



# Manage FC network interfaces

## ONTAP 9.15.1 REST API reference

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September 11, 2024

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# Manage FC network interfaces

## Network FC interfaces endpoint overview

### Overview

Fibre Channel (FC) interfaces are the logical endpoints for FC network connections to an SVM. An FC interface provides FC access to storage within the interface SVM using either Fibre Channel Protocol (FCP) or NVMe over FC (NVMe/FC).

The FC interface REST API allows you to create, delete, update, and discover FC interfaces, and obtain status information for FC interfaces.

An FC interface is created on an FC port which is located on a cluster node. The FC port must be specified to identify the location of the interface for a POST or PATCH request that relocates an interface. You can identify the port by supplying either the node and port names or the port UUID.

### Performance monitoring

Performance of an FC interface can be monitored by observing the `metric.*` and `statistics.*` properties. These properties show the performance of an FC interface 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.

### Interface placement recommendations

The FC interface REST API can also recommend the placement (cluster nodes and FC ports) for FC interfaces for a new or existing SVM as well as evaluate caller-proposed locations for FC interfaces. This functionality is available to cluster administrators only and is accessed using `GET /network/fc/interfaces` with the `recommend` family of query parameters.

The query parameter `recommend.data_protocol` is required when getting recommendations or evaluating caller-proposed locations for FC interfaces. It identifies the type of FC interfaces to recommend. Other `recommend` query parameters are optional and are used to modify the recommendation algorithm.

If an SVM is supplied using the query parameter `recommend.svm.name` and/or `recommend.svm.uuid`, existing FC interfaces are considered as part of the overall solution and only additionally recommended interfaces are returned. If no SVM is supplied, recommendations are returned for a new SVM.

FC fabrics connected to the cluster are discovered by the API. By default, FC interfaces are placed and evaluated for each fabric. The query parameter `recommend.fabrics.name` can be used to identify specific FC fabrics to use.

Cluster nodes supporting FC fabric connections for the specific data protocol are discovered by the API. By default, FC interfaces are placed all supported cluster nodes. Either query parameter `recommend.nodes.name` or `recommend.nodes.uuid` can be used to identify specific cluster nodes to use.

FC interfaces for the FC-NVMe data protocol are limited to two (2) interfaces per cluster node with a maximum of four (4) nodes, within a single SVM.

Placement recommendations are best effort and limited by the information available. In situations where an optimum configuration cannot be produced, the API returns the recommendations it can along with messages

describing how the caller might improve the configuration. These messages are produced by evaluating the calculated FC interface layout against best practices.

The same best practice evaluation can be applied to a caller-proposed configuration by using the query parameter `recommend.proposed.locations.port.uuid` to specify the locations for proposed FC interfaces. When this query parameter is supplied, the best practice evaluation is performed using the proposed interface locations and messages are produced describing how the caller might improve the configuration.

## Examples

### Creating an FC interface using the port node and name to identify the location

This example uses the `return_records` query parameter to retrieve the newly created FC interface in the POST response.

```
# The API:
POST /api/network/fc/interfaces

# The call:
curl -X POST 'https://<mgmt-
ip>/api/network/fc/interfaces?return_records=true' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm1" }, "name": "lif1",
"location": { "home_port": { "name": "0a", "home_node": { "name": "node1"
} } }, "data_protocol": "fcp" }'

# The response:
{
  "num_records": 1,
  "records": [
    {
      "svm": {
        "uuid": "cf300f5c-db83-11e8-bd46-005056bba0e0",
        "name": "svm1",
        "_links": {
          "self": {
            "href": "/api/svm/svms/cf300f5c-db83-11e8-bd46-005056bba0e0"
          }
        }
      },
      "uuid": "f6045b92-dec7-11e8-a733-005056bba0e0",
      "name": "lif1",
      "location": {
        "home_node": {
          "uuid": "baf9b9f-db81-11e8-bd46-005056bba0e0",
          "name": "node1",
          "_links": {
            "self": {
```

```

        "href": "/api/cluster/nodes/bafe9b9f-db81-11e8-bd46-
005056bba0e0"
    }
}
},
"home_port": {
    "uuid": "300c1ae3-db82-11e8-bd46-005056bba0e0",
    "name": "0a",
    "node": {
        "name": "node1"
    },
    "_links": {
        "self": {
            "href": "/api/network/fc/ports/300c1ae3-db82-11e8-bd46-
005056bba0e0"
        }
    }
},
"node": {
    "uuid": "bafe9b9f-db81-11e8-bd46-005056bba0e0",
    "name": "node1",
    "_links": {
        "self": {
            "href": "/api/cluster/nodes/bafe9b9f-db81-11e8-bd46-
005056bba0e0"
        }
    }
},
"port": {
    "uuid": "300c1ae3-db82-11e8-bd46-005056bba0e0",
    "name": "0a",
    "node": {
        "name": "node1"
    },
    "_links": {
        "self": {
            "href": "/api/network/fc/ports/300c1ae3-db82-11e8-bd46-
005056bba0e0"
        }
    }
}
},
"enabled": true,
"state": "down",
"data_protocol": "fcp",
"wwpn": "20:04:00:50:56:bb:a0:e0",

```

```

    "wwnn": "20:00:00:50:56:bb:a0:e0",
    "port_address": "9da2cb1",
    "_links": {
      "self": {
        "href": "/api/network/fc/interfaces/f6045b92-dec7-11e8-a733-005056bba0e0"
      }
    }
  }
]
}

```

### Creating an FC interface using the port UUID to identify the location

This example uses the `return_records` query parameter to retrieve the newly created FC interface in the POST response.

```

# The API:
POST /api/network/fc/interfaces

# The call:
curl -X POST 'https://<mgmt-
ip>/api/network/fc/interfaces?return_records=true' -H 'Accept:
application/hal+json' -d '{ "svm": { "name": "svm3" }, "name": "lif2",
"location": { "home_port": { "uuid": "24bb636a-db83-11e8-9a49-
005056bb1ec6" } }, "data_protocol": "fc_nvme" }'

# The response:
{
  "num_records": 1,
  "records": [
    {
      "svm": {
        "uuid": "a5060466-dbab-11e8-bd46-005056bba0e0",
        "name": "svm3",
        "_links": {
          "self": {
            "href": "/api/svm/svms/a5060466-dbab-11e8-bd46-005056bba0e0"
          }
        }
      },
      "uuid": "cdeb5591-dec9-11e8-a733-005056bba0e0",
      "name": "lif2",
      "location": {

```

```
"home_node": {
  "uuid": "e85aa147-db83-11e8-9a48-005056bb1ec6",
  "name": "node3",
  "_links": {
    "self": {
      "href": "/api/cluster/nodes/e85aa147-db83-11e8-9a48-
005056bb1ec6"
    }
  }
},
"home_port": {
  "uuid": "24bb636a-db83-11e8-9a49-005056bb1ec6",
  "name": "1b",
  "node": {
    "name": "node3"
  },
  "_links": {
    "self": {
      "href": "/api/network/fc/ports/24bb636a-db83-11e8-9a49-
005056bb1ec6"
    }
  }
},
"node": {
  "uuid": "e85aa147-db83-11e8-9a48-005056bb1ec6",
  "name": "node3",
  "_links": {
    "self": {
      "href": "/api/cluster/nodes/e85aa147-db83-11e8-9a48-
005056bb1ec6"
    }
  }
},
"port": {
  "uuid": "24bb636a-db83-11e8-9a49-005056bb1ec6",
  "name": "1b",
  "node": {
    "name": "node3"
  },
  "_links": {
    "self": {
      "href": "/api/network/fc/ports/24bb636a-db83-11e8-9a49-
005056bb1ec6"
    }
  }
}
```

```

    },
    "enabled": true,
    "state": "down",
    "data_protocol": "fc_nvme",
    "wwpn": "20:05:00:50:56:bb:a0:e0",
    "wwnn": "20:02:00:50:56:bb:a0:e0",
    "port_address": "612e202b",
    "_links": {
      "self": {
        "href": "/api/network/fc/interfaces/cdeb5591-dec9-11e8-a733-005056bba0e0"
      }
    }
  }
]
}

```

## Retrieving all properties for all FC interfaces

This example uses the `fields` query parameter to retrieve all properties.

```

# The API:
GET /api/network/fc/interfaces

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

# The response:
{
  "records": [
    {
      "svm": {
        "uuid": "a5060466-dbab-11e8-bd46-005056bba0e0",
        "name": "svm3",
        "_links": {
          "self": {
            "href": "/api/svm/svms/a5060466-dbab-11e8-bd46-005056bba0e0"
          }
        }
      },
      "uuid": "cdeb5591-dec9-11e8-a733-005056bba0e0",
      "name": "lif2",
      "location": {

