



Manage clusters

ONTAP 9.7 REST API reference

NetApp
April 02, 2024

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Manage clusters

Cluster endpoint overview

Overview

You can use this API to create a cluster, update cluster-wide configurations, and retrieve the current configuration details.

Creating a cluster

You can create a new cluster by issuing a POST request to /cluster. Parameters are provided in the body of the POST request to configure cluster-wide settings and add nodes during the cluster setup.

Fields used for creating a cluster

The fields used for the cluster APIs fall into the following categories:

- Required cluster-wide configuration
- Optional cluster-wide configuration

Required cluster-wide configuration

The following fields are always required for any POST /cluster request:

- name
- password

Optional cluster-wide configuration

The following fields are used to set up additional cluster-wide configurations:

- location
- contact
- dns_domains
- name_servers
- ntp_servers
- timezone
- license
- configuration_backup
- management_interface
- nodes

Nodes field

The nodes field specifies the nodes to join to the cluster. To use this API, all nodes must run the same version of ONTAP. If you do not specify a node, the cluster is configured with one node added. The REST request is

issued to the node that is added to the cluster. If you specify one node, do not use the "node.cluster_interface.ip.address" field. If you specify multiple nodes, specify the node to which the REST request is issued in addition to the remote nodes. Use the "node.cluster_interface.ip.address" field to identify each node. All other node fields are optional in all cases. If you provide a field for one node, you need to provide the same field for all nodes.

Node networking fields

The cluster management interface and each node management interface use the cluster management interface subnet mask and gateway. For advanced configurations in which the cluster and node management interfaces are on different subnets, use the `/network/ip/interface` APIs to configure network interfaces after setup is complete. The management interfaces are used to communicate with the name servers and NTP servers. The address family of the name servers and NTP servers must match the management interfaces address family.

Single node cluster field

When the "single_node_cluster" field is set to "true", the cluster is created in single node cluster mode. You can provide a node field for this node for node-specific configuration but do not use the "node.cluster_interface.ip.address" field. Storage failover is configured to non-HA mode, and ports used for cluster ports are moved to the default IPspace. This might cause the node to reboot during setup. While a node reboots, the RESTful interface might not be available. See "Connection failures during cluster create" for more information.

Create recommended aggregates parameter

When the "create_recommended_aggregates" parameter is set to "true", aggregates based on an optimal layout recommended by the system are created on each of the nodes in the cluster. The default setting is "false".

Performance monitoring

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

Monitoring cluster create status

Errors before the job starts

Configuration in the POST `/cluster` request is validated before the cluster create job starts. If an invalid configuration is found, an HTTP error code in the 4xx range is returned. No cluster create job is started.

Polling on the job

After a successful POST `/cluster` request is issued, an HTTP error code of 202 is returned along with a job UUID and link in the body of the response. The cluster create job continues asynchronously and is monitored with the job UUID using the `/cluster/jobs` API. The "message" field in the response of the GET `/cluster/jobs/{uuid}` request shows the current step in the job, and the "state" field shows the overall state of the

job.

Errors during the job

If a failure occurs during the cluster create job, the job body provides details of the error along with error code fields. See the error table under "Responses" in the POST /cluster documentation for common error codes and descriptions.

Rerunning POST /cluster

The POST /cluster request can be rerun if errors occur. When rerunning the request, use the same body and query parameters. You can change the value of any field in the original body or query, but you cannot change the provided fields. For example, an initial request might have a body section as follows:

```
body =
{
  "name": "clusCreateRerun",
  "password": "openSesame",
  "nodes": [
    {
      "cluster_interface": {
        "ip": {
          "address": "1.1.1.1"
        }
      }
    },
    {
      "cluster_interface": {
        "ip": {
          "address": "2.2.2.2"
        }
      }
    }
  ]
}
```

A rerun request updates the body details to:

```
body =
{
  "name": "clusCreateRerun",
  "password": "openSesame",
  "nodes": [
    {
      "cluster_interface": {
        "ip": {
          "address": "3.3.3.3"
        }
      }
    },
    {
      "cluster_interface": {
        "ip": {
          "address": "4.4.4.4"
        }
      }
    }
  ]
}
```

A rerun request with the following body details is invalid:

```
body =
{
  "name": "clusCreateRerun",
  "password": "openSesame",
  "nodes": [
    {
      "cluster_interface": {
        "ip": {
          "address": "3.3.3.3"
        }
      }
    }
  ]
}
```

Note that the password might already be configured. If a password is already configured and then a new password is provided, the new request overwrites the existing password. If a password is already configured either by another interface or by a previous POST request to /cluster, authenticate any future REST requests with that password. If a POST request to /cluster with the default return_timeout of 0 returns an error, then the password was not changed.

Connection failures during cluster create

A request to poll the job status might fail during a cluster create job in the following two cases. In these cases, programmatic use of the RESTful interface might be resilient to these connection failures.

1. When the "single_node_cluster" flag is set to "true", the node might reboot. During this time, the RESTful interface might refuse connections and return errors on a GET request, or connection timeouts might occur. Programmatic use of the RESTful interface during reboots must consider these effects while polling a cluster create job.
 2. The "mgmt_auto" LIF is removed during the cluster create job. A POST /cluster request might be issued on the "mgmt_auto" LIF. However, requests to poll the job status might fail during cluster create when the "mgmt_auto" LIF is removed. The "mgmt_auto" LIF is only removed if a cluster management interface is provided as an argument to POST /cluster, and only after the cluster management interface is created. Programmatic use of the POST /cluster API on the "mgmt_auto" LIF should be configured to dynamically switch to polling the job on the cluster management LIF.
-

Modifying cluster configurations

The following fields can be used to modify a cluster-wide configuration:

- name
 - location
 - contact
 - dns_domains
 - name_servers
 - timezone
 - certificate
-

Examples

Minimally configuring a 2-node setup

```
# Body
body =
{
"name": "clusCreateExample1",
"password": "openSesame",
"nodes": [
{
"cluster_interface": {
"ip": {
"address": "1.1.1.1"
}
}
},
{
"cluster_interface": {
"ip": {
"address": "2.2.2.2"
}
}
}
]
}

# Request
curl -X POST "https://<mgmt-ip>/api/cluster" -d body
```

Setting up a single node with additional node configuration and auto aggregate creation


```
# Body
body =
{
  "name": "clusCreateExample2",
  "password": "openSesame",
  "nodes": [
    {
      "name": "singleNode",
      "location": "Sunnyvale"
    }
  ]
}

# Request
curl -X POST "https://<mgmt-
ip>/api/cluster?single_node_cluster=true&create_recommended_aggregates=true" -d body
```

Modifying a cluster-wide configuration

```
# Body
body =
{
  "contact": "it@company.com"
}

# Request
curl -X PATCH "https://<mgmt-ip>/api/cluster" -d body
```

Creating a cluster using the cluster "create" operation

This example shows how to create a cluster using the cluster APIs. Specifically, this example shows the creation of a two-node cluster and uses information from the nodes themselves combined with user supplied information to configure the cluster.

Preparing for setup

Before the REST APIs can be issued to create the cluster, the cluster must be wired up and powered on. The network connections between the nodes for the cluster interconnect and the connections to the management network must be completed. After the nodes are powered on, the nodes automatically configure interfaces on the platform's default cluster ports to allow the nodes to discover each other during setup and expansion workflows. You must configure a management interface on one node or use the `mgmt_auto` LIF, which is assigned an IP address using DHCP, to start using the REST APIs. By making a console connection to a node,

the cluster setup wizard guides you through the configuration of the initial node management interface to which the REST calls can be sent. Once this step is completed, exit the wizard by typing "exit". You can then issue REST API requests.

1. Wire and power on the nodes.
2. Make a console connection to one node to access the cluster setup wizard.
3. Enter node management interface information to enable REST API requests to be sent to the node.

```
Welcome to the cluster setup wizard.
You can enter the following commands at any time:
"help" or "?" - if you want to have a question clarified,
"back" - if you want to change previously answered questions, and
"exit" or "quit" - if you want to quit the cluster setup wizard.
Any changes you made before quitting will be saved.
You can return to cluster setup at any time by typing "cluster setup".
To accept a default or omit a question, do not enter a value.
This system will send event messages and periodic reports to NetApp
Technical
Support. To disable this feature, enter
autosupport modify -support disable
within 24 hours.
Enabling AutoSupport can significantly speed problem determination and
resolution should a problem occur on your system.
For further information on AutoSupport, see:
http://support.netapp.com/autosupport/
Type yes to confirm and continue {yes}: yes
Enter the node management interface port [e0c]:
Enter the node management interface IP address: 10.224.82.249
Enter the node management interface netmask: 255.255.192.0
Enter the node management interface default gateway: 10.224.64.1
A node management interface on port e0c with IP address 10.224.82.249
has been created.
Use your web browser to complete cluster setup by accessing
https://10.224.82.249
Otherwise, press Enter to complete cluster setup using the command
line
interface: exit
Exiting the cluster setup wizard. Any changes you made have been
saved.
The cluster administrator's account (username "admin") password is set
to the system default.
Warning: You have exited the cluster setup wizard before completing
all
of the tasks. The cluster is not configured. You can complete cluster
setup by typing
"cluster setup" in the command line interface.
```

