



# **Retrieve directories**

## REST API reference

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# Retrieve directories

## Retrieve directories

### Overview

You can use this API to retrieve a list of directories with the most I/O activity for FlexVol and FlexGroup volumes belonging to a specified SVM, within the past several seconds. To obtain this list, only the volumes which have the activity tracking feature enabled are considered.

This API is used to provide insight into I/O activity and supports ordering by I/O activity types, namely `iops` and `throughput` metrics. Use the `top_metric` parameter to specify which type of I/O activity to filter for. This API supports returning only one I/O activity type per request.

### Enabling and disabling activity tracking feature

The following APIs can be used to enable, disable, and retrieve the activity tracking state for a FlexVol or a FlexGroup volume.

&ndash; PATCH `/api/storage/volumes/{uuid} -d '{"activity_tracking.state":"on"}'`

&ndash; PATCH `/api/storage/volumes/{uuid} -d '{"activity_tracking.state":"off"}'`

&ndash; GET `/api/storage/volumes/{uuid}/?fields=activity_tracking`

### Excluded volumes list

Optionally, the API returns an excluded list of activity tracking-enabled volumes, which were not accounted for when obtaining the list of clients with the most I/O activity for the SVM. This excluded list contains both the volume information and the reason for exclusion.

### Approximate accounting and error bars

When too many directories have recent activity, some directories 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 directories that would have otherwise been included might not be present in the final list returned by the API.

### Failure to return list of directories with most I/O activity

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

&ndash; The volumes belonging to the SVM do not have the activity tracking feature enabled.

&ndash; The volumes belonging to the SVM have not had any recent NFS/CIFS client traffic.

&ndash; The NFS/CIFS client operations are being served by the client-side filesystem cache.

&ndash; The NFS/CIFS client operations are being buffered by the client operating system.

&ndash; On rare occasions, the incoming traffic pattern is not suitable to obtain the list of directories with the most I/O activity.

## Failure to return pathnames

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

## Retrieve a list of the directories with the most I/O activity

For a report on the directories 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 directories with the greatest number of average read operations per second. The current maximum number of directories returned by the API for an I/O activity type is 25.

&ndash; GET /api/svm/svms/{svm.uuid}/top-metrics/directories

## Examples

**Retrieving a list of the directories with the greatest average number of read operations per second:**

```
# The API:
GET /api/svm/svms/{svm.uuid}/top-metrics/directories

# The Call:
curl -X GET "https://<mgmt-ip>/api/svm/svms/{svm.uuid}/top-
metrics/directories?top_metric=iops.read"

# The Response:
{
  "records": [
    {
      "svm": {
        "name": "vs1"
      },
      "iops": {
        "read": 1495,
        "error": {
          "lower_bound": 1495,
          "upper_bound": 1505
        }
      },
      "path": "/vol/fv1/dir1/dir2",
      "junction-path": "/fv1",
      "volume": {
```

```

    "name": "fv1",
    "uuid": "73b293df-e9d7-46cc-a9ce-2df8e52ef86",
    "_links": {
      "self": {
        "href": "/api/storage/volumes/73b293df-e9d7-46cc-a9ce-2df8e52ef86"
      }
    },
    "_links": {
      "directory": {
        "href": "/api/storage/volumes/73b293df-e9d7-46cc-a9ce-2df8e52ef864/files/dir1%2Fdir2"
      },
      "metadata": {
        "href": "/api/storage/volumes/73b293df-e9d7-46cc-a9ce-2df8e52ef864/files/dir1%2Fdir2?return_metadata=true"
      }
    },
    {
      "svm": {
        "name": "vs1"
      },
      "iops": {
        "read": 1022,
        "error": {
          "lower_bound": 1022,
          "upper_bound": 1032
        }
      },
      "path": "/vol/fv2/dir3/dir4",
      "junction-path": "/fv2",
      "volume": {
        "name": "fv2",
        "uuid": "11b293df-e9d7-46cc-a9ce-2df8e52ef811",
        "_links": {
          "self": {
            "href": "/api/storage/volumes/11b293df-e9d7-46cc-a9ce-2df8e52ef811"
          }
        }
      },
      "_links": {
        "directory": {
          "href": "/api/storage/volumes/11b293df-e9d7-46cc-a9ce-

```

```

2df8e52ef811/files/dir3%2Fdir4"
    },
    "metadata": {
        "href": "/api/storage/volumes/11b293df-e9d7-46cc-a9ce-
2df8e52ef811/files/dir3%2Fdir4?return_metadata=true"
    }
}
},
{
    "svm": {
        "name": "vs1"
    },
    "iops": {
        "read": 345,
        "error": {
            "lower_bound": 345,
            "upper_bound": 355
        }
    },
    "path": "/vol/fv1/dir12",
    "junction-path": "/fv1",
    "volume": {
        "name": "fv1",
        "uuid": "73b293df-e9d7-46cc-a9ce-2df8e52ef864",
        "_links": {
            "self": {
                "href": "/api/storage/volumes/73b293df-e9d7-46cc-a9ce-
2df8e52ef864"
            }
        }
    },
    "_links": {
        "directory": {
            "href": "/api/storage/volumes/73b293df-e9d7-46cc-a9ce-
2df8e52ef864/files/dir12"
        },
        "metadata": {
            "href": "/api/storage/volumes/73b293df-e9d7-46cc-a9ce-
2df8e52ef864/files/dir12?return_metadata=true"
        }
    }
}
],
"num_records": 3,
"excluded_volumes": [
    {

