshold-related issues
- Investigate and troubleshoot performance issues

Volume/Performance Explorer page

This page provides detailed performance information for a volume in a cluster. The title of this page depends on whether you are viewing a FlexVol volume or a FlexGroup volume.

The Volume/Performance Explorer page enables you to track and compare volume performance during a specific time period, which helps you to troubleshoot and fine-tune your volume performance.

Root volumes are not displayed on this page.

Using the View and Compare functionality:

- For FlexVol volumes, you can compare the performance of this volume with:
  - other volumes on the same aggregate
  - other volumes that are in the same QoS policy group
  - the aggregate on which this volume resides
  - the storage VM on which this volume resides
  - the LUNs that are on this volume
- For FlexGroup volumes, you can compare the performance of this FlexGroup with:
  - the aggregates on which the FlexGroup resides
  - the storage VM on which the FlexGroup resides
  - the constituent volumes of the FlexGroup

The statistics in the charts are updated after each collection period; which by default is every 5 minutes. The View statistics in selector provides an option to show statistics averaged over the previous hour. This functionality enables you to view the latency chart in support of the NetApp"`Performance Guarantee`" program.

The Volume/Performance Explorer page enables you to:

- View threshold-related issues and their details
- Track and compare volume performance data
- Investigate and troubleshoot threshold-related issues
- Investigate and troubleshoot performance issues
- Launch System Manager to make a configuration change to the volume

  The **Configure Volume** button is available if you are logged in to Unified Manager with the Application Administrator or Storage Administrator role, and when using ONTAP 9.5 or greater.

For data protection (DP) volumes, only counter values for user-generated traffic are displayed.

Constituent Volume/Performance Explorer page

The Constituent Volume/Performance Explorer page provides detailed performance information for the selected FlexGroup constituent.

The Constituent Volume/Performance Explorer page enables you to track and compare constituent performance during a specific time period, which helps in troubleshooting and fine-tuning the performance of a FlexGroup volume and its constituent volumes.

Using the View and Compare functionality you can compare the performance of this constituent volume with:

- the aggregate on which this constituent volume resides
- the storage VM on which this constituent volume resides
- the FlexGroup volume to which the constituent volume belongs
- other volumes that are on the same aggregate

The Constituent Volume/Performance Explorer page enables you to:

- View threshold-related issues and their details
- Track and compare constituent performance data
- Investigate and troubleshoot threshold-related issues
- Investigate and troubleshoot performance issues

For data protection (DP) volumes, only counter values for user-generated traffic are displayed.

LUN/Performance Explorer page

The LUN/Performance Explorer page provides a detailed overview of the performance of all the LUNs within a cluster.

The LUN/Performance Explorer page enables you to track and compare LUN performance during a specific time period, which helps you to troubleshoot and fine-tune the performance of your LUNs.

Using the View and Compare functionality you can compare the performance of this LUN with:

- other LUNs that are on the same volume
- other LUNs that are in the same QoS policy group
- the volume on which the LUN resides

The statistics in the charts are updated after each collection period; which by default is every 5 minutes. The View statistics in selector provides an option to show statistics averaged over the previous hour. This functionality enables you to view the latency chart in support of the NetApp “Performance Guarantee” program.

The LUN/Performance Explorer page enables you to:

- View threshold-related issues and their details
- Track and compare LUN performance data
- Investigate and troubleshoot threshold-related issues

- Investigate and troubleshoot performance issues

NVMe Namespace/Performance Explorer page

The NVMe Namespace/Performance Explorer page provides a detailed overview of the performance of all the NVMe Namespaces within a cluster.

The NVMe Namespace/Performance Explorer page enables you to track and compare NVMe Namespace performance during a specific time period, which helps you to troubleshoot and fine-tune the performance of your Namespaces.