Discovering the nodes

If you issue a `GET /api/cluster/nodes` request when the nodes are not in a cluster, the API returns a list of nodes that were discovered on the cluster interconnect. Information returned includes the node's serial number, model, software version, UUID, and cluster interface address. The number of nodes returned should

be the same as the number of nodes expected to be in the cluster. If too many nodes are discovered, remove the nodes that should not be part of the cluster. If not enough nodes are discovered, verify all the nodes are powered on, that the connections to the cluster interconnect are complete, and retry the command.

```
# The API:
/api/cluster/nodes

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/nodes?fields=state,uptime" -H
"accept: application/hal+json"

# The response:
"records": [
{
  "uuid": "6dce4710-c860-11e9-b5bc-005056bb6135",
  "name": "cluster1",
  "uptime": 134555,
  "state": "up",
  "_links": {
    "self": {
      "href": "/api/cluster/nodes/6dce4710-c860-11e9-b5bc-005056bb6135"
    }
  }
},
],
"num_records": 1,
"_links": {
"self": {
  "href": "/api/cluster/nodes?fields=state,uptime"
}
}
```

Creating the cluster

When the node information is available, including each node's cluster interface address, you can assemble the information for creating the cluster. Provide the cluster name and the password for the admin account. The rest of the information is optional and can be configured later using other APIs. Provide the cluster interface address for each node to be included in the cluster so that you can connect to it while adding it to the cluster. In addition to the cluster interface address, you can provide the optional node name, location, and management interface information. If you do not provide node names, nodes are named based on the cluster name. The nodes' management interface subnet mask and gateway values are omitted and must be the same as the cluster management interface's subnet mask and gateway.

```

# The API:
/api/cluster

# The call:
curl -X POST "https://<mgmt-ip>/api/cluster" -H "accept:
application/hal+json" -H "accept: application/hal+json" -d
'{"name":"cluster1","location":"datacenter1","contact":"me","dns_domains":
["example.com"],"name_servers":["10.224.223.130","10.224.223.131","10.224.
223.132"],"ntp_servers":["time.nist.gov"],"management_interface":{"ip":{"a
ddress":"10.224.82.25","netmask":"255.255.192.0","gateway":"10.224.64.1"}}
,"password":"mypassword","license":{"keys":["AMEPOSOIKLKGEEEEEDGNDEKSJDE"]}
,"nodes":[{"cluster_interface":{"ip":{"address":"169.254.245.113"}}, {"name
":"node1","management_interface":{"ip":{"address":"10.224.82.29"}}, {"clust
er_interface":{"ip":{"address":"169.254.217.95"}}, {"name":"node2","manageme
nt_interface":{"ip":{"address":"10.224.82.31"}}}]}'

# The response:
{
  "job": {
    "uuid": "b5bc07e2-19e9-11e9-a751-005056bbd95f",
    "_links": {
      "self": {
        "href": "/api/cluster/jobs/b5bc07e2-19e9-11e9-a751-005056bbd95f"
      }
    }
  }
}

```

Monitoring the progress of cluster creation

To monitor the progress of the cluster create operation, poll the returned job link until the state value is no longer "running" or "queued".

```
# The API:
/api/cluster/jobs/b5bc07e2-19e9-11e9-a751-005056bbd95f

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/jobs/b5bc07e2-1e9-11e9-a751-005056bbd95f" -H "accept: application/hal+json"

# The response:
{
  "uuid": "b5bc07e2-19e9-11e9-a751-005056bbd95f",
  "description": "POST /api/cluster",
  "state": "success",
  "message": "success",
  "code": 0,
  "_links": {
    "self": {
      "href": "/api/cluster/jobs/b5bc07e2-19e9-11e9-a751-005056bbd95f"
    }
  }
}
```

Verifying the cluster information

After the cluster is created, you can verify the information applied using a number of APIs. You can retrieve most of the information provided using the `/api/cluster` and `/api/cluster/nodes` APIs. In addition, you can view the network interface and route information using the `/api/network` APIs. The following example shows how to retrieve the cluster information:

```
# The API:
/api/cluster

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster?fields=management_interfaces"
-H "accept: application/hal+json"

# The response:
{
  "management_interfaces": [
    {
      "uuid": "c661725a-19e9-11e9-a751-005056bbd95f",
      "name": "cluster_mgmt",
      "ip": {
        "address": "10.224.82.25"
      },
      "_links": {
        "self": {
          "href": "/api/network/ip/interfaces/c661725a-19e9-11e9-a751-005056bbd95f"
        }
      }
    },
    {
      "self": {
        "href": "/api/cluster"
      }
    }
  ]
}
```

Retrieve the cluster configuration

GET /cluster

Retrieves the cluster configuration.

Learn more

- [DOC /cluster](#)

Parameters

Name	Type	In	Required	Description
max_records	integer	query	False	Limit the number of records returned.
return_records	boolean	query	False	The default is true for GET calls. When set to false, only the number of records is returned.
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.
order_by	array[string]	query	False	Order results by specified fields and optional [asc
desc] direction. Default direction is 'asc' for ascending.	fields	array[string]	query	False

Response

Status: 200, Ok

Name	Type	Description
_links	_links	
certificate	certificate	Certificate used by cluster and node management interfaces for TLS connection requests.
configuration_backup	configuration_backup	
contact	string	

Name	Type	Description
dns_domains	array[string]	<p>A list of DNS domains. Domain names have the following requirements:</p> <ul style="list-style-type: none"> • The name must contain only the following characters: A through Z, a through z, 0 through 9, ".", "-" or "_". • The first character of each label, delimited by ".", must be one of the following characters: A through Z or a through z or 0 through 9. • The last character of each label, delimited by ".", must be one of the following characters: A through Z, a through z, or 0 through 9. • The top level domain must contain only the following characters: A through Z, a through z. • The system reserves the following names: "all", "local", and "localhost".
license	license	License keys or NLF contents.
location	string	
management_interface	management_interface	The management interface of the cluster. The subnet mask and gateway for this interface are used for the node management interfaces provided in the node configuration.
management_interfaces	array[management_interfaces]	
metric	metric	Performance numbers, such as IOPS latency and throughput.
name	string	
name_servers	array[string]	The list of IP addresses of the DNS servers. Addresses can be either IPv4 or IPv6 addresses.
nodes	array[nodes]	

Name	Type	Description
ntp_servers	array[string]	Host name, IPv4 address, or IPv6 address for the external NTP time servers.
password	string	Initial admin password used to create the cluster.
san_optimized	boolean	Specifies if this cluster is an All SAN Array.
statistics	statistics	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
timezone	timezone	Provides the cluster-wide time zone information that localizes time found on messages displayed on each node's: <ul style="list-style-type: none"> • console messages; • logging to internal ONTAP log files; and • localized REST API full ISO-8601 date, time, and time zone format information. Machine-to-machine interfaces, such as file access protocols (NFS, CIFS), block access protocols (SAN), and other protocols such as Manage ONTAP (ONTAPI), use second or subsecond time values that are based on world time or UTC.
uuid	string	
version	version	This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.

Example response

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "certificate": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "configuration_backup": {
    "password": "yourpassword",
    "url": "http://10.224.65.198/backups",
    "username": "me"
  },
  "contact": "<a href=
mailto:support@company.com">support@company.com</a>",
  "dns_domains": [
    "example.com",
    "example2.example3.com"
  ],
  "license": {
    "keys": {
    }
  },
  "location": "building 1",
  "management_interface": {
    "ip": {
      "address": "10.10.10.7",
      "gateway": "10.1.1.1",
      "netmask": "24"
    }
  },
  "management_interfaces": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    },
    "ip": {
```

```

    "address": "10.10.10.7"
  },
  "name": "lif1",
  "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 11:20:13 UTC"
},
"name": "cluster1",
"name_servers": [
  "10.224.65.20",
  "2001:db08:a0b:12f0::1"
],
"nodes": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "cluster_interface": {
    "ip": {
      "address": "10.10.10.7"
    }
  }
},

```

```

"cluster_interfaces": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "ip": {
    "address": "10.10.10.7"
  },
  "name": "lif1",
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"controller": {
  "flash_cache": {
    "capacity": 102400000000,
    "firmware_version": "NA05",
    "hardware_revision": "A1",
    "model": "X1970A",
    "part_number": "119-00207",
    "serial_number": "A22P5061550000187",
    "slot": "6-1",
    "state": "ok"
  },
  "frus": {
    "id": 0,
    "state": "ok",
    "type": "fan"
  },
  "over_temperature": "over"
},
"date": "2019-04-17 11:49:26 -0400",
"ha": {
  "giveback": {
    "failure": {
      "code": 852126,
      "message": "Failed to initiate giveback. Run the \"storage failover show-giveback\" command for more information."
    },
    "state": "failed"
  },
  "partners": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    }
  }
},

```

