



# Manage storage aggregate metrics

ONTAP 9.14.1 REST API reference

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# Manage storage aggregate metrics

## Storage aggregates UUID metrics endpoint overview

### Overview

The Storage Aggregate Metrics API provides historical performance metrics for the specified aggregate. The collection GET operation retrieves read, write, other and total metrics for a given aggregate, in terms of IOPS, latency and throughput. The read and write categories display the I/O operations that service user reads and writes across all the hosted volumes on a given aggregate. The other category encompasses background I/O operations that implement data protection services currently running on the aggregate. IOPs are the number of I/O operations reported per second, throughput is the amount of I/O operations measured in bytes per second and latency is the average response time for an IOP, reported in microseconds. Without a specified time interval, the output is limited to statistics collected at 15 second intervals over the last hour.

### Examples

#### Retrieving metrics for an aggregate

In this example, the API returns a set of records that exist for the aggregate with the given UUID for the last hour.

```
# The API:
/api/storage/aggregates/{uuid}/metrics

#The call:
curl -X GET "https://<mgmt-ip>/api/storage/aggregates/538bf337-1b2c-11e8-
bad0-005056b48388/metrics?max_records=4" -H "accept: application/json"

#The response:
{
  "records": [
    {
      "timestamp": "2019-01-14T23:33:45Z"
    },
    {
      "timestamp": "2019-01-14T23:33:30Z"
    },
    {
      "timestamp": "2019-01-14T23:33:15Z"
    },
    {
      "timestamp": "2019-01-14T23:33:00Z"
    }
  ],
  "num_records": 4
}
```

### Retrieving metrics for an aggregate with a set timestamp

In this example, the API returns metric values for latency, IOPS, and throughput properties such as read, write and total. The status and duration for which the metrics are requested are also returned.

```

#The API:
/api/storage/aggregates/{uuid}/metrics?timestamp={timestamp}

#The call:
curl -X GET "https://<mgmt-ip>/api/storage/aggregates/538bf337-1b2c-11e8-
bad0-005056b48388/metrics?timestamp=2019-01-1T23:33:00Z" -H "accept:
application/json"

#The response:
{
  "records": [
    {
      "uuid": "538bf337-1b2c-11e8-bad0-005056b48388",
      "timestamp": "2019-01-01T23:33:00Z",
      "status": "ok",
      "duration": "PT15S",
      "throughput": {
        "read": 6826,
        "write": 205892,
        "other": 0,
        "total": 212718
      },
      "latency": {
        "read": 148,
        "write": 216,
        "other": 0,
        "total": 199
      },
      "iops": {
        "read": 1,
        "write": 5,
        "other": 0,
        "total": 6
      }
    }
  ]
}

```

### Retrieving metrics for an aggregate for a set time interval

In this example, the API returns the requested metrics for the given time interval of 1 week. The interval value can be 1 hour, 1 day, 1 week, 1 month or 1 year. If the interval value is not set, a default value of 1 hour is used.

```
#The API:
```

```
/api/storage/aggregates/{uuid}/metrics
```

```
#The call:
```

```
curl -X GET "https://<mgmt-ip>/api/storage/aggregates/538bf337-1b2c-11e8-bad0-005056b48388/metrics?return_timeout=15&fields=*&interval=1w&max_records=4" -H "accept: application/json"
```

```
#The response:
```

```
{
  "records": [
    {
      "timestamp": "2019-01-01T23:30:00Z",
      "status": "ok",
      "duration": "PT30M",
      "throughput": {
        "read": 268328,
        "write": 5556255,
        "other": 0,
        "total": 5824584
      },
      "latency": {
        "read": 156,
        "write": 430,
        "other": 0,
        "total": 318
      },
      "iops": {
        "read": 18,
        "write": 26,
        "other": 0,
        "total": 45
      }
    },
    {
      "timestamp": "2019-01-01T23:00:00Z",
      "status": "ok",
      "duration": "PT30M",
      "throughput": {
        "read": 474266,
        "write": 6121908,
        "other": 0,
        "total": 6596175
      },
      "latency": {
        "read": 154,
```

```
    "write": 448,  
    "other": 0,  
    "total": 262  
  },  
  "iops": {  
    "read": 48,  
    "write": 28,  
    "other": 0,  
    "total": 76  
  }  
},  
{  
  "timestamp": "2019-01-01T22:30:00Z",  
  "status": "ok",  
  "duration": "PT30M",  
  "throughput": {  
    "read": 540164,  
    "write": 2411356,  
    "other": 26244685,  
    "total": 29196206  
  },  
  "latency": {  
    "read": 159,  
    "write": 394,  
    "other": 192,  
    "total": 193  
  },  
  "iops": {  
    "read": 94,  
    "write": 16,  
    "other": 437,  
    "total": 548  
  }  
},  
{  
  "timestamp": "2019-01-01T22:00:00Z",  
  "status": "ok",  
  "duration": "PT30M",  
  "throughput": {  
    "read": 2842,  
    "write": 2765407,  
    "other": 0,  
    "total": 2768249  
  },  
  "latency": {  
    "read": 189,
```

```

    "write": 540,
    "other": 0,
    "total": 523
  },
  "iops": {
    "read": 0,
    "write": 13,
    "other": 0,
    "total": 13
  }
}
],
"num_records": 4
}

