Manage cluster software

REST API reference

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Manage cluster software

Cluster software endpoint overview

Overview

You can use the ONTAP cluster software API to retrieve and display relevant information about a software profile, software packages collection, software history collection, and firmware packages collection. This API retrieves the information about all software packages present in the cluster, or a specific software package, or firmware upgrade status.

You can use the POST request to download a software package/firmware from an HTTP or FTP server. The PATCH request provides the option to upgrade the cluster software version. Select the `validate_only` field to validate the package before triggering the update. Set the `version` field to trigger the installation of the package in the cluster. You can pause, resume, or cancel any ongoing software upgrade by selecting `action`. You can use the DELETE request to remove a specific software package present in the cluster.

Examples

Retrieving software profile information

The following example shows how to retrieve software and firmware profile information. You can check the validation results after selecting the `validate_only` field. Upgrade progress information is available after an upgrade has started.

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

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/software?return_timeout=15" -H
"accept: application/hal+json"

# The response:
{
"validation_results": [
 {
   "update_check": "NFS mounts",
   "status": "warning",
   "issue": {
       "message": "Use NFS hard mounts, if possible.",
     }
   ,
   "action": {
       "message": "Use NFS hard mounts, if possible.",
   }
 }
```

```
],
"version": "9.5.0",
"pending_version": "9.6.0",
"nodes": [
  {
    "node": "Node 1",
    "version": "9.5.0",
    "firmware": {
      "cluster_fw_progress": [
        {
          "job": {
            "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
            "_links": {
              "self": {
                "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
              }
            }
          },
          "zip_file_name": "abc.zip",
          "update_type": "automatic_update",
          "update_state": [
            {
              "worker_node": {
                "name": "Node 1",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
              },
              "status": "failed",
              "attempts": 3,
              "message": "Cannot open the local staging zip file.",
              "code": 2228325
            },
            {
              "worker_node": {
                "name": "Node 2",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3498"
              },
              "status": "complete",
              "attempts": 3,
              "message": "Success",
              "code": 0
            }
          ]
        },
        {
          "job": {
```

```
            "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
            "_links": {
              "self": {
                "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
              }
            }
          },
          "zip_file_name": "xyz.zip",
          "update_type": "manual_update",
          "update_state": [
            {
              "worker_node": {
                "name": "Node 1",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
              },
              "status": "failed",
              "attempts": 3,
              "message": "Cannot open the local staging zip file.",
              "code": 2228325
            },
            {
              "worker_node": {
                "name": "Node 2",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3498"
              },
              "status": "complete",
              "attempts": 3,
              "message": "Success",
              "code": 0
            }
          ]
        }
      ],
      "disk": {
        "num_waiting_download": 0,
        "total_completion_estimate": 0,
        "average_duration_per_disk": 120,
        "update_status": "idle"
      },
      "shelf": {
        "update_status": "idle",
        "in_progress_count": 2
      },
      "dqp": {
        "revision": "20200117",
```

```
        "version": "3.17",
        "file_name": "qual_devices_v2",
        "record_count": {
          "drive": 680,
          "alias": 200,
          "device": 29,
          "system": 3
        }
      },
      "sp_bmc": {
        "fw_type": "SP",
        "image": " primary",
        "status": "installed",
        "is_current": true,
        "running_version": "1.2.3.4",
        "autoupdate": false,
        "last_update_status": "passed",
        "start_time": "2018-05-21T09:53:04+05:30",
        "percent_done": 100,
        "end_time": "2018-05-21T09:53:04+05:30",
        "in_progress": false
      }
    }
  }
],
"metrocluster": {
  "progress_summary": {
          "message": "Update paused by user"
   },
  "progress_details": {
          "message": "Installing software image on cluster \"sti70-vsim-
ucs165n_siteA\"."
   },
  "clusters": [
    {
      "name": "sti70-vsim-ucs165n_siteA",
      "uuid": "720f046c-4b13-11e9-9c34-005056ac5626",
      "estimated_duration": 3480,
      "elapsed_duration": 0,
      "state": "waiting"
    },
  ]
},
"state": "in_progress",
"start_time": "2018-05-21T09:53:04+05:30",
"end_time": "2018-05-21T11:53:04+05:30",
```