```

    "name": "node1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "ports": {
    "number": 0,
    "state": "active"
  },
  "takeover": {
    "failure": {
      "code": 852130,
      "message": "Failed to initiate takeover. Run the \"storage failover show-takeover\" command for more information."
    },
    "state": "failed"
  }
},
"location": "rack 2 row 5",
"management_interface": {
  "ip": {
    "address": "10.10.10.7"
  }
},
"management_interfaces": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "ip": {
    "address": "10.10.10.7"
  },
  "name": "lif1",
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"membership": "available",
"model": "FAS3070",
"name": "node-01",
"serial_number": "4048820-60-9",
"service_processor": {
  "firmware_version": "string",
  "ipv4_interface": {
    "address": "10.10.10.7",
    "gateway": "10.1.1.1",
    "netmask": "24"
  },
  "ipv6_interface": {

```

```
    "address": "fd20:8b1e:b255:5011:10:141:4:97",
    "gateway": "fd20:8b1e:b255:5011:10::1",
    "netmask": 64
  },
  "link_status": "up",
  "mac_address": "string",
  "state": "online"
},
"state": "up",
"system_id": 92027651,
"system_machine_type": "7Y56-CTOWW1",
"uptime": 300536,
"uuid": "4ea7a442-86d1-11e0-ae1c-123478563412",
"vendor_serial_number": 791603000068,
"version": {
  "full": "NetApp Release 9.4.0: Sun Nov 05 18:20:57 UTC 2017",
  "generation": 9,
  "major": 4,
  "minor": 0
},
"vm": {
  "provider_type": "GoogleCloud"
}
},
"ntp_servers": [
  "time.nist.gov",
  "10.98.19.20",
  "2610:20:6F15:15::27"
],
"password": "mypassword",
"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 11:20:13 UTC"
  },
  "timezone": {
    "name": "America/New_York"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
  "version": {
    "full": "NetApp Release 9.4.0: Sun Nov 05 18:20:57 UTC 2017",
    "generation": 9,
    "major": 4,
    "minor": 0
  }
}

```

Error

Status: Default, Error

Name	Type	Description
error	error	

Example error

