



Retrieve files

ONTAP 9.15.1 REST API reference

NetApp
September 11, 2024

Table of Contents

- Retrieve files 1
- Storage volumes volume.uuid top-metrics files endpoint overview 1
- Retrieve files with the most I/O activity 6

Retrieve files

Storage volumes volume.uuid top-metrics files endpoint overview

Overview

You can use this API to retrieve a list of files with the most I/O activity for a specified volume, within the past several seconds. Use the `top_metric` parameter to specify which type of I/O activity to filter for. This API is used to provide insight into I/O activity and supports ordering by I/O activity types, namely `iops` or `throughput` metrics. This API also supports only returning one I/O activity type per request.

Approximate accounting and error bars

When too many files have recent activity, some files might be dropped from the list. In this situation, the spread of values in the `error` field increases, indicating that there are larger error bars on the value for `iops` or `throughput`. As the list becomes increasingly more approximate due to dropped entries, some of the files that would have otherwise been included might not be present in the final list returned by the API.

Failure to return list of files with most I/O activity

The API can sometimes fail to return the list of files with the most I/O activity, due to the following reasons:

- – The volume does not have the activity tracking feature enabled.
- – The volume has not had any recent NFS/CIFS client traffic.
- – The NFS/CIFS client operations are being served by the client-side filesystem cache.
- – The NFS/CIFS client operations are being buffered by the client operating system.
- – On rare occasions, the incoming traffic pattern is not suitable to obtain the list of files with the most I/O activity.

Failure to return pathnames

The API can sometimes fail to obtain the filesystem pathnames for certain files, either due to internal transient errors or if those files have been recently deleted. In such cases, instead of the pathname, the API will return "`{<volume_instance_uuid>.<fileid>}`" for that file.`</fileid></volume_instance_uuid>`

Retrieve a list of the files with the most I/O activity

For a report on the files with the most I/O activity returned in descending order, specify the I/O activity type you want to filter for by passing the `iops` or `throughput` property into the `top_metric` parameter. If the I/O activity type is not specified, by default the API returns a list of the files with the greatest number of the average read operations per second. The current maximum number of files returned by the API for an I/O activity type is 25.

- – GET `/api/storage/volumes/{volume.uuid}/top-metrics/files`

Examples

Retrieving a list of the files with the greatest average number of write bytes received per second:

```
# The API:
GET /api/storage/volumes/{volume.uuid}/top-metrics/files

# The Call:
curl -X GET "https://<mgmt-ip>/api/storage/volumes/{volume.uuid}/top-
metrics/files?top_metric=throughput.write"

# The Response:
{
  "records": [
    {
      "volume": {
        "name": "fv"
      },
      "throughput": {
        "write": 24,
        "error": {
          "lower_bound": 24,
          "upper_bound": 29
        }
      },
      "path": "/d5/f5",
      "svm": {
        "uuid": "0ba74c3e-d5ca-11eb-8fbb-005056ac0f77",
        "name": "vs0",
        "_links": {
          "self": {
            "href": "/api/svm/svms/0ba74c3e-d5ca-11eb-8fbb-005056ac0f77"
          }
        }
      },
      "_links": {
        "metadata": {
          "href": "/api/storage/volumes/4ec6d1ea-d5da-11eb-a25f-
005056ac0f77/files/d5%2Ff5?return_metadata=true"
        }
      }
    },
    {
      "volume": {
        "name": "fv"
      },
    },
  ]
}
```

```

"throughput": {
  "write": 12,
  "error": {
    "lower_bound": 12,
    "upper_bound": 22
  }
},
"path": "/d6/f6",
"svm": {
  "uuid": "0ba74c3e-d5ca-11eb-8fbb-005056ac0f77",
  "name": "vs0",
  "_links": {
    "self": {
      "href": "/api/svm/svms/0ba74c3e-d5ca-11eb-8fbb-005056ac0f77"
    }
  }
},
"_links": {
  "metadata": {
    "href": "/api/storage/volumes/4ec6d1ea-d5da-11eb-a25f-005056ac0f77/files/d6%2Ff6?return_metadata=true"
  }
}
},
{
  "volume": {
    "name": "fv"
  },
  "throughput": {
    "write": 8,
    "error": {
      "lower_bound": 8,
      "upper_bound": 10
    }
  },
  "path": "/d3/f3",
  "svm": {
    "uuid": "0ba74c3e-d5ca-11eb-8fbb-005056ac0f77",
    "name": "vs0",
    "_links": {
      "self": {
        "href": "/api/svm/svms/0ba74c3e-d5ca-11eb-8fbb-005056ac0f77"
      }
    }
  }
},
"_links": {