```



```
"home_node": {
  "uuid": "e85aa147-db83-11e8-9a48-005056bb1ec6",
  "name": "node3",
  "_links": {
    "self": {
      "href": "/api/cluster/nodes/e85aa147-db83-11e8-9a48-
005056bb1ec6"
    }
  }
},
"home_port": {
  "uuid": "24bb636a-db83-11e8-9a49-005056bb1ec6",
  "name": "1b",
  "node": {
    "name": "node3"
  },
  "_links": {
    "self": {
      "href": "/api/network/fc/ports/24bb636a-db83-11e8-9a49-
005056bb1ec6"
    }
  }
},
"node": {
  "uuid": "e85aa147-db83-11e8-9a48-005056bb1ec6",
  "name": "node3",
  "_links": {
    "self": {
      "href": "/api/cluster/nodes/e85aa147-db83-11e8-9a48-
005056bb1ec6"
    }
  }
},
"port": {
  "uuid": "24bb636a-db83-11e8-9a49-005056bb1ec6",
  "name": "1b",
  "node": {
    "name": "node3"
  },
  "_links": {
    "self": {
      "href": "/api/network/fc/ports/24bb636a-db83-11e8-9a49-
005056bb1ec6"
    }
  }
}
```

```

    },
    "enabled": true,
    "state": "down",
    "data_protocol": "fc_nvme",
    "wwpn": "20:05:00:50:56:bb:a0:e0",
    "wwnn": "20:02:00:50:56:bb:a0:e0",
    "port_address": "612e202b",
    "_links": {
      "self": {
        "href": "/api/network/fc/interfaces/cdeb5591-dec9-11e8-a733-
005056bba0e0"
      }
    }
  },
  {
    "svm": {
      "uuid": "cf300f5c-db83-11e8-bd46-005056bba0e0",
      "name": "svm1",
      "_links": {
        "self": {
          "href": "/api/svm/svms/cf300f5c-db83-11e8-bd46-005056bba0e0"
        }
      }
    },
    "uuid": "f6045b92-dec7-11e8-a733-005056bba0e0",
    "name": "lif1",
    "location": {
      "home_node": {
        "uuid": "bafe9b9f-db81-11e8-bd46-005056bba0e0",
        "name": "node1",
        "_links": {
          "self": {
            "href": "/api/cluster/nodes/bafe9b9f-db81-11e8-bd46-
005056bba0e0"
          }
        }
      }
    },
    "home_port": {
      "uuid": "300c1ae3-db82-11e8-bd46-005056bba0e0",
      "name": "0a",
      "node": {
        "name": "node1"
      },
      "_links": {
        "self": {
          "href": "/api/network/fc/ports/300c1ae3-db82-11e8-bd46-

```

```

005056bba0e0"
    }
  },
  "node": {
    "uuid": "bafe9b9f-db81-11e8-bd46-005056bba0e0",
    "name": "node1",
    "_links": {
      "self": {
        "href": "/api/cluster/nodes/bafe9b9f-db81-11e8-bd46-
005056bba0e0"
      }
    }
  },
  "port": {
    "uuid": "300c1ae3-db82-11e8-bd46-005056bba0e0",
    "name": "0a",
    "node": {
      "name": "node1"
    },
    "_links": {
      "self": {
        "href": "/api/network/fc/ports/300c1ae3-db82-11e8-bd46-
005056bba0e0"
      }
    }
  },
  "enabled": true,
  "state": "down",
  "data_protocol": "fc",
  "wwpn": "20:04:00:50:56:bb:a0:e0",
  "wwnn": "20:00:00:50:56:bb:a0:e0",
  "port_address": "9da2cb1",
  "_links": {
    "self": {
      "href": "/api/network/fc/interfaces/f6045b92-dec7-11e8-a733-
005056bba0e0"
    }
  }
},
"num_records": 2,
_links": {
  "self": {
    "href": "/api/network/fc/interfaces?fields="

```

```
}  
}  
}
```

---

### Retrieving a list of selected FC interfaces

This example uses property query parameters to retrieve FC interfaces configured for the FC Protocol that are set to *up*.

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

# The call:
curl -X GET 'https://<mgmt-
ip>/api/network/fc/interfaces?data_protocol=fcp&state=up' -H 'Accept:
application/hal+json'

# The response:
{
  "records": [
    {
      "svm": {
        "uuid": "cf300f5c-db83-11e8-bd46-005056bba0e0",
        "name": "svm1",
        "_links": {
          "self": {
            "href": "/api/svm/svms/cf300f5c-db83-11e8-bd46-005056bba0e0"
          }
        }
      },
      "uuid": "f6045b92-dec7-11e8-a733-005056bba0e0",
      "name": "lif1",
      "state": "up",
      "data_protocol": "fcp",
      "_links": {
        "self": {
          "href": "/api/network/fc/interfaces/f6045b92-dec7-11e8-a733-
005056bba0e0"
        }
      }
    },
    {
      "num_records": 1,
      "_links": {
        "self": {
          "href": "/api/network/fc/interfaces?data_protocol=fcp&state=up"
        }
      }
    }
  ]
}
```

## Retrieving a specific FC interface

```
# The API:
GET /api/network/fc/interfaces/{uuid}

# The call:
curl -X GET 'https://<mgmt-ip>/api/network/fc/interfaces/cdeb5591-dec9-11e8-a733-005056bba0e0' -H 'Accept: application/hal+json'

# The response:
{
  "svm": {
    "uuid": "a5060466-dbab-11e8-bd46-005056bba0e0",
    "name": "svm3",
    "_links": {
      "self": {
        "href": "/api/svm/svms/a5060466-dbab-11e8-bd46-005056bba0e0"
      }
    }
  },
  "uuid": "cdeb5591-dec9-11e8-a733-005056bba0e0",
  "name": "lif2",
  "location": {
    "home_node": {
      "uuid": "e85aa147-db83-11e8-9a48-005056bb1ec6",
      "name": "node3",
      "_links": {
        "self": {
          "href": "/api/cluster/nodes/e85aa147-db83-11e8-9a48-005056bb1ec6"
        }
      }
    }
  },
  "home_port": {
    "uuid": "24bb636a-db83-11e8-9a49-005056bb1ec6",
    "name": "1b",
    "node": {
      "name": "node3"
    }
  },
  "_links": {
    "self": {
      "href": "/api/network/fc/ports/24bb636a-db83-11e8-9a49-005056bb1ec6"
    }
  }
},
  "node": {
```

```
"uuid": "e85aa147-db83-11e8-9a48-005056bb1ec6",
"name": "node3",
"_links": {
  "self": {
    "href": "/api/cluster/nodes/e85aa147-db83-11e8-9a48-005056bb1ec6"
  }
},
"port": {
  "uuid": "24bb636a-db83-11e8-9a49-005056bb1ec6",
  "name": "1b",
  "node": {
    "name": "node3"
  },
  "_links": {
    "self": {
      "href": "/api/network/fc/ports/24bb636a-db83-11e8-9a49-005056bb1ec6"
    }
  }
},
"enabled": true,
"state": "down",
"data_protocol": "fc_nvme",
"wwpn": "20:05:00:50:56:bb:a0:e0",
"wwnn": "20:02:00:50:56:bb:a0:e0",
"port_address": "612e202b",
"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,  
    "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,  
    "total": 0  
  }  
},  
"_links": {  
  "self": {  
    "href": "/api/network/fc/interfaces/cdeb5591-dec9-11e8-a733-  
005056bba0e0"  
  }  
}  
}
```

## Disabling an FC interface

When updating certain properties of an FC interface, the interface must first be disabled using the following:



```
# The API:
PATCH /api/network/fc/interfaces/{uuid}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/network/fc/interfaces/f6045b92-dec7-11e8-a733-005056bba0e0' -H 'Accept: application/hal+json' -d '{ "enabled": false }'
```

## Moving an FC interface to a new node and port

To move an FC interface to another node or port, the destination FC port must be specified in a PATCH request. Either the port UUID or node and port names can be used to identify the port.

Note that only FC interfaces configured for the FC Protocol can be moved. FC interfaces configured for NVMe/FC cannot be moved. The interface must also be set to the disabled state before being moved.

```
# The API:
PATCH /api/network/fc/interfaces/{uuid}

# The call:
curl -X PATCH 'https://<mgmt-ip>/api/network/fc/interfaces/f6045b92-dec7-11e8-a733-005056bba0e0' -H 'Accept: application/hal+json' -d '{
"location": { "home_port": { "uuid": "a1dc7aa5-db83-11e8-9ef7-005056bbbbcc" } } }'
```

## Deleting an FC interface

```
# The API:
DELETE /api/network/fc/interfaces/{uuid}

# The call:
curl -X DELETE 'https://<mgmt-ip>/api/network/fc/interfaces/f6045b92-dec7-11e8-a733-005056bba0e0' -H 'Accept: application/hal+json'
```

## Recommending interface locations for a new SVM

This example gets recommendations for FCP network interfaces for a new SVM.