```

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

```

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

Name	Type	Description
self	href	

certificate

Certificate used by cluster and node management interfaces for TLS connection requests.

Name	Type	Description
_links	_links	
uuid	string	Certificate UUID

configuration_backup

Name	Type	Description
password	string	
url	string	An external backup location for the cluster configuration. This is mostly required for single node clusters where node and cluster configuration backups cannot be copied to other nodes in the cluster.
username	string	
validate_certificate	boolean	Use this parameter with the value "true" to validate the digital certificate of the remote server. Digital certificate validation is available only when the HTTPS protocol is used in the URL; it is disabled by default.

license

License keys or NLF contents.

Name	Type	Description
keys	array[string]	

ip

Object to setup an interface along with its default router.

Name	Type	Description
address	string	IPv4 or IPv6 address
gateway	string	The IPv4 or IPv6 address of the default router.
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, you must set the netmask length. The default value is 64. Output is always netmask length.

management_interface

The management interface of the cluster. The subnet mask and gateway for this interface are used for the node management interfaces provided in the node configuration.

Name	Type	Description
ip	ip	Object to setup an interface along with its default router.

ip

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address

management_interfaces

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface.

Name	Type	Description
uuid	string	The UUID that uniquely identifies the interface.

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
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.

metric

Performance numbers, such as IOPS latency and throughput.

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

Name	Type	Description
status	string	Errors associated with the sample. For example, if the aggregation of data over multiple nodes fails, then any partial errors might return "ok" on success or "error" on an internal uncategorized failure. Whenever a sample collection is missed but done at a later time, it is back filled to the previous 15 second timestamp and tagged with "backfilled_data". "Inconsistent_delta_time" is encountered when the time between two collections is not the same for all nodes. Therefore, the aggregated value might be over or under inflated. "Negative_delta" is returned when an expected monotonically increasing value has decreased in value. "Inconsistent_old_data" is returned when one or more nodes do not have the latest data.
throughput	throughput	The rate of throughput bytes per second observed at the storage object.
timestamp	string	The timestamp of the performance data.

node_setup_ip

The IP configuration for cluster setup.

Name	Type	Description
address	string	IPv4 or IPv6 address

cluster_interface

The cluster network IP address of the node to be added.

Name	Type	Description
ip	node_setup_ip	The IP configuration for cluster setup.

cluster_interfaces

Network interface

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface.
uuid	string	The UUID that uniquely identifies the interface.

flash_cache

Name	Type	Description
capacity	integer	Size in bytes
firmware_version	string	
hardware_revision	string	
model	string	
part_number	string	
serial_number	string	
slot	string	
state	string	

frus

Name	Type	Description
id	integer	
state	string	
type	string	

controller

Controller information

Name	Type	Description
flash_cache	array[flash_cache]	A list of Flash-Cache devices. Only returned when requested by name.

Name	Type	Description
frus	array[frus]	List of FRUs on the node. Only returned when requested by name.
over_temperature	string	Specifies whether the hardware is currently operating outside of its recommended temperature range. The hardware shuts down if the temperature exceeds critical thresholds.

failure

Indicates the failure code and message.

Name	Type	Description
code	integer	Message code
message	string	Detailed message based on the state.

giveback

Represents the state of the node that is giving storage back to its HA partner.

Name	Type	Description
failure	failure	Indicates the failure code and message.
state	string	

partners

Name	Type	Description
_links	_links	
name	string	
uuid	string	

ports

Name	Type	Description
number	unsigned	HA port number

Name	Type	Description
state	string	<p>HA port state:</p> <ul style="list-style-type: none"> • <i>down</i> - Logical HA link is down. • <i>initialized</i> - Logical HA link is initialized. The physical link is up, but the subnet manager hasn't started to configure the port. • <i>armed</i> - Logical HA link is armed. The physical link is up and the subnet manager started but did not yet complete configuring the port. • <i>active</i> - Logical HA link is active. • <i>reserved</i> - Logical HA link is active, but the physical link is down.

takeover

This represents the state of the node that is taking over storage from its HA partner.

Name	Type	Description
failure	failure	Indicates the failure code and message.
state	string	

ha

Name	Type	Description
auto_giveback	boolean	Specifies whether giveback is automatically initiated when the node that owns the storage is ready.
enabled	boolean	Specifies whether or not storage failover is enabled.
giveback	giveback	Represents the state of the node that is giving storage back to its HA partner.

Name	Type	Description
partners	array[partners]	Nodes in this node's High Availability (HA) group.
ports	array[ports]	
takeover	takeover	This represents the state of the node that is taking over storage from its HA partner.

management_interface

The management interface of the node to be added. The subnet mask is set based on the management interface of the cluster or the management interfaces of other nodes.

Name	Type	Description
ip	node_setup_ip	The IP configuration for cluster setup.

management_interfaces

Network interface

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface.
uuid	string	The UUID that uniquely identifies the interface.

ipv4_interface

Object to setup an interface along with its default router.

Name	Type	Description
address	string	IPv4 or IPv6 address
gateway	string	The IPv4 or IPv6 address of the default router.

Name	Type	Description
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, you must set the netmask length. The default value is 64. Output is always netmask length.

ipv6_interface

Object to setup an interface along with its default router.

Name	Type	Description
address	string	IPv6 address
gateway	string	The IPv6 address of the default router.
netmask	integer	The IPv6 netmask/prefix length. The default value is 64 with a valid range of 1 to 127.

service_processor

Name	Type	Description
dhcp_enabled	boolean	Set to "true" to use DHCP to configure an IPv4 interface.
firmware_version	string	The version of firmware installed.
ipv4_interface	ipv4_interface	Object to setup an interface along with its default router.
ipv6_interface	ipv6_interface	Object to setup an interface along with its default router.
link_status	string	
mac_address	string	
state	string	

version

This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.

Name	Type	Description
full	string	The full cluster version string.
generation	integer	The generation portion of the version.
major	integer	The major portion of the version.
minor	integer	The minor portion of the version.

vm

Name	Type	Description
provider_type	string	Cloud provider where the VM is hosted.

nodes

Complete node information

Name	Type	Description
_links	_links	
cluster_interface	cluster_interface	The cluster network IP address of the node to be added.
cluster_interfaces	array[cluster_interfaces]	
controller	controller	Controller information
date	string	The current or "wall clock" time of the node in ISO-8601 date, time, and time zone format. The ISO-8601 date and time are localized based on the ONTAP cluster's timezone setting. <ul style="list-style-type: none"> • example: 2019-04-17 11:49:26 -0400 • format: date-time • readOnly: 1
ha	ha	
location	string	

Name	Type	Description
management_interface	management_interface	The management interface of the node to be added. The subnet mask is set based on the management interface of the cluster or the management interfaces of other nodes.
management_interfaces	array[management_interfaces]	
membership	string	<p>Possible values:</p> <ul style="list-style-type: none"> • <i>available</i> - A node is detected on the internal cluster network and can be added to the cluster. Nodes that have a membership of "available" are not returned when a GET request is called when the cluster exists. Provide a query on the "membership" property for <i>available</i> to scan for nodes on the cluster network. Nodes that have a membership of "available" are returned automatically before a cluster is created. • <i>joining</i> - Joining nodes are in the process of being added to the cluster. The node might be progressing through the steps to become a member or might have failed. The job to add the node or create the cluster provides details on the current progress of the node. • <i>member</i> - Nodes that are members have successfully joined the cluster.
model	string	
name	string	
serial_number	string	
service_processor	service_processor	

Name	Type	Description
state	string	<p>State of the node:</p> <ul style="list-style-type: none"> • <i>up</i> - Node is up and operational. • <i>booting</i> - Node is booting up. • <i>down</i> - Node has stopped or is dumping core. • <i>taken_over</i> - Node has been taken over by its HA partner and is not yet waiting for giveback. • <i>waiting_for_giveback</i> - Node has been taken over by its HA partner and is waiting for the HA partner to giveback disks. • <i>degraded</i> - Node has one or more critical services offline. • <i>unknown</i> - Node or its HA partner cannot be contacted and there is no information on the node's state.
system_id	string	
system_machine_type	string	OEM system machine type.
uptime	integer	The total time, in seconds, that the node has been up.
uuid	string	
vendor_serial_number	string	OEM vendor serial number.
version	version	This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.
vm	vm	

iops_raw

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

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

latency_raw

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

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

throughput_raw

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

Name	Type	Description
other	integer	Performance metric for other I/O operations. Other I/O operations can be metadata operations, such as directory lookups and so on.
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	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 can be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.

Name	Type	Description
status	string	Errors associated with the sample. For example, if the aggregation of data over multiple nodes fails, then any partial errors might return "ok" on success or "error" on an internal uncategorized failure. Whenever a sample collection is missed but done at a later time, it is back filled to the previous 15 second timestamp and tagged with "backfilled_data". "Inconsistent_delta_time" is encountered when the time between two collections is not the same for all nodes. Therefore, the aggregated value might be over or under inflated. "Negative_delta" is returned when an expected monotonically increasing value has decreased in value. "Inconsistent_old_data" is returned when one or more nodes do not have the latest data.
throughput_raw	throughput_raw	Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

timezone

Provides the cluster-wide time zone information that localizes time found on messages displayed on each node's:

- console messages;
- logging to internal ONTAP log files; and
- localized REST API full ISO-8601 date, time, and time zone format information. Machine-to-machine interfaces, such as file access protocols (NFS, CIFS), block access protocols (SAN), and other protocols such as Manage ONTAP (ONTAPI), use second or subsecond time values that are based on world time or UTC.

Name	Type	Description
name	string	<p>The ONTAP time zone name or identification in either IANA time zone format "Area/Location", or an ONTAP traditional time zone.</p> <p>The initial first node in cluster setting for time zone is "Etc/UTC". "Etc/UTC" is the IANA timezone "Area/Location" specifier for Coordinated Universal Time (UTC), which is an offset of 0.</p> <p>IANA time zone format</p> <p>The IANA time zone, formatted as "Area/Location", is based on geographic areas that have had the same time zone offset for many years.</p> <p>"Location" represents a compound name using additional forward slashes.</p> <p>An example of the "Area/Location" time zone is "America/New_York" and represents most of the United States Eastern Time Zone. Examples of "Area/Location" with "Location" as a compound name are "America/Argentina/Buenos_Aires" and "America/Indiana/Indianapolis".</p> <p>ONTAP traditional time zone</p> <p>Examples of the traditional time zones are "EST5EDT" for the United States Eastern Time Zone and "CET" for Central European Time Zone.</p> <ul style="list-style-type: none"> • example: America/New_York

error_arguments

Name	Type	Description
code	string	Argument code

Name	Type	Description
message	string	Message argument

error

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

Update the cluster configuration

PATCH /cluster

Updates the cluster configuration after the cluster is created.

Related ONTAP commands

- `cluster identity modify`
- `system node modify`
- `vserver services dns modify`
- `vserver services name-service dns modify`
- `timezone`
- `security ssl modify`

Learn more

- [DOC /cluster](#)

Parameters

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

Name	Type	In	Required	Description
return_timeout	integer	query	False	The number of seconds to allow the call to execute before returning. When doing a POST, PATCH, or DELETE operation on a single record, the default is 0 seconds. This means that if an asynchronous operation is started, the server immediately returns HTTP code 202 (Accepted) along with a link to the job. If a non-zero value is specified for POST, PATCH, or DELETE operations, ONTAP waits that length of time to see if the job completes so it can return something other than 202.

Request Body

Name	Type	Description
_links	_links	
certificate	certificate	Certificate used by cluster and node management interfaces for TLS connection requests.
configuration_backup	configuration_backup	
contact	string	

Name	Type	Description
dns_domains	array[string]	<p>A list of DNS domains. Domain names have the following requirements:</p> <ul style="list-style-type: none"> • The name must contain only the following characters: A through Z, a through z, 0 through 9, ".", "-" or "_". • The first character of each label, delimited by ".", must be one of the following characters: A through Z or a through z or 0 through 9. • The last character of each label, delimited by ".", must be one of the following characters: A through Z, a through z, or 0 through 9. • The top level domain must contain only the following characters: A through Z, a through z. • The system reserves the following names: "all", "local", and "localhost".
license	license	License keys or NLF contents.
location	string	
management_interface	management_interface	The management interface of the cluster. The subnet mask and gateway for this interface are used for the node management interfaces provided in the node configuration.
management_interfaces	array[management_interfaces]	
metric	metric	Performance numbers, such as IOPS latency and throughput.
name	string	
name_servers	array[string]	The list of IP addresses of the DNS servers. Addresses can be either IPv4 or IPv6 addresses.
nodes	array[nodes]	

Name	Type	Description
ntp_servers	array[string]	Host name, IPv4 address, or IPv6 address for the external NTP time servers.
password	string	Initial admin password used to create the cluster.
san_optimized	boolean	Specifies if this cluster is an All SAN Array.
statistics	statistics	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
timezone	timezone	Provides the cluster-wide time zone information that localizes time found on messages displayed on each node's: <ul style="list-style-type: none"> • console messages; • logging to internal ONTAP log files; and • localized REST API full ISO-8601 date, time, and time zone format information. Machine-to-machine interfaces, such as file access protocols (NFS, CIFS), block access protocols (SAN), and other protocols such as Manage ONTAP (ONTAPI), use second or subsecond time values that are based on world time or UTC.
uuid	string	
version	version	This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.

Example request

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "certificate": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    }
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"configuration_backup": {
  "password": "yourpassword",
  "url": "http://10.224.65.198/backups",
  "username": "me"
},
"contact": "<a href=
mailto:support@company.com">support@company.com</a>",
"dns_domains": [
  "example.com",
  "example2.example3.com"
],
"license": {
  "keys": {
  }
},
"location": "building 1",
"management_interface": {
  "ip": {
    "address": "10.10.10.7",
    "gateway": "10.1.1.1",
    "netmask": "24"
  }
},
"management_interfaces": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  }
},
"ip": {
```

```

    "address": "10.10.10.7"
  },
  "name": "lif1",
  "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 11:20:13 UTC"
},
"name": "cluster1",
"name_servers": [
  "10.224.65.20",
  "2001:db08:a0b:12f0::1"
],
"nodes": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "cluster_interface": {
    "ip": {
      "address": "10.10.10.7"
    }
  }
},

```

```

"cluster_interfaces": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "ip": {
    "address": "10.10.10.7"
  },
  "name": "lif1",
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"controller": {
  "flash_cache": {
    "capacity": 102400000000,
    "firmware_version": "NA05",
    "hardware_revision": "A1",
    "model": "X1970A",
    "part_number": "119-00207",
    "serial_number": "A22P5061550000187",
    "slot": "6-1",
    "state": "ok"
  },
  "frus": {
    "id": 0,
    "state": "ok",
    "type": "fan"
  },
  "over_temperature": "over"
},
"date": "2019-04-17 11:49:26 -0400",
"ha": {
  "giveback": {
    "failure": {
      "code": 852126,
      "message": "Failed to initiate giveback. Run the \"storage failover show-giveback\" command for more information."
    },
    "state": "failed"
  },
  "partners": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    }
  }
},

```



```

    "name": "node1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "ports": {
    "number": 0,
    "state": "active"
  },
  "takeover": {
    "failure": {
      "code": 852130,
      "message": "Failed to initiate takeover. Run the \"storage failover show-takeover\" command for more information."
    },
    "state": "failed"
  }
},
"location": "rack 2 row 5",
"management_interface": {
  "ip": {
    "address": "10.10.10.7"
  }
},
"management_interfaces": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "ip": {
    "address": "10.10.10.7"
  },
  "name": "lif1",
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"membership": "available",
"model": "FAS3070",
"name": "node-01",
"serial_number": "4048820-60-9",
"service_processor": {
  "firmware_version": "string",
  "ipv4_interface": {
    "address": "10.10.10.7",
    "gateway": "10.1.1.1",
    "netmask": "24"
  },
  "ipv6_interface": {