```

```

    "metadata": {
      "href": "/api/storage/volumes/4ec6d1ea-d5da-11eb-a25f-005056ac0f77/files/d3%2Ff3?return_metadata=true"
    }
  }
],
"num_records": 3,
"_links": {
  "self": {
    "href": "/api/storage/volumes/4ec6d1ea-d5da-11eb-a25f-005056ac0f77/top-metrics/files?top_metric=throughput.write"
  }
}
}

```

Retrieving a list of the files with the most traffic with failure in obtaining the pathnames for the files:

```

# The Call:
curl -X GET "https://<mgmt-ip>/api/storage/volumes/{volume.uuid}/top-metrics/files?top_metric=throughput.write"

# The Response:
{
  "records": [
    {
      "volume": {
        "name": "fv"
      },
      "throughput": {
        "write": 24,
        "error": {
          "lower_bound": 24,
          "upper_bound": 29
        }
      },
      "path": "{4ec6d1ea-d5da-11eb-a25f-005056ac0f77:1232}",
      "svm": {
        "uuid": "0ba74c3e-d5ca-11eb-8fbb-005056ac0f77",
        "name": "vs0",
        "_links": {
          "self": {
            "href": "/api/svm/svms/0ba74c3e-d5ca-11eb-8fbb-005056ac0f77"
          }
        }
      }
    }
  ]
}

```

```

    }
  },
  {
    "volume": {
      "name": "fv"
    },
    "throughput": {
      "write": 12,
      "error": {
        "lower_bound": 12,
        "upper_bound": 22
      }
    },
    "path": "{4ec6d1ea-d5da-11eb-a25f-005056ac0f77:6754}",
    "svm": {
      "uuid": "0ba74c3e-d5ca-11eb-8fbb-005056ac0f77",
      "name": "vs0",
      "_links": {
        "self": {
          "href": "/api/svm/svms/0ba74c3e-d5ca-11eb-8fbb-005056ac0f77"
        }
      }
    }
  },
  {
    "volume": {
      "name": "fv"
    },
    "throughput": {
      "write": 8,
      "error": {
        "lower_bound": 8,
        "upper_bound": 10
      }
    },
    "path": "{4ec6d1ea-d5da-11eb-a25f-005056ac0f77:8654}",
    "svm": {
      "uuid": "0ba74c3e-d5ca-11eb-8fbb-005056ac0f77",
      "name": "vs0",
      "_links": {
        "self": {
          "href": "/api/svm/svms/0ba74c3e-d5ca-11eb-8fbb-005056ac0f77"
        }
      }
    }
  }
}

```

```
],
"num_records": 3,
"_links": {
  "self": {
    "href": "/api/storage/volumes/4ec6d1ea-d5da-11eb-a25f-005056ac0f77/top-metrics/files?top_metric=throughput.write"
  }
}
}
```

Example showing the behavior of the API when there is no read/write traffic:

```
# The Call:
curl -X GET "https://<mgmt-ip>/api/storage/volumes/{volume.uuid}/top-
metrics/files?top_metric=throughput.write"

# The Response:
{
  "records": [
  ],
  "num_records": 0,
  "notice": {
    "message": "The activity tracking report for volume \"FV\" in SVM
\"vs0\" returned zero records. Check whether the volume have read/write
traffic. Refer to the REST API documentation for more information on why
there might be no records.",
    "code": "124518418"
  },
  "_links": {
    "self": {
      "href": "/api/storage/volumes/9af63729-8ac8-11ec-b1bc-005056a79da4/top-metrics/files?top_metric=throughput.write"
    }
  }
}
```

Retrieve files with the most I/O activity

GET /storage/volumes/{volume.uuid}/top-metrics/files

Introduced In: 9.10

Retrieves a list of files with the most IO activity.

