SAN

REST API reference

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SAN

SAN overview

Overview

The storage area network (SAN) endpoints and objects enable you to configure, provision, and manage SAN-related objects.

Fibre Channel

Logins

Fibre Channel logins represent connections, formed by Fibre Channel initiators, that have successfully logged in to ONTAP. This represents the Fibre Channel login on which higher-level protocols, such as Fibre Channel Protocol (FCP) and Non-Volatile Memory Express over Fibre Channel (NVMe over FC), rely.

The Fibre Channel logins REST API provides information about active Fibre Channel logins.

WWPN Aliases

A WWPN (world wide port name) is a unique 64-bit identifier for a Fibre Channel initiator. It is displayed as a 16-character hexadecimal value. SAN administrators may find it easier to identify Fibre Channel initiators using an alias, especially in larger SANs.

The WWPN alias REST API allows you to create, delete and discover aliases for WWPNs.

Services

A Fibre Channel Protocol (FCP) service defines the properties of the Fibre Channel Protocol target for an SVM. There can be at most one FCP service for a given SVM. An SVM's FCP service must be created before FCP initiators can login to the SVM.

The Fibre Channel Proctocol (FCP) service REST API allows you to create, update, delete, and discover Fibre Channel Services for SVMs. Fibre Channel interfaces are the logical endpoints for Fibre Channel network connections to an SVM.

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iSCSI

Credentials

An iSCSI credentials object defines the authentication credentials to be used between an iSCSI initiator and ONTAP. It identifies an authentication type, user names, and the passwords that must be used to authenticate a specific initiator.

The iSCSI credentials REST API allows you to create, update, delete, and discover iSCSI credential objects.

Services

An iSCSI service defines the properties of the iSCSI target for an SVM. There can be at most one iSCSI service for an SVM. An SVM's iSCSI service must be created before iSCSI initiators can login to the SVM.

The iSCSI service REST API allows you to create, update, delete, and discover iSCSI services for SVMs.

Sessions

An iSCSI session consists of one or more TCP connections that link an iSCSI initiator with an iSCSI target. TCP connections can be added and removed from an iSCSI session by the iSCSI initiator. Across all TCP connections within an iSCSI session, an initiator sees one and the same target. After the connection is established, iSCSI control, data, and status messages are communicated over the session.

The iSCSI sessions REST API provides information about iSCSI initiators that have successfully logged in to ONTAP.

Learn More

- *IP Interfaces* found in the *networking* section. IP interfaces are the logical endpoints for iSCSI network connections to an SVM.

Initiator Groups

An initiator group (igroup) is a collection of Fibre Channel WWPNs (world wide port names), iSCSI IQNs (qualified names), iSCSI EUIs (extended unique identifiers), or any combination of these, that identify host initiators.

Initiator groups are used to control which hosts can access specific LUNs. To grant access to a LUN from one or more hosts, a network administrator creates an initiator group containing the hosts' initiator names, and then creates a LUN map that associates the initiator group with the LUN.

The initator group REST API allows you to create, update, delete, and discover initiator groups. It also enables you to add and remove initiators that can access the target and associated LUNs.

Portsets

A portset is a collection of Fibre Channel Protocol and/or iSCSI network interfaces from the portset's SVM.

Portsets are used to limit the network interfaces through which an initiator can connect to mapped LUNs. When a portset is bound to an initiator group (igroup), and the initiator group is mapped to a LUN, the initiators of the initiator group can only reach the LUN through the network interfaces in the portset.

Portsets are not recommended for new configurations. With modern releases of ONTAP, it is recommended to use multiple SVMs and initiator groups with no bound portset to load balance applications over multiple ports on a node. Selective LUN mapping will automatically limit the number of visible paths to a LUN from the client host to those required for efficient access and high availability. The REST portset API is primarily intended for legacy use.

The portset REST API allows you to create, delete, and discover portsets, and to add and remove network interaces from portsets.

A portset can be bound to one or more initiator groups. An initiator group (igroup) can be bound to at most one

portset.

LUN Maps

A LUN map is an association between a LUN and an initiator group. When a LUN is mapped to an initiator group, the group's initiators are granted access to the LUN. The relationship between an initiator group and a LUN is many initiator groups to many LUNs.

The LUN map REST API allows you to create, delete, and discover LUN maps and manage the reporting nodes of a LUN map.

LUNs

A LUN is the logical representation of storage in a storage area network (SAN).

The LUN REST API allows you to create, update, delete, and discover LUNs.

VMware Virtual Volume (vVol) Bindings

A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping.

Class `protocol_endpoint` and `vvol` LUNs support many-to-many vVol bindings. A LUN of one class can be bound to zero or more LUNs of the opposite class.

The vVol binding between any two specific LUNs is reference counted. When a REST POST is executed for a vVol binding that already exists, the vVol binding reference count is incremented. When a REST DELETE is executed, the vVol binding reference count is decremented. Only when the vVol binding count reaches zero, or the query parameter `delete_all_references` is supplied, is the vVol binding destroyed.

The vVol binding REST API allows you to create, delete, and discover vVol bindings.

Retrieve FC port information

Network FC logins endpoint overview

Overview

Fibre Channel (FC) logins represent connections formed by FC initiators that have successfully logged in to ONTAP. This represents the FC login on which higher-level protocols such as Fibre Channel Protocol and NVMe over FC (NVMe/FC) rely.

The Fibre Channel logins REST API provides information about active FC logins.

Examples

Retrieving all FC logins

```
# The API:
```

```
GET /api/network/fc/logins

# The call:
curl -X GET "https://<mgmt-ip>/api/network/fc/logins" -H "Accept:
application/hal+json"

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "056403da-83a7-4b13-bc78-6a93e8ea3596",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/056403da-83a7-4b13-bc78-6a93e8ea3596"
        }
      }
    },
    "interface": {
      "uuid": "01056403-1383-bc4b-786a-93e8ea35969d",
      "name": "lif1",
      "_links": {
        "self": {
          "href": "/api/network/fc/interfaces/01056403-1383-bc4b-786a-
93e8ea35969d"
        }
      }
    },
    "initiator": {
      "wwpn": "8b:21:2f:07:00:00:00:00"
    },
    "_links": {
      "self": {
        "href": "/api/network/fc/logins/01056403-1383-bc4b-786a-
93e8ea35969d/8b%3A21%3A2f%3A07%3A00%3A00%3A00%3A00"
      }
    }
  },
  {
    "svm": {
      "uuid": "056403da-83a7-4b13-bc78-6a93e8ea3596",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/056403da-83a7-4b13-bc78-6a93e8ea3596"
```

```
        }
      }
    },
    "interface": {
      "uuid": "02056403-1383-bc4b-786a-93e8ea35969d",
      "name": "lif2",
      "_links": {
        "self": {
          "href": "/api/network/fc/interfaces/02056403-1383-bc4b-786a-
93e8ea35969d"
        }
      }
    },
    "initiator": {
      "wwpn": "8c:21:2f:07:00:00:00:00"
    },
    "_links": {
      "self": {
        "href": "/api/network/fc/logins/02056403-1383-bc4b-786a-
93e8ea35969d/8c%3A21%3A2f%3A07%3A00%3A00%3A00%3A00"
      }
    }
  },
  {
    "svm": {
      "uuid": "156403da-83a7-4b13-bc78-6a93e8ea3596",
      "name": "svm2",
      "_links": {
        "self": {
          "href": "/api/svm/svms/156403da-83a7-4b13-bc78-6a93e8ea3596"
        }
      }
    },
    "interface": {
      "uuid": "03056403-1383-bc4b-786a-93e8ea35969d",
      "name": "lif3",
      "_links": {
        "self": {
          "href": "/api/network/fc/interfaces/00056403-1383-bc4b-786a-
93e8ea35969d"
        }
      }
    },
    "initiator": {
      "wwpn": "8a:21:2f:07:00:00:00:00"
    },
```

```
    "_links": {
      "self": {
        "href": "/api/network/fc/logins/00056403-1383-bc4b-786a-
93e8ea35969d/8a%3A21%3A2f%3A07%3A00%3A00%3A00%3A00"
      }
    }
  }
],
"num_records": 3,
"_links": {
  "self": {
    "href": "/api/network/fc/logins"
  }
}
}
```

Retrieving all FC logins with data protocol *fcp* in SVM *svm1*

The `svm.name` and `protocol` query parameters are used to perform the query.

```
# The API:
GET /api/network/fc/logins

# The call:
curl -X GET "https://<mgmt-
ip>/api/network/fc/logins?svm.name=svm1&protocol=fcp" -H "Accept:
application/hal+json"

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "056403da-83a7-4b13-bc78-6a93e8ea3596",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/056403da-83a7-4b13-bc78-6a93e8ea3596"
        }
      }
    },
    "interface": {
      "uuid": "01056403-1383-bc4b-786a-93e8ea35969d",
      "name": "lif2",
```

```
      "_links": {
        "self": {
          "href": "/api/network/fc/interfaces/01056403-1383-bc4b-786a-
93e8ea35969d"
        }
      }
    },
    "initiator": {
      "wwpn": "8b:21:2f:07:00:00:00:00"
    },
    "protocol": "fcp",
    "_links": {
      "self": {
        "href": "/api/network/fc/logins/01056403-1383-bc4b-786a-
93e8ea35969d/8b%3A21%3A2f%3A07%3A00%3A00%3A00%3A00"
      }
    }
  },
  {
    "svm": {
      "uuid": "056403da-83a7-4b13-bc78-6a93e8ea3596",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/056403da-83a7-4b13-bc78-6a93e8ea3596"
        }
      }
    },
    "interface": {
      "uuid": "02056403-1383-bc4b-786a-93e8ea35969d",
      "name": "lif3",
      "_links": {
        "self": {
          "href": "/api/network/fc/interfaces/02056403-1383-bc4b-786a-
93e8ea35969d"
        }
      }
    },
    "initiator": {
      "wwpn": "8c:21:2f:07:00:00:00:00"
    },
    "protocol": "fcp",
    "_links": {
      "self": {
        "href": "/api/network/fc/logins/02056403-1383-bc4b-786a-
93e8ea35969d/8c%3A21%3A2f%3A07%3A00%3A00%3A00%3A00"
```

```
      }
    }
  }
],
"num_records": 2,
"_links": {
  "self": {
    "href": "/api/network/fc/logins?svm.name=svm1&protocol=fcp"
  }
}
}
```

Retrieving all FC logins for initiators belonging to *igroup1* and returning all of their properties

The `igroups.name` query parameter is used to perform the query. The `fields` query parameter is used to return all of the properties.

```
# The API:
GET /api/network/fc/logins

# The call:
curl -X GET "https://<mgmt-
ip>/api/network/fc/logins?igroups.name=igroup1&fields=*" -H "Accept:
application/hal+json"

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "056403da-83a7-4b13-bc78-6a93e8ea3596",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/056403da-83a7-4b13-bc78-6a93e8ea3596"
        }
      }
    },
    "interface": {
      "uuid": "01056403-1383-bc4b-786a-93e8ea35969d",
      "name": "lif2",
      "wwpn": "8b:21:2f:07:00:00:00:00",
      "_links": {
        "self": {
```

```
          "href": "/api/network/fc/interfaces/01056403-1383-bc4b-786a-
93e8ea35969d"
        }
      }
    },
    "initiator": {
      "wwpn": "8b:21:2f:07:00:00:00:00",
      "wwnn": "95:21:2f:07:00:00:00:00",
      "comment": "Example information about this initiator"
    },
    "igroups": [
      {
        "uuid": "243bbb8a-46e9-4b2d-a508-a62dc93df9d1",
        "name": "igroup1",
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/243bbb8a-46e9-4b2d-a508-
a62dc93df9d1"
          }
        }
      }
    ],
    "port_address": "8aa53",
    "protocol": "fcp",
    "_links": {
      "self": {
        "href": "/api/network/fc/logins/01056403-1383-bc4b-786a-
93e8ea35969d/8b%3A21%3A2f%3A07%3A00%3A00%3A00%3A00"
      }
    }
  }
],
"num_records": 1,
"_links": {
  "self": {
    "href": "/api/network/fc/logins?igroups.name=igroup1&fields=*"
  }
}
}
```


Retrieve FC logins

GET `/network/fc/logins`

Introduced In: 9.6

Retrieves FC logins.

Related ONTAP commands

- `vserver fcp initiator show`

Learn more

- SAN: DOC /network/fc/logins
- NVMe: DOC /network/fc/logins

Parameters

Name	Type	In	Required	Description
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
protocol	string	query	False	Filter by protocol
initiator.wwpn	string	query	False	Filter by initiator.wwpn
initiator.port_address	string	query	False	Filter by initiator.port_address
initiator.comment	string	query	False	Filter by initiator.comment • Introduced in: 9.9
initiator.wwnn	string	query	False	Filter by initiator.wwnn
initiator.aliases	string	query	False	Filter by initiator.aliases
interface.wwpn	string	query	False	Filter by interface.wwpn
interface.name	string	query	False	Filter by interface.name
interface.uuid	string	query	False	Filter by interface.uuid

Name	Type	In	Required	Description
igroups.name	string	query	False	Filter by igroups.name • maxLength: 96 • minLength: 1
igroups.uuid	string	query	False	Filter by igroups.uuid
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. • 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. • 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	
num_records	integer	The number of records in the response.
records	array[fc_login]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "next": {
          "href": "/api/resourcelink"
        },
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroups": [
        {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "initiator": {
        "aliases": [
          "alias1"
        ],
        "comment": "This is an FC initiator for host 5",
        "port_address": "5060A",
        "wwnn": "2f:a0:00:a0:98:0b:56:13",
        "wwpn": "2f:a0:00:a0:98:0b:56:13"
      },
      "interface": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
```

```
            }
          },
          "name": "fc_lif1",
          "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
          "wwpn": "20:00:00:50:56:b4:13:a8"
        },
        "protocol": "string",
        "svm": {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "svm1",
          "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
        }
      }
    ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

igroups

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

initiator

Information about the logged in FC initiator.

Name	Type	Description
aliases	array[string]	The logged in initiator world wide port name (WWPN) aliases.
comment	string	A comment available for use by the administrator. This is modifiable from the initiator REST endpoint directly. See PATCH /protocols/san/igroups/{igroup.uuid}/initiators/{name} .

Name	Type	Description
port_address	string	The port address of the initiator's FC port. Each port in an FC switched fabric has its own unique port address for routing purposes. The port address is assigned by a switch in the fabric when that port logs in to the fabric. This property refers to the address given by a switch to the initiator port. This is useful for obtaining statistics and diagnostic information from FC switches. This is a hexadecimal encoded numeric value.
wwnn	string	The logged in initiator world wide node name (WWNN).
wwpn	string	The logged in initiator WWPN.

interface

An FC interface.

Name	Type	Description
_links	_links	
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

fc_login

A Fibre Channel (FC) login represents a connection formed by an FC initiator that has successfully logged in to ONTAP. This represents the FC login on which higher-level protocols such as Fibre Channel Protocol and NVMe over Fibre Channel (NVMe/FC) rely.

Name	Type	Description
_links	_links	
igroups	array[igroups]	The initiator groups in which the initiator is a member.
initiator	initiator	Information about the logged in FC initiator.
interface	interface	An FC interface.
protocol	string	The data protocol used to perform the login.
svm	svm	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve an FC login

GET `/network/fc/logins/{interface.uuid}/{initiator.wwpn}`

Introduced In: 9.6

Retrieves an FC login.

Related ONTAP commands

- `vserver fcp initiator show`

Learn more

- SAN: DOC /network/fc/logins
- NVMe: DOC /network/fc/logins

Parameters

Name	Type	In	Required	Description
interface.uuid	string	path	True	The unique identifier of the FC interface through which the initiator logged in.
initiator.wwpn	string	path	True	The world wide port name (WWPN) of the initiator.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
igroups	array[igroups]	The initiator groups in which the initiator is a member.
initiator	initiator	Information about the logged in FC initiator.
interface	interface	An FC interface.
protocol	string	The data protocol used to perform the login.
svm	svm	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "igroups": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "igroup1",
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "initiator": {
    "aliases": [
      "alias1"
    ],
    "comment": "This is an FC initiator for host 5",
    "port_address": "5060A",
    "wwnn": "2f:a0:00:a0:98:0b:56:13",
    "wwpn": "2f:a0:00:a0:98:0b:56:13"
  },
  "interface": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "fc_lif1",
    "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
    "wwpn": "20:00:00:50:56:b4:13:a8"
  },
  "protocol": "string",
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
```

```
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  }
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
4	The Fibre Channel login specified does not exist.
5373983	An invalid WWPN was supplied.
5374881	The Fibre Channel interface specified does not exist.

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

igroups

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

initiator

Information about the logged in FC initiator.

Name	Type	Description
aliases	array[string]	The logged in initiator world wide port name (WWPN) aliases.
comment	string	A comment available for use by the administrator. This is modifiable from the initiator REST endpoint directly. See PATCH /protocols/san/igroups/{igroup.uuid}/initiators/{name} .

Name	Type	Description
port_address	string	The port address of the initiator's FC port. Each port in an FC switched fabric has its own unique port address for routing purposes. The port address is assigned by a switch in the fabric when that port logs in to the fabric. This property refers to the address given by a switch to the initiator port. This is useful for obtaining statistics and diagnostic information from FC switches. This is a hexadecimal encoded numeric value.
wwnn	string	The logged in initiator world wide node name (WWNN).
wwpn	string	The logged in initiator WWPN.

interface

An FC interface.

Name	Type	Description
_links	_links	
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Manage FC WWPN aliases

Network FC wwpn-aliases endpoint overview

Overview

A worldwide port name (WWPN) is a unique 64-bit identifier for a Fibre Channel (FC) initiator. It is displayed as a 16-character hexadecimal value. SAN administrators might find it easier to identify FC initiators using an alias, especially in larger SANs.

The WWPN alias REST API allows you to create, delete, and discover aliases for WWPNs.

Multiple aliases can be created for a WWPN, but you cannot use the same alias for multiple WWPNs.

An alias can consist of up to 32 characters. Valid characters are:

- A through Z
- a through z
- numbers 0 through 9
- hyphen ("-")
- underscore ("_")
- left and right braces ("{", "}")
- period (".")

Examples

Creating a WWPN alias

```
# The API:
POST /api/network/fc/wwpn-aliases

# The call:
curl -X POST "https://<mgmt-ip>/api/network/fc/wwpn-aliases" -H "Accept:
application/json" -d '{ "svm": { "name": "svm1" }, "wwpn":
"50:0a:09:82:b4:30:25:05", "alias": "alias3" }'
```

Retrieving all properties of all WWPN aliases

The `fields` query parameter is used to request that all properties be returned.

```
# The API:
GET /api/network/fc/wwpn-aliases

# The call:
curl -X GET "https://<mgmt-ip>/api/network/fc/wwpn-aliases?fields=*" -H
"Accept: application/hal+json"

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "68589d3d-7efa-11e8-9eed-005056b43025",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/68589d3d-7efa-11e8-9eed-005056b43025"
        }
      }
    },
    "alias": "alias1",
    "wwpn": "20:00:00:50:56:b4:30:25",
    "_links": {
      "self": {
        "href": "/api/network/fc/wwpn-aliases/68589d3d-7efa-11e8-9eed-
005056b43025/alias1"
      }
    }
  },
  {
```

```
    "svm": {
      "uuid": "68589d3d-7efa-11e8-9eed-005056b43025",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/68589d3d-7efa-11e8-9eed-005056b43025"
        }
      }
    },
    "alias": "alias2",
    "wwpn": "50:0a:09:82:b4:30:25:00",
    "_links": {
      "self": {
        "href": "/api/network/fc/wwpn-aliases/68589d3d-7efa-11e8-9eed-
005056b43025/alias2"
      }
    }
  }
],
"num_records": 2,
"_links": {
  "self": {
    "href": "/api/network/fc/wwpn-aliases"
  }
}
}
```

Retrieving all WWPN aliases named "alias1"

The `alias` query parameter is used to specify a query for the value "alias1".

```
# The API:
GET /api/network/fc/wwpn-aliases

# The call:
curl -X GET "https://<mgmt-ip>/api/network/fc/wwpn-aliases?alias=alias1"
-H "Accept: application/hal+json"

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "68589d3d-7efa-11e8-9eed-005056b43025",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/68589d3d-7efa-11e8-9eed-005056b43025"
        }
      }
    },
    "alias": "alias1",
    "wwpn": "20:00:00:50:56:b4:30:25",
    "_links": {
      "self": {
        "href": "/api/network/fc/wwpn-aliases/68589d3d-7efa-11e8-9eed-
005056b43025/alias1"
      }
    }
  }
],
"num_records": 1,
"_links": {
  "self": {
    "href": "/api/network/fc/wwpn-aliases?alias=alias1"
  }
}
}
```

Retrieving a specific WWPN alias

The alias to be returned is identified by the UUID of its SVM and the alias name.

```
# The API:
GET /api/network/fc/wwpn-aliases/{svm.uuid}/{alias}

# The call:
curl -X GET "https://<mgmt-ip>/api/network/fc/wwpn-aliases/68589d3d-7efa-
11e8-9eed-005056b43025/alias2" -H "Accept: application/hal+json"

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "68589d3d-7efa-11e8-9eed-005056b43025",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/68589d3d-7efa-11e8-9eed-005056b43025"
        }
      }
    },
    "alias": "alias2",
    "wwpn": "50:0a:09:82:b4:30:25:00",
    "_links": {
      "self": {
        "href": "/api/network/fc/wwpn-aliases/68589d3d-7efa-11e8-9eed-
005056b43025/alias1"
      }
    }
  }
],
"num_records": 1,
"_links": {
  "self": {
    "href": "/api/network/fc/wwpn-aliases?alias=alias1"
  }
}
}
```

Deleting a WWPN alias

The alias to delete is identified by the UUID of its SVM and the alias name.

```
# The API:
DELETE /api/network/fc/wwpn-aliases/{svm.uuid}/{alias}

# The call:
curl -X DELETE "https://<mgmt-ip>/api/network/fc/wwpn-aliases/68589d3d-
7efa-11e8-9eed-005056b43025/alias2" -H "Accept: application/hal+json"
```

Retrieve FC WWPN aliases

GET `/network/fc/wwpn-aliases`

Introduced In: 9.6

Retrieves FC WWPN aliases.

Related ONTAP commands

- `vserver fcp wwpn-alias show`

Learn more

- DOC /network/fc/wwpn-aliases

Parameters

Name	Type	In	Required	Description
alias	string	query	False	Filter by alias
wwpn	string	query	False	Filter by wwpn
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
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. • Default value: 1

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. • 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	
num_records	integer	The number of records in the response.
records	array[wwpn_alias]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "alias": "host1",
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "wwpn": "2f:a0:00:a0:98:0b:56:13"
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

wwpn_alias

A Fibre Channel (FC) world wide port name (WWPN) alias. A WWPN is a unique 64-bit identifier for an FC initiator. It is displayed as a 16-character hexadecimal value. SAN administrators may find it easier to identify FC initiators using an alias, especially in larger SANs.

Name	Type	Description
_links	_links	
alias	string	The FC WWPN alias. Required in POST.
svm	svm	
wwpn	string	The FC initiator WWPN. Required in POST.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Create an FC WWPN alias

POST `/network/fc/wwpn-aliases`

Introduced In: 9.6

Creates an FC WWPN alias.

Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the FC alias.
- `alias` - Name of the FC alias.
- `wwpn` - FC WWPN for which to create the alias.

Related ONTAP commands

- `vserver fcp wwpn-alias set`

Learn more

- DOC /network/fc/wwpn-aliases

Parameters

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
alias	string	The FC WWPN alias. Required in POST.
svm	svm	
wwpn	string	The FC initiator WWPN. Required in POST.

Example request

```
{
  "alias": "host1",
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "wwpn": "2f:a0:00:a0:98:0b:56:13"
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[wwpn_alias]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "alias": "host1",
      "svm": {
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "wwpn": "2f:a0:00:a0:98:0b:56:13"
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254317	The alias already exists.
1260882	The supplied SVM does not exist.
2621462	The supplied SVM does not exist.
2621706	Both the SVM UUID and SVM name were supplied, but do not refer to the same SVM.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5373982	An invalid WWPN was supplied. The valid WWN format is XX:XX:XX:XX:XX:XX:XX:XX, where X is a hexadecimal digit. Example: "01:02:03:04:0a:0b:0c:0d".

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

wwpn_alias

A Fibre Channel (FC) world wide port name (WWPN) alias. A WWPN is a unique 64-bit identifier for an FC initiator. It is displayed as a 16-character hexadecimal value. SAN administrators may find it easier to identify FC initiators using an alias, especially in larger SANs.

Name	Type	Description
alias	string	The FC WWPN alias. Required in POST.
svm	svm	
wwpn	string	The FC initiator WWPN. Required in POST.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments
code	string	Error code

Name	Type	Description
message	string	Error message
target	string	The target parameter that caused the error.

Delete an FC WWPN alias

DELETE `/network/fc/wwpn-aliases/{svm.uuid}/{alias}`

Introduced In: 9.6

Deletes an FC WWPN alias.

Related ONTAP commands

- `vserver fcp wwpn-alias remove`

Learn more

- DOC /network/fc/wwpn-aliases

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of the SVM.
alias	string	path	True	The name of FC WWPN alias.

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1260882	An SVM with the specified UUID does not exist.

Error Code	Description
5374046	The alias could not be found.

Name	Type	Description
error	error	

Example error


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


Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve an FC WWPN alias

GET `/network/fc/wwpn-aliases/{svm.uuid}/{alias}`

Introduced In: 9.6

Retrieves an FC WWPN alias.

Related ONTAP commands

- `vserver fcp wwpn-alias show`

Learn more

- DOC /network/fc/wwpn-aliases

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of the SVM in which the alias is found.

Name	Type	In	Required	Description
alias	string	path	True	The name of FC WWPN alias.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
alias	string	The FC WWPN alias. Required in POST.
svm	svm	
wwpn	string	The FC initiator WWPN. Required in POST.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "alias": "host1",
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "wwpn": "2f:a0:00:a0:98:0b:56:13"
}
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1260882	The supplied SVM does not exist.

Name	Type	Description
error	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
self	href	

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Manage FC services for SVMs

Protocols SAN fcp services endpoint overview

Overview

A Fibre Channel Protocol (FC Protocol) service defines the properties of the FC Protocol target for an SVM. There can be at most one FC Protocol service for an SVM. An SVM FC Protocol service must be created before FC Protocol initiators can log in to the SVM.

The FC Protocol service REST API allows you to create, update, delete, and discover FC services for SVMs.

Performance monitoring

Performance of the SVM can be monitored by the `metric.*` and `statistics.*` properties. These show the performance of the SVM in terms of IOPS, latency, and throughput. The `metric.*` properties denote an average whereas `statistics.*` properties denote a real-time monotonically increasing value aggregated across all nodes.

Examples

Creating an FC Protocol service for an SVM

The simplest way to create an FC Protocol service is to specify only the SVM, either by name or UUID. By default, the new FC Protocol service is enabled.

In this example, the `return_records` query parameter is used to retrieve the new FC Protocol service object in the REST response.

```
# The API:
POST /api/protocols/san/fcp/services

# The call:
curl -X POST 'https://<mgmt-
ip>/api/protocols/san/fcp/services?return_records=true' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm1" } }'

# The response:
{
"num_records": 1,
"records": [
  {
    "svm": {
      "uuid": "5c659d90-c01a-11e8-88ed-005056bbb24b",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/5c659d90-c01a-11e8-88ed-005056bbb24b"
        }
      }
    },
    "enabled": true,
    "target": {
      "name": "20:00:00:50:56:bb:b2:4b"
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/fcp/services/5c659d90-c01a-11e8-88ed-
005056bbb24b"
      }
    }
  }
]
}
```

Retrieving FC Protocol services for all SVMs in the cluster

```
# The API:
GET /api/protocols/san/fcp/services

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/fcp/services' -H 'Accept:
```

```
application/hal+json'

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "5c659d90-c01a-11e8-88ed-005056bbb24b",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/5c659d90-c01a-11e8-88ed-005056bbb24b"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/fcp/services/5c659d90-c01a-11e8-88ed-
005056bbb24b"
      }
    }
  },
  {
    "svm": {
      "uuid": "6011f874-c01a-11e8-88ed-005056bbb24b",
      "name": "svm2",
      "_links": {
        "self": {
          "href": "/api/svm/svms/6011f874-c01a-11e8-88ed-005056bbb24b"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/fcp/services/6011f874-c01a-11e8-88ed-
005056bbb24b"
      }
    }
  }
],
"num_records": 2,
"_links": {
  "self": {
    "href": "/api/protocols/san/fcp/services"
  }
}
```

```
}
```

Retrieving details for a specific FC Protocol service

The FC Protocol service is identified by the UUID of its SVM.

```
# The API:
GET /api/protocols/san/fcp/services/{svm.uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/fcp/services/5c659d90-
c01a-11e8-88ed-005056bbb24b' -H 'Accept: application/hal+json'

# The response:
{
"svm": {
  "uuid": "5c659d90-c01a-11e8-88ed-005056bbb24b",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/5c659d90-c01a-11e8-88ed-005056bbb24b"
    }
  }
},
"enabled": true,
"target": {
  "name": "20:00:00:50:56:bb:b2:4b"
},
"_links": {
  "self": {
    "href": "/api/protocols/san/fcp/services/5c659d90-c01a-11e8-88ed-
005056bbb24b"
  }
}
}
```

Disabling an FC Protocol service

Disabling an FC Protocol service shuts down all active FC Protocol logins for the SVM and prevents new FC Protocol logins.

The FC Protocol service to update is identified by the UUID of its SVM.

```
# The API:
PATCH /api/protocols/san/fcp/services/{svm.uuid}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/protocols/san/fcp/services/5c659d90-
c01a-11e8-88ed-005056bbb24b' -H 'Accept: application/hal+json' -d '{
"enabled": "false" }'
```

You can retrieve the FC Protocol service to confirm the change.

In this example, the `fields` query parameter is used to limit the response to the `enabled` property and FC Protocol service identifiers.

```
# The API:
GET /api/protocols/san/fcp/services/{svm.uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/fcp/services/5c659d90-
c01a-11e8-88ed-005056bbb24b?fields=enabled' -H 'Accept:
application/hal+json'

# The response:
{
"svm": {
  "uuid": "5c659d90-c01a-11e8-88ed-005056bbb24b",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/5c659d90-c01a-11e8-88ed-005056bbb24b"
    }
  }
},
"enabled": false,
"_links": {
  "self": {
    "href": "/api/protocols/san/fcp/services/5c659d90-c01a-11e8-88ed-
005056bbb24b"
  }
}
}
```

Deleting an FC Protocol service

The FC Protocol service must be disabled before it can be deleted.

The FC Protocol service to delete is identified by the UUID of its SVM.

```
# The API:
DELETE /api/protocols/san/fcp/services/{svm.uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/fcp/services/5c659d90-
c01a-11e8-88ed-005056bbb24b' -H 'Accept: application/hal+json'
```

Retrieve FC protocol services

GET `/protocols/san/fcp/services`

Introduced In: 9.6

Retrieves FC Protocol services.

Expensive properties

There is an added computational cost to retrieving values for these properties. They are not included by default in GET results and must be explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

- `statistics.*`
- `metric.*`

Related ONTAP commands

- `vserver fcp show`

Learn more

- DOC /protocols/san/fcp/services

Parameters

Name	Type	In	Required	Description
statistics.throughput_raw.read	integer	query	False	Filter by statistics.throughput_raw.read • Introduced in: 9.7

Name	Type	In	Required	Description
statistics.throughput_raw.total	integer	query	False	Filter by statistics.throughput_raw.total • Introduced in: 9.7
statistics.throughput_raw.write	integer	query	False	Filter by statistics.throughput_raw.write • Introduced in: 9.7
statistics.latency_raw.total	integer	query	False	Filter by statistics.latency_raw.total • Introduced in: 9.7
statistics.latency_raw.read	integer	query	False	Filter by statistics.latency_raw.read • Introduced in: 9.7
statistics.latency_raw.write	integer	query	False	Filter by statistics.latency_raw.write • Introduced in: 9.7
statistics.latency_raw.other	integer	query	False	Filter by statistics.latency_raw.other • Introduced in: 9.7
statistics.iops_raw.total	integer	query	False	Filter by statistics.iops_raw.total • Introduced in: 9.7

Name	Type	In	Required	Description
statistics.iops_raw.read	integer	query	False	Filter by statistics.iops_raw.read • Introduced in: 9.7
statistics.iops_raw.write	integer	query	False	Filter by statistics.iops_raw.write • Introduced in: 9.7
statistics.iops_raw.other	integer	query	False	Filter by statistics.iops_raw.other • Introduced in: 9.7
statistics.timestamp	string	query	False	Filter by statistics.timestamp • Introduced in: 9.7
statistics.status	string	query	False	Filter by statistics.status • Introduced in: 9.7
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
metric.latency.total	integer	query	False	Filter by metric.latency.total • Introduced in: 9.7
metric.latency.read	integer	query	False	Filter by metric.latency.read • Introduced in: 9.7

Name	Type	In	Required	Description
metric.latency.write	integer	query	False	Filter by metric.latency.write • Introduced in: 9.7
metric.latency.other	integer	query	False	Filter by metric.latency.other • Introduced in: 9.7
metric.duration	string	query	False	Filter by metric.duration • Introduced in: 9.7
metric.throughput.read	integer	query	False	Filter by metric.throughput.read • Introduced in: 9.7
metric.throughput.total	integer	query	False	Filter by metric.throughput.total • Introduced in: 9.7
metric.throughput.write	integer	query	False	Filter by metric.throughput.write • Introduced in: 9.7
metric.status	string	query	False	Filter by metric.status • Introduced in: 9.7

Name	Type	In	Required	Description
metric.iops.total	integer	query	False	Filter by metric.iops.total • Introduced in: 9.7
metric.iops.read	integer	query	False	Filter by metric.iops.read • Introduced in: 9.7
metric.iops.write	integer	query	False	Filter by metric.iops.write • Introduced in: 9.7
metric.iops.other	integer	query	False	Filter by metric.iops.other • Introduced in: 9.7
metric.timestamp	string	query	False	Filter by metric.timestamp • Introduced in: 9.7
target.name	string	query	False	Filter by target.name • maxLength: 128 • minLength: 1
enabled	boolean	query	False	Filter by enabled
fields	array[string]	query	False	Specify the fields to return.
max_records	integer	query	False	Limit the number of records returned.

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is true for GET calls. When set to false, only the number of records is returned. • 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. • 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	
num_records	integer	The number of records in the response.
records	array[fcp_service]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "metric": {
        "_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": "2017-01-25T11:20:13Z"
      },
      "statistics": {
        "iops_raw": {
```

```
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "latency_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "status": "ok",
        "throughput_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "timestamp": "2017-01-25T11:20:13Z"
      },
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "target": {
        "name": "20:00:00:50:56:bb:b2:4b"
      }
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

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	Peformance 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	Peformance metric for write I/O operations.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

metric

Name	Type	Description
_links	_links	
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.

Name	Type	Description
latency	latency	The round trip latency in microseconds observed at the storage object.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.

iops_raw

The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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_raw	throughput_raw	Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Name	Type	Description
name	string	The target name of the FC Protocol service. This is generated for the SVM during POST. The FC Protocol target name is a world wide node name (WWNN). If required, the target name can be modified using the ONTAP command line. • example: 20:00:00:50:56:bb:b2:4b • maxLength: 128 • minLength: 1 • readOnly: 1 • Introduced in: 9.6

fcp_service

A Fibre Channel (FC) Protocol service defines the properties of the FC Protocol target for an SVM. There can be at most one FC Protocol service for an SVM. An SVM's FC Protocol service must be created before FC Protocol initiators can login to the SVM.

A FC Protocol service is identified by the UUID of its SVM.

Name	Type	Description
_links	_links	

Name	Type	Description
enabled	boolean	The administrative state of the FC Protocol service. The FC Protocol service can be disabled to block all FC Protocol connectivity to the SVM. This is optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	
svm	svm	
target	target	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Create an FC protocol service

POST `/protocols/san/fcp/services`

Introduced In: 9.6

Creates an FC Protocol service.

Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the FC Protocol service.

Related ONTAP commands

- `vserver fcp create`

Learn more

- DOC /protocols/san/fcp/services

Parameters

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
enabled	boolean	The administrative state of the FC Protocol service. The FC Protocol service can be disabled to block all FC Protocol connectivity to the SVM. This is optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	
svm	svm	
target	target	

Example request


```
{
  "metric": {
    "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": "2017-01-25T11:20:13Z"
  },
  "statistics": {
    "iops_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "latency_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "status": "ok",
    "throughput_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "timestamp": "2017-01-25T11:20:13Z"
  },
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
```

```
  "target": {
    "name": "20:00:00:50:56:bb:b2:4b"
  }
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[fcp_service]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "metric": {
        "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": "2017-01-25T11:20:13Z"
      },
      "statistics": {
        "iops_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "latency_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "status": "ok",
        "throughput_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "timestamp": "2017-01-25T11:20:13Z"
      },
      "svm": {
```

```
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "target": {
        "name": "20:00:00:50:56:bb:b2:4b"
      }
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1115127	The cluster lacks a valid FCP license.
2621462	The supplied SVM does not exist.
2621507	The Fibre Channel Protocol is not allowed for the specified SVM.
2621706	The specified `svm.uuid` and `svm.name` do not refer to the same SVM.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5374082	The Fibre Channel Protocol service already exists for the SVM.
5374092	The Fibre Channel Procotol is not supported on the cluster hardware configuration; there are no Fibre Channel adapters.
5374893	The SVM is stopped. The SVM must be running to create a Fibre Channel Protocol service.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

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	Peformance 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.

Name	Type	Description
write	integer	Peformance metric for write I/O operations.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

metric

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.

Name	Type	Description
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.

iops_raw

The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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_raw	throughput_raw	Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Name	Type	Description
name	string	The target name of the FC Protocol service. This is generated for the SVM during POST. The FC Protocol target name is a world wide node name (WWNN). If required, the target name can be modified using the ONTAP command line. • example: 20:00:00:50:56:bb:b2:4b • maxLength: 128 • minLength: 1 • readOnly: 1 • Introduced in: 9.6

fcp_service

A Fibre Channel (FC) Protocol service defines the properties of the FC Protocol target for an SVM. There can be at most one FC Protocol service for an SVM. An SVM's FC Protocol service must be created before FC Protocol initiators can login to the SVM.

A FC Protocol service is identified by the UUID of its SVM.

Name	Type	Description
enabled	boolean	The administrative state of the FC Protocol service. The FC Protocol service can be disabled to block all FC Protocol connectivity to the SVM. This is optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	

Name	Type	Description
statistics	statistics	
svm	svm	
target	target	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Delete an FC protocol service

DELETE `/protocols/san/fcp/services/{svm.uuid}`

Introduced In: 9.6

Deletes an FC Protocol service. An FC Protocol service must be disabled before it can be deleted.

Related ONTAP commands

- `vserver fcp delete`

Learn more

- DOC /protocols/san/fcp/services

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of the SVM for which to delete the FC Protocol service.

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.
5373960	The Fibre Channel Protocol service cannot be removed while it is enabled.
5374083	There is no Fibre Channel Protocol service for the specified SVM.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve an FC protocol service

GET `/protocols/san/fcp/services/{svm.uuid}`

Introduced In: 9.6

Retrieves an FC Protocol service.

Related ONTAP commands

- `vserver fcp show`

Learn more

- DOC /protocols/san/fcp/services

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of the SVM for which to retrieve the FC Protocol service.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
enabled	boolean	The administrative state of the FC Protocol service. The FC Protocol service can be disabled to block all FC Protocol connectivity to the SVM. This is optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	
svm	svm	
target	target	

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "metric": {
    "_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": "2017-01-25T11:20:13Z"
  },
  "statistics": {
    "iops_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "latency_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "status": "ok",
    "throughput_raw": {
```

```
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "timestamp": "2017-01-25T11:20:13Z"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "target": {
    "name": "20:00:00:50:56:bb:b2:4b"
  }
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.
5374083	There is no Fibre Channel Protocol service for the specified SVM.

Name	Type	Description
error	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
self	href	

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	Peformance 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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

metric

Name	Type	Description
_links	_links	
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.

Name	Type	Description
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.

iops_raw

The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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_raw	throughput_raw	Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Name	Type	Description
name	string	The target name of the FC Protocol service. This is generated for the SVM during POST. The FC Protocol target name is a world wide node name (WWNN). If required, the target name can be modified using the ONTAP command line. • example: 20:00:00:50:56:bb:b2:4b • maxLength: 128 • minLength: 1 • readOnly: 1 • Introduced in: 9.6

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments
code	string	Error code
message	string	Error message

Name	Type	Description
target	string	The target parameter that caused the error.

Update an FC protocol service

PATCH `/protocols/san/fcp/services/{svm.uuid}`

Introduced In: 9.6

Updates an FC Protocol service.

Related ONTAP commands

- `vserver fcp modify`
- `vserver fcp start`
- `vserver fcp stop`

Learn more

- DOC /protocols/san/fcp/services

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of the SVM whose FC Protocol service is to be updated.

Request Body

Name	Type	Description
enabled	boolean	The administrative state of the FC Protocol service. The FC Protocol service can be disabled to block all FC Protocol connectivity to the SVM. This is optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	

Name	Type	Description
svm	svm	
target	target	

Example request


```
{
  "metric": {
    "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": "2017-01-25T11:20:13Z"
  },
  "statistics": {
    "iops_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "latency_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "status": "ok",
    "throughput_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "timestamp": "2017-01-25T11:20:13Z"
  },
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
```

```
  "target": {
    "name": "20:00:00:50:56:bb:b2:4b"
  }
}
```

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.
5374083	There is no Fibre Channel Protocol service for the specified SVM.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

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	Peformance 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.

Name	Type	Description
write	integer	Peformance metric for write I/O operations.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

metric

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.

Name	Type	Description
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.

iops_raw

The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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_raw	throughput_raw	Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Name	Type	Description
name	string	The target name of the FC Protocol service. This is generated for the SVM during POST. The FC Protocol target name is a world wide node name (WWNN). If required, the target name can be modified using the ONTAP command line. • example: 20:00:00:50:56:bb:b2:4b • maxLength: 128 • minLength: 1 • readOnly: 1 • Introduced in: 9.6

fcp_service

A Fibre Channel (FC) Protocol service defines the properties of the FC Protocol target for an SVM. There can be at most one FC Protocol service for an SVM. An SVM's FC Protocol service must be created before FC Protocol initiators can login to the SVM.

A FC Protocol service is identified by the UUID of its SVM.

Name	Type	Description
enabled	boolean	The administrative state of the FC Protocol service. The FC Protocol service can be disabled to block all FC Protocol connectivity to the SVM. This is optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	

Name	Type	Description
statistics	statistics	
svm	svm	
target	target	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve historical performance metrics for the FC protocol service of an SVM

GET `/protocols/san/fcp/services/{svm.uuid}/metrics`

Introduced In: 9.7

Retrieves historical performance metrics for the FC Protocol service of an SVM.

Parameters

Name	Type	In	Required	Description
throughput.read	integer	query	False	Filter by throughput.read
throughput.total	integer	query	False	Filter by throughput.total
throughput.write	integer	query	False	Filter by throughput.write

Name	Type	In	Required	Description
status	string	query	False	Filter by status
iops.total	integer	query	False	Filter by iops.total
iops.read	integer	query	False	Filter by iops.read
iops.write	integer	query	False	Filter by iops.write
iops.other	integer	query	False	Filter by iops.other
duration	string	query	False	Filter by duration
timestamp	string	query	False	Filter by timestamp
latency.total	integer	query	False	Filter by latency.total
latency.read	integer	query	False	Filter by latency.read
latency.write	integer	query	False	Filter by latency.write
latency.other	integer	query	False	Filter by latency.other
svm.uuid	string	path	True	The unique identifier of the SVM.

Name	Type	In	Required	Description
interval	string	query	False	The time range for the data. Examples can be 1h, 1d, 1m, 1w, 1y. The period for each time range is as follows: • 1h: Metrics over the most recent hour sampled over 15 seconds. • 1d: Metrics over the most recent day sampled over 5 minutes. • 1w: Metrics over the most recent week sampled over 30 minutes. • 1m: Metrics over the most recent month sampled over 2 hours. • 1y: Metrics over the most recent year sampled over a day. • Default value: 1 • enum: ["1h", "1d", "1w", "1m", "1y"]

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. • Default value: 1 • Max value: 120 • Min value: 0
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	_links	
num_records	integer	Number of records
records	array[records]	

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",
      "svm": {
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "throughput": {
        "read": 200,
        "total": 1000,
        "write": 100
      },
      "timestamp": "2017-01-25T11:20:13Z"
    }
  ]
}
```

Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

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	Peformance 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	Peformance metric for write I/O operations.

svm

Name	Type	Description
uuid	string	The unique identifier of the SVM.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

records

Performance numbers, such as IOPS latency and throughput, for SVM protocols.

Name	Type	Description
_links	_links	

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	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.
svm	svm	
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

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.

Manage SAN igroups

Protocols SAN igroups endpoint overview

Overview

An initiator group (igroup) is a collection of Fibre Channel (FC) world wide port names (WWPNs), and/or iSCSI Qualified Names (IQNs), and/or iSCSI EUIs (Extended Unique Identifiers) that identify host initiators.

Initiator groups are used to control which hosts can access specific LUNs. To grant access to a LUN from one or more hosts, create an initiator group containing the host initiator names, then create a LUN map that associates the initiator group with the LUN.

An initiator group may contain either initiators or other initiator groups, but not both simultaneously. When a parent initiator group is mapped, it inherits all of the initiators of any initiator groups nested below it. If any nested initiator group is modified to contain different initiators, the parent initiator groups inherit the change. A parent can have many nested initiator groups and an initiator group can be nested under multiple parents. Initiators can only be added or removed from the initiator group that directly contains them. The maximum supported depth of nesting is three layers.

Best practice when using nested initiator groups is to match host hierarchies. A single initiator group should correspond to a single host. If a LUN needs to be mapped to multiple hosts, the initiator groups representing those hosts should be aggregated into a parent initiator group and the LUN should be mapped to that initiator group. For multi-ported hosts, initiators have a comment property where the port corresponding to the initiator can be documented.

The initiator group REST API allows you to create, update, delete, and discover initiator groups, and to add and remove initiators that can access the target and associated LUNs.

An initiator can appear in multiple initiator groups. An initiator group can be mapped to multiple LUNs. A

specific initiator can be mapped to a specific LUN only once. With the introduction of nestable initiator groups, best practice is to use the hierarchy such that an initiator is only a direct member of a single initiator group, and that initiator group can then be referenced by other initiator groups. This avoid needing to update multiple initiator groups when initiators change.

All initiators or nested initiator groups in an initiator group must be from the same operating system. The initiator group's operating system is specified when the initiator group is created.

When an initiator group is created, the `protocol` property is used to restrict member initiators to Fibre Channel (*fcp*), iSCSI (*iscsi*), or both (*mixed*). Initiator groups within a nested hierarchy may not have conflicting protocols.

Zero or more initiators or nested initiator groups can be supplied when the initiator group is created. After creation, initiators can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/initiators` endpoint. Initiator groups containing other initiator groups report the aggregated list of initiators from all nested initiator groups, but modifications of the initiator list must be performed on the initiator group that directly contains the initiators. See DELETE /protocols/san/igroups/{igroup.uuid}/initiators/{name} for more details.

An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.

Examples

Creating an initiator group with no initiators

The example initiator group used here is for Linux iSCSI initiators only. Note that the `return_records` query parameter is used to obtain the newly created initiator group in the response.

```
# The API:
POST /api/protocols/san/igroups

# The call:
curl -X POST 'https://<mgmt-
ip>/api/protocols/san/igroups?return_records=true' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm1" }, "name": "igroup1",
"os_type": "linux", "protocol": "iscsi" }'

# The response:
{
"num_records": 1,
"records": [
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
        }
      }
    },
    "uuid": "8f249e7d-ab9f-11e8-b8a3-005056bb7072",
    "name": "igroup1",
    "protocol": "iscsi",
    "os_type": "linux",
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/8f249e7d-ab9f-11e8-b8a3-
005056bb7072"
      }
    }
  }
]
}
```

Creating an initiator group with initiators

The example initiator group used here is for Windows. FC Protocol and iSCSI initiators are allowed. Note that the `return_records` query parameter is used to obtain the newly created initiator group in the response.

```
# The API:
```

```
POST /api/protocols/san/igroups

# The call:
curl -X POST 'https://<mgmt-
ip>/api/protocols/san/igroups?return_records=true' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm1" }, "name": "igroup2",
"os_type": "windows", "protocol": "mixed", "initiators": [ { "name":
"20:01:00:50:56:bb:70:72" }, { "name": "iqn.1991-05.com.ms:host1" } ] }'

# The response:
{
"num_records": 1,
"records": [
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
        }
      }
    },
    "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7072",
    "name": "igroup2",
    "protocol": "mixed",
    "os_type": "windows",
    "initiators": [
      {
        "name": "20:01:00:50:56:bb:70:72",
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072/initiators/20:01:00:50:56:bb:70:72"
          }
        }
      },
      {
        "name": "iqn.1991-05.com.ms:host1",
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072/initiators/iqn.1991-05.com.ms:host1"
          }
        }
      }
```

```
    ],
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072"
      }
    }
  }
]
}
```

Creating an initiator group with nested initiator groups

The example initiator group used here is for Windows. FC Protocol and iSCSI initiators are allowed. Note that the `return_records` query parameter is used to obtain the newly created initiator group in the response. The new initiator group is create so as to contain the initiator group created in the previous example. The initiators list reports all initiators nested below this initiator group, and note that the href link for the initiators refers to the initiator group that directly owns the initiator, not this initiator group.

