SAN

ONTAP REST API reference

NetApp
February 26, 2025

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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.

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.

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.

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"
    },
    "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
protocol	string	query	False	Filter by protocol
interface.uuid	string	query	False	Filter by interface.uuid
interface.name	string	query	False	Filter by interface.name
interface.wwpn	string	query	False	Filter by interface.wwpn
initiator.wwpn	string	query	False	Filter by initiator.wwpn
initiator.wwnn	string	query	False	Filter by initiator.wwnn

Name	Type	In	Required	Description
initiator.aliases	string	query	False	Filter by initiator.aliases
initiator.port_address	string	query	False	Filter by initiator.port_address
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
igroups.uuid	string	query	False	Filter by igroups.uuid
igroups.name	string	query	False	Filter by igroups.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	Number of records.
records	array[fc_login]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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"
        ],
        "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": "lif1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
        "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.

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"
    ],
    "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": "lif1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
    "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.

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	Number of records.
records	array[wwpn_alias]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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

SVM, applies only to SVM-scoped objects.

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	SVM, applies only to SVM-scoped objects.
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
_links	_links	
alias	string	The FC WWPN alias. Required in POST.
svm	svm	SVM, applies only to SVM-scoped objects.
wwpn	string	The FC initiator WWPN. Required in POST.

Example request

```
{
  "_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"
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
_links	_links	
num_records	integer	Number of records.
records	array[wwpn_alias]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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
```

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".

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

SVM, applies only to SVM-scoped objects.

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	SVM, applies only to SVM-scoped objects.
wwpn	string	The FC initiator WWPN. Required in POST.

_links

Name	Type	Description
next	href	
self	href	

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 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.
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	SVM, applies only to SVM-scoped objects.
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

SVM, applies only to SVM-scoped objects.

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 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
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name

Name	Type	In	Required	Description
metric.throughput.write	integer	query	False	Filter by metric.throughput.write • 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.duration	string	query	False	Filter by metric.duration • Introduced in: 9.7
metric.timestamp	string	query	False	Filter by metric.timestamp • 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

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

Name	Type	In	Required	Description
statistics.latency_raw.read	integer	query	False	Filter by statistics.latency_raw.read • Introduced in: 9.7
statistics.latency_raw.other	integer	query	False	Filter by statistics.latency_raw.other • Introduced in: 9.7
statistics.latency_raw.write	integer	query	False	Filter by statistics.latency_raw.write • Introduced in: 9.7
statistics.timestamp	string	query	False	Filter by statistics.timestamp • 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
statistics.iops_raw.other	integer	query	False	Filter by statistics.iops_raw.other • 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.throughput_raw.write	integer	query	False	Filter by statistics.throughput_raw.write • Introduced in: 9.7
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
statistics.status	string	query	False	Filter by statistics.status • Introduced in: 9.7
enabled	boolean	query	False	Filter by enabled
target.name	string	query	False	Filter by target.name
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	Number of records.
records	array[fcp_service]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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
_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 request


```
{
  "_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"
  }
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
_links	_links	
num_records	integer	Number of records.
records	array[fcp_service]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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
```

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.

Error Code	Description
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.

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

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	

_links

Name	Type	Description
next	href	
self	href	

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
_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	

Name	Type	Description
statistics	statistics	
svm	svm	
target	target	

Example request


```
{
  "_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"
  }
}
```


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.

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

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.

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
timestamp	string	query	False	Filter by timestamp
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.other	integer	query	False	Filter by throughput.other
throughput.write	integer	query	False	Filter by throughput.write
latency.total	integer	query	False	Filter by latency.total
latency.read	integer	query	False	Filter by latency.read
latency.other	integer	query	False	Filter by latency.other
latency.write	integer	query	False	Filter by latency.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.other	integer	query	False	Filter by iops.other
iops.write	integer	query	False	Filter by iops.write
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"
    }
  },
  "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"
    }
  ]
}
```


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.

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.

The initator group REST API allows you to create, update, delete, and discover initiator groups, and 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.

All initiators 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*).

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.

An FC WWPN consist 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 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 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"
      }
    }
  }
]
}
```

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"
      }
    }
  }
],
"num_records": 2,
"_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.

