



qos statistics commands

ONTAP 9.6 commands

NetApp
February 11, 2024

This PDF was generated from <https://docs.netapp.com/us-en/ontap-cli-96/qos-statistics-characteristics-show.html> on February 11, 2024. Always check docs.netapp.com for the latest.

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qos statistics commands

qos statistics characteristics show

Display QoS policy group characterization

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics characteristics show` command displays data that characterizes the behavior of QoS policy groups.

The command displays the following data:

- The QoS policy group name (Policy Group)
- Input/output operations performed per second (IOPS)
- Throughput achieved in kilobytes per second (KB/s) or megabytes per second (MB/s) as appropriate (Throughput)
- Request size in bytes (B) (Request size)
- Read percentage from total I/O (Read)
- Concurrency, which indicates the number of concurrent users generating the I/O traffic (Concurrency)

The results displayed per iteration are sorted by IOPS. Each iteration starts with a row that displays the total IOPS used across all QoS policy groups. Other columns in this row are either totals or averages.

Parameters

`[-node {<nodename>|local}] - Node`

Selects the policy groups that match this parameter value. If you do not specify this parameter, the command displays data for the entire cluster.

`[-iterations <integer>] - Number of Iterations`

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

`{ [-rows <integer>} - Number of Rows in the Output`

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

`| [-policy-group <text>] - QoS Policy Group Name }`

Selects the QoS policy group whose name matches the specified value. If you do not specify this parameter, the command displays data for all QoS policy groups.

`[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration`

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

Examples

```
cluster1::> qos statistics characteristics show -iterations 100 -rows 4
Policy Group          IOPS      Throughput Request size  Read
Concurrency
-----
-----  
-total-                31       304.00KB/s     10041B    0%
16
 _System-Best-Effort   15        0KB/s        0B    0%
0
vol1                  11       44.00KB/s     4096B    0%
40
vol2                  4        256.00KB/s    65536B    0%
14
vs1vol0               1        4.00KB/s     4096B    0%
4
-total-                37       808.00KB/s    22361B    2%
3
 _System-Best-Effort   15        0KB/s        0B    0%
0
vol2                  12       768.00KB/s    65536B    0%
9
vs1vol0               8        32.00KB/s     4096B   12%
1
vol1                  2        8.00KB/s     4096B    0%
1
```

The example above displays the characteristics of the 4 QoS policy groups with the highest IOPS values and refreshes the display 100 times before terminating.

```

cluster1::> qos statistics characteristics show -iterations 100 -policy
-group pg1
Policy Group          IOPS      Throughput Request size Read
Concurrency
-----
-----  

-total-                293       3.02MB/s     10783B  54%
0
pg1                   118       470.67KB/s    4096B  100%
0
-total-                181       478.14KB/s   2700B  65%
0
pg1                   117       469.33KB/s   4096B  100%
0
-total-                226       525.78KB/s   2382B  60%
1
pg1                   110       440.00KB/s   4096B  100%
1
-total-                233       1.67MB/s     7527B  49%
1
pg1                   112       446.67KB/s   4096B  100%
1

```

The example above displays the system characteristics of the QoS policy group *pg1* and refreshes the display 100 times before terminating.

qos statistics latency show

Display latency breakdown data per QoS policy group

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics latency show` command displays the average latencies for QoS policy groups across the various Data ONTAP subsystems.

The command displays the following data:

- The QoS policy group name (Policy Group)
- Total latency observed per I/O operation (Latency)
- Latency observed per I/O operation in the Network subsystem (Network)
- Latency observed per I/O operation across the internally connected nodes in a Cluster (Cluster)
- Latency observed per I/O operation in the Data management subsystem (Data)
- Latency observed per I/O operation in the Storage subsystem (Disk)

- Latency observed per I/O operation in the QoS subsystem (QoS)
- Latency observed per I/O operation for NVRAM transfer (NVRAM)
- Latency observed per I/O operation for Object Store(Cloud) operations

The results displayed per iteration are sorted by the Latency field. Each iteration starts with a row that displays the average latency, in microseconds (us) or milliseconds (ms), observed across all QoS policy groups.

Parameters

[-node {<nodename>|local}] - Node

Selects the policy groups that match this parameter value. If you do not specify this parameter, the command displays data for the entire cluster.

[-iterations <integer>] - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

{ [-rows <integer>] - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

| [-policy-group <text>] - QoS Policy Group Name }

Selects the QoS policy group whose name matches the specified value. If you do not specify this parameter, the command displays data for all QoS policy groups.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

Examples

```

cluster1::> qos statistics latency show -iterations 100 -rows 3
Policy Group          Latency      Network      Cluster      Data
Disk      QoS       NVRAM      Cloud
-----  -----  -----
-----  -----  -----
-total-           110.35ms   110.02ms    0ms   327.00us
0ms      0ms        0ms        0ms
vs1vol0           167.82ms   167.22ms    0ms   603.00us
0ms      0ms        0ms        0ms
vol1              117.76ms   117.56ms    0ms   191.00us
0ms      0ms        0ms        0ms
vol2              44.24ms    44.05ms    0ms   190.00us
0ms      0ms        0ms        0ms
-total-           38.89ms    38.63ms    0ms   256.00us
0ms      0ms        0ms        0ms
vol2              64.47ms    64.20ms    0ms   266.00us
0ms      0ms        0ms        0ms
vol1              27.28ms    27.03ms    0ms   253.00us
0ms      0ms        0ms        0ms
vs1vol0           23.72ms    23.47ms    0ms   249.00us
0ms      0ms        0ms        0ms
-total-           409.81ms   409.65ms    0ms   169.00us
0ms      0ms        0ms        0ms
vol1              816.92ms   816.80ms    0ms   120.00us
0ms      0ms        0ms        0ms
vol2              407.88ms   407.66ms    0ms   219.00us
0ms      0ms        0ms        0ms
vs1vol0           3.68ms     3.49ms     0ms   193.00us
0ms      0ms        0ms        0ms
-total-           1169.00us  107.00us   0ms   1062.00us
0ms      0ms        0ms        0ms
vol2              1169.00us  107.00us   0ms   1062.00us
0ms      0ms        0ms        0ms