```

```
    "address": "fd20:8b1e:b255:5011:10:141:4:97",
    "gateway": "fd20:8b1e:b255:5011:10::1",
    "netmask": 64
  },
  "link_status": "up",
  "mac_address": "string",
  "state": "online"
},
"state": "up",
"system_id": 92027651,
"system_machine_type": "7Y56-CTOWW1",
"uptime": 300536,
"uuid": "4ea7a442-86d1-11e0-ae1c-123478563412",
"vendor_serial_number": 791603000068,
"version": {
  "full": "NetApp Release 9.4.0: Sun Nov 05 18:20:57 UTC 2017",
  "generation": 9,
  "major": 4,
  "minor": 0
},
"vm": {
  "provider_type": "GoogleCloud"
}
},
"ntp_servers": [
  "time.nist.gov",
  "10.98.19.20",
  "2610:20:6F15:15::27"
],
"password": "mypassword",
"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 11:20:13 UTC"
  },
  "timezone": {
    "name": "America/New_York"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
  "version": {
    "full": "NetApp Release 9.4.0: Sun Nov 05 18:20:57 UTC 2017",
    "generation": 9,
    "major": 4,
    "minor": 0
  }
}

```

Response

Status: 202, Accepted

Name	Type	Description
job	job_link	

Example response

```

{
  "job": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    }
  },
  "uuid": "string"
}

```

Error

Status: Default

ONTAP Error Response Codes

Error Code	Description
3604491	Updating timezone failed.
3604520	Internal error. System state is not correct to read or change timezone.
8847361	Too many DNS domains provided.
8847362	Too many name servers provided.
9240587	A name must be provided.
12451843	Certificate does not exist.

Name	Type	Description
error	error	

Example error

```

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

```

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

Name	Type	Description
self	href	

certificate

Certificate used by cluster and node management interfaces for TLS connection requests.

Name	Type	Description
_links	_links	
uuid	string	Certificate UUID

configuration_backup

Name	Type	Description
password	string	
url	string	An external backup location for the cluster configuration. This is mostly required for single node clusters where node and cluster configuration backups cannot be copied to other nodes in the cluster.
username	string	
validate_certificate	boolean	Use this parameter with the value "true" to validate the digital certificate of the remote server. Digital certificate validation is available only when the HTTPS protocol is used in the URL; it is disabled by default.

license

License keys or NLF contents.

Name	Type	Description
keys	array[string]	

ip

Object to setup an interface along with its default router.

Name	Type	Description
address	string	IPv4 or IPv6 address
gateway	string	The IPv4 or IPv6 address of the default router.
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, you must set the netmask length. The default value is 64. Output is always netmask length.

management_interface

The management interface of the cluster. The subnet mask and gateway for this interface are used for the node management interfaces provided in the node configuration.

Name	Type	Description
ip	ip	Object to setup an interface along with its default router.

ip

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address

management_interfaces

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface.

Name	Type	Description
uuid	string	The UUID that uniquely identifies the interface.

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
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.

metric

Performance numbers, such as IOPS latency and throughput.

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

Name	Type	Description
status	string	Errors associated with the sample. For example, if the aggregation of data over multiple nodes fails, then any partial errors might return "ok" on success or "error" on an internal uncategorized failure. Whenever a sample collection is missed but done at a later time, it is back filled to the previous 15 second timestamp and tagged with "backfilled_data". "Inconsistent_delta_time" is encountered when the time between two collections is not the same for all nodes. Therefore, the aggregated value might be over or under inflated. "Negative_delta" is returned when an expected monotonically increasing value has decreased in value. "Inconsistent_old_data" is returned when one or more nodes do not have the latest data.
throughput	throughput	The rate of throughput bytes per second observed at the storage object.
timestamp	string	The timestamp of the performance data.

node_setup_ip

The IP configuration for cluster setup.

Name	Type	Description
address	string	IPv4 or IPv6 address

cluster_interface

The cluster network IP address of the node to be added.

Name	Type	Description
ip	node_setup_ip	The IP configuration for cluster setup.

cluster_interfaces

Network interface

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface.
uuid	string	The UUID that uniquely identifies the interface.

flash_cache

Name	Type	Description
capacity	integer	Size in bytes
firmware_version	string	
hardware_revision	string	
model	string	
part_number	string	
serial_number	string	
slot	string	
state	string	

frus

Name	Type	Description
id	integer	
state	string	
type	string	

controller

Controller information

Name	Type	Description
flash_cache	array[flash_cache]	A list of Flash-Cache devices. Only returned when requested by name.

Name	Type	Description
frus	array[frus]	List of FRUs on the node. Only returned when requested by name.
over_temperature	string	Specifies whether the hardware is currently operating outside of its recommended temperature range. The hardware shuts down if the temperature exceeds critical thresholds.

failure

Indicates the failure code and message.

Name	Type	Description
code	integer	Message code
message	string	Detailed message based on the state.

giveback

Represents the state of the node that is giving storage back to its HA partner.

Name	Type	Description
failure	failure	Indicates the failure code and message.
state	string	

partners

Name	Type	Description
_links	_links	
name	string	
uuid	string	

ports

Name	Type	Description
number	unsigned	HA port number

Name	Type	Description
state	string	<p>HA port state:</p> <ul style="list-style-type: none"> • <i>down</i> - Logical HA link is down. • <i>initialized</i> - Logical HA link is initialized. The physical link is up, but the subnet manager hasn't started to configure the port. • <i>armed</i> - Logical HA link is armed. The physical link is up and the subnet manager started but did not yet complete configuring the port. • <i>active</i> - Logical HA link is active. • <i>reserved</i> - Logical HA link is active, but the physical link is down.

takeover

This represents the state of the node that is taking over storage from its HA partner.

Name	Type	Description
failure	failure	Indicates the failure code and message.
state	string	

ha

Name	Type	Description
auto_giveback	boolean	Specifies whether giveback is automatically initiated when the node that owns the storage is ready.
enabled	boolean	Specifies whether or not storage failover is enabled.
giveback	giveback	Represents the state of the node that is giving storage back to its HA partner.

Name	Type	Description
partners	array[partners]	Nodes in this node's High Availability (HA) group.
ports	array[ports]	
takeover	takeover	This represents the state of the node that is taking over storage from its HA partner.

management_interface

The management interface of the node to be added. The subnet mask is set based on the management interface of the cluster or the management interfaces of other nodes.

Name	Type	Description
ip	node_setup_ip	The IP configuration for cluster setup.

management_interfaces

Network interface

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface.
uuid	string	The UUID that uniquely identifies the interface.

ipv4_interface

Object to setup an interface along with its default router.

Name	Type	Description
address	string	IPv4 or IPv6 address
gateway	string	The IPv4 or IPv6 address of the default router.

Name	Type	Description
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, you must set the netmask length. The default value is 64. Output is always netmask length.

ipv6_interface

Object to setup an interface along with its default router.

Name	Type	Description
address	string	IPv6 address
gateway	string	The IPv6 address of the default router.
netmask	integer	The IPv6 netmask/prefix length. The default value is 64 with a valid range of 1 to 127.

service_processor

Name	Type	Description
dhcp_enabled	boolean	Set to "true" to use DHCP to configure an IPv4 interface.
firmware_version	string	The version of firmware installed.
ipv4_interface	ipv4_interface	Object to setup an interface along with its default router.
ipv6_interface	ipv6_interface	Object to setup an interface along with its default router.
link_status	string	
mac_address	string	
state	string	

version

This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.

Name	Type	Description
full	string	The full cluster version string.
generation	integer	The generation portion of the version.
major	integer	The major portion of the version.
minor	integer	The minor portion of the version.

vm

Name	Type	Description
provider_type	string	Cloud provider where the VM is hosted.

nodes

Complete node information

Name	Type	Description
_links	_links	
cluster_interface	cluster_interface	The cluster network IP address of the node to be added.
cluster_interfaces	array[cluster_interfaces]	
controller	controller	Controller information
date	string	The current or "wall clock" time of the node in ISO-8601 date, time, and time zone format. The ISO-8601 date and time are localized based on the ONTAP cluster's timezone setting. <ul style="list-style-type: none"> • example: 2019-04-17 11:49:26 -0400 • format: date-time • readOnly: 1
ha	ha	
location	string	

Name	Type	Description
management_interface	management_interface	The management interface of the node to be added. The subnet mask is set based on the management interface of the cluster or the management interfaces of other nodes.
management_interfaces	array[management_interfaces]	
membership	string	<p>Possible values:</p> <ul style="list-style-type: none"> • <i>available</i> - A node is detected on the internal cluster network and can be added to the cluster. Nodes that have a membership of "available" are not returned when a GET request is called when the cluster exists. Provide a query on the "membership" property for <i>available</i> to scan for nodes on the cluster network. Nodes that have a membership of "available" are returned automatically before a cluster is created. • <i>joining</i> - Joining nodes are in the process of being added to the cluster. The node might be progressing through the steps to become a member or might have failed. The job to add the node or create the cluster provides details on the current progress of the node. • <i>member</i> - Nodes that are members have successfully joined the cluster.
model	string	
name	string	
serial_number	string	
service_processor	service_processor	

Name	Type	Description
state	string	<p>State of the node:</p> <ul style="list-style-type: none"> • <i>up</i> - Node is up and operational. • <i>booting</i> - Node is booting up. • <i>down</i> - Node has stopped or is dumping core. • <i>taken_over</i> - Node has been taken over by its HA partner and is not yet waiting for giveback. • <i>waiting_for_giveback</i> - Node has been taken over by its HA partner and is waiting for the HA partner to giveback disks. • <i>degraded</i> - Node has one or more critical services offline. • <i>unknown</i> - Node or its HA partner cannot be contacted and there is no information on the node's state.
system_id	string	
system_machine_type	string	OEM system machine type.
uptime	integer	The total time, in seconds, that the node has been up.
uuid	string	
vendor_serial_number	string	OEM vendor serial number.
version	version	This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.
vm	vm	

iops_raw

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

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

latency_raw

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

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

throughput_raw

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

Name	Type	Description
other	integer	Performance metric for other I/O operations. Other I/O operations can be metadata operations, such as directory lookups and so on.
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	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 can be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.