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

# The call:
curl -X GET 'https://<mgmt-ip>/api/protocols/san/igroups?fields=*' -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",
    "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"
      }
    }
  }
],
"num_records": 2,
"_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'
```

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 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.

- `lun_maps.*`

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
protocol	string	query	False	Filter by protocol
os_type	string	query	False	Filter by os_type
uuid	string	query	False	Filter by uuid
initiators.name	string	query	False	Filter by initiators.name
initiators.igroup.uuid	string	query	False	Filter by initiators.igroup.uuid
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
delete_on_unmap	boolean	query	False	Filter by delete_on_unmap
lun_maps.lun.node.name	string	query	False	Filter by lun_maps.lun.node.name
lun_maps.lun.node.uuid	string	query	False	Filter by lun_maps.lun.node.uuid
lun_maps.lun.name	string	query	False	Filter by lun_maps.lun.name
lun_maps.lun.uuid	string	query	False	Filter by lun_maps.lun.uuid
lun_maps.logical_unit_number	integer	query	False	Filter by lun_maps.logical_unit_number
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	Number of records.
records	array[igroup]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "initiators": [
        {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "igroup": {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "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",
    "protocol": "string",
    "svm": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "svm1",
      "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
    },
    "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	

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	
uuid	string	The unique identifier of the initiator group.

igroup_initiator_no_records

Name	Type	Description
_links	_links	
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 consist 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.

Name	Type	Description
lun	lun	The LUN to which the initiator group is mapped.

svm

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

igroup

An initiator group (igroup) is a collection of Fibre Channel (FC) world wide port names (WWPN), 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 hosts' initiator names, then create a LUN map that associates the initiator group with the LUN.

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.

All initiators 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*).

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.

Name	Type	Description
_links	_links	
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
initiators	array[igroup_initiator_no_records]	The initiators that are members of the group. Optional in POST. 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 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. Note that renaming an initiator group must be done in a PATCH request separate from any other modifications.
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.

Name	Type	Description
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.
svm	svm	
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.

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.

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
_links	_links	
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
initiators	array[igroup_initiator_no_records]	The initiators that are members of the group. Optional in POST. 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 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. Note that renaming an initiator group must be done in a PATCH request separate from any other modifications.
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.

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

Example request

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "initiators": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "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",
  "protocol": "string",
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
_links	_links	
num_records	integer	Number of records.
records	array[igroup]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "initiators": [
        {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "igroup": {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "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",
      "protocol": "string",
      "svm": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "svm1",
        "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
      },
      "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
2621462	The supplied SVM does not exist.

Error Code	Description
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.
5374038	An invalid Fibre Channel WWPN was supplied.
5374039	An invalid iSCSI initiator name was supplied.
5374732	An initiator is already in another initiator group with a conflicting operating system type.

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 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	
uuid	string	The unique identifier of the initiator group.

igroup_initiator_no_records

Name	Type	Description
_links	_links	
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 consist 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.

Name	Type	Description
lun	lun	The LUN to which the initiator group is mapped.

svm

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

igroup

An initiator group (igroup) is a collection of Fibre Channel (FC) world wide port names (WWPN), 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 hosts' initiator names, then create a LUN map that associates the initiator group with the LUN.

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.

All initiators 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*).

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.

Name	Type	Description
_links	_links	
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
initiators	array[igroup_initiator_no_records]	The initiators that are members of the group. Optional in POST. 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 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. Note that renaming an initiator group must be done in a PATCH request separate from any other modifications.
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.

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

_links

Name	Type	Description
next	href	
self	href	

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 initiators of an initiator group

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

Introduced In: 9.6

Retrieves initiators of an 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 initiator group.
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	Number of records.
records	array[igroup_initiator]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "iqn.1998-01.com.corp.iscsi:name1",
      "records": [
        {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "igroup": {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "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	

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	
uuid	string	The unique identifier of the initiator group.

records

Name	Type	Description
_links	_links	
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 consist 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	
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 consist 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.

Name	Type	Description
records	array[records]	An array of initiators specified to add multiple initiators to an initiator group in a single API call. Valid in POST only and not allowed when the `name` property is used.

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 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.

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
_links	_links	
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 consist 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. Valid in POST only and not allowed when the `name` property is used.

Example request

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "igroup": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "iqn.1998-01.com.corp.iscsi:name1",
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "iqn.1998-01.com.corp.iscsi:name1"
    }
  ]
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
_links	_links	
num_records	integer	Number of records.
records	array[igroup_initiator]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
      },
      "name": "iqn.1998-01.com.corp.iscsi:name1",
      "records": [
        {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          },
          "igroup": {
            "_links": {
              "self": {
                "href": "/api/resourcelink"
              }
            },
            "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
          },
          "name": "iqn.1998-01.com.corp.iscsi:name1"
        }
      ]
    }
```

```
  ]
}
```

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.
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.
5374853	You can add initiators to an initiator group using the `records` property, or the `name` property, but you cannot use both in the same request.
5374854	Only `records` property elements should be populated with the `name` property values.