```
# The API:
POST /api/protocols/san/igroups

# The call:
curl -X POST 'https://<mgmt-
ip>/api/protocols/san/igroups?return_records=true' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm1" }, "name": "igroup3",
"os_type": "windows", "protocol": "mixed", "igroups": [ { "name":
"igroup2" } ] }'

# The response:
{
"num_records": 1,
"records": [
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
        }
      }
    },
    "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7073",
    "name": "igroup3",
```

```
    "protocol": "mixed",
    "os_type": "windows",
    "igroups": [
      {
        "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7072",
        "name": "igroup2",
        "_links": { "self": { "href":
"/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-005056bb7072" } }
      }
    ],
    "initiators": [
      {
        "name": "20:01:00:50:56:bb:70:72",
        "igroup": {
          "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7072",
          "name": "igroup2",
          "_links": { "self": { "href":
"/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-005056bb7072" } }
        },
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072/initiators/20:01:00:50:56:bb:70:72"
          }
        }
      },
      {
        "name": "iqn.1991-05.com.ms:host1",
        "igroup": {
          "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7072",
          "name": "igroup2",
          "_links": { "self": { "href":
"/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-005056bb7072" } }
        },
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072/initiators/iqn.1991-05.com.ms:host1"
          }
        }
      }
    ],
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7073"
```

```
      }
    }
  }
]
}
```

Retrieving all initiator groups

```
# The API:
GET /api/protocols/san/igroups

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/igroups' -H 'Accept:
application/hal+json'

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
        }
      }
    },
    "uuid": "8f249e7d-ab9f-11e8-b8a3-005056bb7072",
    "name": "igroup1",
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/8f249e7d-ab9f-11e8-b8a3-
005056bb7072"
      }
    }
  },
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
```

```
        }
      }
    },
    "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7072",
    "name": "igroup2",
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072"
      }
    }
  },
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
        }
      }
    },
    "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7073",
    "name": "igroup3",
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7073"
      }
    }
  }
],
"num_records": 3,
"_links": {
  "self": {
    "href": "/api/protocols/san/igroups"
  }
}
}
```

Retrieving all properties of all initiator groups

The `fields` query parameter is used to request all initiator group properties. Note that the nested and parent initiator groups are considered expensive properties and will only be returned if explicitly requested.

```
# The API:
GET /api/protocols/san/igroups

# The call:
curl -X GET 'https://<mgmt-
ip>/api/protocols/san/igroups?fields=*,igroups,parent_igroups' -H 'Accept:
application/hal+json'

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
        }
      }
    },
    "uuid": "8f249e7d-ab9f-11e8-b8a3-005056bb7072",
    "name": "igroup1",
    "protocol": "iscsi",
    "os_type": "linux",
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/8f249e7d-ab9f-11e8-b8a3-
005056bb7072"
      }
    }
  },
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
        }
      }
    },
    "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7072",
    "name": "igroup2",
    "parent_igroups": [
      {
```

```
        "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7073",
        "name": "igroup3",
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7073"
          }
        }
      }
    ],
    "protocol": "mixed",
    "os_type": "windows",
    "initiators": [
      {
        "name": "20:01:00:50:56:bb:70:72",
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072/initiators/20:01:00:50:56:bb:70:72"
          }
        }
      },
      {
        "name": "iqn.1991-05.com.ms:host1",
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072/initiators/iqn.1991-05.com.ms:host1"
          }
        }
      }
    ],
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072"
      }
    }
  },
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
```

```
        }
      }
    },
    "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7073",
    "name": "igroup3",
    "protocol": "mixed",
    "os_type": "windows",
    "igroups": [
      {
        "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7072",
        "name": "igroup2",
        "_links": { "self": { "href":
"/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-005056bb7072" } }
      }
    ],
    "initiators": [
      {
        "name": "20:01:00:50:56:bb:70:72",
        "igroup": {
          "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7072",
          "name": "igroup2",
          "_links": { "self": { "href":
"/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-005056bb7072" } }
        },
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072/initiators/20:01:00:50:56:bb:70:72"
          }
        }
      },
      {
        "name": "iqn.1991-05.com.ms:host1",
        "igroup": {
          "uuid": "abf9c39d-ab9f-11e8-b8a3-005056bb7072",
          "name": "igroup2",
          "_links": { "self": { "href":
"/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-005056bb7072" } }
        },
        "_links": {
          "self": {
            "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7072/initiators/iqn.1991-05.com.ms:host1"
          }
        }
      }
```

```
    ],
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/abf9c39d-ab9f-11e8-b8a3-
005056bb7073"
      }
    }
  }
],
"num_records": 3,
"_links": {
  "self": {
    "href": "/api/protocols/san/igroups?fields=*"
  }
}
}
```

Retrieving all initiator groups for Linux

The `os_type` query parameter is used to perform the query.

```
# The API:
GET /api/protocols/san/igroups

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/igroups?os_type=linux' -H
'Accept: application/hal+json'

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
        }
      }
    },
    "uuid": "8f249e7d-ab9f-11e8-b8a3-005056bb7072",
    "name": "igroup1",
    "os_type": "linux",
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/8f249e7d-ab9f-11e8-b8a3-
005056bb7072"
      }
    }
  }
],
"num_records": 1,
"_links": {
  "self": {
    "href": "/api/protocols/san/igroups?os_type=linux"
  }
}
}
```

Retrieving a specific initiator group

```
# The API:
GET /api/protocols/san/igroups/{uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072' -H 'Accept: application/hal+json'

# The response:
{
"svm": {
  "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
    }
  }
},
"uuid": "8f249e7d-ab9f-11e8-b8a3-005056bb7072",
"name": "igroup1",
"protocol": "iscsi",
"os_type": "linux",
"_links": {
  "self": {
    "href": "/api/protocols/san/igroups/8f249e7d-ab9f-11e8-b8a3-
005056bb7072"
  }
}
}
```

Retrieving LUNs mapped to a specific initiator group

The `fields` parameter is used to specify the desired properties.

```
# The API:
GET /api/protocols/san/igroups

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072?fields=lun_maps' -H 'Accept: application/hal+json'

# The response:
{
```

```
"svm": {
  "uuid": "02b0dfff-aa28-11e8-a653-005056bb7072",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/02b0dfff-aa28-11e8-a653-005056bb7072"
    }
  }
},
"uuid": "8f249e7d-ab9f-11e8-b8a3-005056bb7072",
"name": "igroup1",
"lun_maps": [
  {
    "logical_unit_number": 0,
    "lun": {
      "name": "/vol/vol1/lun1",
      "uuid": "4b33ba57-c4e0-4dbb-bc47-214800d18a71",
      "node": {
        "name": "node1",
        "uuid": "f17182af-223f-4d51-8197-2cb2146d5c4c",
        "_links": {
          "self": {
            "href": "/api/cluster/nodes/f17182af-223f-4d51-8197-
2cb2146d5c4c"
          }
        }
      },
      "_links": {
        "self": {
          "href": "/api/storage/luns/4b33ba57-c4e0-4dbb-bc47-214800d18a71"
        }
      }
    }
  }
],
"_links": {
  "self": {
    "href": "/api/protocols/san/igroups/8f249e7d-ab9f-11e8-b8a3-
005056bb7072"
  }
}
}
```

Renaming an initiator group

Note that renaming an initiator group must be done in a PATCH request separate from any other modifications.

```
# The API:
PATCH /api/protocols/san/igroups/{uuid}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072' -H 'Accept: application/hal+json' -d '{ "name":
"igroup1_newName" }'
```

Changing the operating system type of an initiator group

```
# The API:
PATCH /api/protocols/san/igroups/{uuid}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072' -H 'Accept: application/hal+json' -d '{ "os_type":
"aix" }'
```

Adding an initiator to an initiator group

```
# The API:
POST /api/protocols/san/igroups/{igroup.uuid}/initiators

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072/initiators' -H 'Accept: application/hal+json' -d '{
"name": "iqn.1991-05.com.ms:host2" }'
```

Adding multiple initiators to an initiator group

Note the use of the `records` property to add multiple initiators to the initiator group in a single API call.

```
# The API:
POST /api/protocols/san/igroups/{igroup.uuid}/initiators

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072/initiators' -H 'Accept: application/hal+json' -d '{
"records": [ { "name": "iqn.1991-05.com.ms:host3" }, { "name": "iqn.1991-
05.com.ms:host4" } ] }'
```

Removing an initiator from an initiator group

```
# The API:
DELETE /api/protocols/san/igroups/{igroup.uuid}/initiators/iqn.1991-
05.com.ms:host3

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072/initiators/iqn.1991-05.com.ms:host3' -H 'Accept:
application/hal+json'
```

Removing an initiator from a mapped initiator group

Normally, removing an initiator from an initiator group that is mapped to a LUN is not allowed. The removal can be forced using the `allow_delete_while_mapped` query parameter.

```
# The API:
DELETE /api/protocols/san/igroups/{igroup.uuid}/initiators/iqn.1991-
05.com.ms:host4

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072/initiators/iqn.1991-
05.com.ms:host4?allow_delete_while_mapped=true' -H 'Accept:
application/hal+json'
```

Adding a nested initiator group to an initiator group

```
# The API:
POST /api/protocols/san/igroups/{igroup.uuid}/igroups

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072/igroups' -H 'Accept: application/hal+json' -d '{
"name": "host2_igroup" }'
```

Adding multiple nested initiator groups to an initiator group

Note the use of the `records` property to add multiple nested initiator groups to the initiator group in a single API call.

```
# The API:
POST /api/protocols/san/igroups/{igroup.uuid}/igroups

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072/igroups' -H 'Accept: application/hal+json' -d '{
"records": [ { "name": "host3_igroup" }, { "uuid": "c439efc8-0a70-11eb-
adc1-0242ac120002" } ] }'
```

Removing a nested initiator group from an initiator group

```
# The API:
DELETE /api/protocols/san/igroups/{igroup.uuid}/igroups/{uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072/igroups/c439efc8-0a70-11eb-adc1-0242ac120002' -H
'Accept: application/hal+json'
```

Removing a nested initiator group from a mapped initiator group

Normally, removing a nested initiator group from an initiator group that is mapped to a LUN is not allowed. The removal can be forced using the `allow_delete_while_mapped` query parameter.

```
# The API:
DELETE /api/protocols/san/igroups/{igroup.uuid}/igroups/{uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/igroups/8f249e7d-ab9f-
11e8-b8a3-005056bb7072/igroups/c439efc8-0a70-11eb-adc1-
0242ac120002?allow_delete_while_mapped=true' -H 'Accept:
application/hal+json'
```

Deleting an initiator group

```
# The API:
DELETE /api/protocols/san/igroups/{uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/igroups/abf9c39d-ab9f-
11e8-b8a3-005056bb7072' -H 'Accept: application/hal+json'
```

Deleting a mapped initiator group

Normally, deleting an initiator group that is mapped to a LUN is not allowed. The deletion can be forced using the `allow_delete_while_mapped` query parameter.

```
# The API:
DELETE /api/protocols/san/igroups/{uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/igroups/abf9c39d-ab9f-
11e8-b8a3-005056bb7072?allow_delete_while_mapped=true' -H 'Accept:
application/hal+json'
```

Retrieve initiator groups

GET `/protocols/san/igroups`

Introduced In: 9.6

Retrieves initiator groups.

Expensive properties

There is an added computational cost to retrieving values for these properties. They are not included by default in GET results and must be explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

- `connectivity_tracking.*`
- `igroups.*`
- `lun_maps.*`
- `parent_igroups.*`
- `target.*`

Related ONTAP commands

- `lun igroup show`
- `lun mapping show`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
name	string	query	False	Filter by name • maxLength: 96 • minLength: 1
lun_maps.lun.uuid	string	query	False	Filter by lun_maps.lun.uuid
lun_maps.lun.name	string	query	False	Filter by lun_maps.lun.name
lun_maps.lun.node.uuid	string	query	False	Filter by lun_maps.lun.node.uuid
lun_maps.lun.node.name	string	query	False	Filter by lun_maps.lun.node.name
lun_maps.logical_unit_number	integer	query	False	Filter by lun_maps.logical_unit_number

Name	Type	In	Required	Description
supports_igroups	boolean	query	False	Filter by supports_igroups • Introduced in: 9.9
target.vendor_id	string	query	False	Filter by target.vendor_id • Introduced in: 9.11
target.firmware_revision	string	query	False	Filter by target.firmware_revision • Introduced in: 9.11
target.product_id	string	query	False	Filter by target.product_id • Introduced in: 9.11
initiators.name	string	query	False	Filter by initiators.name • maxLength: 96 • minLength: 1
initiators.connectivity_tracking.connection_state	string	query	False	Filter by initiators.connectivity_tracking.connection_state • Introduced in: 9.11
initiators.comment	string	query	False	Filter by initiators.comment • maxLength: 254 • minLength: 0 • Introduced in: 9.9

Name	Type	In	Required	Description
initiators.igroup.name	string	query	False	Filter by initiators.igroup.name • maxLength: 96 • minLength: 1 • Introduced in: 9.9
initiators.igroup.uuid	string	query	False	Filter by initiators.igroup.uuid
portset.uuid	string	query	False	Filter by portset.uuid • Introduced in: 9.9
portset.name	string	query	False	Filter by portset.name • maxLength: 96 • minLength: 1 • Introduced in: 9.9
parent_igroups.name	string	query	False	Filter by parent_igroups.name • maxLength: 96 • minLength: 1 • Introduced in: 9.9
parent_igroups.uuid	string	query	False	Filter by parent_igroups.uuid • Introduced in: 9.9

Name	Type	In	Required	Description
parent_igroups.comment	string	query	False	Filter by parent_igroups.comment • maxLength: 254 • minLength: 0 • Introduced in: 9.9
comment	string	query	False	Filter by comment • maxLength: 254 • minLength: 0 • Introduced in: 9.9
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
protocol	string	query	False	Filter by protocol
connectivity_tracking.connection_state	string	query	False	Filter by connectivity_tracking.connection_state • Introduced in: 9.11
connectivity_tracking.required_nodes.uuid	string	query	False	Filter by connectivity_tracking.required_nodes.uuid • Introduced in: 9.11
connectivity_tracking.required_nodes.name	string	query	False	Filter by connectivity_tracking.required_nodes.name • Introduced in: 9.11

Name	Type	In	Required	Description
connectivity_tracking.alerts.summary.target	string	query	False	Filter by connectivity_tracking.alerts.summary.target • Introduced in: 9.11
connectivity_tracking.alerts.summary.arguments.message	string	query	False	Filter by connectivity_tracking.alerts.summary.arguments.message • Introduced in: 9.11
connectivity_tracking.alerts.summary.arguments.code	string	query	False	Filter by connectivity_tracking.alerts.summary.arguments.code • Introduced in: 9.11
connectivity_tracking.alerts.summary.code	string	query	False	Filter by connectivity_tracking.alerts.summary.code • Introduced in: 9.11
connectivity_tracking.alerts.summary.message	string	query	False	Filter by connectivity_tracking.alerts.summary.message • Introduced in: 9.11
delete_on_unmap	boolean	query	False	Filter by delete_on_unmap
os_type	string	query	False	Filter by os_type

Name	Type	In	Required	Description
igroups.comment	string	query	False	Filter by igroups.comment • maxLength: 254 • minLength: 0 • Introduced in: 9.9
igroups.uuid	string	query	False	Filter by igroups.uuid • Introduced in: 9.9
igroups.name	string	query	False	Filter by igroups.name • maxLength: 96 • minLength: 1 • Introduced in: 9.9
uuid	string	query	False	Filter by uuid
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. • Default value: 1

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. • 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	
num_records	integer	The number of records in the response.
records	array[igroup]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "comment": "string",
      "connectivity_tracking": {
        "alerts": [
          {
            "summary": {
              "arguments": [
                {
                  "code": "string",
                  "message": "string"
                }
              ],
              "code": "4",
              "message": "entry doesn't exist",
              "target": "uuid"
            }
          }
        ],
        "connection_state": "string",
        "required_nodes": [
          {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "name": "node1",
            "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
```

```
        }
      ]
    },
    "igroups": [
      {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "comment": "string",
        "igroups": null,
        "name": "igroup1",
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      }
    ],
    "initiators": [
      {
        "_links": {
          "connectivity_tracking": {
            "href": "/api/resourcelink"
          },
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "comment": "string",
        "connectivity_tracking": {
          "connection_state": "string"
        },
        "igroup": {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        },
        "name": "iqn.1998-01.com.corp.iscsi:name1"
      }
    ],
    "lun_maps": [
      {
        "_links": {
          "self": {
```

```
            "href": "/api/resourcelink"
          }
        },
        "logical_unit_number": 0,
        "lun": {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "lun1",
          "node": {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "name": "node1",
            "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
          },
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      }
    ],
    "name": "igroup1",
    "os_type": "string",
    "parent_igroups": [
      {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "comment": "string",
        "name": "igroup1",
        "parent_igroups": null,
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      }
    ],
    "portset": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "portset1",
```

```
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "protocol": "string",
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "target": {
        "firmware_revision": "9111",
        "product_id": "LUN C-Mode",
        "vendor_id": "NETAPP"
      },
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

summary

A user friendly message describing the connection state of the initiator group.

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.

alerts

Name	Type	Description
summary	summary	A user friendly message describing the connection state of the initiator group.

required_nodes

Name	Type	Description
_links	_links	
name	string	
uuid	string	

connectivity_tracking

An overview of the connections to ONTAP by the initiators in this group.

Name	Type	Description
alerts	array[alerts]	
connection_state	string	Connection state.
required_nodes	array[required_nodes]	Nodes to which the initiators in this group should be connected to ensure reliable service. This is the collection of any node hosting a LUN mapped to this igroup as well as the HA partners of those nodes.

igroup_child

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator.
igroups	array[]	Further nested initiator groups.
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

connectivity_tracking

A link to the initiator with connectivity information relevant to its membership of this initiator group.

Name	Type	Description
href	string	

self

A link to the initiator where mutations can be made. If the initiator is inherited from a nested initiator group, the link refers to the initiator in the nested initiator group. In this case, mutations of the initiator will be applied to all initiator groups referencing the same nested initiator group.

Name	Type	Description
href	string	

_links

Name	Type	Description
connectivity_tracking	connectivity_tracking	A link to the initiator with connectivity information relevant to its membership of this initiator group.
self	self	A link to the initiator where mutations can be made. If the initiator is inherited from a nested initiator group, the link refers to the initiator in the nested initiator group. In this case, mutations of the initiator will be applied to all initiator groups referencing the same nested initiator group.

connectivity_tracking

Overview of the initiator's connections to ONTAP.

Name	Type	Description
connection_state	string	Connection state.

igroup

The initiator group that directly owns the initiator, which is where modification of the initiator is supported. This property will only be populated when the initiator is a member of a nested initiator group.

Name	Type	Description
_links	_links	

Name	Type	Description
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

initiators

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11
igroup	igroup	The initiator group that directly owns the initiator, which is where modification of the initiator is supported. This property will only be populated when the initiator is a member of a nested initiator group.
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.

node

Name	Type	Description
_links	_links	
name	string	
uuid	string	

lun

The LUN to which the initiator group is mapped.

Name	Type	Description
_links	_links	
name	string	The name of the LUN.
node	node	
uuid	string	The unique identifier of the LUN.

lun_maps

A LUN map with which the initiator group is associated.

Name	Type	Description
_links	_links	
logical_unit_number	integer	The logical unit number assigned to the LUN for initiators in the initiator group.
lun	lun	The LUN to which the initiator group is mapped.

igroup_parent

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator.
name	string	The name of the initiator group.
parent_igroups	array[]	The initiator groups that contain this initiator group as as member.

Name	Type	Description
uuid	string	The unique identifier of the initiator group.

portset

The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset.

Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.

Name	Type	Description
_links	_links	
name	string	The name of the portset.
uuid	string	The unique identifier of the portset.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Properties of the SCSI target to which the initiator group provides access.

Name	Type	Description
firmware_revision	string	The firmware revision of the SCSI target specific to the OS type of the initiator group.
product_id	string	The product ID of the SCSI target.
vendor_id	string	The vendor ID of the SCSI target.

igroup

An initiator group (igroup) is a collection of Fibre Channel (FC) world wide port names (WWPNs), and/or

iSCSI Qualified Names (IQNs), and/or iSCSI EUIs (Extended Unique Identifiers) that identify host initiators.

Initiator groups are used to control which hosts can access specific LUNs. To grant access to a LUN from one or more hosts, create an initiator group containing the host initiator names, then create a LUN map that associates the initiator group with the LUN.

An initiator group may contain either initiators or other initiator groups, but not both simultaneously. When a parent initiator group is mapped, it inherits all of the initiators of any initiator groups nested below it. If any nested initiator group is modified to contain different initiators, the parent initiator groups inherit the change. A parent can have many nested initiator groups and an initiator group can be nested under multiple parents. Initiators can only be added or removed from the initiator group that directly contains them. The maximum supported depth of nesting is three layers.

Best practice when using nested initiator groups is to match host hierarchies. A single initiator group should correspond to a single host. If a LUN needs to be mapped to multiple hosts, the initiator groups representing those hosts should be aggregated into a parent initiator group and the LUN should be mapped to that initiator group. For multi-ported hosts, initiators have a comment property where the port corresponding to the initiator can be documented.

An initiator can appear in multiple initiator groups. An initiator group can be mapped to multiple LUNs. A specific initiator can be mapped to a specific LUN only once. With the introduction of nestable initiator groups, best practice is to use the hierarchy such that an initiator is only a direct member of a single initiator group, and that initiator group can then be referenced by other initiator groups.

All initiators or nested initiator groups in an initiator group must be from the same operating system. The initiator group's operating system is specified when the initiator group is created.

When an initiator group is created, the `protocol` property is used to restrict member initiators to Fibre Channel (*fcp*), iSCSI (*iscsi*), or both (*mixed*). Initiator groups within a nested hierarchy may not have conflicting protocols.

Zero or more initiators or nested initiator groups can be supplied when the initiator group is created. After creation, initiators can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/initiators` endpoint. Initiator groups containing other initiator groups report the aggregated list of initiators from all nested initiator groups, but modifications of the initiator list must be performed on the initiator group that directly contains the initiators. See DELETE /protocols/san/igroups/{igroup.uuid}/initiators/{name} for more details.

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	An overview of the connections to ONTAP by the initiators in this group. • readOnly: 1 • Introduced in: 9.11

Name	Type	Description
delete_on_unmap	boolean	An option that causes the initiator group to be deleted when the last LUN map associated with it is deleted. Optional in POST and PATCH. This property defaults to *false* when the initiator group is created.
igroups	array[igroup_child]	The initiator groups that are members of the group. Optional in POST. This property is mutually exclusive with the *initiators* property during POST. This array contains only the direct children of the initiator group. If the member initiator groups have further nested initiator groups, those are reported in the `igroups` property of the child initiator group. Zero or more nested initiator groups can be supplied when the initiator group is created. The initiator group will act as if it contains the aggregatation of all initiators in any nested initiator groups. After creation, nested initiator groups can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/igroups` endpoint. See DELETE /protocols/san/igroups/{igroup.uuid}/igroups/{uuid} for more details.

Name	Type	Description
initiators	array[initiators]	The initiators that are members of the group or any group nested below this group. Optional in POST. This property is mutually exclusive with the *igroups* property during POST. During GET, this array contains initiators that are members of this group or any nested initiator groups below this group. When initiators of nested groups are returned, they include links to the initiator group that directly contains the initiator. Zero or more initiators can be supplied when the initiator group is created. After creation, initiators can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/initiators` endpoint. See DELETE /protocols/san/igroups/{igroup.uuid}/initiators/{name} for more details.
lun_maps	array[lun_maps]	All LUN maps with which the initiator is associated. If the requested igroup is part of a remote, non-local, MetroCluster SVM, the LUN maps are not retrieved. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
name	string	The name of the initiator group. Required in POST; optional in PATCH.
os_type	string	The host operating system of the initiator group. All initiators in the group should be hosts of the same operating system. Required in POST; optional in PATCH.
parent_igroups	array[igroup_parent]	The initiator groups that contain this initiator group as as member.
portset	portset	The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset. Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.
protocol	string	The protocols supported by the initiator group. This restricts the type of initiators that can be added to the initiator group. Optional in POST; if not supplied, this defaults to *mixed*. The protocol of an initiator group cannot be changed after creation of the group.
supports_igroups	boolean	An initiator group may contain either initiators or other initiator groups, but not both simultaneously. This property is *true* when initiator groups can be added to this initiator group. The `initiators.name` property cannot be used to determine this via a query because it reports initiators inherited from nested igroups.
svm	svm	

Name	Type	Description
target	target	Properties of the SCSI target to which the initiator group provides access.
uuid	string	The unique identifier of the initiator group.

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.

Create an initiator group

POST `/protocols/san/igroups`

Introduced In: 9.6

Creates an initiator group.

Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the initiator group.
- `name` - Name of the initiator group.
- `os_type` - Operating system of the initiator group's initiators.

Recommended optional properties

- `initiators.name` - Name(s) of initiator group's initiators. This property can be used to create the initiator group and populate it with initiators in a single request.

Default property values

If not specified in POST, the following default property values are assigned.

- `protocol` - *mixed* - Data protocol of the initiator group's initiators.

Related ONTAP commands

- `lun igroup create`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	An overview of the connections to ONTAP by the initiators in this group. • readOnly: 1 • Introduced in: 9.11
delete_on_unmap	boolean	An option that causes the initiator group to be deleted when the last LUN map associated with it is deleted. Optional in POST and PATCH. This property defaults to *false* when the initiator group is created.

Name	Type	Description
igroups	array[igroup_child]	The initiator groups that are members of the group. Optional in POST. This property is mutually exclusive with the *initiators* property during POST. This array contains only the direct children of the initiator group. If the member initiator groups have further nested initiator groups, those are reported in the `igroups` property of the child initiator group. Zero or more nested initiator groups can be supplied when the initiator group is created. The initiator group will act as if it contains the aggregatation of all initiators in any nested initiator groups. After creation, nested initiator groups can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/igroups` endpoint. See DELETE /protocols/san/igroups/{igroup.uuid}/igroups/{uuid} for more details.

Name	Type	Description
initiators	array[initiators]	The initiators that are members of the group or any group nested below this group. Optional in POST. This property is mutually exclusive with the *igroups* property during POST. During GET, this array contains initiators that are members of this group or any nested initiator groups below this group. When initiators of nested groups are returned, they include links to the initiator group that directly contains the initiator. Zero or more initiators can be supplied when the initiator group is created. After creation, initiators can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/initiators` endpoint. See DELETE /protocols/san/igroups/{igroup.uuid}/initiators/{name} for more details.
lun_maps	array[lun_maps]	All LUN maps with which the initiator is associated. If the requested igroup is part of a remote, non-local, MetroCluster SVM, the LUN maps are not retrieved. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
name	string	The name of the initiator group. Required in POST; optional in PATCH.

Name	Type	Description
os_type	string	The host operating system of the initiator group. All initiators in the group should be hosts of the same operating system. Required in POST; optional in PATCH.
parent_igroups	array[igroup_parent]	The initiator groups that contain this initiator group as as member.
portset	portset	The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset. Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.
protocol	string	The protocols supported by the initiator group. This restricts the type of initiators that can be added to the initiator group. Optional in POST; if not supplied, this defaults to *mixed*. The protocol of an initiator group cannot be changed after creation of the group.
supports_igroups	boolean	An initiator group may contain either initiators or other initiator groups, but not both simultaneously. This property is *true* when initiator groups can be added to this initiator group. The `initiators.name` property cannot be used to determine this via a query because it reports initiators inherited from nested igroups.
svm	svm	
target	target	Properties of the SCSI target to which the initiator group provides access.

Name	Type	Description
uuid	string	The unique identifier of the initiator group.

Example request


```
{
  "comment": "string",
  "connectivity_tracking": {
    "alerts": [
      {
        "summary": {
          "arguments": [
            {
              "code": "string",
              "message": "string"
            }
          ],
          "code": "4",
          "message": "entry doesn't exist",
          "target": "uuid"
        }
      }
    ],
    "connection_state": "string",
    "required_nodes": [
      {
        "name": "node1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      }
    ]
  },
  "igroups": [
    {
      "comment": "string",
      "igroups": null,
      "name": "igroup1",
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "initiators": [
    {
      "comment": "string",
      "connectivity_tracking": {
        "connection_state": "string"
      },
      "igroup": {
        "name": "igroup1",
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
```

```
      "name": "iqn.1998-01.com.corp.iscsi:name1"
    }
  ],
  "lun_maps": [
    {
      "logical_unit_number": 0,
      "lun": {
        "name": "lun1",
        "node": {
          "name": "node1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      }
    }
  ],
  "name": "igroup1",
  "os_type": "string",
  "parent_igroups": [
    {
      "comment": "string",
      "name": "igroup1",
      "parent_igroups": null,
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "portset": {
    "name": "portset1",
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "protocol": "string",
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "target": {
    "firmware_revision": "9111",
    "product_id": "LUN C-Mode",
    "vendor_id": "NETAPP"
  },
  "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[igroup]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "comment": "string",
      "connectivity_tracking": {
        "alerts": [
          {
            "summary": {
              "arguments": [
                {
                  "code": "string",
                  "message": "string"
                }
              ],
              "code": "4",
              "message": "entry doesn't exist",
              "target": "uuid"
            }
          }
        ],
        "connection_state": "string",
        "required_nodes": [
          {
            "name": "node1",
            "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
          }
        ]
      },
      "igroups": [
        {
          "comment": "string",
          "igroups": null,
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "initiators": [
        {
          "comment": "string",
          "connectivity_tracking": {
            "connection_state": "string"
          },
          "igroup": {
```

```
            "name": "igroup1",
            "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
          },
          "name": "iqn.1998-01.com.corp.iscsi:name1"
        }
      ],
      "lun_maps": [
        {
          "logical_unit_number": 0,
          "lun": {
            "name": "lun1",
            "node": {
              "name": "node1",
              "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
            },
            "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
          }
        }
      ],
      "name": "igroup1",
      "os_type": "string",
      "parent_igroups": [
        {
          "comment": "string",
          "name": "igroup1",
          "parent_igroups": null,
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "portset": {
        "name": "portset1",
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "protocol": "string",
      "svm": {
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "target": {
        "firmware_revision": "9111",
        "product_id": "LUN C-Mode",
        "vendor_id": "NETAPP"
      },
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ]
```

```
}
```

Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	The supplied SVM does not exist.
2621706	The specified `svm.uuid` and `svm.name` do not refer to the same SVM.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5373958	An invalid initiator group name was supplied.
5373966	An initiator group cannot be created in an SVM that is configured for NVMe.
5373969	A supplied initiator name looks like an iSCSI IQN initiator, but the portions after the prefix are missing.
5373971	A supplied initiator name looks like an iSCSI IQN initiator, but the date portion is invalid.
5373972	A supplied initiator name looks like an iSCSI IQN initiator, but the naming authority portion is invalid.
5373977	A supplied initiator name looks like an iSCSI EUI initiator, but the length is invalid.
5373978	A supplied initiator name looks like an iSCSI EUI initiator, but the format is invalid.
5373992	A supplied initiator name was too long to be valid.
5373993	A supplied initiator name did not match any valid format.
5374023	An initiator group with the same name already exists.
5374027	An attempt was made to bind a portset with no member network interfaces to the initiator group.

Error Code	Description
5374028	An attempt was made to bind a portset with an incompatible protocol to the initiator group.
5374038	An invalid Fibre Channel WWPN was supplied.
5374039	An invalid iSCSI initiator name was supplied.
5374040	Initiators and child initiator groups were both supplied, but only one option is allowed.
5374732	An initiator is already in another initiator group with a conflicting operating system type.
5374735	An attempt was made to add a child igroup that would exceed the maximum allowable depth.
5374737	A supplied child initiator group already exists in another initiator group's hierarchy.
5374739	A supplied child initiator group has an operating system type that differs from the parent initiator group.
5374740	A supplied child initiator group has an protocol that differs from the parent initiator group.
5374741	A supplied child initiator group is already owned by a different child in the initiator group's hierarchy.
5374742	A supplied child initiator group contains an initiator that is already owned by another initiator group in the hierarchy.
5374746	The cluster is currently running in a mixed version and nested initiator groups cannot be created until the effective cluster version reaches 9.9.1.
5374747	The cluster is currently running in a mixed version and initiator group comments cannot be created until the effective cluster version reaches 9.9.1.
5374917	Multiple matching initiators have been supplied with conflicting comments.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

summary

A user friendly message describing the connection state of the initiator group.

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.

alerts

Name	Type	Description
summary	summary	A user friendly message describing the connection state of the initiator group.

required_nodes

Name	Type	Description
name	string	
uuid	string	

connectivity_tracking

An overview of the connections to ONTAP by the initiators in this group.

Name	Type	Description
alerts	array[alerts]	
connection_state	string	Connection state.
required_nodes	array[required_nodes]	Nodes to which the initiators in this group should be connected to ensure reliable service. This is the collection of any node hosting a LUN mapped to this igroup as well as the HA partners of those nodes.

igroup_child

Name	Type	Description
comment	string	A comment available for use by the administrator.
igroups	array[]	Further nested initiator groups.
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

connectivity_tracking

A link to the initiator with connectivity information relevant to its membership of this initiator group.

Name	Type	Description
href	string	

self

A link to the initiator where mutations can be made. If the initiator is inherited from a nested initiator group, the link refers to the initiator in the nested initiator group. In this case, mutations of the initiator will be applied to all initiator groups referencing the same nested initiator group.

Name	Type	Description
href	string	

connectivity_tracking

Overview of the initiator’s connections to ONTAP.

Name	Type	Description
connection_state	string	Connection state.

igroup

The initiator group that directly owns the initiator, which is where modification of the initiator is supported. This property will only be populated when the initiator is a member of a nested initiator group.

Name	Type	Description
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

initiators

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11
igroup	igroup	The initiator group that directly owns the initiator, which is where modification of the initiator is supported. This property will only be populated when the initiator is a member of a nested initiator group.

Name	Type	Description
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.

node

Name	Type	Description
name	string	
uuid	string	

lun

The LUN to which the initiator group is mapped.

Name	Type	Description
name	string	The name of the LUN.
node	node	
uuid	string	The unique identifier of the LUN.

lun_maps

A LUN map with which the initiator group is associated.

Name	Type	Description
logical_unit_number	integer	The logical unit number assigned to the LUN for initiators in the initiator group.
lun	lun	The LUN to which the initiator group is mapped.

igroup_parent

Name	Type	Description
comment	string	A comment available for use by the administrator.
name	string	The name of the initiator group.
parent_igroups	array[]	The initiator groups that contain this initiator group as as member.
uuid	string	The unique identifier of the initiator group.

portset

The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset.

Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.

Name	Type	Description
name	string	The name of the portset.
uuid	string	The unique identifier of the portset.

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Properties of the SCSI target to which the initiator group provides access.

Name	Type	Description
firmware_revision	string	The firmware revision of the SCSI target specific to the OS type of the initiator group.
product_id	string	The product ID of the SCSI target.

Name	Type	Description
vendor_id	string	The vendor ID of the SCSI target.

igroup

An initiator group (igroup) is a collection of Fibre Channel (FC) world wide port names (WWPNs), and/or iSCSI Qualified Names (IQNs), and/or iSCSI EUIs (Extended Unique Identifiers) that identify host initiators.

Initiator groups are used to control which hosts can access specific LUNs. To grant access to a LUN from one or more hosts, create an initiator group containing the host initiator names, then create a LUN map that associates the initiator group with the LUN.

An initiator group may contain either initiators or other initiator groups, but not both simultaneously. When a parent initiator group is mapped, it inherits all of the initiators of any initiator groups nested below it. If any nested initiator group is modified to contain different initiators, the parent initiator groups inherit the change. A parent can have many nested initiator groups and an initiator group can be nested under multiple parents. Initiators can only be added or removed from the initiator group that directly contains them. The maximum supported depth of nesting is three layers.

Best practice when using nested initiator groups is to match host hierarchies. A single initiator group should correspond to a single host. If a LUN needs to be mapped to multiple hosts, the initiator groups representing those hosts should be aggregated into a parent initiator group and the LUN should be mapped to that initiator group. For multi-ported hosts, initiators have a comment property where the port corresponding to the initiator can be documented.

An initiator can appear in multiple initiator groups. An initiator group can be mapped to multiple LUNs. A specific initiator can be mapped to a specific LUN only once. With the introduction of nestable initiator groups, best practice is to use the hierarchy such that an initiator is only a direct member of a single initiator group, and that initiator group can then be referenced by other initiator groups.

All initiators or nested initiator groups in an initiator group must be from the same operating system. The initiator group's operating system is specified when the initiator group is created.

When an initiator group is created, the `protocol` property is used to restrict member initiators to Fibre Channel (*fcp*), iSCSI (*iscsi*), or both (*mixed*). Initiator groups within a nested hierarchy may not have conflicting protocols.

Zero or more initiators or nested initiator groups can be supplied when the initiator group is created. After creation, initiators can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/initiators` endpoint. Initiator groups containing other initiator groups report the aggregated list of initiators from all nested initiator groups, but modifications of the initiator list must be performed on the initiator group that directly contains the initiators. See DELETE /protocols/san/igroups/{igroup.uuid}/initiators/{name} for more details.

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.

Name	Type	Description
connectivity_tracking	connectivity_tracking	An overview of the connections to ONTAP by the initiators in this group. • readOnly: 1 • Introduced in: 9.11
delete_on_unmap	boolean	An option that causes the initiator group to be deleted when the last LUN map associated with it is deleted. Optional in POST and PATCH. This property defaults to *false* when the initiator group is created.
igroups	array[igroup_child]	The initiator groups that are members of the group. Optional in POST. This property is mutually exclusive with the *initiators* property during POST. This array contains only the direct children of the initiator group. If the member initiator groups have further nested initiator groups, those are reported in the `igroups` property of the child initiator group. Zero or more nested initiator groups can be supplied when the initiator group is created. The initiator group will act as if it contains the aggregation of all initiators in any nested initiator groups. After creation, nested initiator groups can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/igroups` endpoint. See DELETE /protocols/san/igroups/{igroup.uuid}/igroups/{uuid} for more details.

Name	Type	Description
initiators	array[initiators]	The initiators that are members of the group or any group nested below this group. Optional in POST. This property is mutually exclusive with the *igroups* property during POST. During GET, this array contains initiators that are members of this group or any nested initiator groups below this group. When initiators of nested groups are returned, they include links to the initiator group that directly contains the initiator. Zero or more initiators can be supplied when the initiator group is created. After creation, initiators can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/initiators` endpoint. See DELETE /protocols/san/igroups/{igroup.uuid}/initiators/{name} for more details.
lun_maps	array[lun_maps]	All LUN maps with which the initiator is associated. If the requested igroup is part of a remote, non-local, MetroCluster SVM, the LUN maps are not retrieved. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
name	string	The name of the initiator group. Required in POST; optional in PATCH.
os_type	string	The host operating system of the initiator group. All initiators in the group should be hosts of the same operating system. Required in POST; optional in PATCH.
parent_igroups	array[igroup_parent]	The initiator groups that contain this initiator group as as member.
portset	portset	The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset. Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.
protocol	string	The protocols supported by the initiator group. This restricts the type of initiators that can be added to the initiator group. Optional in POST; if not supplied, this defaults to *mixed*. The protocol of an initiator group cannot be changed after creation of the group.
supports_igroups	boolean	An initiator group may contain either initiators or other initiator groups, but not both simultaneously. This property is *true* when initiator groups can be added to this initiator group. The `initiators.name` property cannot be used to determine this via a query because it reports initiators inherited from nested igroups.
svm	svm	

Name	Type	Description
target	target	Properties of the SCSI target to which the initiator group provides access.
uuid	string	The unique identifier of the initiator group.

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.

Retrieve nested initiator groups of an initiator group

GET `/protocols/san/igroups/{igroup.uuid}/igroups`

Introduced In: 9.9

Retrieves nested initiator groups of an initiator group. This API only reports the nested initiator groups that are direct children of the initiator group. Further nested initiator groups are reported by their direct parent initiator group.

Related ONTAP commands

- `lun igroup show`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
igroup.uuid	string	path	True	The unique identifier of the parent initiator group.

Name	Type	In	Required	Description
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. • 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. • 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	
num_records	integer	The number of records in the response.

Name	Type	Description
records	array[igroup_nested]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "igroup1",
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374852	The initiator group specified in the URI does not exist.

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

igroup

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the parent initiator group.

records

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

igroup_nested

Name	Type	Description
_links	_links	
igroup	igroup	
name	string	The name of the initiator group.

Name	Type	Description
uuid	string	The unique identifier of the initiator group.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Add nested initiator groups to an initiator group

POST `/protocols/san/igroups/{igroup.uuid}/igroups`

Introduced In: 9.9

Adds one or more nested initiator groups to an initiator group. A single nested initiator group can be added by directly specifying the name or UUID. Multiple nested initiator groups can be added by specifying the names or UUIDs in the records array. Nested initiator groups cannot be added to an initiator group that already directly contains initiators.

Required properties

- `name` and/or `uuid` or `records` - Nested initiator groups to add to the initiator group.

Related ONTAP commands

- `lun igroup add`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
igroup.uuid	string	path	True	The unique identifier of the parent initiator group.
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
igroup	igroup	
name	string	The name of the initiator group.
records	array[records]	An array of initiator groups specified to add multiple nested initiator groups to an initiator group in a single API call. Not allowed when the `name` property is used.
uuid	string	The unique identifier of the initiator group.

Example request

```
{
  "igroup": {
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "igroup1",
  "records": [
    {
      "name": "igroup1",
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[igroup_nested]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "igroup": {
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "igroup1",
      "records": [
        {
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374735	An attempt was made to add a child igroup that would exceed the maximum allowable depth.
5374736	A supplied child initiator group already exists in the parent initiator group's hierarchy.
5374737	A supplied child initiator group already exists in another initiator group's hierarchy.
5374739	A supplied child initiator group has an operating system type that differs from the parent initiator group.
5374740	A supplied child initiator group has an protocol that differs from the parent initiator group.
5374741	A supplied child initiator group is already owned by a different child in the initiator group's hierarchy.
5374742	A supplied child initiator group contains an initiator that is already owned by another initiator group in the hierarchy.
5374852	The initiator group specified in the URI does not exist.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

igroup

Name	Type	Description
uuid	string	The unique identifier of the parent initiator group.

records

Name	Type	Description
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

igroup_nested

Name	Type	Description
igroup	igroup	
name	string	The name of the initiator group.
records	array[records]	An array of initiator groups specified to add multiple nested initiator groups to an initiator group in a single API call. Not allowed when the `name` property is used.
uuid	string	The unique identifier of the initiator group.

error_arguments

Name	Type	Description
code	string	Argument code

Name	Type	Description
message	string	Message argument

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.

Remove a nested initiator group from an initiator group

DELETE `/protocols/san/igroups/{igroup.uuid}/igroups/{uuid}`

Introduced In: 9.9

Removes a nested initiator group from an initiator group. This API does not delete the nested initiator group itself. It removes the relationship between a parent and child initiator group. This API only supports removal of initiator groups owned directly by the initiator group. Further nested initiator groups must be removed from the direct parent initiator group.

Related ONTAP commands

- `lun igroup remove`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
igroup.uuid	string	path	True	The unique identifier of the parent initiator group.
uuid	string	path	True	The unique identifier of the nested initiator group.

Name	Type	In	Required	Description
allow_delete_while_mapped	boolean	query	False	Allows the deletion of a nested initiator group from of a mapped initiator group. Deleting a nested initiator group from a mapped initiator group means that the LUNs, to which the initiator group is mapped, are no longer available to the initiators nested below the initiator group being removed. This might cause a disruption in the availability of data. **This parameter should be used with caution.** • Default value:

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254213	The initiator group is mapped to one or more LUNs and `allow_delete_while_mapped` has not been specified.
5374738	The child initiator group is not owned by the parent initiator group.
5374852	The initiator group specified in the URI does not exist.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve a nested initiator group of an initiator group

GET `/protocols/san/igroups/{igroup.uuid}/igroups/{uuid}`

Introduced In: 9.9

Retrieves a nested initiator group of an initiator group. This API only reports the nested initiator groups that are direct children of the initiator group. Further nested initiator groups are reported by their direct parent initiator group.

Related ONTAP commands

- `lun igroup show`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
igroup.uuid	string	path	True	The unique identifier of the parent initiator group.
uuid	string	path	True	The unique identifier of the nested initiator group.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
igroup	igroup	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "igroup": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "igroup1",
  "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
4	The nested initiator group is not a member of the initiator group.
5374852	The parent initiator group specified in the URI does not exist.

Name	Type	Description
error	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
self	href	

igroup

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the parent initiator group.

records

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments
code	string	Error code

Name	Type	Description
message	string	Error message
target	string	The target parameter that caused the error.

Retrieve initiators of an initiator group

GET `/protocols/san/igroups/{igroup.uuid}/initiators`

Introduced In: 9.6

Retrieves initiators of an initiator group. This API only reports initiators owned directly by the initiator group. Initiators of nested initiator groups are not included in this collection.

Expensive properties

There is an added computational cost to retrieving values for these properties. They are not included by default in GET results and must be explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

- `connectivity_tracking.*`

Related ONTAP commands

- `lun igroup show`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
igroup.uuid	string	path	True	The unique identifier of the initiator group.
fields	array[string]	query	False	Specify the fields to return.
max_records	integer	query	False	Limit the number of records returned.

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is true for GET calls. When set to false, only the number of records is returned. • 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. • 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	
num_records	integer	The number of records in the response.
records	array[igroup_initiator]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "comment": "string",
      "connectivity_tracking": {
        "alerts": [
          {
            "summary": {
              "arguments": [
                {
                  "code": "string",
                  "message": "string"
                }
              ],
              "code": "4",
              "message": "entry doesn't exist",
              "target": "uuid"
            }
          }
        ],
        "connection_state": "string",
        "connections": [
          {
            "logins": [
              {
                "interface": {
                  "fc": {
                    "_links": {
                      "self": {
                        "href": "/api/resourcelink"
```

```
                    }
                  },
                  "name": "fc_lif1",
                  "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
                  "wwpn": "20:00:00:50:56:b4:13:a8"
                },
                "ip": {
                  "_links": {
                    "self": {
                      "href": "/api/resourcelink"
                    }
                  },
                  "ip": {
                    "address": "10.10.10.7"
                  },
                  "name": "lif1",
                  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
                }
              },
              "last_seen_time": "2021-03-14T05:19:00Z"
            }
          ],
          "node": {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "name": "node1",
            "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
          }
        }
      ]
    },
    "igroup": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "igroup1",
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    },
    "name": "iqn.1998-01.com.corp.iscsi:name1"
  }
]
```

```
}
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374852	The initiator group specified in the URI does not exist.

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

summary

A user friendly message describing the connection state.

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.

alerts

Name	Type	Description
summary	summary	A user friendly message describing the connection state.

fc

An FC interface.

Name	Type	Description
_links	_links	
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address

ip

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.
uuid	string	The UUID that uniquely identifies the interface.

interface

Name	Type	Description
fc	fc	An FC interface.

Name	Type	Description
ip	ip	

logins

Name	Type	Description
connected	boolean	True if the initiator is currently logged in to this connection's interface.
interface	interface	
last_seen_time	string	The last time this initiator logged in. Logins not seen for 48 hours are cleared and not reported.

node

Name	Type	Description
_links	_links	
name	string	
uuid	string	

connections

Name	Type	Description
logins	array[logins]	
node	node	

connectivity_tracking

Overview of the initiator's connections to ONTAP.

Name	Type	Description
alerts	array[alerts]	
connection_state	string	Connection state.
connections	array[connections]	

igroup

The initiator group in which the initiator is found.

Note that this does not mean that the initiator cannot also be found in other initiator groups.

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

records

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.

igroup_initiator

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11

Name	Type	Description
igroup	igroup	The initiator group in which the initiator is found. Note that this does not mean that the initiator cannot also be found in other initiator groups.
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.

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.

Add initiators to an initiator group

POST `/protocols/san/igroups/{igroup.uuid}/initiators`

Introduced In: 9.6

Adds one or more initiators to an initiator group. This API does not support adding initiators to an initiator group that already contains nested initiator groups.

Required properties

- `name` or `records.name` - Initiator name(s) to add to the initiator group.

Related ONTAP commands

- `lun igroup add`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
igroup.uuid	string	path	True	The unique identifier of the initiator group.
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11
igroup	igroup	The initiator group in which the initiator is found. Note that this does not mean that the initiator cannot also be found in other initiator groups.

Name	Type	Description
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.
records	array[records]	An array of initiators specified to add multiple initiators to an initiator group in a single API call. Not allowed when the `name` property is used.