```
# The API
```

```
GET /api/network/fc/interfaces
```

```
# The call:
```

```
curl -X GET 'https://<mgmt-  
ip>/api/network/fc/interfaces?recommend.data_protocol=fcp&fields=*' -H  
'Accept: application/hal+json'
```

```
# The response:
```

```
{  
  "records": [  
    {  
      "location": {  
        "home_port": {  
          "uuid": "300c1ae3-db82-11e8-bd46-005056bba0e0",  
          "name": "0a",  
          "node": {  
            "name": "node1"  
          },  
          "_links": {  
            "self": {  
              "href": "/api/network/fc/ports/300c1ae3-db82-11e8-bd46-  
005056bba0e0"  
            }  
          }  
        },  
        "data_protocol": "fcp",  
        "comment": "fabric: 55:0e:b1:a0:20:40:80:00"  
      },  
      {  
        "location": {  
          "home_port": {  
            "uuid": "ad7d3915-db82-11e8-b36d-005056bb982e",  
            "name": "0a",  
            "node": {  
              "name": "node2"  
            },  
            "_links": {  
              "self": {  
                "href": "/api/network/fc/ports/ad7d3915-db82-11e8-b36d-  
005056bb982e"  
              }  
            }  
          },  
          "data_protocol": "fcp",
```

```

    "comment": "fabric: 55:0e:b1:a0:20:40:80:00"
  },
  {
    "location": {
      "home_port": {
        "uuid": "300c1dfd-db82-11e8-bd46-005056bba0e0",
        "name": "0b",
        "node": {
          "name": "node1"
        },
        "_links": {
          "self": {
            "href": "/api/network/fc/ports/300c1dfd-db82-11e8-bd46-005056bba0e0"
          }
        }
      },
      "data_protocol": "fcp",
      "comment": "fabric: 55:0e:b1:a0:20:40:80:01"
    }
  },
  "num_records": 3,
  "recommend": {
    "messages": [
      {
        "message": "The following network ports are disabled (cluster node:port): node2:0b",
        "code": "5375959",
        "arguments": [
          {
            "message": "node2:0b"
          }
        ],
        "severity": "informational"
      }
    ]
  },
  "_links": {
    "self": {
      "href": "/api/network/fc/interfaces?recommend.data_protocol=fcp&fields=*"
    }
  }
}

```

## Proposing interface locations for a new SVM

This example requests that caller-proposed locations for FC-NVMe interfaces on two nodes be evaluated.

```
# The API
GET /api/network/fc/interfaces

# The call:
curl -X GET 'https://<mgmt-
ip>/api/network/fc/interfaces?&recommend.data_protocol=fc_nvme&recommend.p
roposed.locations.port.uuid=300c2786-db82-11e8-bd46-005056bba0e0,ad7d47d6-
db82-11e8-b36d-005056bb982e&fields=*' -H 'Accept: application/hal+json'

# The response:
{
  "records": [
  ],
  "num_records": 0,
  "recommend": {
    "messages": [
      {
        "message": "Cluster node \"node1\" does not have the requested
number (1) of network interfaces for the following Fibre Channel fabrics:
55:0e:b1:a0:20:40:80:07.",
        "code": "5375969",
        "arguments": [
          {
            "message": "node1"
          },
          {
            "message": "1"
          },
          {
            "message": "55:0e:b1:a0:20:40:80:07"
          }
        ],
        "severity": "warning"
      },
      {
        "message": "Cluster node \"node2\" does not have the requested
number (1) of network interfaces for the following Fibre Channel fabrics:
55:0e:b1:a0:20:40:80:07.",
        "code": "5375969",
        "arguments": [
          {
            "message": "node2"
          }
        ]
      }
    ]
  }
}
```

```

    },
    {
      "message": "1"
    },
    {
      "message": "55:0e:b1:a0:20:40:80:07"
    }
  ],
  "severity": "warning"
},
{
  "message": "The SVM cannot be reached from all of the Fibre Channel
(FC) fabrics to which the cluster is connected. Cluster FC fabrics:
55:0e:b1:a0:20:40:80:06, 55:0e:b1:a0:20:40:80:07. SVM FC fabrics:
55:0e:b1:a0:20:40:80:06.",
  "code": "5375970",
  "arguments": [
    {
      "message": "55:0e:b1:a0:20:40:80:06, 55:0e:b1:a0:20:40:80:07"
    },
    {
      "message": "55:0e:b1:a0:20:40:80:06"
    }
  ],
  "severity": "warning"
},
{
  "message": "The SVM is configured for 1 Fibre Channel (FC) fabrics.
The preferred configuration is 2 FC fabrics.",
  "code": "5375973",
  "arguments": [
    {
      "message": "1"
    },
    {
      "message": "2"
    }
  ],
  "severity": "warning"
}
]
},
"_links": {
  "self": {
    "href":
"/api/network/fc/interfaces?recommend.data_protocol=fc_nvme&recommend.node

```

```
s.name=node1,node2&recommend.proposed.locations.port.uuid=300c2786-db82-11e8-bd46-005056bba0e0,ad7d47d6-db82-11e8-b36d-005056bb982e&fields=*"
}
```

## Retrieve FC interfaces

GET /network/fc/interfaces

Introduced In: 9.6

Retrieves FC interfaces.

### Related ONTAP commands

- network interface show
- vserver fcp interface show

### Learn more

- [DOC /network/fc/interfaces](#)

### Parameters

Name	Type	In	Required	Description
recommend.svm.name	string	query	False	<p>The name of an existing SVM for which to recommend FC interfaces. If neither query parameter <code>recommend.svm.name</code> nor <code>recommend.svm.uuid</code> are provided when recommending FC interfaces, recommendations are made for a new, non-existent SVM.</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.11</li> </ul>

Name	Type	In	Required	Description
recommend.svm.uuid	string	query	False	<p>The UUID of an existing SVM for which to recommend FC interfaces. If neither query parameter <code>recommend.svm.name</code> nor <code>recommend.svm.uuid</code> are provided when recommending FC interfaces, recommendations are made for a new, non-existent SVM.</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.11</li> </ul>
recommend.data_protocol	string	query	False	<p>The target data protocol for which to recommend FC interfaces. This query parameter is required when recommending FC interfaces.</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.11</li> <li>• enum: ["fcp", "fc_nvme"]</li> </ul>

Name	Type	In	Required	Description
recommend.interfaces_per_node	integer	query	False	<p>The target number of interfaces per FC fabric per cluster node when recommending FC interfaces. If this query parameter is not provided, the default value is one (1).</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.11</li> <li>• Default value: 1</li> <li>• Max value: 4</li> <li>• Min value: 1</li> </ul>
recommend.fabrics.name	array[string]	query	False	<p>The names of the FC fabrics to target when recommending FC interfaces. If this query parameter is not provided, FC interfaces will be recommended for each FC fabric discovered.</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.11</li> </ul>



Name	Type	In	Required	Description
recommend.nodes.name	array[string]	query	False	<p>The names of the cluster nodes to target when recommending FC interfaces. If this query parameter is not provided, FC interfaces will be recommended for all nodes that have FC network ports supporting target data protocol. Query parameters <code>recommend.nodes.name</code> and <code>recommend.nodes.uid</code> are mutually exclusive; use either names or UUIDs to identify cluster nodes.</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.11</li> </ul>
recommend.nodes.uid	array[string]	query	False	<p>The UUIDs of the cluster nodes to target when recommending FC interfaces. If this query parameter is not provided, FC interfaces will be recommended for all nodes that have FC network ports supporting target data protocol. Query parameters <code>recommend.nodes.name</code> and <code>recommend.nodes.uid</code> are mutually exclusive; use either names or UUIDs to identify cluster nodes.</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.11</li> </ul>

Name	Type	In	Required	Description
recommend.proposed.locations.port.uuid	array[string]	query	False	<p>The UUIDs of the FC ports on which FC interfaces are proposed. A UUID may be supplied multiple times to proposed multiple FC interfaces. FC ports must be enabled, support the target data protocol and be reporting an FC fabric.</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.11</li> </ul>
port_address	string	query	False	Filter by port_address
data_protocol	string	query	False	Filter by data_protocol
comment	string	query	False	Filter by comment
uuid	string	query	False	Filter by uuid
svm.uuid	string	query	False	Filter by svm.uuid
svm.name	string	query	False	Filter by svm.name
metric.status	string	query	False	<p>Filter by metric.status</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.8</li> </ul>
metric.throughput.total	integer	query	False	<p>Filter by metric.throughput.total</p> <ul style="list-style-type: none"> <li>• Introduced in: 9.8</li> </ul>

Name	Type	In	Required	Description
metric.throughput.write	integer	query	False	Filter by metric.throughput.write  • Introduced in: 9.8
metric.throughput.read	integer	query	False	Filter by metric.throughput.read  • Introduced in: 9.8
metric.duration	string	query	False	Filter by metric.duration  • Introduced in: 9.8
metric.latency.write	integer	query	False	Filter by metric.latency.write  • Introduced in: 9.8
metric.latency.read	integer	query	False	Filter by metric.latency.read  • Introduced in: 9.8
metric.latency.other	integer	query	False	Filter by metric.latency.other  • Introduced in: 9.8
metric.latency.total	integer	query	False	Filter by metric.latency.total  • Introduced in: 9.8
metric.timestamp	string	query	False	Filter by metric.timestamp  • Introduced in: 9.8

Name	Type	In	Required	Description
metric.iops.write	integer	query	False	Filter by metric.iops.write  • Introduced in: 9.8
metric.iops.read	integer	query	False	Filter by metric.iops.read  • Introduced in: 9.8
metric.iops.other	integer	query	False	Filter by metric.iops.other  • Introduced in: 9.8
metric.iops.total	integer	query	False	Filter by metric.iops.total  • Introduced in: 9.8
wwnn	string	query	False	Filter by wwnn
name	string	query	False	Filter by name
wwpn	string	query	False	Filter by wwpn
state	string	query	False	Filter by state
statistics.iops_raw.write	integer	query	False	Filter by statistics.iops_raw.write  • Introduced in: 9.8
statistics.iops_raw.read	integer	query	False	Filter by statistics.iops_raw.read  • Introduced in: 9.8

Name	Type	In	Required	Description
statistics.iops_raw.other	integer	query	False	Filter by statistics.iops_raw.other  • Introduced in: 9.8
statistics.iops_raw.total	integer	query	False	Filter by statistics.iops_raw.total  • Introduced in: 9.8
statistics.status	string	query	False	Filter by statistics.status  • Introduced in: 9.8
statistics.latency_raw.write	integer	query	False	Filter by statistics.latency_raw.write  • Introduced in: 9.8
statistics.latency_raw.read	integer	query	False	Filter by statistics.latency_raw.read  • Introduced in: 9.8
statistics.latency_raw.other	integer	query	False	Filter by statistics.latency_raw.other  • Introduced in: 9.8
statistics.latency_raw.total	integer	query	False	Filter by statistics.latency_raw.total  • Introduced in: 9.8

Name	Type	In	Required	Description
statistics.throughput_raw.total	integer	query	False	Filter by statistics.throughput_raw.total  • Introduced in: 9.8
statistics.throughput_raw.write	integer	query	False	Filter by statistics.throughput_raw.write  • Introduced in: 9.8
statistics.throughput_raw.read	integer	query	False	Filter by statistics.throughput_raw.read  • Introduced in: 9.8
statistics.timestamp	string	query	False	Filter by statistics.timestamp  • Introduced in: 9.8
enabled	boolean	query	False	Filter by enabled
location.home_node.uuid	string	query	False	Filter by location.home_node.uuid  • Introduced in: 9.8
location.home_node.name	string	query	False	Filter by location.home_node.name  • Introduced in: 9.8
location.port.name	string	query	False	Filter by location.port.name
location.port.node.name	string	query	False	Filter by location.port.node.name

Name	Type	In	Required	Description
location.port.uuid	string	query	False	Filter by location.port.uuid
location.home_port.name	string	query	False	Filter by location.home_port.name  • Introduced in: 9.8
location.home_port.node.name	string	query	False	Filter by location.home_port.node.name  • Introduced in: 9.8
location.home_port.uuid	string	query	False	Filter by location.home_port.uuid  • Introduced in: 9.8
location.is_home	boolean	query	False	Filter by location.is_home  • Introduced in: 9.8
location.node.uuid	string	query	False	Filter by location.node.uuid
location.node.name	string	query	False	Filter by location.node.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. <ul style="list-style-type: none"> <li>• Default value: 1</li> </ul>
return_timeout	integer	query	False	The number of seconds to allow the call to execute before returning. When iterating over a collection, the default is 15 seconds. ONTAP returns earlier if either max records or the end of the collection is reached. <ul style="list-style-type: none"> <li>• Default value: 1</li> <li>• Max value: 120</li> <li>• Min value: 0</li> </ul>
order_by	array[string]	query	False	Order results by specified fields and optional [asc

## Response

Status: 200, Ok

Name	Type	Description
_links	<a href="#">_links</a>	
num_records	integer	The number of records in the response.
recommend	<a href="#">recommend</a>	Response properties specific to the FC interface placement functionality. See the <i>Interface placement recommendations</i> section of <a href="#">DOC /network/fc/interfaces</a>



Name	Type	Description
records	array[ <a href="#">fc_interface</a> ]	

## Example response