```
"estimated_time": 5220,
"elapsed_time": 2140,
"update_details": [
  {
    "phase": "Data ONTAP updates",
    "state": "in_progress",
    "estimated_duration": 4620,
    "elapsed_duration": 29,
    "node": {
      "name": "sti70-vsim-ucs165n"
    }
  }
],
"status_details": [
  {
    "name": "do-download-job",
    "state": "completed",
    "issue": {
            "message": "Image update complete",
            "code": 0
     },
    "start_time": "2018-05-21T09:53:04+05:30",
    "end_time": "2018-05-21T11:53:04+05:30",
    "node": {
      "name": "sti70-vsim-ucs165n"
    }
  }
],
"_links": {
  "self": {
    "href": "/api/cluster/software/"
  }
}
}
```

Upgrading the software version

The following example shows how to upgrade cluster software. Set the `version` field to trigger the installation of the package. You can select the `validate_only` field to validate the package before the installation starts. Setting `skip_warning` as `true` ignores the validation warning before the installation starts. Setting the `action` field performs a `pause`, `resume`, or `cancel' operation on an ongoing upgrade. An upgrade can only be resumed if it is in the paused state. Setting` stabilize_minutes `allows each node a specified amount of time to stabilize after a reboot; the default is 8 minutes. If` show_validation_details` is set to "true", all validation details will be shown in the output.

You can start the upgrade process at the cluster level. There are no options available to start the upgrade for a specific node or HA pair.

1. Validating the package and verifying the validation results

The following example shows how to validate a cluster software package. You must validate the package before the software upgrade. Set the `validate_only` field to `true` to start the validation. You can check for validation results in the GET /cluster/software endpoint.

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

# The call:
curl -X PATCH "https://<mgmt_ip>/api/cluster/software?validate_only=true"
-H "accept: application/json" -H "Content-Type: application/hal+json" -d
'{ "version": "9.5.0"}'

# The response:
{
"job": {
  "uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
  "_links": {
    "self": {
      "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
    }
  }
}
}
```

The call to validate the software cluster version returns the job UUID, including a HAL link to retrieve details about the job. The job object includes a `state` field and a message to indicate the progress of the job. When the job is complete and the application is fully created, the message indicates success and the `state` field of the job is set to `success`.

```
# The API:
/api/cluster/jobs/{uuid}

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/jobs/f587d316-5feb-11e8-b0e0-
005056956dfc" -H "accept: application/hal+json"

# The response:
{
"uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
"description": "PATCH /api/cluster/software",
"state": "success",
"message": "success",
"code": 0,
"_links": {
  "self": {
    "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
  }
}
}
```

You can check for validation results in the GET /cluster/software endpoint. The following example shows how to check the validation warnings and errors after setting the `validate_only` field to `true`.

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

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

# The response:
{
"version": "9.7.0",
"validation_results": [
  {
    "update_check": "High Availability status",
    "status": "error",
    "issue": {
      "message": "Cluster HA is not configured in the cluster. Storage
failover is not enabled on node \"node1\", \"node2\".",
    },
    "action": {
```

```
      "message": "Check cluster HA configuration. Check storage failover
status."
    }
  },
  {
    "update_check": "Manual checks",
    "status": "warning",
    "issue" : {
      "message": "Manual validation checks need to be performed. Refer to
the Upgrade Advisor Plan or \"Performing manual checks before an automated
cluster upgrade\" section in the \"Clustered Data ONTAP Upgrade Express
Guide\" for the remaining validation checks that need to be performed
before update. Failing to do so can result in an update failure or an I/O
disruption."
    },
    "action": {
      "message": "Refer to the Upgrade Advisor Plan or \"Performing manual
checks before an automated cluster upgrade\" section in the \"Clustered
Data ONTAP Upgrade Express Guide\" for the remaining validation checks
that need to be performed before update."
    }
  }
],
"nodes": [
  {
    "node": "sti70-vsim-ucs165n",
    "version": "9.5.0",
    "firmware": {
      "cluster_fw_progress": [
        {
          "job": {
            "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
            "_links": {
              "self": {
                "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
              }
            }
          },
          "zip_file_name": "abc.zip",
          "update_type": "automatic_update",
          "update_state": [
            {
              "worker_node": {
                "name": "Node 1",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3498"
```