```

The example above displays latencies for the 3 QoS policy groups with the highest latencies and refreshes the display 100 times before terminating.

```

cluster1::> qos statistics latency show -iterations 100 -policy-group pg1
Policy Group          Latency      Network     Cluster      Data
Disk      QoS       NVRAM       Cloud
-----
----- -----
-total-                  5.88ms    308.00us      0ms   434.00us
5.14ms      0ms        0ms        0ms
pg1                      5.88ms    308.00us      0ms   434.00us
5.14ms      0ms        0ms        0ms
-total-                  4.17ms    280.00us      0ms   477.00us
3.42ms      0ms        0ms        0ms
pg1                      4.17ms    280.00us      0ms   477.00us
3.42ms      0ms        0ms        0ms
-total-                  4.43ms    274.00us      0ms   656.00us
3.50ms      0ms        0ms        0ms
pg1                      4.43ms    274.00us      0ms   656.00us
3.50ms      0ms        0ms        0ms
-total-                  4.89ms    276.00us      0ms   699.00us
3.92ms      0ms        0ms        0ms
pg1                      4.89ms    276.00us      0ms   699.00us
3.92ms      0ms        0ms        0ms

```

The example above displays latencies for the QoS policy group *pg1* and refreshes the display 100 times before terminating.

qos statistics performance show

Display system performance data per QoS policy group

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics performance show` command shows the current system performance levels that QoS policy groups are achieving.

The command displays the following data:

- The QoS policy group name (Policy Group)
- Input/output operations performed per second (IOPS)
- Throughput in kilobytes per second (KB/s) or megabytes per second (MB/s) as appropriate (Throughput)
- Latency observed per request in microseconds (us) or milliseconds (ms) as appropriate (Latency)

The results displayed per iteration are sorted by IOPS. Each iteration starts with a row that displays the total IOPS used across all QoS policy groups. Other columns in this row are either totals or averages.

Parameters

[-node {<nodename>|local}] - Node

Selects the policy groups that match this parameter value. If you do not specify this parameter, the command displays data for the entire cluster.

[-iterations <integer>] - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

{ [-rows <integer>] - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

| [-policy-group <text>] - QoS Policy Group Name }

Selects the QoS policy group whose name matches the specified value. If you do not specify this parameter, the command displays data for all QoS policy groups.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

Examples

```
cluster1::> qos statistics performance show -iterations 100 -rows 4
Policy Group          IOPS      Throughput     Latency
-----  -----  -----
-total-                79       1296.00KB/s   337.41ms
_System-Best-Effort    25        0KB/s        0ms
vol1                  24       96.00KB/s    193.72ms
vol2                  18      1152.00KB/s   750.98ms
vs1vol0               12       48.00KB/s    707.38ms
-total-                109      1.99MB/s    133.27ms
_System-Best-Effort    35        0KB/s        0ms
vol2                  29       1.81MB/s    249.27ms
vs1vol0               24       96.00KB/s    48.32ms
vol1                  21       84.00KB/s    292.30ms
```

The example above displays the system performance for the 4 QoS policy groups with the highest IOPS and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics performance show -iterations 100 -policy-group pg1
Policy Group          IOPS      Throughput     Latency
-----
-total-                2833    10.66MB/s   924.00us
pg1                   2655    10.37MB/s   917.00us
-total-                2837    10.65MB/s   923.00us
pg1                   2655    10.37MB/s   917.00us
-total-                2799    10.73MB/s   802.00us
pg1                   2737    10.69MB/s   815.00us
-total-                2930    13.33MB/s   905.00us
pg1                   2720    10.62MB/s   858.00us

```

The example above displays the system performance for the QoS policy group *pg1* and refreshes the display 100 times before terminating.

qos statistics resource cpu show

Display CPU resource utilization data per QoS policy group

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics resource cpu show` command displays the CPU utilization for QoS policy groups per node.

The command displays the following data:

- The QoS policy group name (Policy Group)
- CPU utilization observed in percentage (CPU)

The results displayed per iteration are sorted by total CPU utilization. Each iteration starts with a row that displays the total CPU utilization across all QoS policy groups.

Parameters

-node {<nodename>|local} - Node

Selects the policy groups that match this parameter value.

[-iterations <integer>] - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

{ [-rows <integer>] - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

[-policy-group <text>] - QoS Policy Group Name }

Selects the QoS policy group whose name matches the specified value. If you do not specify this parameter, the command displays data for all QoS policy groups.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

Examples

```
cluster1::> qos statistics resource cpu show -node nodeA -iterations 100  
-rows 3
```

Policy Group	CPU
-total- (100%)	9%
fast	1%
slow	3%
medium	5%
-total- (100%)	8%
slow	1%
fast	3%
medium	3%

The example above displays the total CPU utilization for the 3 QoS policy groups with the highest CPU utilization and it refreshes the display 100 times before terminating.

```
cluster1::> qos statistics resource cpu show -node local -iterations 100  
-policy-group pg1
```

Policy Group	CPU
-total- (100%)	7%
pg1	1%
-total- (100%)	7%
pg1	1%
-total- (100%)	7%
pg1	1%
-total- (100%)	10%
pg1	1%

The example above displays the total CPU utilization for the QoS policy group *pg1* and refreshes the display 100 times before terminating.

qos statistics resource disk show

Display disk resource utilization data per QoS policy group

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics resource disk show` command displays the disk utilization for QoS policy groups per node. The disk utilization shows the percentage of time spent on the disk during read and write operations. The command displays disk utilization for system-defined policy groups; however, their disk utilization is not included in the total utilization. The command only supports hard disks.

The command displays the following data:

- The QoS policy group name (Policy Group)
- Disk utilization (Disk)
- The number of HDD data disks utilized (Number of HDD Disks)

The results displayed are sorted by total disk utilization. Each iteration starts with a row that displays the total disk utilization across all QoS policy groups.

Parameters

-node {<nodename>|local} - Node

Selects the policy groups that match this parameter value.

[-iterations <integer>] - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

{ [-rows <integer>} - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

| [-policy-group <text>] - QoS Policy Group Name }

Selects the QoS policy group whose name matches the specified value. If you do not specify this parameter, the command displays data for all QoS policy groups.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

Examples

```
cluster1::> qos statistics resource disk show -node nodeA -iterations 100
-rows 3
      Policy Group          Disk Number of HDD Disks
----- -----
    -total-                40%                  27
    pg1                     22%                  5
    slow                    10%                  10
    fast                    8%                   12
    _System_Default         7%                   20
    -total-                42%                  27
    pg1                     22%                  5
    slow                    12%                  10
    fast                    8%                   12
    _System_Default         7%                   20
```

The example above displays the total disk utilization for the 3 QoS policy groups with the highest disk utilization and it refreshes the display 100 times before terminating.