Example request


```
{
  "comment": "string",
  "connectivity_tracking": {
    "alerts": [
      {
        "summary": {
          "arguments": [
            {
              "code": "string",
              "message": "string"
            }
          ],
          "code": "4",
          "message": "entry doesn't exist",
          "target": "uuid"
        }
      }
    ],
    "connection_state": "string",
    "connections": [
      {
        "logins": [
          {
            "interface": {
              "fc": {
                "name": "fc_lif1",
                "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
                "wwpn": "20:00:00:50:56:b4:13:a8"
              },
              "ip": {
                "name": "lif1",
                "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
              }
            },
            "last_seen_time": "2021-03-14T05:19:00Z"
          }
        ],
        "node": {
          "name": "node1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        }
      }
    ]
  },
```

```
  "igroup": {
    "name": "igroup1",
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "iqn.1998-01.com.corp.iscsi:name1",
  "records": [
    {
      "comment": "string",
      "name": "iqn.1998-01.com.corp.iscsi:name1"
    }
  ]
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[igroup_initiator]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "comment": "string",
      "connectivity_tracking": {
        "alerts": [
          {
            "summary": {
              "arguments": [
                {
                  "code": "string",
                  "message": "string"
                }
              ],
              "code": "4",
              "message": "entry doesn't exist",
              "target": "uuid"
            }
          }
        ],
        "connection_state": "string",
        "connections": [
          {
            "logins": [
              {
                "interface": {
                  "fc": {
                    "name": "fc_lif1",
                    "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
                    "wwpn": "20:00:00:50:56:b4:13:a8"
                  },
                  "ip": {
                    "name": "lif1",
                    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
                  }
                },
                "last_seen_time": "2021-03-14T05:19:00Z"
              }
            ],
            "node": {
              "name": "node1",
              "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
            }
```

```
            }
          ]
        },
        "igroup": {
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        },
        "name": "iqn.1998-01.com.corp.iscsi:name1",
        "records": [
          {
            "comment": "string",
            "name": "iqn.1998-01.com.corp.iscsi:name1"
          }
        ]
      }
    ]
}
```

Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254193	Adding an initiator would cause the initiator to be mapped to the same LUN more than once.
1254324	Adding an initiator would cause the initiator to have the same logical unit identifier for multiple LUN maps.
5373969	A supplied initiator name looks like an iSCSI IQN initiator, but the portions after the prefix are missing.
5373971	A supplied initiator name looks like an iSCSI IQN initiator, but the date portion is invalid.
5373972	A supplied initiator name looks like an iSCSI IQN initiator, but the naming authority portion is invalid.
5373977	A supplied initiator name looks like an iSCSI EUI initiator, but the length is invalid.

Error Code	Description
5373978	A supplied initiator name looks like an iSCSI EUI initiator, but the format is invalid.
5373992	A supplied initiator name was too long to be valid.
5373993	A supplied initiator name did not match any valid format.
5374033	Initiators must be supplied.
5374035	A supplied initiator is already in the initiator group.
5374038	An invalid Fibre Channel WWPN was supplied.
5374039	An invalid iSCSI initiator name was supplied.
5374734	An initiator is already in another initiator group with a conflicting operating system type.
5374852	The initiator group specified in the URI does not exist.
5374917	Multiple matching initiators have been supplied with conflicting comments.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

summary

A user friendly message describing the connection state.

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.

alerts

Name	Type	Description
summary	summary	A user friendly message describing the connection state.

fc

An FC interface.

Name	Type	Description
name	string	The name of the FC interface.

Name	Type	Description
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

ip

Name	Type	Description
ip	ip	IP information
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.
uuid	string	The UUID that uniquely identifies the interface.

interface

Name	Type	Description
fc	fc	An FC interface.
ip	ip	

logins

Name	Type	Description
connected	boolean	True if the initiator is currently logged in to this connection's interface.
interface	interface	
last_seen_time	string	The last time this initiator logged in. Logins not seen for 48 hours are cleared and not reported.

node

Name	Type	Description
name	string	
uuid	string	

connections

Name	Type	Description
logins	array[logins]	
node	node	

connectivity_tracking

Overview of the initiator's connections to ONTAP.

Name	Type	Description
alerts	array[alerts]	
connection_state	string	Connection state.
connections	array[connections]	

igroup

The initiator group in which the initiator is found.

Note that this does not mean that the initiator cannot also be found in other initiator groups.

Name	Type	Description
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

records

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.

Name	Type	Description
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.

igroup_initiator

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11
igroup	igroup	The initiator group in which the initiator is found. Note that this does not mean that the initiator cannot also be found in other initiator groups.

Name	Type	Description
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.
records	array[records]	An array of initiators specified to add multiple initiators to an initiator group in a single API call. Not allowed when the `name` property is used.

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.

Delete an initiator from an initiator group

DELETE `/protocols/san/igroups/{igroup.uuid}/initiators/{name}`

Introduced In: 9.6

Deletes an initiator from an initiator group. This API only supports removal of initiators owned directly by the initiator group. Initiators of nested initiator groups must be removed on the initiator group that directly owns the initiator.

Related ONTAP commands

- `lun igroup remove`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
igroup.uuid	string	path	True	The unique identifier of the initiator group.
name	string	path	True	The name of the initiator to delete.
allow_delete_while_mapped	boolean	query	False	Allows the deletion of an initiator from of a mapped initiator group. Deleting an initiator from a mapped initiator group makes the LUNs to which the initiator group is mapped no longer available to the initiator. This might cause a disruption in the availability of data. **This parameter should be used with caution.** • Default value:

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254213	The initiator group is mapped to one or more LUNs and `allow_delete_while_mapped` has not been specified.
5374034	An initiator is not a member of the initiator group.
5374041	The initiator is not owned by the supplied initiator group.
5374852	The initiator group specified in the URI does not exist.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve an initiator

GET `/protocols/san/igroups/{igroup.uuid}/initiators/{name}`

Introduced In: 9.6

Retrieves an initiator of an initiator group. This API only reports initiators owned directly by the initiator group. Initiators of nested initiator groups are not part of this collection.

Expensive properties

There is an added computational cost to retrieving values for these properties. They are not included by default in GET results and must be explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

- `connectivity_tracking.*`

Related ONTAP commands

- `lun igroup show`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
igroup.uuid	string	path	True	The unique identifier of the initiator group.
name	string	path	True	Initiator name
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11
igroup	igroup	The initiator group in which the initiator is found. Note that this does not mean that the initiator cannot also be found in other initiator groups.

Name	Type	Description
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "comment": "string",
  "connectivity_tracking": {
    "alerts": [
      {
        "summary": {
          "arguments": [
            {
              "code": "string",
              "message": "string"
            }
          ],
          "code": "4",
          "message": "entry doesn't exist",
          "target": "uuid"
        }
      }
    ],
    "connection_state": "string",
    "connections": [
      {
        "logins": [
          {
            "interface": {
              "fc": {
                "_links": {
                  "self": {
                    "href": "/api/resourcelink"
                  }
                },
                "name": "fc_lif1",
                "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
                "wwpn": "20:00:00:50:56:b4:13:a8"
              },
              "ip": {
                "_links": {
                  "self": {
                    "href": "/api/resourcelink"
                  }
```

```
                },
                "ip": {
                  "address": "10.10.10.7"
                },
                "name": "lif1",
                "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
              }
            },
            "last_seen_time": "2021-03-14T05:19:00Z"
          }
        ],
        "node": {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "node1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        }
      }
    ]
  },
  "igroup": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "igroup1",
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "iqn.1998-01.com.corp.iscsi:name1"
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
4	The initiator is not a member of the initiator group.

Error Code	Description
5374852	The initiator group specified in the URI does not exist.

Name	Type	Description
error	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
self	href	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

summary

A user friendly message describing the connection state.

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.

alerts

Name	Type	Description
summary	summary	A user friendly message describing the connection state.

fc

An FC interface.

Name	Type	Description
_links	_links	
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address

ip

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.
uuid	string	The UUID that uniquely identifies the interface.

interface

Name	Type	Description
fc	fc	An FC interface.
ip	ip	

logins

Name	Type	Description
connected	boolean	True if the initiator is currently logged in to this connection's interface.

Name	Type	Description
interface	interface	
last_seen_time	string	The last time this initiator logged in. Logins not seen for 48 hours are cleared and not reported.

node

Name	Type	Description
_links	_links	
name	string	
uuid	string	

connections

Name	Type	Description
logins	array[logins]	
node	node	

connectivity_tracking

Overview of the initiator's connections to ONTAP.

Name	Type	Description
alerts	array[alerts]	
connection_state	string	Connection state.
connections	array[connections]	

igroup

The initiator group in which the initiator is found.

Note that this does not mean that the initiator cannot also be found in other initiator groups.

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

records

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.

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.

Update an initiator

PATCH `/protocols/san/igroups/{igroup.uuid}/initiators/{name}`

Introduced In: 9.9

Updates an initiator of an initiator group. This API only supports modification of initiators owned directly by the initiator group. Initiators of nested initiator groups must be modified on the initiator group that directly owns the initiator.

Related ONTAP commands

- `lun igroup initiator modify`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
igroup.uuid	string	path	True	The unique identifier of the initiator group.
name	string	path	True	The initiator name.

Request Body

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11
igroup	igroup	The initiator group in which the initiator is found. Note that this does not mean that the initiator cannot also be found in other initiator groups.
records	array[records]	An array of initiators specified to add multiple initiators to an initiator group in a single API call. Not allowed when the `name` property is used.

Example request


```
{
  "comment": "string",
  "connectivity_tracking": {
    "alerts": [
      {
        "summary": {
          "arguments": [
            {
              "code": "string",
              "message": "string"
            }
          ],
          "code": "4",
          "message": "entry doesn't exist",
          "target": "uuid"
        }
      }
    ],
    "connection_state": "string",
    "connections": [
      {
        "logins": [
          {
            "interface": {
              "fc": {
                "name": "fc_lif1",
                "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
                "wwpn": "20:00:00:50:56:b4:13:a8"
              },
              "ip": {
                "name": "lif1",
                "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
              }
            },
            "last_seen_time": "2021-03-14T05:19:00Z"
          }
        ],
        "node": {
          "name": "node1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        }
      }
    ]
  },
```

```
  "igroup": {
    "name": "igroup1",
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "records": [
    {
      "comment": "string"
    }
  ]
}
```

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374034	An initiator is not a member of the initiator group.
5374744	The cluster is currently running in a mixed version and the initiators cannot be modified until the effective cluster version reaches 9.9.1.
5374852	The initiator group does not exist.
5374918	A subset of the provided list of initiators were modified before a failure occurred.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

summary

A user friendly message describing the connection state.

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.

alerts

Name	Type	Description
summary	summary	A user friendly message describing the connection state.

fc

An FC interface.

Name	Type	Description
name	string	The name of the FC interface.

Name	Type	Description
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

ip

Name	Type	Description
ip	ip	IP information
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.
uuid	string	The UUID that uniquely identifies the interface.

interface

Name	Type	Description
fc	fc	An FC interface.
ip	ip	

logins

Name	Type	Description
connected	boolean	True if the initiator is currently logged in to this connection's interface.
interface	interface	
last_seen_time	string	The last time this initiator logged in. Logins not seen for 48 hours are cleared and not reported.

node

Name	Type	Description
name	string	
uuid	string	

connections

Name	Type	Description
logins	array[logins]	
node	node	

connectivity_tracking

Overview of the initiator's connections to ONTAP.

Name	Type	Description
alerts	array[alerts]	
connection_state	string	Connection state.
connections	array[connections]	

igroup

The initiator group in which the initiator is found.

Note that this does not mean that the initiator cannot also be found in other initiator groups.

Name	Type	Description
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

records

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.

igroup_initiator

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11
igroup	igroup	The initiator group in which the initiator is found. Note that this does not mean that the initiator cannot also be found in other initiator groups.
records	array[records]	An array of initiators specified to add multiple initiators to an initiator group in a single API call. Not allowed when the `name` property is used.

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.

Delete an initiator group

DELETE `/protocols/san/igroups/{uuid}`

Introduced In: 9.6

Deletes an initiator group.

Related ONTAP commands

- `lun igroup delete`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the initiator group.
allow_delete_while_mapped	boolean	query	False	Allows the deletion of a mapped initiator group. Deleting a mapped initiator group means that the LUNs, to which the initiator group is mapped, are no longer available to the initiators. This might cause a disruption in the availability of data. **This parameter should be used with caution.** • Default value:

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254213	The initiator group is mapped to one or more LUNs and `allow_delete_while_mapped` has not been specified.
5374852	The initiator group does not exist.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve an initiator group

GET `/protocols/san/igroups/{uuid}`

Introduced In: 9.6

Retrieves an initiator group.

Expensive properties

There is an added computational cost to retrieving values for these properties. They are not included by default in GET results and must be explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

- `igroups.*`
- `lun_maps.*`
- `parent_igroups.*`
- `connectivity_tracking.*`

Related ONTAP commands

- `lun igroup show`
- `lun mapping show`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the initiator group.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	An overview of the connections to ONTAP by the initiators in this group. • readOnly: 1 • Introduced in: 9.11
delete_on_unmap	boolean	An option that causes the initiator group to be deleted when the last LUN map associated with it is deleted. Optional in POST and PATCH. This property defaults to *false* when the initiator group is created.

Name	Type	Description
igroups	array[igroup_child]	The initiator groups that are members of the group. Optional in POST. This property is mutually exclusive with the *initiators* property during POST. This array contains only the direct children of the initiator group. If the member initiator groups have further nested initiator groups, those are reported in the `igroups` property of the child initiator group. Zero or more nested initiator groups can be supplied when the initiator group is created. The initiator group will act as if it contains the aggregatation of all initiators in any nested initiator groups. After creation, nested initiator groups can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/igroups` endpoint. See DELETE /protocols/san/igroups/{igroup.uuid}/igroups/{uuid} for more details.

Name	Type	Description
initiators	array[initiators]	The initiators that are members of the group or any group nested below this group. Optional in POST. This property is mutually exclusive with the *igroups* property during POST. During GET, this array contains initiators that are members of this group or any nested initiator groups below this group. When initiators of nested groups are returned, they include links to the initiator group that directly contains the initiator. Zero or more initiators can be supplied when the initiator group is created. After creation, initiators can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/initiators` endpoint. See DELETE /protocols/san/igroups/{igroup.uuid}/initiators/{name} for more details.
lun_maps	array[lun_maps]	All LUN maps with which the initiator is associated. If the requested igroup is part of a remote, non-local, MetroCluster SVM, the LUN maps are not retrieved. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
name	string	The name of the initiator group. Required in POST; optional in PATCH.

Name	Type	Description
os_type	string	The host operating system of the initiator group. All initiators in the group should be hosts of the same operating system. Required in POST; optional in PATCH.
parent_igroups	array[igroup_parent]	The initiator groups that contain this initiator group as as member.
portset	portset	The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset. Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.
protocol	string	The protocols supported by the initiator group. This restricts the type of initiators that can be added to the initiator group. Optional in POST; if not supplied, this defaults to *mixed*. The protocol of an initiator group cannot be changed after creation of the group.
supports_igroups	boolean	An initiator group may contain either initiators or other initiator groups, but not both simultaneously. This property is *true* when initiator groups can be added to this initiator group. The `initiators.name` property cannot be used to determine this via a query because it reports initiators inherited from nested igroups.
svm	svm	
target	target	Properties of the SCSI target to which the initiator group provides access.

Name	Type	Description
uuid	string	The unique identifier of the initiator group.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "comment": "string",
  "connectivity_tracking": {
    "alerts": [
      {
        "summary": {
          "arguments": [
            {
              "code": "string",
              "message": "string"
            }
          ],
          "code": "4",
          "message": "entry doesn't exist",
          "target": "uuid"
        }
      }
    ],
    "connection_state": "string",
    "required_nodes": [
      {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "node1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      }
    ]
  },
  "igroups": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "comment": "string",
```

```
      "igroups": null,
      "name": "igroup1",
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "initiators": [
    {
      "_links": {
        "connectivity_tracking": {
          "href": "/api/resourcelink"
        },
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "comment": "string",
      "connectivity_tracking": {
        "connection_state": "string"
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "igroup1",
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "iqn.1998-01.com.corp.iscsi:name1"
    }
  ],
  "lun_maps": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "logical_unit_number": 0,
      "lun": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "lun1",
```

```
        "node": {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "node1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      }
    }
  ],
  "name": "igroup1",
  "os_type": "string",
  "parent_igroups": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "comment": "string",
      "name": "igroup1",
      "parent_igroups": null,
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "portset": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "portset1",
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "protocol": "string",
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
```

```
  },
  "target": {
    "firmware_revision": "9111",
    "product_id": "LUN C-Mode",
    "vendor_id": "NETAPP"
  },
  "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374852	The initiator group does not exist.

Name	Type	Description
error	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
self	href	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

summary

A user friendly message describing the connection state of the initiator group.

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.

alerts

Name	Type	Description
summary	summary	A user friendly message describing the connection state of the initiator group.

required_nodes

Name	Type	Description
_links	_links	

Name	Type	Description
name	string	
uuid	string	

connectivity_tracking

An overview of the connections to ONTAP by the initiators in this group.

Name	Type	Description
alerts	array[alerts]	
connection_state	string	Connection state.
required_nodes	array[required_nodes]	Nodes to which the initiators in this group should be connected to ensure reliable service. This is the collection of any node hosting a LUN mapped to this igroup as well as the HA partners of those nodes.

igroup_child

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator.
igroups	array[]	Further nested initiator groups.
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

connectivity_tracking

A link to the initiator with connectivity information relevant to its membership of this initiator group.

Name	Type	Description
href	string	

self

A link to the initiator where mutations can be made. If the initiator is inherited from a nested initiator group, the link refers to the initiator in the nested initiator group. In this case, mutations of the initiator will be

applied to all initiator groups referencing the same nested initiator group.

Name	Type	Description
href	string	

_links

Name	Type	Description
connectivity_tracking	connectivity_tracking	A link to the initiator with connectivity information relevant to its membership of this initiator group.
self	self	A link to the initiator where mutations can be made. If the initiator is inherited from a nested initiator group, the link refers to the initiator in the nested initiator group. In this case, mutations of the initiator will be applied to all initiator groups referencing the same nested initiator group.

connectivity_tracking

Overview of the initiator's connections to ONTAP.

Name	Type	Description
connection_state	string	Connection state.

igroup

The initiator group that directly owns the initiator, which is where modification of the initiator is supported. This property will only be populated when the initiator is a member of a nested initiator group.

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

initiators

Name	Type	Description
_links	_links	

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11
igroup	igroup	The initiator group that directly owns the initiator, which is where modification of the initiator is supported. This property will only be populated when the initiator is a member of a nested initiator group.
name	string	The FC WWPN, iSCSI IQN, or iSCSI EUI that identifies the host initiator. Valid in POST only and not allowed when the `records` property is used. An FC WWPN consists of 16 hexadecimal digits grouped as 8 pairs separated by colons. The format for an iSCSI IQN is *iqn.yyyy-mm.reverse_domain_name:any*. The iSCSI EUI format consists of the *eui.* prefix followed by 16 hexadecimal characters.

node

Name	Type	Description
_links	_links	
name	string	
uuid	string	

lun

The LUN to which the initiator group is mapped.

Name	Type	Description
_links	_links	

Name	Type	Description
name	string	The name of the LUN.
node	node	
uuid	string	The unique identifier of the LUN.

lun_maps

A LUN map with which the initiator group is associated.

Name	Type	Description
_links	_links	
logical_unit_number	integer	The logical unit number assigned to the LUN for initiators in the initiator group.
lun	lun	The LUN to which the initiator group is mapped.

igroup_parent

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator.
name	string	The name of the initiator group.
parent_igroups	array[]	The initiator groups that contain this initiator group as as member.
uuid	string	The unique identifier of the initiator group.

portset

The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset.

Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.

Name	Type	Description
_links	_links	

Name	Type	Description
name	string	The name of the portset.
uuid	string	The unique identifier of the portset.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Properties of the SCSI target to which the initiator group provides access.

Name	Type	Description
firmware_revision	string	The firmware revision of the SCSI target specific to the OS type of the initiator group.
product_id	string	The product ID of the SCSI target.
vendor_id	string	The vendor ID of the SCSI target.

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.

Update an initiator group

PATCH `/protocols/san/igroups/{uuid}`

Introduced In: 9.6

Updates an initiator group.

Related ONTAP commands

- `lun igroup modify`
- `lun igroup rename`
- `lun igroup bind`
- `lun igroup unbind`

Learn more

- DOC /protocols/san/igroups

Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the initiator group.

Request Body

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	An overview of the connections to ONTAP by the initiators in this group. • readOnly: 1 • Introduced in: 9.11
delete_on_unmap	boolean	An option that causes the initiator group to be deleted when the last LUN map associated with it is deleted. Optional in POST and PATCH. This property defaults to *false* when the initiator group is created.

Name	Type	Description
lun_maps	array[lun_maps]	All LUN maps with which the initiator is associated. If the requested igroup is part of a remote, non-local, MetroCluster SVM, the LUN maps are not retrieved. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
name	string	The name of the initiator group. Required in POST; optional in PATCH.
os_type	string	The host operating system of the initiator group. All initiators in the group should be hosts of the same operating system. Required in POST; optional in PATCH.
parent_igroups	array[igroup_parent]	The initiator groups that contain this initiator group as as member.
portset	portset	The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset. Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.

Name	Type	Description
supports_igroups	boolean	An initiator group may contain either initiators or other initiator groups, but not both simultaneously. This property is *true* when initiator groups can be added to this initiator group. The `initiators.name` property cannot be used to determine this via a query because it reports initiators inherited from nested igroups.
target	target	Properties of the SCSI target to which the initiator group provides access.
uuid	string	The unique identifier of the initiator group.

Example request


```
{
  "comment": "string",
  "connectivity_tracking": {
    "alerts": [
      {
        "summary": {
          "arguments": [
            {
              "code": "string",
              "message": "string"
            }
          ],
          "code": "4",
          "message": "entry doesn't exist",
          "target": "uuid"
        }
      }
    ],
    "connection_state": "string",
    "required_nodes": [
      {
        "name": "node1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      }
    ]
  },
  "lun_maps": [
    {
      "logical_unit_number": 0,
      "lun": {
        "name": "lun1",
        "node": {
          "name": "node1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      }
    }
  ],
  "name": "igroup1",
  "os_type": "string",
  "parent_igroups": [
    {
      "comment": "string",
```

```
      "name": "igroup1",
      "parent_igroups": null,
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "portset": {
    "name": "portset1",
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "target": {
    "firmware_revision": "9111",
    "product_id": "LUN C-Mode",
    "vendor_id": "NETAPP"
  },
  "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
}
```


Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254264	An attempt was made to bind a portset to an initiator group that is already bound to a portset.
5373958	An invalid initiator group name was supplied for a rename operation.
5374023	A rename operation failed because an initiator group with the same name already exists.
5374027	An attempt was made to bind a portset with no member network interfaces to the initiator group.
5374028	An attempt was made to bind a portset with an incompatible protocol to the initiator group.
5374733	An initiator is already in another initiator group with a conflicting operating system type.

Error Code	Description
5374745	An attempt was made to add an initiator group as a child to itself.
5374746	The cluster is currently running in a mixed version and nested initiator groups cannot be created until the effective cluster version reaches 9.9.1.
5374747	The cluster is currently running in a mixed version and initiator group comments cannot be created until the effective cluster version reaches 9.9.1.
5374852	The initiator group does not exist.
5374868	The initiator group was partially modified before an error was encountered while renaming the initiator group.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

summary

A user friendly message describing the connection state of the initiator group.

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.

alerts

Name	Type	Description
summary	summary	A user friendly message describing the connection state of the initiator group.

required_nodes

Name	Type	Description
name	string	
uuid	string	

connectivity_tracking

An overview of the connections to ONTAP by the initiators in this group.

Name	Type	Description
alerts	array[alerts]	
connection_state	string	Connection state.
required_nodes	array[required_nodes]	Nodes to which the initiators in this group should be connected to ensure reliable service. This is the collection of any node hosting a LUN mapped to this igroup as well as the HA partners of those nodes.

igroup_child

Name	Type	Description
comment	string	A comment available for use by the administrator.
igroups	array[]	Further nested initiator groups.

connectivity_tracking

A link to the initiator with connectivity information relevant to its membership of this initiator group.

Name	Type	Description
href	string	

self

A link to the initiator where mutations can be made. If the initiator is inherited from a nested initiator group, the link refers to the initiator in the nested initiator group. In this case, mutations of the initiator will be applied to all initiator groups referencing the same nested initiator group.

Name	Type	Description
href	string	

connectivity_tracking

Overview of the initiator’s connections to ONTAP.

Name	Type	Description
connection_state	string	Connection state.

igroup

The initiator group that directly owns the initiator, which is where modification of the initiator is supported. This property will only be populated when the initiator is a member of a nested initiator group.

Name	Type	Description
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

initiators

Name	Type	Description
_links	_links	
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	Overview of the initiator's connections to ONTAP. • readOnly: 1 • Introduced in: 9.11
igroup	igroup	The initiator group that directly owns the initiator, which is where modification of the initiator is supported. This property will only be populated when the initiator is a member of a nested initiator group.

node

Name	Type	Description
name	string	
uuid	string	

lun

The LUN to which the initiator group is mapped.

Name	Type	Description
name	string	The name of the LUN.
node	node	

Name	Type	Description
uuid	string	The unique identifier of the LUN.

lun_maps

A LUN map with which the initiator group is associated.

Name	Type	Description
logical_unit_number	integer	The logical unit number assigned to the LUN for initiators in the initiator group.
lun	lun	The LUN to which the initiator group is mapped.

igroup_parent

Name	Type	Description
comment	string	A comment available for use by the administrator.
name	string	The name of the initiator group.
parent_igroups	array[]	The initiator groups that contain this initiator group as as member.
uuid	string	The unique identifier of the initiator group.

portset

The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset.

Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.

Name	Type	Description
name	string	The name of the portset.
uuid	string	The unique identifier of the portset.

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Properties of the SCSI target to which the initiator group provides access.

Name	Type	Description
firmware_revision	string	The firmware revision of the SCSI target specific to the OS type of the initiator group.
product_id	string	The product ID of the SCSI target.
vendor_id	string	The vendor ID of the SCSI target.

igroup

An initiator group (igroup) is a collection of Fibre Channel (FC) world wide port names (WWPNs), and/or iSCSI Qualified Names (IQNs), and/or iSCSI EUIs (Extended Unique Identifiers) that identify host initiators.

Initiator groups are used to control which hosts can access specific LUNs. To grant access to a LUN from one or more hosts, create an initiator group containing the host initiator names, then create a LUN map that associates the initiator group with the LUN.

An initiator group may contain either initiators or other initiator groups, but not both simultaneously. When a parent initiator group is mapped, it inherits all of the initiators of any initiator groups nested below it. If any nested initiator group is modified to contain different initiators, the parent initiator groups inherit the change. A parent can have many nested initiator groups and an initiator group can be nested under multiple parents. Initiators can only be added or removed from the initiator group that directly contains them. The maximum supported depth of nesting is three layers.

Best practice when using nested initiator groups is to match host hierarchies. A single initiator group should correspond to a single host. If a LUN needs to be mapped to multiple hosts, the initiator groups representing those hosts should be aggregated into a parent initiator group and the LUN should be mapped to that initiator group. For multi-ported hosts, initiators have a comment property where the port corresponding to the initiator can be documented.

An initiator can appear in multiple initiator groups. An initiator group can be mapped to multiple LUNs. A specific initiator can be mapped to a specific LUN only once. With the introduction of nestable initiator groups, best practice is to use the hierarchy such that an initiator is only a direct member of a single initiator group, and that initiator group can then be referenced by other initiator groups.

All initiators or nested initiator groups in an initiator group must be from the same operating system. The initiator group’s operating system is specified when the initiator group is created.

When an initiator group is created, the `protocol` property is used to restrict member initiators to Fibre Channel (*fcp*), iSCSI (*iscsi*), or both (*mixed*). Initiator groups within a nested hierarchy may not have conflicting protocols.

Zero or more initiators or nested initiator groups can be supplied when the initiator group is created. After creation, initiators can be added or removed from the initiator group using the `/protocols/san/igroups/{igroup.uuid}/initiators` endpoint. Initiator groups containing other initiator groups report the aggregated list of initiators from all nested initiator groups, but modifications of the initiator list must be performed on the initiator group that directly contains the initiators. See DELETE /protocols/san/igroups/{igroup.uuid}/initiators/{name} for more details.

Name	Type	Description
comment	string	A comment available for use by the administrator. Valid in POST and PATCH.
connectivity_tracking	connectivity_tracking	An overview of the connections to ONTAP by the initiators in this group. • readOnly: 1 • Introduced in: 9.11
delete_on_unmap	boolean	An option that causes the initiator group to be deleted when the last LUN map associated with it is deleted. Optional in POST and PATCH. This property defaults to *false* when the initiator group is created.
lun_maps	array[lun_maps]	All LUN maps with which the initiator is associated. If the requested igroup is part of a remote, non-local, MetroCluster SVM, the LUN maps are not retrieved. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
name	string	The name of the initiator group. Required in POST; optional in PATCH.
os_type	string	The host operating system of the initiator group. All initiators in the group should be hosts of the same operating system. Required in POST; optional in PATCH.
parent_igroups	array[igroup_parent]	The initiator groups that contain this initiator group as as member.
portset	portset	The portset to which the initiator group is bound. Binding the initiator group to a portset restricts the initiators of the group to accessing mapped LUNs only through network interfaces in the portset. Optional in POST and PATCH. PATCH `portset.name` to an empty string ("") to unbind a portset from the initiator group.
supports_igroups	boolean	An initiator group may contain either initiators or other initiator groups, but not both simultaneously. This property is *true* when initiator groups can be added to this initiator group. The `initiators.name` property cannot be used to determine this via a query because it reports initiators inherited from nested igroups.
target	target	Properties of the SCSI target to which the initiator group provides access.
uuid	string	The unique identifier of the initiator group.

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.

Manage iSCSI credentials

Protocols SAN iSCSI credentials endpoint overview

Overview

An iSCSI credentials object defines authentication credentials to be used between an initiator and ONTAP. It identifies an authentication type, user names, and passwords that must be used to authenticate a specific initiator.

The iSCSI credentials REST API allows you to create, update, delete, and discover iSCSI credentials.

How iSCSI authentication works

An iSCSI credentials object defines the authentication credentials to be used between an initiator and ONTAP. While establishing an iSCSI connection, the initiator sends a login request to ONTAP to begin an iSCSI session. ONTAP then either permits or denies the login request, or determines that a login is not required.

For an initiator, you can specify an authentication type, user names and passwords, and a whitelist of optional network addresses from which the initiator is allowed to connect.

iSCSI authentication methods

- Challenge-Handshake Authentication Protocol (CHAP) - The initiator logs in using a CHAP user name and password. There are two types of CHAP user names and passwords:
  - Inbound - ONTAP authenticates the initiator. Inbound settings are required if you are using CHAP authentication.
  - Outbound - These are optional credentials to enable the initiator to authenticate ONTAP. You can use credentials only if inbound credentials are also being used.
- deny - The initiator is denied access to ONTAP.
- none - ONTAP does not require authentication for the initiator. The CHAP inbound/outbound password can be any valid string or an even number of valid hexidecimal digits preceded by '0X' or '0x'.

Initiator address list

The initiator address list is a way to specify valid IP addresses from which the initiator is allowed to connect. If the list is specified and the source address of an iSCSI connection is not in the list, the connection is rejected.

Initiator addresses can be specified in either IPv4 or IPv6 format and in one of two forms:

- Range

```
{
  "start": "192.168.0.0",
  "end": "192.168.0.255"
}
```

- Mask

```
{
  "address": "192.168.0.0",
  "netmask": "24"
}
```

Initiator "default"

The default iSCSI authentication definition is created when the iSCSI service is created. An iSCSI credentials object with *default* as the initiator name identifies the default authentication for an SVM. The default credentials are used for any initiator that does not have specific iSCSI credentials. The default iSCSI authentication method is *none*, but can be changed to *deny* or *CHAP*. The default credentials object does not support an initiator address list.

Examples

Creating iSCSI credentials requiring no authentication

```
# The API:
POST /api/protocols/san/iscsi/credentials

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/iscsi/credentials' -H
'Accept: application/hal+json' -d '{ "svm": { "name": "svm1" },
"initiator": "iqn.1992-08.com.netapp:initiator1", "authentication_type":
"none" }'
```

Creating iSCSI credentials using CHAP inbound authentication

```
# The API:
POST /api/protocols/san/iscsi/credentials

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/iscsi/credentials' -H
'Accept: application/hal+json' -d '{ "svm": { "name": "svm1" },
"initiator": "iqn.1992-08.com.netapp:initiator2", "authentication_type":
"CHAP", "chap": { "inbound": { "user": "user1", "password": "password1" }
} }'
```

Retrieving all properties of all iSCSI credentials

The `fields` query parameter is used to request all iSCSI credentials properties.

Passwords are not included in the GET output.

```
# The API:
GET /api/protocols/san/iscsi/credentials

# The call:
curl -X GET 'https://<mgmt-
ip>/api/protocols/san/iscsi/credentials?fields=*' -H 'Accept:
application/hal+json'

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "19d04b8e-94d7-11e8-8370-005056b48fd2",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/19d04b8e-94d7-11e8-8370-005056b48fd2"
        }
      }
    },
    "initiator": "default",
    "authentication_type": "none",
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/credentials/19d04b8e-94d7-11e8-
8370-005056b48fd2/default"
      }
```

```
    }
  },
  {
    "svm": {
      "uuid": "19d04b8e-94d7-11e8-8370-005056b48fd2",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/19d04b8e-94d7-11e8-8370-005056b48fd2"
        }
      }
    },
    "initiator": "iqn.1992-08.com.netapp:initiator1",
    "authentication_type": "none",
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/credentials/19d04b8e-94d7-11e8-
8370-005056b48fd2/iqn.1992-08.com.netapp:initiator1"
      }
    }
  },
  {
    "svm": {
      "uuid": "19d04b8e-94d7-11e8-8370-005056b48fd2",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/19d04b8e-94d7-11e8-8370-005056b48fd2"
        }
      }
    },
    "initiator": "iqn.1992-08.com.netapp:initiator2",
    "authentication_type": "chap",
    "chap": {
      "inbound": {
        "user": "user1"
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/credentials/19d04b8e-94d7-11e8-
8370-005056b48fd2/iqn.1992-08.com.netapp:initiator2"
      }
    }
  },
  {
```

```
    "svm": {
      "uuid": "25f617cf-94d7-11e8-8370-005056b48fd2",
      "name": "svm2",
      "_links": {
        "self": {
          "href": "/api/svm/svms/25f617cf-94d7-11e8-8370-005056b48fd2"
        }
      }
    },
    "initiator": "default",
    "authentication_type": "none",
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/credentials/25f617cf-94d7-11e8-
8370-005056b48fd2/default"
      }
    }
  },
  {
    "svm": {
      "uuid": "25f617cf-94d7-11e8-8370-005056b48fd2",
      "name": "svm2",
      "_links": {
        "self": {
          "href": "/api/svm/svms/25f617cf-94d7-11e8-8370-005056b48fd2"
        }
      }
    },
    "initiator": "iqn.1992-08.com.netapp:initiator2",
    "authentication_type": "none",
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/credentials/25f617cf-94d7-11e8-
8370-005056b48fd2/iqn.1992-08.com.netapp:initiator2"
      }
    }
  },
  {
    "svm": {
      "uuid": "25f617cf-94d7-11e8-8370-005056b48fd2",
      "name": "svm2",
      "_links": {
        "self": {
          "href": "/api/svm/svms/25f617cf-94d7-11e8-8370-005056b48fd2"
        }
      }
```

```
    },
    "initiator": "iqn.1992-08.com.netapp:initiator3",
    "authentication_type": "deny",
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/credentials/25f617cf-94d7-11e8-
8370-005056b48fd2/iqn.1992-08.com.netapp:initiator3"
      }
    }
  }
],
"num_records": 6,
"_links": {
  "self": {
    "href": "/api/protocols/san/iscsi/credentials?fields=*"
  }
}
}
```

Retrieving specific iSCSI credentials

```
# The API:
GET /api/protocols/san/iscsi/credentials/{svm.uuid}/{initiator}

# The call:
curl -X GET 'https://<mgmt-
ip>/api/protocols/san/iscsi/credentials/25f617cf-94d7-11e8-8370-
005056b48fd2/iqn.1992-08.com.netapp:initiator2' -H 'Accept:
application/hal+json'

# The response:
{
"svm": {
  "uuid": "25f617cf-94d7-11e8-8370-005056b48fd2",
  "name": "svm2",
  "_links": {
    "self": {
      "href": "/api/svm/svms/25f617cf-94d7-11e8-8370-005056b48fd2"
    }
  }
},
"initiator": "iqn.1992-08.com.netapp:initiator2",
"authentication_type": "chap",
"chap": {
  "inbound": {
    "user": "user1"
  }
},
"_links": {
  "self": {
    "href": "/api/protocols/san/iscsi/credentials/25f617cf-94d7-11e8-8370-
005056b48fd2/iqn.1992-08.com.netapp:initiator2"
  }
}
}
```

Updating the authentication type of iSCSI credentials

```
# The API:
PATCH /api/protocols/san/iscsi/credentials/{svm.uuid}/{initiator}

# The call:
curl -X PATCH 'https://<mgmt-
ip>/api/protocols/san/iscsi/credentials/25f617cf-94d7-11e8-8370-
005056b48fd2/iqn.1992-08.com.netapp:initiator2' -H 'Accept:
application/hal+json' -d '{ "authentication_type": "chap", "chap": {
"inbound": { "user": "user1", "password": "password1" } } }'
```

Updating the initiator address list of iSCSI credentials

```
# The API:
PATCH /api/protocols/san/iscsi/credentials/{svm.uuid}/{initiator}

# The call:
curl -X PATCH 'https://<mgmt-
ip>/api/protocols/san/iscsi/credentials/25f617cf-94d7-11e8-8370-
005056b48fd2/iqn.1992-08.com.netapp:initiator2' -H 'Accept:
application/hal+json' -d '{ "initiator_address": { "ranges": [ { "start":
"192.168.0.0", "end": "192.168.255.255" } ] } }'
```

Deleting iSCSI credentials

```
# The API:
DELETE /api/protocols/san/iscsi/credentials/{svm.uuid}/{initiator}

# The call:
curl -X DELETE 'https://<mgmt-
ip>/api/protocols/san/iscsi/credentials/25f617cf-94d7-11e8-8370-
005056b48fd2/iqn.1992-08.com.netapp:initiator2' -H 'Accept:
application/hal+json'
```

Retrieve iSCSI credentials

GET `/protocols/san/iscsi/credentials`

Introduced In: 9.6

Retrieves iSCSI credentials.

Related ONTAP commands

- `vserver iscsi security show`

Learn more

- DOC /protocols/san/iscsi/credentials

Parameters

Name	Type	In	Required	Description
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
chap.outbound.user	string	query	False	Filter by chap.outbound.user • maxLength: 128 • minLength: 1
chap.inbound.user	string	query	False	Filter by chap.inbound.user • maxLength: 128 • minLength: 1
initiator_address.masks.address	string	query	False	Filter by initiator_address.masks.address
initiator_address.masks.family	string	query	False	Filter by initiator_address.masks.family
initiator_address.masks.netmask	string	query	False	Filter by initiator_address.masks.netmask
initiator_address.ranges.start	string	query	False	Filter by initiator_address.ranges.start
initiator_address.ranges.family	string	query	False	Filter by initiator_address.ranges.family

Name	Type	In	Required	Description
initiator_address.ranges.end	string	query	False	Filter by initiator_address.ranges.end
authentication_type	string	query	False	Filter by authentication_type
initiator	string	query	False	Filter by initiator
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. • 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. • 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	
num_records	integer	The number of records in the response.
records	array[iscsi_credentials]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "authentication_type": "string",
      "chap": {
        "inbound": {
          "user": "string"
        },
        "outbound": {
          "user": "string"
        }
      },
      "initiator": "iqn.1998-01.com.corp.iscsi:name1",
      "initiator_address": {
        "masks": [
          {
            "address": "10.10.10.7",
            "family": "string",
            "netmask": "24"
          }
        ],
        "ranges": [
          {
            "end": "10.10.10.7",
            "family": "string",
            "start": "10.10.10.7"
          }
        ]
      },
      "svm": {
```

```
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      }
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

inbound

Inbound CHAP credentials.

Name	Type	Description
user	string	The inbound CHAP user name. Optional in POST and PATCH.

outbound

Output CHAP credentials.

To clear previously set outbound CHAP credentials, set property `chap.outbound.user` to an empty string in PATCH.

Name	Type	Description
user	string	The outbound CHAP user name. Optional in POST and PATCH. To clear previously set outbound CHAP credentials, set this property to an empty string in PATCH.

chap

Challenge-Handshake Authentication Protocol (CHAP) credentials.

Name	Type	Description
inbound	inbound	Inbound CHAP credentials.
outbound	outbound	Output CHAP credentials. To clear previously set outbound CHAP credentials, set property `chap.outbound.user` to an empty string in PATCH.

ip_info

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address
family	string	IPv4 or IPv6
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, the default value is 64 with a valid range of 1 to 127. Output is always netmask length.

ip_address_range

IP address range

Name	Type	Description
end	string	IPv4 or IPv6 address
family	string	IPv4 or IPv6
start	string	IPv4 or IPv6 address

initiator_address

Initiator address ranges.

Name	Type	Description
masks	array[ip_info]	
ranges	array[ip_address_range]	

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

iscsi_credentials

Name	Type	Description
_links	_links	
authentication_type	string	The iSCSI authentication type. Required in POST; optional in PATCH.
chap	chap	Challenge-Handshake Authentication Protocol (CHAP) credentials.
initiator	string	The iSCSI initiator to which the credentials apply. Required in POST.
initiator_address	initiator_address	Initiator address ranges.
svm	svm	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments
code	string	Error code
message	string	Error message

Name	Type	Description
target	string	The target parameter that caused the error.

Create iSCSI credentials

POST `/protocols/san/iscsi/credentials`

Introduced In: 9.6

Creates iSCSI credentials.

Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the iSCSI credentials.
- `initiator` - Initiator for which the iSCSI credentials are to be created.
- `authentication_type` - Type of authentication to use for the credentials.

Recommended optional properties

- `chap.inbound.user` - In-bound CHAP authentication user name.
- `chap.inbound.password` - In-bound CHAP authentication password.
- `chap.outbound.user` - Out-bound CHAP authentication user name.
- `chap.outbound.password` - Out-bound CHAP authentication password.

Related ONTAP commands

- `vserver iscsi security create`

Learn more

- DOC /protocols/san/iscsi/credentials

Parameters

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
authentication_type	string	The iSCSI authentication type. Required in POST; optional in PATCH.
chap	chap	Challenge-Handshake Authentication Protocol (CHAP) credentials.
initiator	string	The iSCSI initiator to which the credentials apply. Required in POST.
initiator_address	initiator_address	Initiator address ranges.
svm	svm	

Example request


```
{
  "authentication_type": "string",
  "chap": {
    "inbound": {
      "password": "string",
      "user": "string"
    },
    "outbound": {
      "password": "string",
      "user": "string"
    }
  },
  "initiator": "iqn.1998-01.com.corp.iscsi:name1",
  "initiator_address": {
    "masks": [
      {
        "address": "10.10.10.7",
        "netmask": "24"
      }
    ],
    "ranges": [
      {
        "end": "10.10.10.7",
        "start": "10.10.10.7"
      }
    ]
  },
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  }
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.

Name	Type	Description
records	array[iscsi_credentials]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "authentication_type": "string",
      "chap": {
        "inbound": {
          "password": "string",
          "user": "string"
        },
        "outbound": {
          "password": "string",
          "user": "string"
        }
      },
      "initiator": "iqn.1998-01.com.corp.iscsi:name1",
      "initiator_address": {
        "masks": [
          {
            "address": "10.10.10.7",
            "netmask": "24"
          }
        ],
        "ranges": [
          {
            "end": "10.10.10.7",
            "start": "10.10.10.7"
          }
        ]
      },
      "svm": {
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      }
    }
  ]
}
```

Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.
2621706	Both the SVM UUID and SVM name were supplied, but they do not refer to the same SVM.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5373969	A non-empty qualifier is required after the prefix. An example of a valid IQN is *iqn.1995-08.com.example:string*.
5373970	The IQN prefix is invalid. The correct IQN prefix is *iqn*. An example of a valid IQN is *iqn.1995-08.com.example:string*.
5373971	The date field is invalid. A valid date field is *yyyy-mm*. An example of a valid IQN is *iqn.1995-08.com.example:string*.
5373972	The naming authority and string fields can contain only the characters *a-z*, *0-9*, ., *:*, and -.
5373977	The EUI-64 identifier field must be exactly 16 hexadecimal digits.
5373978	The EUI formatted initiator name supplied is invalid. A valid EUI format is *eui.XXXXXXXXXXXXXXXX*, where X is a hexadecimal digit.
5373997	The initiator name supplied in invalid. The valid initiator name formats are *iqn.1995-08.com.example:string* or *eui.0123456789abcdef*.
5374078	The iSCSI service does not exist.
5374142	An iSCSI security credential already exists for the specified initiator.
5374145	The iSCSI security password must contain an even number of valid hex digits.

Error Code	Description
5374147	The CHAP inbound and outbound passwords must be different.
5374149	The inbound user and password properties are required for CHAP authentication.
5374150	Outbound CHAP authentication requires an outbound password.
5374855	The value for property `initiator_address.ranges.start` is greater than the value for property `initiator_address.ranges.end`.
5374856	The value for property `initiator_address.ranges.start` does not belong to the same IP address family as the value for property `initiator_address.ranges.end`.
5374900	Setting the CHAP authentication properties are not supported with authentication types *none* or *deny*.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

inbound

Inbound CHAP credentials.

Name	Type	Description
password	string	The inbound CHAP password. Write-only; optional in POST and PATCH.
user	string	The inbound CHAP user name. Optional in POST and PATCH.

outbound

Output CHAP credentials.

To clear previously set outbound CHAP credentials, set property `chap.outbound.user` to an empty string in PATCH.

Name	Type	Description
password	string	The outbound CHAP password. Write-only; optional in POST and PATCH.
user	string	The outbound CHAP user name. Optional in POST and PATCH. To clear previously set outbound CHAP credentials, set this property to an empty string in PATCH.

chap

Challenge-Handshake Authentication Protocol (CHAP) credentials.

Name	Type	Description
inbound	inbound	Inbound CHAP credentials.

Name	Type	Description
outbound	outbound	Output CHAP credentials. To clear previously set outbound CHAP credentials, set property `chap.outbound.user` to an empty string in PATCH.

ip_info

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, the default value is 64 with a valid range of 1 to 127. Output is always netmask length.

ip_address_range

IP address range

Name	Type	Description
end	string	IPv4 or IPv6 address
start	string	IPv4 or IPv6 address

initiator_address

Initiator address ranges.

Name	Type	Description
masks	array[ip_info]	
ranges	array[ip_address_range]	

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

iscsi_credentials

Name	Type	Description
authentication_type	string	The iSCSI authentication type. Required in POST; optional in PATCH.
chap	chap	Challenge-Handshake Authentication Protocol (CHAP) credentials.
initiator	string	The iSCSI initiator to which the credentials apply. Required in POST.
initiator_address	initiator_address	Initiator address ranges.
svm	svm	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Delete iSCSI credentials

DELETE `/protocols/san/iscsi/credentials/{svm.uuid}/{initiator}`

Introduced In: 9.6

Deletes specified iSCSI credentials.

Related ONTAP commands

- `vserver iscsi security delete`

Learn more

- DOC /protocols/san/iscsi/credentials

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of an SVM.
initiator	string	path	True	The iSCSI initiator of the credentials object.

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.
2621706	Both the SVM UUID and SVM name were supplied, but they do not refer to the same SVM.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5374148	The default security credential cannot be deleted for an SVM.
5374895	The iSCSI security credential does not exist on the specified SVM.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve specific iSCSI credentials

GET `/protocols/san/iscsi/credentials/{svm.uuid}/{initiator}`

Introduced In: 9.6

Retrieves specified iSCSI credentials.