```
            },
            "status": "failed",
            "attempts": 3,
            "message": "Cannot open the local staging zip file.",
            "code": 2228325
          },
          {
            "worker_node": {
              "name": "Node 2",
              "uuid": "fcd40f70-f531-11eb-b235-005056bb3498"
            },
            "status": "complete",
            "attempts": 3,
            "message": "Success",
            "code": 0
          }
        ]
      },
      {
        "job": {
          "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
          "_links": {
            "self": {
              "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
            }
          }
        },
        "zip_file_name": "xyz.zip",
        "update_type": "automatic_update",
        "update_state": [
          {
            "worker_node": {
              "name": "Node 1",
              "uuid": "fcd40f70-f531-11eb-b235-005056bb3498"
            },
            "status": "failed",
            "attempts": 3,
            "message": "Cannot open the local staging zip file.",
            "code": 2228325
          },
          {
            "worker_node": {
              "name": "Node 2",
              "uuid": "fcd40f70-f531-11eb-b235-005056bb3498"
            },
```

```
              "status": "complete",
              "attempts": 3,
              "message": "Success",
              "code": 0
            }
          ]
        }
      ],
      "disk": {
        "num_waiting_download": 0,
        "total_completion_estimate": 0,
        "average_duration_per_disk": 120,
        "update_status": "idle"
      },
      "shelf": {
        "update_status": "idle",
        "in_progress_count": 2
      },
      "dqp": {
        "revision": "20200117",
        "version": "3.17",
        "file_name": "qual_devices_v2",
        "record_count": {
          "drive": 680,
          "alias": 200,
          "device": 29,
          "system": 3
        }
      },
      "sp_bmc": {
        "fw_type": "SP",
        "image": " primary",
        "status": "installed",
        "is_current": true,
        "running_version": "1.2.3.4",
        "autoupdate": false,
        "last_update_status": "passed",
        "start_time": "2018-05-21T09:53:04+05:30",
        "percent_done": 100,
        "end_time": "2018-05-21T09:53:04+05:30",
        "in_progress": false
      }
    }
  }
],
"state": "failed",
```

```
"elapsed_duration": 56,
"estimated_duration": 600,
"_links": {
  "self": {
    "href": "/api/cluster/software"
  }
}
}
```

2. Updating the cluster

The following example shows how to initiate a cluster software upgrade. You must validate the package before the software upgrade starts. Set the `skip_warnings` field to `true` to skip validation warnings and start the software package upgrade. You can specify the `stabilize_minutes` value between 1 to 60 minutes. Setting `stabilize_minutes` allows each node a specified amount of time to stabilize after a reboot; the default is 8 minutes. If the value of `show_validation_details` is set to "true", then all validation details will be shown in the output.

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

# The call:
curl -X PATCH "https://<mgmt_ip>/api/cluster/software?skip_warnings=true"
-H "accept: application/json" -H "Content-Type: application/hal+json" -d
'{ "version": "9.5.0"}'

# The response:
{
"job": {
  "uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
  "_links": {
    "self": {
      "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
    }
  }
}
}
```

The call to update the software cluster version returns the job UUID, including a HAL link to retrieve details about the job. The job object includes a `state` field and a message to indicate the progress of the job. When the job is complete and the application is fully created, the message indicates success and the `state` field of the job is set to `success`.

```
# The API:
/api/cluster/jobs/{uuid}

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/jobs/f587d316-5feb-11e8-b0e0-
005056956dfc" -H "accept: application/hal+json"

# The response:
{
"uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
"description": "PATCH /api/cluster/software",
"state": "success",
"message": "success",
"code": 0,
"_links": {
  "self": {
    "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
  }
}
}
```

You can check the update progress information in the GET /cluster/software endpoint. The following example shows how to check the progress of an update after setting the `skip_warnings` field to `true`. Each node's object also includes information about the firmware update status on the node.

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

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

# The response:
{
"version": "9.7.0",
"validation_results": [
  {
    "update_check": "Manual checks",
    "status": "warning",
    "issue" : {
      "message": "Manual validation checks need to be performed. Refer to
the Upgrade Advisor Plan or \"Performing manual checks before an automated
cluster upgrade\" section in the \"Clustered Data ONTAP Upgrade Express
```