```
cluster1::> qos statistics resource disk show -node local -iterations 100
-policy-group pg1
      Policy Group          Disk Number of HDD Disks
----- -----
    -total-                3%                   10
    pg1                     1%                   24
    -total-                3%                   10
    pg1                     1%                   24
    -total-                3%                   10
    pg1                     1%                   24
    -total-                3%                   10
    pg1                     1%                   24
```

The example above displays the total disk utilization for the QoS policy group *pg1* and refreshes the display 100 times before terminating.

qos statistics volume characteristics show

Display volume characteristics

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The *qos statistics volume characteristics show* command displays data that characterizes the behavior of volumes.

The command displays the following data:

- QoS volume name (Workload)
- QoS workload ID (ID)
- Input/output operations per second (IOPS)
- Throughput achieved in kilobytes per second (KB/s) or megabytes per second (MB/s) as appropriate (Throughput)
- Request size in bytes (B) (Request size)
- Read percentage from total IOPS (Read)
- Concurrency, which indicates the number of concurrent users generating the I/O traffic (Concurrency)

The results displayed per iteration are sorted by IOPS. Each iteration starts with a row that displays the total IOPS used across all volumes. Other columns in this row are either totals or averages.

Parameters

[-node {<nodename>|local}] - Node

Selects the volumes that match this parameter value. If you do not specify this parameter, the command displays data for the entire cluster.

{ [-rows <integer>}] - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. The default setting is 10. The allowed range of values is 1 to 20.

| -vserver <vserver name> - Vserver Name

Specifies the Vserver to which the volume belongs.

-volume <volume name> - Volume Name }

Selects the characteristic data that match this parameter value. Enter a complete volume name or press the <Tab> key to complete the name. Wildcard query characters are not supported.

[-iterations <integer>}] - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

[-show-flexgroup-as-constituents {true|false}] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```

cluster1::> qos statistics volume characteristics show -iterations 100
-rows 3
Workload           ID    IOPS      Throughput Request size Read
Concurrency
-----
-----
```

Workload	ID	IOPS	Throughput	Request size	Read
-total-	-	68	176.00KB/s	2650B	7%
8					
vs1vol0-wid102	102	24	96.00KB/s	4096B	20%
13					
vol_1-wid103	103	20	80.00KB/s	4096B	0%
12					
vol_2-wid104	104	1	0KB/s	0B	0%
0					
-total-	-	157	528.00KB/s	3443B	3%
4					
vol_2-wid104	104	48	192.00KB/s	4096B	0%
9					
vol_1-wid103	103	43	172.00KB/s	4096B	0%
0					
vs1vol0-wid102	102	41	164.00KB/s	4096B	14%
6					
-total-	-	274	1016.00KB/s	3797B	2%
2					
vs1vol0-wid102	102	85	340.00KB/s	4096B	8%
4					
vol_2-wid104	104	85	340.00KB/s	4096B	0%
1					
vol_1-wid103	103	84	336.00KB/s	4096B	0%
3					

The example above displays characteristics for the 3 volumes with the highest IOPS and it refreshes the display 100 times before terminating.

```
cluster1::> qos statistics volume characteristics show -vserver vs0  
-volume vs0_volo -iterations 100  


| Workload<br>Concurrency | ID    | IOPS | Throughput | Request Size | Read |
|-------------------------|-------|------|------------|--------------|------|
| -total-<br>2            | -     | 1567 | 783.33KB/s | 512Kb        | 90%  |
| vs0_volo-wid1..<br>1    | 15658 | 785  | 392.33KB/s | 512Kb        | 89%  |
| -total-<br>1            | -     | 1521 | 760.50KB/s | 512Kb        | 90%  |
| vs0_volo-wid1..<br>0    | 15658 | 982  | 491.17KB/s | 512Kb        | 90%  |
| -total-<br>0            | -     | 1482 | 741.00KB/s | 512Kb        | 89%  |
| vs0_volo-wid1..<br>0    | 15658 | 945  | 472.50KB/s | 512Kb        | 90%  |
| -total-<br>0            | -     | 1482 | 741.00KB/s | 512Kb        | 89%  |
| vs0_volo-wid1..<br>0    | 15658 | 945  | 472.50KB/s | 512Kb        | 90%  |
| -total-<br>0            | -     | 1702 | 850.83KB/s | 512Kb        | 90%  |
| vs0_volo-wid1..<br>0    | 15658 | 1018 | 509.00KB/s | 512Kb        | 90%  |


```

The example above displays characteristics for volume `vs0_vo10` in Vserver `vs0` and it refreshes the display 100 times before terminating.

qos statistics volume latency show

Display latency breakdown data per volume

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics volume latency show` command displays the average latencies for volumes on Data ONTAP subsystems.

The command displays the following data:

- The QoS volume name (Workload)
 - The QoS workload ID (ID)
 - Total latency observed per I/O operation (Latency)

- Latency observed per I/O operation in the Network subsystem (Network)
- Latency observed per I/O operation across the internally connected nodes in a Cluster (Cluster)
- Latency observed per I/O operation in the Data management subsystem (Data)
- Latency observed per I/O operation in the Storage subsystem (Disk)
- Latency observed per I/O operation in the QoS subsystem (QoS)
- Latency observed per I/O operation for NVRAM transfer (NVRAM)
- Latency observed per I/O operation for Object Store(Cloud) operations

The results displayed per iteration are sorted by the total latency field. Each iteration starts with a row that displays the average latency, in microseconds (us) or milliseconds (ms) observed across all volumes.

Parameters

[-node {<nodename>|local}] - Node

Selects the volumes that match this parameter value. If you do not specify this parameter, the command displays data for the entire cluster.

{ [-rows <integer>} - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. The default setting is 10. The allowed range of values is 1 to 20.

| -vserver <vserver name> - Vserver Name

Specifies the Vserver to which the volume belongs.

-volume <volume name> - Volume Name }

Selects the latency data that match this parameter value. Enter a complete volume name or press the <Tab> key to complete the name. Wildcard query characters are not supported.