```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "recommend": {
    "messages": [
      {
        "arguments": [
          {
            "code": "string",
            "message": "string"
          }
        ],
        "code": 5375959,
        "message": "Network ports are disabled.",
        "severity": "informational"
      }
    ]
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "comment": "string",
      "data_protocol": "string",
      "location": {
        "home_node": {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          }
        },
        "name": "node1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      }
    }
  ],
}
```

```
"home_port": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "name": "0a",
  "node": {
    "name": "node1"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"node": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "name": "node1",
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"port": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "name": "0a",
  "node": {
    "name": "node1"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
}
},
"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": "2017-01-25 06:20:13 -0500"
  },
  "name": "fc_lif1",
  "port_address": "5060F",
  "state": "string",
  "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": "2017-01-25 06:20:13 -0500"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "bce9827d-4d8f-60af-c771-6e8e9af2c6f0",
  "wwnn": "20:00:00:50:56:b4:13:01",

```

```

      "wwpn": "20:00:00:50:56:b4:13:a8"
    }
  ]
}

```

## Error

Status: Default

### ONTAP Error Response Codes

Error Code	Description
5373982	An invalid WWN was specified. The length is incorrect.
5373983	An invalid WWN was specified. The format is incorrect.
5374938	Query parameter <code>recommend.data_protocol</code> is required when any other <code>recommend</code> query parameters are specified.
5374939	Query parameter <code>recommend.fabrics.name</code> specifies a duplicate FC fabric.
5374940	Query parameter <code>recommend.nodes.name</code> or <code>recommend.nodes.uuid</code> specifies a duplicate node.
5375953	Query parameter <code>recommend.fabrics.name</code> specifies an FC fabric to which no FC port is connected.
5375954	Query parameter <code>recommend.nodes.name</code> or <code>recommend.nodes.uuid</code> specifies a node that does not support the specified data protocol.
5375955	Query parameter <code>recommend.proposed.locations.port.uuid</code> does not specify a valid port or specifies a port that is support the specified data protocol.
5375956	Query parameter <code>recommend.proposed.locations.port.uuid</code> specifies a port that is not located on a node specified by query parameter <code>recommend.nodes.name</code> or <code>recommend.nodes.uuid</code> . If the nodes are to be constrained, only ports on those nodes may be proposed.
5375957	Query parameter <code>recommend.proposed.locations.port.uuid</code> specifies a port that is disabled.

Error Code	Description
5375958	Query parameter recommend.proposed.locations.port.uuid specifies a port that is not reporting a connected FC fabric.

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

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

### Example error

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

### Definitions

## See Definitions

href

Name	Type	Description
href	string	

\_links

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

error\_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

fc\_interface\_recommend\_message

Name	Type	Description
arguments	array[ <a href="#">error_arguments</a> ]	The message substitution arguments.

Name	Type	Description
code	string	<p>The message code. Possible messages:</p> <p>ONTAP Error Response Codes</p> <p>Error Code — Description</p> <p>5375959 — Network ports are disabled.</p> <p>5375960 — Network ports are enabled, but not reporting a connected FC fabric.</p> <p>5375961 — The limit for the number of FC network interfaces on a cluster node has been reached.</p> <p>5375962 — The limit for the number of FC network interfaces on a port has been reached.</p> <p>5375963 — An HA pair of cluster nodes has a discrepancy in the presence of FC ports.</p> <p>5375964 — An HA pair of cluster nodes has a discrepancy in support for an FC data protocol.</p> <p>5375965 — An HA pair of cluster nodes cannot be reached from the same FC fabrics.</p> <p>5375966 — A cluster node cannot be reached from all of the FC fabrics from which other cluster nodes with FC interfaces in the SVM can be reached.</p> <p>5375967 — The limit for the number of FC network interfaces on a cluster node has been exceeded.</p> <p>5375968 — The limit for the number of FC network interfaces on an FC port has been exceeded.</p> <p>5375969 — The requested number of network interfaces per FC fabric per cluster node has not been achieved.</p> <p>5375970 — The SVM cannot be</p>



Name	Type	Description
message	string	The message text.
severity	string	The severity of the message. Message severities are as follows: <ul style="list-style-type: none"> <li>• <code>error</code> - Messages reporting problems that must be corrected before creating the FC network interfaces.</li> <li>• <code>warning</code> - Messages indicating issues that need rectifying in order to achieve an optimal configuration.</li> <li>• <code>informational</code> - Messages providing relevant information for consideration.</li> </ul>

recommend

Response properties specific to the FC interface placement functionality. See the *Interface placement recommendations* section of [DOC /network/fc/interfaces](#)

Name	Type	Description
messages	array[ <a href="#">fc_interface_recommend_message</a> ]	Messages describing the results of a FC network interface placement operation or evaluation of caller-proposed locations.

\_links

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

home\_node

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	
uuid	string	

node

The node on which the FC port is located.

Name	Type	Description
name	string	The name of the node on which the FC port is located.

home\_port

An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	The name of the FC port.
node	<a href="#">node</a>	The node on which the FC port is located.
uuid	string	The unique identifier of the FC port.

node

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	
uuid	string	

port

An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	The name of the FC port.
node	<a href="#">node</a>	The node on which the FC port is located.
uuid	string	The unique identifier of the FC port.

location

The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID,

or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.

`location.node` and `location.port` refer to the current location of the FC interface. This can be different from `location.home_node` and `location.home_port` in instances where the FC interface has failed over to its HA partner node. The `location.node`, `location.port`, and `location.is_home` properties are not available for interfaces on the inactive side of a MetroCluster relationship.

Name	Type	Description
<code>home_node</code>	<a href="#">home_node</a>	
<code>home_port</code>	<a href="#">home_port</a>	An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.
<code>is_home</code>	boolean	Indicates if the FC interface is currently on its home node.
<code>node</code>	<a href="#">node</a>	
<code>port</code>	<a href="#">port</a>	An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

## iops

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

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

## latency

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

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

throughput

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

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

metric

Performance numbers, such as IOPS latency and throughput

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

Name	Type	Description
iops	<a href="#">iops</a>	The rate of I/O operations observed at the storage object.
latency	<a href="#">latency</a>	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	<a href="#">throughput</a>	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.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Performance 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	Performance 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.

Name	Type	Description
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	Performance 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	<a href="#">iops_raw</a>	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	<a href="#">latency_raw</a>	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
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	<a href="#">throughput_raw</a>	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

SVM, applies only to SVM-scoped objects.

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
name	string	The name of the SVM. This field cannot be specified in a PATCH method.
uuid	string	The unique identifier of the SVM. This field cannot be specified in a PATCH method.



## fc\_interface

A Fibre Channel (FC) interface is the logical endpoint for FC network connections to an SVM. An FC interface provides FC access to storage within the interface SVM using either Fibre Channel Protocol or NVMe over Fibre Channel (NVMe/FC).

An FC interface is created on an FC port which is located on a cluster node. The FC port must be specified to identify the location of the interface for a POST or PATCH operation that relocates an interface. You can identify the port by supplying either the cluster node and port names or the port UUID.

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
comment	string	A user configurable comment. Optional in POST; valid in PATCH. To clear a prior comment, set the property to an empty string in PATCH.
data_protocol	string	The data protocol for which the FC interface is configured. Required in POST.
enabled	boolean	The administrative state of the FC interface. The FC interface can be disabled to block all FC communication with the SVM through this interface. Optional in POST and PATCH; defaults to <i>true</i> (enabled) in POST.