Related ONTAP commands

- `vserver iscsi security show`

Learn more

- DOC /protocols/san/iscsi/credentials

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of an SVM.
initiator	string	path	True	The iSCSI initiator of the credentials object.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
authentication_type	string	The iSCSI authentication type. Required in POST; optional in PATCH.
chap	chap	Challenge-Handshake Authentication Protocol (CHAP) credentials.
initiator	string	The iSCSI initiator to which the credentials apply. Required in POST.
initiator_address	initiator_address	Initiator address ranges.
svm	svm	

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "authentication_type": "string",
  "chap": {
    "inbound": {
      "user": "string"
    },
    "outbound": {
      "user": "string"
    }
  },
  "initiator": "iqn.1998-01.com.corp.iscsi:name1",
  "initiator_address": {
    "masks": [
      {
        "address": "10.10.10.7",
        "family": "string",
        "netmask": "24"
      }
    ],
    "ranges": [
      {
        "end": "10.10.10.7",
        "family": "string",
        "start": "10.10.10.7"
      }
    ]
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  }
}
```

Error

```
Status: Default, Error
```

Name	Type	Description
error	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
self	href	

inbound

Inbound CHAP credentials.

Name	Type	Description
user	string	The inbound CHAP user name. Optional in POST and PATCH.

outbound

Output CHAP credentials.

To clear previously set outbound CHAP credentials, set property `chap.outbound.user` to an empty string in PATCH.

Name	Type	Description
user	string	The outbound CHAP user name. Optional in POST and PATCH. To clear previously set outbound CHAP credentials, set this property to an empty string in PATCH.

chap

Challenge-Handshake Authentication Protocol (CHAP) credentials.

Name	Type	Description
inbound	inbound	Inbound CHAP credentials.

Name	Type	Description
outbound	outbound	Output CHAP credentials. To clear previously set outbound CHAP credentials, set property `chap.outbound.user` to an empty string in PATCH.

ip_info

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address
family	string	IPv4 or IPv6
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, the default value is 64 with a valid range of 1 to 127. Output is always netmask length.

ip_address_range

IP address range

Name	Type	Description
end	string	IPv4 or IPv6 address
family	string	IPv4 or IPv6
start	string	IPv4 or IPv6 address

initiator_address

Initiator address ranges.

Name	Type	Description
masks	array[ip_info]	
ranges	array[ip_address_range]	

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Update iSCSI credentials

PATCH `/protocols/san/iscsi/credentials/{svm.uuid}/{initiator}`

Introduced In: 9.6

Updates specified iSCSI credentials.

Related ONTAP commands

- `vserver iscsi security add-initiator-address-ranges`
- `vserver iscsi security default`
- `vserver iscsi security modify`
- `vserver iscsi security remove-initiator-address-ranges`

Learn more

- DOC /protocols/san/iscsi/credentials

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of an SVM.
initiator	string	path	True	The iSCSI initiator of the credentials object.
add_initiator_addresses	boolean	query	False	If *true*, the initiator addresses in the body merge into the existing addresses in the iSCSI security object rather than replace the existing addresses. • Default value:
remove_initiator_addresses	boolean	query	False	If *true*, the initiator addresses in the body are removed from the existing addresses in the iSCSI security object rather than replace the existing addresses. • Default value:

Request Body

Name	Type	Description
authentication_type	string	The iSCSI authentication type. Required in POST; optional in PATCH.
chap	chap	Challenge-Handshake Authentication Protocol (CHAP) credentials.
initiator_address	initiator_address	Initiator address ranges.

Name	Type	Description
svm	svm	

Example request


```
{
  "authentication_type": "string",
  "chap": {
    "inbound": {
      "password": "string",
      "user": "string"
    },
    "outbound": {
      "password": "string",
      "user": "string"
    }
  },
  "initiator_address": {
    "masks": [
      {
        "address": "10.10.10.7",
        "netmask": "24"
      }
    ],
    "ranges": [
      {
        "end": "10.10.10.7",
        "start": "10.10.10.7"
      }
    ]
  },
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  }
}
```


Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.
2621706	Both the SVM UUID and SVM name were supplied, but they do not refer to the same SVM.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5374145	The iSCSI security password must contain an even number of valid hex digits.
5374147	The CHAP inbound and outbound passwords must be different.
5374149	The inbound user and password properties are required for CHAP authentication.
5374150	Outbound CHAP authentication requires an outbound password.
5374155	The functionality is not supported for the default security credential.
5374855	The value for property `initiator_address.ranges.start` is greater than the value for property `initiator_address.ranges.end`.
5374856	The value for property `initiator_address.ranges.start` does not belong to the same IP address family as the value for property `initiator_address.ranges.end`.
5374895	The iSCSI security credential does not exist on the specified SVM.
5374900	Setting the CHAP authentication properties are not supported with authentication types *none* or *deny*.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

inbound

Inbound CHAP credentials.

Name	Type	Description
password	string	The inbound CHAP password. Write-only; optional in POST and PATCH.
user	string	The inbound CHAP user name. Optional in POST and PATCH.

outbound

Output CHAP credentials.

To clear previously set outbound CHAP credentials, set property `chap.outbound.user` to an empty string in PATCH.

Name	Type	Description
password	string	The outbound CHAP password. Write-only; optional in POST and PATCH.
user	string	The outbound CHAP user name. Optional in POST and PATCH. To clear previously set outbound CHAP credentials, set this property to an empty string in PATCH.

chap

Challenge-Handshake Authentication Protocol (CHAP) credentials.

Name	Type	Description
inbound	inbound	Inbound CHAP credentials.

Name	Type	Description
outbound	outbound	Output CHAP credentials. To clear previously set outbound CHAP credentials, set property `chap.outbound.user` to an empty string in PATCH.

ip_info

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, the default value is 64 with a valid range of 1 to 127. Output is always netmask length.

ip_address_range

IP address range

Name	Type	Description
end	string	IPv4 or IPv6 address
start	string	IPv4 or IPv6 address

initiator_address

Initiator address ranges.

Name	Type	Description
masks	array[ip_info]	
ranges	array[ip_address_range]	

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

iscsi_credentials

Name	Type	Description
authentication_type	string	The iSCSI authentication type. Required in POST; optional in PATCH.
chap	chap	Challenge-Handshake Authentication Protocol (CHAP) credentials.
initiator_address	initiator_address	Initiator address ranges.
svm	svm	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Manage iSCSI services

Protocols SAN iSCSI services endpoint overview

Overview

An iSCSI service defines the properties of the iSCSI target for an SVM. There can be at most one iSCSI service for an SVM. An SVM's iSCSI service must be created before iSCSI initiators can log in to the SVM.

The iSCSI service REST API allows you to create, update, delete, and discover iSCSI services for SVMs.

Performance monitoring

Performance of the SVM can be monitored by the `metric.*` and `statistics.*` properties. These show the performance of the SVM in terms of IOPS, latency and throughput. The `metric.*` properties denote an average whereas `statistics.*` properties denote a real-time monotonically increasing value aggregated across all nodes.

Examples

Creating an iSCSI service for an SVM

The simplest way to create an iSCSI service is to specify only the SVM, either by name or UUID. By default, the new iSCSI service is enabled and uses the SVM name as its target alias.

In this example, the `return_records` query parameter is used to retrieve the new iSCSI service object in the REST response.

```
# The API:
POST /api/protocols/san/iscsi/services

# The call:
curl -X POST 'https://<mgmt-
ip>/api/protocols/san/iscsi/services?return_records=true' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm1" } }'

# The response:
{
"num_records": 1,
"records": [
  {
    "svm": {
      "uuid": "19d04b8e-94d7-11e8-8370-005056b48fd2",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/19d04b8e-94d7-11e8-8370-005056b48fd2"
        }
      }
    },
    "enabled": true,
    "target": {
      "name": "iqn.1992-
08.com.netapp:sn.19d04b8e94d711e88370005056b48fd2:vs.4",
      "alias": "svm1"
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/services/19d04b8e-94d7-11e8-
8370-005056b48fd2"
      }
    }
  }
]
}
```

Retrieving the iSCSI services for all SVMs in the cluster

```
# The API:
GET /api/protocols/san/iscsi/services
```

```
# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/iscsi/services' -H
'Accept: application/hal+json'

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "19d04b8e-94d7-11e8-8370-005056b48fd2",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/19d04b8e-94d7-11e8-8370-005056b48fd2"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/services/19d04b8e-94d7-11e8-
8370-005056b48fd2"
      }
    }
  },
  {
    "svm": {
      "uuid": "25f617cf-94d7-11e8-8370-005056b48fd2",
      "name": "svm2",
      "_links": {
        "self": {
          "href": "/api/svm/svms/25f617cf-94d7-11e8-8370-005056b48fd2"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/services/25f617cf-94d7-11e8-
8370-005056b48fd2"
      }
    }
  }
],
"num_records": 2,
"_links": {
  "self": {
    "href": "/api/protocols/san/iscsi/services"
```

```
  }
}
}
```

Retrieving details for a specific iSCSI service

The iSCSI service is identified by the UUID of its SVM.

```
# The API:
GET /api/protocols/san/iscsi/services/{svm.uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/iscsi/services/19d04b8e-
94d7-11e8-8370-005056b48fd2' -H 'Accept: application/hal+json'

# The response:
{
"svm": {
  "uuid": "19d04b8e-94d7-11e8-8370-005056b48fd2",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/19d04b8e-94d7-11e8-8370-005056b48fd2"
    }
  }
},
"enabled": true,
"target": {
  "name": "iqn.1992-
08.com.netapp:sn.19d04b8e94d711e88370005056b48fd2:vs.4",
  "alias": "svm1"
},
"_links": {
  "self": {
    "href": "/api/protocols/san/iscsi/services/19d04b8e-94d7-11e8-8370-
005056b48fd2"
  }
}
}
```

Disabling an iSCSI service

Disabling an iSCSI service shuts down all active iSCSI sessions for the SVM and prevents the creation of new iSCSI sessions.

The iSCSI service to update is identified by the UUID of its SVM.

```
# The API:
PATCH /api/protocols/san/iscsi/services/{svm.uuid}

# The call:
curl -X PATCH 'https://<mgmt-
ip>/api/protocols/san/iscsi/services/19d04b8e-94d7-11e8-8370-005056b48fd2'
-H 'Accept: application/hal+json' -d '{ "enabled": "false" }'
```

You can retrieve the iSCSI service to confirm the change.

In this example, the `fields` query parameter is used to limit the response to the `enabled` property and iSCSI service identifiers.

```
# The API:
GET /api/protocols/san/iscsi/services/{svm.uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/iscsi/services/19d04b8e-
94d7-11e8-8370-005056b48fd2?fields=enabled' -H 'Accept:
application/hal+json'

# The response:
{
"svm": {
  "uuid": "19d04b8e-94d7-11e8-8370-005056b48fd2",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/19d04b8e-94d7-11e8-8370-005056b48fd2"
    }
  }
},
"enabled": false,
"_links": {
  "self": {
    "href": "/api/protocols/san/iscsi/services/19d04b8e-94d7-11e8-8370-
005056b48fd2"
  }
}
}
```

Deleting an iSCSI service

The iSCSI service must be disabled before it can be deleted.

The iSCSI service to be deleted is identified by the UUID of its SVM.

```
# The API:
DELETE /api/protocols/san/iscsi/services/{svm.uuid}

# The call:
curl -X DELETE 'https://<mgmt-
ip>/api/protocols/san/iscsi/services/19d04b8e-94d7-11e8-8370-005056b48fd2'
-H 'Accept: application/hal+json'
```

Retrieve iSCSI services

GET `/protocols/san/iscsi/services`

Introduced In: 9.6

Retrieves iSCSI services.

Expensive properties

There is an added computational cost to retrieving values for these properties. They are not included by default in GET results and must be explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

- `statistics.*`
- `metric.*`

Related ONTAP commands

- `vserver iscsi show`

Learn more

- DOC /protocols/san/iscsi/services

Parameters

Name	Type	In	Required	Description
target.name	string	query	False	Filter by target.name • maxLength: 128 • minLength: 1
target.alias	string	query	False	Filter by target.alias • maxLength: 128 • minLength: 1
metric.latency.total	integer	query	False	Filter by metric.latency.total • Introduced in: 9.7
metric.latency.read	integer	query	False	Filter by metric.latency.read • Introduced in: 9.7

Name	Type	In	Required	Description
metric.latency.write	integer	query	False	Filter by metric.latency.write • Introduced in: 9.7
metric.latency.other	integer	query	False	Filter by metric.latency.other • Introduced in: 9.7
metric.duration	string	query	False	Filter by metric.duration • Introduced in: 9.7
metric.throughput.read	integer	query	False	Filter by metric.throughput.read • Introduced in: 9.7
metric.throughput.total	integer	query	False	Filter by metric.throughput.total • Introduced in: 9.7
metric.throughput.write	integer	query	False	Filter by metric.throughput.write • Introduced in: 9.7
metric.status	string	query	False	Filter by metric.status • Introduced in: 9.7

Name	Type	In	Required	Description
metric.iops.total	integer	query	False	Filter by metric.iops.total • Introduced in: 9.7
metric.iops.read	integer	query	False	Filter by metric.iops.read • Introduced in: 9.7
metric.iops.write	integer	query	False	Filter by metric.iops.write • Introduced in: 9.7
metric.iops.other	integer	query	False	Filter by metric.iops.other • Introduced in: 9.7
metric.timestamp	string	query	False	Filter by metric.timestamp • Introduced in: 9.7
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
statistics.throughput_raw.read	integer	query	False	Filter by statistics.throughput_raw.read • Introduced in: 9.7
statistics.throughput_raw.total	integer	query	False	Filter by statistics.throughput_raw.total • Introduced in: 9.7

Name	Type	In	Required	Description
statistics.throughput_raw.write	integer	query	False	Filter by statistics.throughput_raw.write • Introduced in: 9.7
statistics.latency_raw.total	integer	query	False	Filter by statistics.latency_raw.total • Introduced in: 9.7
statistics.latency_raw.read	integer	query	False	Filter by statistics.latency_raw.read • Introduced in: 9.7
statistics.latency_raw.write	integer	query	False	Filter by statistics.latency_raw.write • Introduced in: 9.7
statistics.latency_raw.other	integer	query	False	Filter by statistics.latency_raw.other • Introduced in: 9.7
statistics.iops_raw.total	integer	query	False	Filter by statistics.iops_raw.total • Introduced in: 9.7
statistics.iops_raw.read	integer	query	False	Filter by statistics.iops_raw.read • Introduced in: 9.7

Name	Type	In	Required	Description
statistics.iops_raw.write	integer	query	False	Filter by statistics.iops_raw.write • Introduced in: 9.7
statistics.iops_raw.other	integer	query	False	Filter by statistics.iops_raw.other • Introduced in: 9.7
statistics.timestamp	string	query	False	Filter by statistics.timestamp • Introduced in: 9.7
statistics.status	string	query	False	Filter by statistics.status • Introduced in: 9.7
enabled	boolean	query	False	Filter by enabled
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. • Default value: 1

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. • 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	
num_records	integer	The number of records in the response.
records	array[iscsi_service]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "metric": {
        "_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": "2017-01-25T11:20:13Z"
      },
      "statistics": {
        "iops_raw": {
```

```
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "latency_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "status": "ok",
        "throughput_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "timestamp": "2017-01-25T11:20:13Z"
      },
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "target": {
        "alias": "svm1",
        "name": "iqn.1992-
08.com.netapp:sn.574caf71890911e8a6b7005056b4ea79:vs.2"
      }
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

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	Peformance 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	Peformance metric for write I/O operations.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

metric

Name	Type	Description
_links	_links	
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.

Name	Type	Description
latency	latency	The round trip latency in microseconds observed at the storage object.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.

iops_raw

The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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_raw	throughput_raw	Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Name	Type	Description
alias	string	The iSCSI target alias of the iSCSI service. The target alias can contain one (1) to 128 characters and feature any printable character except space (" "). A PATCH request with an empty alias ("") clears the alias. Optional in POST and PATCH. In POST, this defaults to the name of the SVM.
name	string	The iSCSI target name of the iSCSI service. This is generated for the SVM during POST. If required, the target name can be modified using the ONTAP command line. • example: iqn.1992-08.com.netapp:sn.574caf71890911e8a6b7005056b4ea79:vs.2 • maxLength: 128 • minLength: 1 • readOnly: 1 • Introduced in: 9.6

iscsi_service

An iSCSI service defines the properties of the iSCSI target for an SVM. There can be at most one iSCSI service for an SVM. An SVM's iSCSI service must be created before iSCSI initiators can log in to the SVM.

An iSCSI service is identified by the UUID of its SVM.

Name	Type	Description
_links	_links	
enabled	boolean	The administrative state of the iSCSI service. The iSCSI service can be disabled to block all iSCSI connectivity to the SVM. Optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	
svm	svm	
target	target	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Create an iSCSI service

POST `/protocols/san/iscsi/services`

Introduced In: 9.6

Creates an iSCSI service.

Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the iSCSI service.

Related ONTAP commands

- `vserver iscsi create`

Learn more

- DOC /protocols/san/iscsi/services

Parameters

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
enabled	boolean	The administrative state of the iSCSI service. The iSCSI service can be disabled to block all iSCSI connectivity to the SVM. Optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	
svm	svm	
target	target	

Example request


```
{
  "metric": {
    "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": "2017-01-25T11:20:13Z"
  },
  "statistics": {
    "iops_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "latency_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "status": "ok",
    "throughput_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "timestamp": "2017-01-25T11:20:13Z"
  },
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
```

```
  "target": {
    "alias": "svm1",
    "name": "iqn.1992-
08.com.netapp:sn.574caf71890911e8a6b7005056b4ea79:vs.2"
  }
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[iscsi_service]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "metric": {
        "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": "2017-01-25T11:20:13Z"
      },
      "statistics": {
        "iops_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "latency_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "status": "ok",
        "throughput_raw": {
          "read": 200,
          "total": 1000,
          "write": 100
        },
        "timestamp": "2017-01-25T11:20:13Z"
      },
      "svm": {
```

```
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "target": {
        "alias": "svm1",
        "name": "iqn.1992-
08.com.netapp:sn.574caf71890911e8a6b7005056b4ea79:vs.2"
      }
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1115127	The cluster lacks a valid iSCSI license.
2621462	The supplied SVM does not exist.
2621507	The iSCSI protocol is not allowed for the specified SVM.
2621706	The specified `svm.uuid` and `svm.name` do not refer to the same SVM.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5373966	An iSCSI service cannot be created in an SVM that is configured for NVMe.
5374077	An iSCSI service already exists for the specified SVM.
5374893	The SVM is stopped. The SVM must be running to create an iSCSI service.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

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	Peformance 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.

Name	Type	Description
write	integer	Peformance metric for write I/O operations.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

metric

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.

Name	Type	Description
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.

iops_raw

The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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_raw	throughput_raw	Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Name	Type	Description
alias	string	The iSCSI target alias of the iSCSI service. The target alias can contain one (1) to 128 characters and feature any printable character except space (" "). A PATCH request with an empty alias ("") clears the alias. Optional in POST and PATCH. In POST, this defaults to the name of the SVM.
name	string	The iSCSI target name of the iSCSI service. This is generated for the SVM during POST. If required, the target name can be modified using the ONTAP command line. • example: iqn.1992-08.com.netapp:sn.574caf71890911e8a6b7005056b4ea79:vs.2 • maxLength: 128 • minLength: 1 • readOnly: 1 • Introduced in: 9.6

iscsi_service

An iSCSI service defines the properties of the iSCSI target for an SVM. There can be at most one iSCSI service for an SVM. An SVM's iSCSI service must be created before iSCSI initiators can log in to the SVM.

An iSCSI service is identified by the UUID of its SVM.

Name	Type	Description
enabled	boolean	The administrative state of the iSCSI service. The iSCSI service can be disabled to block all iSCSI connectivity to the SVM. Optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	
svm	svm	
target	target	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Delete an iSCSI service

DELETE `/protocols/san/iscsi/services/{svm.uuid}`

Introduced In: 9.6

Deletes an iSCSI service. An iSCSI service must be disabled before it can be deleted.

Related ONTAP commands

- `vserver iscsi delete`

Learn more

- DOC /protocols/san/iscsi/services

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of the SVM for which to delete the iSCSI service.

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.
5373960	The iSCSI service is enabled. The iSCSI service must be disabled before it can be deleted.
5374078	The SVM does not have an iSCSI service.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve an iSCSI service

GET `/protocols/san/iscsi/services/{svm.uuid}`

Introduced In: 9.6

Retrieves an iSCSI service.

Related ONTAP commands

- `vserver iscsi show`

Learn more

- DOC /protocols/san/iscsi/services

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of the SVM for which to retrieve the iSCSI service.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
enabled	boolean	The administrative state of the iSCSI service. The iSCSI service can be disabled to block all iSCSI connectivity to the SVM. Optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	
svm	svm	
target	target	

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "metric": {
    "_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": "2017-01-25T11:20:13Z"
  },
  "statistics": {
    "iops_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "latency_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "status": "ok",
    "throughput_raw": {
```

```
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "timestamp": "2017-01-25T11:20:13Z"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "target": {
    "alias": "svm1",
    "name": "iqn.1992-
08.com.netapp:sn.574caf71890911e8a6b7005056b4ea79:vs.2"
  }
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.
5374078	The SVM does not have an iSCSI service.

Name	Type	Description
error	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
self	href	

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	Peformance 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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

metric

Name	Type	Description
_links	_links	
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.

Name	Type	Description
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.

iops_raw

The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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_raw	throughput_raw	Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Name	Type	Description
alias	string	The iSCSI target alias of the iSCSI service. The target alias can contain one (1) to 128 characters and feature any printable character except space (" "). A PATCH request with an empty alias ("") clears the alias. Optional in POST and PATCH. In POST, this defaults to the name of the SVM.
name	string	The iSCSI target name of the iSCSI service. This is generated for the SVM during POST. If required, the target name can be modified using the ONTAP command line. • example: iqn.1992-08.com.netapp:sn.574caf71890911e8a6b7005056b4ea79:vs.2 • maxLength: 128 • minLength: 1 • readOnly: 1 • Introduced in: 9.6

error_arguments

Name	Type	Description
code	string	Argument code

Name	Type	Description
message	string	Message argument

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.

Update an iSCSI service

PATCH `/protocols/san/iscsi/services/{svm.uuid}`

Introduced In: 9.6

Updates an iSCSI service.

Related ONTAP commands

- `vserver iscsi modify`
- `vserver iscsi start`
- `vserver iscsi stop`

Learn more

- DOC /protocols/san/iscsi/services

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of the SVM for which to update the iSCSI service.

Request Body

Name	Type	Description
enabled	boolean	The administrative state of the iSCSI service. The iSCSI service can be disabled to block all iSCSI connectivity to the SVM. Optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	
svm	svm	
target	target	

Example request


```
{
  "metric": {
    "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": "2017-01-25T11:20:13Z"
  },
  "statistics": {
    "iops_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "latency_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "status": "ok",
    "throughput_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "timestamp": "2017-01-25T11:20:13Z"
  },
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
```

```
  "target": {
    "alias": "svm1",
    "name": "iqn.1992-
08.com.netapp:sn.574caf71890911e8a6b7005056b4ea79:vs.2"
  }
}
```

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.
5374078	The SVM does not have an iSCSI service.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

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	Peformance 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.

Name	Type	Description
write	integer	Peformance metric for write I/O operations.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

metric

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.

Name	Type	Description
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.

iops_raw

The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This should be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This should be divided by the raw IOPS value to calculate the average latency per I/O operation.
status	string	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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_raw	throughput_raw	Throughput bytes observed at the storage object. This should be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

target

Name	Type	Description
alias	string	The iSCSI target alias of the iSCSI service. The target alias can contain one (1) to 128 characters and feature any printable character except space (" "). A PATCH request with an empty alias ("") clears the alias. Optional in POST and PATCH. In POST, this defaults to the name of the SVM.
name	string	The iSCSI target name of the iSCSI service. This is generated for the SVM during POST. If required, the target name can be modified using the ONTAP command line. • example: iqn.1992-08.com.netapp:sn.574caf71890911e8a6b7005056b4ea79:vs.2 • maxLength: 128 • minLength: 1 • readOnly: 1 • Introduced in: 9.6

iscsi_service

An iSCSI service defines the properties of the iSCSI target for an SVM. There can be at most one iSCSI service for an SVM. An SVM's iSCSI service must be created before iSCSI initiators can log in to the SVM.

An iSCSI service is identified by the UUID of its SVM.

Name	Type	Description
enabled	boolean	The administrative state of the iSCSI service. The iSCSI service can be disabled to block all iSCSI connectivity to the SVM. Optional in POST and PATCH. The default setting is *true* (enabled) in POST.
metric	metric	
statistics	statistics	
svm	svm	
target	target	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve historical performance metrics for the iSCSI protocol of an SVM

GET `/protocols/san/iscsi/services/{svm.uuid}/metrics`

Introduced In: 9.7

Retrieves historical performance metrics for the iSCSI protocol of an SVM.

Parameters

Name	Type	In	Required	Description
timestamp	string	query	False	Filter by timestamp
latency.total	integer	query	False	Filter by latency.total
latency.read	integer	query	False	Filter by latency.read
latency.write	integer	query	False	Filter by latency.write
latency.other	integer	query	False	Filter by latency.other
throughput.read	integer	query	False	Filter by throughput.read
throughput.total	integer	query	False	Filter by throughput.total
throughput.write	integer	query	False	Filter by throughput.write
status	string	query	False	Filter by status
iops.total	integer	query	False	Filter by iops.total
iops.read	integer	query	False	Filter by iops.read
iops.write	integer	query	False	Filter by iops.write
iops.other	integer	query	False	Filter by iops.other
duration	string	query	False	Filter by duration
svm.uuid	string	path	True	The unique identifier of the SVM.

Name	Type	In	Required	Description
interval	string	query	False	The time range for the data. Examples can be 1h, 1d, 1m, 1w, 1y. The period for each time range is as follows: • 1h: Metrics over the most recent hour sampled over 15 seconds. • 1d: Metrics over the most recent day sampled over 5 minutes. • 1w: Metrics over the most recent week sampled over 30 minutes. • 1m: Metrics over the most recent month sampled over 2 hours. • 1y: Metrics over the most recent year sampled over a day. • Default value: 1 • enum: ["1h", "1d", "1w", "1m", "1y"]

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. • Default value: 1 • Max value: 120 • Min value: 0
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	_links	
num_records	integer	Number of records
records	array[records]	

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",
      "svm": {
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "throughput": {
        "read": 200,
        "total": 1000,
        "write": 100
      },
      "timestamp": "2017-01-25T11:20:13Z"
    }
  ]
}
```

Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

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	Peformance 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	Peformance metric for write I/O operations.

svm

Name	Type	Description
uuid	string	The unique identifier of the SVM.

throughput

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

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

records

Performance numbers, such as IOPS latency and throughput, for SVM protocols.

Name	Type	Description
_links	_links	

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	Any errors associated with the sample. For example, if the aggregation of data over multiple nodes fails then any of the partial errors might be returned, "ok" on success, or "error" on any 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.
svm	svm	
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

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.

View iSCSI sessions

Protocols SAN iSCSI sessions endpoint overview

Overview

An iSCSI session is one or more TCP connections that link an iSCSI initiator with an iSCSI target. TCP connections can be added and removed from an iSCSI session by the iSCSI initiator. Across all TCP connections within an iSCSI session, an initiator sees one and the same target. After the connection is established, iSCSI control, data, and status messages are communicated over the session.

The iSCSI sessions REST API provides information about iSCSI initiators that have successfully logged in to ONTAP.

Examples

Retrieving all iSCSI sessions

```
# The API:
GET /api/protocols/san/iscsi/sessions

# The call:
curl -X GET "https://<mgmt-ip>/api/protocols/san/iscsi/sessions" -H
"Accept: application/hal+json"

# The response:
{
"records": [
```

```
  {
    "svm": {
      "uuid": "a009a9e7-4081-b576-7575-ada21efcaf16",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/a009a9e7-4081-b576-7575-ada21efcaf16"
        }
      }
    },
    "target_portal_group": "iscsi_lif1",
    "tsih": 10,
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/sessions/a009a9e7-4081-b576-
7575-ada21efcaf16/iscsi_lif1/10"
      }
    }
  },
  {
    "svm": {
      "uuid": "b009a9e7-4081-b576-7575-ada21efcaf16",
      "name": "svm2",
      "_links": {
        "self": {
          "href": "/api/svm/svms/b009a9e7-4081-b576-7575-ada21efcaf16"
        }
      }
    },
    "target_portal_group": "iscsi_lif2",
    "tsih": 11,
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/sessions/b009a9e7-4081-b576-
7575-ada21efcaf16/iscsi_lif2/11"
      }
    }
  }
],
"num_records": 2,
"_links": {
  "self": {
    "href": "/api/protocols/san/iscsi/sessions"
  }
}
}
```

Retrieving all of the iSCSI sessions under the target portal group *iscsi_lif1*

The `tpgroup` query parameter is used to perform the query.

```
# The API:
GET /api/protocols/san/iscsi/sessions

# The call:
curl -X GET "https://<mgmt-
ip>/api/protocols/san/iscsi/sessions?tpgroup=iscsi_lif1" -H "Accept:
application/hal+json"

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "a009a9e7-4081-b576-7575-ada21efcaf16",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/a009a9e7-4081-b576-7575-ada21efcaf16"
        }
      }
    },
    "target_portal_group": "iscsi_lif1",
    "tsih": 10,
    "_links": {
      "self": {
        "href": "/api/protocols/san/iscsi/sessions/a009a9e7-4081-b576-
7575-ada21efcaf16/iscsi_lif1/10"
      }
    }
  }
],
"num_records": 1,
"_links": {
  "self": {
    "href": "/api/protocols/san/iscsi/sessions"
  }
}
}
```

Retrieving an iSCSI session

```
# The API:
GET
/api/protocols/san/iscsi/sessions/{svm.uuid}/{target_portal_group}/{tsih}

# The call:
curl -X GET "https://<mgmt-ip>/api/protocols/san/iscsi/sessions/a009a9e7-
4081-b576-7575-ada21efcaf16/iscsi_lif1/10" -H "Accept:
application/hal+json"

# The response:
{
"svm": {
  "uuid": "a009a9e7-4081-b576-7575-ada21efcaf16",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/a009a9e7-4081-b576-7575-ada21efcaf16"
    }
  }
},
"target_portal_group": "iscsi_lif1",
"tsih": 10,
"initiator": {
  "name": "iqn.1994-05.com.example:string",
  "comment": "Example information about this initiator"
},
"isid": "61:62:63:64:65:00",
"target_portal_group_tag": 1027,
"connections": [
  {
    "cid": 1,
    "authentication_type": "chap",
    "initiator_address": {
      "address": "10.224.123.85",
      "port": 43827
    },
    "interface": {
      "name": "iscsi_lif1",
      "uuid": "c15439b4-dbb4-11e8-90ac-005056bba882",
      "ip": {
        "address": "192.168.0.1",
        "port": 3260
      },
      "_links": {
```

```
        "self": {
          "href": "/api/network/ip/interfaces/c15439b4-dbb4-11e8-90ac-
005056bba882"
        }
      }
    }
  }
],
"igroups": [
  {
    "uuid": "af7838cd-f993-4faf-90b7-5524787ae1e8",
    "name": "igroup1",
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/af7838cd-f993-4faf-90b7-
5524787ae1e8"
      }
    }
  },
  {
    "uuid": "bf7838cd-f993-4faf-90b7-5524787ae1e8",
    "name": "igroup2",
    "_links": {
      "self": {
        "href": "/api/protocols/san/igroups/bf7838cd-f993-4faf-90b7-
5524787ae1e8"
      }
    }
  }
],
"_links": {
  "self": {
    "href": "/api/protocols/san/iscsi/sessions/a009a9e7-4081-b576-7575-
ada21efcaf16/iscsi_lif1/10"
  }
}
}
```

Retrieve iSCSI sessions

GET `/protocols/san/iscsi/sessions`

Introduced In: 9.6

Retrieves iSCSI sessions.

Related ONTAP commands

- `vserver iscsi connection show`
- `vserver iscsi session parameter show`
- `vserver iscsi session show`

Learn more

- DOC /protocols/san/iscsi/sessions

Parameters

Name	Type	In	Required	Description
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
target_portal_group	string	query	False	Filter by target_portal_group
tsih	integer	query	False	Filter by tsih
target_portal_group_tag	integer	query	False	Filter by target_portal_group_tag
connections.initiator_address.address	string	query	False	Filter by connections.initiator_address.address
connections.initiator_address.port	integer	query	False	Filter by connections.initiator_address.port
connections.interface.uuid	string	query	False	Filter by connections.interface.uuid
connections.interface.name	string	query	False	Filter by connections.interface.name

Name	Type	In	Required	Description
connections.interface.ip.port	integer	query	False	Filter by connections.interface.ip.port • Max value: 65536 • Min value: 1
connections.interface.ip.address	string	query	False	Filter by connections.interface.ip.address
connections.authentication_type	string	query	False	Filter by connections.authentication_type
connections.cid	integer	query	False	Filter by connections.cid
igroups.name	string	query	False	Filter by igroups.name • maxLength: 96 • minLength: 1
igroups.uuid	string	query	False	Filter by igroups.uuid
initiator.alias	string	query	False	Filter by initiator.alias
initiator.name	string	query	False	Filter by initiator.name
initiator.comment	string	query	False	Filter by initiator.comment • Introduced in: 9.9
isid	string	query	False	Filter by isid
fields	array[string]	query	False	Specify the fields to return.

Name	Type	In	Required	Description
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. • 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. • Max value: 120 • Min value: 0 • Default value: 1
order_by	array[string]	query	False	Order results by specified fields and optional [asc

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
num_records	integer	The number of records in the response.
records	array[iscsi_session]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "connections": [
        {
          "_links": {
            "next": {
              "href": "/api/resourcelink"
            },
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "authentication_type": "string",
          "cid": 0,
          "initiator_address": {
            "address": "10.10.10.7",
            "port": 55432
          },
          "interface": {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "ip": {
              "address": "10.10.10.7",
              "port": 3260
            },
            "name": "lif1",
```

```
            "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
          }
        }
      ],
      "igroups": [
        {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "initiator": {
        "alias": "initiator_alias1",
        "comment": "This is an iSCSI initiator for host 5",
        "name": "iqn.1992-01.example.com:string"
      },
      "isid": "61:62:63:64:65:00",
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "target_portal_group": "tpgroup1",
      "target_portal_group_tag": 0,
      "tsih": 0
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

initiator_address

The TCP socket information for the initiator end of the connection. This is useful for network packet debugging.

Name	Type	Description
address	string	The TCP IPv4 or IPv6 address of the initiator end of the iSCSI connection.
port	integer	The TCP port number of the initiator end of the iSCSI connection.

ip

The IP information. ONTAP only supports port 3260.

Name	Type	Description
address	string	IPv4 or IPv6 address
port	integer	The TCP port number of the iSCSI access endpoint.

interface

The network interface information for the target end of the connection.

Name	Type	Description
_links	_links	
ip	ip	The IP information. ONTAP only supports port 3260. • readOnly: 1 • Introduced in: 9.6
name	string	The name of the interface.
uuid	string	The UUID that uniquely identifies the interface.

iscsi_connection

An active iSCSI connection.

Name	Type	Description
_links	_links	
authentication_type	string	The iSCSI authentication type used to establish the connection.
cid	integer	The identifier of the connection within the session.
initiator_address	initiator_address	The TCP socket information for the initiator end of the connection. This is useful for network packet debugging.
interface	interface	The network interface information for the target end of the connection.

igroups

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

initiator

The initiator that created the session.

Name	Type	Description
alias	string	The initiator alias.
comment	string	A comment available for use by the administrator. This is modifiable from the initiator REST endpoint directly. See PATCH /protocols/san/igroups/{igroup.uuid}/initiators/{name} .
name	string	The world wide unique name of the initiator.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

iscsi_session

An iSCSI session is one or more TCP connections that link an iSCSI initiator with an iSCSI target. TCP connections can be added and removed from an iSCSI session by the iSCSI initiator. Across all TCP connections within an iSCSI session, an initiator sees one and the same target. After the connection is established, iSCSI control, data, and status messages are communicated over the session.

Name	Type	Description
_links	_links	
connections	array[iscsi_connection]	The iSCSI connections that make up the iSCSI session.
igroups	array[igroups]	The initiator groups in which the initiator is a member.
initiator	initiator	The initiator that created the session.
isid	string	The initiator portion of the session identifier specified by the initiator during login.
svm	svm	

Name	Type	Description
target_portal_group	string	The target portal group to which the session belongs.
target_portal_group_tag	integer	The target portal group tag of the session.
tsih	integer	The target session identifier handle (TSIH) of the session.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve an iSCSI session

GET `/protocols/san/iscsi/sessions/{svm.uuid}/{tpgroup}/{tsih}`

Introduced In: 9.6

Retrieves an iSCSI session.

Related ONTAP commands

- `vserver iscsi connection show`
- `vserver iscsi session parameter show`
- `vserver iscsi session show`

Learn more

- DOC /protocols/san/iscsi/sessions

Parameters

Name	Type	In	Required	Description
svm.uuid	string	path	True	The unique identifier of the SVM of the iSCSI session.
tpgroup	string	path	True	The target portal group of the iSCSI session.
tsih	integer	path	True	The target session identifying handle.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
connections	array[iscsi_connection]	The iSCSI connections that make up the iSCSI session.
igroups	array[igroups]	The initiator groups in which the initiator is a member.
initiator	initiator	The initiator that created the session.
isid	string	The initiator portion of the session identifier specified by the initiator during login.
svm	svm	
target_portal_group	string	The target portal group to which the session belongs.

Name	Type	Description
target_portal_group_tag	integer	The target portal group tag of the session.
tsih	integer	The target session identifier handle (TSIH) of the session.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "connections": [
    {
      "_links": {
        "next": {
          "href": "/api/resourcelink"
        },
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "authentication_type": "string",
      "cid": 0,
      "initiator_address": {
        "address": "10.10.10.7",
        "port": 55432
      },
      "interface": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "ip": {
          "address": "10.10.10.7",
          "port": 3260
        },
        "name": "lif1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      }
    }
  ],
  "igroups": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
```

```
      "name": "igroup1",
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "initiator": {
    "alias": "initiator_alias1",
    "comment": "This is an iSCSI initiator for host 5",
    "name": "iqn.1992-01.example.com:string"
  },
  "isid": "61:62:63:64:65:00",
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "target_portal_group": "tpgroup1",
  "target_portal_group_tag": 0,
  "tsih": 0
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	An SVM with the specified UUID does not exist.

Name	Type	Description
error	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
self	href	

_links

Name	Type	Description
next	href	
self	href	

initiator_address

The TCP socket information for the initiator end of the connection. This is useful for network packet debugging.

Name	Type	Description
address	string	The TCP IPv4 or IPv6 address of the initiator end of the iSCSI connection.
port	integer	The TCP port number of the initiator end of the iSCSI connection.

ip

The IP information. ONTAP only supports port 3260.

Name	Type	Description
address	string	IPv4 or IPv6 address
port	integer	The TCP port number of the iSCSI access endpoint.

interface

The network interface information for the target end of the connection.

Name	Type	Description
_links	_links	
ip	ip	The IP information. ONTAP only supports port 3260. • readOnly: 1 • Introduced in: 9.6
name	string	The name of the interface.
uuid	string	The UUID that uniquely identifies the interface.

iscsi_connection

An active iSCSI connection.

Name	Type	Description
_links	_links	
authentication_type	string	The iSCSI authentication type used to establish the connection.
cid	integer	The identifier of the connection within the session.
initiator_address	initiator_address	The TCP socket information for the initiator end of the connection. This is useful for network packet debugging.
interface	interface	The network interface information for the target end of the connection.

igroups

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

initiator

The initiator that created the session.

Name	Type	Description
alias	string	The initiator alias.
comment	string	A comment available for use by the administrator. This is modifiable from the initiator REST endpoint directly. See PATCH /protocols/san/igroups/{igroup.uuid}/initiators/{name} .
name	string	The world wide unique name of the initiator.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Manage SAN LUN maps

Protocols SAN lun-maps endpoint overview

Overview

A LUN map is an association between a LUN and an initiator group. When a LUN is mapped to an initiator group, the initiator group's initiators are granted access to the LUN. The relationship between an initiator group and a LUN is many initiator groups to many LUNs.

A LUN map also configures the cluster nodes from which network paths to the LUN are advertised via the SAN protocols as part of the Selective LUN Map (SLM) functionality of ONTAP. These nodes are referred to as the reporting nodes of a LUN map. For further information, see DOC /protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes .

The LUN map REST API allows you to create, delete, and discover LUN maps, and manage the reporting nodes of a LUN map.

Examples

Creating a LUN map

```
# The API:
POST /api/protocols/san/lun-maps

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/lun-maps' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm1" }, "igroup": { "name":
"igroup1" }, "lun": { "name": "/vol/vol1/lun1" } }'
```

Retrieving all of the LUN maps

```
# The API:
GET /api/protocols/san/lun-maps

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/lun-maps' -H 'Accept:
application/hal+json'

# The response:
{
"records": [
  {
    "svm": {
      "uuid": "03157e81-24c5-11e9-9ec1-005056bba643",
      "name": "svm1",
```

```
      "_links": {
        "self": {
          "href": "/api/svm/svms/03157e81-24c5-11e9-9ec1-005056bba643"
        }
      }
    },
    "lun": {
      "uuid": "a60d9862-9bee-49a6-8162-20d2421bb1a6",
      "name": "/vol/vol1/lun1",
      "_links": {
        "self": {
          "href": "/api/storage/luns/a60d9862-9bee-49a6-8162-20d2421bb1a6"
        }
      }
    },
    "igroup": {
      "uuid": "40d98b2c-24c5-11e9-9ec1-005056bba643",
      "name": "ig1",
      "_links": {
        "self": {
          "href": "/api/protocols/san/igroups/40d98b2c-24c5-11e9-9ec1-
005056bba643"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/lun-maps/a60d9862-9bee-49a6-8162-
20d2421bb1a6/40d98b2c-24c5-11e9-9ec1-005056bba643"
      }
    }
  }
],
"num_records": 1,
"_links": {
  "self": {
    "href": "/api/protocols/san/lun-maps"
  }
}
}
```

Retrieving a specific LUN map

```
# The API:
```

```
GET /api/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/lun-maps/a60d9862-9bee-
49a6-8162-20d2421bb1a6/40d98b2c-24c5-11e9-9ec1-005056bba643' -H 'Accept:
application/hal+json'

# The response:
{
"svm": {
  "uuid": "03157e81-24c5-11e9-9ec1-005056bba643",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/03157e81-24c5-11e9-9ec1-005056bba643"
    }
  }
},
"lun": {
  "uuid": "a60d9862-9bee-49a6-8162-20d2421bb1a6",
  "name": "/vol/vol1/lun1",
  "node": {
    "uuid": "7d8607ea-24c1-11e9-9ec1-005056bba643",
    "name": "node1",
    "_links": {
      "self": {
        "href": "/api/cluster/nodes/7d8607ea-24c1-11e9-9ec1-005056bba643"
      }
    }
  },
  "_links": {
    "self": {
      "href": "/api/storage/luns/a60d9862-9bee-49a6-8162-20d2421bb1a6"
    }
  }
},
"igroup": {
  "uuid": "40d98b2c-24c5-11e9-9ec1-005056bba643",
  "name": "ig1",
  "os_type": "linux",
  "protocol": "mixed",
  "_links": {
    "self": {
      "href": "/api/protocols/san/igroups/40d98b2c-24c5-11e9-9ec1-
005056bba643"
    }
```

```
  }
},
"logical_unit_number": 0,
"reporting_nodes": [
  {
    "uuid": "11a465f5-2ac0-11eb-a303-005056bb1e81",
    "name": "node1",
    "_links": {
      "node": {
        "href": "/cluster/nodes/11a465f5-2ac0-11eb-a303-005056bb1e81"
      },
      "self": {
        "href": "/api/protocols/san/lun-maps/a60d9862-9bee-49a6-8162-
20d2421bb1a6/40d98b2c-24c5-11e9-9ec1-005056bba643/reporting-
nodes/11a465f5-2ac0-11eb-a303-005056bb1e81"
      }
    }
  },
  {
    "uuid": "6c7cb50f-2abf-11eb-9840-005056bbd490",
    "name": "node2",
    "_links": {
      "node": {
        "href": "/cluster/nodes/6c7cb50f-2abf-11eb-9840-005056bbd490"
      },
      "self": {
        "href": "/api/protocols/san/lun-maps/a60d9862-9bee-49a6-8162-
20d2421bb1a6/40d98b2c-24c5-11e9-9ec1-005056bba643/reporting-
nodes/6c7cb50f-2abf-11eb-9840-005056bbd490"
      }
    }
  }
],
"_links": {
  "self": {
    "href": "/api/protocols/san/lun-maps/a60d9862-9bee-49a6-8162-
20d2421bb1a6/40d98b2c-24c5-11e9-9ec1-005056bba643"
  }
}
}
```


Deleting a LUN map

```
# The API:
DELETE /api/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/lun-maps/a60d9862-
9bee-49a6-8162-20d2421bb1a6/40d98b2c-24c5-11e9-9ec1-005056bba643' -H
'Accept: application/hal+json'
```

Retrieve LUN maps

GET `/protocols/san/lun-maps`

Introduced In: 9.6

Retrieves LUN maps.

Related ONTAP commands

- `lun mapping show`

Learn more

- DOC /protocols/san/lun-maps

Parameters

Name	Type	In	Required	Description
reporting_nodes.name	string	query	False	Filter by reporting_nodes.name • Introduced in: 9.10
reporting_nodes.uuid	string	query	False	Filter by reporting_nodes.uuid • Introduced in: 9.10
logical_unit_number	integer	query	False	Filter by logical_unit_number • Max value: 4095 • Min value: 0

Name	Type	In	Required	Description
lun.uuid	string	query	False	Filter by lun.uuid
lun.name	string	query	False	Filter by lun.name
lun.node.uuid	string	query	False	Filter by lun.node.uuid
lun.node.name	string	query	False	Filter by lun.node.name
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
igroup.os_type	string	query	False	Filter by igroup.os_type
igroup.name	string	query	False	Filter by igroup.name
igroup.uuid	string	query	False	Filter by igroup.uuid
igroup.protocol	string	query	False	Filter by igroup.protocol
igroup.initiators	string	query	False	Filter by igroup.initiators
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. • Default value: 1

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. • Max value: 120 • Min value: 0 • Default value: 1
order_by	array[string]	query	False	Order results by specified fields and optional [asc

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
num_records	integer	The number of records in the response.
records	array[lun_map]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "initiators": [
          "iqn.1998-01.com.corp.iscsi:name1"
        ],
        "name": "igroup1",
        "os_type": "string",
        "protocol": "string",
        "uuid": "1ad8544d-8cd1-91e0-9e1c-723478563412"
      },
      "logical_unit_number": 1,
      "lun": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "/vol/volume1/qtree1/lun1",
        "node": {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
```

```
          },
          "name": "node1",
          "uuid": "1cf8aa42-8cd1-12e0-a11c-423468563412"
        },
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "reporting_nodes": [
        {
          "_links": {
            "node": {
              "href": "/api/resourcelink"
            },
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "node1",
          "uuid": "5ac8eb9c-4e32-dbaa-57ca-fb905976f54e"
        }
      ],
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      }
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

igroup

The initiator group to which the LUN is mapped. Required in POST by supplying either the `igroup.uuid`, `igroup.name`, or both.

Name	Type	Description
_links	_links	
initiators	array[string]	The initiators that are members of the initiator group.
name	string	The name of the initiator group. Valid in POST.
os_type	string	The host operating system of the initiator group. All initiators in the group should be hosts of the same operating system.
protocol	string	The protocols supported by the initiator group. This restricts the type of initiators that can be added to the initiator group.
uuid	string	The unique identifier of the initiator group. Valid in POST.

node

The LUN node.

Name	Type	Description
_links	_links	
name	string	The name the LUN's node.
uuid	string	The unique identifier of the LUN node.

lun

The LUN to which the initiator group is mapped. Required in POST by supplying either the `lun.uuid`, `lun.name`, or both.

Name	Type	Description
_links	_links	
name	string	The fully qualified path name of the LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and file name of the LUN. Valid in POST.
node	node	The LUN node.
uuid	string	The unique identifier of the LUN. Valid in POST.

_links

Name	Type	Description
node	href	
self	href	

reporting_nodes

A cluster node from which network paths to the LUN are advertised by ONTAP via the SAN protocols.

Name	Type	Description
_links	_links	
name	string	The name of the node. Either `uuid` or `name` are required in POST.

Name	Type	Description
uuid	string	The unique identifier of the node. Either `uuid` or `name` are required in POST.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

lun_map

A LUN map is an association between a LUN and an initiator group. When a LUN is mapped to an initiator group, the initiator group's initiators are granted access to the LUN. The relationship between a LUN and an initiator group is many LUNs to many initiator groups.

Name	Type	Description
_links	_links	
igroup	igroup	The initiator group to which the LUN is mapped. Required in POST by supplying either the `igroup.uuid`, `igroup.name`, or both.
logical_unit_number	integer	The logical unit number assigned to the LUN when mapped to the specified initiator group. The number is used to identify the LUN to initiators in the initiator group when communicating through Fibre Channel Protocol or iSCSI. Optional in POST; if no value is provided, ONTAP assigns the lowest available value. • example: 1 • Max value: 4095 • Min value: 0 • Introduced in: 9.6 • readCreate: 1

Name	Type	Description
lun	lun	The LUN to which the initiator group is mapped. Required in POST by supplying either the `lun.uuid`, `lun.name`, or both.
reporting_nodes	array[reporting_nodes]	The cluster nodes from which network paths to the mapped LUNs are advertised via the SAN protocols as part of the Selective LUN Map (SLM) feature of ONTAP. When a LUN map is created, the cluster node hosting the LUN and its high availability (HA) partner are set as the default reporting node. In POST, the property `additional_reporting_node` may be used to add an additional node and its HA partner. For further information, see DOC /protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes . • readOnly: 1 • Introduced in: 9.10
svm	svm	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments
code	string	Error code
message	string	Error message

Name	Type	Description
target	string	The target parameter that caused the error.

Create a LUN map

POST `/protocols/san/lun-maps`

Introduced In: 9.6

Creates a LUN map.

Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the LUN map.
- `igroup.uuid` or `igroup.name` - Existing initiator group to map to the specified LUN.
- `lun.uuid` or `lun.name` - Existing LUN to map to the specified initiator group.

Default property values

If not specified in POST, the following default property values are assigned.

- `logical_unit_number` - If no value is provided, ONTAP assigns the lowest available value.

Related ONTAP commands

- `lun mapping create`

Learn more

- DOC /protocols/san/lun-maps

Parameters

Name	Type	In	Required	Description
additional_reporting_node.uuid	string	query	False	The unique identifier of an ONTAP cluster node to add to the default reporting nodes for the LUN map. The HA partner for the node is also added. • Introduced in: 9.10

Name	Type	In	Required	Description
additional_reporting_node.name	string	query	False	The name of an ONTAP cluster node to add to the default reporting nodes for the LUN map. The HA partner for the node is also added. • Introduced in: 9.10
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
igroup	igroup	The initiator group to which the LUN is mapped. Required in POST by supplying either the `igroup.uuid`, `igroup.name`, or both.
logical_unit_number	integer	The logical unit number assigned to the LUN when mapped to the specified initiator group. The number is used to identify the LUN to initiators in the initiator group when communicating through Fibre Channel Protocol or iSCSI. Optional in POST; if no value is provided, ONTAP assigns the lowest available value. • example: 1 • Max value: 4095 • Min value: 0 • Introduced in: 9.6 • readCreate: 1

Name	Type	Description
lun	lun	The LUN to which the initiator group is mapped. Required in POST by supplying either the `lun.uuid`, `lun.name`, or both.
reporting_nodes	array[reporting_nodes]	The cluster nodes from which network paths to the mapped LUNs are advertised via the SAN protocols as part of the Selective LUN Map (SLM) feature of ONTAP. When a LUN map is created, the cluster node hosting the LUN and its high availability (HA) partner are set as the default reporting node. In POST, the property `additional_reporting_node` may be used to add an additional node and its HA partner. For further information, see DOC /protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes . • readOnly: 1 • Introduced in: 9.10
svm	svm	

Example request


```
{
  "igroup": {
    "initiators": [
      "iqn.1998-01.com.corp.iscsi:name1"
    ],
    "name": "igroup1",
    "os_type": "string",
    "protocol": "string",
    "uuid": "1ad8544d-8cd1-91e0-9e1c-723478563412"
  },
  "logical_unit_number": 1,
  "lun": {
    "name": "/vol/volume1/qtree1/lun1",
    "node": {
      "name": "node1",
      "uuid": "1cf8aa42-8cd1-12e0-a11c-423468563412"
    },
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "reporting_nodes": [
    {
      "name": "node1",
      "uuid": "5ac8eb9c-4e32-dbaa-57ca-fb905976f54e"
    }
  ],
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  }
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[lun_map]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "igroup": {
        "initiators": [
          "iqn.1998-01.com.corp.iscsi:name1"
        ],
        "name": "igroup1",
        "os_type": "string",
        "protocol": "string",
        "uuid": "1ad8544d-8cd1-91e0-9e1c-723478563412"
      },
      "logical_unit_number": 1,
      "lun": {
        "name": "/vol/volume1/qtree1/lun1",
        "node": {
          "name": "node1",
          "uuid": "1cf8aa42-8cd1-12e0-a11c-423468563412"
        },
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "reporting_nodes": [
        {
          "name": "node1",
          "uuid": "5ac8eb9c-4e32-dbaa-57ca-fb905976f54e"
        }
      ],
      "svm": {
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      }
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254207	The LUN is already mapped to the same initiator group.
2621462	The specified SVM does not exist or is not accessible to the caller.
2621706	Both the SVM UUID and SVM name were supplied, but don’t refer to the same SVM.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5374053	The LUN is the destination of an ongoing restore operation and is inaccessible for I/O and management. Wait for the restore to complete and try the command again.
5374238	The operation is not allowed on a LUN in a Snapshot copy.
5374316	A LUN move operation is in progress on the source LUN.
5374329	A LUN of class `vvol` cannot be mapped.
5374573	A node has no interface configured with the iSCSI or Fibre Channel protocols for the specified SVM.
5374574	Multiple nodes have no interface configured with the iSCSI or Fibre Channel protocols for the specified SVM.
5374581	A node has no interface configured with the iSCSI protocol for the specified SVM.
5374582	Multiple nodes have no interface configured with the iSCSI protocol for the specified SVM.
5374583	A node has no interface configured with the Fibre Channel protocol for the specified SVM.
5374584	Multiple nodes have no interface configured with the Fibre Channel protocol for the specified SVM.
5374901	Either `lun.uuid` or `lun.name` must be provided to create a LUN map.
5374902	Either `igroup.uuid` or `igroup.name` must be provided to create a LUN map.