[-iterations <integer>} - Number of Iterations

Specifies the number of times that the command refreshes the display with updated data before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

[-show-flexgroup-as-constituents {true|false}] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```

cluster1::> qos statistics volume latency show -iterations 100 -rows 3
Workload          ID  Latency     Network   Cluster      Data    Disk
QoS      NVRAM      Cloud
-----
----- -----
-total-           110.35ms  110.02ms  0ms  327.00us  0ms
0ms      0ms        0ms
vs1vol0          111 167.82ms  167.22ms  0ms  603.00us  0ms
0ms      0ms        0ms
vol1             1234 117.76ms  117.56ms  0ms  191.00us  0ms
0ms      0ms        0ms
vol2             999  44.24ms   44.05ms  0ms  190.00us  0ms
0ms      0ms        0ms
-total-           - 38.89ms   38.63ms  0ms  256.00us  0ms
0ms      0ms        0ms
vol2             999  64.47ms   64.20ms  0ms  266.00us  0ms
0ms      0ms        0ms
vol1             1234 27.28ms   27.03ms  0ms  253.00us  0ms
0ms      0ms        0ms
vs1vol0          111  23.72ms   23.47ms  0ms  249.00us  0ms
0ms      0ms        0ms
-total-           - 409.81ms  409.65ms  0ms  169.00us  0ms
0ms      0ms        0ms
vol1             1234 816.92ms  816.80ms  0ms  120.00us  0ms
0ms      0ms        0ms
vol2             999  407.88ms  407.66ms  0ms  219.00us  0ms
0ms      0ms        0ms
vs1vol0          111   3.68ms    3.49ms  0ms  193.00us  0ms
0ms      0ms        0ms

```

The example above displays latencies for the 3 volumes with the highest latencies and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics volume latency show -vserver vs0 -volume
vs0_vo10 -iterations 100
Workload          ID   Latency     Network    Cluster      Data
Disk        QoS   NVRAM      Cloud
-----
----- 
-total-           -   455.00us  158.00us      0ms  297.00us
0ms       0ms   0ms       0ms
vs0_vo10-wid1..  15658  428.00us  155.00us      0ms  273.00us
0ms       0ms   0ms       0ms
-total-           -   337.00us  130.00us      0ms  207.00us
0ms       0ms   0ms       0ms
vs0_vo10-wid1..  15658  316.00us  128.00us      0ms  188.00us
0ms       0ms   0ms       0ms
-total-           -   464.00us  132.00us      0ms  332.00us
0ms       0ms   0ms       0ms
vs0_vo10-wid1..  15658  471.00us  130.00us      0ms  341.00us
0ms       0ms   0ms       0ms
-total-           -   321.00us  138.00us      0ms  183.00us
0ms       0ms   0ms       0ms
vs0_vo10-wid1..  15658  302.00us  137.00us      0ms  165.00us
0ms       0ms   0ms       0ms
-total-           -   418.00us  142.00us      0ms  276.00us
0ms       0ms   0ms       0ms
vs0_vo10-wid1..  15658  424.00us  143.00us      0ms  281.00us
0ms       0ms   0ms       0ms

```

The example above displays latencies for volume `vs0_vo10` in Vserver `vs0` and it refreshes the display 100 times before terminating.

qos statistics volume performance show

Display system performance data per volume

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics volume performance show` command shows the current system performance that each volume is achieving.

The command displays the following data:

- The QoS volume name (Workload)
- The QoS workload ID (ID)
- Input/output operations performed per second (IOPS)

- Throughput in kilobytes per second (KB/s) or megabytes per second (MB/s) as appropriate (Throughput)
- Latency observed per request in microseconds (us) or milliseconds (ms) as appropriate (Latency)

The results displayed per iteration are sorted by IOPS. Each iteration starts with a row that displays the total IOPS used across all volumes. Other columns in this row are either totals or averages.

Parameters

[-node {<nodename>|local}] - Node

Selects the volumes that match this parameter value. If you do not specify this parameter, the command displays data for the entire cluster.

{ [-rows <integer>} - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. The default setting is 10. The allowed range of values is 1 to 20.

| -vserver <vserver name> - Vserver Name

Specifies the Vserver to which the volume belongs.

-volume <volume name> - Volume Name }

Selects the performance data that match this parameter value. Enter a complete volume name or press the <Tab> key to complete the name. Wildcard query characters are not supported.

[-iterations <integer>} - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

[-show-flexgroup-as-constituents {true|false}] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```
cluster1::> qos statistics volume performance show -iterations 100 -rows 3
Workload          ID    IOPS      Throughput   Latency
-----  -----  -----  -----  -----
-total-          -     97      1.90MB/s  216.87ms
vol_2-wid104    104    28      1.75MB/s  412.78ms
vol_1-wid103    103    25      100.00KB/s 169.16ms
vs1vol0-wid102  102    13      52.00KB/s  403.78ms
-total-          -     98      1276.00KB/s 89.98ms
vs1vol0-wid102  102    28      112.00KB/s  80.70ms
vol_1-wid103    103    19      76.00KB/s  114.72ms
vol_2-wid104    104    17      1088.00KB/s 257.60ms
-total-          -     78      1152.00KB/s 225.22ms
vol_1-wid103    103    17      68.00KB/s  452.27ms
vol_2-wid104    104    16      1024.00KB/s 419.93ms
vs1vol0-wid102  102    15      60.00KB/s  210.63ms
```

The example above displays the system performance for the 3 volumes with the highest IOPS and it refreshes the display 100 times before terminating.

```
cluster1::> qos statistics volume performance show -vserver vs0 -volume
vs0_volo -iterations 100
Workload          ID    IOPS      Throughput   Latency
-----  -----  -----  -----  -----
-total-          -     1278    639.17KB/s 404.00us
vs0_volo-wid1..  15658   526    263.17KB/s 436.00us
-total-          -     1315    657.33KB/s 86.00us
vs0_volo-wid1..  15658   528    264.17KB/s 88.00us
-total-          -     1220    609.83KB/s 418.00us
vs0_volo-wid1..  15658   515    257.33KB/s 531.00us
-total-          -     1202    600.83KB/s 815.00us
vs0_volo-wid1..  15658   519    259.67KB/s 924.00us
-total-          -     1240    620.17KB/s 311.00us
vs0_volo-wid1..  15658   525    262.50KB/s 297.00us
```

The example above displays the system performance for volume `vs0_volo` in Vserver `vs0` and it refreshes the display 100 times before terminating.

qos statistics volume resource cpu show

Display CPU resource utilization data per volume

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics volume resource cpu show` command displays the CPU utilization for volumes per node.

The command displays the following data:

- The QoS volume name (Workload)
- The QoS workload ID (ID)
- CPU utilization observed in percentage (CPU)

The results displayed per iteration are sorted by total CPU utilization. Each iteration starts with a row that displays the total CPU utilization across all volumes.

Parameters

-node {<nodename>|local} - Node

Selects the volumes that match this parameter value.

{ [-rows <integer>} - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. The default setting is 10. The allowed range of values is 1 to 20.

| -vserver <vserver name> - Vserver Name

Specifies the Vserver to which the volume belongs.

-volume <volume name> - Volume Name }

Selects the CPU utilization data that match this parameter value. Enter a complete volume name or press the <Tab> key to complete the name. Wildcard query characters are not supported.

[-iterations <integer>} - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

[-show-flexport-as-constituents {true|false}] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```

cluster1::> qos statistics volume resource cpu show -node nodeA
-iterations 100 -rows 3
  Workload          ID    CPU
  -----
  --total- (100%)   -    9%
  vs0vol1-wid-102  102   5%
  vs0vol2-wid-121  121   2%
  vs2_volo-wid-..  212   2%
  -total- (100%)   -    8%
  vs0vol1-wid-102  102   5%
  vs0vol2-wid-121  121   2%
  vs2_volo-wid-..  212   1%