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 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	
uuid	string	The unique identifier of the initiator group.

records

Name	Type	Description
_links	_links	
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 consist 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	
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 consist 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.

Name	Type	Description
records	array[records]	An array of initiators specified to add multiple initiators to an initiator group in a single API call. Valid in POST only and not allowed when the `name` property is used.

_links

Name	Type	Description
next	href	
self	href	

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 initiator from an initiator group

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

Introduced In: 9.6

Deletes an initiator from an 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 initiator group.
name	string	path	True	The initiator name.
allow_delete_while_mapped	boolean	query	False	Allows 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	The initiator is not a member of the 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.

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

Name	Type	In	Required	Description
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
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 consist 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. Valid in POST only and not allowed when the `name` property is used.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "igroup": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
  },
  "name": "iqn.1998-01.com.corp.iscsi:name1",
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "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.
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	

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	
uuid	string	The unique identifier of the initiator group.

records

Name	Type	Description
_links	_links	
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 consist 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_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 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 deletion of a mapped initiator group. Deleting a mapped initiator group makes the LUNs to which the initiator group is mapped 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
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 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.

- `lun_maps.*`

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	
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.
initiators	array[igroup_initiator_no_records]	The initiators that are members of the group. Optional in POST. 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.

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 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. Note that renaming an initiator group must be done in a PATCH request separate from any other modifications.
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.
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.
svm	svm	
uuid	string	The unique identifier of the initiator group.

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "initiators": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "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",
  "protocol": "string",
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "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	

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	
uuid	string	The unique identifier of the initiator group.

igroup_initiator_no_records

Name	Type	Description
_links	_links	
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 consist 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.

Name	Type	Description
lun	lun	The LUN to which the initiator group is mapped.

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 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`

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
_links	_links	
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.
initiators	array[igroup_initiator_no_records]	The initiators that are members of the group. Optional in POST. 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.

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 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. Note that renaming an initiator group must be done in a PATCH request separate from any other modifications.
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.
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.
svm	svm	
uuid	string	The unique identifier of the initiator group.

Example request


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "initiators": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "igroup": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "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",
  "protocol": "string",
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "4ea7a442-86d1-11e0-ae1c-123478563412"
}
```


Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
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.
5374733	An initiator is already in another initiator group with a conflicting operating system type.
5374852	The initiator group does not exist.

Error Code	Description
5374868	The initiator group was partially modified before an error was encountered while renaming the initiator group.

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 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	
uuid	string	The unique identifier of the initiator group.

igroup_initiator_no_records

Name	Type	Description
_links	_links	
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 consist 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.

Name	Type	Description
lun	lun	The LUN to which the initiator group is mapped.

svm

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

igroup

An initiator group (igroup) is a collection of Fibre Channel (FC) world wide port names (WWPN), 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 hosts' initiator names, then create a LUN map that associates the initiator group with the LUN.

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.

All initiators 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*).

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.

Name	Type	Description
_links	_links	
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
initiators	array[igroup_initiator_no_records]	The initiators that are members of the group. Optional in POST. 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 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. Note that renaming an initiator group must be done in a PATCH request separate from any other modifications.
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.

Name	Type	Description
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.
svm	svm	
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.

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
initiator	string	query	False	Filter by initiator
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
chap.inbound.user	string	query	False	Filter by chap.inbound.user
chap.outbound.user	string	query	False	Filter by chap.outbound.user
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.family	string	query	False	Filter by initiator_address.ranges.family
initiator_address.ranges.end	string	query	False	Filter by initiator_address.ranges.end
initiator_address.ranges.start	string	query	False	Filter by initiator_address.ranges.start

Name	Type	In	Required	Description
authentication_type	string	query	False	Filter by authentication_type
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	

Name	Type	Description
num_records	integer	Number of records.
records	array[iscsi_credentials]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "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",
            "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
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.

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.

chap

Challenge-Handshake Authentication Protocol (CHAP) credentials.

Name	Type	Description
inbound	inbound	Inbound CHAP credentials.
outbound	outbound	Output CHAP credentials.

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, you must set the netmask length. The default value is 64. 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	Type	Description
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 and 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.

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
_links	_links	
authentication_type	string	The iSCSI authentication type. Required in POST and optional in PATCH.

Name	Type	Description
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

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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",
        "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"
  }
}
```