Parameters

Name	Type	In	Required	Description
volume.uuid	string	path	True	Volume UUID
top_metric	string	query	False	I/O activity type <ul style="list-style-type: none"> • Default value: 1 • enum: ["iops.read", "iops.write", "throughput.read", "throughput.write"]
max_records_per_volume	integer	query	False	Max records per volume.
throughput.write	integer	query	False	Filter by throughput.write
throughput.read	integer	query	False	Filter by throughput.read
throughput.error.lower_bound	integer	query	False	Filter by throughput.error.lower_bound
throughput.error.upper_bound	integer	query	False	Filter by throughput.error.upper_bound
volume.name	string	query	False	Filter by volume.name
path	string	query	False	Filter by path
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
iops.write	integer	query	False	Filter by iops.write
iops.read	integer	query	False	Filter by iops.read

Name	Type	In	Required	Description
iops.error.lower_bound	integer	query	False	Filter by iops.error.lower_bound
iops.error.upper_bound	integer	query	False	Filter by iops.error.upper_bound
fields	array[string]	query	False	Specify the fields to return.
max_records	integer	query	False	Limit the number of records returned.
return_records	boolean	query	False	The default is true for GET calls. When set to false, only the number of records is returned. <ul style="list-style-type: none"> • Default value: 1
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"> • Default value: 1 • Max value: 120 • Min value: 0
order_by	array[string]	query	False	Order results by specified fields and optional [asc

Response

Status: 200, Ok

Name	Type	Description
_links	_links	
incomplete_response_reason	incomplete_response_reason	Indicates that the metric report provides incomplete data.
notice	notice	Optional field that indicates why no records are returned by the volume activity tracking REST API.
num_records	integer	Number of records.
records	array[top_metrics_file]	

Example response

```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "incomplete_response_reason": {
    "code": "111411207",
    "message": "Partial data has been returned for this metric report. Reason: The activity tracking report for this volume is not available because the system is busy collecting tracking data."
  },
  "notice": {
    "code": "111411207",
    "message": "No read/write traffic on volume."
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "metadata": {
          "href": "/api/resourcelink"
        },
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "iops": {
        "details": [
          {
            "client_ip": "192.168.185.170",
            "read": 5,
            "total": 4,
            "user_id": "S-1-5-21-256008430-3394229847-3930036330-1001",
            "user_name": "James",
            "write": 4
          }
        ]
      },
      "error": {
        "lower_bound": 34,
        "upper_bound": 54
      }
    }
  ]
}
```

```

    },
    "read": 5,
    "total": 4,
    "write": 4
  },
  "path": "/dir_abc/dir_123/file_1",
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "throughput": {
    "details": [
      {
        "client_ip": "192.168.185.170",
        "read": 5,
        "total": 4,
        "user_id": "S-1-5-21-256008430-3394229847-3930036330-1001",
        "user_name": "James",
        "write": 4
      }
    ],
    "error": {
      "lower_bound": 34,
      "upper_bound": 54
    },
    "read": 2,
    "total": 20,
    "write": 20
  },
  "volume": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "volume1",
    "uuid": "028baa66-41bd-11e9-81d5-00a0986138f7"
  }
}
]
}