```

The example above displays total CPU utilization for the 3 volumes with the highest CPU utilization and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics volume resource cpu show -node local -vserver
vs0 -volume vs0_voll -iterations 100
  Workload          ID    CPU
  -----
  -total- (100%)   -    2%
  vs0_voll-wid7..  7916  2%
  -total- (100%)   -    2%
  vs0_voll-wid7..  7916  2%
  -total- (100%)   -    1%
  vs0_voll-wid7..  7916  1%
  -total- (100%)   -    2%
  vs0_voll-wid7..  7916  1%
  -total- (100%)   -    2%
  vs0_voll-wid7..  7916  2%

```

The example above displays total CPU utilization for volume `vs0_voll` in Vserver `vs0` and it refreshes the display 100 times before terminating.

qos statistics volume resource disk show

Display disk resource utilization data per volume

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics volume resource disk show` command displays the disk utilization for volumes per node. The disk utilization shows the percentage of time spent on the disk during read and write operations. The command only supports hard disks.

The command displays the following data:

- The QoS volume name (Workload)
- The QoS workload ID (ID)
- Disk utilization (Disk)
- The number of HDD data disks utilized (Number of HDD Disks)

The results displayed are sorted by total disk utilization. Each iteration starts with a row that displays the total disk utilization across all volumes.

Parameters

-node {<nodename>|local} - Node

Selects the volumes that match this parameter value.

{ [-rows <integer>} - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. The default setting is 10. The allowed range of values is 1 to 20.

| -vserver <vserver name> - Vserver Name

Specifies the Vserver to which the volume belongs.

-volume <volume name> - Volume Name }

Selects the disk utilization data that match this parameter value. Enter a complete volume name or press the <Tab> key to complete the name. Wildcard query characters are not supported.

[-iterations <integer>} - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

[-show-flexport-as-constituents {true|false}] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```

cluster1::> qos statistics volume resource disk show -node nodeB
-iterations 100 -rows 3
      Workload          ID  Disk Number of HDD Disks
-----  -----
    -total- (100%)     -   30%           4
    vs0vol1-wid101     101  12%           2
    vs0vol2-wid121     121  10%           1
    vol0-wid1002       1002 8%            1
    -total- (100%)     -   30%           4
    vs0vol1-wid101     101  12%           2
    vs0vol2-wid121     121  10%           1
    vol0-wid1002       1002 8%            1

```

The example above displays total disk utilization for the 3 volumes with the highest disk utilization and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics volume resource disk show -node local -vserver
vs0 -volume vs0_vo10 -iterations 100
      Workload          ID  Disk Number of HDD Disks
-----  -----
    -total-             -   5%           10
    vs0_vo10-wid1..    15658 1%            6
    -total-             -   5%           10
    vs0_vo10-wid1..    15658 1%            6
    -total-             -   6%           10
    vs0_vo10-wid1..    15658 2%            6
    -total-             -   6%           10
    vs0_vo10-wid1..    15658 2%            6
    -total-             -   6%           10
    vs0_vo10-wid1..    15658 2%            6

```

The example above displays total disk utilization for volume `vs0_vo10` in Vserver `vs0` and it refreshes the display 100 times before terminating.

qos statistics workload characteristics show

Display QoS workload characterization

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics workload characteristics show` command displays data that characterizes the behavior of QoS workloads.

The command displays the following data:

- The QoS workload name (Workload)
- The QoS workload ID (ID)
- Input/output operations performed per second (IOPS)
- Throughput achieved in kilobytes per second (KB/s) or megabytes per second (MB/s) as appropriate (Throughput)
- Request size in bytes (B) (Request size)
- Read percentage from total IOPS (Read)
- Concurrency, which indicates the number of concurrent users generating the I/O traffic (Concurrency)

The results displayed per iteration are sorted by IOPS. Each iteration starts with a row that displays the total IOPS used across all QoS workloads. Other columns in this row are either totals or averages.

Parameters

[`-node {<nodename>|local}`] - Node

Selects the QoS workloads that match this parameter value. If you do not specify this parameter, the command displays data for the entire cluster.

[`-iterations <integer>`] - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

[`-refresh-display {true|false}`] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

{ [`-rows <integer>`] - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

[`-policy-group <text>`] - QoS Policy Group Name

Selects the QoS workloads that belong to the QoS policy group specified by this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [`-workload <text>`] - QoS Workload Name

Selects the QoS workload that match this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [`-workload-id <integer>`] - QoS Workload ID }

Selects the QoS workload that match the QoS workload ID specified by this parameter value.

[`-show-flexport-as-constituents {true|false}`] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```
cluster1::> qos statistics workload characteristics show -iterations 100  
-rows 4  
Workload ID IOPS Throughput Request size Read  
Concurrency  
-----  
-----  
-total- - 68 176.00KB/s 2650B 7%  
8  
vs1vol0-wid102 102 24 96.00KB/s 4096B 20%  
13  
_Scan_Besteff.. 101 23 0KB/s 0B 0%  
0  
vol_1-wid103 103 20 80.00KB/s 4096B 0%  
12  
vol_2-wid104 104 1 0KB/s 0B 0%  
0  
-total- - 157 528.00KB/s 3443B 3%  
4  
vol_2-wid104 104 48 192.00KB/s 4096B 0%  
9  
vol_1-wid103 103 43 172.00KB/s 4096B 0%  
0  
vs1vol0-wid102 102 41 164.00KB/s 4096B 14%  
6  
_Scan_Besteff.. 101 25 0KB/s 0B 0%  
0  
-total- - 274 1016.00KB/s 3797B 2%  
2  
vs1vol0-wid102 102 85 340.00KB/s 4096B 8%  
4  
vol_2-wid104 104 85 340.00KB/s 4096B 0%  
1  
vol_1-wid103 103 84 336.00KB/s 4096B 0%  
3  
_Scan_Besteff.. 101 20 0KB/s 0B 0%  
0
```