Response

```
Status: 201, Created
```

Name	Type	Description
_links	_links	
num_records	integer	Number of records.
records	array[iscsi_credentials]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "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",
            "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
```

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.

Error Code	Description
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.
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*.

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
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.

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.

chap

Challenge-Handshake Authentication Protocol (CHAP) credentials.

Name	Type	Description
inbound	inbound	Inbound CHAP credentials.
outbound	outbound	Output CHAP credentials.

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, you must set the netmask length. The default value is 64. 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	

Name	Type	Description
authentication_type	string	The iSCSI authentication type. Required in POST and 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	

_links

Name	Type	Description
next	href	
self	href	

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.

Error Code	Description
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.

Name	Type	In	Required	Description
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 and 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": {
      "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",
        "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
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.

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.

chap

Challenge-Handshake Authentication Protocol (CHAP) credentials.

Name	Type	Description
inbound	inbound	Inbound CHAP credentials.
outbound	outbound	Output CHAP credentials.

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, you must set the netmask length. The default value is 64. 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.

Name	Type	In	Required	Description
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
_links	_links	
authentication_type	string	The iSCSI authentication type. Required in POST and 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

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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",
        "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"
  }
}
```

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*.

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
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.

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.

chap

Challenge-Handshake Authentication Protocol (CHAP) credentials.

Name	Type	Description
inbound	inbound	Inbound CHAP credentials.
outbound	outbound	Output CHAP credentials.

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, you must set the netmask length. The default value is 64. 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	

Name	Type	Description
authentication_type	string	The iSCSI authentication type. Required in POST and 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.

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 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
metric.throughput.write	integer	query	False	Filter by metric.throughput.write • 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

Name	Type	In	Required	Description
metric.duration	string	query	False	Filter by metric.duration • Introduced in: 9.7
metric.timestamp	string	query	False	Filter by metric.timestamp • 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.other	integer	query	False	Filter by metric.iops.other • Introduced in: 9.7
metric.iops.write	integer	query	False	Filter by metric.iops.write • 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.other	integer	query	False	Filter by metric.latency.other • Introduced in: 9.7
metric.latency.write	integer	query	False	Filter by metric.latency.write • Introduced in: 9.7
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
enabled	boolean	query	False	Filter by enabled
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.other	integer	query	False	Filter by statistics.latency_raw.other • Introduced in: 9.7

Name	Type	In	Required	Description
statistics.latency_raw.write	integer	query	False	Filter by statistics.latency_raw.write • Introduced in: 9.7
statistics.timestamp	string	query	False	Filter by statistics.timestamp • 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
statistics.iops_raw.other	integer	query	False	Filter by statistics.iops_raw.other • Introduced in: 9.7
statistics.iops_raw.write	integer	query	False	Filter by statistics.iops_raw.write • 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.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
statistics.status	string	query	False	Filter by statistics.status • Introduced in: 9.7
target.alias	string	query	False	Filter by target.alias
target.name	string	query	False	Filter by target.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	Number of records.
records	array[iscsi_service]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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
_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 request


```
{
  "_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"
  }
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
_links	_links	
num_records	integer	Number of records.
records	array[iscsi_service]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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
```

ONTAP Error Response Codes

Error Code	Description
1115127	The cluster lacks a valid iSCSI license.
2621462	The supplied SVM does not exist.

Error Code	Description
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.

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

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	

_links

Name	Type	Description
next	href	
self	href	

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
_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 request


```
{
  "_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"
  }
}
```


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.

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

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.