```

### Related ONTAP commands

- `statistics aggregate show`

## Retrieve historical performance metrics for an aggregate

GET `/storage/aggregates/{uuid}/metrics`

**Introduced In:** 9.7

Retrieves historical performance metrics for an aggregate.

### Parameters

| Name             | Type    | In    | Required | Description                |
|------------------|---------|-------|----------|----------------------------|
| throughput.total | integer | query | False    | Filter by throughput.total |
| throughput.other | integer | query | False    | Filter by throughput.other |
| throughput.write | integer | query | False    | Filter by throughput.write |
| throughput.read  | integer | query | False    | Filter by throughput.read  |
| status           | string  | query | False    | Filter by status           |
| latency.total    | integer | query | False    | Filter by latency.total    |



| <b>Name</b>   | <b>Type</b> | <b>In</b> | <b>Required</b> | <b>Description</b>                  |
|---------------|-------------|-----------|-----------------|-------------------------------------|
| latency.other | integer     | query     | False           | Filter by latency.other             |
| latency.write | integer     | query     | False           | Filter by latency.write             |
| latency.read  | integer     | query     | False           | Filter by latency.read              |
| duration      | string      | query     | False           | Filter by duration                  |
| timestamp     | string      | query     | False           | Filter by timestamp                 |
| iops.total    | integer     | query     | False           | Filter by iops.total                |
| iops.other    | integer     | query     | False           | Filter by iops.other                |
| iops.write    | integer     | query     | False           | Filter by iops.write                |
| iops.read     | integer     | query     | False           | Filter by iops.read                 |
| uuid          | string      | path      | True            | Unique identifier of the aggregate. |

| Name     | Type   | In    | Required | Description  |
|----------|--------|-------|----------|--|
| interval | string | query | False    | <p>The time range for the data. Values can be 1h, 1d, 1w, 1m, or 1y. The period for each time range is as follows:</p> <ul style="list-style-type: none"> <li>• 1h: Metrics over the most recent hour sampled over 15 seconds.</li> <li>• 1d: Metrics over the most recent day sampled over 5 minutes.</li> <li>• 1w: Metrics over the most recent week sampled over 30 minutes.</li> <li>• 1m: Metrics over the most recent month sampled over 2 hours.</li> <li>• 1y: Metrics over the most recent year sampled over a day.</li> <li>• Default value: 1</li> <li>• enum: ["1h", "1d", "1w", "1m", "1y"]</li> </ul> |

| Name   | Type           | In      | Required | Description   |
|--|----------------|---------|----------|---|
| return_timeout   | integer        | query   | False    | The number of seconds to allow the call to execute before returning. When iterating over a collection, the default is 15 seconds. ONTAP returns earlier if either max records or the end of the collection is reached. <ul style="list-style-type: none"> <li>• Default value: 1</li> <li>• Max value: 120</li> <li>• Min value: 0</li> </ul> |
| fields   | array[string]  | query   | False    | Specify the fields to return.   |
| max_records  | integer        | query   | False    | Limit the number of records returned.   |
| order_by   | array[string]  | query   | False    | Order results by specified fields and optional [asc   |
| desc] direction. Default direction is 'asc' for ascending. | return_records | boolean | query    | False   |