The example above displays characteristics for the 4 QoS workloads with the highest IOPS and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics workload characteristics show -iterations 100
-rows 2 -policy-group pg1
      Workload          ID    IOPS      Throughput Request size Read
Concurrency
-----
-----+-----+-----+-----+-----+-----+-----+
-----+-----+-----+-----+-----+-----+-----+
      -total-        -  243   546.86KB/s  2307B  61%
1
0      file-test1_a... 6437    34   136.00KB/s  4096B 100%
0      file-test1_c... 5078    33   133.33KB/s  4096B 100%
0
1      -total-        -  310   3.09MB/s  10428B  55%
0
0      file-test1_a... 6437    36   142.67KB/s  4096B 100%
0      file-test1_b... 9492    35   138.67KB/s  4096B 100%
0
1      -total-        -  192   575.71KB/s  3075B  71%
0
0      file-test1-wi... 7872    39   157.33KB/s  4096B 100%
0      file-test1_c... 5078    38   153.33KB/s  4096B 100%
0

```

The example above displays the characteristics for the 2 QoS workloads belonging to QoS policy group *pg1* with the highest IOPS and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics workload characteristics show -iterations 100
-wkload-id 9492
      Workload          ID    IOPS      Throughput Request size Read
Concurrency
-----
-----+-----+-----+-----+-----+-----+
-----+-----+-----+-----+-----+-----+
      -total-        -    737     2.14MB/s    3045B  79%
1
0      file-test1_b... 9492    265     1058.67KB/s   4096B 100%
1
1      -total-        -    717     4.26MB/s    6235B  80%
1
0      file-test1_b... 9492    272     1086.67KB/s   4096B 100%
1
0      -total-        -    623     2.50MB/s    4202B  86%
0
0      file-test1_b... 9492    263     1050.67KB/s   4096B 100%
0
0      -total-        -    595     2.11MB/s    3712B  89%
0
0      file-test1_b... 9492    266     1064.00KB/s   4096B 100%
0

```

The example above displays the characteristics for the QoS workload with QoS workload ID 9492 and it refreshes the display 100 times before terminating.

qos statistics workload latency show

Display latency breakdown data per QoS workload

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The *qos statistics workload latency show* command displays the average latencies for QoS workloads on Data ONTAP subsystems.

The command displays the following data:

- The QoS workload name (Workload)
- The QoS workload ID (ID)
- Total latency observed per I/O operation (Latency)
- Latency observed per I/O operation in the Network subsystem (Network)
- Latency observed per I/O operation across the internally connected nodes in a Cluster (Cluster)
- Latency observed per I/O operation in the Data management subsystem (Data)

- Latency observed per I/O operation in the Storage subsystem (Disk)
- Latency observed per I/O operation in the QoS subsystem (QoS)
- Latency observed per I/O operation for NVRAM transfer (NVRAM)
- Latency observed per I/O operation for Object Store(Cloud) operations

The results displayed per iteration are sorted by the total latency field. Each iteration starts with a row that displays the average latency, in microseconds (us) or milliseconds (ms) observed across all QoS workloads.

Parameters

[-node {<nodename>|local}] - Node

Selects the QOS workloads that match this parameter value. If you do not specify this parameter, the command displays data for the entire cluster.

[-iterations <integer>] - Number of Iterations

Specifies the number of times that the command refreshes the display with updated data before terminating. If you do not specify this parameter, the command continues to run until you interrupt it by pressing Ctrl-C.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

{ [-rows <integer>] - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

[-policy-group <text>] - QoS Policy Group Name

Selects the QoS workloads that belong to the QoS policy group specified by this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [-workload <text>] - QoS Workload Name

Selects the QoS workload that match this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [-workload-id <integer>] - QoS Workload ID }

Selects the QoS workload that match the QoS workload ID specified by this parameter value.

[-show-flexgroup-as-constituents {true|false}] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```

cluster1::> qos statistics workload latency show -iterations 100 -rows 3
Workload          ID  Latency   Network Cluster      Data    Disk
QoS      NVRAM     Cloud
-----
----- -----
-total-           110.35ms  110.02ms  0ms  327.00us  0ms
0ms      0ms       0ms
vs1vol0          111 167.82ms  167.22ms  0ms  603.00us  0ms
0ms      0ms       0ms
vol1             1234 117.76ms  117.56ms  0ms  191.00us  0ms
0ms      0ms       0ms
vol2             999  44.24ms   44.05ms  0ms  190.00us  0ms
0ms      0ms       0ms
-total-           -   38.89ms   38.63ms  0ms  256.00us  0ms
0ms      0ms       0ms
vol2             999  64.47ms   64.20ms  0ms  266.00us  0ms
0ms      0ms       0ms
vol1             1234 27.28ms   27.03ms  0ms  253.00us  0ms
0ms      0ms       0ms
vs1vol0          111  23.72ms   23.47ms  0ms  249.00us  0ms
0ms      0ms       0ms
-total-           -   409.81ms  409.65ms  0ms  169.00us  0ms
0ms      0ms       0ms
vol1             1234 816.92ms  816.80ms  0ms  120.00us  0ms
0ms      0ms       0ms
vol2             999  407.88ms  407.66ms  0ms  219.00us  0ms
0ms      0ms       0ms
vs1vol0          111   3.68ms    3.49ms  0ms  193.00us  0ms
0ms      0ms       0ms

```

The example above displays latencies for the 3 QoS workloads with the highest latencies and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics workload latency show -iterations 100 -rows 2
-policy-group pg1
Workload          ID   Latency     Network    Cluster      Data
Disk        QoS   NVRAM      Cloud
-----  -----
-----  -----
-total-          -   4.80ms  287.00us    0ms  427.00us
4.08ms       0ms   0ms       0ms
file-test1-wi.. 7872  9.60ms  265.00us    0ms  479.00us
8.85ms       0ms   0ms       0ms
file-test1_a... 6437  8.22ms  262.00us    0ms  424.00us
7.53ms       0ms   0ms       0ms
-total-          -   4.20ms  296.00us    0ms  421.00us
3.48ms       0ms   0ms       0ms
file-test1-wi.. 7872  8.70ms  211.00us    0ms  489.00us
8.00ms       0ms   0ms       0ms
file-test1_a... 6437  6.70ms  297.00us    0ms  464.00us
5.94ms       0ms   0ms       0ms
-total-          -   5.90ms  303.00us    0ms  1.71ms
3.88ms       0ms   0ms       0ms
file-test1-wi.. 7872  11.36ms 263.00us    0ms  2.06ms
9.04ms       0ms   0ms       0ms
file-test1_a... 6437  9.48ms  250.00us    0ms  2.30ms
6.93ms       0ms   0ms       0ms