Name	Type	Description
status	string	Errors associated with the sample. For example, if the aggregation of data over multiple nodes fails, then any partial errors might return "ok" on success or "error" on an internal uncategorized failure. Whenever a sample collection is missed but done at a later time, it is back filled to the previous 15 second timestamp and tagged with "backfilled_data". "Inconsistent_delta_time" is encountered when the time between two collections is not the same for all nodes. Therefore, the aggregated value might be over or under inflated. "Negative_delta" is returned when an expected monotonically increasing value has decreased in value. "Inconsistent_old_data" is returned when one or more nodes do not have the latest data.
throughput_raw	throughput_raw	Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

timezone

Provides the cluster-wide time zone information that localizes time found on messages displayed on each node's:

- console messages;
- logging to internal ONTAP log files; and
- localized REST API full ISO-8601 date, time, and time zone format information. Machine-to-machine interfaces, such as file access protocols (NFS, CIFS), block access protocols (SAN), and other protocols such as Manage ONTAP (ONTAPI), use second or subsecond time values that are based on world time or UTC.

Name	Type	Description
name	string	<p>The ONTAP time zone name or identification in either IANA time zone format "Area/Location", or an ONTAP traditional time zone.</p> <p>The initial first node in cluster setting for time zone is "Etc/UTC". "Etc/UTC" is the IANA timezone "Area/Location" specifier for Coordinated Universal Time (UTC), which is an offset of 0.</p> <p>IANA time zone format</p> <p>The IANA time zone, formatted as "Area/Location", is based on geographic areas that have had the same time zone offset for many years.</p> <p>"Location" represents a compound name using additional forward slashes.</p> <p>An example of the "Area/Location" time zone is "America/New_York" and represents most of the United States Eastern Time Zone. Examples of "Area/Location" with "Location" as a compound name are "America/Argentina/Buenos_Aires" and "America/Indiana/Indianapolis".</p> <p>ONTAP traditional time zone</p> <p>Examples of the traditional time zones are "EST5EDT" for the United States Eastern Time Zone and "CET" for Central European Time Zone.</p> <ul style="list-style-type: none"> • example: America/New_York

cluster

Complete cluster information

Name	Type	Description
_links	_links	
certificate	certificate	Certificate used by cluster and node management interfaces for TLS connection requests.
configuration_backup	configuration_backup	
contact	string	
dns_domains	array[string]	<p>A list of DNS domains. Domain names have the following requirements:</p> <ul style="list-style-type: none"> • The name must contain only the following characters: A through Z, a through z, 0 through 9, ".", "-" or "_". • The first character of each label, delimited by ".", must be one of the following characters: A through Z or a through z or 0 through 9. • The last character of each label, delimited by ".", must be one of the following characters: A through Z, a through z, or 0 through 9. • The top level domain must contain only the following characters: A through Z, a through z. • The system reserves the following names: "all", "local", and "localhost".
license	license	License keys or NLF contents.
location	string	
management_interface	management_interface	The management interface of the cluster. The subnet mask and gateway for this interface are used for the node management interfaces provided in the node configuration.
management_interfaces	array[management_interfaces]	

Name	Type	Description
metric	metric	Performance numbers, such as IOPS latency and throughput.
name	string	
name_servers	array[string]	The list of IP addresses of the DNS servers. Addresses can be either IPv4 or IPv6 addresses.
nodes	array[nodes]	
ntp_servers	array[string]	Host name, IPv4 address, or IPv6 address for the external NTP time servers.
password	string	Initial admin password used to create the cluster.
san_optimized	boolean	Specifies if this cluster is an All SAN Array.
statistics	statistics	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
timezone	timezone	Provides the cluster-wide time zone information that localizes time found on messages displayed on each node's: <ul style="list-style-type: none"> • console messages; • logging to internal ONTAP log files; and • localized REST API full ISO-8601 date, time, and time zone format information. Machine-to-machine interfaces, such as file access protocols (NFS, CIFS), block access protocols (SAN), and other protocols such as Manage ONTAP (ONTAPI), use second or subsecond time values that are based on world time or UTC.

Name	Type	Description
uuid	string	
version	version	This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.

job_link

Name	Type	Description
_links	_links	
uuid	string	The UUID of the asynchronous job that is triggered by a POST, PATCH, or DELETE operation.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

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

Create a cluster

POST /cluster

Creates a cluster.

Required properties

- name
- password

Recommended optional properties

- location
- contact
- dns_domains
- name_servers
- ntp_servers
- license
- configuration_backup
- management_interface
- nodes
- timezone

Learn more

- [DOC /cluster](#)

Parameters

Name	Type	In	Required	Description
return_timeout	integer	query	False	<p>The number of seconds to allow the call to execute before returning. When doing a POST, PATCH, or DELETE operation on a single record, the default is 0 seconds. This means that if an asynchronous operation is started, the server immediately returns HTTP code 202 (Accepted) along with a link to the job. If a non-zero value is specified for POST, PATCH, or DELETE operations, ONTAP waits that length of time to see if the job completes so it can return something other than 202.</p> <ul style="list-style-type: none"> • Default value: 1
return_records	boolean	query	False	<p>The default is false. If set to true, the records are returned.</p> <ul style="list-style-type: none"> • Default value:
single_node_cluster	boolean	query	False	<p>Configures a single node cluster. All cluster ports are reassigned to the default network. The storage failover settings are configured to non-HA. The node reboots during this operation.</p>

Name	Type	In	Required	Description
create_recommended_aggregates	boolean	query	False	<p>Create aggregates based on an optimal layout recommended by the system.</p> <ul style="list-style-type: none"> • Default value:

Request Body

Name	Type	Description
_links	_links	
certificate	certificate	Certificate used by cluster and node management interfaces for TLS connection requests.
configuration_backup	configuration_backup	
contact	string	
dns_domains	array[string]	<p>A list of DNS domains. Domain names have the following requirements:</p> <ul style="list-style-type: none"> • The name must contain only the following characters: A through Z, a through z, 0 through 9, ".", "-" or "_". • The first character of each label, delimited by ".", must be one of the following characters: A through Z or a through z or 0 through 9. • The last character of each label, delimited by ".", must be one of the following characters: A through Z, a through z, or 0 through 9. • The top level domain must contain only the following characters: A through Z, a through z. • The system reserves the following names: "all", "local", and "localhost".
license	license	License keys or NLF contents.

Name	Type	Description
location	string	
management_interface	management_interface	The management interface of the cluster. The subnet mask and gateway for this interface are used for the node management interfaces provided in the node configuration.
management_interfaces	array[management_interfaces]	
metric	metric	Performance numbers, such as IOPS latency and throughput.
name	string	
name_servers	array[string]	The list of IP addresses of the DNS servers. Addresses can be either IPv4 or IPv6 addresses.
nodes	array[nodes]	
ntp_servers	array[string]	Host name, IPv4 address, or IPv6 address for the external NTP time servers.
password	string	Initial admin password used to create the cluster.
san_optimized	boolean	Specifies if this cluster is an All SAN Array.
statistics	statistics	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.