Error Code	Description
5374920	The cluster node specified in additional_reporting_node does not exist.
5374921	The cluster node name and UUID specified in additional_reporting_node do not refer to the same cluster node.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

igroup

The initiator group to which the LUN is mapped. Required in POST by supplying either the `igroup.uuid`, `igroup.name`, or both.

Name	Type	Description
initiators	array[string]	The initiators that are members of the initiator group.
name	string	The name of the initiator group. Valid in POST.
os_type	string	The host operating system of the initiator group. All initiators in the group should be hosts of the same operating system.
protocol	string	The protocols supported by the initiator group. This restricts the type of initiators that can be added to the initiator group.
uuid	string	The unique identifier of the initiator group. Valid in POST.

node

The LUN node.

Name	Type	Description
name	string	The name the LUN's node.
uuid	string	The unique identifier of the LUN node.

lun

The LUN to which the initiator group is mapped. Required in POST by supplying either the `lun.uuid`,

`lun.name`, or both.

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and file name of the LUN. Valid in POST.
node	node	The LUN node.
uuid	string	The unique identifier of the LUN. Valid in POST.

reporting_nodes

A cluster node from which network paths to the LUN are advertised by ONTAP via the SAN protocols.

Name	Type	Description
name	string	The name of the node. Either `uuid` or `name` are required in POST.
uuid	string	The unique identifier of the node. Either `uuid` or `name` are required in POST.

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

lun_map

A LUN map is an association between a LUN and an initiator group. When a LUN is mapped to an initiator group, the initiator group's initiators are granted access to the LUN. The relationship between a LUN and an initiator group is many LUNs to many initiator groups.

Name	Type	Description
igroup	igroup	The initiator group to which the LUN is mapped. Required in POST by supplying either the `igroup.uuid`, `igroup.name`, or both.
logical_unit_number	integer	The logical unit number assigned to the LUN when mapped to the specified initiator group. The number is used to identify the LUN to initiators in the initiator group when communicating through Fibre Channel Protocol or iSCSI. Optional in POST; if no value is provided, ONTAP assigns the lowest available value. • example: 1 • Max value: 4095 • Min value: 0 • Introduced in: 9.6 • readCreate: 1
lun	lun	The LUN to which the initiator group is mapped. Required in POST by supplying either the `lun.uuid`, `lun.name`, or both.

Name	Type	Description
reporting_nodes	array[reporting_nodes]	The cluster nodes from which network paths to the mapped LUNs are advertised via the SAN protocols as part of the Selective LUN Map (SLM) feature of ONTAP. When a LUN map is created, the cluster node hosting the LUN and its high availability (HA) partner are set as the default reporting node. In POST, the property `additional_reporting_node` may be used to add an additional node and its HA partner. For further information, see DOC /protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes . • readOnly: 1 • Introduced in: 9.10
svm	svm	

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Delete a LUN map

DELETE `/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}`

Introduced In: 9.6

Deletes a LUN map.

Related ONTAP commands

- `lun mapping delete`

Learn more

- DOC /protocols/san/lun-maps

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	
igroup.uuid	string	path	True	

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The specified LUN does not exist or is not accessible to the caller.
5374878	The specified initiator group does not exist, is not accessible to the caller, or is not in the same SVM as the specified LUN.
5374922	The specified LUN map does not exist.

Name	Type	Description
error	error	

Example error


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


Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve a LUN map

GET `/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}`

Introduced In: 9.6

Retrieves a LUN map.

Related ONTAP commands

- `lun mapping show`

Learn more

- DOC /protocols/san/lun-maps

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	The unique identifier of the LUN.
igroup.uuid	string	path	True	The unique identifier of the igroup.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
igroup	igroup	The initiator group to which the LUN is mapped. Required in POST by supplying either the `igroup.uuid`, `igroup.name`, or both.

Name	Type	Description
logical_unit_number	integer	The logical unit number assigned to the LUN when mapped to the specified initiator group. The number is used to identify the LUN to initiators in the initiator group when communicating through Fibre Channel Protocol or iSCSI. Optional in POST; if no value is provided, ONTAP assigns the lowest available value. • example: 1 • Max value: 4095 • Min value: 0 • Introduced in: 9.6 • readCreate: 1
lun	lun	The LUN to which the initiator group is mapped. Required in POST by supplying either the `lun.uuid`, `lun.name`, or both.
reporting_nodes	array[reporting_nodes]	The cluster nodes from which network paths to the mapped LUNs are advertised via the SAN protocols as part of the Selective LUN Map (SLM) feature of ONTAP. When a LUN map is created, the cluster node hosting the LUN and its high availability (HA) partner are set as the default reporting node. In POST, the property `additional_reporting_node` may be used to add an additional node and its HA partner. For further information, see DOC /protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes . • readOnly: 1 • Introduced in: 9.10
svm	svm	

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "igroup": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "initiators": [
      "iqn.1998-01.com.corp.iscsi:name1"
    ],
    "name": "igroup1",
    "os_type": "string",
    "protocol": "string",
    "uuid": "1ad8544d-8cd1-91e0-9e1c-723478563412"
  },
  "logical_unit_number": 1,
  "lun": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "/vol/volume1/qtree1/lun1",
    "node": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "node1",
      "uuid": "1cf8aa42-8cd1-12e0-a11c-423468563412"
    },
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "reporting_nodes": [
    {
      "_links": {
        "node": {
          "href": "/api/resourcelink"
```

```
        },
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "node1",
      "uuid": "5ac8eb9c-4e32-dbaa-57ca-fb905976f54e"
    }
  ],
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  }
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374852	The initiator group does not exist or is not accessible to the caller.
5374875	The LUN does not exist or is not accessible to the caller.

Name	Type	Description
error	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
self	href	

igroup

The initiator group to which the LUN is mapped. Required in POST by supplying either the `igroup.uuid`, `igroup.name`, or both.

Name	Type	Description
_links	_links	
initiators	array[string]	The initiators that are members of the initiator group.
name	string	The name of the initiator group. Valid in POST.
os_type	string	The host operating system of the initiator group. All initiators in the group should be hosts of the same operating system.
protocol	string	The protocols supported by the initiator group. This restricts the type of initiators that can be added to the initiator group.
uuid	string	The unique identifier of the initiator group. Valid in POST.

node

The LUN node.

Name	Type	Description
_links	_links	
name	string	The name the LUN's node.

Name	Type	Description
uuid	string	The unique identifier of the LUN node.

lun

The LUN to which the initiator group is mapped. Required in POST by supplying either the `lun.uuid`, `lun.name`, or both.

Name	Type	Description
_links	_links	
name	string	The fully qualified path name of the LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and file name of the LUN. Valid in POST.
node	node	The LUN node.
uuid	string	The unique identifier of the LUN. Valid in POST.

_links

Name	Type	Description
node	href	
self	href	

reporting_nodes

A cluster node from which network paths to the LUN are advertised by ONTAP via the SAN protocols.

Name	Type	Description
_links	_links	
name	string	The name of the node. Either `uuid` or `name` are required in POST.
uuid	string	The unique identifier of the node. Either `uuid` or `name` are required in POST.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Add, remove, or discover LUN map reporting nodes

Protocols SAN lun-maps lun.uuid igroup.uuid reporting-nodes endpoint overview

Overview

A LUN map's reporting nodes are the cluster nodes from which network paths to a mapped LUN are advertised via the SAN protocols as part of the Selective LUN Map (SLM) feature of ONTAP. SLM reduces the number of paths from the host to a mapped LUN and enables management of a single initiator group (igroup) per host.

If there are no reporting nodes in a LUN map, network paths to all cluster nodes having the appropriate network interfaces (LIFs) in the SVM are advertised. This is not a typical configuration and is reserved for limited specific use cases. Note that having no reporting nodes in a LUN map differs subtly from having all reporting nodes in the LUN map. If a LUN map has an empty reporting nodes list and a new node is added to the cluster, a path to the new node will also be advertised. If a LUN map has all cluster nodes in its reporting nodes list and a new node is added to the cluster, a path to the new node is not advertised unless the LUN map's reporting nodes are explicitly updated to include the new node.

If portsets are used to further restrict access for initiators to specific LIFs, the mapped LUN will be accessible

only via the LIFs in the portset that are on the reporting nodes of the LUN map.

When a LUN map is created, the cluster node hosting the mapped LUN and its high availability (HA) partner are set as the initial reporting nodes.

Before moving a mapped LUN or a volume containing mapped LUNs to another HA pair within the same cluster, the destination node should be added to the LUN map's reporting nodes. This ensures that active, optimized LUN paths are maintained. After moving a mapped LUN or a volume containing mapped LUNs to another HA pair within the same cluster, the cluster node that previously hosted the mapped LUN should be removed from the LUN map's reporting node. Further details for this workflow may be found in the ONTAP SAN Administration documentation - see `Modifying the SLM reporting-nodes list`.

The LUN map reporting nodes REST API allows you to add, remove and discover the reporting nodes of a LUN map.

Examples

Adding a node to a LUN map

This example adds a cluster node, and its high availability (HA) partner cluster node, to a LUN map's reporting nodes.

```
# The API:
POST /api/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/lun-maps/c8ad35ce-ef03-
4577-88f0-9ad150ac6bbf/b10a8165-8346-11eb-ab8e-005056bbb402/reporting-
nodes' -H 'Accept: application/hal+json' -d '{ "name": "node2" }'
```

Removing a node from a LUN map

This example removes a cluster node, and its high availability (HA) partner cluster node, from a LUN map's reporting nodes.

```
# The API:
DELETE /api/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-
nodes/{uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/lun-maps/c8ad35ce-
ef03-4577-88f0-9ad150ac6bbf/b10a8165-8346-11eb-ab8e-
005056bbb402/reporting-nodes/6d2cd7d5-493a-daf8-9ae1-219e4ad6f77d' -H
'Accept: application/hal+json'
```

Retrieve LUN map reporting nodes

GET `/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes`

Introduced In: 9.10

Retrieves LUN map reporting nodes.

Related ONTAP commands

- `lun mapping show`

Learn more

- DOC /protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	The unique identifier of the LUN.
igroup.uuid	string	path	True	The unique identifier of the igroup.
uuid	string	query	False	Filter by uuid
name	string	query	False	Filter by name
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. • Default value: 1

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. • 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	
num_records	integer	The number of records in the response.
records	array[lun_map_reporting_node]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "node": {
          "href": "/api/resourcelink"
        },
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "lun": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "node1",
      "uuid": "5ac8eb9c-4e32-dbaa-57ca-fb905976f54e"
    }
  ]
}
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The specified LUN does not exist or is not accessible to the caller.
5374878	The specified initiator group does not exist, is not accessible to the caller, or is not in the same SVM as the specified LUN.
5374922	The specified LUN map does not exist.

Name	Type	Description
error	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	

_links

Name	Type	Description
node	href	
self	href	

_links

Name	Type	Description
self	href	

igroup

The initiator group of the LUN map of the reporting node.

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the initiator group.

lun

The LUN of the LUN map of the reporting node.

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the LUN.

lun_map_reporting_node

A cluster node from which network paths to the LUN are advertised by ONTAP via the SAN protocols.

Name	Type	Description
_links	_links	
igroup	igroup	The initiator group of the LUN map of the reporting node.
lun	lun	The LUN of the LUN map of the reporting node.
name	string	The name of the node. Either `uuid` or `name` are required in POST.
uuid	string	The unique identifier of the node. Either `uuid` or `name` are required in POST.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Add a reporting node and its HA partner to a LUN map

POST `/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes`

Introduced In: 9.10

Adds a reporting node and its HA partner to a LUN map.

Required properties

- `uuid` or `name` - A cluster node to add.

Related ONTAP commands

- `lun mapping add-reporting-nodes`

Learn more

- DOC /protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	The unique identifier of the LUN.
igroup.uuid	string	path	True	The unique identifier of the igroup.
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
igroup	igroup	The initiator group of the LUN map of the reporting node.
lun	lun	The LUN of the LUN map of the reporting node.
name	string	The name of the node. Either `uuid` or `name` are required in POST.
uuid	string	The unique identifier of the node. Either `uuid` or `name` are required in POST.

Example request

```
{
  "igroup": {
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "lun": {
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "node1",
  "uuid": "5ac8eb9c-4e32-dbaa-57ca-fb905976f54e"
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[lun_map_reporting_node]	

Example response

```
{
  "num_records": 1,
  "records": [
    {
      "igroup": {
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "lun": {
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "node1",
      "uuid": "5ac8eb9c-4e32-dbaa-57ca-fb905976f54e"
    }
  ]
}
```

Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The specified LUN does not exist or is not accessible to the caller.
5374878	The specified initiator group does not exist, is not accessible to the caller, or is not in the same SVM as the specified LUN.
5374920	The specified cluster node does not exist.
5374921	The specified cluster node name and UUID do not refer to the same cluster node.
5374922	The specified LUN map does not exist.
5374923	A cluster node `uuid` or `name` must be specified to add a reporting node.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

igroup

The initiator group of the LUN map of the reporting node.

Name	Type	Description
uuid	string	The unique identifier of the initiator group.

lun

The LUN of the LUN map of the reporting node.

Name	Type	Description
uuid	string	The unique identifier of the LUN.

lun_map_reporting_node

A cluster node from which network paths to the LUN are advertised by ONTAP via the SAN protocols.

Name	Type	Description
igroup	igroup	The initiator group of the LUN map of the reporting node.
lun	lun	The LUN of the LUN map of the reporting node.
name	string	The name of the node. Either `uuid` or `name` are required in POST.
uuid	string	The unique identifier of the node. Either `uuid` or `name` are required in POST.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Remove a reporting node and its HA partner from a LUN map

DELETE `/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes/{uuid}`

Introduced In: 9.10

Removes a reporting node and its HA partner from a LUN map.

Related ONTAP commands

- `lun mapping remove-reporting-nodes`

Learn more

- DOC /protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	
igroup.uuid	string	path	True	
uuid	string	path	True	

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374608	An attempt was made to delete the last reporting node for a LUN. The REST API requires that a LUN map must maintain at least one reporting node.
5374875	The specified LUN does not exist or is not accessible to the caller.
5374878	The specified initiator group does not exist, is not accessible to the caller, or is not in the same SVM as the specified LUN.
5374922	The specified LUN map does not exist.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve a LUN map reporting node

GET `/protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes/{uuid}`

Introduced In: 9.10

Retrieves a LUN map reporting node.

Related ONTAP commands

- `lun mapping show`

Learn more

- DOC /protocols/san/lun-maps/{lun.uuid}/{igroup.uuid}/reporting-nodes

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	The unique identifier of the LUN.
igroup.uuid	string	path	True	The unique identifier of the igroup.

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the node.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
igroup	igroup	The initiator group of the LUN map of the reporting node.
lun	lun	The LUN of the LUN map of the reporting node.
name	string	The name of the node. Either `uuid` or `name` are required in POST.
uuid	string	The unique identifier of the node. Either `uuid` or `name` are required in POST.

Example response


```
{
  "_links": {
    "node": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "igroup": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "lun": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "node1",
  "uuid": "5ac8eb9c-4e32-dbaa-57ca-fb905976f54e"
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The specified LUN does not exist or is not accessible to the caller.
5374878	The specified initiator group does not exist, is not accessible to the caller, or is not in the same SVM as the specified LUN.

Error Code	Description
5374922	The specified LUN map does not exist.

Name	Type	Description
error	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
node	href	
self	href	

_links

Name	Type	Description
self	href	

igroup

The initiator group of the LUN map of the reporting node.

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the initiator group.

lun

The LUN of the LUN map of the reporting node.

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the LUN.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Manage SAN portsets

Protocols SAN portsets endpoint overview

Overview

A portset is a collection of Fibre Channel Protocol and/or iSCSI network interfaces from the portset's SVM.

Portsets are used to limit the network interfaces through which an initiator can connect to mapped LUNs. When a portset is bound to an initiator group (igroup), and the initiator group is mapped to a LUN, the initiators of the initiator group can only reach the LUN through the network interfaces in the portset.

Portsets are not recommended for new configurations. With modern releases of ONTAP, it is recommended to use multiple SVMs and initiator groups with no bound portset to load balance applications over multiple ports on a node. Selective LUN mapping will automatically limit the number of visible paths to a LUN from the client host to those required for efficient access and high availability. The REST portset API is primarily intended for legacy use.

The portset REST API allows you to create, delete, and discover portsets, and to add and remove network interaces from portsets.

A portset can be bound to one or more initiator groups. An initiator group (igroup) can be bound to at most one portset.

When a portset is created, the `protocol` property is used to restrict member network interfaces to Fibre Channel Procotol (*fcp*), iSCSI (*iscsi*), or both (*mixed*).

Zero or more network interfaces can be supplied when the portset is created. After creation, network interfaces can be added to or removed from the portset using the `/protocols/san/portsets/{portset.uuid}/interfaces` endpoint. See DELETE /protocols/san/portsets/{portset.uuid}/interfaces/{name} for more details.

Examples

Creating a portset with no network interfaces

The example portset uses the default `mixed` protocol. Note that the `return_records` query parameter is used to obtain the newly created portset in the response.

```
# The API:
POST /api/protocols/san/portsets

# The call:
curl -X POST 'https://<mgmt-
ip>/api/protocols/san/portsets?return_records=true' -H 'Accept:
application/hal+json' -d '{ "svm" : { "name": "svm1" }, "name": "portset1"
}'

# The response:
{
"num_records": 1,
"records": [
  {
    "uuid": "5d7b1dfa-1ed7-11eb-8b0f-005056bb3521",
    "svm": {
      "uuid": "31484775-1e23-11eb-b2a8-005056bb3521",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/31484775-1e23-11eb-b2a8-005056bb3521"
        }
      }
    },
    "name": "portset1",
    "protocol": "mixed",
    "_links": {
      "self": {
        "href": "/api/protocols/san/portsets/5d7b1dfa-1ed7-11eb-8b0f-
005056bb3521"
      }
    }
  }
]
}
```

Creating an iSCSI portset with two network interfaces

Note that the `return_records` query parameter is used to obtain the newly created portset in the response.

```
# The API:
POST /api/protocols/san/portsets
```

```
# The call:
curl -X POST 'https://<mgmt-
ip>/api/protocols/san/portsets?return_records=true' -H 'Accept:
application/hal+json' -d '{ "svm" : { "name": "svm1" }, "name":
"portset2", "protocol": "iscsi", "interfaces": [ { "ip": { "name": "lif1"
} }, { "ip": { "name": "lif2" } } ] }'

# The response:
{
"num_records": 1,
"records": [
  {
    "uuid": "816c0d49-1ed7-11eb-8b0f-005056bb3521",
    "svm": {
      "uuid": "31484775-1e23-11eb-b2a8-005056bb3521",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/31484775-1e23-11eb-b2a8-005056bb3521"
        }
      }
    },
    "name": "portset2",
    "protocol": "iscsi",
    "interfaces": [
      {
        "uuid": "f37bfb01-1e2a-11eb-b2a8-005056bb3521",
        "ip": {
          "uuid": "f37bfb01-1e2a-11eb-b2a8-005056bb3521",
          "name": "lif1",
          "ip": {
            "address": "192.168.1.100"
          },
          "_links": {
            "self": {
              "href": "/api/network/ip/interfaces/f37bfb01-1e2a-11eb-b2a8-
005056bb3521"
            }
          }
        },
        "_links": {
          "self": {
            "href": "/api/protocols/san/portsets/816c0d49-1ed7-11eb-8b0f-
005056bb3521/interfaces/f37bfb01-1e2a-11eb-b2a8-005056bb3521"
          }
        }
```

```
      },
      {
        "uuid": "f92178e7-1e2a-11eb-b2a8-005056bb3521",
        "ip": {
          "uuid": "f92178e7-1e2a-11eb-b2a8-005056bb3521",
          "name": "lif2",
          "ip": {
            "address": "192.168.1.101"
          },
          "_links": {
            "self": {
              "href": "/api/network/ip/interfaces/f92178e7-1e2a-11eb-b2a8-
005056bb3521"
            }
          }
        },
        "_links": {
          "self": {
            "href": "/api/protocols/san/portsets/816c0d49-1ed7-11eb-8b0f-
005056bb3521/interfaces/f92178e7-1e2a-11eb-b2a8-005056bb3521"
          }
        }
      }
    ],
    "_links": {
      "self": {
        "href": "/api/protocols/san/portsets/816c0d49-1ed7-11eb-8b0f-
005056bb3521"
      }
    }
  }
]
}
```

Retrieving a summary of all portsets

```
# The API:
GET /api/protocols/san/portsets

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/portsets' -H 'Accept:
application/hal+json'

# The response:
```

```
{
"records": [
  {
    "uuid": "5d7b1dfa-1ed7-11eb-8b0f-005056bb3521",
    "name": "portset1",
    "_links": {
      "self": {
        "href": "/api/protocols/san/portsets/5d7b1dfa-1ed7-11eb-8b0f-
005056bb3521"
      }
    }
  },
  {
    "uuid": "816c0d49-1ed7-11eb-8b0f-005056bb3521",
    "name": "portset2",
    "_links": {
      "self": {
        "href": "/api/protocols/san/portsets/816c0d49-1ed7-11eb-8b0f-
005056bb3521"
      }
    }
  },
  {
    "uuid": "b716b4d2-1ed7-11eb-8b0f-005056bb3521",
    "name": "portset3",
    "_links": {
      "self": {
        "href": "/api/protocols/san/portsets/b716b4d2-1ed7-11eb-8b0f-
005056bb3521"
      }
    }
  }
],
"num_records": 3,
"_links": {
  "self": {
    "href": "/api/protocols/san/portsets"
  }
}
}
```


Retrieving details for a specific portset

```
# The API:
```

```
GET /api/protocols/san/portsets/{uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/portsets/b716b4d2-1ed7-
11eb-8b0f-005056bb3521' -H 'Accept: application/hal+json'

# The response:
{
"uuid": "b716b4d2-1ed7-11eb-8b0f-005056bb3521",
"svm": {
  "uuid": "31484775-1e23-11eb-b2a8-005056bb3521",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/31484775-1e23-11eb-b2a8-005056bb3521"
    }
  }
},
"name": "portset3",
"protocol": "fcp",
"interfaces": [
  {
    "uuid": "164eb052-1e2b-11eb-b2a8-005056bb3521",
    "fc": {
      "uuid": "164eb052-1e2b-11eb-b2a8-005056bb3521",
      "name": "lif5",
      "wwpn": "20:01:00:50:56:bb:35:21",
      "_links": {
        "self": {
          "href": "/api/network/fc/interfaces/164eb052-1e2b-11eb-b2a8-
005056bb3521"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/portsets/b716b4d2-1ed7-11eb-8b0f-
005056bb3521/interfaces/164eb052-1e2b-11eb-b2a8-005056bb3521"
      }
    }
  },
  {
    "uuid": "197ba2b7-1e2b-11eb-b2a8-005056bb3521",
    "fc": {
      "uuid": "197ba2b7-1e2b-11eb-b2a8-005056bb3521",
      "name": "lif6",
```

```
      "wwpn": "20:02:00:50:56:bb:35:21",
      "_links": {
        "self": {
          "href": "/api/network/fc/interfaces/197ba2b7-1e2b-11eb-b2a8-
005056bb3521"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/portsets/b716b4d2-1ed7-11eb-8b0f-
005056bb3521/interfaces/197ba2b7-1e2b-11eb-b2a8-005056bb3521"
      }
    }
  }
],
"_links": {
  "self": {
    "href": "/api/protocols/san/portsets/b716b4d2-1ed7-11eb-8b0f-
005056bb3521"
  }
}
}
```

Deleting a portset

```
# The API:
DELETE /api/protocols/san/portsets/{uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/portsets/b716b4d2-
1ed7-11eb-8b0f-005056bb3521' -H 'Accept: application/hal+json'
```

Adding a network interface to a portset

```
# The API:
POST /api/protocols/san/portsets/{uuid}/interfaces

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/portsets/5d7b1dfa-1ed7-
11eb-8b0f-005056bb3521/interfaces' -H 'Accept: application/hal+json' -d '{
"fc": { "name": "lif4" } }'
}
```

Adding multiple network interfaces to a portset in a single call

```
# The API:
POST /api/protocols/san/portsets/{uuid}/interfaces

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/portsets/5d7b1dfa-1ed7-
11eb-8b0f-005056bb3521/interfaces' -H 'Accept: application/hal+json' -d '{
"records": [ { "ip": { "name": "lif1" } },  { "ip": { "name": "lif2" } },
{ "fc": { "name": "lif5" } } ] }'
```

Removing a network interface from a portset

```
# The API:
DELETE /api/protocols/san/portsets/{uuid}/interfaces/f92178e7-1e2a-11eb-
b2a8-005056bb3521

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/portsets/5d7b1dfa-
1ed7-11eb-8b0f-005056bb3521/interfaces/f92178e7-1e2a-11eb-b2a8-
005056bb3521' -H 'Accept: application/hal+json'
```

Retrieve portsets

GET `/protocols/san/portsets`

Introduced In: 9.9

Retrieves portsets.

Related ONTAP commands

- `lun portset show`

Learn more

- DOC /protocols/san/portsets

Parameters

Name	Type	In	Required	Description
interfaces.uuid	string	query	False	Filter by interfaces.uuid
interfaces.ip.uuid	string	query	False	Filter by interfaces.ip.uuid
interfaces.ip.name	string	query	False	Filter by interfaces.ip.name
interfaces.ip.ip.address	string	query	False	Filter by interfaces.ip.ip.address
interfaces.fc.wwpn	string	query	False	Filter by interfaces.fc.wwpn
interfaces.fc.name	string	query	False	Filter by interfaces.fc.name
interfaces.fc.uuid	string	query	False	Filter by interfaces.fc.uuid
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
protocol	string	query	False	Filter by protocol
name	string	query	False	Filter by name • maxLength: 96 • minLength: 1
uuid	string	query	False	Filter by uuid

Name	Type	In	Required	Description
igroups.name	string	query	False	Filter by igroups.name • maxLength: 96 • minLength: 1
igroups.uuid	string	query	False	Filter by igroups.uuid
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. • 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. • 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	
num_records	integer	The number of records in the response.
records	array[portset]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroups": [
        {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "interfaces": [
        {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "fc": {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "name": "fc_lif1",
            "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
            "wwpn": "20:00:00:50:56:b4:13:a8"
```

```
          },
          "ip": {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "ip": {
              "address": "10.10.10.7"
            },
            "name": "lif1",
            "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
          },
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "name": "portset1",
      "protocol": "string",
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

igroups

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

fc

An FC interface.

Name	Type	Description
_links	_links	
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address

ip

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.
uuid	string	The UUID that uniquely identifies the interface.

interfaces

A container for either a Fibre Channel network interface or an IP network interface. On POST `fc` and `ip` are mutually exclusive.

Name	Type	Description
_links	_links	
fc	fc	An FC interface.
ip	ip	
uuid	string	The unique identifier of the network interface.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

portset

Name	Type	Description
_links	_links	

Name	Type	Description
igroups	array[igroups]	An array initiator groups to which the portset is bound.
interfaces	array[interfaces]	An array of network interfaces that are members of the portset. These are the only network interfaces through which the initiators of a bound igroup can access mapped LUNs. Zero or more network interfaces can be supplied when the portset is created. After creation, network interfaces can be added or removed from the portset using the `/protocols/san/portsets/{portset.uuid}/interfaces` endpoint. See DELETE /protocols/san/portsets/{portset.uuid}/interfaces/{uuid} for more details.
name	string	The name of the portset. Required in POST. The name of a portset cannot be changed after creation.
protocol	string	The protocols supported by the portset. This restricts the type of network interfaces that can be added to the portset. Optional in POST; if not supplied, this defaults to *mixed*. The protocol of a portset cannot be changed after creation.
svm	svm	
uuid	string	The unique identifier for a portset.

error_arguments

Name	Type	Description
code	string	Argument code

Name	Type	Description
message	string	Message argument

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.

Create a portset

POST `/protocols/san/portsets`

Introduced In: 9.9

Creates a portset.

Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the portset.
- `name` - Name of the portset.

Recommended optional properties

- `protocol` - The network protocol of the interfaces in the portset.
- `interfaces` - Network interfaces to include in the portset. This property can be used to create the portset and populate it with network interfaces in a single request.

Default property values

If not specified in POST, the following default property values are assigned.

- `protocol` - *mixed* - Data protocol of the portset's network interfaces.

Related ONTAP commands

- `lun portset create`

Learn more

- DOC /protocols/san/portsets

Parameters

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
igroups	array[igroups]	An array initiator groups to which the portset is bound.
interfaces	array[interfaces]	An array of network interfaces that are members of the portset. These are the only network interfaces through which the initiators of a bound igroup can access mapped LUNs. Zero or more network interfaces can be supplied when the portset is created. After creation, network interfaces can be added or removed from the portset using the `/protocols/san/portsets/{portset.uuid}/interfaces` endpoint. See DELETE /protocols/san/portsets/{portset.uuid}/interfaces/{uuid} for more details.
name	string	The name of the portset. Required in POST. The name of a portset cannot be changed after creation.

Name	Type	Description
protocol	string	The protocols supported by the portset. This restricts the type of network interfaces that can be added to the portset. Optional in POST; if not supplied, this defaults to *mixed*. The protocol of a portset cannot be changed after creation.
svm	svm	
uuid	string	The unique identifier for a portset.

Example request


```
{
  "igroups": [
    {
      "name": "igroup1",
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "interfaces": [
    {
      "fc": {
        "name": "fc_lif1",
        "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
        "wwpn": "20:00:00:50:56:b4:13:a8"
      },
      "ip": {
        "name": "lif1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "name": "portset1",
  "protocol": "string",
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[portset]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "igroups": [
        {
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "interfaces": [
        {
          "fc": {
            "name": "fc_lif1",
            "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
            "wwpn": "20:00:00:50:56:b4:13:a8"
          },
          "ip": {
            "name": "lif1",
            "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
          },
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "name": "portset1",
      "protocol": "string",
      "svm": {
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254259	A portset with the same name already exists in the SVM.
2621462	The specified SVM does not exist.
2621706	The specified `svm.uuid` and `svm.name` do not refer to the same SVM.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5373958	The specified portset name contains invalid characters.
5374905	An invalid interfaces array element was specified.
5374906	A specified network interface was not found.
5374907	The specified network interface UUID and name don’t identify the same network interface.
5374914	An attempt was made to add a network interface of an incompatible protocol to a portset.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

igroups

Name	Type	Description
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

fc

An FC interface.

Name	Type	Description
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

ip

Name	Type	Description
ip	ip	IP information
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.
uuid	string	The UUID that uniquely identifies the interface.

interfaces

A container for either a Fibre Channel network interface or an IP network interface. On POST `fc` and `ip` are mutually exclusive.

Name	Type	Description
fc	fc	An FC interface.
ip	ip	
uuid	string	The unique identifier of the network interface.

svm

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

portset

Name	Type	Description
igroups	array[igroups]	An array initiator groups to which the portset is bound.
interfaces	array[interfaces]	An array of network interfaces that are members of the portset. These are the only network interfaces through which the initiators of a bound igroup can access mapped LUNs. Zero or more network interfaces can be supplied when the portset is created. After creation, network interfaces can be added or removed from the portset using the `/protocols/san/portsets/{portset.uuid}/interfaces` endpoint. See DELETE /protocols/san/portsets/{portset.uuid}/interfaces/{uuid} for more details.

Name	Type	Description
name	string	The name of the portset. Required in POST. The name of a portset cannot be changed after creation.
protocol	string	The protocols supported by the portset. This restricts the type of network interfaces that can be added to the portset. Optional in POST; if not supplied, this defaults to *mixed*. The protocol of a portset cannot be changed after creation.
svm	svm	
uuid	string	The unique identifier for a portset.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve portset network interfaces

GET `/protocols/san/portsets/{portset.uuid}/interfaces`

Introduced In: 9.9

Retrieves interfaces of a portset.

Related ONTAP commands

- `lun portset show`

Learn more

- DOC /protocols/san/portsets

Parameters

Name	Type	In	Required	Description
portset.uuid	string	path	True	The unique identifier of the portset.
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. • 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. • Default value: 1 • Max value: 120 • Min value: 0

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	_links	
num_records	integer	The number of records in the response.
records	array[portset_interface]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "fc": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "fc_lif1",
        "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
        "wwpn": "20:00:00:50:56:b4:13:a8"
      },
      "ip": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "ip": {
          "address": "10.10.10.7"
        },
        "name": "lif1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "portset": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
```

```
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374908	The portset specified in the URI does not exist.

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

fc

An FC interface.

Name	Type	Description
_links	_links	
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address

ip

Name	Type	Description
_links	_links	
ip	ip	IP information

Name	Type	Description
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.
uuid	string	The UUID that uniquely identifies the interface.

portset

The portset in which the network interface is found.

Note that this does not mean that the network interface cannot also be found in other portsets.

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the portset.

records

A container for either a Fibre Channel network interface or an IP network interface. On POST `fc` and `ip` are mutually exclusive.

Name	Type	Description
_links	_links	
fc	fc	An FC interface.
ip	ip	
uuid	string	The unique identifier of the network interface.

portset_interface

Name	Type	Description
_links	_links	
fc	fc	An FC interface.
ip	ip	

Name	Type	Description
portset	portset	The portset in which the network interface is found. Note that this does not mean that the network interface cannot also be found in other portsets.
uuid	string	The unique identifier of the network interface.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Add portset network interfaces

POST `/protocols/san/portsets/{portset.uuid}/interfaces`

Introduced In: 9.9

Adds one or more interfaces to a portset.

Required properties

- `fc`, `ip` or `records` - Network interface(s) to add to the portset.

Related ONTAP commands

- `lun portset add`

Learn more

- DOC /protocols/san/portsets

Parameters

Name	Type	In	Required	Description
portset.uuid	string	path	True	The unique identifier of the portset.
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
fc	fc	An FC interface.
ip	ip	
portset	portset	The portset in which the network interface is found. Note that this does not mean that the network interface cannot also be found in other portsets.
records	array[records]	An array of network interfaces specified to add multiple interfaces to a portset in a single API call. Valid in POST only and not allowed when the `fc` or `ip` property is used.
uuid	string	The unique identifier of the network interface.

Example request


```
{
  "fc": {
    "name": "fc_lif1",
    "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
    "wwpn": "20:00:00:50:56:b4:13:a8"
  },
  "ip": {
    "name": "lif1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "portset": {
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "records": [
    {
      "fc": {
        "name": "fc_lif1",
        "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
        "wwpn": "20:00:00:50:56:b4:13:a8"
      },
      "ip": {
        "name": "lif1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[portset_interface]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "fc": {
        "name": "fc_lif1",
        "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
        "wwpn": "20:00:00:50:56:b4:13:a8"
      },
      "ip": {
        "name": "lif1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "portset": {
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "records": [
        {
          "fc": {
            "name": "fc_lif1",
            "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
            "wwpn": "20:00:00:50:56:b4:13:a8"
          },
          "ip": {
            "name": "lif1",
            "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
          },
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      ],
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374906	A specified network interface was not found.
5374907	The specified network interface UUID and name don’t identify the same network interface.
5374909	An invalid combination of network interface properties was specified.
5374910	An incomplete set of network interface properties was specified.
5374914	An attempt was made to add a network interface of an incompatible protocol to a portset.
5374915	An attempt was made to add a duplicate network interface to a portset.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

fc

An FC interface.

Name	Type	Description
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

ip

Name	Type	Description
ip	ip	IP information
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.
uuid	string	The UUID that uniquely identifies the interface.

portset

The portset in which the network interface is found.

Note that this does not mean that the network interface cannot also be found in other portsets.

Name	Type	Description
uuid	string	The unique identifier of the portset.

records

A container for either a Fibre Channel network interface or an IP network interface. On POST `fc` and `ip` are mutually exclusive.

Name	Type	Description
fc	fc	An FC interface.
ip	ip	
uuid	string	The unique identifier of the network interface.

portset_interface

Name	Type	Description
fc	fc	An FC interface.
ip	ip	
portset	portset	The portset in which the network interface is found. Note that this does not mean that the network interface cannot also be found in other portsets.
records	array[records]	An array of network interfaces specified to add multiple interfaces to a portset in a single API call. Valid in POST only and not allowed when the `fc` or `ip` property is used.
uuid	string	The unique identifier of the network interface.

error_arguments

Name	Type	Description
code	string	Argument code

Name	Type	Description
message	string	Message argument

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.

Delete portset network interfaces

DELETE `/protocols/san/portsets/{portset.uuid}/interfaces/{uuid}`

Introduced In: 9.9

Deletes a network interface from a portset.

Related ONTAP commands

- `lun portset remove`

Learn more

- DOC /protocols/san/portsets

Parameters

Name	Type	In	Required	Description
portset.uuid	string	path	True	The unique identifier of the portset.
uuid	string	path	True	The unique identifier of the network interface in the portset.

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374906	A specified network interface was not found.
5374908	The portset specified in the URI does not exist.
5374916	The specified network interface is not in the portset.

Name	Type	Description
error	error	

Example error


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


Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve specific portset network interfaces

GET `/protocols/san/portsets/{portset.uuid}/interfaces/{uuid}`

Introduced In: 9.9

Retrieves a network interface of a portset.

Related ONTAP commands

- `lun portset show`

Learn more

- DOC /protocols/san/portsets

Parameters

Name	Type	In	Required	Description
portset.uuid	string	path	True	The unique identifier of the portset.

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the network interface in the portset.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
fc	fc	An FC interface.
ip	ip	
portset	portset	The portset in which the network interface is found. Note that this does not mean that the network interface cannot also be found in other portsets.
uuid	string	The unique identifier of the network interface.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "fc": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "fc_lif1",
    "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
    "wwpn": "20:00:00:50:56:b4:13:a8"
  },
  "ip": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "ip": {
      "address": "10.10.10.7"
    },
    "name": "lif1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "portset": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
4	The interface is not a member of the portset.
5374908	The portset specified in the URI does not exist.

Name	Type	Description
error	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
self	href	

fc

An FC interface.

Name	Type	Description
_links	_links	
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address

ip

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.

Name	Type	Description
uuid	string	The UUID that uniquely identifies the interface.

portset

The portset in which the network interface is found.

Note that this does not mean that the network interface cannot also be found in other portsets.

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the portset.

records

A container for either a Fibre Channel network interface or an IP network interface. On POST `fc` and `ip` are mutually exclusive.

Name	Type	Description
_links	_links	
fc	fc	An FC interface.
ip	ip	
uuid	string	The unique identifier of the network interface.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments
code	string	Error code

Name	Type	Description
message	string	Error message
target	string	The target parameter that caused the error.

Delete a portset

DELETE `/protocols/san/portsets/{uuid}`

Introduced In: 9.9

Deletes a portset.

Related ONTAP commands

- `lun portset delete`

Learn more

- DOC /protocols/san/portsets

Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the portset.
allow_delete_while_bound	boolean	query	False	Allows deletion of a portset that is bound to an igroup. Deleting a portset can expand the set of LIFs through which a LUN is available. • Default value:

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374063	An attempt was made to delete a portset that is bound to an initiator group without using query parameter `allow_delete_while_bound`.
5374908	The portset does not exist.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve a portset

GET `/protocols/san/portsets/{uuid}`

Introduced In: 9.9

Retrieves a portset.

Related ONTAP commands

- `lun portset show`

Learn more

- DOC /protocols/san/portsets

Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the portset.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
igroups	array[igroups]	An array initiator groups to which the portset is bound.
interfaces	array[interfaces]	An array of network interfaces that are members of the portset. These are the only network interfaces through which the initiators of a bound igroup can access mapped LUNs. Zero or more network interfaces can be supplied when the portset is created. After creation, network interfaces can be added or removed from the portset using the `/protocols/san/portsets/{portset.uuid}/interfaces` endpoint. See DELETE /protocols/san/portsets/{portset.uuid}/interfaces/{uuid} for more details.
name	string	The name of the portset. Required in POST. The name of a portset cannot be changed after creation.
protocol	string	The protocols supported by the portset. This restricts the type of network interfaces that can be added to the portset. Optional in POST; if not supplied, this defaults to *mixed*. The protocol of a portset cannot be changed after creation.
svm	svm	
uuid	string	The unique identifier for a portset.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "igroups": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "igroup1",
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "interfaces": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "fc": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "fc_lif1",
        "uuid": "3a09ab42-4da1-32cf-9d35-3385a6101a0b",
        "wwpn": "20:00:00:50:56:b4:13:a8"
      },
      "ip": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "ip": {
          "address": "10.10.10.7"
        },
        "name": "lif1",
```

```
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ],
  "name": "portset1",
  "protocol": "string",
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
4	The portset does not exist.

Name	Type	Description
error	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
self	href	

igroups

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

fc

An FC interface.

Name	Type	Description
_links	_links	
name	string	The name of the FC interface.
uuid	string	The unique identifier of the FC interface.
wwpn	string	The WWPN of the FC interface.

ip

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address

ip

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface. If only the name is provided, the SVM scope must be provided by the object this object is embedded in.
uuid	string	The UUID that uniquely identifies the interface.

interfaces

A container for either a Fibre Channel network interface or an IP network interface. On POST `fc` and `ip` are mutually exclusive.

Name	Type	Description
_links	_links	
fc	fc	An FC interface.
ip	ip	
uuid	string	The unique identifier of the network interface.

svm

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Manage SAN vVol bindings

Protocols SAN vvol-bindings endpoint overview

Overview

A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping.

Class `protocol_endpoint` and `vvol` LUNs support many-to-many vVol bindings. A LUN of one class can be bound to zero or more LUNs of the opposite class.

The vVol binding between any two specific LUNs is reference counted. When a REST POST is executed for a vVol binding that already exists, the vVol binding reference count is incremented. When a REST DELETE is executed, the vVol binding reference count is decremented. Only when the vVol binding count reaches zero, or the query parameter `delete_all_references` is supplied, is the vVol binding destroyed.

The vVol binding REST API allows you to create, delete, and discover vVol bindings.

Examples

Creating a vVol binding

```
# The API:
POST /api/protocols/san/vvol-bindings

# The call:
curl -X POST 'https://<mgmt-ip>/api/protocols/san/vvol-bindings' -H
'Accept: application/hal+json' -d '{ "svm": { "name": "svm1" },
"protocol_endpoint": { "name": "/vol/vol1/pe1" }, "vvol" : { "name":
"/vol/vol1/vvol1" } }'
```

Retrieving all vVol bindings

```
# The API:
GET /api/protocols/san/vvol-bindings

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/vvol-bindings' -H
'Accept: application/hal+json'

# The response:
{
"records": [
  {
    "protocol_endpoint": {
      "uuid": "2aab57f3-dc5d-491e-80d2-15c7ed5dd5c4",
      "name": "/vol/vol1/pe1",
      "_links": {
        "self": {
          "href": "/api/storage/luns/2aab57f3-dc5d-491e-80d2-15c7ed5dd5c4"
        }
      }
    },
    "vvol": {
      "uuid": "28c02623-42fa-4f5f-a984-a02044bfc005",
      "name": "/vol/vol1/vvol1",
      "_links": {
        "self": {
          "href": "/api/storage/luns/28c02623-42fa-4f5f-a984-a02044bfc005"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/vvol-bindings/2aab57f3-dc5d-491e-80d2-
15c7ed5dd5c4/28c02623-42fa-4f5f-a984-a02044bfc005"
      }
    }
  },
  {
    "protocol_endpoint": {
      "uuid": "2aab57f3-dc5d-491e-80d2-15c7ed5dd5c4",
      "name": "/vol/vol1/pe1",
      "_links": {
        "self": {
          "href": "/api/storage/luns/2aab57f3-dc5d-491e-80d2-15c7ed5dd5c4"
        }
```

```
      }
    },
    "vvol": {
      "uuid": "a8d4ba93-918f-40ad-a1e4-4d7b244bdcdf",
      "name": "/vol/vol1/vvol2",
      "_links": {
        "self": {
          "href": "/api/storage/luns/a8d4ba93-918f-40ad-a1e4-4d7b244bdcdf"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/vvol-bindings/2aab57f3-dc5d-491e-80d2-
15c7ed5dd5c4/a8d4ba93-918f-40ad-a1e4-4d7b244bdcdf"
      }
    }
  }
],
"num_records": 2,
"_links": {
  "self": {
    "href": "/api/protocols/san/vvol-bindings"
  }
}
}
```

Retrieving a specific vVol binding

```
# The API:
GET /api/protocols/san/vvol-bindings/{protocol_endpoint.uuid}/{vvol.uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/vvol-bindings/2aab57f3-
dc5d-491e-80d2-15c7ed5dd5c4/28c02623-42fa-4f5f-a984-a02044bfc005' -H
'Accept: application/hal+json'

# The response:
{
"protocol_endpoint": {
  "uuid": "2aab57f3-dc5d-491e-80d2-15c7ed5dd5c4",
  "name": "/vol/vol1/pe1",
  "_links": {
    "self": {
```

```
      "href": "/api/storage/luns/2aab57f3-dc5d-491e-80d2-15c7ed5dd5c4"
    }
  }
},
"vvol": {
  "uuid": "28c02623-42fa-4f5f-a984-a02044bfc005",
  "name": "/vol/vol1/vvol1",
  "_links": {
    "self": {
      "href": "/api/storage/luns/28c02623-42fa-4f5f-a984-a02044bfc005"
    }
  }
},
"svm": {
  "uuid": "bf295ccc-a6bb-11eb-93e8-005056bb470f",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/bf295ccc-a6bb-11eb-93e8-005056bb470f"
    }
  }
},
"id": 2411392,
"is_optimal": true,
"count": 1,
"_links": {
  "self": {
    "href": "/api/protocols/san/vvol-bindings/2aab57f3-dc5d-491e-80d2-
15c7ed5dd5c4/28c02623-42fa-4f5f-a984-a02044bfc005"
  }
}
}
```

Deleting a vVol binding

```
# The API:
DELETE /api/protocols/san/vvol-
bindings/{protocol_endpoint.uuid}/{vvol.uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/protocols/san/vvol-
bindings/2aab57f3-dc5d-491e-80d2-15c7ed5dd5c4/28c02623-42fa-4f5f-a984-
a02044bfc005' -H 'Accept: application/hal+json'
```

Retrieve vVol bindings

GET `/protocols/san/vvol-bindings`

Introduced In: 9.10

Retrieves vVol bindings.