## Response

Status: 200, Ok

| Name        | Type                             | Description       |
|-------------|----------------------------------|-------------------|
| _links      | <a href="#">_links</a>           |                   |
| num_records | integer                          | Number of records |
| records     | array[ <a href="#">records</a> ] |                   |

## Example response

```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "duration": "PT15S",
    "iops": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "latency": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "status": "ok",
    "throughput": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "timestamp": "2017-01-25 11:20:13 +0000"
  }
}
```

## Error

Status: Default

## ONTAP Error Response Codes

| Error Code | Description   |
|------------|---|
| 8586225    | Encountered unexpected error in retrieving metrics for the requested aggregate. |

Also see the table of common errors in the [Response body](#) overview section of this documentation.

| Name  | Type                           | Description |
|-------|--------------------------------|-------------|
| error | <a href="#">returned_error</a> |             |

### Example error

```
{
  "error": {
    "arguments": {
      "code": "string",
      "message": "string"
    },
    "code": "4",
    "message": "entry doesn't exist",
    "target": "uuid"
  }
}
```

## Definitions

## See Definitions

href

| Name | Type   | Description |
|------|--------|-------------|
| href | string |             |

\_links

| Name | Type                 | Description |
|------|----------------------|-------------|
| next | <a href="#">href</a> |             |
| self | <a href="#">href</a> |             |

\_links

| Name | Type                 | Description |
|------|----------------------|-------------|
| self | <a href="#">href</a> |             |

iops

The rate of I/O operations observed at the storage object.

| Name  | Type    | Description  |
|-------|---------|--|
| other | integer | Performance metric for other I/O operations. Other I/O operations can be metadata operations, such as directory lookups and so on. |
| read  | integer | Performance metric for read I/O operations.  |
| total | integer | Performance metric aggregated over all types of I/O operations.  |
| write | integer | Performance metric for write I/O operations.   |

latency

The round trip latency in microseconds observed at the storage object.

| Name  | Type    | Description  |
|-------|---------|--|
| other | integer | Performance metric for other I/O operations. Other I/O operations can be metadata operations, such as directory lookups and so on. |
| read  | integer | Performance metric for read I/O operations.  |
| total | integer | Performance metric aggregated over all types of I/O operations.  |
| write | integer | Performance metric for write I/O operations.   |

### throughput

The rate of throughput bytes per second observed at the storage object.

| Name  | Type    | Description  |
|-------|---------|--|
| other | integer | Performance metric for other I/O operations. Other I/O operations can be metadata operations, such as directory lookups and so on. |
| read  | integer | Performance metric for read I/O operations.  |
| total | integer | Performance metric aggregated over all types of I/O operations.  |
| write | integer | Performance metric for write I/O operations.   |

### records

Performance numbers, such as IOPS latency and throughput.

| Name                   | Type                   | Description |
|------------------------|------------------------|-------------|
| <a href="#">_links</a> | <a href="#">_links</a> |             |

| Name       | Type       | Description   |
|------------|------------|---|
| duration   | string     | The duration over which this sample is calculated. The time durations are represented in the ISO-8601 standard format. Samples can be calculated over the following durations:  |
| iops       | iops       | The rate of I/O operations observed at the storage object.  |
| latency    | latency    | The round trip latency in microseconds observed at the storage object.  |
| status     | string     | Errors associated with the sample. For example, if the aggregation of data over multiple nodes fails, then any partial errors might return "ok" on success or "error" on an internal uncategorized failure. Whenever a sample collection is missed but done at a later time, it is back filled to the previous 15 second timestamp and tagged with "backfilled_data". "Inconsistent_delta_time" is encountered when the time between two collections is not the same for all nodes. Therefore, the aggregated value might be over or under inflated. "Negative_delta" is returned when an expected monotonically increasing value has decreased in value. "Inconsistent_old_data" is returned when one or more nodes do not have the latest data. |
| throughput | throughput | The rate of throughput bytes per second observed at the storage object.   |
| timestamp  | string     | The timestamp of the performance data.  |

error\_arguments



| Name    | Type   | Description      |
|---------|--------|------------------|
| code    | string | Argument code    |
| message | string | Message argument |

returned\_error

| Name      | Type                                     | Description                                 |
|-----------|--|---|
| arguments | array[ <a href="#">error_arguments</a> ] | Message arguments                           |
| code      | string                                   | Error code                                  |
| message   | string                                   | Error message                               |
| target    | string                                   | The target parameter that caused the error. |

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