Using the View and Compare functionality you can compare the performance of this NVMe Namespace with:

- the volume on which the Namespace resides
- other Namespaces that are on the same volume
- other Namespaces that are on the same storage VM

The NVMe Namespace/Performance Explorer page enables you to:

- View threshold-related issues and their details
- Track and compare Namespace performance data
- Investigate and troubleshoot threshold-related issues
- Investigate and troubleshoot performance issues
- Launch System Manager to make a configuration change to the Namespace

  The **Configure NVMe Namespace** button is available if you are logged in to Unified Manager with the Application Administrator or Storage Administrator role, and when using ONTAP 9.5 or greater.

Network Interface/Performance Explorer page

The Network Interface/Performance Explorer page provides a detailed performance overview for all of the network interfaces (LIFs) within a cluster.

The Network Interface/Performance Explorer page enables you to track and compare network interface performance during a specific time period, which helps you to troubleshoot and fine-tune your network interface performance.

Using the View and Compare functionality you can compare the performance of this network interface with:

- other network interfaces that are on the same port
- other network interfaces that are on the same storage VM
- the port on which the network interface resides
- the storage VM on which the network interface resides

The Network Interface/Performance Explorer page enables you to:

- View threshold-related issues and their details

- Track and compare network interface performance data
- Investigate and troubleshoot threshold-related issues
- Investigate and troubleshoot performance issues

Port/Performance Explorer page

The Port/Performance Explorer page provides a detailed performance overview of all ports in a cluster.

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

The Port/Performance Explorer page enables you to track and compare port performance during a specific time period, which helps you to troubleshoot and fine-tune your port performance.

Using the View and Compare functionality you can compare the performance of this port with:

- other ports on the same node
- the node on which the port resides
- network interfaces that are on the port

Only cluster and data LIFs are displayed when filtering using the “network interfaces on this port” option. No intercluster LIFs are shown.

The Port/Performance Explorer page enables you to:

- View threshold-related issues and their details
- Track and compare port performance data
- Investigate and troubleshoot threshold-related issues
- Investigate and troubleshoot performance issues

Cluster/Performance Information page

Use the Cluster/Performance Information page to view a list of the physical and logical attributes of the cluster. This information might help in answering performance-related questions.

Cluster attributes

- **Management Network Interface**

  The name of the cluster management LIF, and whether the LIF is currently available (Up), or not (Down).

- **IP Address**

  The IPv4 or IPv6 address of the cluster management LIF.

- **FQDN**

The fully qualified domain name (FQDN) of the cluster management LIF.

- **OS Version**

  The version of ONTAP software installed on the cluster.

  > If different versions of ONTAP software are installed on the nodes in the cluster, the listed version is the lowest version number. Check the Node/Performance Information page to view the version of ONTAP software installed on each node.

- **Serial Number**

  The unique identification number of the cluster.

- **Model / Family**

  The platform model number and model family of all the nodes in the cluster.

- **Capacity (free/total)**

  The total storage available to the cluster, in gigabytes, and the amount of storage currently available.

- **Logical Space Used**

  The real size of the data that is being stored on this aggregates of this cluster without applying the savings from using ONTAP storage efficiency technologies.

- **Allowed Protocols**

  The list of all protocols that can be serviced by this cluster. The available protocols are FC/FCoE, iSCSI, HTTP, NVMe, NDMP, NFS, and CIFS.

- **Nodes**

  The number of nodes in this cluster. You can click the number to display the nodes in the Performance/Nodes Inventory page.

- **Storage VM**

  The number of SVMs in this cluster. You can click the number to display the SVMs in the Performance/Storage VMs Inventory page.

- **Network Interfaces**

  The number of LIFs in this cluster. You can click the number to display the LIFs in the Performance/LIFs Inventory page.

- **Contact / Location**

  If available, the name of the storage administrator to contact regarding this cluster, and the location of the cluster.

Node/Performance Information page

Use the Node/Performance Information page to view a list of the physical and logical attributes of the node. This information might help in answering performance-related questions.

Node attributes

- **IP Address**

  The IPv4 or IPv6 address of the node management LIF.

- **FQDN**

  The fully qualified domain name (FQDN) of the node management LIF.

- **OS Version**

  The version of ONTAP software installed on the node.