Related ONTAP commands

- `lun bind show`
- DOC /protocols/san/vvol-bindings

Parameters

Name	Type	In	Required	Description
is_optimal	boolean	query	False	Filter by is_optimal
vvol.name	string	query	False	Filter by vvol.name
vvol.uuid	string	query	False	Filter by vvol.uuid
count	integer	query	False	Filter by count
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
protocol_endpoint.name	string	query	False	Filter by protocol_endpoint.name
protocol_endpoint.uuid	string	query	False	Filter by protocol_endpoint.uuid
id	integer	query	False	Filter by id
fields	array[string]	query	False	Specify the fields to return.
max_records	integer	query	False	Limit the number of records returned.

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is true for GET calls. When set to false, only the number of records is returned. • 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. • 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	
num_records	integer	The number of records in the response.
records	array[vvol_binding]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "count": 1,
      "id": 1,
      "is_optimal": 1,
      "protocol_endpoint": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "/vol/volume1/lun1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "vvol": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
```

```
        "name": "/vol/volume1/lun1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      }
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

protocol_endpoint

The class `protocol_endpoint` LUN in the vVol binding. Required in POST.

Name	Type	Description
_links	_links	
name	string	The fully qualified path name of the LUN composed of the "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH.
uuid	string	The unique identifier of the LUN.

svm

The SVM in which the vVol binding and its LUNs are located. Required in POST.

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

vvol

The class `vvol` LUN in the vVol binding. Required in POST.

Name	Type	Description
_links	_links	
name	string	The fully qualified path name of the LUN composed of the "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH.
uuid	string	The unique identifier of the LUN.

vvol_binding

A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping.

Class `protocol_endpoint` and `vvol` LUNs support many-to-many vVol bindings. A LUN of one class can be bound to zero or more LUNs of the opposite class.

The vVol binding between any two specific LUNs is reference counted. When a REST POST is executed for a vVol binding that already exists, the vVol binding reference count is incremented. When a REST DELETE is executed, the vVol binding reference count is decremented. Only when the vVol binding count reaches zero, or the query parameter `delete_all_references` is supplied, is the vVol binding destroyed.

Name	Type	Description
_links	_links	
count	integer	The vVol binding between any two specific LUNs is reference counted. When a REST POST is executed for a vVol binding that already exists, the vVol binding reference count is incremented. When a REST DELETE is executed, the vVol binding reference count is decremented. Only when the vVol binding count reaches zero, or the query parameter `delete_all_references` is supplied, is the vVol binding destroyed.

Name	Type	Description
id	integer	The identifier assigned to the vVol binding. The bind identifier is unique amongst all class `vvol` LUNs bound to the same class `protocol_endpoint` LUN.
is_optimal	boolean	Indicates if the class `procotol_endpoint` LUN and the class `vvol` LUN are on the same cluster node.
protocol_endpoint	protocol_endpoint	The class `protocol_endpoint` LUN in the vVol binding. Required in POST.
svm	svm	The SVM in which the vVol binding and its LUNs are located. Required in POST.
vvol	vvol	The class `vvol` LUN in the vVol binding. Required in POST.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Create a vVol binding

POST `/protocols/san/vvol-bindings`

Introduced In: 9.10

Creates a vVol binding. The binding between any two specific LUNs is reference counted. When a binding is created that already exists, the binding count is incremented.

Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the vVol binding.
- `protocol_endpoint.uuid` or `protocol_endpoint.name` - Existing class `protocol_endpoint` LUN to bind to the specified class `vvol` LUN.
- `vvol.uuid` or `vvol.name` - Existing class `vvol` LUN to bind to the specified class `protocol_endpoint` LUN.

Related ONTAP commands

- `lun bind create`

Learn more

- DOC /protocols/san/vvol-bindings

Parameters

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
count	integer	The vVol binding between any two specific LUNs is reference counted. When a REST POST is executed for a vVol binding that already exists, the vVol binding reference count is incremented. When a REST DELETE is executed, the vVol binding reference count is decremented. Only when the vVol binding count reaches zero, or the query parameter `delete_all_references` is supplied, is the vVol binding destroyed.
id	integer	The identifier assigned to the vVol binding. The bind identifier is unique amongst all class `vvol` LUNs bound to the same class `protocol_endpoint` LUN.
is_optimal	boolean	Indicates if the class `procotol_endpoint` LUN and the class `vvol` LUN are on the same cluster node.
protocol_endpoint	protocol_endpoint	The class `protocol_endpoint` LUN in the vVol binding. Required in POST.
svm	svm	The SVM in which the vVol binding and its LUNs are located. Required in POST.
vvol	vvol	The class `vvol` LUN in the vVol binding. Required in POST.

Example request


```
{
  "count": 1,
  "id": 1,
  "is_optimal": 1,
  "protocol_endpoint": {
    "name": "/vol/volume1/lun1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "vvol": {
    "name": "/vol/volume1/lun1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  }
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[vvol_binding]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "count": 1,
      "id": 1,
      "is_optimal": 1,
      "protocol_endpoint": {
        "name": "/vol/volume1/lun1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "svm": {
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "vvol": {
        "name": "/vol/volume1/lun1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      }
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	The specified SVM does not exist or is not accessible to the caller.
2621706	Both the SVM UUID and SVM name were supplied, but don’t refer to the same SVM.

Error Code	Description
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5374238	A LUN in a Snapshot copy was specified.
5374323	The LUN specified as the protocol endpoint LUN is not of class `protocol_endpoint`.
5374325	The LUN specified as the vVol LUN is not of class `vvol`.
5374874	The UUID and name supplied for the protocol endpoint of Vvol LUN do not refer to the same LUN. Use to the `target` property of the error object to differentiate between the protocol endpoint LUN and the vVol LUN.
5374875	The protocol endpoint or vVol LUN was not found or is not accessible to the caller. Use to the `target` property of the error object to differentiate between the protocol endpoint LUN and the vVol LUN.
5374876	The protocol endpoint or vVol LUN was not found in the SVM. Use to the `target` property of the error object to differentiate between the protocol endpoint LUN and the vVol LUN.
5374924	No protocol endpoint LUN was supplied.
5374925	No vVol LUN was supplied.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

protocol_endpoint

The class `protocol_endpoint` LUN in the vVol binding. Required in POST.

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of the "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH.
uuid	string	The unique identifier of the LUN.

svm

The SVM in which the vVol binding and its LUNs are located. Required in POST.

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

vvol

The class `vvol` LUN in the vVol binding. Required in POST.

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of the "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH.
uuid	string	The unique identifier of the LUN.

vvol_binding

A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping.

Class `protocol_endpoint` and `vvol` LUNs support many-to-many vVol bindings. A LUN of one class can be bound to zero or more LUNs of the opposite class.

The vVol binding between any two specific LUNs is reference counted. When a REST POST is executed for a vVol binding that already exists, the vVol binding reference count is incremented. When a REST DELETE is executed, the vVol binding reference count is decremented. Only when the vVol binding count reaches zero, or the query parameter `delete_all_references` is supplied, is the vVol binding destroyed.

Name	Type	Description
count	integer	The vVol binding between any two specific LUNs is reference counted. When a REST POST is executed for a vVol binding that already exists, the vVol binding reference count is incremented. When a REST DELETE is executed, the vVol binding reference count is decremented. Only when the vVol binding count reaches zero, or the query parameter `delete_all_references` is supplied, is the vVol binding destroyed.
id	integer	The identifier assigned to the vVol binding. The bind identifier is unique amongst all class `vvol` LUNs bound to the same class `protocol_endpoint` LUN.
is_optimal	boolean	Indicates if the class `procotol_endpoint` LUN and the class `vvol` LUN are on the same cluster node.
protocol_endpoint	protocol_endpoint	The class `protocol_endpoint` LUN in the vVol binding. Required in POST.

Name	Type	Description
svm	svm	The SVM in which the vVol binding and its LUNs are located. Required in POST.
vvol	vvol	The class `vvol` LUN in the vVol binding. Required in POST.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Delete a vVol binding

DELETE `/protocols/san/vvol-bindings/{protocol_endpoint.uuid}/{vvol.uuid}`

Introduced In: 9.10

Deletes a vVol binding. The binding between any two specific LUNs is reference counted. When a binding is deleted, the binding count is decremented, but the LUNs remain bound if the resultant reference count is greater than zero. When the binding count reaches zero, the binding is destroyed.

Related ONTAP commands

- `lun bind destroy`

Learn more

- DOC /protocols/san/vvol-bindings

Parameters

Name	Type	In	Required	Description
protocol_endpoint.uuid	string	path	True	The unique identifier of the class `protocol_endpoint` LUN.
vvol.uuid	string	path	True	The unique identifier of the class `vvol` LUN.
delete_all_references	boolean	query	False	Forces deletion of the binding regardless of the reference count value. • Default value:

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The vVol binding was not found because the protocol endpoint or vVol LUN was not found. Use to the `target` property of the error object to differentiate between the protocol endpoint LUN and the vVol LUN.
5374926	The vVol binding was not found.

Name	Type	Description
error	error	

Example error


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


Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve a vVol binding

GET `/protocols/san/vvol-bindings/{protocol_endpoint.uuid}/{vvol.uuid}`

Introduced In: 9.10

Retrieves a vVol binding.

Related ONTAP commands

- `lun bind show`

Learn more

- DOC /protocols/san/vvol-bindings

Parameters

Name	Type	In	Required	Description
protocol_endpoint.uuid	string	path	True	The unique identifier of the class `protocol_endpoint` LUN.
vvol.uuid	string	path	True	The unique identifier of the class `vvol` LUN.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
count	integer	The vVol binding between any two specific LUNs is reference counted. When a REST POST is executed for a vVol binding that already exists, the vVol binding reference count is incremented. When a REST DELETE is executed, the vVol binding reference count is decremented. Only when the vVol binding count reaches zero, or the query parameter `delete_all_references` is supplied, is the vVol binding destroyed.

Name	Type	Description
id	integer	The identifier assigned to the vVol binding. The bind identifier is unique amongst all class `vvol` LUNs bound to the same class `protocol_endpoint` LUN.
is_optimal	boolean	Indicates if the class `procotol_endpoint` LUN and the class `vvol` LUN are on the same cluster node.
protocol_endpoint	protocol_endpoint	The class `protocol_endpoint` LUN in the vVol binding. Required in POST.
svm	svm	The SVM in which the vVol binding and its LUNs are located. Required in POST.
vvol	vvol	The class `vvol` LUN in the vVol binding. Required in POST.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "count": 1,
  "id": 1,
  "is_optimal": 1,
  "protocol_endpoint": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "/vol/volume1/lun1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "vvol": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "/vol/volume1/lun1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  }
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
4	The vVol binding was not found.

Name	Type	Description
error	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
self	href	

protocol_endpoint

The class `protocol_endpoint` LUN in the vVol binding. Required in POST.

Name	Type	Description
_links	_links	
name	string	The fully qualified path name of the LUN composed of the "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH.
uuid	string	The unique identifier of the LUN.

svm

The SVM in which the vVol binding and its LUNs are located. Required in POST.

Name	Type	Description
_links	_links	
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

vvol

The class `vvol` LUN in the vVol binding. Required in POST.

Name	Type	Description
_links	_links	

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of the "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH.
uuid	string	The unique identifier of the LUN.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Manage LUNs

Storage luns endpoint overview

Overview

A LUN is the logical representation of storage in a storage area network (SAN).

The LUN REST API allows you to create, update, delete, and discover LUNs.

A LUN is located within a volume. Optionally, it can be located within a qtree in a volume.

A LUN can be created to a specified size using thin or thick provisioning. A LUN can then be renamed, resized, cloned, moved to a different volume and copied. LUNs support the assignment of a quality of service (QoS) policy for performance management or a QoS policy can be assigned to the volume containing the LUN. See the LUN object model to learn more about each of the properties supported by the LUN REST API.

A LUN must be mapped to an initiator group to grant access to the initiator group's initiators (client hosts). Initiators can then access the LUN and perform I/O over a Fibre Channel (FC) fabric using the FC Protocol or a TCP/IP network using iSCSI.

Performance monitoring

Performance of a LUN can be monitored by observing the `metric.*` and `statistics.*` properties. These properties show the performance of a LUN in terms of IOPS, latency and throughput. The `metric.*` properties denote an average whereas `statistics.*` properies denote a real-time monotonically increasing value aggregated across all nodes.

Examples

Creating a LUN

This example creates a 300 gigabyte, thin-provisioned LUN in SVM *svm1*, volume *vol1*, configured for use by *linux* initiators. The `return_records` query parameter is used to retrieve properties of the newly created LUN in the POST response.

```
# The API:
POST /api/storage/luns

# The call:
curl -X POST 'https://<mgmt-ip>/api/storage/luns?return_records=true' -H
'Accept: application/hal+json' -d '{ "svm": { "name": "svm1" }, "os_type":
"linux", "space": { "size": "300G" }, "name" : "/vol/vol1/lun1" }'

# The response:
{
"num_records": 1,
"records": [
  {
    "uuid": "5a24ae5b-28af-47fb-b129-5adf6cfba0a6",
    "svm": {
      "uuid": "6bf967fd-2a1c-11e9-b682-005056bbc17d",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/6bf967fd-2a1c-11e9-b682-005056bbc17d"
        }
      }
    },
    "name": "/vol/vol1/lun1",
    "location": {
      "logical_unit": "lun1",
      "volume": {
        "uuid": "71cd0dba-2a1c-11e9-b682-005056bbc17d",
        "name": "vol1",
```

```
        "_links": {
          "self": {
            "href": "/api/storage/volumes/71cd0dba-2a1c-11e9-b682-
005056bbc17d"
          }
        }
      }
    },
    "class": "regular",
    "enabled": true,
    "os_type": "linux",
    "serial_number": "wf0Iq+N4uck3",
    "space": {
      "guarantee": {
        "requested": false,
        "reserved": false
      },
      "scsi_thin_provisioning_support_enabled": false,
      "size": 322163441664,
      "used": 0
    },
    "status": {
      "container_state": "online",
      "read_only": false,
      "state": "online"
    },
    "_links": {
      "self": {
        "href": "/api/storage/luns/5a24ae5b-28af-47fb-b129-5adf6cfba0a6"
      }
    }
  }
]
}
```


Updating a LUN

This example sets the `comment` property of a LUN.

```
# The API:
PATCH /api/storage/luns/{uuid}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/storage/luns/5a24ae5b-28af-47fb-b129-
5adf6cfba0a6' -H 'Accept: application/hal+json' -d '{ "comment": "Data for
the finance department." }'
```

Retrieving LUNs

This example retrieves summary information for all online LUNs in SVM *svm1*. The `svm.name` and `status.state` query parameters are used to find the desired LUNs.

```
# The API:
GET /api/storage/luns

# The call:
curl -X GET 'https://<mgmt-
ip>/api/storage/luns?svm.name=svm1&status.state=online' -H 'Accept:
application/hal+json'

# The response:
{
"records": [
  {
    "uuid": "5a24ae5b-28af-47fb-b129-5adf6cfba0a6",
    "svm": {
      "name": "svm1"
    },
    "name": "/vol/vol1/lun1",
    "status": {
      "state": "online"
    },
    "_links": {
      "self": {
        "href": "/api/storage/luns/5a24ae5b-28af-47fb-b129-5adf6cfba0a6"
      }
    }
  },
  {
    "uuid": "c903a978-9bac-4ce9-8237-4a3ba8b13f08",
    "svm": {
      "name": "svm1"
    },
    "name": "/vol/vol1/lun2",
```

```
    "status": {
      "state": "online"
    },
    "_links": {
      "self": {
        "href": "/api/storage/luns/c903a978-9bac-4ce9-8237-4a3ba8b13f08"
      }
    }
  },
  {
    "uuid": "7faf0a9e-0a47-4876-8318-3638d5da16bf",
    "svm": {
      "name": "svm1"
    },
    "name": "/vol/vol2/lun3",
    "status": {
      "state": "online"
    },
    "_links": {
      "self": {
        "href": "/api/storage/luns/7faf0a9e-0a47-4876-8318-3638d5da16bf"
      }
    }
  }
],
"num_records": 3,
"_links": {
  "self": {
    "href": "/api/storage/luns?svm.name=svm1&status.state=online"
  }
}
}
```

Retrieving details for a specific LUN

In this example, the `fields` query parameter is used to request all fields, including advanced fields, that would not otherwise be returned by default for the LUN.

```
# The API:
GET /api/storage/luns/{uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/storage/luns/5a24ae5b-28af-47fb-b129-
5adf6cfba0a6?fields=**' -H 'Accept: application/hal+json'

# The response:
```

```
{
"uuid": "5a24ae5b-28af-47fb-b129-5adf6cfba0a6",
"svm": {
  "uuid": "6bf967fd-2a1c-11e9-b682-005056bbc17d",
  "name": "svm1",
  "_links": {
    "self": {
      "href": "/api/svm/svms/6bf967fd-2a1c-11e9-b682-005056bbc17d"
    }
  }
},
"name": "/vol/vol1/lun1",
"location": {
  "logical_unit": "lun1",
  "volume": {
    "uuid": "71cd0dba-2a1c-11e9-b682-005056bbc17d",
    "name": "vol1",
    "_links": {
      "self": {
        "href": "/api/storage/volumes/71cd0dba-2a1c-11e9-b682-
005056bbc17d"
      }
    }
  }
},
"auto_delete": false,
"class": "vvol",
"comment": "Data for the finance department.",
"enabled": true,
"lun_maps": [
  {
    "logical_unit_number": 0,
    "igroup": {
      "uuid": "2b9d57e1-2a66-11e9-b682-005056bbc17d",
      "name": "ig1",
      "_links": {
        "self": {
          "href": "/api/protocols/san/igroups/2b9d57e1-2a66-11e9-b682-
005056bbc17d"
        }
      }
    },
    "_links": {
      "self": {
        "href": "/api/protocols/san/lun-maps/5a24ae5b-28af-47fb-b129-
5adf6cfba0a6/2b9d57e1-2a66-11e9-b682-005056bbc17d"
```

```
      }
    }
  }
],
"os_type": "linux",
"serial_number": "wf0Iq+N4uck3",
"space": {
  "guarantee": {
    "requested": false,
    "reserved": false
  },
  "scsi_thin_provisioning_support_enabled": false,
  "size": 322163441664,
  "used": 0
},
"vvol": {
  "is_bound": true,
  "bindings": [
    {
      "id": 4304512,
      "partner": {
        "uuid": "353c7262-be4b-4176-acf3-f1021faa8b64",
        "name": "/vol/vol1/pelun1",
        "_links": {
          "self": {
            "href": "/api/storage/luns/353c7262-be4b-4176-acf3-
f1021faa8b64"
          }
        }
      },
      "_links": {
        "self": {
          "href": "/api/protocols/san/vvol-bindings/353c7262-be4b-4176-
acf3-f1021faa8b64/5a24ae5b-28af-47fb-b129-5adf6cfba0a6"
        }
      }
    }
  ]
},
 "metric": {
  "timestamp": "2019-04-09T05:50:15Z",
  "duration": "PT15S",
  "status": "ok",
  "latency": {
    "other": 0,
    "total": 0,
```

```
    "read": 0,
    "write": 0
  },
  "iops": {
    "read": 0,
    "write": 0,
    "other": 0,
    "total": 0
  },
  "throughput": {
    "read": 0,
    "write": 0,
    "other": 0,
    "total": 0
  }
},
"statistics": {
  "timestamp": "2019-04-09T05:50:42Z",
  "status": "ok",
  "latency_raw": {
    "other": 38298,
    "total": 38298,
    "read": 0,
    "write": 0
  },
  "iops_raw": {
    "read": 0,
    "write": 0,
    "other": 3,
    "total": 3
  },
  "throughput_raw": {
    "read": 0,
    "write": 0,
    "other": 0,
    "total": 0
  }
},
"status": {
  "container_state": "online",
  "mapped": true,
  "read_only": false,
  "state": "online"
},
"consistency_group": {
  "name": "vol1",
```

```
  "uuid": "6d657aaf-b57a-5396-82ea-c01329e46c79",
  "_links": {
    "self": {
      "href": "/api/application/consistency-groups/6d657aaf-b57a-5396-
82ea-c01329e46c79"
    }
  }
},
"_links": {
  "self": {
    "href": "/api/storage/luns/5a24ae5b-28af-47fb-b129-
5adf6cfba0a6?fields=**"
  }
}
}
```

Deleting a LUN

```
# The API:
DELETE /api/storage/luns/{uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/storage/luns/c903a978-9bac-4ce9-
8237-4a3ba8b13f08' -H 'Accept: application/hal+json'
```

LUN data

The LUN REST API also supports reading data from and writing data to a LUN via the REST API as multipart/form-data.

Reading data is performed using a GET request on the LUN endpoint. The request header must include `Accept: multipart/form-data`. When this header entry is provided, query parameters `data.offset` and `data.size` are required and used to specify the portion of the LUN's data to read; no other query parameters are allowed. Reads are limited to one megabyte (1MB) per request. Data is returned as `multipart/form-data` content with exactly one form entry containing the data. The form entry has content type `application/octet-stream`.

Writing data is performed using a PATCH request on the LUN endpoint. The request header must include `Content-Type: multipart/form-data`. When this header entry is provided, query parameter `data.offset` is required and used to specify the location within the LUN at which to write the data; no other query parameters are allowed. The request body must be `multipart/form-data` content with exactly one form entry containing the data to write. The content type entry of the form data is ignored and always treated as `application/octet-stream`. Writes are limited to one megabyte (1MB) per request.

Reading data from a LUN

```
# The API:
GET /api/storage/luns/{uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/storage/luns/c903a978-9bac-4ce9-8237-
4a3ba8b13f08?data.offset=0&data.size=9' -H 'Accept: multipart/form-data'

# In the response header:
Content-Type: multipart/form-data; boundary="c6e9cf51ab354af0"

# The response body:
--c6e9cf51ab354af0
Content-Disposition: form-data;
Content-Type: application/octet-stream
data here
--c6e9cf51ab354af0--
```

Writing data to a LUN

This example writes the contents of a file to a LUN starting at offset 1024.

```
# The API:
PATCH /api/storage/luns/{uuid}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/storage/luns/c903a978-9bac-4ce9-8237-
4a3ba8b13f08&data.offset=1024' -F "data=@file;type=application/octet-
stream"
```

Cloning LUNs

A clone of a LUN is an independent "copy" of the LUN that shares unchanged data blocks with the original. As blocks of the source and clone are modified, unique blocks are written for each. LUN clones can be created quickly and consume very little space initially. They can be created for the purpose of back-up, or to replicate data for multiple consumers.

Space reservations can be set for the LUN clone independent of the source LUN by setting the `space.guarantee.requested` property in a POST or PATCH request.

A LUN clone can be set to auto-delete by setting the `auto_delete` property. If the LUN's volume is configured for automatic deletion, LUNs that have auto-delete enabled are deleted when a volume is nearly full to reclaim a target amount of free space in the volume.

The value of property `space.scsi_thin_provisioning_support_enabled` is not propagated to the

destination when a LUN is cloned as a new LUN; it is reset to false. The value of this property is maintained from the destination LUN when a LUN is overwritten as a clone.

Creating a new LUN clone

You create a new LUN clone as you create any LUN - a POST request to /storage/luns. Set `clone.source.uuid` or `clone.source.name` to identify the source LUN from which the clone is created. The LUN clone and its source must reside in the same volume.

The source LUN can reside in a Snapshot copy, in which case the `clone.source.name` field must be used to identify it. Add `/.snapshot/<snapshot_name>` to the path after the volume name to identify the Snapshot copy. For example `/vol/vol1/.snapshot/snap1/lun1`.

By default, new LUN clones do not inherit the QoS policy of the source LUN; a QoS policy should be set for the clone by setting the `qos_policy` property.

```
# The API:
POST /api/storage/luns

# The call:
curl -X POST 'https://<mgmt-ip>/api/storage/luns' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm1" }, "name":
"/vol/vol1/lun2clone1", "clone": { "source": { "name": "/vol/vol1/lun2" }
}, "qos_policy": { "name": "qos1" } }'
```

Over-writing an existing LUN's data as a clone of another

You can overwrite an existing LUN as a clone of another, using a PATCH request to /storage/luns/{uuid}. Set the `clone.source.uuid` or `clone.source.name` property to identify the source LUN from which the clone data is taken. The LUN clone and its source must reside in the same volume.

When used in a PATCH request, the patched LUN's data is overwritten as a clone of the source. The following properties are preserved from the patched LUN unless otherwise specified as part of the PATCH: `class`, `auto_delete`, `lun_maps`, `vvol`, `serial_number`, `status.state`, and `uuid`.

Persistent reservations for the updated LUN are also preserved.

```
# The API:
PATCH /api/storage/luns/{uuid}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/storage/luns/5a24ae5b-28af-47fb-b129-
5adf6cfba0a6' -H 'Accept: application/hal+json' -d '{ "clone": { "source":
{ "name": "/vol/vol1/lun2" } } }'
```

Converting an NVMe namespace into a LUN

An existing NVMe namespace can be converted in-place to a LUN with no modification to the data blocks. In other words, there is no additional copy created for the data blocks. There are certain requirements for converting an NVMe namespace to a LUN. For instance, the namespace should not be mapped to an NVMe subsystem. Additionally, the namespace should not have a block size other than 512 bytes.

The conversion process updates the metadata to the NVMe namespace, making it a LUN. The conversion is both time and space efficient. After conversion, the new LUN behaves as a regular LUN and may be mapped to an initiator group.

Convert an NVMe namespace into a LUN

You convert an NVMe namespace into a LUN by calling a POST to /storage/luns. Set `convert.namespace.uuid` or `convert.namespace.name` to identify the source NVMe namespace which is to be converted in-place into a LUN.

```
# The API:
POST /api/storage/luns

# The call:
curl -X POST 'https://<mgmt-ip>/api/storage/luns' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm1" }, "convert": {
"namespace": { "name": "/vol/vol1/namespace1" } } }'
```

Moving LUNs between volumes

You move a LUN between volumes by using a PATCH request to /storage/luns/{uuid}. Set the volume portion of the fully qualified LUN path `name` property, `path.volume.uuid`, or `path.volume.name` property to a different volume than the LUN's current volume. Moving a LUN between volumes is an asynchronous activity. A successful request returns a response of 200 synchronously, which indicates that the movement has been successfully queued. The LUN object can then be further polled with a GET request to `/storage/luns/{uuid}` to monitor the status of the movement.

The `movement` sub-object of the LUN object is populated while a LUN movement is in progress and for two minutes following completion of a movement.

Starting a LUN movement

```
# The API:
PATCH /api/storage/luns/{uuid}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/storage/luns/7faf0a9e-0a47-4876-8318-
3638d5da16bf' -H 'Accept: application/hal+json' -d '{ "name":
"/vol/vol1/lun3" }'
```

Checking on the status of the LUN movement

```
# The API:
GET /api/storage/luns/{uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/storage/luns/7faf0a9e-0a47-4876-8318-
3638d5da16bf?fields=movement' -H 'Accept: application/hal+json'

# The response:
{
"uuid": "7faf0a9e-0a47-4876-8318-3638d5da16bf",
"name": "/vol/vol1/lun3",
"movement": {
  "paths": {
    "destination": "/vol/vol1/lun3",
    "source": "/vol/vol2/lun3"
  },
  "progress": {
    "elapsed": 1,
    "percent_complete": 0,
    "state": "preparing",
    "volume_snapshot_blocked": false
  }
},
"_links": {
  "self": {
    "href": "/api/storage/luns/7faf0a9e-0a47-4876-8318-3638d5da16bf"
  }
}
}
```

Retrieve LUNs

GET `/storage/luns`

Introduced In: 9.6

Retrieves LUNs.

Expensive properties

There is an added computational cost to retrieving values for these properties. They are not included by default in GET results and must be explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

- `attributes.*`
- `auto_delete`
- `copy.*`
- `lun_maps.*`
- `movement.*`
- `statistics.*`
- `vvol.bindings.*`
- `metric.*`

Related ONTAP commands

- `lun bind show`
- `lun copy show`
- `lun mapping show`
- `lun move show`
- `lun show`
- `volume file clone show-autodelete`

Learn more

- DOC /storage/luns

Parameters

Name	Type	In	Required	Description
auto_delete	boolean	query	False	Filter by auto_delete
uuid	string	query	False	Filter by uuid
qos_policy.uuid	string	query	False	Filter by qos_policy.uuid
qos_policy.name	string	query	False	Filter by qos_policy.name
os_type	string	query	False	Filter by os_type
class	string	query	False	Filter by class

Name	Type	In	Required	Description
consistency_group.uuid	string	query	False	Filter by consistency_group.uuid • Introduced in: 9.10
consistency_group.name	string	query	False	Filter by consistency_group.name • Introduced in: 9.10
attributes.name	string	query	False	Filter by attributes.name • Introduced in: 9.10 • maxLength: 4091 • minLength: 1
attributes.value	string	query	False	Filter by attributes.value • Introduced in: 9.10 • maxLength: 4091 • minLength: 1
metric.duration	string	query	False	Filter by metric.duration • Introduced in: 9.7
metric.latency.total	integer	query	False	Filter by metric.latency.total • Introduced in: 9.7

Name	Type	In	Required	Description
metric.latency.read	integer	query	False	Filter by metric.latency.read • Introduced in: 9.7
metric.latency.write	integer	query	False	Filter by metric.latency.write • Introduced in: 9.7
metric.latency.other	integer	query	False	Filter by metric.latency.other • Introduced in: 9.7
metric.timestamp	string	query	False	Filter by metric.timestamp • Introduced in: 9.7
metric.throughput.total	integer	query	False	Filter by metric.throughput.total • Introduced in: 9.7
metric.throughput.read	integer	query	False	Filter by metric.throughput.read • Introduced in: 9.7
metric.throughput.write	integer	query	False	Filter by metric.throughput.write • Introduced in: 9.7

Name	Type	In	Required	Description
metric.throughput.other	integer	query	False	Filter by metric.throughput.other • Introduced in: 9.7
metric.status	string	query	False	Filter by metric.status • Introduced in: 9.7
metric.iops.total	integer	query	False	Filter by metric.iops.total • Introduced in: 9.7
metric.iops.read	integer	query	False	Filter by metric.iops.read • Introduced in: 9.7
metric.iops.write	integer	query	False	Filter by metric.iops.write • Introduced in: 9.7
metric.iops.other	integer	query	False	Filter by metric.iops.other • Introduced in: 9.7
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
copy.destinations.progress.elapsed	integer	query	False	Filter by copy.destinations.progress.elapsed • Introduced in: 9.10

Name	Type	In	Required	Description
copy.destinations.progress.volume_snapshot_blocked	boolean	query	False	Filter by copy.destinations.progress.volume_snapshot_blocked • Introduced in: 9.10
copy.destinations.progress.percent_complete	integer	query	False	Filter by copy.destinations.progress.percent_complete • Introduced in: 9.10 • Max value: 100 • Min value: 0
copy.destinations.progress.state	string	query	False	Filter by copy.destinations.progress.state • Introduced in: 9.10
copy.destinations.progress.failure.target	string	query	False	Filter by copy.destinations.progress.failure.target • Introduced in: 9.10
copy.destinations.progress.failure.arguments.message	string	query	False	Filter by copy.destinations.progress.failure.arguments.message • Introduced in: 9.10
copy.destinations.progress.failure.arguments.code	string	query	False	Filter by copy.destinations.progress.failure.arguments.code • Introduced in: 9.10

Name	Type	In	Required	Description
copy.destinations.progress.failure.code	string	query	False	Filter by copy.destinations.progress.failure.code • Introduced in: 9.10
copy.destinations.progress.failure.message	string	query	False	Filter by copy.destinations.progress.failure.message • Introduced in: 9.10
copy.destinations.uuid	string	query	False	Filter by copy.destinations.uuid • Introduced in: 9.10
copy.destinations.max_throughput	integer	query	False	Filter by copy.destinations.max_throughput • Introduced in: 9.10
copy.destinations.name	string	query	False	Filter by copy.destinations.name • Introduced in: 9.10
copy.source.uuid	string	query	False	Filter by copy.source.uuid • Introduced in: 9.10
copy.source.max_throughput	integer	query	False	Filter by copy.source.max_throughput • Introduced in: 9.10

Name	Type	In	Required	Description
copy.source.name	string	query	False	Filter by copy.source.name • Introduced in: 9.10
copy.source.progress.elapsed	integer	query	False	Filter by copy.source.progress.elapsed • Introduced in: 9.10
copy.source.progress.volume_snapshot_blocked	boolean	query	False	Filter by copy.source.progress.volume_snapshot_blocked • Introduced in: 9.10
copy.source.progress.percent_complete	integer	query	False	Filter by copy.source.progress.percent_complete • Introduced in: 9.10 • Max value: 100 • Min value: 0
copy.source.progress.state	string	query	False	Filter by copy.source.progress.state • Introduced in: 9.10
copy.source.progress.failure.target	string	query	False	Filter by copy.source.progress.failure.target • Introduced in: 9.10

Name	Type	In	Required	Description
copy.source.progress.failure.arguments.message	string	query	False	Filter by copy.source.progress.failure.arguments.message • Introduced in: 9.10
copy.source.progress.failure.arguments.code	string	query	False	Filter by copy.source.progress.failure.arguments.code • Introduced in: 9.10
copy.source.progress.failure.code	string	query	False	Filter by copy.source.progress.failure.code • Introduced in: 9.10
copy.source.progress.failure.message	string	query	False	Filter by copy.source.progress.failure.message • Introduced in: 9.10
space.used	integer	query	False	Filter by space.used
space.guarantee.requested	boolean	query	False	Filter by space.guarantee.requested
space.guarantee.reserved	boolean	query	False	Filter by space.guarantee.reserved
space.scsi_thin_provisioning_support_enabled	boolean	query	False	Filter by space.scsi_thin_provisioning_support_enabled • Introduced in: 9.10

Name	Type	In	Required	Description
space.size	integer	query	False	Filter by space.size • Max value: 140737488355328 • Min value: 4096
comment	string	query	False	Filter by comment • maxLength: 254 • minLength: 0
create_time	string	query	False	Filter by create_time • Introduced in: 9.7
vvol.bindings.partner.name	string	query	False	Filter by vvol.bindings.partner.name • Introduced in: 9.10
vvol.bindings.partner.uuid	string	query	False	Filter by vvol.bindings.partner.uuid • Introduced in: 9.10
vvol.bindings.id	integer	query	False	Filter by vvol.bindings.id • Introduced in: 9.10
vvol.is_bound	boolean	query	False	Filter by vvol.is_bound • Introduced in: 9.10

Name	Type	In	Required	Description
statistics.iops_raw.total	integer	query	False	Filter by statistics.iops_raw.total • Introduced in: 9.7
statistics.iops_raw.read	integer	query	False	Filter by statistics.iops_raw.read • Introduced in: 9.7
statistics.iops_raw.write	integer	query	False	Filter by statistics.iops_raw.write • Introduced in: 9.7
statistics.iops_raw.other	integer	query	False	Filter by statistics.iops_raw.other • Introduced in: 9.7
statistics.throughput_raw.total	integer	query	False	Filter by statistics.throughput_raw.total • Introduced in: 9.7
statistics.throughput_raw.read	integer	query	False	Filter by statistics.throughput_raw.read • Introduced in: 9.7
statistics.throughput_raw.write	integer	query	False	Filter by statistics.throughput_raw.write • Introduced in: 9.7

Name	Type	In	Required	Description
statistics.throughput_raw.other	integer	query	False	Filter by statistics.throughput_raw.other • Introduced in: 9.7
statistics.latency_raw.total	integer	query	False	Filter by statistics.latency_raw.total • Introduced in: 9.7
statistics.latency_raw.read	integer	query	False	Filter by statistics.latency_raw.read • Introduced in: 9.7
statistics.latency_raw.write	integer	query	False	Filter by statistics.latency_raw.write • Introduced in: 9.7
statistics.latency_raw.other	integer	query	False	Filter by statistics.latency_raw.other • Introduced in: 9.7
statistics.status	string	query	False	Filter by statistics.status • Introduced in: 9.7
statistics.timestamp	string	query	False	Filter by statistics.timestamp • Introduced in: 9.7

Name	Type	In	Required	Description
movement.max_throughput	integer	query	False	Filter by movement.max_throughput
movement.paths.source	string	query	False	Filter by movement.paths.source
movement.paths.destination	string	query	False	Filter by movement.paths.destination
movement.progress.failure.target	string	query	False	Filter by movement.progress.failure.target
movement.progress.failure.arguments.message	string	query	False	Filter by movement.progress.failure.arguments.message
movement.progress.failure.arguments.code	string	query	False	Filter by movement.progress.failure.arguments.code
movement.progress.failure.code	string	query	False	Filter by movement.progress.failure.code
movement.progress.failure.message	string	query	False	Filter by movement.progress.failure.message
movement.progress.volume_snapshot_blocked	boolean	query	False	Filter by movement.progress.volume_snapshot_blocked
movement.progress.percent_complete	integer	query	False	Filter by movement.progress.percent_complete • Max value: 100 • Min value: 0

Name	Type	In	Required	Description
movement.progress.elapsed	integer	query	False	Filter by movement.progress.elapsed
movement.progress.state	string	query	False	Filter by movement.progress.state
lun_maps.logical_unit_number	integer	query	False	Filter by lun_maps.logical_unit_number
lun_maps.igroup.uuid	string	query	False	Filter by lun_maps.igroup.uuid
lun_maps.igroup.name	string	query	False	Filter by lun_maps.igroup.name
name	string	query	False	Filter by name
enabled	boolean	query	False	Filter by enabled
status.container_state	string	query	False	Filter by status.container_state
status.read_only	boolean	query	False	Filter by status.read_only
status.state	string	query	False	Filter by status.state
status.mapped	boolean	query	False	Filter by status.mapped
location.node.uuid	string	query	False	Filter by location.node.uuid • Introduced in: 9.10
location.node.name	string	query	False	Filter by location.node.name • Introduced in: 9.10

Name	Type	In	Required	Description
location.volume.uuid	string	query	False	Filter by location.volume.uuid
location.volume.name	string	query	False	Filter by location.volume.name
location.logical_unit	string	query	False	Filter by location.logical_unit
location.qtree.id	integer	query	False	Filter by location.qtree.id • Max value: 4994 • Min value: 0
location.qtree.name	string	query	False	Filter by location.qtree.name
serial_number	string	query	False	Filter by serial_number • maxLength: 12 • minLength: 12
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. • Default value: 1

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. • Max value: 120 • Min value: 0 • Default value: 1
order_by	array[string]	query	False	Order results by specified fields and optional [asc

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
num_records	integer	The number of records in the response.
records	array[lun]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "attributes": [
        {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "name1",
          "value": "value1"
        }
      ],
      "class": "string",
      "comment": "string",
      "consistency_group": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "cg1",
        "uuid": "4abc2317-4332-9d37-93a0-20bd29c22df0"
      },
      "copy": {
        "destinations": [
          {
            "_links": {
              "self": {
```

```
            "href": "/api/resourcelink"
          }
        },
        "max_throughput": 0,
        "name": "/vol/vol1/lun1",
        "progress": {
          "elapsed": 0,
          "failure": {
            "arguments": [
              {
                "code": "string",
                "message": "string"
              }
            ],
            "code": "4",
            "message": "entry doesn't exist",
            "target": "uuid"
          },
          "percent_complete": 0,
          "state": "string"
        },
        "uuid": "1bc327d5-4654-5284-a116-f182282240b4"
      }
    ],
    "source": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "/vol/vol2/lun1",
      "progress": {
        "elapsed": 0,
        "failure": {
          "arguments": [
            {
              "code": "string",
              "message": "string"
            }
          ],
          "code": "4",
          "message": "entry doesn't exist",
          "target": "uuid"
        },
        "percent_complete": 0,
        "state": "string"
```

```
      },
      "uuid": "03c05019-40d9-3945-c767-dca4c3be5e90"
    }
  },
  "create_time": "2018-06-04T19:00:00Z",
  "location": {
    "logical_unit": "lun1",
    "node": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "qtree": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "id": 1,
      "name": "qt1"
    },
    "volume": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "volume1",
      "uuid": "028baa66-41bd-11e9-81d5-00a0986138f7"
    }
  },
  "lun_maps": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
```

```
            }
          },
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        },
        "logical_unit_number": 0
      }
    ],
    "metric": {
      "_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": "2017-01-25T11:20:13Z"
    },
    "movement": {
      "paths": {
        "destination": "/vol/vol1/lun1",
        "source": "/vol/vol2/lun2"
      },
      "progress": {
        "elapsed": 0,
        "failure": {
          "arguments": [
            {
              "code": "string",
              "message": "string"
            }
```

```
          ],
          "code": "4",
          "message": "entry doesn't exist",
          "target": "uuid"
        },
        "percent_complete": 0,
        "state": "string"
      }
    },
    "name": "/vol/volume1/qtree1/lun1",
    "os_type": "string",
    "qos_policy": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "qos1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "serial_number": "string",
    "space": {
      "size": 1073741824,
      "used": 0
    },
    "statistics": {
      "iops_raw": {
        "read": 200,
        "total": 1000,
        "write": 100
      },
      "latency_raw": {
        "read": 200,
        "total": 1000,
        "write": 100
      },
      "status": "ok",
      "throughput_raw": {
        "read": 200,
        "total": 1000,
        "write": 100
      },
      "timestamp": "2017-01-25T11:20:13Z"
    },
    "status": {
      "container_state": "string",
```

```
        "state": "online"
      },
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
      "vvol": {
        "bindings": [
          {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "id": 1,
            "partner": {
              "_links": {
                "self": {
                  "href": "/api/resourcelink"
                }
              },
              "name": "/vol/vol1/lun1",
              "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
            }
          }
        ]
      }
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

attributes

A name/value pair optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP.

Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes.

Optional in POST.

Name	Type	Description
_links	_links	
name	string	The attribute name.
value	string	The attribute value.

source

The source LUN for a LUN clone operation. This can be specified using property `clone.source.uuid` or `clone.source.name`. If both properties are supplied, they must refer to the same LUN.

Valid in POST to create a new LUN as a clone of the source.

Valid in PATCH to overwrite an existing LUN's data as a clone of another.

clone

This sub-object is used in POST to create a new LUN as a clone of an existing LUN, or PATCH to overwrite an existing LUN as a clone of another. Setting a property in this sub-object indicates that a LUN clone is desired. Consider the following other properties when cloning a LUN: `auto_delete`,

`qos_policy`, `space.guarantee.requested` and `space.scsi_thin_provisioning_support_enabled`.

When used in a PATCH, the patched LUN's data is over-written as a clone of the source and the following properties are preserved from the patched LUN unless otherwise specified as part of the PATCH: `class`, `auto_delete`, `lun_maps`, `serial_number`, `status.state`, and `uuid`.

Persistent reservations for the patched LUN are also preserved.

consistency_group

The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.

Name	Type	Description
_links	_links	
name	string	The name of the consistency group.
uuid	string	The unique identifier of the consistency group.

namespace

The source namespace for convert operation. This can be specified using property `convert.namespace.uuid` or `convert.namespace.name`. If both properties are supplied, they must refer to the same NVMe namespace.

Valid in POST. A convert request from NVMe namespace to LUN cannot be combined with setting any other LUN properties. All other properties of the converted LUN comes from the source NVMe namespace.

convert

This sub-object is used in POST to convert a valid in-place NVMe namespace to a LUN. Setting a property in this sub-object indicates that a conversion from the specified NVMe namespace to LUN is desired.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Error information provided if the asynchronous LUN copy operation fails.

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.

progress

Properties related to the progress of an active or recently completed LUN copy.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN copy, in seconds.
failure	error	Error information provided if the asynchronous LUN copy operation fails.
percent_complete	integer	The percentage completed of the LUN copy.
state	string	The state of the LUN copy.
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN copy. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN copy.

destinations

A LUN copy operation in which the containing LUN is the source of the copy.

Name	Type	Description
_links	_links	

Name	Type	Description
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN copy. See property `copy.source.max_throughput` for further details.
name	string	The fully qualified path of the LUN copy destination composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.
progress	progress	Properties related to the progress of an active or recently completed LUN copy.
uuid	string	The unique identifier of the LUN copy destination.

progress

Properties related to the progress of an active or recently completed LUN copy.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN copy, in seconds.
failure	error	Error information provided if the asynchronous LUN copy operation fails.
percent_complete	integer	The percentage completed of the LUN copy.
state	string	The state of the LUN copy. Valid in PATCH when an LUN copy is active. Set to *paused* to pause a LUN copy. Set to *replicating* to resume a paused LUN copy.

Name	Type	Description
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN copy. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN copy.

source

The source LUN of a LUN copy operation in which the containing LUN is the destination of the copy.

Valid in POST except when creating a LUN clone. A LUN copy request cannot be combined with setting any other LUN properties except the destination location. All other properties of the destination LUN come from the source LUN.

Name	Type	Description
_links	_links	
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN copy. This property can be used to throttle a transfer and limit its impact on the performance of the source and destination nodes. The specified value will be rounded up to the nearest megabyte. If this property is not specified in a POST that begins a LUN copy, throttling is not applied to the data transfer. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. Valid only in a POST that begins a LUN copy or a PATCH when a LUN copy is already in process. • format: int64 • Introduced in: 9.10

Name	Type	Description
name	string	The fully qualified path of the LUN copy source composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Set this property in POST to specify the source for a LUN copy operation.
progress	progress	Properties related to the progress of an active or recently completed LUN copy.
uuid	string	The unique identifier of the LUN copy source. Set this property in POST to specify the source for a LUN copy operation.

copy

This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties.

Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy.

While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN.

There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
destinations	array[destinations]	An array of destination LUNs of LUN copy operations in which the containing LUN is the source of the copy.

Name	Type	Description
source	source	The source LUN of a LUN copy operation in which the containing LUN is the destination of the copy. Valid in POST except when creating a LUN clone. A LUN copy request cannot be combined with setting any other LUN properties except the destination location. All other properties of the destination LUN come from the source LUN.

node

The cluster node that hosts the LUN.

Name	Type	Description
_links	_links	
name	string	
uuid	string	

qtree

The qtree in which the LUN is optionally located. Valid in POST and PATCH.

If properties `name` and `location.qtree.name` and/or `location.qtree.uuid` are specified in the same request, they must refer to the same qtree.

A PATCH that modifies the qtree of the LUN is considered a rename operation.

Name	Type	Description
_links	_links	
id	integer	The identifier for the qtree, unique within the qtree's volume.
name	string	The name of the qtree.

volume

The volume in which the LUN is located. Valid in POST and PATCH.

If properties `name` and `location.volume.name` and/or `location.volume.uuid` are specified in the same request, they must refer to the same volume.

A PATCH that modifies the volume of the LUN begins an asynchronous LUN movement operation.

Name	Type	Description
_links	_links	
name	string	The name of the volume.
uuid	string	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. • example: 028baa66-41bd-11e9-81d5-00a0986138f7 • Introduced in: 9.6

location

The location of the LUN within the ONTAP cluster. Valid in POST and PATCH.

Name	Type	Description
logical_unit	string	The base name component of the LUN. Valid in POST and PATCH. If properties `name` and `location.logical_unit` are specified in the same request, they must refer to the base name. A PATCH that modifies the base name of the LUN is considered a rename operation.
node	node	The cluster node that hosts the LUN.
qtree	qtree	The qtree in which the LUN is optionally located. Valid in POST and PATCH. If properties `name` and `location.qtree.name` and/or `location.qtree.uuid` are specified in the same request, they must refer to the same qtree. A PATCH that modifies the qtree of the LUN is considered a rename operation.

Name	Type	Description
volume	volume	The volume in which the LUN is located. Valid in POST and PATCH. If properties `name` and `location.volume.name` and/or `location.volume.uuid` are specified in the same request, they must refer to the same volume. A PATCH that modifies the volume of the LUN begins an asynchronous LUN movement operation.

igroup

The initiator group to which the LUN is mapped.

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

lun_maps

A LUN map with which the LUN is associated.

Name	Type	Description
_links	_links	
igroup	igroup	The initiator group to which the LUN is mapped.
logical_unit_number	integer	The logical unit number assigned to the LUN for initiators in the initiator group.

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	Peformance 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	Peformance 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.

Name	Type	Description
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

metric

Name	Type	Description
_links	_links	
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.

Name	Type	Description
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.

paths

The fully qualified LUN path names involved in the LUN movement.

Name	Type	Description
destination	string	The fully qualified path of the LUN movement destination composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.

Name	Type	Description
source	string	The fully qualified path of the LUN movement source composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.

error

Error information provided if the asynchronous LUN movement operation fails.

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.

progress

Properties related to the progress of an active or recently completed LUN movement.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN movement, in seconds.
failure	error	Error information provided if the asynchronous LUN movement operation fails.
percent_complete	integer	The percentage completed of the LUN movement.
state	string	The state of the LUN movement. Valid in PATCH when an LUN movement is active. Set to *paused* to pause a LUN movement. Set to *replicating* to resume a paused LUN movement.

Name	Type	Description
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN movement. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN movement.

movement

This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the supplied properties used must refer to the same volume.

Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement.

While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object.

There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN movement. This property can be used to throttle a transfer and limit its impact on the performance of the source and destination nodes. The specified value will be rounded up to the nearest megabyte. If this property is not specified in a POST that begins a LUN movement, throttling is not applied to the data transfer. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. This property is valid only in a POST that begins a LUN movement or a PATCH when a LUN movement is already in process. • format: int64 • Introduced in: 9.6
paths	paths	The fully qualified LUN path names involved in the LUN movement.
progress	progress	Properties related to the progress of an active or recently completed LUN movement.

qos_policy

The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH.

Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.

Name	Type	Description
_links	_links	

Name	Type	Description
name	string	The name of the QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set this property to an empty string ("") in a PATCH request. Valid in POST and PATCH.
uuid	string	The unique identifier of the QoS policy. Valid in POST and PATCH.

guarantee

Properties that request and report the space guarantee for the LUN.

Name	Type	Description
requested	boolean	The requested space reservation policy for the LUN. If *true*, a space reservation is requested for the LUN; if *false*, the LUN is thin provisioned. Guaranteeing a space reservation request for a LUN requires that the volume in which the LUN resides is also space reserved and that the fractional reserve for the volume is 100%. Valid in POST and PATCH.
reserved	boolean	Reports if the LUN is space guaranteed. If *true*, a space guarantee is requested and the containing volume and aggregate support the request. If *false*, a space guarantee is not requested or a space guarantee is requested and either the containing volume or aggregate do not support the request.

space

The storage space related properties of the LUN.

Name	Type	Description
guarantee	guarantee	Properties that request and report the space guarantee for the LUN.
scsi_thin_provisioning_support_enabled	boolean	To leverage the benefits of SCSI thin provisioning, it must be supported by your host. SCSI thin provisioning uses the Logical Block Provisioning feature as defined in the SCSI SBC-3 standard. Only hosts that support this standard can use SCSI thin provisioning in ONTAP. When you enable SCSI thin provisioning support in ONTAP, you turn on the following SCSI thin provisioning features: • Unmapping and reporting space usage for space reclamation • Reporting resource exhaustion errors The value of this property is not propagated to the destination when a LUN is cloned as a new LUN or copied; it is reset to false. The value of this property is maintained from the destination LUN when a LUN is overwritten as a clone. Valid in POST and PATCH. • Default value: • Introduced in: 9.10

Name	Type	Description
size	integer	The total provisioned size of the LUN. The LUN size can be increased but not be made smaller using the REST interface. The maximum and minimum sizes listed here are the absolute maximum and absolute minimum sizes in bytes. The actual minimum and maxiumum sizes vary depending on the ONTAP version, ONTAP platform and the available space in the containing volume and aggregate. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. • example: 1073741824 • format: int64 • Max value: 140737488355328 • Min value: 4096 • Introduced in: 9.6

Name	Type	Description
used	integer	The amount of space consumed by the main data stream of the LUN. This value is the total space consumed in the volume by the LUN, including filesystem overhead, but excluding prefix and suffix streams. Due to internal filesystem overhead and the many ways SAN filesystems and applications utilize blocks within a LUN, this value does not necessarily reflect actual consumption/availability from the perspective of the filesystem or application. Without specific knowledge of how the LUN blocks are utilized outside of ONTAP, this property should not be used as an indicator for an out-of-space condition. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. • format: int64 • readOnly: 1 • Introduced in: 9.6

iops_raw

The number of I/O operations observed at the storage object. This can be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.

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.

Name	Type	Description
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This can be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.
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.

Name	Type	Description
throughput_raw	throughput_raw	Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

status

Status information about the LUN.

Name	Type	Description
container_state	string	The state of the volume and aggregate that contain the LUN. LUNs are only available when their containers are available.
mapped	boolean	Reports if the LUN is mapped to one or more initiator groups. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
read_only	boolean	Reports if the LUN allows only read access.
state	string	The state of the LUN. Normal states for a LUN are *online* and *offline*. Other states indicate errors.

svm

The SVM in which the LUN is located.

Name	Type	Description
_links	_links	

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

partner

The LUN partner that this LUN is bound to. If this LUN is a `vvol` class LUN, the partner is a `protocol_endpoint` class LUN.

Name	Type	Description
_links	_links	
name	string	The name of the partner LUN.
uuid	string	The unique identifier of the partner LUN.

bindings

A vVol binding with which the LUN is associated.

Name	Type	Description
_links	_links	
id	integer	The identifier assigned to the binding. The bind identifier is unique amongst all class `vvol` LUNs bound to the same class `protocol_endpoint` LUN.
partner	partner	The LUN partner that this LUN is bound to. If this LUN is a `vvol` class LUN, the partner is a `protocol_endpoint` class LUN.

vvol

A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping.

See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings.

There is an added computational cost to retrieving property values for `vvol`. They are not populated for

either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
bindings	array[bindings]	Bindings between the LUN, which must be of class `protocol_endpoint` or `vvol`, and LUNs of the opposite class. A class `vvol` LUN must be bound to a class `protocol_endpoint` LUN in order to be accessed. Class `protocol_endpoint` and `vvol` LUNs allow many-to-many bindings. A LUN of one class is allowed to be bound to zero or more LUNs of the opposite class. The binding between any two specific LUNs is reference counted. When a binding is created that already exists, the binding count is incremented. When a binding is deleted, the binding count is decremented, but the LUNs remain bound if the resultant reference count is greater than zero. When the binding count reaches zero, the binding is destroyed. The bindings array contains LUNs of the opposite class of the containing LUN object. There is an added computational cost to retrieving property values for `vvol.bindings`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
is_bound	boolean	Reports if the LUN is part of a VMware virtual volume (vVol) bind relationship. This is `true` if the LUN is of class `protocol_endpoint` or `vvol` and has one or more bindings to a LUN of the opposite class. This is false if the LUN is of class `regular` or unbound.

lun

A LUN is the logical representation of storage in a storage area network (SAN).

In ONTAP, a LUN is located within a volume. Optionally, it can be located within a qtree in a volume.

A LUN can be created to a specified size using thin or thick provisioning. A LUN can then be renamed, resized, cloned, and moved to a different volume. LUNs support the assignment of a quality of service (QoS) policy for performance management or a QoS policy can be assigned to the volume containing the LUN. See the LUN object model to learn more about each of the properties supported by the LUN REST API.

A LUN must be mapped to an initiator group to grant access to the initiator group's initiators (client hosts). Initiators can then access the LUN and perform I/O over a Fibre Channel (FC) fabric using the Fibre Channel Protocol or a TCP/IP network using iSCSI.

Name	Type	Description
_links	_links	

Name	Type	Description
attributes	array[attributes]	An array of name/value pairs optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP. Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes. Valid in POST except when creating a LUN clone. A cloned can already have attributes from its source. You can add, modify, and delete the attributes of a LUN clone in separate requests after creation of the LUN. Attributes may be added/modified/removed for an existing LUN using the /api/storage/luns/{lun.uuid}/attributes endpoint. For further information, see DOC /storage/luns/{lun.uuid}/attributes . There is an added computational cost to retrieving property values for `attributes`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more. • Introduced in: 9.10 • readCreate: 1

Name	Type	Description
auto_delete	boolean	This property marks the LUN for auto deletion when the volume containing the LUN runs out of space. This is most commonly set on LUN clones. When set to *true*, the LUN becomes eligible for automatic deletion when the volume runs out of space. Auto deletion only occurs when the volume containing the LUN is also configured for auto deletion and free space in the volume decreases below a particular threshold. This property is optional in POST and PATCH. The default value for a new LUN is *false*. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
class	string	The class of LUN. Optional in POST.
comment	string	A configurable comment available for use by the administrator. Valid in POST and PATCH.
consistency_group	consistency_group	The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.

Name	Type	Description
copy	copy	This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties. Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy. While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN. There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
create_time	string	The time the LUN was created.

Name	Type	Description
enabled	boolean	The enabled state of the LUN. LUNs can be disabled to prevent access to the LUN. Certain error conditions also cause the LUN to become disabled. If the LUN is disabled, you can consult the `state` property to determine if the LUN is administratively disabled (*offline*) or has become disabled as a result of an error. A LUN in an error condition can be brought online by setting the `enabled` property to *true* or brought administratively offline by setting the `enabled` property to *false*. Upon creation, a LUN is enabled by default. Valid in PATCH.
location	location	The location of the LUN within the ONTAP cluster. Valid in POST and PATCH. • Introduced in: 9.6
lun_maps	array[lun_maps]	The LUN maps with which the LUN is associated. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
metric	metric	

Name	Type	Description
movement	movement	This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the supplied properties used must refer to the same volume. Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement. While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object. There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH. A PATCH that modifies the qtree and/or base name portion of the LUN path is considered a rename operation. A PATCH that modifies the volume portion of the LUN path begins an asynchronous LUN movement operation.
os_type	string	The operating system type of the LUN. Required in POST when creating a LUN that is not a clone of another. Disallowed in POST when creating a LUN clone.
qos_policy	qos_policy	The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH. Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.

Name	Type	Description
serial_number	string	The LUN serial number. The serial number is generated by ONTAP when the LUN is created. • maxLength: 12 • minLength: 12 • readOnly: 1 • Introduced in: 9.6
space	space	The storage space related properties of the LUN.
statistics	statistics	
status	status	Status information about the LUN.
svm	svm	The SVM in which the LUN is located.
uuid	string	The unique identifier of the LUN. The UUID is generated by ONTAP when the LUN is created. • example: 1cd8a442-86d1-11e0-ae1c-123478563412 • readOnly: 1 • Introduced in: 9.6

Name	Type	Description
vvol	vvol	A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping. See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings. There is an added computational cost to retrieving property values for `vvol`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

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.

Create a LUN

POST `/storage/luns`

Introduced In: 9.6

Creates a LUN.

Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the LUN.
- `name`, `location.volume.name` or `location.volume.uuid` - Existing volume in which to create the LUN.
- `name` or `location.logical_unit` - Base name of the LUN.
- `os_type` - Operating system from which the LUN will be accessed. Required when creating a non-clone LUN and disallowed when creating a clone of an existing LUN. A clone's `os_type` is taken from the source LUN.
- `space.size` - Size of the LUN. Required when creating a non-clone LUN and disallowed when creating a clone of an existing LUN. A clone's size is taken from the source LUN.

Recommended optional properties

- `qos_policy.name` or `qos_policy.uuid` - Existing traditional or adaptive QoS policy to be applied to the LUN. All LUNs should be managed by a QoS policy at the volume or LUN level.

Default property values

If not specified in POST, the follow default property values are assigned.

- `auto_delete` - *false*

Related ONTAP commands

- `lun create`
- `lun convert-from-namespace`
- `lun copy start`
- `volume file clone autodelete`
- `volume file clone create`

Learn more

- DOC /storage/luns

Parameters

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
attributes	array[attributes]	An array of name/value pairs optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP. Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes. Valid in POST except when creating a LUN clone. A cloned can already have attributes from its source. You can add, modify, and delete the attributes of a LUN clone in separate requests after creation of the LUN. Attributes may be added/modified/removed for an existing LUN using the /api/storage/luns/{lun.uuid}/attributes endpoint. For further information, see DOC /storage/luns/{lun.uuid}/attributes . There is an added computational cost to retrieving property values for `attributes`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more. • Introduced in: 9.10 • readCreate: 1

Name	Type	Description
auto_delete	boolean	This property marks the LUN for auto deletion when the volume containing the LUN runs out of space. This is most commonly set on LUN clones. When set to *true*, the LUN becomes eligible for automatic deletion when the volume runs out of space. Auto deletion only occurs when the volume containing the LUN is also configured for auto deletion and free space in the volume decreases below a particular threshold. This property is optional in POST and PATCH. The default value for a new LUN is *false*. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
class	string	The class of LUN. Optional in POST.

Name	Type	Description
clone	clone	This sub-object is used in POST to create a new LUN as a clone of an existing LUN, or PATCH to overwrite an existing LUN as a clone of another. Setting a property in this sub-object indicates that a LUN clone is desired. Consider the following other properties when cloning a LUN: `auto_delete`, `qos_policy`, `space.guarantee.requested` and `space.scsi_thin_provisioning_support_enabled`. When used in a PATCH, the patched LUN's data is over-written as a clone of the source and the following properties are preserved from the patched LUN unless otherwise specified as part of the PATCH: `class`, `auto_delete`, `lun_maps`, `serial_number`, `status.state`, and `uuid`. Persistent reservations for the patched LUN are also preserved.
comment	string	A configurable comment available for use by the administrator. Valid in POST and PATCH.
consistency_group	consistency_group	The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.
convert	convert	This sub-object is used in POST to convert a valid in-place NVMe namespace to a LUN. Setting a property in this sub-object indicates that a conversion from the specified NVMe namespace to LUN is desired.

Name	Type	Description
copy	copy	This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties. Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy. While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN. There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
create_time	string	The time the LUN was created.

Name	Type	Description
location	location	The location of the LUN within the ONTAP cluster. Valid in POST and PATCH. • Introduced in: 9.6
lun_maps	array[lun_maps]	The LUN maps with which the LUN is associated. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
movement	movement	This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the supplied properties used must refer to the same volume. Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement. While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object. There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH. A PATCH that modifies the qtree and/or base name portion of the LUN path is considered a rename operation. A PATCH that modifies the volume portion of the LUN path begins an asynchronous LUN movement operation.
os_type	string	The operating system type of the LUN. Required in POST when creating a LUN that is not a clone of another. Disallowed in POST when creating a LUN clone.
qos_policy	qos_policy	The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH. Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.

Name	Type	Description
serial_number	string	The LUN serial number. The serial number is generated by ONTAP when the LUN is created. • maxLength: 12 • minLength: 12 • readOnly: 1 • Introduced in: 9.6
space	space	The storage space related properties of the LUN.
status	status	Status information about the LUN.
svm	svm	The SVM in which the LUN is located.
uuid	string	The unique identifier of the LUN. The UUID is generated by ONTAP when the LUN is created. • example: 1cd8a442-86d1-11e0-ae1c-123478563412 • readOnly: 1 • Introduced in: 9.6

Name	Type	Description
vvol	vvol	A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping. See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings. There is an added computational cost to retrieving property values for `vvol`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Example request