```
Guide\" for the remaining validation checks that need to be performed
before update. Failing to do so can result in an update failure or an I/O
disruption."
    },
    "action": {
      "message": "Refer to the Upgrade Advisor Plan or \"Performing manual
checks before an automated cluster upgrade\" section in the \"Clustered
Data ONTAP Upgrade Express Guide\" for the remaining validation checks
that need to be performed before update."
    }
  }
],
"nodes": [
  {
    "node": "sti70-vsim-ucs165n",
    "version": "9.5.0",
    "firmware": {
      "cluster_fw_progress": [
        {
          "job": {
            "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
            "_links": {
              "self": {
                "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
              }
            }
          },
          "zip_file_name": "abc.zip",
          "update_type": "automated_update",
          "update_state": [
            {
              "worker_node": {
                "name": "Node 3",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
              },
              "status": "failed",
              "attempts": 3,
              "message": "Cannot open the local staging zip file.",
              "code": 2228325
            },
            {
              "worker_node": {
                "name": "Node 4",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3498"
              },
```

```
              "status": "complete",
              "attempts": 3,
              "message": "Success",
              "code": 0
            }
          ]
        },
        {
          "job": {
            "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
            "_links": {
              "self": {
                "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
              }
            }
          },
          "zip_file_name": "xyz.zip",
          "update_type": "automated_update",
          "update_state": [
            {
              "worker_node": {
                "name": "Node 1",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
              },
              "status": "failed",
              "attempts": 3,
              "message": "Cannot open the local staging zip file.",
              "code": 2228325
            },
            {
              "worker_node": {
                "name": "Node 2",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
              },
              "status": "complete",
              "attempts": 3,
              "message": "Success",
              "code": 0
            }
          ]
        }
      ],
      "disk": {
        "num_waiting_download": 0,
        "total_completion_estimate": 0,
```

```
        "average_duration_per_disk": 120,
        "update_status": "idle"
      },
      "shelf": {
        "update_status": "idle",
        "in_progress_count": 2
      },
      "dqp": {
        "revision": "20200117",
        "version": "3.17",
        "file_name": "qual_devices_v2",
        "record_count": {
          "drive": 680,
          "alias": 200,
          "device": 29,
          "system": 3
        }
      },
      "sp_bmc": {
        "fw_type": "SP",
        "image": " primary",
        "status": "installed",
        "is_current": true,
        "running_version": "1.2.3.4",
        "autoupdate": false,
        "last_update_status": "passed",
        "start_time": "2018-05-21T09:53:04+05:30",
        "percent_done": 100,
        "end_time": "2018-05-21T09:53:04+05:30",
        "in_progress": false
      }
    }
  }
],
"pending_version": "9.7.0",
"state": "in_progress",
"elapsed_duration": 63,
"estimated_duration": 5220,
"status_details": [
  {
    "name": "do-download-job",
    "status": "running",
    "issue": {
            "message": "Installing software image.",
            "code": 10551400
     },
```