- **Model / Family**

  The platform model number of the node.

- **Capacity (free/total)**

  The total storage available to the node, in gigabytes, and the amount of storage currently available.

- **Cluster**

  The name of the cluster to which this node belongs. You can click the name to display cluster details the Cluster/Performance Explorer page.

- **HA Partner**

  The name of the HA partner node, if applicable. You can click the name to display partner node details in the Node/Performance Explorer page.

- **Aggregates**

  The number of aggregates on this node. You can click the number to display the aggregates in the Performance/Aggregates Inventory page.

  The number listed here may not match the number in the Performance/Aggregates Inventory page because the inventory page does not include root aggregates.

- **Ports**

  The number of ports on this node. You can click the number to display the ports in the Performance/Ports Inventory page.

  The number listed here may not match the number in the Performance/Ports Inventory page because the inventory page does not include node management ports.

- **Contact / Location**

  If available, the name of the administrator to contact regarding this node, and the location of the node.

- **# of Cores / Speed**

  If available, the number of CPU cores on the controller, and the speed of the CPU cores.

- **RAM**

  If available, the total memory available on the controller.

Flash Devices

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

- **Slot Number**

  The slot number in which the Flash Cache module is installed.

- **Status**

  The operational status of the module. Valid values:

  - Online
  - Offline_failed
  - Offline_threshold

- **Model / Family**

  The model number of the module.

- **Firmware Rev**

  The version of firmware installed on the module.

- **Capacity**

  The size of the installed Flash Cache module.

Aggregate/Performance Information page

Use the Aggregate/Performance Information page to view a list of the physical and logical attributes of the aggregate. This information might help in answering performance-related questions.

Aggregate attributes

- **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

- HDD (FabricPool)

  Combines HDDs and a cloud tier

- VMDisk (SDS)

  Virtual disks within a virtual machine

- VMDisk (FabricPool)

  Combines virtual disks and a cloud tier

- LUN (FlexArray)

- **Cluster**

  The name of the cluster to which the aggregate belongs. You can click the name to display cluster details in the Cluster/Performance Explorer page.

- **Node**

  The name of the node to which the disks of the aggregate belong. You can click the name to display node details in the Node/Performance Explorer page.

- **Flash Pool**

  Whether this is a Flash Pool aggregate: Yes or No.

  A Flash Pool aggregate is a hybrid aggregate that consists of both SSDs and HDDs.

- **FabricPool**

  Whether this is a FabricPool aggregate: Yes or No.

  A FabricPool aggregate is an aggregate that consists of either SSDs and a cloud tier, or HDDs and a cloud tier (starting with ONTAP 9.8).

- **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.

- **Logical Space Used**

  The real size of the data that is being stored on this aggregate without applying the savings from using ONTAP storage efficiency technologies.

Storage VM/Performance Information page

Use the Storage VM/Performance Information page to view a list of the configured attributes of the SVM. This information might help in answering performance-related questions.

Storage VM attributes

- **IP Address**

  The IPv4 or IPv6 addresses of all interfaces connected to this SVM.

- **IPspace**

  The IPspace in which this SVM resides.

- **Domain Name**

  The fully qualified domain names (FQDNs) of the interfaces connected to this SVM.

- **Service Type**

  The type of SVM.

  Possible values include: “Admin” for the cluster-wide management SVM, “System” for cluster-level communications in an IPspace, “Data” for data serving SVM, and “Node” for node management SVM.

- **Capacity (free/total)**

  The total storage available to the SVM, in gigabytes, and the amount of storage currently available.

- **Cluster**

  The name of the cluster to which the SVM belongs. You can click the name to display cluster details in the Cluster/Performance Explorer page.

- **Volumes**

  The number of volumes in the SVM. You can click the number to display the volumes in the Performance/Volumes Inventory page.

- **Network Interfaces**

  The number of network interfaces available to the SVM.

- **Data Network Interfaces**

The number and type of Data network interfaces available to the SVM.

- **Allowed Volume Type**

  The type of volume that can be created on the SVM.