Name	Type	Description
location	location	<p>The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID, or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.</p> <p><code>location.node</code> and <code>location.port</code> refer to the current location of the FC interface. This can be different from <code>location.home_node</code> and <code>location.home_port</code> in instances where the FC interface has failed over to its HA partner node. The <code>location.node</code>, <code>location.port</code>, and <code>location.is_home</code> properties are not available for interfaces on the inactive side of a MetroCluster relationship.</p>
metric	metric	Performance numbers, such as IOPS latency and throughput
name	string	The name of the FC interface. Required in POST; optional in PATCH.

Name	Type	Description
port_address	string	<p>The port address of the FC interface. Each FC port in an FC switched fabric has its own unique FC port address for routing purposes. The FC 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 FC interface when the SVM performs a port login (PLOGI).</p> <p>This is useful for obtaining statistics and diagnostic information from FC switches.</p> <p>This is a hexadecimal encoded numeric value.</p>
state	string	<p>The current operational state of the FC interface. The state is set to <i>down</i> if the interface is not enabled.</p> <p>If the cluster node hosting the port is down or unavailable, no state value is returned.</p>
statistics	<a href="#">statistics</a>	<p>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.</p>
svm	<a href="#">svm</a>	<p>SVM, applies only to SVM-scoped objects.</p>
uuid	string	<p>The unique identifier of the FC interface. Required in the URL.</p>

Name	Type	Description
wwnn	string	<p>The world wide node name (WWNN) of the FC interface SVM. The WWNN is generated by ONTAP when Fibre Channel Protocol or the NVMe service is created for the FC interface SVM.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:01</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>
wwpn	string	<p>The world wide port name (WWPN) of the FC interface. The WWPN is generated by ONTAP when the FC interface is created.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:a8</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>

returned\_error

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

## Create an FC interface

POST `/network/fc/interfaces`

**Introduced In:** 9.6

Creates an FC interface.

## Required properties

- `svm.uuid` or `svm.name` - Existing SVM in which to create the FC interface.
- `name` - Name of the FC interface.
- `location.port.uuid` or both `location.port.name` and `location.port.node.name` - FC port on which to create the FC interface.
- `data_protocol` - Data protocol for the FC interface.

## Default property values

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

- `enabled` - *true*

## Related ONTAP commands

- `network interface create`

## Learn more

- [DOC /network/fc/interfaces](#)

## Parameters

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

## Request Body

Name	Type	Description
<code>_links</code>	<a href="#">_links</a>	
<code>comment</code>	string	A user configurable comment. Optional in POST; valid in PATCH. To clear a prior comment, set the property to an empty string in PATCH.
<code>data_protocol</code>	string	The data protocol for which the FC interface is configured. Required in POST.

Name	Type	Description
enabled	boolean	The administrative state of the FC interface. The FC interface can be disabled to block all FC communication with the SVM through this interface. Optional in POST and PATCH; defaults to <i>true</i> (enabled) in POST.
location	<a href="#">location</a>	<p>The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID, or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.</p> <p><code>location.node</code> and <code>location.port</code> refer to the current location of the FC interface. This can be different from <code>location.home_node</code> and <code>location.home_port</code> in instances where the FC interface has failed over to its HA partner node. The <code>location.node</code>, <code>location.port</code>, and <code>location.is_home</code> properties are not available for interfaces on the inactive side of a MetroCluster relationship.</p>
metric	<a href="#">metric</a>	Performance numbers, such as IOPS latency and throughput
name	string	The name of the FC interface. Required in POST; optional in PATCH.

Name	Type	Description
port_address	string	<p>The port address of the FC interface. Each FC port in an FC switched fabric has its own unique FC port address for routing purposes. The FC 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 FC interface when the SVM performs a port login (PLOGI).</p> <p>This is useful for obtaining statistics and diagnostic information from FC switches.</p> <p>This is a hexadecimal encoded numeric value.</p>
state	string	<p>The current operational state of the FC interface. The state is set to <i>down</i> if the interface is not enabled.</p> <p>If the cluster node hosting the port is down or unavailable, no state value is returned.</p>
statistics	<a href="#">statistics</a>	<p>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.</p>
svm	<a href="#">svm</a>	<p>SVM, applies only to SVM-scoped objects.</p>
uuid	string	<p>The unique identifier of the FC interface. Required in the URL.</p>

Name	Type	Description
wwnn	string	<p>The world wide node name (WWNN) of the FC interface SVM. The WWNN is generated by ONTAP when Fibre Channel Protocol or the NVMe service is created for the FC interface SVM.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:01</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>
wwpn	string	<p>The world wide port name (WWPN) of the FC interface. The WWPN is generated by ONTAP when the FC interface is created.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:a8</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>



## Example request

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "comment": "string",
  "data_protocol": "string",
  "location": {
    "home_node": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "home_port": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "0a",
      "node": {
        "name": "node1"
      },
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "node": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "port": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      }
    }
  }
}
```

```

    },
    "name": "0a",
    "node": {
      "name": "node1"
    },
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  }
},
"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": "2017-01-25 06:20:13 -0500"
},
"name": "fc_lif1",
"port_address": "5060F",
"state": "string",
"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": "2017-01-25 06:20:13 -0500"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "bce9827d-4d8f-60af-c771-6e8e9af2c6f0",
  "wwnn": "20:00:00:50:56:b4:13:01",
  "wwpn": "20:00:00:50:56:b4:13:a8"
}

```

## Response

Status: 201, Created

Name	Type	Description
_links	<a href="#">_links</a>	
num_records	integer	The number of records in the response.
recommend	<a href="#">recommend</a>	Response properties specific to the FC interface placement functionality. See the <i>Interface placement recommendations</i> section of <a href="#">DOC /network/fc/interfaces</a>
records	array[ <a href="#">fc_interface</a> ]	

## Example response

```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "recommend": {
    "messages": [
      {
        "arguments": [
          {
            "code": "string",
            "message": "string"
          }
        ],
        "code": 5375959,
        "message": "Network ports are disabled.",
        "severity": "informational"
      }
    ]
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "comment": "string",
      "data_protocol": "string",
      "location": {
        "home_node": {
          "_links": {
            "self": {
              "href": "/api/resourcelink"
            }
          }
        },
        "name": "node1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      }
    }
  ],
}
```

```
"home_port": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "name": "0a",
  "node": {
    "name": "node1"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"node": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "name": "node1",
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"port": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "name": "0a",
  "node": {
    "name": "node1"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
}
},
"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": "2017-01-25 06:20:13 -0500"
  },
  "name": "fc_lif1",
  "port_address": "5060F",
  "state": "string",
  "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": "2017-01-25 06:20:13 -0500"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "bce9827d-4d8f-60af-c771-6e8e9af2c6f0",
  "wwnn": "20:00:00:50:56:b4:13:01",

```

```

      "wwpn": "20:00:00:50:56:b4:13:a8"
    }
  ]
}

```

## Headers

Name	Description	Type
Location	Useful for tracking the resource location	string

## Error

Status: Default

## ONTAP Error Response Codes

Error Code	Description
1966140	An interface with the same name already exists.
1966217	The specified port is not valid on the node provided.
2621462	The supplied SVM does not exist.
2621706	The specified <code>svm.uuid</code> and <code>svm.name</code> do not refer to the same SVM.
2621707	No SVM was specified. Either <code>svm.name</code> or <code>svm.uuid</code> must be supplied.
5373966	A Fibre Channel interface with the <code>fc</code> protocol cannot be created in an SVM that is configured for NVMe.
5373982	An invalid WWN was specified. The length is incorrect.
5373983	An invalid WWN was specified. The format is incorrect.
5374102	The specified Fibre Channel interface cannot be created because the Fibre Channel adapter is down. Bring the adapter up and try again.
5374871	The Fibre Channel port identified by the specified UUID does not refer to the same port as that identified by the specified node name and/or port name.
5374872	If either <code>location.port.node.name</code> or <code>location.port.name</code> is supplied, both properties must be supplied.