```
    "start_time": "2019-01-14T23:12:14+05:30",
    "end_time": "2019-01-14T23:12:14+05:30",
    "node": {
      "name": "node1"
    }
  },
  {
    "name": "do-download-job",
    "status": "running",
    "issue": {
            "message": "Installing software image.",
            "code": 10551400
    },
    "start_time": "2019-01-14T23:12:14+05:30",
    "end_time": "2019-01-14T23:12:14+05:30",
    "node": {
      "name": "node2"
    }
  }
],
"update_details": [
  {
    "phase": "Data ONTAP updates",
    "status": "in-progress",
    "estimated_duration": 4620,
    "elapsed_duration": 10,
    "node": {
      "name": "node1"
    }
  },
  {
    "phase": "Data ONTAP updates",
    "status": "in-progress",
    "estimated_duration": 4620,
    "elapsed_duration": 10,
    "node": {
      "name": "node2"
    }
  }
],
"_links": {
  "self": {
    "href": "/api/cluster/software"
  }
}
}
```

In the case of a post update check failure, the details are available under the heading "post_update_checks" in the GET /cluster/software endpoint. The following example shows how to check the progress of an update after a post update check has failed. Each node's object also includes information about the firmware update status on the node.

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

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

# The response:
{
"version": "9.7.0",
"validation_results": [
  {
    "update_check": "Manual checks",
    "status": "warning",
    "issue" : {
      "message": "Manual validation checks need to be performed. Refer to
the Upgrade Advisor Plan or \"Performing manual checks before an automated
cluster upgrade\" section in the \"Clustered Data ONTAP Upgrade Express
Guide\" for the remaining validation checks that need to be performed
before update. Failing to do so can result in an update failure or an I/O
disruption."
    },
    "action": {
      "message": "Refer to the Upgrade Advisor Plan or \"Performing manual
checks before an automated cluster upgrade\" section in the \"Clustered
Data ONTAP Upgrade Express Guide\" for the remaining validation checks
that need to be performed before update."
    }
  }
],
"nodes": [
  {
    "node": "sti70-vsim-ucs165n",
    "version": "9.5.0",
    "firmware": {
      "cluster_fw_progress": [
        {
          "job": {
            "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
            "_links": {
              "self": {
```

```
              "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
            }
          }
        },
        "zip_file_name": "abc.zip",
        "update_type": "automated_update",
        "update_state": [
          {
            "worker_node": {
              "name": "Node 1",
              "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
            },
            "status": "working",
            "attempts": 3,
            "message": "<message catalog text>",
            "code": 3
          },
          {
            "worker_node": {
              "name": "Node 2",
              "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
            },
            "status": "completed",
            "attempts": 3,
            "message": "Error message",
            "code": 0
          }
        ]
      },
      {
        "job": {
          "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
          "_links": {
            "self": {
              "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
            }
          }
        },
        "zip_file_name": "xyz.zip",
        "update_type": "automated_update",
        "update_state": [
          {
            "worker_node": {
              "name": "Node 1",
```

```
            "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
          },
          "status": "completed",
          "attempts": 1,
          "message": "Error message",
          "code": 0
        },
        {
          "worker_node": {
            "name": "Node 2",
            "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
          },
          "status": "completed",
          "attempts": "3",
          "message": "Error message",
          "code": 0
        }
      ]
    }
  ],
  "disk": {
    "num_waiting_download": 0,
    "total_completion_estimate": 0,
    "average_duration_per_disk": 120,
    "update_status": "idle"
  },
  "shelf": {
    "update_status": "idle",
    "in_progress_count": 2
  },
  "dqp": {
    "revision": "20200117",
    "version": "3.17",
    "file_name": "qual_devices_v2",
    "record_count": {
      "drive": 680,
      "alias": 200,
      "device": 29,
      "system": 3
    }
  },
  "sp_bmc": {
    "fw_type": "SP",
    "image": " primary",
    "status": "installed",
    "is_current": "true",
```

```
        "running_version": "1.2.3.4",
        "autoupdate": "false",
        "last_update_status": "passed",
        "start_time": "2018-05-21T09:53:04+05:30",
        "percent_done": 100,
        "end_time": "2018-05-21T09:53:04+05:30",
        "in_progress": "yes"
      }
    }
  }
],
"pending_version": "9.7.0",
"state": "in_progress",
"elapsed_duration": 63,
"estimated_duration": 5220,
"status_details": [
  {
    "name": "do-download-job",
    "status": "completed",
    "issue": {
            "message": "Image update complete.",
            "code": 0
     },
    "start_time": "2019-01-14T23:12:14+05:30",
    "end_time": "2019-01-14T23:12:14+05:30",
    "node": {
      "name": "node1"
    }
  },
  {
    "name": "do-download-job",
    "status": "completed",
    "issue": {
            "message": "Image update complete.",
            "code": 0
    },
    "start_time": "2019-01-14T23:12:14+05:30",
    "end_time": "2019-01-14T23:12:14+05:30",
    "node": {
      "name": "node2"
    }
  }
],
"update_details": [
  {
    "phase": "Data ONTAP updates",
```

```
    "status": "completed",
    "estimated_duration": 4620,
    "elapsed_duration": 3120,
    "node": {
      "name": "node1"
    }
  },
  {
    "phase": "Data ONTAP updates",
    "status": "completed",
    "estimated_duration": 4620,
    "elapsed_duration": 3210,
    "node": {
      "name": "node2"
    }
  },
  {
    "phase": "Post-update checks",
    "status": "paused_on_error",
    "estimated_duration": 600,
    "elapsed_duration": 10,
    "node": {
      "name": "node2"
    }
  }
],
"post_update_checks": [
  {
    "update_check": "Aggregate Health Status",
    "status": "error",
    "issue": {
      "message": "Not all aggregates are online"
    },
    "action": {
      "message": "Ensure all aggregates are online."
    }
  },
  {
    "update_check": "HA Health Status",
    "status": "error",
    "issue": {
      "message": "Storage failover is not enabled on nodes of the
cluster."
    },
    "action": {
      "message": "Ensure storage failover is enabled on all nodes of the
```

```
cluster."
    }
  }
],
"_links": {
  "self": {
    "href": "/api/cluster/software"
  }
}
}
```

3. Pausing, resuming or canceling an upgrade

The following example shows how to `pause` an ongoing cluster software package upgrade. Set the `action` field to `pause`, `resume`, or `cancel` to pause, resume or cancel the upgrade respectively. Not all update operations support these actions. An update can only be resumed if it is in the paused state.