  SVMs can contain one or more FlexVol volumes or FlexGroup volumes.

- **Allowed Protocols**

  The list of all protocols that can be serviced by this SVM. The available protocols are FC/FCoE, iSCSI, HTTP, NDMP, NVMe, NFS, and CIFS.

- **Port Set**

  If defined for FCP or iSCSI protocols, the port set that is assigned to this SVM.

Volume/Performance Information page

Use this page to view a list of the physical and logical attributes of the volume. This information might help in answering performance-related questions. The title of this page depends on whether you are viewing a FlexVol volume or a FlexGroup volume.

Volume attributes

- **Type**

  The volume's type; either read-write (RW) or data-protection (DP).

- **Style**

  The style of volume; either FlexVol or FlexGroup.

- **Cluster**

  The name of the cluster to which this FlexVol volume or FlexGroup volume belongs. You can click the name to display cluster details in the Cluster/Performance Explorer page.

- **Aggregates**

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

  For FlexVol volumes, you can click the name to display aggregate details in the Aggregate/Performance Explorer page. For FlexGroup volumes, you can click the number to display the aggregates that are used in this FlexGroup volume in the Performance/Aggregates Inventory page.

- **Storage VM**

  The name of the SVM to which this FlexVol volume or FlexGroup volume belongs. You can click the name to display SVM details in the Storage VM/Performance Explorer page.

- **Tiering Policy**

The tiering policy set on the volume. The policy takes affect 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 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”.
- All. The data for this volume always remains on the cloud tier.

- **RAID Type**

  The redundancy type that is being used on the performance tier of the aggregate where this volume resides. Possible types:

  - RAID0
  - RAID4
  - RAID-DP
  - RAID-TEC

  The value “Not Applicable” is displayed for FlexGroup volumes because the constituent volumes can be on aggregates of different RAID types.

- **Capacity (free/total)**

  The total storage available on the volume, in gigabytes, and the amount of storage currently available.

- **Logical Space Used**

  The real size of the data that is being stored on this volume without applying the savings from using ONTAP storage efficiency technologies.

Constituent Volume/Performance Information page

Use the Constituent Volume/Performance Information page to view a list of the physical and logical attributes of the FlexGroup constituent volume. This information might help in answering performance-related questions.

Constituent Volume attributes

- **Type**

  The constituent’s type; either read-write (RW) or data-protection (DP).

- **Style**

  The style of volume; this is a constituent volume of a FlexGroup volume.

- **Cluster**

  The name of the cluster to which this FlexGroup constituent volume belongs. You can click the name to display cluster details in the Cluster/Performance Explorer page.

- **Aggregate**

  The name of the aggregate on which this FlexGroup constituent volume resides. You can click the name to display aggregate details in the Aggregate/Performance Explorer page.

- **FlexGroup**

  The name of the FlexGroup volume to which this constituent belongs. You can click the name to display FlexGroup volume details in the Constituent Volume/Performance Explorer page.

- **Storage VM**

  The name of the SVM to which this FlexGroup constituent volume belongs. You can click the name to display SVM details in the Performance/SVM Explorer page.

- **Tiering Policy**

  The tiering policy set on the volume. The policy takes affect 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 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”.
  - All. The data for this volume always remains on the cloud tier.

- **RAID Type**

  The redundancy type that is being used on the aggregate where this constituent resides. Possible types:

  - RAID0
  - RAID4
  - RAID-DP
  - RAID-TEC

- **Capacity (free/total)**

  The total storage available on the constituent, in gigabytes, and the amount of storage currently available.

LUN/Performance Information page

Use the LUN/Performance Information page to view a list of the physical and logical attributes of the LUN. This information might help in answering performance-related

questions.

LUN attributes

- **WWN**

  The WWN (World Wide Name) of the LUN.

- **Path**

  The full path of the LUN, for example, `/vol/vol1/lun1`.