```
{
  "attributes": [
    {
      "name": "name1",
      "value": "value1"
    }
  ],
  "class": "string",
  "clone": {
    "source": {
      "name": "/vol/volume1/lun1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    }
  },
  "comment": "string",
  "consistency_group": {
    "name": "cg1",
    "uuid": "4abc2317-4332-9d37-93a0-20bd29c22df0"
  },
  "convert": {
    "namespace": {
      "name": "/vol/volume1/namespace1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    }
  },
  "copy": {
    "destinations": [
      {
        "max_throughput": 0,
        "name": "/vol/vol1/lun1",
        "progress": {
          "elapsed": 0,
          "percent_complete": 0,
          "state": "string"
        },
        "uuid": "1bc327d5-4654-5284-a116-f182282240b4"
      }
    ],
    "source": {
      "name": "/vol/vol2/lun1",
      "uuid": "03c05019-40d9-3945-c767-dca4c3be5e90"
    }
  },
  "create_time": "2018-06-04T19:00:00Z",
```

```
  "enabled": null,
  "location": {
    "logical_unit": "lun1",
    "node": {
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "qtree": {
      "id": 1,
      "name": "qt1"
    },
    "volume": {
      "name": "volume1",
      "uuid": "028baa66-41bd-11e9-81d5-00a0986138f7"
    }
  },
  "lun_maps": [
    {
      "igroup": {
        "name": "igroup1",
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "logical_unit_number": 0
    }
  ],
  "movement": {
    "paths": {
      "destination": "/vol/vol1/lun1",
      "source": "/vol/vol2/lun2"
    }
  },
  "name": "/vol/volume1/qtree1/lun1",
  "os_type": "string",
  "qos_policy": {
    "name": "qos1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "serial_number": "string",
  "space": {
    "size": 1073741824,
    "used": 0
  },
  "status": {
    "container_state": "string",
    "state": "online"
  },
```

```
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
  "vvol": {
    "bindings": [
      {
        "id": 1,
        "partner": {
          "name": "/vol/vol1/lun1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      }
    ]
  }
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[lun]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "attributes": [
        {
          "name": "name1",
          "value": "value1"
        }
      ],
      "class": "string",
      "clone": {
        "source": {
          "name": "/vol/volume1/lun1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        }
      },
      "comment": "string",
      "consistency_group": {
        "name": "cg1",
        "uuid": "4abc2317-4332-9d37-93a0-20bd29c22df0"
      },
      "convert": {
        "namespace": {
          "name": "/vol/volume1/namespace1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        }
      },
      "copy": {
        "destinations": [
          {
            "max_throughput": 0,
            "name": "/vol/vol1/lun1",
            "progress": {
              "elapsed": 0,
              "percent_complete": 0,
              "state": "string"
            },
            "uuid": "1bc327d5-4654-5284-a116-f182282240b4"
          }
        ],
        "source": {
          "name": "/vol/vol2/lun1",
          "uuid": "03c05019-40d9-3945-c767-dca4c3be5e90"
```

```
      }
    },
    "create_time": "2018-06-04T19:00:00Z",
    "enabled": null,
    "location": {
      "logical_unit": "lun1",
      "node": {
        "name": "node1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "qtree": {
        "id": 1,
        "name": "qt1"
      },
      "volume": {
        "name": "volume1",
        "uuid": "028baa66-41bd-11e9-81d5-00a0986138f7"
      }
    },
    "lun_maps": [
      {
        "igroup": {
          "name": "igroup1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        },
        "logical_unit_number": 0
      }
    ],
    "movement": {
      "paths": {
        "destination": "/vol/vol1/lun1",
        "source": "/vol/vol2/lun2"
      }
    },
    "name": "/vol/volume1/qtree1/lun1",
    "os_type": "string",
    "qos_policy": {
      "name": "qos1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "serial_number": "string",
    "space": {
      "size": 1073741824,
      "used": 0
    },
    "status": {
```

```
        "container_state": "string",
        "state": "online"
      },
      "svm": {
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
      "vvol": {
        "bindings": [
          {
            "id": 1,
            "partner": {
              "name": "/vol/vol1/lun1",
              "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
            }
          }
        ]
      }
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
917927	The specified volume was not found.
918236	The specified `location.volume.uuid` and `location.volume.name` do not refer to the same volume.
2621462	The specified SVM does not exist.
2621706	The specified `svm.uuid` and `svm.name` do not refer to the same SVM.

Error Code	Description
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5242927	The specified qtree was not found.
5242950	The specified `location.qtree.id` and `location.qtree.name` do not refer to the same qtree.
5374121	A LUN name can only contain characters A-Z, a-z, 0-9, "-", ".", "_", "{" and "}".
5374123	A negative size was provided for the LUN.
5374124	The specified size is too small for the LUN.
5374125	The specified size is too large for the LUN.
5374129	LUNs cannot be created on a load sharing mirror volume.
5374130	An invalid size value was provided.
5374237	LUNs cannot be created on an SVM root volume.
5374238	LUNs cannot be created in Snapshot copies.
5374241	A size value with invalid units was provided.
5374242	A LUN or NVMe namespace already exists at the specified path.
5374352	An invalid name was provided for the LUN.
5374707	Creating a LUN in the specific volume is not allowed because the volume is reserved for an application.
5374858	The volume specified by `name` is not the same as that specified by `location.volume`.
5374859	No volume was specified for the LUN.
5374860	The qtree specified by `name` is not the same as that specified by `location.qtree`.
5374861	The LUN base name specified by `name` is not the same as that specified by `location.logical_unit`.
5374862	No LUN path base name was provided for the LUN.
5374863	An error occurred after successfully creating the LUN. Some properties were not set.
5374874	The specified `clone.source.uuid` and `clone.source.name` do not refer to the same LUN.
5374875	The specified `clone.source` was not found.
5374876	The specified `clone.source` was not found.

Error Code	Description
5374883	The property cannot be specified when creating a LUN clone. The `target` property of the error object identifies the property.
5374884	A property that is required when creating a new LUN that is not a LUN clone or LUN copy was not supplied. The `target` property of the error object identifies the property.
5374886	An error occurred after successfully creating the LUN preventing the retrieval of its properties.
5374899	The `clone.source.uuid` property is not supported when specifying a source LUN from a Snapshot copy.
5374928	An incomplete attribute name/value pair was supplied.
5374929	The combined sizes of an attribute name and value are too large.
5374932	A name for an attribute was duplicated.
5374942	The property cannot be specified at the same time when creating a LUN as a clone. The `target` property of the error object identifies the other property given with clone.
5374943	The property cannot be specified at the same time when creating a LUN as a copy. The `target` property of the error object identifies the other property given with copy.
5374944	The property cannot be specified when converting an NVMe namespace into a LUN. The `target` property of the error object identifies the property.
7018877	Maximum combined total (50) of file and LUN copy and move operations reached. When one or more of the operations has completed, try the command again.
13565952	The LUN clone request failed.
72089755	NVMe namespace with a block size of 4096 bytes cannot be converted to a LUN.
72089756	Namespace is currently mapped to subsystem.
72089757	NVMe namespace in a Snapshot copy cannot be converted to a LUN.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

attributes

A name/value pair optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP.

Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes.

Optional in POST.

Name	Type	Description
name	string	The attribute name.
value	string	The attribute value.

source

The source LUN for a LUN clone operation. This can be specified using property `clone.source.uuid` or `clone.source.name`. If both properties are supplied, they must refer to the same LUN.

Valid in POST to create a new LUN as a clone of the source.

Valid in PATCH to overwrite an existing LUN's data as a clone of another.

Name	Type	Description
name	string	The fully qualified path name of the clone source LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH.
uuid	string	The unique identifier of the clone source LUN. Valid in POST and PATCH.

clone

This sub-object is used in POST to create a new LUN as a clone of an existing LUN, or PATCH to overwrite an existing LUN as a clone of another. Setting a property in this sub-object indicates that a LUN

clone is desired. Consider the following other properties when cloning a LUN: `auto_delete`, `qos_policy`, `space.guarantee.requested` and `space.scsi_thin_provisioning_support_enabled`.

When used in a PATCH, the patched LUN's data is over-written as a clone of the source and the following properties are preserved from the patched LUN unless otherwise specified as part of the PATCH: `class`, `auto_delete`, `lun_maps`, `serial_number`, `status.state`, and `uuid`.

Persistent reservations for the patched LUN are also preserved.

Name	Type	Description
source	source	The source LUN for a LUN clone operation. This can be specified using property `clone.source.uuid` or `clone.source.name`. If both properties are supplied, they must refer to the same LUN. Valid in POST to create a new LUN as a clone of the source. Valid in PATCH to overwrite an existing LUN's data as a clone of another.

consistency_group

The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.

Name	Type	Description
name	string	The name of the consistency group.
uuid	string	The unique identifier of the consistency group.

namespace

The source namespace for convert operation. This can be specified using property `convert.namespace.uuid` or `convert.namespace.name`. If both properties are supplied, they must refer to the same NVMe namespace.

Valid in POST. A convert request from NVMe namespace to LUN cannot be combined with setting any other LUN properties. All other properties of the converted LUN comes from the source NVMe namespace.

Name	Type	Description
name	string	The fully qualified path name of the source NVMe namespace composed of a "/vol" prefix, the volume name, the (optional) qtree name and base name of the NVMe namespace. Valid in POST.
uuid	string	The unique identifier of the source NVMe namespace. Valid in POST.

convert

This sub-object is used in POST to convert a valid in-place NVMe namespace to a LUN. Setting a property in this sub-object indicates that a conversion from the specified NVMe namespace to LUN is desired.

Name	Type	Description
namespace	namespace	The source namespace for convert operation. This can be specified using property `convert.namespace.uuid` or `convert.namespace.name`. If both properties are supplied, they must refer to the same NVMe namespace. Valid in POST. A convert request from NVMe namespace to LUN cannot be combined with setting any other LUN properties. All other properties of the converted LUN comes from the source NVMe namespace.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Error information provided if the asynchronous LUN copy operation fails.

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.

progress

Properties related to the progress of an active or recently completed LUN copy.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN copy, in seconds.
percent_complete	integer	The percentage completed of the LUN copy.
state	string	The state of the LUN copy.
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN copy. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN copy.

destinations

A LUN copy operation in which the containing LUN is the source of the copy.

Name	Type	Description
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN copy. See property `copy.source.max_throughput` for further details.

Name	Type	Description
name	string	The fully qualified path of the LUN copy destination composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.
progress	progress	Properties related to the progress of an active or recently completed LUN copy.
uuid	string	The unique identifier of the LUN copy destination.

progress

Properties related to the progress of an active or recently completed LUN copy.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN copy, in seconds.
percent_complete	integer	The percentage completed of the LUN copy.
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN copy. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN copy.

source

The source LUN of a LUN copy operation in which the containing LUN is the destination of the copy.

Valid in POST except when creating a LUN clone. A LUN copy request cannot be combined with setting any other LUN properties except the destination location. All other properties of the destination LUN come from the source LUN.

Name	Type	Description
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN copy. This property can be used to throttle a transfer and limit its impact on the performance of the source and destination nodes. The specified value will be rounded up to the nearest megabyte. If this property is not specified in a POST that begins a LUN copy, throttling is not applied to the data transfer. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. Valid only in a POST that begins a LUN copy or a PATCH when a LUN copy is already in process. • format: int64 • Introduced in: 9.10
name	string	The fully qualified path of the LUN copy source composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Set this property in POST to specify the source for a LUN copy operation.
uuid	string	The unique identifier of the LUN copy source. Set this property in POST to specify the source for a LUN copy operation.

copy

This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties.

Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the

copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy.

While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN.

There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
destinations	array[destinations]	An array of destination LUNs of LUN copy operations in which the containing LUN is the source of the copy.
source	source	The source LUN of a LUN copy operation in which the containing LUN is the destination of the copy. Valid in POST except when creating a LUN clone. A LUN copy request cannot be combined with setting any other LUN properties except the destination location. All other properties of the destination LUN come from the source LUN.

node

The cluster node that hosts the LUN.

Name	Type	Description
name	string	
uuid	string	

qtree

The qtree in which the LUN is optionally located. Valid in POST and PATCH.

If properties `name` and `location.qtree.name` and/or `location.qtree.uuid` are specified in the same request, they must refer to the same qtree.

A PATCH that modifies the qtree of the LUN is considered a rename operation.

Name	Type	Description
id	integer	The identifier for the qtree, unique within the qtree's volume.
name	string	The name of the qtree.

volume

The volume in which the LUN is located. Valid in POST and PATCH.

If properties `name` and `location.volume.name` and/or `location.volume.uuid` are specified in the same request, they must refer to the same volume.

A PATCH that modifies the volume of the LUN begins an asynchronous LUN movement operation.

Name	Type	Description
name	string	The name of the volume.
uuid	string	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. • example: 028baa66-41bd-11e9-81d5-00a0986138f7 • Introduced in: 9.6

location

The location of the LUN within the ONTAP cluster. Valid in POST and PATCH.

Name	Type	Description
logical_unit	string	The base name component of the LUN. Valid in POST and PATCH. If properties `name` and `location.logical_unit` are specified in the same request, they must refer to the base name. A PATCH that modifies the base name of the LUN is considered a rename operation.

Name	Type	Description
node	node	The cluster node that hosts the LUN.
qtree	qtree	The qtree in which the LUN is optionally located. Valid in POST and PATCH. If properties `name` and `location.qtree.name` and/or `location.qtree.uuid` are specified in the same request, they must refer to the same qtree. A PATCH that modifies the qtree of the LUN is considered a rename operation.
volume	volume	The volume in which the LUN is located. Valid in POST and PATCH. If properties `name` and `location.volume.name` and/or `location.volume.uuid` are specified in the same request, they must refer to the same volume. A PATCH that modifies the volume of the LUN begins an asynchronous LUN movement operation.

igroup

The initiator group to which the LUN is mapped.

Name	Type	Description
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

lun_maps

A LUN map with which the LUN is associated.

Name	Type	Description
igroup	igroup	The initiator group to which the LUN is mapped.
logical_unit_number	integer	The logical unit number assigned to the LUN for initiators in the initiator group.

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	Peformance 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.

Name	Type	Description
write	integer	Peformance 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	Peformance metric for write I/O operations.

metric

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.

Name	Type	Description
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.

paths

The fully qualified LUN path names involved in the LUN movement.

Name	Type	Description
destination	string	The fully qualified path of the LUN movement destination composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.

Name	Type	Description
source	string	The fully qualified path of the LUN movement source composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.

error

Error information provided if the asynchronous LUN movement operation fails.

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.

progress

Properties related to the progress of an active or recently completed LUN movement.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN movement, in seconds.
percent_complete	integer	The percentage completed of the LUN movement.
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN movement. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN movement.

movement

This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the

supplied properties used must refer to the same volume.

Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement.

While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object.

There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN movement. This property can be used to throttle a transfer and limit its impact on the performance of the source and destination nodes. The specified value will be rounded up to the nearest megabyte. If this property is not specified in a POST that begins a LUN movement, throttling is not applied to the data transfer. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. This property is valid only in a POST that begins a LUN movement or a PATCH when a LUN movement is already in process. • format: int64 • Introduced in: 9.6
paths	paths	The fully qualified LUN path names involved in the LUN movement.

qos_policy

The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH.

Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.

Name	Type	Description
name	string	The name of the QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set this property to an empty string ("") in a PATCH request. Valid in POST and PATCH.
uuid	string	The unique identifier of the QoS policy. Valid in POST and PATCH.

guarantee

Properties that request and report the space guarantee for the LUN.

Name	Type	Description
requested	boolean	The requested space reservation policy for the LUN. If *true*, a space reservation is requested for the LUN; if *false*, the LUN is thin provisioned. Guaranteeing a space reservation request for a LUN requires that the volume in which the LUN resides is also space reserved and that the fractional reserve for the volume is 100%. Valid in POST and PATCH.
reserved	boolean	Reports if the LUN is space guaranteed. If *true*, a space guarantee is requested and the containing volume and aggregate support the request. If *false*, a space guarantee is not requested or a space guarantee is requested and either the containing volume or aggregate do not support the request.

space

The storage space related properties of the LUN.

Name	Type	Description
guarantee	guarantee	Properties that request and report the space guarantee for the LUN.
scsi_thin_provisioning_support_enabled	boolean	To leverage the benefits of SCSI thin provisioning, it must be supported by your host. SCSI thin provisioning uses the Logical Block Provisioning feature as defined in the SCSI SBC-3 standard. Only hosts that support this standard can use SCSI thin provisioning in ONTAP. When you enable SCSI thin provisioning support in ONTAP, you turn on the following SCSI thin provisioning features: • Unmapping and reporting space usage for space reclamation • Reporting resource exhaustion errors The value of this property is not propagated to the destination when a LUN is cloned as a new LUN or copied; it is reset to false. The value of this property is maintained from the destination LUN when a LUN is overwritten as a clone. Valid in POST and PATCH. • Default value: 1 • Introduced in: 9.10

Name	Type	Description
size	integer	The total provisioned size of the LUN. The LUN size can be increased but not be made smaller using the REST interface. The maximum and minimum sizes listed here are the absolute maximum and absolute minimum sizes in bytes. The actual minimum and maxiumum sizes vary depending on the ONTAP version, ONTAP platform and the available space in the containing volume and aggregate. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. • example: 1073741824 • format: int64 • Max value: 140737488355328 • Min value: 4096 • Introduced in: 9.6

Name	Type	Description
used	integer	The amount of space consumed by the main data stream of the LUN. This value is the total space consumed in the volume by the LUN, including filesystem overhead, but excluding prefix and suffix streams. Due to internal filesystem overhead and the many ways SAN filesystems and applications utilize blocks within a LUN, this value does not necessarily reflect actual consumption/availability from the perspective of the filesystem or application. Without specific knowledge of how the LUN blocks are utilized outside of ONTAP, this property should not be used as an indicator for an out-of-space condition. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. • format: int64 • readOnly: 1 • Introduced in: 9.6

iops_raw

The number of I/O operations observed at the storage object. This can be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.

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.

Name	Type	Description
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This can be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.
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.

Name	Type	Description
throughput_raw	throughput_raw	Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

status

Status information about the LUN.

Name	Type	Description
container_state	string	The state of the volume and aggregate that contain the LUN. LUNs are only available when their containers are available.
mapped	boolean	Reports if the LUN is mapped to one or more initiator groups. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
read_only	boolean	Reports if the LUN allows only read access.
state	string	The state of the LUN. Normal states for a LUN are *online* and *offline*. Other states indicate errors.

svm

The SVM in which the LUN is located.

Name	Type	Description
name	string	The name of the SVM.

Name	Type	Description
uuid	string	The unique identifier of the SVM.

partner

The LUN partner that this LUN is bound to. If this LUN is a `vvol` class LUN, the partner is a `protocol_endpoint` class LUN.

Name	Type	Description
name	string	The name of the partner LUN.
uuid	string	The unique identifier of the partner LUN.

bindings

A vVol binding with which the LUN is associated.

Name	Type	Description
id	integer	The identifier assigned to the binding. The bind identifier is unique amongst all class `vvol` LUNs bound to the same class `protocol_endpoint` LUN.
partner	partner	The LUN partner that this LUN is bound to. If this LUN is a `vvol` class LUN, the partner is a `protocol_endpoint` class LUN.

vvol

A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping.

See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings.

There is an added computational cost to retrieving property values for `vvol`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
bindings	array[bindings]	Bindings between the LUN, which must be of class `protocol_endpoint` or `vvol`, and LUNs of the opposite class. A class `vvol` LUN must be bound to a class `protocol_endpoint` LUN in order to be accessed. Class `protocol_endpoint` and `vvol` LUNs allow many-to-many bindings. A LUN of one class is allowed to be bound to zero or more LUNs of the opposite class. The binding between any two specific LUNs is reference counted. When a binding is created that already exists, the binding count is incremented. When a binding is deleted, the binding count is decremented, but the LUNs remain bound if the resultant reference count is greater than zero. When the binding count reaches zero, the binding is destroyed. The bindings array contains LUNs of the opposite class of the containing LUN object. There is an added computational cost to retrieving property values for `vvol.bindings`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
is_bound	boolean	Reports if the LUN is part of a VMware virtual volume (vVol) bind relationship. This is `true` if the LUN is of class `protocol_endpoint` or `vvol` and has one or more bindings to a LUN of the opposite class. This is false if the LUN is of class `regular` or unbound.

lun

A LUN is the logical representation of storage in a storage area network (SAN).

In ONTAP, a LUN is located within a volume. Optionally, it can be located within a qtree in a volume.

A LUN can be created to a specified size using thin or thick provisioning. A LUN can then be renamed, resized, cloned, and moved to a different volume. LUNs support the assignment of a quality of service (QoS) policy for performance management or a QoS policy can be assigned to the volume containing the LUN. See the LUN object model to learn more about each of the properties supported by the LUN REST API.

A LUN must be mapped to an initiator group to grant access to the initiator group's initiators (client hosts). Initiators can then access the LUN and perform I/O over a Fibre Channel (FC) fabric using the Fibre Channel Protocol or a TCP/IP network using iSCSI.

Name	Type	Description
attributes	array[attributes]	An array of name/value pairs optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP. Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes. Valid in POST except when creating a LUN clone. A cloned can already have attributes from its source. You can add, modify, and delete the attributes of a LUN clone in separate requests after creation of the LUN. Attributes may be added/modified/removed for an existing LUN using the /api/storage/luns/{lun.uuid}/attributes endpoint. For further information, see DOC /storage/luns/{lun.uuid}/attributes . There is an added computational cost to retrieving property values for `attributes`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more. • Introduced in: 9.10 • readCreate: 1

Name	Type	Description
auto_delete	boolean	This property marks the LUN for auto deletion when the volume containing the LUN runs out of space. This is most commonly set on LUN clones. When set to *true*, the LUN becomes eligible for automatic deletion when the volume runs out of space. Auto deletion only occurs when the volume containing the LUN is also configured for auto deletion and free space in the volume decreases below a particular threshold. This property is optional in POST and PATCH. The default value for a new LUN is *false*. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
class	string	The class of LUN. Optional in POST.

Name	Type	Description
clone	clone	This sub-object is used in POST to create a new LUN as a clone of an existing LUN, or PATCH to overwrite an existing LUN as a clone of another. Setting a property in this sub-object indicates that a LUN clone is desired. Consider the following other properties when cloning a LUN: `auto_delete`, `qos_policy`, `space.guarantee.requested` and `space.scsi_thin_provisioning_support_enabled`. When used in a PATCH, the patched LUN's data is over-written as a clone of the source and the following properties are preserved from the patched LUN unless otherwise specified as part of the PATCH: `class`, `auto_delete`, `lun_maps`, `serial_number`, `status.state`, and `uuid`. Persistent reservations for the patched LUN are also preserved.
comment	string	A configurable comment available for use by the administrator. Valid in POST and PATCH.
consistency_group	consistency_group	The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.
convert	convert	This sub-object is used in POST to convert a valid in-place NVMe namespace to a LUN. Setting a property in this sub-object indicates that a conversion from the specified NVMe namespace to LUN is desired.

Name	Type	Description
copy	copy	This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties. Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy. While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN. There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
create_time	string	The time the LUN was created.

Name	Type	Description
location	location	The location of the LUN within the ONTAP cluster. Valid in POST and PATCH. • Introduced in: 9.6
lun_maps	array[lun_maps]	The LUN maps with which the LUN is associated. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
movement	movement	This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the supplied properties used must refer to the same volume. Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement. While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object. There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH. A PATCH that modifies the qtree and/or base name portion of the LUN path is considered a rename operation. A PATCH that modifies the volume portion of the LUN path begins an asynchronous LUN movement operation.
os_type	string	The operating system type of the LUN. Required in POST when creating a LUN that is not a clone of another. Disallowed in POST when creating a LUN clone.
qos_policy	qos_policy	The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH. Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.

Name	Type	Description
serial_number	string	The LUN serial number. The serial number is generated by ONTAP when the LUN is created. • maxLength: 12 • minLength: 12 • readOnly: 1 • Introduced in: 9.6
space	space	The storage space related properties of the LUN.
status	status	Status information about the LUN.
svm	svm	The SVM in which the LUN is located.
uuid	string	The unique identifier of the LUN. The UUID is generated by ONTAP when the LUN is created. • example: 1cd8a442-86d1-11e0-ae1c-123478563412 • readOnly: 1 • Introduced in: 9.6

Name	Type	Description
vvol	vvol	A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping. See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings. There is an added computational cost to retrieving property values for `vvol`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

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.

Delete a LUN

DELETE `/storage/luns/{uuid}`

Introduced In: 9.6

Deletes a LUN.

Related ONTAP commands

- `lun copy cancel`
- `lun delete`

Learn more

- DOC /storage/luns

Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the LUN to retrieve.
allow_delete_while_mapped	boolean	query	False	Allows deletion of a mapped LUN. A mapped LUN might be in use. Deleting a mapped LUN also deletes the LUN map and makes the data no longer available. This might cause a disruption in the availability of data. **This parameter should be used with caution.** • Default value:

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254197	The LUN is mapped and cannot be deleted without specifying the `allow_delete_while_mapped` query parameter.
5374705	Deleting the LUN is not allowed because it is part of an application.
5374865	The LUN's aggregate is offline. The aggregate must be online to modify or remove the LUN.
5374866	The LUN's volume is offline. The volume must be online to modify or remove the LUN.
5374875	The specified LUN was not found.
5374876	The specified LUN was not found.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve LUN properties or data

GET `/storage/luns/{uuid}`

Introduced In: 9.6

Retrieves a LUN's properties or a LUN's data.

LUN data read requests are distinguished by the header entry `Accept: multipart/form-data`. When this header entry is provided, query parameters `data.offset` and `data.size` are required and used to specify the portion of the LUN's data to read; no other query parameters are allowed. Reads are limited to one megabyte (1MB) per request. Data is returned as `multipart/form-data` content with exactly one form entry containing the data. The form entry has content type `application/octet-stream`.

Expensive properties

There is an added computational cost to retrieving values for these properties. They are not included by default in GET results and must be explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

- `attributes.*`
- `auto_delete`
- `copy.*`
- `lun_maps.*`

- `movement.*`
- `statistics.*`
- `vvol.bindings.*`
- `metric.*`

Related ONTAP commands

- `lun bind show`
- `lun copy show`
- `lun mapping show`
- `lun move show`
- `lun show`
- `volume file clone show-autodelete`

Learn more

- DOC /storage/luns

Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the LUN to retrieve.

Name	Type	In	Required	Description
data.offset	integer	query	False	The offset, in bytes, at which to begin reading LUN data. LUN data read requests are distinguished by the header entry `Accept: multipart/form-data`. When this header entry is provided, query parameters `data.offset` and `data.size` are required and used to specify the portion of the LUN's data to read; no other query parameters are allowed. Reads are limited to one megabyte (1MB) per request. Data is returned as `multipart/form-data` content with exactly one form entry containing the data. The form entry has content type `application/octet-stream`. • format: int64 • Min value: 0 • Introduced in: 9.11

Name	Type	In	Required	Description
data.size	integer	query	False	The size, in bytes, of LUN data to read. LUN data read requests are distinguished by the header entry `Accept: multipart/form-data`. When this header entry is provided, query parameters `data.offset` and `data.size` are required and used to specify the portion of the LUN's data to read; no other query parameters are allowed. Reads are limited to one megabyte (1MB) per request. Data is returned as `multipart/form-data` content with exactly one form entry containing the data. The form entry has content type `application/octet-stream`. • format: int64 • Min value: 1 • Introduced in: 9.11 • Max value: 1048576
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
attributes	array[attributes]	An array of name/value pairs optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP. Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes. Valid in POST except when creating a LUN clone. A cloned can already have attributes from its source. You can add, modify, and delete the attributes of a LUN clone in separate requests after creation of the LUN. Attributes may be added/modified/removed for an existing LUN using the /api/storage/luns/{lun.uuid}/attributes endpoint. For further information, see DOC /storage/luns/{lun.uuid}/attributes . There is an added computational cost to retrieving property values for `attributes`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more. • Introduced in: 9.10 • readCreate: 1

Name	Type	Description
auto_delete	boolean	This property marks the LUN for auto deletion when the volume containing the LUN runs out of space. This is most commonly set on LUN clones. When set to *true*, the LUN becomes eligible for automatic deletion when the volume runs out of space. Auto deletion only occurs when the volume containing the LUN is also configured for auto deletion and free space in the volume decreases below a particular threshold. This property is optional in POST and PATCH. The default value for a new LUN is *false*. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
class	string	The class of LUN. Optional in POST.
comment	string	A configurable comment available for use by the administrator. Valid in POST and PATCH.
consistency_group	consistency_group	The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.

Name	Type	Description
copy	copy	This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties. Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy. While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN. There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
create_time	string	The time the LUN was created.

Name	Type	Description
enabled	boolean	The enabled state of the LUN. LUNs can be disabled to prevent access to the LUN. Certain error conditions also cause the LUN to become disabled. If the LUN is disabled, you can consult the `state` property to determine if the LUN is administratively disabled (*offline*) or has become disabled as a result of an error. A LUN in an error condition can be brought online by setting the `enabled` property to *true* or brought administratively offline by setting the `enabled` property to *false*. Upon creation, a LUN is enabled by default. Valid in PATCH.
location	location	The location of the LUN within the ONTAP cluster. Valid in POST and PATCH. • Introduced in: 9.6
lun_maps	array[lun_maps]	The LUN maps with which the LUN is associated. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
metric	metric	

Name	Type	Description
movement	movement	This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the supplied properties used must refer to the same volume. Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement. While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object. There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH. A PATCH that modifies the qtree and/or base name portion of the LUN path is considered a rename operation. A PATCH that modifies the volume portion of the LUN path begins an asynchronous LUN movement operation.
os_type	string	The operating system type of the LUN. Required in POST when creating a LUN that is not a clone of another. Disallowed in POST when creating a LUN clone.
qos_policy	qos_policy	The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH. Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.

Name	Type	Description
serial_number	string	The LUN serial number. The serial number is generated by ONTAP when the LUN is created. • maxLength: 12 • minLength: 12 • readOnly: 1 • Introduced in: 9.6
space	space	The storage space related properties of the LUN.
statistics	statistics	
status	status	Status information about the LUN.
svm	svm	The SVM in which the LUN is located.
uuid	string	The unique identifier of the LUN. The UUID is generated by ONTAP when the LUN is created. • example: 1cd8a442-86d1-11e0-ae1c-123478563412 • readOnly: 1 • Introduced in: 9.6

Name	Type	Description
vvol	vvol	A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping. See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings. There is an added computational cost to retrieving property values for `vvol`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "attributes": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "name1",
      "value": "value1"
    }
  ],
  "class": "string",
  "comment": "string",
  "consistency_group": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "cg1",
    "uuid": "4abc2317-4332-9d37-93a0-20bd29c22df0"
  },
  "copy": {
    "destinations": [
      {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "max_throughput": 0,
        "name": "/vol/vol1/lun1",
        "progress": {
          "elapsed": 0,
          "failure": {
            "arguments": [
              {
                "code": "string",
```

```
              "message": "string"
            }
          ],
          "code": "4",
          "message": "entry doesn't exist",
          "target": "uuid"
        },
        "percent_complete": 0,
        "state": "string"
      },
      "uuid": "1bc327d5-4654-5284-a116-f182282240b4"
    }
  ],
  "source": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "/vol/vol2/lun1",
    "progress": {
      "elapsed": 0,
      "failure": {
        "arguments": [
          {
            "code": "string",
            "message": "string"
          }
        ],
        "code": "4",
        "message": "entry doesn't exist",
        "target": "uuid"
      },
      "percent_complete": 0,
      "state": "string"
    },
    "uuid": "03c05019-40d9-3945-c767-dca4c3be5e90"
  }
},
"create_time": "2018-06-04T19:00:00Z",
"location": {
  "logical_unit": "lun1",
  "node": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
```

```
        }
      },
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "qtree": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "id": 1,
      "name": "qt1"
    },
    "volume": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "volume1",
      "uuid": "028baa66-41bd-11e9-81d5-00a0986138f7"
    }
  },
  "lun_maps": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "igroup1",
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "logical_unit_number": 0
    }
  ],
  "metric": {
    "_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": "2017-01-25T11:20:13Z"
  },
  "movement": {
    "paths": {
      "destination": "/vol/vol1/lun1",
      "source": "/vol/vol2/lun2"
    },
    "progress": {
      "elapsed": 0,
      "failure": {
        "arguments": [
          {
            "code": "string",
            "message": "string"
          }
        ],
        "code": "4",
        "message": "entry doesn't exist",
        "target": "uuid"
      },
      "percent_complete": 0,
      "state": "string"
    }
  },
  "name": "/vol/volume1/qtree1/lun1",
  "os_type": "string",
```

```
  "qos_policy": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "qos1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "serial_number": "string",
  "space": {
    "size": 1073741824,
    "used": 0
  },
  "statistics": {
    "iops_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "latency_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "status": "ok",
    "throughput_raw": {
      "read": 200,
      "total": 1000,
      "write": 100
    },
    "timestamp": "2017-01-25T11:20:13Z"
  },
  "status": {
    "container_state": "string",
    "state": "online"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
```

```
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
  "vvol": {
    "bindings": [
      {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "id": 1,
        "partner": {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "name": "/vol/vol1/lun1",
          "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
        }
      }
    ]
  }
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The specified LUN was not found.
5374876	The specified LUN was not found.

Name	Type	Description
error	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
self	href	

attributes

A name/value pair optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP.

Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes.

Optional in POST.

Name	Type	Description
_links	_links	
name	string	The attribute name.
value	string	The attribute value.

source

The source LUN for a LUN clone operation. This can be specified using property `clone.source.uuid` or `clone.source.name`. If both properties are supplied, they must refer to the same LUN.

Valid in POST to create a new LUN as a clone of the source.

Valid in PATCH to overwrite an existing LUN's data as a clone of another.

clone

This sub-object is used in POST to create a new LUN as a clone of an existing LUN, or PATCH to overwrite an existing LUN as a clone of another. Setting a property in this sub-object indicates that a LUN clone is desired. Consider the following other properties when cloning a LUN: `auto_delete`, `qos_policy`, `space.guarantee.requested` and `space.scsi_thin_provisioning_support_enabled`.

When used in a PATCH, the patched LUN's data is over-written as a clone of the source and the following properties are preserved from the patched LUN unless otherwise specified as part of the PATCH: `class`, `auto_delete`, `lun_maps`, `serial_number`, `status.state`, and `uuid`.

Persistent reservations for the patched LUN are also preserved.

consistency_group

The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.

Name	Type	Description
_links	_links	
name	string	The name of the consistency group.
uuid	string	The unique identifier of the consistency group.

namespace

The source namespace for convert operation. This can be specified using property `convert.namespace.uuid` or `convert.namespace.name`. If both properties are supplied, they must refer to the same NVMe namespace.

Valid in POST. A convert request from NVMe namespace to LUN cannot be combined with setting any other LUN properties. All other properties of the converted LUN comes from the source NVMe namespace.

convert

This sub-object is used in POST to convert a valid in-place NVMe namespace to a LUN. Setting a property in this sub-object indicates that a conversion from the specified NVMe namespace to LUN is desired.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Error information provided if the asynchronous LUN copy operation fails.

Name	Type	Description
arguments	array[error_arguments]	Message arguments
code	string	Error code

Name	Type	Description
message	string	Error message
target	string	The target parameter that caused the error.

progress

Properties related to the progress of an active or recently completed LUN copy.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN copy, in seconds.
failure	error	Error information provided if the asynchronous LUN copy operation fails.
percent_complete	integer	The percentage completed of the LUN copy.
state	string	The state of the LUN copy.
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN copy. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN copy.

destinations

A LUN copy operation in which the containing LUN is the source of the copy.

Name	Type	Description
_links	_links	
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN copy. See property `copy.source.max_throughput` for further details.