```

Error

Status: Default

ONTAP Error Response Codes

Error Code	Description
124518405	Volume activity tracking is not supported on volumes that contain LUNs.
124518407	Volume activity tracking is not supported on FlexCache volumes.
124518408	Volume activity tracking is not supported on audit staging volumes.
124518409	Volume activity tracking is not supported on object store server volumes.
124518410	Volume activity tracking is not supported on SnapMirror destination volumes.
124518411	Enabling or disabling volume activity tracking is not supported on individual FlexGroup constituents.
124518412	Volume activity tracking is not supported on SnapLock volumes.
124518414	Volume activity tracking is not supported on volumes that contain NVMe namespaces.
124518415	Failed to get the volume activity tracking report on volume volume.name in SVM svm.name.
124518416	Internal error. Volume activity tracking report timed out for volume volume.name in SVM svm.name.
124518417	Volume wildcard queries are not supported for activity tracking reports.
124518418	The activity tracking report for volume volume.name in SVM svm.name returned zero records. Check whether the volume has read/write traffic. Refer to the REST API documentation for more information.
124519411	Volume activity tracking is not enabled on the volume.

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

Name	Type	Description
error	returned_error	

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	href	
self	href	

incomplete_response_reason

Indicates that the metric report provides incomplete data.

Name	Type	Description
code	string	Warning code indicating why partial data was reported.
message	string	A message describing the reason for partial data.

notice

Optional field that indicates why no records are returned by the volume activity tracking REST API.

Name	Type	Description
code	string	Warning code indicating why no records are returned.
message	string	Details why no records are returned.

_links

Name	Type	Description
metadata	href	
self	href	

top_metric_file_detail

Name	Type	Description
client_ip	string	IP address of the client. Both IPv4 and IPv6 IP addresses are supported.
read	integer	Average number of read operations or bytes, per second.
total	integer	Average number of read and write operations or read and write bytes, per second.
user_id	string	User ID of the user.
user_name	string	Name of the user.
write	integer	Average number of write operations or bytes, per second.

top_metric_value_error_bounds

Name	Type	Description
lower_bound	integer	Lower bound of the nominal value of a metric.
upper_bound	integer	Upper bound of the nominal value of a metric.

iops

Name	Type	Description
details	array[top_metric_file_detail]	
error	top_metric_value_error_bounds	
read	integer	Average number of read operations per second.
total	integer	Average number of read and write operations, per second.
write	integer	Average number of write operations per second.

_links

Name	Type	Description
self	href	

svm

SVM, applies only to SVM-scoped objects.

Name	Type	Description
_links	_links	
name	string	The name of the SVM. This field cannot be specified in a PATCH method.
uuid	string	The unique identifier of the SVM. This field cannot be specified in a PATCH method.

throughput

Name	Type	Description
details	array[top_metric_file_detail]	
error	top_metric_value_error_bounds	
read	integer	Average number of read bytes received per second.
total	integer	Average number of read and write bytes received, per second.
write	integer	Average number of write bytes received per second.

volume

Name	Type	Description
_links	_links	
name	string	The name of the volume. This field cannot be specified in a POST or PATCH method.

Name	Type	Description
uuid	string	<p>Unique identifier for the volume. This corresponds to the instance-uuid that is exposed in the CLI and ONTAPI. It does not change due to a volume move.</p> <ul style="list-style-type: none"> • example: 028baa66-41bd-11e9-81d5-00a0986138f7 • Introduced in: 9.6 • x-nullable: true

top_metrics_file

Information about a file's IO activity.

Name	Type	Description
_links	_links	
detailed	boolean	Specifies whether "iops.details" or "throughput.details" is returned with the report. These extra details list the top 10 clients and users contributing to each file in the report.
iops	iops	
path	string	Path of the file.
svm	svm	SVM, applies only to SVM-scoped objects.
throughput	throughput	
volume	volume	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

returned_error

Name	Type	Description
arguments	array[error_arguments]	Message arguments
code	string	Error code
message	string	Error message
target	string	The target parameter that caused the error.

Copyright information

Copyright © 2024 NetApp, Inc. All Rights Reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.