- **Alignment**

  Indicates the alignment state of the LUN. Possible values:

  - Not mapped
  - Aligned
  - Misaligned
  - Possibly misaligned
  - Indeterminate

- **Capacity (free/total)**

  The total storage available on the LUN, in gigabytes, and the amount of storage currently available.

- **Volume**

  The name of the volume to which the LUN belongs. You can click the name to display volume details in the Volume/Performance Explorer page.

- **Storage VM**

  The name of the SVM to which the LUN belongs. You can click the name to display SVM details in the Storage VM/Performance Explorer page.

- **Node**

  The name of the node on which the LUN resides. You can click the name to display node details in the Node/Performance Explorer page.

- **Cluster**

  The name of the cluster to which the LUN belongs. You can click the name to display cluster details in the Cluster/Performance Explorer page.

- **State**

  The state of the LUN. Valid states can be online, offline, nvfail, space-error, and foreign-lun-error.

- **Mapped**

  Whether the LUN is mapped to an initiator group (true), or not (false).

NVMe Namespace/Performance Information page

Use the NVMe Namespace/Performance Information page to view a list of the physical and logical attributes of the Namespace. This information might help in answering performance-related questions.

NVMe Namespace attributes

- **Cluster**

  The name of the cluster to which the Namespace belongs. You can click the name to display cluster details in the Cluster/Performance Explorer page.

- **Capacity (free/total)**

  The total storage capacity of the Namespace and the amount of storage currently available.

- **Node**

  The name of the node on which the Namespace resides. You can click the name to display node details in the Node/Performance Explorer page.

- **Path**

  The full path of the NVMe Namespace, for example, `/vol/vol1/namespace1`.

- **State**

  The state of the Namespace. Valid states can be online, offline, nvfail, and space-error.

- **Subsystem**

  The subsystem of the Namespace.

- **Storage VM**

  The name of the SVM to which the Namespace belongs. You can click the name to display SVM details in the Storage VM/Performance Explorer page.

- **Volume**

  The name of the volume to which the Namespace belongs. You can click the name to display volume details in the Volume/Performance Explorer page.

Network Interface/Performance Information page

Use the Network Interface/Performance Information page to view a list of the configured attributes of the network interface (LIF). This information might help in answering performance-related questions.

Network Interface attributes

- **IP Address**

  The IPv4 or IPv6 address assigned to the LIF. There can be multiple IP addresses assigned to a LIF.

- **Role**

  The role determines the kind of traffic that is supported over the LIF.

  LIFs can have one of the following roles:

  - Data
  - Cluster
  - Node Management
  - Intercluster

- **Failover Group**

  The name of the failover group that is assigned to the network interface.

  This field applies only to network LIFs, not to SAN (FC/ISCSI) and NVMe LIFs.

- **Failover Policy**

  The name of the failover policy that is assigned to the LIF.

  This field applies only to network LIFs, not to SAN (FC/ISCSI) and NVMe LIFs.

- **Home Port**

  The name of the node and port that has been defined as the home port for this interface. You can click the name to display port details in the Port/Performance Explorer page.

- **Current Port**

  The name of the node and port on which the interface is currently hosted. You can click the name to display port details in the Port/Performance Explorer page.

Port/Performance Information page

Use the Port/Performance Information page to view a list of the physical and logical attributes of the port. This information might help in answering performance-related questions.

Port attributes

- **WWN**

  The WWN (World Wide Name) of the port.

- **Node**

The name of the node on which the physical port resides. You can click the name to display node details in the Node/Performance Explorer page.

- **Cluster**

  The name of the cluster to which the port belongs. You can click the name to display cluster details the Cluster/Performance Explorer page.

- **Operational Speed**

  The actual speed at which the port is configured to run.

  FCP ports are auto-sensing and display as “Auto”.

- **Role**

  The network port function: either Data or Cluster.

  FCP ports cannot have a role, and this field is not displayed.

- **Type**

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

- **State**

  The link status of the port.

  - For network ports, an active port is listed as “Up” and an inactive port is listed as “Down”.
  - For FCP ports, an active port is listed as “Online” and an inactive port is listed as “Link not connected”.

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