Name	Type	Description
name	string	The fully qualified path of the LUN copy destination composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.
progress	progress	Properties related to the progress of an active or recently completed LUN copy.
uuid	string	The unique identifier of the LUN copy destination.

progress

Properties related to the progress of an active or recently completed LUN copy.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN copy, in seconds.
failure	error	Error information provided if the asynchronous LUN copy operation fails.
percent_complete	integer	The percentage completed of the LUN copy.
state	string	The state of the LUN copy. Valid in PATCH when an LUN copy is active. Set to *paused* to pause a LUN copy. Set to *replicating* to resume a paused LUN copy.
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN copy. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN copy.

source

The source LUN of a LUN copy operation in which the containing LUN is the destination of the copy.

Valid in POST except when creating a LUN clone. A LUN copy request cannot be combined with setting any other LUN properties except the destination location. All other properties of the destination LUN come from the source LUN.

Name	Type	Description
_links	_links	
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN copy. This property can be used to throttle a transfer and limit its impact on the performance of the source and destination nodes. The specified value will be rounded up to the nearest megabyte. If this property is not specified in a POST that begins a LUN copy, throttling is not applied to the data transfer. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. Valid only in a POST that begins a LUN copy or a PATCH when a LUN copy is already in process. • format: int64 • Introduced in: 9.10
name	string	The fully qualified path of the LUN copy source composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Set this property in POST to specify the source for a LUN copy operation.
progress	progress	Properties related to the progress of an active or recently completed LUN copy.

Name	Type	Description
uuid	string	The unique identifier of the LUN copy source. Set this property in POST to specify the source for a LUN copy operation.

copy

This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties.

Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy.

While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN.

There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
destinations	array[destinations]	An array of destination LUNs of LUN copy operations in which the containing LUN is the source of the copy.
source	source	The source LUN of a LUN copy operation in which the containing LUN is the destination of the copy. Valid in POST except when creating a LUN clone. A LUN copy request cannot be combined with setting any other LUN properties except the destination location. All other properties of the destination LUN come from the source LUN.

node

The cluster node that hosts the LUN.

Name	Type	Description
_links	_links	
name	string	
uuid	string	

qtree

The qtree in which the LUN is optionally located. Valid in POST and PATCH.

If properties `name` and `location.qtree.name` and/or `location.qtree.uuid` are specified in the same request, they must refer to the same qtree.

A PATCH that modifies the qtree of the LUN is considered a rename operation.

Name	Type	Description
_links	_links	
id	integer	The identifier for the qtree, unique within the qtree's volume.
name	string	The name of the qtree.

volume

The volume in which the LUN is located. Valid in POST and PATCH.

If properties `name` and `location.volume.name` and/or `location.volume.uuid` are specified in the same request, they must refer to the same volume.

A PATCH that modifies the volume of the LUN begins an asynchronous LUN movement operation.

Name	Type	Description
_links	_links	
name	string	The name of the volume.
uuid	string	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. • example: 028baa66-41bd-11e9-81d5-00a0986138f7 • Introduced in: 9.6

location

The location of the LUN within the ONTAP cluster. Valid in POST and PATCH.

Name	Type	Description
logical_unit	string	The base name component of the LUN. Valid in POST and PATCH. If properties `name` and `location.logical_unit` are specified in the same request, they must refer to the base name. A PATCH that modifies the base name of the LUN is considered a rename operation.
node	node	The cluster node that hosts the LUN.
qtree	qtree	The qtree in which the LUN is optionally located. Valid in POST and PATCH. If properties `name` and `location.qtree.name` and/or `location.qtree.uuid` are specified in the same request, they must refer to the same qtree. A PATCH that modifies the qtree of the LUN is considered a rename operation.
volume	volume	The volume in which the LUN is located. Valid in POST and PATCH. If properties `name` and `location.volume.name` and/or `location.volume.uuid` are specified in the same request, they must refer to the same volume. A PATCH that modifies the volume of the LUN begins an asynchronous LUN movement operation.

igroup

The initiator group to which the LUN is mapped.

Name	Type	Description
_links	_links	
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

lun_maps

A LUN map with which the LUN is associated.

Name	Type	Description
_links	_links	
igroup	igroup	The initiator group to which the LUN is mapped.
logical_unit_number	integer	The logical unit number assigned to the LUN for initiators in the initiator group.

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	Peformance 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	Peformance 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	Peformance metric for write I/O operations.

metric

Name	Type	Description
_links	_links	

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.

paths

The fully qualified LUN path names involved in the LUN movement.

Name	Type	Description
destination	string	The fully qualified path of the LUN movement destination composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.
source	string	The fully qualified path of the LUN movement source composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.

error

Error information provided if the asynchronous LUN movement operation fails.

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.

progress

Properties related to the progress of an active or recently completed LUN movement.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN movement, in seconds.
failure	error	Error information provided if the asynchronous LUN movement operation fails.
percent_complete	integer	The percentage completed of the LUN movement.

Name	Type	Description
state	string	The state of the LUN movement. Valid in PATCH when an LUN movement is active. Set to *paused* to pause a LUN movement. Set to *replicating* to resume a paused LUN movement.
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN movement. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN movement.

movement

This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the supplied properties used must refer to the same volume.

Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement.

While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object.

There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN movement. This property can be used to throttle a transfer and limit its impact on the performance of the source and destination nodes. The specified value will be rounded up to the nearest megabyte. If this property is not specified in a POST that begins a LUN movement, throttling is not applied to the data transfer. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. This property is valid only in a POST that begins a LUN movement or a PATCH when a LUN movement is already in process. • format: int64 • Introduced in: 9.6
paths	paths	The fully qualified LUN path names involved in the LUN movement.
progress	progress	Properties related to the progress of an active or recently completed LUN movement.

qos_policy

The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH.

Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.

Name	Type	Description
_links	_links	

Name	Type	Description
name	string	The name of the QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set this property to an empty string ("") in a PATCH request. Valid in POST and PATCH.
uuid	string	The unique identifier of the QoS policy. Valid in POST and PATCH.

guarantee

Properties that request and report the space guarantee for the LUN.

Name	Type	Description
requested	boolean	The requested space reservation policy for the LUN. If *true*, a space reservation is requested for the LUN; if *false*, the LUN is thin provisioned. Guaranteeing a space reservation request for a LUN requires that the volume in which the LUN resides is also space reserved and that the fractional reserve for the volume is 100%. Valid in POST and PATCH.
reserved	boolean	Reports if the LUN is space guaranteed. If *true*, a space guarantee is requested and the containing volume and aggregate support the request. If *false*, a space guarantee is not requested or a space guarantee is requested and either the containing volume or aggregate do not support the request.

space

The storage space related properties of the LUN.

Name	Type	Description
guarantee	guarantee	Properties that request and report the space guarantee for the LUN.
scsi_thin_provisioning_support_enabled	boolean	To leverage the benefits of SCSI thin provisioning, it must be supported by your host. SCSI thin provisioning uses the Logical Block Provisioning feature as defined in the SCSI SBC-3 standard. Only hosts that support this standard can use SCSI thin provisioning in ONTAP. When you enable SCSI thin provisioning support in ONTAP, you turn on the following SCSI thin provisioning features: • Unmapping and reporting space usage for space reclamation • Reporting resource exhaustion errors The value of this property is not propagated to the destination when a LUN is cloned as a new LUN or copied; it is reset to false. The value of this property is maintained from the destination LUN when a LUN is overwritten as a clone. Valid in POST and PATCH. • Default value: 1 • Introduced in: 9.10

Name	Type	Description
size	integer	The total provisioned size of the LUN. The LUN size can be increased but not be made smaller using the REST interface. The maximum and minimum sizes listed here are the absolute maximum and absolute minimum sizes in bytes. The actual minimum and maxiumum sizes vary depending on the ONTAP version, ONTAP platform and the available space in the containing volume and aggregate. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. • example: 1073741824 • format: int64 • Max value: 140737488355328 • Min value: 4096 • Introduced in: 9.6

Name	Type	Description
used	integer	The amount of space consumed by the main data stream of the LUN. This value is the total space consumed in the volume by the LUN, including filesystem overhead, but excluding prefix and suffix streams. Due to internal filesystem overhead and the many ways SAN filesystems and applications utilize blocks within a LUN, this value does not necessarily reflect actual consumption/availability from the perspective of the filesystem or application. Without specific knowledge of how the LUN blocks are utilized outside of ONTAP, this property should not be used as an indicator for an out-of-space condition. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. • format: int64 • readOnly: 1 • Introduced in: 9.6

iops_raw

The number of I/O operations observed at the storage object. This can be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.

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.

Name	Type	Description
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This can be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.
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.

Name	Type	Description
throughput_raw	throughput_raw	Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

status

Status information about the LUN.

Name	Type	Description
container_state	string	The state of the volume and aggregate that contain the LUN. LUNs are only available when their containers are available.
mapped	boolean	Reports if the LUN is mapped to one or more initiator groups. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
read_only	boolean	Reports if the LUN allows only read access.
state	string	The state of the LUN. Normal states for a LUN are *online* and *offline*. Other states indicate errors.

svm

The SVM in which the LUN is located.

Name	Type	Description
_links	_links	

Name	Type	Description
name	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

partner

The LUN partner that this LUN is bound to. If this LUN is a `vvol` class LUN, the partner is a `protocol_endpoint` class LUN.

Name	Type	Description
_links	_links	
name	string	The name of the partner LUN.
uuid	string	The unique identifier of the partner LUN.

bindings

A vVol binding with which the LUN is associated.

Name	Type	Description
_links	_links	
id	integer	The identifier assigned to the binding. The bind identifier is unique amongst all class `vvol` LUNs bound to the same class `protocol_endpoint` LUN.
partner	partner	The LUN partner that this LUN is bound to. If this LUN is a `vvol` class LUN, the partner is a `protocol_endpoint` class LUN.

vvol

A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping.

See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings.

There is an added computational cost to retrieving property values for `vvol`. They are not populated for

either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
bindings	array[bindings]	Bindings between the LUN, which must be of class `protocol_endpoint` or `vvol`, and LUNs of the opposite class. A class `vvol` LUN must be bound to a class `protocol_endpoint` LUN in order to be accessed. Class `protocol_endpoint` and `vvol` LUNs allow many-to-many bindings. A LUN of one class is allowed to be bound to zero or more LUNs of the opposite class. The binding between any two specific LUNs is reference counted. When a binding is created that already exists, the binding count is incremented. When a binding is deleted, the binding count is decremented, but the LUNs remain bound if the resultant reference count is greater than zero. When the binding count reaches zero, the binding is destroyed. The bindings array contains LUNs of the opposite class of the containing LUN object. There is an added computational cost to retrieving property values for `vvol.bindings`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
is_bound	boolean	Reports if the LUN is part of a VMware virtual volume (vVol) bind relationship. This is `true` if the LUN is of class `protocol_endpoint` or `vvol` and has one or more bindings to a LUN of the opposite class. This is false if the LUN is of class `regular` or unbound.

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.

Update an existing LUN

PATCH `/storage/luns/{uuid}`

Introduced In: 9.6

Updates an existing LUN in one of several ways:

- Updates the properties of a LUN.
- Writes data to a LUN. LUN data write requests are distinguished by the header entry `Content-Type: multipart/form-data`. When this header entry is provided, query parameter `data.offset` is required and used to specify the location within the LUN at which to write the data; no other query parameters are allowed. The request body must be `multipart/form-data` content with exactly one form entry containing the data to write. The content type entry of the form data is ignored and always treated as `application/octet-stream`. Writes are limited to one megabyte (1MB) per request.
- Overwrites the contents of a LUN as a clone of another.
- Begins the movement of a LUN between volumes. PATCH can also pause and resume the movement of a LUN between volumes that is already in active.

Related ONTAP commands

- `lun copy modify`

- `lun copy pause`
- `lun copy resume`
- `lun modify`
- `lun move-in-volume`
- `lun move modify`
- `lun move pause`
- `lun move resume`
- `lun move start`
- `lun resize`
- `volume file clone autodelete`

Learn more

- DOC /storage/luns

Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier of the LUN to retrieve.

Name	Type	In	Required	Description
data.offset	integer	query	False	The offset, in bytes, at which to begin writing LUN data. LUN data write requests are distinguished by the header entry `Content-Type: multipart/form-data`. When this header entry is provided, query parameter `data.offset` is required and used to specify the location within the LUN at which to write the data; no other query parameters are allowed. The request body must be `multipart/form-data` content with exactly one form entry containing the data to write. The content type entry of the form data is ignored and always treated as `application/octet-stream`. Writes are limited to one megabyte (1MB) per request. • format: int64 • Min value: 0 • Introduced in: 9.11

Request Body

Name	Type	Description
auto_delete	boolean	This property marks the LUN for auto deletion when the volume containing the LUN runs out of space. This is most commonly set on LUN clones. When set to *true*, the LUN becomes eligible for automatic deletion when the volume runs out of space. Auto deletion only occurs when the volume containing the LUN is also configured for auto deletion and free space in the volume decreases below a particular threshold. This property is optional in POST and PATCH. The default value for a new LUN is *false*. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
clone	clone	This sub-object is used in POST to create a new LUN as a clone of an existing LUN, or PATCH to overwrite an existing LUN as a clone of another. Setting a property in this sub-object indicates that a LUN clone is desired. Consider the following other properties when cloning a LUN: `auto_delete`, `qos_policy`, `space.guarantee.requested` and `space.scsi_thin_provisioning_support_enabled`. When used in a PATCH, the patched LUN's data is over-written as a clone of the source and the following properties are preserved from the patched LUN unless otherwise specified as part of the PATCH: `class`, `auto_delete`, `lun_maps`, `serial_number`, `status.state`, and `uuid`. Persistent reservations for the patched LUN are also preserved.
comment	string	A configurable comment available for use by the administrator. Valid in POST and PATCH.
consistency_group	consistency_group	The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.

Name	Type	Description
copy	copy	This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties. Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy. While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN. There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
create_time	string	The time the LUN was created.

Name	Type	Description
enabled	boolean	The enabled state of the LUN. LUNs can be disabled to prevent access to the LUN. Certain error conditions also cause the LUN to become disabled. If the LUN is disabled, you can consult the `state` property to determine if the LUN is administratively disabled (*offline*) or has become disabled as a result of an error. A LUN in an error condition can be brought online by setting the `enabled` property to *true* or brought administratively offline by setting the `enabled` property to *false*. Upon creation, a LUN is enabled by default. Valid in PATCH.
location	location	The location of the LUN within the ONTAP cluster. Valid in POST and PATCH. • Introduced in: 9.6
lun_maps	array[lun_maps]	The LUN maps with which the LUN is associated. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
movement	movement	This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the supplied properties used must refer to the same volume. Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement. While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object. There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH. A PATCH that modifies the qtree and/or base name portion of the LUN path is considered a rename operation. A PATCH that modifies the volume portion of the LUN path begins an asynchronous LUN movement operation.
qos_policy	qos_policy	The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH. Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.
serial_number	string	The LUN serial number. The serial number is generated by ONTAP when the LUN is created. • maxLength: 12 • minLength: 12 • readOnly: 1 • Introduced in: 9.6
space	space	The storage space related properties of the LUN.
status	status	Status information about the LUN.

Name	Type	Description
svm	svm	The SVM in which the LUN is located.
uuid	string	The unique identifier of the LUN. The UUID is generated by ONTAP when the LUN is created. • example: 1cd8a442-86d1-11e0-ae1c-123478563412 • readOnly: 1 • Introduced in: 9.6
vvol	vvol	A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping. See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings. There is an added computational cost to retrieving property values for `vvol`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Example request


```
{
  "clone": {
    "source": {
      "name": "/vol/volume1/lun1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    }
  },
  "comment": "string",
  "consistency_group": {
    "name": "cg1",
    "uuid": "4abc2317-4332-9d37-93a0-20bd29c22df0"
  },
  "copy": {
    "destinations": [
      {
        "max_throughput": 0,
        "name": "/vol/vol1/lun1",
        "progress": {
          "elapsed": 0,
          "percent_complete": 0,
          "state": "string"
        },
        "uuid": "1bc327d5-4654-5284-a116-f182282240b4"
      }
    ],
    "source": {
      "progress": {
        "elapsed": 0,
        "percent_complete": 0,
        "state": "string"
      }
    }
  },
  "create_time": "2018-06-04T19:00:00Z",
  "location": {
    "logical_unit": "lun1",
    "node": {
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "qtree": {
      "id": 1,
      "name": "qt1"
    },
```

```
    "volume": {
      "name": "volume1",
      "uuid": "028baa66-41bd-11e9-81d5-00a0986138f7"
    }
  },
  "lun_maps": [
    {
      "igroup": {
        "name": "igroup1",
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "logical_unit_number": 0
    }
  ],
  "movement": {
    "paths": {
      "destination": "/vol/vol1/lun1",
      "source": "/vol/vol2/lun2"
    },
    "progress": {
      "elapsed": 0,
      "percent_complete": 0,
      "state": "string"
    }
  },
  "name": "/vol/volume1/qtree1/lun1",
  "qos_policy": {
    "name": "qos1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "serial_number": "string",
  "space": {
    "size": 1073741824,
    "used": 0
  },
  "status": {
    "container_state": "string",
    "state": "online"
  },
  "svm": {
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
  "vvol": {
    "bindings": [
```

```
        {
          "id": 1,
          "partner": {
            "name": "/vol/vol1/lun1",
            "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
          }
        }
      ]
    }
}
```

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
917927	The specified volume was not found.
918236	The specified `location.volume.uuid` and `location.volume.name` do not refer to the same volume.
5242927	The specified qtree was not found.
5242950	The specified `location.qtree.id` and `location.qtree.name` do not refer to the same qtree.
5374124	The specified LUN size is too small.
5374125	The specified LUN size is too large.
5374130	An invalid size value was provided.
5374241	A size value with invalid units was provided.
5374480	Modifying the LUN is not allowed because it is in a foreign LUN import relationship.
5374858	The volume specified by `name` is not the same as that specified by `location.volume`.
5374860	The qtree specified by `name` is not the same as that specified by `location.qtree`.

Error Code	Description
5374861	The LUN base name specified by `name` is not the same as that specified by `location.logical_unit`.
5374864	An error occurred after successfully overwriting data for the LUN as a clone. Some properties were not modified.
5374865	The LUN's aggregate is offline. The aggregate must be online to modify or remove the LUN.
5374866	The LUN's volume is offline. The volume must be online to modify or remove the LUN.
5374874	The specified `clone.source.uuid` and `clone.source.name` do not refer to the same LUN.
5374875	The specified LUN was not found. This can apply to `clone.source` or the target LUN. The `target` property of the error object identifies the property.
5374876	The specified LUN was not found. This can apply to `clone.source` or the target LUN. The `target` property of the error object identifies the property.
5374885	An error occurred after successfully modifying some of the properties of the LUN. Some properties were not modified.
5374889	An invalid value was specified for `movement.progress.state`. Active LUN movement operations can be PATCHed to only *paused* or *replicating*.
5374892	An attempt was made to reduce the size of a LUN.
5374904	The destination volume is not online.
7018877	Maximum combined total (50) of file and LUN copy and move operations reached. When one or more of the operations has completed, try the command again.
7018919	A copy or move job exists with the same destination LUN.
13565952	The LUN clone request failed.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

attributes

A name/value pair optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP.

Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes.

Optional in POST.

source

The source LUN for a LUN clone operation. This can be specified using property `clone.source.uuid` or `clone.source.name`. If both properties are supplied, they must refer to the same LUN.

Valid in POST to create a new LUN as a clone of the source.

Valid in PATCH to overwrite an existing LUN's data as a clone of another.

Name	Type	Description
name	string	The fully qualified path name of the clone source LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH.
uuid	string	The unique identifier of the clone source LUN. Valid in POST and PATCH.

clone

This sub-object is used in POST to create a new LUN as a clone of an existing LUN, or PATCH to overwrite an existing LUN as a clone of another. Setting a property in this sub-object indicates that a LUN clone is desired. Consider the following other properties when cloning a LUN: `auto_delete`, `qos_policy`, `space.guarantee.requested` and `space.scsi_thin_provisioning_support_enabled`.

When used in a PATCH, the patched LUN's data is over-written as a clone of the source and the following properties are preserved from the patched LUN unless otherwise specified as part of the PATCH: `class`, `auto_delete`, `lun_maps`, `serial_number`, `status.state`, and `uuid`.

Persistent reservations for the patched LUN are also preserved.

Name	Type	Description
source	source	The source LUN for a LUN clone operation. This can be specified using property `clone.source.uuid` or `clone.source.name`. If both properties are supplied, they must refer to the same LUN. Valid in POST to create a new LUN as a clone of the source. Valid in PATCH to overwrite an existing LUN's data as a clone of another.

consistency_group

The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.

Name	Type	Description
name	string	The name of the consistency group.
uuid	string	The unique identifier of the consistency group.

namespace

The source namespace for convert operation. This can be specified using property `convert.namespace.uuid` or `convert.namespace.name`. If both properties are supplied, they must refer to the same NVMe namespace.

Valid in POST. A convert request from NVMe namespace to LUN cannot be combined with setting any other LUN properties. All other properties of the converted LUN comes from the source NVMe namespace.

convert

This sub-object is used in POST to convert a valid in-place NVMe namespace to a LUN. Setting a property in this sub-object indicates that a conversion from the specified NVMe namespace to LUN is desired.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Error information provided if the asynchronous LUN copy operation fails.

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.

progress

Properties related to the progress of an active or recently completed LUN copy.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN copy, in seconds.
percent_complete	integer	The percentage completed of the LUN copy.
state	string	The state of the LUN copy.
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN copy. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN copy.

destinations

A LUN copy operation in which the containing LUN is the source of the copy.

Name	Type	Description
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN copy. See property `copy.source.max_throughput` for further details.
name	string	The fully qualified path of the LUN copy destination composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.
progress	progress	Properties related to the progress of an active or recently completed LUN copy.
uuid	string	The unique identifier of the LUN copy destination.

progress

Properties related to the progress of an active or recently completed LUN copy.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN copy, in seconds.
percent_complete	integer	The percentage completed of the LUN copy.
state	string	The state of the LUN copy. Valid in PATCH when an LUN copy is active. Set to *paused* to pause a LUN copy. Set to *replicating* to resume a paused LUN copy.
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN copy. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN copy.

source

The source LUN of a LUN copy operation in which the containing LUN is the destination of the copy.

Valid in POST except when creating a LUN clone. A LUN copy request cannot be combined with setting any other LUN properties except the destination location. All other properties of the destination LUN come from the source LUN.

Name	Type	Description
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN copy. This property can be used to throttle a transfer and limit its impact on the performance of the source and destination nodes. The specified value will be rounded up to the nearest megabyte. If this property is not specified in a POST that begins a LUN copy, throttling is not applied to the data transfer. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. Valid only in a POST that begins a LUN copy or a PATCH when a LUN copy is already in process. • format: int64 • Introduced in: 9.10
progress	progress	Properties related to the progress of an active or recently completed LUN copy.

copy

This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties.

Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy.

While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN.

There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
destinations	array[destinations]	An array of destination LUNs of LUN copy operations in which the containing LUN is the source of the copy.
source	source	The source LUN of a LUN copy operation in which the containing LUN is the destination of the copy. Valid in POST except when creating a LUN clone. A LUN copy request cannot be combined with setting any other LUN properties except the destination location. All other properties of the destination LUN come from the source LUN.

node

The cluster node that hosts the LUN.

Name	Type	Description
name	string	
uuid	string	

qtree

The qtree in which the LUN is optionally located. Valid in POST and PATCH.

If properties `name` and `location.qtree.name` and/or `location.qtree.uuid` are specified in the same request, they must refer to the same qtree.

A PATCH that modifies the qtree of the LUN is considered a rename operation.

Name	Type	Description
id	integer	The identifier for the qtree, unique within the qtree's volume.
name	string	The name of the qtree.

volume

The volume in which the LUN is located. Valid in POST and PATCH.

If properties `name` and `location.volume.name` and/or `location.volume.uuid` are specified in the same request, they must refer to the same volume.

A PATCH that modifies the volume of the LUN begins an asynchronous LUN movement operation.

Name	Type	Description
name	string	The name of the volume.
uuid	string	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. • example: 028baa66-41bd-11e9-81d5-00a0986138f7 • Introduced in: 9.6

location

The location of the LUN within the ONTAP cluster. Valid in POST and PATCH.

Name	Type	Description
logical_unit	string	The base name component of the LUN. Valid in POST and PATCH. If properties `name` and `location.logical_unit` are specified in the same request, they must refer to the base name. A PATCH that modifies the base name of the LUN is considered a rename operation.
node	node	The cluster node that hosts the LUN.

Name	Type	Description
qtree	qtree	The qtree in which the LUN is optionally located. Valid in POST and PATCH. If properties `name` and `location.qtree.name` and/or `location.qtree.uuid` are specified in the same request, they must refer to the same qtree. A PATCH that modifies the qtree of the LUN is considered a rename operation.
volume	volume	The volume in which the LUN is located. Valid in POST and PATCH. If properties `name` and `location.volume.name` and/or `location.volume.uuid` are specified in the same request, they must refer to the same volume. A PATCH that modifies the volume of the LUN begins an asynchronous LUN movement operation.

igroup

The initiator group to which the LUN is mapped.

Name	Type	Description
name	string	The name of the initiator group.
uuid	string	The unique identifier of the initiator group.

lun_maps

A LUN map with which the LUN is associated.

Name	Type	Description
igroup	igroup	The initiator group to which the LUN is mapped.
logical_unit_number	integer	The logical unit number assigned to the LUN for initiators in the initiator group.

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	Peformance 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.

Name	Type	Description
write	integer	Peformance 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	Peformance metric for write I/O operations.

metric

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.

Name	Type	Description
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.

paths

The fully qualified LUN path names involved in the LUN movement.

Name	Type	Description
destination	string	The fully qualified path of the LUN movement destination composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.

Name	Type	Description
source	string	The fully qualified path of the LUN movement source composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN.

error

Error information provided if the asynchronous LUN movement operation fails.

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.

progress

Properties related to the progress of an active or recently completed LUN movement.

Name	Type	Description
elapsed	integer	The amount of time that has elapsed since the start of the LUN movement, in seconds.
percent_complete	integer	The percentage completed of the LUN movement.
state	string	The state of the LUN movement. Valid in PATCH when an LUN movement is active. Set to *paused* to pause a LUN movement. Set to *replicating* to resume a paused LUN movement.

Name	Type	Description
volume_snapshot_blocked	boolean	This property reports if volume Snapshot copies are blocked by the LUN movement. This property can be polled to identify when volume Snapshot copies can be resumed after beginning a LUN movement.

movement

This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the supplied properties used must refer to the same volume.

Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement.

While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object.

There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
max_throughput	integer	The maximum data throughput, in bytes per second, that should be utilized in support of the LUN movement. This property can be used to throttle a transfer and limit its impact on the performance of the source and destination nodes. The specified value will be rounded up to the nearest megabyte. If this property is not specified in a POST that begins a LUN movement, throttling is not applied to the data transfer. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. This property is valid only in a POST that begins a LUN movement or a PATCH when a LUN movement is already in process. • format: int64 • Introduced in: 9.6
paths	paths	The fully qualified LUN path names involved in the LUN movement.
progress	progress	Properties related to the progress of an active or recently completed LUN movement.

qos_policy

The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH.

Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.

Name	Type	Description
name	string	The name of the QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set this property to an empty string ("") in a PATCH request. Valid in POST and PATCH.
uuid	string	The unique identifier of the QoS policy. Valid in POST and PATCH.

guarantee

Properties that request and report the space guarantee for the LUN.

Name	Type	Description
requested	boolean	The requested space reservation policy for the LUN. If *true*, a space reservation is requested for the LUN; if *false*, the LUN is thin provisioned. Guaranteeing a space reservation request for a LUN requires that the volume in which the LUN resides is also space reserved and that the fractional reserve for the volume is 100%. Valid in POST and PATCH.
reserved	boolean	Reports if the LUN is space guaranteed. If *true*, a space guarantee is requested and the containing volume and aggregate support the request. If *false*, a space guarantee is not requested or a space guarantee is requested and either the containing volume or aggregate do not support the request.

space

The storage space related properties of the LUN.

Name	Type	Description
guarantee	guarantee	Properties that request and report the space guarantee for the LUN.
scsi_thin_provisioning_support_enabled	boolean	To leverage the benefits of SCSI thin provisioning, it must be supported by your host. SCSI thin provisioning uses the Logical Block Provisioning feature as defined in the SCSI SBC-3 standard. Only hosts that support this standard can use SCSI thin provisioning in ONTAP. When you enable SCSI thin provisioning support in ONTAP, you turn on the following SCSI thin provisioning features: • Unmapping and reporting space usage for space reclamation • Reporting resource exhaustion errors The value of this property is not propagated to the destination when a LUN is cloned as a new LUN or copied; it is reset to false. The value of this property is maintained from the destination LUN when a LUN is overwritten as a clone. Valid in POST and PATCH. • Default value: 1 • Introduced in: 9.10

Name	Type	Description
size	integer	The total provisioned size of the LUN. The LUN size can be increased but not be made smaller using the REST interface. The maximum and minimum sizes listed here are the absolute maximum and absolute minimum sizes in bytes. The actual minimum and maxiumum sizes vary depending on the ONTAP version, ONTAP platform and the available space in the containing volume and aggregate. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. • example: 1073741824 • format: int64 • Max value: 140737488355328 • Min value: 4096 • Introduced in: 9.6

Name	Type	Description
used	integer	The amount of space consumed by the main data stream of the LUN. This value is the total space consumed in the volume by the LUN, including filesystem overhead, but excluding prefix and suffix streams. Due to internal filesystem overhead and the many ways SAN filesystems and applications utilize blocks within a LUN, this value does not necessarily reflect actual consumption/availability from the perspective of the filesystem or application. Without specific knowledge of how the LUN blocks are utilized outside of ONTAP, this property should not be used as an indicator for an out-of-space condition. For more information, see *Size properties* in the *docs* section of the ONTAP REST API documentation. • format: int64 • readOnly: 1 • Introduced in: 9.6

iops_raw

The number of I/O operations observed at the storage object. This can be used along with delta time to calculate the rate of I/O operations per unit of time.

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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Peformance metric for write I/O operations.

latency_raw

The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.

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	Peformance metric for write I/O operations.

throughput_raw

Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.

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.

Name	Type	Description
write	integer	Peformance metric for write I/O operations.

statistics

Name	Type	Description
iops_raw	iops_raw	The number of I/O operations observed at the storage object. This can be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.
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.

Name	Type	Description
throughput_raw	throughput_raw	Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

status

Status information about the LUN.

Name	Type	Description
container_state	string	The state of the volume and aggregate that contain the LUN. LUNs are only available when their containers are available.
mapped	boolean	Reports if the LUN is mapped to one or more initiator groups. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
read_only	boolean	Reports if the LUN allows only read access.
state	string	The state of the LUN. Normal states for a LUN are *online* and *offline*. Other states indicate errors.

svm

The SVM in which the LUN is located.

Name	Type	Description
name	string	The name of the SVM.

Name	Type	Description
uuid	string	The unique identifier of the SVM.

partner

The LUN partner that this LUN is bound to. If this LUN is a `vvol` class LUN, the partner is a `protocol_endpoint` class LUN.

Name	Type	Description
name	string	The name of the partner LUN.
uuid	string	The unique identifier of the partner LUN.

bindings

A vVol binding with which the LUN is associated.

Name	Type	Description
id	integer	The identifier assigned to the binding. The bind identifier is unique amongst all class `vvol` LUNs bound to the same class `protocol_endpoint` LUN.
partner	partner	The LUN partner that this LUN is bound to. If this LUN is a `vvol` class LUN, the partner is a `protocol_endpoint` class LUN.

vvol

A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping.

See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings.

There is an added computational cost to retrieving property values for `vvol`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
bindings	array[bindings]	Bindings between the LUN, which must be of class `protocol_endpoint` or `vvol`, and LUNs of the opposite class. A class `vvol` LUN must be bound to a class `protocol_endpoint` LUN in order to be accessed. Class `protocol_endpoint` and `vvol` LUNs allow many-to-many bindings. A LUN of one class is allowed to be bound to zero or more LUNs of the opposite class. The binding between any two specific LUNs is reference counted. When a binding is created that already exists, the binding count is incremented. When a binding is deleted, the binding count is decremented, but the LUNs remain bound if the resultant reference count is greater than zero. When the binding count reaches zero, the binding is destroyed. The bindings array contains LUNs of the opposite class of the containing LUN object. There is an added computational cost to retrieving property values for `vvol.bindings`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
is_bound	boolean	Reports if the LUN is part of a VMware virtual volume (vVol) bind relationship. This is `true` if the LUN is of class `protocol_endpoint` or `vvol` and has one or more bindings to a LUN of the opposite class. This is false if the LUN is of class `regular` or unbound.

lun

A LUN is the logical representation of storage in a storage area network (SAN).

In ONTAP, a LUN is located within a volume. Optionally, it can be located within a qtree in a volume.

A LUN can be created to a specified size using thin or thick provisioning. A LUN can then be renamed, resized, cloned, and moved to a different volume. LUNs support the assignment of a quality of service (QoS) policy for performance management or a QoS policy can be assigned to the volume containing the LUN. See the LUN object model to learn more about each of the properties supported by the LUN REST API.

A LUN must be mapped to an initiator group to grant access to the initiator group's initiators (client hosts). Initiators can then access the LUN and perform I/O over a Fibre Channel (FC) fabric using the Fibre Channel Protocol or a TCP/IP network using iSCSI.

Name	Type	Description
auto_delete	boolean	This property marks the LUN for auto deletion when the volume containing the LUN runs out of space. This is most commonly set on LUN clones. When set to *true*, the LUN becomes eligible for automatic deletion when the volume runs out of space. Auto deletion only occurs when the volume containing the LUN is also configured for auto deletion and free space in the volume decreases below a particular threshold. This property is optional in POST and PATCH. The default value for a new LUN is *false*. There is an added computational cost to retrieving this property's value. It is not populated for either a collection GET or an instance GET unless it is explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
clone	clone	This sub-object is used in POST to create a new LUN as a clone of an existing LUN, or PATCH to overwrite an existing LUN as a clone of another. Setting a property in this sub-object indicates that a LUN clone is desired. Consider the following other properties when cloning a LUN: `auto_delete`, `qos_policy`, `space.guarantee.requested` and `space.scsi_thin_provisioning_support_enabled`. When used in a PATCH, the patched LUN's data is over-written as a clone of the source and the following properties are preserved from the patched LUN unless otherwise specified as part of the PATCH: `class`, `auto_delete`, `lun_maps`, `serial_number`, `status.state`, and `uuid`. Persistent reservations for the patched LUN are also preserved.
comment	string	A configurable comment available for use by the administrator. Valid in POST and PATCH.
consistency_group	consistency_group	The LUN's consistency group. This property is populated for LUNs whose volume is a member of a consistency group. If the volume is a member of a child consistency group, the parent consistency group is reported.

Name	Type	Description
copy	copy	This sub-object applies to LUN copy operations. A LUN can be copied with a POST request that supplies `copy.source` properties. Copying a LUN is an asynchronous activity begun by a POST request that specifies the source of the copy in the `copy.source` properties. The data for the LUN is then asynchronously copied from the source to the destination. The time required to complete the copy depends on the size of the LUN and the load on the cluster. The `copy` sub-object is populated while a LUN copy is in progress and for two (2) minutes following completion of a copy. While LUNs are being copied, the status of the LUN copy operations can be obtained using a GET of the source or destination LUN that requests the `copy` properties. If the LUN is the source LUN for one or more copy operations, the `copy.destinations` array is populated in GET. If the containing LUN is the destination LUN for a copy operation, the `copy.source` sub-object is populated in GET. The LUN copy operation can be further modified using a PATCH on the properties on the `copy.source` sub-object of the copy destination LUN. There is an added computational cost to retrieving property values for `copy`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.
create_time	string	The time the LUN was created.

Name	Type	Description
enabled	boolean	The enabled state of the LUN. LUNs can be disabled to prevent access to the LUN. Certain error conditions also cause the LUN to become disabled. If the LUN is disabled, you can consult the `state` property to determine if the LUN is administratively disabled (*offline*) or has become disabled as a result of an error. A LUN in an error condition can be brought online by setting the `enabled` property to *true* or brought administratively offline by setting the `enabled` property to *false*. Upon creation, a LUN is enabled by default. Valid in PATCH.
location	location	The location of the LUN within the ONTAP cluster. Valid in POST and PATCH. • Introduced in: 9.6
lun_maps	array[lun_maps]	The LUN maps with which the LUN is associated. There is an added computational cost to retrieving property values for `lun_maps`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
movement	movement	This sub-object applies to LUN movement between volumes. A LUN can be moved to a new volume with a PATCH request that changes either the volume portion of property `name`, `location.volume.uuid`, or `location.volume.name`. If the volume is changed using more than one of these properties, the supplied properties used must refer to the same volume. Moving a LUN between volumes is an asynchronous activity begun by a PATCH request. The data for the LUN is then asynchronously copied from the source volume to the destination volume. The time required to complete the move depends on the size of the LUN and the load on the cluster. The `movement` sub-object is populated while a LUN movement is in progress and for two (2) minutes following completion of a movement. While the LUN is being moved, the status of the LUN movement operation can be obtained using a GET for the LUN that requests the `movement` properties. The LUN movement operation can be further modified using a PATCH on the properties on the `movement` sub-object. There is an added computational cost to retrieving property values for `movement`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

Name	Type	Description
name	string	The fully qualified path name of the LUN composed of a "/vol" prefix, the volume name, the (optional) qtree name, and base name of the LUN. Valid in POST and PATCH. A PATCH that modifies the qtree and/or base name portion of the LUN path is considered a rename operation. A PATCH that modifies the volume portion of the LUN path begins an asynchronous LUN movement operation.
qos_policy	qos_policy	The QoS policy for the LUN. Both traditional and adaptive QoS policies are supported. If both property `qos_policy.uuid` and `qos_policy.name` are specified in the same request, they must refer to the same QoS policy. To remove the QoS policy from a LUN, leaving it with no QoS policy, set property `qos_policy.name` to an empty string ("") in a PATCH request. Valid in POST and PATCH. Note that a QoS policy can be set on a LUN, or a LUN's volume, but not both.
serial_number	string	The LUN serial number. The serial number is generated by ONTAP when the LUN is created. • maxLength: 12 • minLength: 12 • readOnly: 1 • Introduced in: 9.6
space	space	The storage space related properties of the LUN.
status	status	Status information about the LUN.

Name	Type	Description
svm	svm	The SVM in which the LUN is located.
uuid	string	The unique identifier of the LUN. The UUID is generated by ONTAP when the LUN is created. • example: 1cd8a442-86d1-11e0-ae1c-123478563412 • readOnly: 1 • Introduced in: 9.6
vvol	vvol	A VMware virtual volume (vVol) binding is an association between a LUN of class `protocol_endpoint` and a LUN of class `vvol`. Class `protocol_endpoint` LUNs are mapped to igroups and granted access using the same configuration as class `regular` LUNs. When a class `vvol` LUN is bound to a mapped class `protocol_endpoint` LUN, VMware can access the class `vvol` LUN through the class `protocol_endpoint` LUN mapping. See DELETE /protocols/san/vvol-bindings to learn more about deleting vVol bindings. There is an added computational cost to retrieving property values for `vvol`. They are not populated for either a collection GET or an instance GET unless explicitly requested using the `fields` query parameter. See Requesting specific fields to learn more.

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments

Name	Type	Description
code	string	Error code
message	string	Error message
target	string	The target parameter that caused the error.

Manage LUN attributes

Storage luns lun.uuid attributes endpoint overview

Overview

LUN attributes are caller-defined name/value pairs optionally stored with a LUN. Attributes are available to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP.

Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes.

The LUN attributes REST API allows you to create, update, delete, and discover attributes for a LUN. The LUN REST API also allows you to set attributes when a LUN is first created.

Examples

Retrieving all attributes from a LUN

This example uses the LUN attribute REST endpoint with the `fields` query parameter to request the names and values.

```
# The API:
GET /api/storage/luns/{lun.uuid}/attributes

# The call:
curl -X GET 'https://<mgmt-ip>/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90/attributes?fields=*' -H 'Accept: application/hal+json'

# The response:
{
"records": [
  {
    "name": "name1",
    "value": "value1",
    "_links": {
      "self": {
        "href": "/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90/attributes/name1"
      }
    }
  },
  {
    "name": "name2",
    "value": "value2",
    "_links": {
      "self": {
        "href": "/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90/attributes/name2"
      }
    }
  }
],
"num_records": 2,
"_links": {
  "self": {
    "href": "/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90/attributes"
  }
}
}
```

This example uses the LUN REST endpoint with the `fields` query parameter to request the attributes properties.

```
# The API:
GET /api/storage/luns/{uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90?fields=attributes' -H 'Accept: application/hal+json'

# The response:
{
"uuid": "4bc204df-ecd8-4f35-8207-d0ccb4db3a90",
"name": "/vol/vol1/lun1",
"attributes": [
  {
    "name": "name1",
    "value": "name1",
    "_links": {
      "self": {
        "href": "/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90/attributes/name1"
      }
    }
  },
  {
    "name": "name2",
    "value": "value2",
    "_links": {
      "self": {
        "href": "/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90/attributes/name2"
      }
    }
  }
],
"_links": {
  "self": {
    "href": "/api/storage/luns/4bc204df-ecd8-4f35-8207-d0ccb4db3a90"
  }
}
}
```

Adding an attribute to a LUN

```
# The API:
POST /api/storage/luns/{lun.uuid}/attributes

# The call:
curl -X POST 'https://<mgmt-ip>/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90/attributes?return_records=true' -H 'Accept:
application/hal+json' -d '{ "name": "name1", "value": "value1" }'

# The response:
{
"num_records": 1,
"records": [
  {
    "name": "name1",
    "value": "value1",
    "_links": {
      "self": {
        "href": "/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90/attributes/name1"
      }
    }
  }
]
}
```

Modifying an attribute value for a LUN

```
# The API
PATCH /api/storage/luns/{lun.uuid}/attributes/{name}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/storage/luns/4bc204df-ecd8-4f35-8207-
d0ccb4db3a90/attributes/name1' -H 'Accept: application/hal+json' -d '{
"value": "newValue" }'
```

Deleting an attribute from a LUN

```
# The API:
DELETE /api/storage/luns/{lun.uuid}/attributes/{name}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/storage/luns/4bc204df-ecd8-4f35-
8207-d0ccb4db3a90/attributes/name1' -H 'Accept: application/hal+json'
```

Retrieve LUN attributes

GET `/storage/luns/{lun.uuid}/attributes`

Introduced In: 9.10

Retrieves LUN attributes.

Learn more

- DOC /storage/luns/{lun.uuid}/attributes

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	The unique identifier of the LUN.
value	string	query	False	Filter by value • maxLength: 4091 • minLength: 1
name	string	query	False	Filter by name • maxLength: 4091 • minLength: 1
fields	array[string]	query	False	Specify the fields to return.
max_records	integer	query	False	Limit the number of records returned.

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is true for GET calls. When set to false, only the number of records is returned. • 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. • 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	
num_records	integer	The number of records in the response.
records	array[lun_attribute]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "lun": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "name1",
      "value": "value1"
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

lun

The LUN for which the attribute is set.

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the LUN.

lun_attribute

A name/value pair optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP.

Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes.

Name	Type	Description
_links	_links	
lun	lun	The LUN for which the attribute is set.
name	string	The attribute name. Required in POST.
value	string	The attribute value. Required in POST; valid in PATCH.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Add an attribute to a LUN

POST `/storage/luns/{lun.uuid}/attributes`

Introduced In: 9.10

Adds an attribute to a LUN.

Required properties

- `name` - The name of the attribute to add.
- `value` - The value of the attribute to add.

Learn more

- DOC /storage/luns/{lun.uuid}/attributes

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	The unique identifier of the LUN.

Name	Type	In	Required	Description
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:

Request Body

Name	Type	Description
lun	lun	The LUN for which the attribute is set.
name	string	The attribute name. Required in POST.
value	string	The attribute value. Required in POST; valid in PATCH.

Example request

```
{
  "lun": {
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "name1",
  "value": "value1"
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
num_records	integer	The number of records in the response.
records	array[lun_attribute]	

Example response


```
{
  "num_records": 1,
  "records": [
    {
      "lun": {
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "name1",
      "value": "value1"
    }
  ]
}
```


Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The specified LUN was not found.
5374928	An incomplete attribute name/value pair was supplied.
5374929	The combined sizes of an attribute name and value are too large.
5374930	The attribute already exists for the LUN.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

lun

The LUN for which the attribute is set.

Name	Type	Description
uuid	string	The unique identifier of the LUN.

lun_attribute

A name/value pair optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP.

Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes.

Name	Type	Description
lun	lun	The LUN for which the attribute is set.
name	string	The attribute name. Required in POST.
value	string	The attribute value. Required in POST; valid in PATCH.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments

Name	Type	Description
code	string	Error code
message	string	Error message
target	string	The target parameter that caused the error.

Delete a LUN attribute

DELETE `/storage/luns/{lun.uuid}/attributes/{name}`

Introduced In: 9.10

Deletes a LUN attribute.

Learn more

- DOC /storage/luns/{lun.uuid}/attributes

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	
name	string	path	True	

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The specified LUN was not found.
5374931	The specified attribute was not found.

Name	Type	Description
error	error	

Example error


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


Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Retrieve a LUN attribute

GET `/storage/luns/{lun.uuid}/attributes/{name}`

Introduced In: 9.10

Retrieves a LUN attribute.

Learn more

- DOC /storage/luns/{lun.uuid}/attributes

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	The unique identifier of the LUN.
name	string	path	True	The name of the attribute.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
lun	lun	The LUN for which the attribute is set.
name	string	The attribute name. Required in POST.
value	string	The attribute value. Required in POST; valid in PATCH.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "lun": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "name1",
  "value": "value1"
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The specified LUN was not found.
5374931	The specified attribute was not found.

Name	Type	Description
error	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
self	href	

lun

The LUN for which the attribute is set.

Name	Type	Description
_links	_links	
uuid	string	The unique identifier of the LUN.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

Update a LUN attribute value

PATCH `/storage/luns/{lun.uuid}/attributes/{name}`

Introduced In: 9.10

Updates a LUN attribute value.

Learn more

- DOC /storage/luns/{lun.uuid}/attributes

Parameters

Name	Type	In	Required	Description
lun.uuid	string	path	True	The unique identifier of the LUN.
name	string	path	True	The name of the attribute.

Request Body

Name	Type	Description
lun	lun	The LUN for which the attribute is set.
value	string	The attribute value. Required in POST; valid in PATCH.

Example request

```
{
  "lun": {
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "value": "value1"
}
```

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The specified LUN was not found.
5374929	The combined sizes of an attribute name and value are too large.
5374931	The specified attribute was not found.

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

lun

The LUN for which the attribute is set.

Name	Type	Description
uuid	string	The unique identifier of the LUN.

lun_attribute

A name/value pair optionally stored with the LUN. Attributes are available to callers to persist small amounts of application-specific metadata. They are in no way interpreted by ONTAP.

Attribute names and values must be at least one byte and no more than 4091 bytes in length. The sum of the name and value lengths must be no more than 4092 bytes.

Name	Type	Description
lun	lun	The LUN for which the attribute is set.
value	string	The attribute value. Required in POST; valid in PATCH.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments
code	string	Error code

Name	Type	Description
message	string	Error message
target	string	The target parameter that caused the error.

Retrieve historical performance metrics for a LUN

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

Introduced In: 9.7

Retrieves historical performance metrics for a LUN.

Parameters

Name	Type	In	Required	Description
uuid	string	path	True	Unique identifier of the LUN.

Name	Type	In	Required	Description
interval	string	query	False	The time range for the data. Examples can be 1h, 1d, 1m, 1w, 1y. The period for each time range is as follows: • 1h: Metrics over the most recent hour sampled over 15 seconds. • 1d: Metrics over the most recent day sampled over 5 minutes. • 1w: Metrics over the most recent week sampled over 30 minutes. • 1m: Metrics over the most recent month sampled over 2 hours. • 1y: Metrics over the most recent year sampled over a day. • Default value: 1 • enum: ["1h", "1d", "1w", "1m", "1y"]
duration	string	query	False	Filter by duration
throughput.total	integer	query	False	Filter by throughput.total
throughput.read	integer	query	False	Filter by throughput.read
throughput.write	integer	query	False	Filter by throughput.write
throughput.other	integer	query	False	Filter by throughput.other

Name	Type	In	Required	Description
status	string	query	False	Filter by status
iops.total	integer	query	False	Filter by iops.total
iops.read	integer	query	False	Filter by iops.read
iops.write	integer	query	False	Filter by iops.write
iops.other	integer	query	False	Filter by iops.other
latency.total	integer	query	False	Filter by latency.total
latency.read	integer	query	False	Filter by latency.read
latency.write	integer	query	False	Filter by latency.write
latency.other	integer	query	False	Filter by latency.other
timestamp	string	query	False	Filter by timestamp
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. • Default value: 1 • Max value: 120 • Min value: 0
fields	array[string]	query	False	Specify the fields to return.
max_records	integer	query	False	Limit the number of records returned.

Name	Type	In	Required	Description
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	_links	
num_records	integer	Number of records
records	array[records]	

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": "2017-01-25T11:20:13Z",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```

Error

```
Status: Default, Error
```

Name	Type	Description
error	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	

_links

Name	Type	Description
self	href	

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	Peformance 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	Peformance 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	Peformance metric for write I/O operations.

records

Performance numbers, such as IOPS latency and throughput.

Name	Type	Description
_links	_links	

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.
uuid	string	The unique identifier of the LUN.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

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.

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