Error Code	Description
5374873	The Fibre Channel port must be specified using either <code>location.port.uuid</code> or <code>location.port.node.name</code> and <code>location.port.name</code> .
5375057	An FC port with the provided UUID does not exist.
72089652	An NVMe service must be created before creating a Fibre Channel interface using the NVMe over FC data protocol.
72089672	The specified Fibre Channel port does not support the NVMe over FC data protocol.
72089900	A Fibre Channel interface with the <code>fc_nvme</code> protocol cannot be created in an SVM that is configured for a SAN protocol.
72089901	NVMe over Fabrics does not support more than 2 LIFs per node per SVM.

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

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

#### Example error

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

## Definitions



## See Definitions

href

Name	Type	Description
href	string	

\_links

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

home\_node

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	
uuid	string	

node

The node on which the FC port is located.

Name	Type	Description
name	string	The name of the node on which the FC port is located.

home\_port

An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	The name of the FC port.
node	<a href="#">node</a>	The node on which the FC port is located.
uuid	string	The unique identifier of the FC port.

node

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	
uuid	string	

## port

An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	The name of the FC port.
node	<a href="#">node</a>	The node on which the FC port is located.
uuid	string	The unique identifier of the FC port.

## location

The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID, or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.

`location.node` and `location.port` refer to the current location of the FC interface. This can be different from `location.home_node` and `location.home_port` in instances where the FC interface has failed over to its HA partner node. The `location.node`, `location.port`, and `location.is_home` properties are not available for interfaces on the inactive side of a MetroCluster relationship.

Name	Type	Description
home_node	<a href="#">home_node</a>	
home_port	<a href="#">home_port</a>	An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.
is_home	boolean	Indicates if the FC interface is currently on its home node.
node	<a href="#">node</a>	

Name	Type	Description
port	port	An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

iops

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

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

latency

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

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

throughput

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

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

metric

Performance numbers, such as IOPS latency and throughput

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
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	<a href="#">iops</a>	The rate of I/O operations observed at the storage object.
latency	<a href="#">latency</a>	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	<a href="#">throughput</a>	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	Performance 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	Performance 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	Performance 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 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

SVM, applies only to SVM-scoped objects.

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
name	string	The name of the SVM. This field cannot be specified in a PATCH method.
uuid	string	The unique identifier of the SVM. This field cannot be specified in a PATCH method.

#### fc\_interface

A Fibre Channel (FC) interface is the logical endpoint for FC network connections to an SVM. An FC interface provides FC access to storage within the interface SVM using either Fibre Channel Protocol or NVMe over Fibre Channel (NVMe/FC).

An FC interface is created on an FC port which is located on a cluster node. The FC port must be specified to identify the location of the interface for a POST or PATCH operation that relocates an interface. You can identify the port by supplying either the cluster node and port names or the port UUID.

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
comment	string	A user configurable comment. Optional in POST; valid in PATCH. To clear a prior comment, set the property to an empty string in PATCH.
data_protocol	string	The data protocol for which the FC interface is configured. Required in POST.
enabled	boolean	The administrative state of the FC interface. The FC interface can be disabled to block all FC communication with the SVM through this interface. Optional in POST and PATCH; defaults to <i>true</i> (enabled) in POST.



Name	Type	Description
location	location	<p>The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID, or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.</p> <p><code>location.node</code> and <code>location.port</code> refer to the current location of the FC interface. This can be different from <code>location.home_node</code> and <code>location.home_port</code> in instances where the FC interface has failed over to its HA partner node. The <code>location.node</code>, <code>location.port</code>, and <code>location.is_home</code> properties are not available for interfaces on the inactive side of a MetroCluster relationship.</p>
metric	metric	Performance numbers, such as IOPS latency and throughput
name	string	The name of the FC interface. Required in POST; optional in PATCH.

Name	Type	Description
port_address	string	<p>The port address of the FC interface. Each FC port in an FC switched fabric has its own unique FC port address for routing purposes. The FC 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 FC interface when the SVM performs a port login (PLOGI).</p> <p>This is useful for obtaining statistics and diagnostic information from FC switches.</p> <p>This is a hexadecimal encoded numeric value.</p>
state	string	<p>The current operational state of the FC interface. The state is set to <i>down</i> if the interface is not enabled.</p> <p>If the cluster node hosting the port is down or unavailable, no state value is returned.</p>
statistics	<a href="#">statistics</a>	<p>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.</p>
svm	<a href="#">svm</a>	<p>SVM, applies only to SVM-scoped objects.</p>
uuid	string	<p>The unique identifier of the FC interface. Required in the URL.</p>

Name	Type	Description
wwnn	string	<p>The world wide node name (WWNN) of the FC interface SVM. The WWNN is generated by ONTAP when Fibre Channel Protocol or the NVMe service is created for the FC interface SVM.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:01</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>
wwpn	string	<p>The world wide port name (WWPN) of the FC interface. The WWPN is generated by ONTAP when the FC interface is created.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:a8</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>

#### \_links

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

#### error\_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

#### fc\_interface\_recommend\_message

Name	Type	Description
arguments	array[ <a href="#">error_arguments</a> ]	The message substitution arguments.

Name	Type	Description
code	string	<p>The message code. Possible messages:</p> <p>ONTAP Error Response Codes</p> <p>Error Code — Description</p> <p>5375959 — Network ports are disabled.</p> <p>5375960 — Network ports are enabled, but not reporting a connected FC fabric.</p> <p>5375961 — The limit for the number of FC network interfaces on a cluster node has been reached.</p> <p>5375962 — The limit for the number of FC network interfaces on a port has been reached.</p> <p>5375963 — An HA pair of cluster nodes has a discrepancy in the presence of FC ports.</p> <p>5375964 — An HA pair of cluster nodes has a discrepancy in support for an FC data protocol.</p> <p>5375965 — An HA pair of cluster nodes cannot be reached from the same FC fabrics.</p> <p>5375966 — A cluster node cannot be reached from all of the FC fabrics from which other cluster nodes with FC interfaces in the SVM can be reached.</p> <p>5375967 — The limit for the number of FC network interfaces on a cluster node has been exceeded.</p> <p>5375968 — The limit for the number of FC network interfaces on an FC port has been exceeded.</p> <p>5375969 — The requested number of network interfaces per FC fabric per cluster node has not been achieved.</p> <p>5375970 — The SVM cannot be</p>

Name	Type	Description
message	string	The message text.
severity	string	The severity of the message. Message severities are as follows: <ul style="list-style-type: none"> <li>• <code>error</code> - Messages reporting problems that must be corrected before creating the FC network interfaces.</li> <li>• <code>warning</code> - Messages indicating issues that need rectifying in order to achieve an optimal configuration.</li> <li>• <code>informational</code> - Messages providing relevant information for consideration.</li> </ul>

recommend

Response properties specific to the FC interface placement functionality. See the *Interface placement recommendations* section of [DOC /network/fc/interfaces](#)

Name	Type	Description
messages	array[ <a href="#">fc_interface_recommend_message</a> ]	Messages describing the results of a FC network interface placement operation or evaluation of caller-proposed locations.

returned\_error

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

# Retrieve historical performance metrics for an FC interface

GET /network/fc/interfaces/{fc\_interface.uuid}/metrics

**Introduced In:** 9.14

Retrieves historical performance metrics for a Fibre Channel interface.