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
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.other	integer	query	False	Filter by iops.other
iops.write	integer	query	False	Filter by iops.write
latency.total	integer	query	False	Filter by latency.total
latency.read	integer	query	False	Filter by latency.read
latency.other	integer	query	False	Filter by latency.other
latency.write	integer	query	False	Filter by latency.write
throughput.total	integer	query	False	Filter by throughput.total
throughput.read	integer	query	False	Filter by throughput.read
throughput.other	integer	query	False	Filter by throughput.other
throughput.write	integer	query	False	Filter by throughput.write
duration	string	query	False	Filter by duration
timestamp	string	query	False	Filter by timestamp
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"
    }
  },
  "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"
    }
  ]
}
```


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.

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"
},
"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
tsih	integer	query	False	Filter by tsih
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
initiator.name	string	query	False	Filter by initiator.name
initiator.alias	string	query	False	Filter by initiator.alias
isid	string	query	False	Filter by isid
connections.initiator_address.port	integer	query	False	Filter by connections.initiator_address.port
connections.initiator_address.address	string	query	False	Filter by connections.initiator_address.address
connections.authentication_type	string	query	False	Filter by connections.authentication_type
connections.cid	integer	query	False	Filter by connections.cid
connections.interface.uuid	string	query	False	Filter by connections.interface.uuid

Name	Type	In	Required	Description
connections.interface.name	string	query	False	Filter by connections.interface.name
connections.interface.ip.address	string	query	False	Filter by connections.interface.ip.address
connections.interface.ip.port	integer	query	False	Filter by connections.interface.ip.port
target_portal_group_tag	integer	query	False	Filter by target_portal_group_tag
target_portal_group	string	query	False	Filter by target_portal_group
igroups.uuid	string	query	False	Filter by igroups.uuid
igroups.name	string	query	False	Filter by igroups.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	Number of records.
records	array[iscsi_session]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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",
        "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.
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	
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.

Name	Type	Description
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.
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",
    "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.
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.

The LUN map REST API allows you to create, delete, and discover LUN maps.

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,
"_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`
- DOC /protocols/san/lun-maps

Parameters

Name	Type	In	Required	Description
lun.node.name	string	query	False	Filter by lun.node.name
lun.node.uuid	string	query	False	Filter by lun.node.uuid
lun.name	string	query	False	Filter by lun.name
lun.uuid	string	query	False	Filter by lun.uuid
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
igroup.protocol	string	query	False	Filter by igroup.protocol
igroup.name	string	query	False	Filter by igroup.name

Name	Type	In	Required	Description
igroup.uuid	string	query	False	Filter by igroup.uuid
igroup.os_type	string	query	False	Filter by igroup.os_type
igroup.initiators	string	query	False	Filter by igroup.initiators
logical_unit_number	integer	query	False	Filter by logical_unit_number
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	Number of records.
records	array[lun_map]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "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"
      },
      "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.

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	

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.
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

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

Request Body

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
lun	lun	The LUN to which the initiator group is mapped. Required in POST by supplying either the `lun.uuid`, `lun.name`, or both.
svm	svm	

Example request


```
{
  "_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"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
```

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

Response

```
Status: 201, Created
```

Name	Type	Description
_links	_links	
num_records	integer	Number of records.
records	array[lun_map]	

Example response


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


Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
1254207	The LUN is already mapped to the same initiator group.
2621462	The specific SVM does not exist.
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.

Error Code	Description
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.

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.

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.

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.
svm	svm	

_links

Name	Type	Description
next	href	
self	href	

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 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	The unique identifier of the LUN.
igroup.uuid	string	path	True	The unique identifier of the igroup.

Response

```
Status: 200, Ok
```

Error

```
Status: Default
```

ONTAP Error Response Codes

Error Code	Description
5374875	The 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 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.

Name	Type	In	Required	Description
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.
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.
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"
  },
  "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 was not found.
5374875	The 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	

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.

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

Name	Type	Description
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.

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 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": {
      "size": 322163441664,
      "used": 0,
      "guarantee": {
        "requested": false,
        "reserved": false
      }
    },
    "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": "regular",
"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": {
  "size": 322163441664,
  "used": 0,
  "guarantee": {
    "requested": false,
    "reserved": false
  }
},
 "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"
},
"_links": {
  "self": {
    "href": "/api/storage/luns/5a24ae5b-28af-47fb-b129-
5adf6cfba0a6?fields=**"
  }
```

```
}
}
```

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 also 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.