```

The example above displays latencies for the 2 QoS workloads belonging to QoS policy group *pg1* with the highest IOPS and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics workload latency show -iterations 100 -workload
-id 9492
      Workload          ID   Latency     Network    Cluster    Data
Disk       QoS      NVRAM    Cloud
----- - -----
      -total-          -  443.00us  273.00us    0ms  170.00us
0ms        0ms      0ms      0ms
      file-test1_b_..  9492  440.00us  272.00us    0ms  168.00us
0ms        0ms      0ms      0ms
      -total-          -  577.00us  313.00us    0ms  264.00us
0ms        0ms      0ms      0ms
      file-test1_b_..  9492  607.00us  316.00us    0ms  291.00us
0ms        0ms      0ms      0ms
      -total-          -  475.00us  291.00us    0ms  184.00us
0ms        0ms      0ms      0ms
      file-test1_b_..  9492  476.00us  293.00us    0ms  183.00us
0ms        0ms      0ms      0ms
      -total-          -  628.00us  284.00us    0ms  344.00us
0ms        0ms      0ms      0ms
      file-test1_b_..  9492  591.00us  281.00us    0ms  310.00us
0ms        0ms      0ms      0ms

```

The example above displays the latencies for the QoS workload with QoS workload ID 9492 and it refreshes the display 100 times before terminating.

qos statistics workload performance show

Display system performance data per QoS workload

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics workload performance show` command shows the current system performance that each QoS workload is achieving.

The command displays the following data:

- The QoS workload name (Workload)
- The QoS workload ID (ID)
- Input/output operations performed per second (IOPS)
- Throughput in kilobytes per second (KB/s) or megabytes per second (MB/s) as appropriate (Throughput)
- Latency observed per request in microseconds (us) or milliseconds (ms) as appropriate (Latency)

The results displayed per iteration are sorted by IOPS. Each iteration starts with a row that displays the total

IOPS used across all QoS workloads. Other columns in this row are either totals or averages.

Parameters

[-node {<nodename>|local}] - Node

Selects the QoS workloads that match this parameter value. If you do not specify this parameter, the command displays data for the entire cluster.

[-iterations <integer>] - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

{ [-rows <integer>] - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

[-policy-group <text>] - QoS Policy Group Name

Selects the QoS workloads that belong to the QoS policy group specified by this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [-workload <text>] - QoS Workload Name

Selects the QoS workload that match this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [-workload-id <integer>] - QoS Workload ID }

Selects the QoS workload that match the QoS workload ID specified by this parameter value.

[-show-flexgroup-as-constituents {true|false}] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```

cluster1::> qos statistics workload performance show -iterations 100 -rows
4
Workload          ID    IOPS      Throughput     Latency
-----  -----  -----  -----  -----
-total-          -    97      1.90MB/s   216.87ms
_Scan_Besteff..  101    31        0KB/s     0ms
vol_2-wid104    104    28      1.75MB/s   412.78ms
vol_1-wid103    103    25      100.00KB/s 169.16ms
vs1vol0-wid102  102    13      52.00KB/s  403.78ms
-total-          -    98      1276.00KB/s 89.98ms
_Scan_Besteff..  101    34        0KB/s     0ms
vs1vol0-wid102  102    28      112.00KB/s 80.70ms
vol_1-wid103    103    19      76.00KB/s  114.72ms
vol_2-wid104    104    17      1088.00KB/s 257.60ms
-total-          -    78      1152.00KB/s 225.22ms
_Scan_Besteff..  101    30        0KB/s     0ms
vol_1-wid103    103    17      68.00KB/s  452.27ms
vol_2-wid104    104    16      1024.00KB/s 419.93ms
vs1vol0-wid102  102    15      60.00KB/s  210.63ms

```

The example above displays the system performance for the 4 QoS workloads with the highest IOPS and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics workload performance show -iterations 100 -rows
2 -policy-group pg1
Workload          ID    IOPS      Throughput     Latency
-----  -----  -----  -----  -----
-total-          -    2598     9.96MB/s  1223.00us
file-testfile..  4228    650      2.54MB/s  1322.00us
file-testfile..  11201   635      2.48MB/s  1128.00us
-total-          -    2825     10.89MB/s 714.00us
file-testfile..  4228    707      2.76MB/s  759.00us
file-testfile..  11201   697      2.72MB/s  693.00us
-total-          -    2696     10.13MB/s 1149.00us
file-testfile..  4228    645      2.52MB/s  945.00us
file-testfile..  6827    634      2.48MB/s  1115.00us

```

The example above displays the system performance for the 2 QoS workloads belonging to QoS policy group *pg1* with the highest IOPS and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics workload performance show -iterations 100
-workload-id 11201
Workload          ID    IOPS      Throughput     Latency
-----  -----  -----  -----  -----
-total-          -    2866    10.92MB/s   905.00us
file-testfile..  11201    674     2.63MB/s   889.00us
-total-          -    2761    10.55MB/s  1054.00us
file-testfile..  11201    638     2.49MB/s  1055.00us
-total-          -    2810    10.58MB/s  832.00us
file-testfile..  11201    685     2.68MB/s  909.00us
-total-          -    2593    9.86MB/s  1092.00us
file-testfile..  11201    632     2.47MB/s  964.00us

```

The example above displays the system performance for the QoS workload with QoS workload ID `11201` and it refreshes the display `100` times before terminating.

qos statistics workload resource cpu show

Display CPU resource utilization data per QoS workload

Availability: This command is available to *cluster* administrators at the `admin` privilege level.

Description

The `qos statistics workload resource cpu show` command displays the CPU utilization for QoS workloads per node.

The command displays the following data:

- The QoS workload name (Workload)
- The QoS workload ID (ID)
- CPU utilization observed in percentage (CPU)

The results displayed per iteration are sorted by total CPU utilization. Each iteration starts with a row that displays the total CPU utilization across all QoS workloads.