Name	Type	Description
timezone	timezone	<p>Provides the cluster-wide time zone information that localizes time found on messages displayed on each node's:</p> <ul style="list-style-type: none"> • console messages; • logging to internal ONTAP log files; and • localized REST API full ISO-8601 date, time, and time zone format information. Machine-to-machine interfaces, such as file access protocols (NFS, CIFS), block access protocols (SAN), and other protocols such as Manage ONTAP (ONTAPI), use second or subsecond time values that are based on world time or UTC.
uuid	string	
version	version	<p>This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.</p>

Example request

```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "certificate": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    }
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"configuration_backup": {
  "password": "yourpassword",
  "url": "http://10.224.65.198/backups",
  "username": "me"
},
"contact": "<a href=
mailto:support@company.com">support@company.com</a>",
"dns_domains": [
  "example.com",
  "example2.example3.com"
],
"license": {
  "keys": {
  }
},
"location": "building 1",
"management_interface": {
  "ip": {
    "address": "10.10.10.7",
    "gateway": "10.1.1.1",
    "netmask": "24"
  }
},
"management_interfaces": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  }
},
"ip": {
```

```

    "address": "10.10.10.7"
  },
  "name": "lif1",
  "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 11:20:13 UTC"
},
"name": "cluster1",
"name_servers": [
  "10.224.65.20",
  "2001:db08:a0b:12f0::1"
],
"nodes": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "cluster_interface": {
    "ip": {
      "address": "10.10.10.7"
    }
  }
},

```

```

"cluster_interfaces": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "ip": {
    "address": "10.10.10.7"
  },
  "name": "lif1",
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"controller": {
  "flash_cache": {
    "capacity": 102400000000,
    "firmware_version": "NA05",
    "hardware_revision": "A1",
    "model": "X1970A",
    "part_number": "119-00207",
    "serial_number": "A22P5061550000187",
    "slot": "6-1",
    "state": "ok"
  },
  "frus": {
    "id": 0,
    "state": "ok",
    "type": "fan"
  },
  "over_temperature": "over"
},
"date": "2019-04-17 11:49:26 -0400",
"ha": {
  "giveback": {
    "failure": {
      "code": 852126,
      "message": "Failed to initiate giveback. Run the \"storage failover show-giveback\" command for more information."
    },
    "state": "failed"
  },
  "partners": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    }
  }
},

```



```

    "name": "node1",
    "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
  },
  "ports": {
    "number": 0,
    "state": "active"
  },
  "takeover": {
    "failure": {
      "code": 852130,
      "message": "Failed to initiate takeover. Run the \"storage failover show-takeover\" command for more information."
    },
    "state": "failed"
  }
},
"location": "rack 2 row 5",
"management_interface": {
  "ip": {
    "address": "10.10.10.7"
  }
},
"management_interfaces": {
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "ip": {
    "address": "10.10.10.7"
  },
  "name": "lif1",
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
},
"membership": "available",
"model": "FAS3070",
"name": "node-01",
"serial_number": "4048820-60-9",
"service_processor": {
  "firmware_version": "string",
  "ipv4_interface": {
    "address": "10.10.10.7",
    "gateway": "10.1.1.1",
    "netmask": "24"
  },
  "ipv6_interface": {

```

```
    "address": "fd20:8b1e:b255:5011:10:141:4:97",
    "gateway": "fd20:8b1e:b255:5011:10::1",
    "netmask": 64
  },
  "link_status": "up",
  "mac_address": "string",
  "state": "online"
},
"state": "up",
"system_id": 92027651,
"system_machine_type": "7Y56-CTOWW1",
"uptime": 300536,
"uuid": "4ea7a442-86d1-11e0-ae1c-123478563412",
"vendor_serial_number": 791603000068,
"version": {
  "full": "NetApp Release 9.4.0: Sun Nov 05 18:20:57 UTC 2017",
  "generation": 9,
  "major": 4,
  "minor": 0
},
"vm": {
  "provider_type": "GoogleCloud"
}
},
"ntp_servers": [
  "time.nist.gov",
  "10.98.19.20",
  "2610:20:6F15:15::27"
],
"password": "mypassword",
"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 11:20:13 UTC"
  },
  "timezone": {
    "name": "America/New_York"
  },
  "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412",
  "version": {
    "full": "NetApp Release 9.4.0: Sun Nov 05 18:20:57 UTC 2017",
    "generation": 9,
    "major": 4,
    "minor": 0
  }
}

```

Response

Status: 202, Accepted

Name	Type	Description
job	job_link	

Example response

```

{
  "job": {
    "_links": {
      "self": {
        "href": "/api/resourcelink"
      }
    }
  },
  "uuid": "string"
}

```

Error

Status: Default

ONTAP Error Response Codes

Error Code	Description
262245	The value provided is invalid.
1179813	Fields set for one node must be set for all nodes.
1179817	The IP address, subnet mask, and gateway must all be provided for cluster management interface.
1179818	The IP address and gateway must be of the same family.
1179821	An IP address and subnet mask conflicts with an existing entry.
1179824	An invalid gateway was provided.
1179825	All management and cluster config IP addresses must belong to the same address family.
2097165	An NTP server could not be reached.
8847361	Too many DNS domains provided.
8847362	Too many name servers provided.
8847394	An invalid DNS domain was provided.
8978433	An invalid license key was provided.
9240587	A name must be provided.
9240594	An invalid name was provided.
39387137	The URL provided is invalid.
131727360	A node could not be added to the cluster. This is a generic code, see response message for details.
131727388	Hostnames for NTP servers cannot be used without DNS configured.
131727389	URL and username are required for configuration backup.

Name	Type	Description
error	error	

Example error

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

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

Name	Type	Description
self	href	

certificate

Certificate used by cluster and node management interfaces for TLS connection requests.

Name	Type	Description
_links	_links	
uuid	string	Certificate UUID

configuration_backup

Name	Type	Description
password	string	
url	string	An external backup location for the cluster configuration. This is mostly required for single node clusters where node and cluster configuration backups cannot be copied to other nodes in the cluster.
username	string	
validate_certificate	boolean	Use this parameter with the value "true" to validate the digital certificate of the remote server. Digital certificate validation is available only when the HTTPS protocol is used in the URL; it is disabled by default.

license

License keys or NLF contents.

Name	Type	Description
keys	array[string]	

ip

Object to setup an interface along with its default router.

Name	Type	Description
address	string	IPv4 or IPv6 address
gateway	string	The IPv4 or IPv6 address of the default router.
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, you must set the netmask length. The default value is 64. Output is always netmask length.

management_interface

The management interface of the cluster. The subnet mask and gateway for this interface are used for the node management interfaces provided in the node configuration.

Name	Type	Description
ip	ip	Object to setup an interface along with its default router.

ip

IP information

Name	Type	Description
address	string	IPv4 or IPv6 address

management_interfaces

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface.

Name	Type	Description
uuid	string	The UUID that uniquely identifies the interface.

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
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.

metric

Performance numbers, such as IOPS latency and throughput.

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

Name	Type	Description
status	string	Errors associated with the sample. For example, if the aggregation of data over multiple nodes fails, then any partial errors might return "ok" on success or "error" on an internal uncategorized failure. Whenever a sample collection is missed but done at a later time, it is back filled to the previous 15 second timestamp and tagged with "backfilled_data". "Inconsistent_delta_time" is encountered when the time between two collections is not the same for all nodes. Therefore, the aggregated value might be over or under inflated. "Negative_delta" is returned when an expected monotonically increasing value has decreased in value. "Inconsistent_old_data" is returned when one or more nodes do not have the latest data.
throughput	throughput	The rate of throughput bytes per second observed at the storage object.
timestamp	string	The timestamp of the performance data.

node_setup_ip

The IP configuration for cluster setup.

Name	Type	Description
address	string	IPv4 or IPv6 address

cluster_interface

The cluster network IP address of the node to be added.

Name	Type	Description
ip	node_setup_ip	The IP configuration for cluster setup.

cluster_interfaces

Network interface

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface.
uuid	string	The UUID that uniquely identifies the interface.

flash_cache

Name	Type	Description
capacity	integer	Size in bytes
firmware_version	string	
hardware_revision	string	
model	string	
part_number	string	
serial_number	string	
slot	string	
state	string	

frus

Name	Type	Description
id	integer	
state	string	
type	string	

controller

Controller information

Name	Type	Description
flash_cache	array[flash_cache]	A list of Flash-Cache devices. Only returned when requested by name.

Name	Type	Description
frus	array[frus]	List of FRUs on the node. Only returned when requested by name.
over_temperature	string	Specifies whether the hardware is currently operating outside of its recommended temperature range. The hardware shuts down if the temperature exceeds critical thresholds.

failure

Indicates the failure code and message.

Name	Type	Description
code	integer	Message code
message	string	Detailed message based on the state.

giveback

Represents the state of the node that is giving storage back to its HA partner.

Name	Type	Description
failure	failure	Indicates the failure code and message.
state	string	

partners

Name	Type	Description
_links	_links	
name	string	
uuid	string	

ports

Name	Type	Description
number	unsigned	HA port number

Name	Type	Description
state	string	<p>HA port state:</p> <ul style="list-style-type: none"> • <i>down</i> - Logical HA link is down. • <i>initialized</i> - Logical HA link is initialized. The physical link is up, but the subnet manager hasn't started to configure the port. • <i>armed</i> - Logical HA link is armed. The physical link is up and the subnet manager started but did not yet complete configuring the port. • <i>active</i> - Logical HA link is active. • <i>reserved</i> - Logical HA link is active, but the physical link is down.

takeover

This represents the state of the node that is taking over storage from its HA partner.

Name	Type	Description
failure	failure	Indicates the failure code and message.
state	string	

ha

Name	Type	Description
auto_giveback	boolean	Specifies whether giveback is automatically initiated when the node that owns the storage is ready.
enabled	boolean	Specifies whether or not storage failover is enabled.
giveback	giveback	Represents the state of the node that is giving storage back to its HA partner.

Name	Type	Description
partners	array[partners]	Nodes in this node's High Availability (HA) group.
ports	array[ports]	
takeover	takeover	This represents the state of the node that is taking over storage from its HA partner.

management_interface

The management interface of the node to be added. The subnet mask is set based on the management interface of the cluster or the management interfaces of other nodes.