Examples

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`, `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" } } }'
```

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.

Examples

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"
  }
}
}
```

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'
```

Retrieve LUNs

GET `/storage/luns`

Introduced In: 9.6

Retrieves LUNs.

Expensive properties

There is an added 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.

- `auto_delete`
- `lun_maps.*`
- `movement.*`
- `status.mapped`
- `statistics.*`
- `metric.*`

Related ONTAP commands

- `lun mapping show`
- `lun move show`
- `lun show`
- `volume file clone show-autodelete`

Learn more

- DOC /storage/luns

Parameters

Name	Type	In	Required	Description
create_time	string	query	False	Filter by create_time • Introduced in: 9.7
location.logical_unit	string	query	False	Filter by location.logical_unit
location.qtree.name	string	query	False	Filter by location.qtree.name

Name	Type	In	Required	Description
location.qtree.id	integer	query	False	Filter by location.qtree.id
location.volume.uuid	string	query	False	Filter by location.volume.uuid
location.volume.name	string	query	False	Filter by location.volume.name
enabled	boolean	query	False	Filter by enabled
qos_policy.uuid	string	query	False	Filter by qos_policy.uuid
qos_policy.name	string	query	False	Filter by qos_policy.name
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
movement.max_throughput	string	query	False	Filter by movement.max_throughput
movement.paths.destination	string	query	False	Filter by movement.paths.destination
movement.paths.source	string	query	False	Filter by movement.paths.source
movement.progress.volume_snapshot_blocked	boolean	query	False	Filter by movement.progress.volume_snapshot_blocked
movement.progress.state	string	query	False	Filter by movement.progress.state
movement.progress.elapsed	integer	query	False	Filter by movement.progress.elapsed

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

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

Name	Type	In	Required	Description
statistics.throughput_raw.other	integer	query	False	Filter by statistics.throughput_raw.other • Introduced in: 9.7
statistics.throughput_raw.write	integer	query	False	Filter by statistics.throughput_raw.write • Introduced in: 9.7
serial_number	string	query	False	Filter by serial_number
auto_delete	boolean	query	False	Filter by auto_delete
uuid	string	query	False	Filter by uuid
os_type	string	query	False	Filter by os_type
metric.timestamp	string	query	False	Filter by metric.timestamp • Introduced in: 9.7
metric.duration	string	query	False	Filter by metric.duration • 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

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

Name	Type	In	Required	Description
metric.iops.read	integer	query	False	Filter by metric.iops.read • Introduced in: 9.7
metric.iops.other	integer	query	False	Filter by metric.iops.other • Introduced in: 9.7
metric.iops.write	integer	query	False	Filter by metric.iops.write • Introduced in: 9.7
comment	string	query	False	Filter by comment
name	string	query	False	Filter by name
space.size	integer	query	False	Filter by space.size
space.used	integer	query	False	Filter by space.used
space.guarantee.reserved	boolean	query	False	Filter by space.guarantee.reserved
space.guarantee.requested	boolean	query	False	Filter by space.guarantee.requested
class	string	query	False	Filter by class
status.read_only	boolean	query	False	Filter by status.read_only
status.mapped	boolean	query	False	Filter by status.mapped
status.container_state	string	query	False	Filter by status.container_state

Name	Type	In	Required	Description
status.state	string	query	False	Filter by status.state
lun_maps.logical_unit_number	integer	query	False	Filter by lun_maps.logical_unit_number
lun_maps.igroup.name	string	query	False	Filter by lun_maps.igroup.name
lun_maps.igroup.uuid	string	query	False	Filter by lun_maps.igroup.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

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	Number of records.
records	array[lun]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "class": "string",
      "clone": {
        "source": {
          "name": "/vol/volume1/lun1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        }
      },
      "comment": "string",
      "create_time": "2018-06-04T19:00:00Z",
      "location": {
        "logical_unit": "lun1",
        "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": {
        "max_throughput": "string",
        "paths": {
          "destination": "/vol/vol1/lun1",
          "source": "/vol/vol2/lun2"
        },
        "progress": {
          "elapsed": 0,
          "failure": {
            "code": "4",
            "message": "Destination volume is offline."
          },
          "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"
    }
  ]
}
```


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	

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`, and `space.guarantee.requested`.

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.

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.

Name	Type	Description
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.
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

Performance numbers, such as IOPS latency and throughput.

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.

failure

Error information provided if the asynchronous LUN movement operation fails.

Name	Type	Description
code	string	The error code.
message	string	The error message.

progress

Name	Type	Description
elapsed	integer	The amount of time, in seconds, that has elapsed since the start of the LUN movement.
failure	failure	Error information provided if the asynchronous LUN movement operation fails.
percent_complete	integer	The percentage complete 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.
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 added 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	string	The maximum data throughput 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. • Introduced in: 9.6

Name	Type	Description
paths	paths	The fully qualified LUN path names involved in the LUN movement.
progress	progress	

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	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.