```

```

    "volume": {
      "uuid": "5bbfc226-3fd8-42c9-a651-fa6167c2cf84",
      "name": "vol10",
      "_links": {
        "self": {
          "href": "/api/storage/volumes/5bbfc226-3fd8-42c9-a651-
fa6167c2cf84"
        }
      }
    },
    "reason": {
      "message": "The volume is offline.",
      "code": 12345
    },
    "_links": {
      "self": {
        "href": "/api/storage/volumes/5bbfc226-3fd8-42c9-a651-
fa6167c2cf84"
      }
    }
  },
  {
    "volume": {
      "uuid": "5bbfc227-3fd8-42c9-a651-fa6167c2cf85",
      "name": "vol22",
      "_links": {
        "self": {
          "href": "/api/storage/volumes/5bbfc227-3fd8-42c9-a651-
fa6167c2cf85"
        }
      }
    },
    "reason": {
      "message": "The volume is offline.",
      "code": 23456
    },
    "_links": {
      "self": {
        "href": "/api/storage/volumes/5bbfc227-3fd8-42c9-a651-
fa6167c2cf85"
      }
    }
  }
],
"_links": {
  "self": {

```

```
    "href": "/api/svm/svms/572361f3-e769-439d-9c04-2ba48a08ff43/top-  
metrics/directories?top_metric=iops.read"  
  }  
}  
}
```

## Retrieving a list of the directories with the most read traffic, with failure to obtain pathnames

```
# The Call:  
curl -X GET "https://<mgmt-ip>/api/svm/svms/{svm.uuid}/top-  
metrics/directories?top_metric=iops.read"  
  
# The Response:  
{  
  "records": [  
    {  
      "svm": {  
        "name": "vs1"  
      },  
      "iops": {  
        "read": 1495,  
        "error": {  
          "lower_bound": 1495,  
          "upper_bound": 1505  
        }  
      },  
      "path": "73b293df-e9d7-46cc-a9ce-2df8e52ef86.1232",  
      "junction-path": "/fv1",  
      "volume": {  
        "name": "fv1",  
        "uuid": "73b293df-e9d7-46cc-a9ce-2df8e52ef86",  
        "_links": {  
          "self": {  
            "href": "/api/storage/volumes/73b293df-e9d7-46cc-a9ce-  
2df8e52ef86"  
          }  
        }  
      }  
    },  
    {  
      "svm": {  
        "name": "vs1"  
      },  
      "iops": {
```



```

    "read": 1022,
    "error": {
      "lower_bound": 1022,
      "upper_bound": 1032
    }
  },
  "path": "11b293df-e9d7-46cc-a9ce-2df8e52ef811.6574",
  "junction-path": "/fv2",
  "volume": {
    "name": "fv2",
    "uuid": "11b293df-e9d7-46cc-a9ce-2df8e52ef811",
    "_links": {
      "self": {
        "href": "/api/storage/volumes/11b293df-e9d7-46cc-a9ce-
2df8e52ef811"
      }
    }
  }
},
{
  "svm": {
    "name": "vs1"
  },
  "iops": {
    "read": 345,
    "error": {
      "lower_bound": 345,
      "upper_bound": 355
    }
  },
  "path": "73b293df-e9d7-46cc-a9ce-2df8e52ef864.7844",
  "junction-path": "/fv1",
  "volume": {
    "name": "fv1",
    "uuid": "73b293df-e9d7-46cc-a9ce-2df8e52ef864",
    "_links": {
      "self": {
        "href": "/api/storage/volumes/73b293df-e9d7-46cc-a9ce-
2df8e52ef864"
      }
    }
  }
}
],
"num_records": 3,
"excluded_volumes": [

```

```

{
  "volume": {
    "uuid": "5bbfc226-3fd8-42c9-a651-fa6167c2cf84",
    "name": "vol10",
    "_links": {
      "self": {
        "href": "/api/storage/volumes/5bbfc226-3fd8-42c9-a651-
fa6167c2cf84"
      }
    }
  },
  "reason": {
    "message": "The volume is offline.",
    "code": 12345
  },
  "_links": {
    "self": {
      "href": "/api/storage/volumes/5bbfc226-3fd8-42c9-a651-
fa6167c2cf84"
    }
  }
},
{
  "volume": {
    "uuid": "5bbfc227-3fd8-42c9-a651-fa6167c2cf85",
    "name": "vol22",
    "_links": {
      "self": {
        "href": "/api/storage/volumes/5bbfc227-3fd8-42c9-a651-
fa6167c2cf85"
      }
    }
  },
  "reason": {
    "message": "The volume is offline.",
    "code": 23456
  },
  "_links": {
    "self": {
      "href": "/api/storage/volumes/5bbfc227-3fd8-42c9-a651-
fa6167c2cf85"
    }
  }
}
],
"_links": {