## Parameters

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

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

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

## Response

Status: 200, Ok

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



## Example response

```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "num_records": 1,
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "duration": "PT15S",
      "iops": {
        "read": 200,
        "total": 1000,
        "write": 100
      },
      "latency": {
        "read": 200,
        "total": 1000,
        "write": 100
      },
      "status": "ok",
      "throughput": {
        "read": 200,
        "total": 1000,
        "write": 100
      },
      "timestamp": "2017-01-25 06:20:13 -0500",
      "uuid": "lcd8a442-86d1-11e0-ae1c-123478563412"
    }
  ]
}
```

## Error

Status: Default

### ONTAP Error Response Codes

Error Code	Description
8585947	No metrics are available for the requested object.
8586225	An unexpected error occurred retrieving metrics for the requested object.

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

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

### Example error

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

## Definitions

## See Definitions

href

Name	Type	Description
href	string	

\_links

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

\_links

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

iops

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

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

latency

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

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

### throughput

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

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

### records

Performance numbers, such as IOPS latency and throughput

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
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	<a href="#">iops</a>	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.
uuid	string	The unique identifier of the FC interface.

#### error\_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

#### returned\_error

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

## Retrieve historical performance metrics for an FC interface for a specific time

GET /network/fc/interfaces/{fc\_interface.uuid}/metrics/{timestamp}

**Introduced In:** 9.14

Retrieves historical performance metrics for a Fibre Channel interface for a specific time.

### Parameters

Name	Type	In	Required	Description
fc_interface.uuid	string	path	True	The unique identifier of the Fibre Channel interface.
timestamp	string	path	True	The timestamp of the performance data.  • format: date-time
fields	array[string]	query	False	Specify the fields to return.

### Response

Status: 200, Ok

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

Name	Type	Description
duration	string	The duration over which this sample is calculated. The time durations are represented in the ISO-8601 standard format. Samples can be calculated over the following durations:
iops	iops	The rate of I/O operations observed at the storage object.
latency	latency	The round trip latency in microseconds observed at the storage object.
status	string	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.
uuid	string	The unique identifier of the FC interface.

## Example response

```
{
  "_links": {
    "self": {
      "href": "/api/resourceLink"
    }
  },
  "duration": "PT15S",
  "iops": {
    "read": 200,
    "total": 1000,
    "write": 100
  },
  "latency": {
    "read": 200,
    "total": 1000,
    "write": 100
  },
  "status": "ok",
  "throughput": {
    "read": 200,
    "total": 1000,
    "write": 100
  },
  "timestamp": "2017-01-25 06:20:13 -0500",
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
}
```

## Error

Status: Default

### ONTAP Error Response Codes

Error Code	Description
8585947	No metrics are available for the requested object.
8586225	An unexpected error occurred retrieving metrics for the requested object.

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



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

### Example error

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

### Definitions

## See Definitions

href

Name	Type	Description
href	string	

\_links

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

iops

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

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

latency

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

Name	Type	Description
other	integer	Performance metric for other I/O operations. Other I/O operations can be metadata operations, such as directory lookups and so on.
read	integer	Performance metric for read I/O operations.

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

#### throughput

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

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

#### error\_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

#### returned\_error

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

# Delete an FC interface

DELETE /network/fc/interfaces/{uuid}

Introduced In: 9.6

Deletes an FC interface.

## Related ONTAP commands

- `network interface delete`

## Learn more

- [DOC /network/fc/interfaces](#)

## Parameters

Name	Type	In	Required	Description
uuid	string	path	True	

## Response

Status: 200, Ok

## Error

Status: Default

## ONTAP Error Response Codes

Error Code	Description
53280992	The FC interface could not be deleted because it is enabled.

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

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

## Example error

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

## Definitions

### See Definitions

#### error\_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

#### returned\_error

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

# Retrieve an FC interface

GET /network/fc/interfaces/{uuid}

Introduced In: 9.6

Retrieves an FC interface.

## Expensive properties

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

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

## Related ONTAP commands

- `network interface show`
- `vserver fcp interface show`

## Learn more

- [DOC /network/fc/interfaces](#)

## Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier for the FC interface.
fields	array[string]	query	False	Specify the fields to return.

## Response

Status: 200, Ok

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

Name	Type	Description
comment	string	A user configurable comment. Optional in POST; valid in PATCH. To clear a prior comment, set the property to an empty string in PATCH.
data_protocol	string	The data protocol for which the FC interface is configured. Required in POST.
enabled	boolean	The administrative state of the FC interface. The FC interface can be disabled to block all FC communication with the SVM through this interface. Optional in POST and PATCH; defaults to <i>true</i> (enabled) in POST.
location	<a href="#">location</a>	<p>The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID, or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.</p> <p><code>location.node</code> and <code>location.port</code> refer to the current location of the FC interface. This can be different from <code>location.home_node</code> and <code>location.home_port</code> in instances where the FC interface has failed over to its HA partner node. The <code>location.node</code>, <code>location.port</code>, and <code>location.is_home</code> properties are not available for interfaces on the inactive side of a MetroCluster relationship.</p>
metric	<a href="#">metric</a>	Performance numbers, such as IOPS latency and throughput

Name	Type	Description
name	string	The name of the FC interface. Required in POST; optional in PATCH.
port_address	string	<p>The port address of the FC interface. Each FC port in an FC switched fabric has its own unique FC port address for routing purposes. The FC 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 FC interface when the SVM performs a port login (PLOGI).</p> <p>This is useful for obtaining statistics and diagnostic information from FC switches.</p> <p>This is a hexadecimal encoded numeric value.</p>
state	string	<p>The current operational state of the FC interface. The state is set to <i>down</i> if the interface is not enabled.</p> <p>If the cluster node hosting the port is down or unavailable, no state value is returned.</p>
statistics	<a href="#">statistics</a>	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.
svm	<a href="#">svm</a>	SVM, applies only to SVM-scoped objects.
uuid	string	The unique identifier of the FC interface. Required in the URL.



Name	Type	Description
wwnn	string	<p>The world wide node name (WWNN) of the FC interface SVM. The WWNN is generated by ONTAP when Fibre Channel Protocol or the NVMe service is created for the FC interface SVM.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:01</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>
wwpn	string	<p>The world wide port name (WWPN) of the FC interface. The WWPN is generated by ONTAP when the FC interface is created.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:a8</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>

## Example response

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "comment": "string",
  "data_protocol": "string",
  "location": {
    "home_node": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "home_port": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "0a",
      "node": {
        "name": "node1"
      },
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "node": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "port": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      }
    }
  }
}
```