Name	Type	Description
ip	node_setup_ip	The IP configuration for cluster setup.

management_interfaces

Network interface

Name	Type	Description
_links	_links	
ip	ip	IP information
name	string	The name of the interface.
uuid	string	The UUID that uniquely identifies the interface.

ipv4_interface

Object to setup an interface along with its default router.

Name	Type	Description
address	string	IPv4 or IPv6 address
gateway	string	The IPv4 or IPv6 address of the default router.

Name	Type	Description
netmask	string	Input as netmask length (16) or IPv4 mask (255.255.0.0). For IPv6, you must set the netmask length. The default value is 64. Output is always netmask length.

ipv6_interface

Object to setup an interface along with its default router.

Name	Type	Description
address	string	IPv6 address
gateway	string	The IPv6 address of the default router.
netmask	integer	The IPv6 netmask/prefix length. The default value is 64 with a valid range of 1 to 127.

service_processor

Name	Type	Description
dhcp_enabled	boolean	Set to "true" to use DHCP to configure an IPv4 interface.
firmware_version	string	The version of firmware installed.
ipv4_interface	ipv4_interface	Object to setup an interface along with its default router.
ipv6_interface	ipv6_interface	Object to setup an interface along with its default router.
link_status	string	
mac_address	string	
state	string	

version

This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.

Name	Type	Description
full	string	The full cluster version string.
generation	integer	The generation portion of the version.
major	integer	The major portion of the version.
minor	integer	The minor portion of the version.

vm

Name	Type	Description
provider_type	string	Cloud provider where the VM is hosted.

nodes

Complete node information

Name	Type	Description
_links	_links	
cluster_interface	cluster_interface	The cluster network IP address of the node to be added.
cluster_interfaces	array[cluster_interfaces]	
controller	controller	Controller information
date	string	The current or "wall clock" time of the node in ISO-8601 date, time, and time zone format. The ISO-8601 date and time are localized based on the ONTAP cluster's timezone setting. <ul style="list-style-type: none"> • example: 2019-04-17 11:49:26 -0400 • format: date-time • readOnly: 1
ha	ha	
location	string	

Name	Type	Description
management_interface	management_interface	The management interface of the node to be added. The subnet mask is set based on the management interface of the cluster or the management interfaces of other nodes.
management_interfaces	array[management_interfaces]	
membership	string	<p>Possible values:</p> <ul style="list-style-type: none"> • <i>available</i> - A node is detected on the internal cluster network and can be added to the cluster. Nodes that have a membership of "available" are not returned when a GET request is called when the cluster exists. Provide a query on the "membership" property for <i>available</i> to scan for nodes on the cluster network. Nodes that have a membership of "available" are returned automatically before a cluster is created. • <i>joining</i> - Joining nodes are in the process of being added to the cluster. The node might be progressing through the steps to become a member or might have failed. The job to add the node or create the cluster provides details on the current progress of the node. • <i>member</i> - Nodes that are members have successfully joined the cluster.
model	string	
name	string	
serial_number	string	
service_processor	service_processor	

Name	Type	Description
state	string	<p>State of the node:</p> <ul style="list-style-type: none"> • <i>up</i> - Node is up and operational. • <i>booting</i> - Node is booting up. • <i>down</i> - Node has stopped or is dumping core. • <i>taken_over</i> - Node has been taken over by its HA partner and is not yet waiting for giveback. • <i>waiting_for_giveback</i> - Node has been taken over by its HA partner and is waiting for the HA partner to giveback disks. • <i>degraded</i> - Node has one or more critical services offline. • <i>unknown</i> - Node or its HA partner cannot be contacted and there is no information on the node's state.
system_id	string	
system_machine_type	string	OEM system machine type.
uptime	integer	The total time, in seconds, that the node has been up.
uuid	string	
vendor_serial_number	string	OEM vendor serial number.
version	version	This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.
vm	vm	

iops_raw

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

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

latency_raw

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

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

throughput_raw

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

Name	Type	Description
other	integer	Performance metric for other I/O operations. Other I/O operations can be metadata operations, such as directory lookups and so on.
read	integer	Performance metric for read I/O operations.
total	integer	Performance metric aggregated over all types of I/O operations.
write	integer	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 can be used along with delta time to calculate the rate of I/O operations per unit of time.
latency_raw	latency_raw	The raw latency in microseconds observed at the storage object. This can be divided by the raw IOPS value to calculate the average latency per I/O operation.

Name	Type	Description
status	string	Errors associated with the sample. For example, if the aggregation of data over multiple nodes fails, then any partial errors might return "ok" on success or "error" on an internal uncategorized failure. Whenever a sample collection is missed but done at a later time, it is back filled to the previous 15 second timestamp and tagged with "backfilled_data". "Inconsistent_delta_time" is encountered when the time between two collections is not the same for all nodes. Therefore, the aggregated value might be over or under inflated. "Negative_delta" is returned when an expected monotonically increasing value has decreased in value. "Inconsistent_old_data" is returned when one or more nodes do not have the latest data.
throughput_raw	throughput_raw	Throughput bytes observed at the storage object. This can be used along with delta time to calculate the rate of throughput bytes per unit of time.
timestamp	string	The timestamp of the performance data.

timezone

Provides the cluster-wide time zone information that localizes time found on messages displayed on each node's:

- console messages;
- logging to internal ONTAP log files; and
- localized REST API full ISO-8601 date, time, and time zone format information. Machine-to-machine interfaces, such as file access protocols (NFS, CIFS), block access protocols (SAN), and other protocols such as Manage ONTAP (ONTAPI), use second or subsecond time values that are based on world time or UTC.

Name	Type	Description
name	string	<p>The ONTAP time zone name or identification in either IANA time zone format "Area/Location", or an ONTAP traditional time zone.</p> <p>The initial first node in cluster setting for time zone is "Etc/UTC". "Etc/UTC" is the IANA timezone "Area/Location" specifier for Coordinated Universal Time (UTC), which is an offset of 0.</p> <p>IANA time zone format</p> <p>The IANA time zone, formatted as "Area/Location", is based on geographic areas that have had the same time zone offset for many years.</p> <p>"Location" represents a compound name using additional forward slashes.</p> <p>An example of the "Area/Location" time zone is "America/New_York" and represents most of the United States Eastern Time Zone. Examples of "Area/Location" with "Location" as a compound name are "America/Argentina/Buenos_Aires" and "America/Indiana/Indianapolis".</p> <p>ONTAP traditional time zone</p> <p>Examples of the traditional time zones are "EST5EDT" for the United States Eastern Time Zone and "CET" for Central European Time Zone.</p> <ul style="list-style-type: none"> • example: America/New_York

cluster

Complete cluster information

Name	Type	Description
_links	_links	
certificate	certificate	Certificate used by cluster and node management interfaces for TLS connection requests.
configuration_backup	configuration_backup	
contact	string	
dns_domains	array[string]	<p>A list of DNS domains. Domain names have the following requirements:</p> <ul style="list-style-type: none"> • The name must contain only the following characters: A through Z, a through z, 0 through 9, ".", "-" or "_". • The first character of each label, delimited by ".", must be one of the following characters: A through Z or a through z or 0 through 9. • The last character of each label, delimited by ".", must be one of the following characters: A through Z, a through z, or 0 through 9. • The top level domain must contain only the following characters: A through Z, a through z. • The system reserves the following names: "all", "local", and "localhost".
license	license	License keys or NLF contents.
location	string	
management_interface	management_interface	The management interface of the cluster. The subnet mask and gateway for this interface are used for the node management interfaces provided in the node configuration.
management_interfaces	array[management_interfaces]	

Name	Type	Description
metric	metric	Performance numbers, such as IOPS latency and throughput.
name	string	
name_servers	array[string]	The list of IP addresses of the DNS servers. Addresses can be either IPv4 or IPv6 addresses.
nodes	array[nodes]	
ntp_servers	array[string]	Host name, IPv4 address, or IPv6 address for the external NTP time servers.
password	string	Initial admin password used to create the cluster.
san_optimized	boolean	Specifies if this cluster is an All SAN Array.
statistics	statistics	These are raw performance numbers, such as IOPS latency and throughput. These numbers are aggregated across all nodes in the cluster and increase with the uptime of the cluster.
timezone	timezone	Provides the cluster-wide time zone information that localizes time found on messages displayed on each node's: <ul style="list-style-type: none"> • console messages; • logging to internal ONTAP log files; and • localized REST API full ISO-8601 date, time, and time zone format information. Machine-to-machine interfaces, such as file access protocols (NFS, CIFS), block access protocols (SAN), and other protocols such as Manage ONTAP (ONTAPI), use second or subsecond time values that are based on world time or UTC.

Name	Type	Description
uuid	string	
version	version	This returns the cluster version information. When the cluster has more than one node, the cluster version is equivalent to the lowest of generation, major, and minor versions on all nodes.

job_link

Name	Type	Description
_links	_links	
uuid	string	The UUID of the asynchronous job that is triggered by a POST, PATCH, or DELETE operation.

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

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

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