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

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

statistics

These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.

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.
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 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	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

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	
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 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. Only *regular* LUNs can be created using the REST API.

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`, and `space.guarantee.requested`. 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.
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 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	Performance numbers, such as IOPS latency and throughput.

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 added 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	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
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

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 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`
- `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
_links	_links	
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 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. Only *regular* LUNs can be created using the REST API.

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`, and `space.guarantee.requested`. 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.
create_time	string	The time the LUN was created.
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.

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 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	Performance numbers, such as IOPS latency and throughput.

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 added 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	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
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

Example request


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "class": "string",
  "clone": {
    "source": {
      "name": "/vol/volume1/lun1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    }
  },
  "comment": "string",
  "create_time": "2018-06-04T19:00:00Z",
  "location": {
    "logical_unit": "lun1",
    "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": {
    "max_throughput": "string",
    "paths": {
      "destination": "/vol/vol1/lun1",
      "source": "/vol/vol2/lun2"
    },
    "progress": {
      "elapsed": 0,
      "failure": {
        "code": "4",
```

```
        "message": "Destination volume is offline."
      },
      "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"
}
```


Response

```
Status: 201, Created
```

Name	Type	Description
_links	_links	
num_records	integer	Number of records.
records	array[lun]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "class": "string",
      "clone": {
        "source": {
          "name": "/vol/volume1/lun1",
          "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
        }
      },
      "comment": "string",
      "create_time": "2018-06-04T19:00:00Z",
      "location": {
        "logical_unit": "lun1",
        "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": {
        "max_throughput": "string",
        "paths": {
          "destination": "/vol/vol1/lun1",
          "source": "/vol/vol2/lun2"
        },
        "progress": {
          "elapsed": 0,
          "failure": {
            "code": "4",
            "message": "Destination volume is offline."
          },
          "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"
    }
  ]
}
```


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.
2621707	No SVM was specified. Either `svm.name` or `svm.uuid` must be supplied.
5242927	The specified qtree was not found.

Error Code	Description
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.
5374883	The property cannot be specified when creating a LUN clone. The `target` property of the error object identifies the property.

Error Code	Description
5374884	The property is required except when creating a LUN clone. 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.
13565952	The LUN clone request failed.

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	

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`, and `space.guarantee.requested`.

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.

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.

Name	Type	Description
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.
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

Performance numbers, such as IOPS latency and throughput.

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.

failure

Error information provided if the asynchronous LUN movement operation fails.

Name	Type	Description
code	string	The error code.
message	string	The error message.

progress

Name	Type	Description
elapsed	integer	The amount of time, in seconds, that has elapsed since the start of the LUN movement.
failure	failure	Error information provided if the asynchronous LUN movement operation fails.
percent_complete	integer	The percentage complete 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.
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 added 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	string	The maximum data throughput 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. • Introduced in: 9.6

Name	Type	Description
paths	paths	The fully qualified LUN path names involved in the LUN movement.
progress	progress	

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	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.

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

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

statistics

These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.

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.
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 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	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

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	
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 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. Only *regular* LUNs can be created using the REST API.

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`, and `space.guarantee.requested`. 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.
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 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	Performance numbers, such as IOPS latency and throughput.

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 added 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	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
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

_links

Name	Type	Description
next	href	
self	href	

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 a LUN

DELETE `/storage/luns/{uuid}`

Introduced In: 9.6

Deletes a LUN.

Related ONTAP commands

- `lun delete`

Learn more

- DOC /storage/luns

Parameters

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

Name	Type	In	Required	Description
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.

Expensive properties

There is an added 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.

- `auto_delete`
- `lun_maps.*`
- `movement.*`
- `status.mapped`
- `statistics.*`
- `metric.*`

Related ONTAP commands

- `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.
fields	array[string]	query	False	Specify the fields to return.

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
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 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. Only *regular* LUNs can be created using the REST API.

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`, and `space.guarantee.requested`. 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.
create_time	string	The time the LUN was created.
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.

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 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	Performance numbers, such as IOPS latency and throughput.