```

```
"self": {
  "href": "/api/svm/svms/572361f3-e769-439d-9c04-2ba48a08ff43/top-
metrics/directories?top_metric=iops.read"
}
}
}
```

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

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

# The Response:
{
  "records": [
  ],
  "num_records": 0,
  "notice": {
    "message": "The activity tracking report for SVM \"vs1\" returned zero
records. Check whether the activity tracking enabled volumes belonging to
the SVM have read/write traffic. Refer to the REST API documentation for
more information on why there might be no records.",
    "code": "124519405",
  },
  "_links": {
    "self": {
      "href": "/api/svm/svms/572361f3-e769-439d-9c04-2ba48a08ff43/top-
metrics/directories?top_metric=throughput.write"
    }
  }
}
```

## Retrieve directories with the greatest value performance metric or capacity metric

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

Introduced In: 9.10

Retrieves a list of directories with the greatest value performance metric or capacity metric.

## Parameters

Name	Type	In	Required	Description
volume.uuid	string	path	True	Volume UUID
top_metric	string	query	False	Type of performance metric or capacity metric. <ul style="list-style-type: none"> <li>• Default value: 1</li> <li>• enum: ["iops.read", "iops.write", "throughput.read", "throughput.write", "non_recursive_bytes_used"]</li> </ul>
max_records_per_volume	integer	query	False	Max records per volume.
non_recursive_bytes_used	integer	query	False	Filter by non_recursive_bytes_used <ul style="list-style-type: none"> <li>• Introduced in: 9.12</li> </ul>
path	string	query	False	Filter by path
volume.name	string	query	False	Filter by volume.name
iops.read	integer	query	False	Filter by iops.read
iops.write	integer	query	False	Filter by iops.write
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
svm.name	string	query	False	Filter by svm.name

Name	Type	In	Required	Description
svm.uuid	string	query	False	Filter by svm.uuid
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
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	<p>The default is true for GET calls. When set to false, only the number of records is returned.</p> <ul style="list-style-type: none"> <li>• Default value: 1</li> </ul>
return_timeout	integer	query	False	<p>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.</p> <ul style="list-style-type: none"> <li>• Default value: 15</li> <li>• Max value: 120</li> <li>• Min value: 0</li> </ul>

Name	Type	In	Required	Description
order_by	array[string]	query	False	Order results by specified fields and optional [asc

## Response

Status: 200, Ok

Name	Type	Description
_links	<a href="#">_links</a>	
incomplete_response_reason	<a href="#">incomplete_response_reason</a>	Indicates that the metric report provides incomplete data.
notice	<a href="#">notice</a>	Optional field that indicates why no records are returned by the volume activity tracking REST API.
num_records	integer	Number of records.
records	array[ <a href="#">top_metrics_directory</a> ]	

## 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: Data collection for the large directory report is in progress."
  },
  "notice": {
    "code": "111411207",
    "message": "No read/write traffic on volume."
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "metadata": {
          "href": "/api/resourcelink"
        },
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "iops": {
        "error": {
          "lower_bound": 34,
          "upper_bound": 54
        },
        "read": 10,
        "write": 5
      },
      "non_recursive_bytes_used": 300,
      "path": "/dir_abc/dir_123/dir_20",
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        }
      }
    }
  ]
}
```

```

    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "throughput": {
    "error": {
      "lower_bound": 34,
      "upper_bound": 54
    },
    "read": 3,
    "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.



Error Code	Description
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.
124518422	Volume activity tracking is not supported on All SAN Array clusters.
124518423	Volume activity tracking is not supported on the volume.
124519410	The large directory report for volume volume.name in SVM svm.name is not available because the file system analytics database version doesn't support this report.
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	<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>	

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	<a href="#">href</a>	
self	<a href="#">href</a>	

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
error	<a href="#">top_metric_value_error_bounds</a>	
read	integer	Average number of read operations per second.
write	integer	Average number of write operations per second.

#### \_links

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

#### svm

SVM, applies only to SVM-scoped objects.

Name	Type	Description
_links	<a href="#">_links</a>	
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
error	<a href="#">top_metric_value_error_bounds</a>	
read	integer	Average number of read bytes received per second.

Name	Type	Description
write	integer	Average number of write bytes received per second.

#### volume

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	The name of the volume. This field cannot be specified in a PATCH method.
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"> <li>• example: 028baa66-41bd-11e9-81d5-00a0986138f7</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>

#### top\_metrics\_directory

Information about a directory's IO metrics.

Name	Type	Description
_links	<a href="#">_links</a>	
iops	<a href="#">iops</a>	
non_recursive_bytes_used	integer	Non-recursive bytes used by the contents of a directory.
path	string	Path of the directory.
svm	<a href="#">svm</a>	SVM, applies only to SVM-scoped objects.
throughput	<a href="#">throughput</a>	
volume	<a href="#">volume</a>	

#### 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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