```

    },
    "name": "0a",
    "node": {
      "name": "node1"
    },
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  }
},
"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": "2017-01-25 06:20:13 -0500"
},
"name": "fc_lif1",
"port_address": "5060F",
"state": "string",
"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": "2017-01-25 06:20:13 -0500"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "bce9827d-4d8f-60af-c771-6e8e9af2c6f0",
  "wwnn": "20:00:00:50:56:b4:13:01",
  "wwpn": "20:00:00:50:56:b4:13:a8"
}

```

## Error

Status: Default, Error

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

## Example error

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

## Definitions

## See Definitions

href

Name	Type	Description
href	string	

\_links

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

home\_node

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	
uuid	string	

node

The node on which the FC port is located.

Name	Type	Description
name	string	The name of the node on which the FC port is located.

home\_port

An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	The name of the FC port.
node	<a href="#">node</a>	The node on which the FC port is located.
uuid	string	The unique identifier of the FC port.

node

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	
uuid	string	

## port

An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	The name of the FC port.
node	<a href="#">node</a>	The node on which the FC port is located.
uuid	string	The unique identifier of the FC port.

## location

The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID, or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.

`location.node` and `location.port` refer to the current location of the FC interface. This can be different from `location.home_node` and `location.home_port` in instances where the FC interface has failed over to its HA partner node. The `location.node`, `location.port`, and `location.is_home` properties are not available for interfaces on the inactive side of a MetroCluster relationship.

Name	Type	Description
home_node	<a href="#">home_node</a>	
home_port	<a href="#">home_port</a>	An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.
is_home	boolean	Indicates if the FC interface is currently on its home node.
node	<a href="#">node</a>	

Name	Type	Description
port	port	An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

iops

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

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

latency

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

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

throughput



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

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

metric

Performance numbers, such as IOPS latency and throughput

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
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	<a href="#">iops</a>	The rate of I/O operations observed at the storage object.
latency	<a href="#">latency</a>	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	<a href="#">throughput</a>	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	Performance 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	Performance 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	Performance 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	<a href="#">iops_raw</a>	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	<a href="#">latency_raw</a>	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	<a href="#">throughput_raw</a>	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

SVM, applies only to SVM-scoped objects.

Name	Type	Description
<code>_links</code>	<a href="#">_links</a>	
<code>name</code>	string	The name of the SVM. This field cannot be specified in a PATCH method.
<code>uuid</code>	string	The unique identifier of the SVM. This field cannot be specified in a PATCH method.

`error_arguments`

Name	Type	Description
<code>code</code>	string	Argument code
<code>message</code>	string	Message argument

`returned_error`

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

## Update an FC interface

PATCH `/network/fc/interfaces/{uuid}`

**Introduced In:** 9.6

Updates an FC interface.

### Related ONTAP commands

- `network interface modify`

## Learn more

- [DOC /network/fc/interfaces](#)

## Parameters

Name	Type	In	Required	Description
uuid	string	path	True	The unique identifier for the FC interface.

## Request Body

Name	Type	Description
_links	<a href="#">_links</a>	
comment	string	A user configurable comment. Optional in POST; valid in PATCH. To clear a prior comment, set the property to an empty string in PATCH.
data_protocol	string	The data protocol for which the FC interface is configured. Required in POST.
enabled	boolean	The administrative state of the FC interface. The FC interface can be disabled to block all FC communication with the SVM through this interface. Optional in POST and PATCH; defaults to <i>true</i> (enabled) in POST.

Name	Type	Description
location	location	<p>The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID, or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.</p> <p>location.node and location.port refer to the current location of the FC interface. This can be different from location.home_node and location.home_port in instances where the FC interface has failed over to its HA partner node. The location.node, location.port, and location.is_home properties are not available for interfaces on the inactive side of a MetroCluster relationship.</p>
metric	metric	Performance numbers, such as IOPS latency and throughput
name	string	The name of the FC interface. Required in POST; optional in PATCH.

Name	Type	Description
port_address	string	<p>The port address of the FC interface. Each FC port in an FC switched fabric has its own unique FC port address for routing purposes. The FC 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 FC interface when the SVM performs a port login (PLOGI).</p> <p>This is useful for obtaining statistics and diagnostic information from FC switches.</p> <p>This is a hexadecimal encoded numeric value.</p>
state	string	<p>The current operational state of the FC interface. The state is set to <i>down</i> if the interface is not enabled.</p> <p>If the cluster node hosting the port is down or unavailable, no state value is returned.</p>
statistics	<a href="#">statistics</a>	<p>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.</p>
svm	<a href="#">svm</a>	<p>SVM, applies only to SVM-scoped objects.</p>
uuid	string	<p>The unique identifier of the FC interface. Required in the URL.</p>



Name	Type	Description
wwnn	string	<p>The world wide node name (WWNN) of the FC interface SVM. The WWNN is generated by ONTAP when Fibre Channel Protocol or the NVMe service is created for the FC interface SVM.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:01</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>
wwpn	string	<p>The world wide port name (WWPN) of the FC interface. The WWPN is generated by ONTAP when the FC interface is created.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:a8</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>

## Example request

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "comment": "string",
  "data_protocol": "string",
  "location": {
    "home_node": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "home_port": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "0a",
      "node": {
        "name": "node1"
      },
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "node": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "name": "node1",
      "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
    },
    "port": {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      }
    }
  }
}
```

```

    },
    "name": "0a",
    "node": {
      "name": "node1"
    },
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  }
},
"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": "2017-01-25 06:20:13 -0500"
},
"name": "fc_lif1",
"port_address": "5060F",
"state": "string",
"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": "2017-01-25 06:20:13 -0500"
  },
  "svm": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "name": "svm1",
    "uuid": "02c9e252-41be-11e9-81d5-00a0986138f7"
  },
  "uuid": "bce9827d-4d8f-60af-c771-6e8e9af2c6f0",
  "wwnn": "20:00:00:50:56:b4:13:01",
  "wwpn": "20:00:00:50:56:b4:13:a8"
}

```

## Response

Status: 200, Ok

## Error

Status: Default

### ONTAP Error Response Codes

Error Code	Description
1966140	An interface with the same name already exists.
1966217	The specified port is not valid on the node provided.
1966238	The node or port of an active SAN data interface cannot be changed.
1966702	The destination node is not healthy.
5373982	An invalid WWN was specified. The length is incorrect.

Error Code	Description
5373983	An invalid WWN was specified. The format is incorrect.
5374579	The SAN Kernel Agent on the node is unavailable.
5374870	A partial failure occurred; renaming the interface failed. Correct the error and resubmit the request.
5374871	The Fibre Channel port identified by the specified UUID does not refer to the same port as that identified by the specified node name and/or port name.
5374872	If either <code>location.port.node.name</code> or <code>location.port.name</code> is supplied, both properties must be supplied.
5375057	An FC port with the provided UUID does not exist.
72089674	You cannot move a Fibre Channel interface configured for the NVMe over FC data protocol.

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

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

### Example error

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

## Definitions

## See Definitions

href

Name	Type	Description
href	string	

\_links

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

home\_node

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	
uuid	string	

node

The node on which the FC port is located.

Name	Type	Description
name	string	The name of the node on which the FC port is located.

home\_port

An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	The name of the FC port.
node	<a href="#">node</a>	The node on which the FC port is located.
uuid	string	The unique identifier of the FC port.

node

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	
uuid	string	

## port

An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

Name	Type	Description
_links	<a href="#">_links</a>	
name	string	The name of the FC port.
node	<a href="#">node</a>	The node on which the FC port is located.
uuid	string	The unique identifier of the FC port.

## location

The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID, or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.

`location.node` and `location.port` refer to the current location of the FC interface. This can be different from `location.home_node` and `location.home_port` in instances where the FC interface has failed over to its HA partner node. The `location.node`, `location.port`, and `location.is_home` properties are not available for interfaces on the inactive side of a MetroCluster relationship.

Name	Type	Description
home_node	<a href="#">home_node</a>	
home_port	<a href="#">home_port</a>	An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.
is_home	boolean	Indicates if the FC interface is currently on its home node.
node	<a href="#">node</a>	

Name	Type	Description
port	port	An FC port is the physical port of an FC adapter on a cluster node that can be connected to an FC network.

iops

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

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

latency

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

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

throughput



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

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

metric

Performance numbers, such as IOPS latency and throughput

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
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	<a href="#">iops</a>	The rate of I/O operations observed at the storage object.
latency	<a href="#">latency</a>	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	<a href="#">throughput</a>	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	Performance 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	Performance 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	Performance 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 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

SVM, applies only to SVM-scoped objects.

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
name	string	The name of the SVM. This field cannot be specified in a PATCH method.
uuid	string	The unique identifier of the SVM. This field cannot be specified in a PATCH method.

#### fc\_interface

A Fibre Channel (FC) interface is the logical endpoint for FC network connections to an SVM. An FC interface provides FC access to storage within the interface SVM using either Fibre Channel Protocol or NVMe over Fibre Channel (NVMe/FC).

An FC interface is created on an FC port which is located on a cluster node. The FC port must be specified to identify the location of the interface for a POST or PATCH operation that relocates an interface. You can identify the port by supplying either the cluster node and port names or the port UUID.

Name	Type	Description
<a href="#">_links</a>	<a href="#">_links</a>	
comment	string	A user configurable comment. Optional in POST; valid in PATCH. To clear a prior comment, set the property to an empty string in PATCH.
data_protocol	string	The data protocol for which the FC interface is configured. Required in POST.
enabled	boolean	The administrative state of the FC interface. The FC interface can be disabled to block all FC communication with the SVM through this interface. Optional in POST and PATCH; defaults to <i>true</i> (enabled) in POST.

Name	Type	Description
location	location	<p>The location of the FC interface is defined by the location of its port. An FC port is identified by its UUID, or a combination of its cluster node name and port name. Either the UUID or the cluster node name and port name are required for POST. To move an interface, supply either the port UUID or the cluster node name and port name in a PATCH.</p> <p><code>location.node</code> and <code>location.port</code> refer to the current location of the FC interface. This can be different from <code>location.home_node</code> and <code>location.home_port</code> in instances where the FC interface has failed over to its HA partner node. The <code>location.node</code>, <code>location.port</code>, and <code>location.is_home</code> properties are not available for interfaces on the inactive side of a MetroCluster relationship.</p>
metric	metric	Performance numbers, such as IOPS latency and throughput
name	string	The name of the FC interface. Required in POST; optional in PATCH.

Name	Type	Description
port_address	string	<p>The port address of the FC interface. Each FC port in an FC switched fabric has its own unique FC port address for routing purposes. The FC 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 FC interface when the SVM performs a port login (PLOGI).</p> <p>This is useful for obtaining statistics and diagnostic information from FC switches.</p> <p>This is a hexadecimal encoded numeric value.</p>
state	string	<p>The current operational state of the FC interface. The state is set to <i>down</i> if the interface is not enabled.</p> <p>If the cluster node hosting the port is down or unavailable, no state value is returned.</p>
statistics	<a href="#">statistics</a>	<p>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.</p>
svm	<a href="#">svm</a>	<p>SVM, applies only to SVM-scoped objects.</p>
uuid	string	<p>The unique identifier of the FC interface. Required in the URL.</p>

Name	Type	Description
wwnn	string	<p>The world wide node name (WWNN) of the FC interface SVM. The WWNN is generated by ONTAP when Fibre Channel Protocol or the NVMe service is created for the FC interface SVM.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:01</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>
wwpn	string	<p>The world wide port name (WWPN) of the FC interface. The WWPN is generated by ONTAP when the FC interface is created.</p> <ul style="list-style-type: none"> <li>• example: 20:00:00:50:56:b4:13:a8</li> <li>• readOnly: 1</li> <li>• Introduced in: 9.6</li> <li>• x-nullable: true</li> </ul>

#### error\_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

#### returned\_error

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



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