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 added 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	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
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

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "class": "string",
  "clone": {
    "source": {
      "name": "/vol/volume1/lun1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    }
  },
  "comment": "string",
  "create_time": "2018-06-04T19:00:00Z",
  "location": {
    "logical_unit": "lun1",
    "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": {
    "max_throughput": "string",
    "paths": {
      "destination": "/vol/vol1/lun1",
      "source": "/vol/vol2/lun2"
    },
    "progress": {
      "elapsed": 0,
      "failure": {
        "code": "4",
```

```
        "message": "Destination volume is offline."
      },
      "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"
}
```


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	

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`, and `space.guarantee.requested`.

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.

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.

Name	Type	Description
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.
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

Performance numbers, such as IOPS latency and throughput.

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.

failure

Error information provided if the asynchronous LUN movement operation fails.

Name	Type	Description
code	string	The error code.
message	string	The error message.

progress

Name	Type	Description
elapsed	integer	The amount of time, in seconds, that has elapsed since the start of the LUN movement.
failure	failure	Error information provided if the asynchronous LUN movement operation fails.
percent_complete	integer	The percentage complete 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.
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 added 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	string	The maximum data throughput 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. • Introduced in: 9.6

Name	Type	Description
paths	paths	The fully qualified LUN path names involved in the LUN movement.
progress	progress	

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	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.

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

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

statistics

These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.

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.
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 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	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 an existing LUN

PATCH `/storage/luns/{uuid}`

Introduced In: 9.6

Updates the properties of a LUN. A PATCH request can also be be used to overwrite the contents of a LUN as a clone of another, to begin movement of a LUN between volumes, and to pause and resume the movement of a LUN between volumes.

Related ONTAP commands

- `lun modify`
- `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 update.

Request Body

Name	Type	Description
_links	_links	
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 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. Only *regular* LUNs can be created using the REST API.

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`, and `space.guarantee.requested`. 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.
create_time	string	The time the LUN was created.
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.

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 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	Performance numbers, such as IOPS latency and throughput.

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 added 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	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
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

Example request


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "class": "string",
  "clone": {
    "source": {
      "name": "/vol/volume1/lun1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    }
  },
  "comment": "string",
  "create_time": "2018-06-04T19:00:00Z",
  "location": {
    "logical_unit": "lun1",
    "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": {
    "max_throughput": "string",
    "paths": {
      "destination": "/vol/vol1/lun1",
      "source": "/vol/vol2/lun2"
    },
    "progress": {
      "elapsed": 0,
      "failure": {
        "code": "4",
```

```
        "message": "Destination volume is offline."
      },
      "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"
}
```


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.
13565952	The LUN clone request failed.

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	

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`, and `space.guarantee.requested`.

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.

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.

Name	Type	Description
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.
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

Performance numbers, such as IOPS latency and throughput.

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.

failure

Error information provided if the asynchronous LUN movement operation fails.

Name	Type	Description
code	string	The error code.
message	string	The error message.

progress

Name	Type	Description
elapsed	integer	The amount of time, in seconds, that has elapsed since the start of the LUN movement.
failure	failure	Error information provided if the asynchronous LUN movement operation fails.
percent_complete	integer	The percentage complete 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.
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 added 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	string	The maximum data throughput 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. • Introduced in: 9.6

Name	Type	Description
paths	paths	The fully qualified LUN path names involved in the LUN movement.
progress	progress	

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	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.

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

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

statistics

These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.

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.
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 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	string	The name of the SVM.
uuid	string	The unique identifier of the SVM.

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	
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 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. Only *regular* LUNs can be created using the REST API.

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`, and `space.guarantee.requested`. 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.
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 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	Performance numbers, such as IOPS latency and throughput.

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 added 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	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
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

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 a LUN

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

Introduced In: 9.7

Retrieves historical performance metrics for a LUN.

Parameters

Name	Type	In	Required	Description
throughput.total	integer	query	False	Filter by throughput.total
throughput.read	integer	query	False	Filter by throughput.read
throughput.other	integer	query	False	Filter by throughput.other
throughput.write	integer	query	False	Filter by throughput.write
duration	string	query	False	Filter by duration
timestamp	string	query	False	Filter by timestamp
iops.total	integer	query	False	Filter by iops.total
iops.read	integer	query	False	Filter by iops.read
iops.other	integer	query	False	Filter by iops.other
iops.write	integer	query	False	Filter by iops.write

Name	Type	In	Required	Description
status	string	query	False	Filter by status
latency.total	integer	query	False	Filter by latency.total
latency.read	integer	query	False	Filter by latency.read
latency.other	integer	query	False	Filter by latency.other
latency.write	integer	query	False	Filter by latency.write
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"]

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"
    }
  },
  "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"
    }
  ]
}
```


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.

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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