Parameters

-node {<nodename>}|local} - Node

Selects the QOS workloads that match this parameter value.

[-iterations <integer>] - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the

command displays each data iteration below the previous one. The default is false.

{ [-rows <integer>] - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

[-policy-group <text>] - QoS Policy Group Name

Selects the QoS workloads that belong to the QoS policy group specified by this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [-workload <text>] - QoS Workload Name

Selects the QoS workload that match this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [-workload-id <integer>] - QoS Workload ID }

Selects the QoS workload that match the QoS workload ID specified by this parameter value.

[-show-flexport-as-constituents {true|false}] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```
cluster1::> qos statistics workload resource cpu show -node nodeA  
-iterations 100 -rows 3  
Workload          ID    CPU  
-----  -----  
--total- (100%)   -    9%  
vs0-wid-102      102   5%  
file-bigvmdk...   121   2%  
vs2_volo-wid...   212   2%  
-total- (100%)   -    8%  
vs0-wid-101      102   5%  
file-bigvmdk...   121   2%  
vs2_volo-wid...   212   1%
```

The example above displays total CPU utilization for the 3 QoS workloads with the highest CPU utilization and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics workload resource cpu show -node local
-iterations 100 -rows 2 -policy-group pg1
  Workload      ID    CPU
  -----
  -total- (100%)   -  41%
  file-test1_b...  9492  16%
  file-test1_c...  5078  16%
  -total- (100%)   -  43%
  file-test1_c...  5078  17%
  file-test1_b...  9492  16%
  -total- (100%)   -  40%
  file-test1_c...  5078  16%
  file-test1_b...  9492  15%

```

The example above displays total CPU utilization for the 2 QoS workloads belonging to QoS policy group *pg1* with the highest IOPS and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics workload resource cpu show -node local
-iterations 100 -workload-id 9492
  Workload      ID    CPU
  -----
  -total- (100%)   -  15%
  file-test1_b...  9492  3%
  -total- (100%)   -  14%
  file-test1_b...  9492  3%
  -total- (100%)   -  14%
  file-test1_b...  9492  2%
  -total- (100%)   -  13%
  file-test1_b...  9492  3%

```

The example above displays total CPU utilization for the QoS workload with QoS workload ID 9492 and it refreshes the display 100 times before terminating.

qos statistics workload resource disk show

Display disk resource utilization data per QoS workload

Availability: This command is available to *cluster* administrators at the *admin* privilege level.

Description

The `qos statistics workload resource disk show` command displays the disk utilization for QoS workloads per node. The disk utilization shows the percentage of time spent on the disk during read and write operations. The command displays disk utilization for system-defined workloads; however, their disk utilization is not included in the total utilization. The command only supports hard disks.

The command displays the following data:

- The QoS workload name (Workload)
- The QoS workload ID (ID)
- Disk utilization (Disk)
- The number of HDD data disks utilized (Number of HDD Disks)

The results displayed are sorted by total disk utilization. Each iteration starts with a row that displays the total disk utilization across all QoS workloads.

Parameters

-node {<nodename>|local} - Node

Selects the QoS workloads that match this parameter value.

[-iterations <integer>] - Number of Iterations

Specifies the number of times the display is refreshed before terminating. If you do not specify this parameter, the command iterates until interrupted by Ctrl-C.

[-refresh-display {true|false}] - Toggle Screen Refresh Between Each Iteration

Specifies the display style. If true, the command clears the display after each data iteration. If false, the command displays each data iteration below the previous one. The default is false.

{ [-rows <integer>] - Number of Rows in the Output

Specifies the number of busiest QoS policy groups to display. Valid values are from 1 to 20. The default value is 10.

[-policy-group <text>] - QoS Policy Group Name

Selects the QoS workloads that belong to the QoS policy group specified by this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [-workload <text>] - QoS Workload Name

Selects the QoS workload that match this parameter value. If you do not specify this parameter, the command displays data for all QoS workloads.

| [-workload-id <integer>] - QoS Workload ID }

Selects the QoS workload that match the QoS workload ID specified by this parameter value.

[-show-flexgroup-as-constituents {true|false}] - Display Flexgroups as Constituents

If the parameter is specified and if the value is true, it will display data for FlexVols and Flexgroup Constituents. Otherwise it will display data for FlexVols and Flexgroups.

Examples

```

cluster1::> qos statistics workload resource disk show -node nodeB
-iterations 100 -rows 3
      Workload          ID  Disk Number of HDD Disks
----- -----
      -total- (100%)    -   30%           4
      _RAID            -   20%           4
      vs0-wid101       101  12%           2
      file-1-wid121    121  10%           1
      vol0-wid1002     1002 8%            1
      _WAFL            -   7%            3
      -total- (100%)    -   30%           4
      vs0-wid101       101  12%           2
      file-1-wid121    121  10%           1
      _RAID            -   10%           4
      vol0-wid1002     1002 8%            1
      _WAFL            -   7%            3

```

The example above displays total disk utilization for the 3 QoS workloads with the highest disk utilization and it refreshes the display 100 times before terminating.

```

cluster1::> qos statistics workload resource disk show -node local
-iterations 100 -rows 2 -policy-group pg1
      Workload          ID  Disk Number of HDD Disks
----- -----
      -total-           -   3%           10
      file-test1_a...   6437 6%            6
      file-test1_wi...  7872 6%            6
      -total-           -   3%           10
      file-test1_a...   6437 5%            6
      file-test1_wi...  7872 5%            6
      -total-           -   3%           10
      file-test1_a...   6437 6%            6
      file-test1_wi...  7872 6%            6

```

The example above displays total disk utilization for the 2 QoS workloads belonging to QoS policy group *pg1* with the highest IOPS and it refreshes the display 100 times before terminating.

```
cluster1::> qos statistics workload resource disk show -node local  
-iterations 100 -workload-id 6437  


| Workload       | ID   | Disk | Number of HDD Disks |
|----------------|------|------|---------------------|
| -total-        | -    | 3%   | 10                  |
| file-test1_a.. | 6437 | 6%   | 6                   |
| -total-        | -    | 3%   | 10                  |
| file-test1_a.. | 6437 | 5%   | 6                   |
| -total-        | -    | 3%   | 10                  |
| file-test1_a.. | 6437 | 6%   | 6                   |


```

The example above displays total disk utilization for the QoS workload with QoS workload ID 6437 and it refreshes the display 100 times before terminating.

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