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

# The call:
curl -X PATCH "https://<mgmt_ip>/api/cluster/software?action=pause" -H
"accept: application/json" -H "Content-Type: application/hal+json" -d '{
"version": "9.5.0"}'

# The response:
{
"job": {
  "uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
  "_links": {
    "self": {
      "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
    }
  }
}
}
```

The call to update the software cluster version and/or firmware version returns the job UUID, including a HAL link to retrieve details about the job. The job object includes a `state` field and a message to indicate the progress of the job. When the job is complete and the application is fully created, the message indicates success and the `state` field of the job is set to `success`.

```
# The API:
/api/cluster/jobs/{uuid}

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/jobs/f587d316-5feb-11e8-b0e0-
005056956dfc" -H "accept: application/hal+json"

# The response:
{
"uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
"description": "PATCH /api/cluster/software",
"state": "success",
"message": "success",
"code": 0,
"_links": {
  "self": {
    "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
  }
}
}
```

You can check the progress of the upgrade in the GET /cluster/software endpoint. The following example shows how to check the progress of the pause upgrade state after setting the `action` field to `pause`.

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

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

# The response:
{
"version": "9.7.0",
"validation_results": [
  {
    "update_check": "Manual checks",
    "status": "warning",
    "issue" : {
      "message": "Manual validation checks need to be performed. Refer to
the Upgrade Advisor Plan or \"Performing manual checks before an automated
cluster upgrade\" section in the \"Clustered Data ONTAP Upgrade Express
Guide\" for the remaining validation checks that need to be performed
```

```
before update. Failing to do so can result in an update failure or an I/O
disruption."
    },
    "action": {
      "message": "Refer to the Upgrade Advisor Plan or \"Performing manual
checks before an automated cluster upgrade\" section in the \"Clustered
Data ONTAP Upgrade Express Guide\" for the remaining validation checks
that need to be performed before update."
    }
  }
],
"nodes": [
  {
    "node": "sti70-vsim-ucs165n",
    "version": "9.5.0",
    "firmware": {
      "cluster_fw_progress": [
        {
          "job": {
            "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
            "_links": {
              "self": {
                "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
              }
            }
          },
          "zip_file_name": "abc.zip",
          "update_type": "automated_update",
          "update_state": [
            {
              "worker_node": {
                "name": "Node 1",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
              },
              "status": "failed",
              "attempts": 3,
              "message": "Cannot open the local staging zip file.",
              "code": 2228325
            },
            {
              "status": "complete",
              "attempts": 3,
              "message": "Success",
              "code": 0
            }
```

```
          ]
        },
        {
          "job": {
            "uuid": "5a21663c-a9a0-11ea-af9a-005056bb44d7",
            "_links": {
              "self": {
                "href": "/api/cluster/jobs/5a21663c-a9a0-11ea-af9a-
005056bb44d7"
              }
            }
          },
          "zip_file_name": "xyz.zip",
          "update_type": "automated_update",
          "update_state": [
            {
              "worker_node": {
                "name": "Node 1",
                "uuid": "fcd40f70-f531-11eb-b235-005056bb3497"
              },
              "status": "failed",
              "attempts": 3,
              "message": "Cannot open the local staging zip file.",
              "code": 2228325
            },
            {
              "status": "complete",
              "attempts": 3,
              "message": "Success",
              "code": 0
            }
          ]
        }
      ],
      "disk": {
        "num_waiting_download": 0,
        "total_completion_estimate": 0,
        "average_duration_per_disk": 120,
        "update_status": "idle"
      },
      "shelf": {
        "update_status": "idle",
        "in_progress_count": 2
      },
      "dqp": {
        "revision": "20200117",
```

```
        "version": "3.17",
        "file_name": "qual_devices_v2",
        "record_count": {
          "drive": 680,
          "alias": 200,
          "device": 29,
          "system": 3
        }
      },
      "sp_bmc": {
        "fw_type": "SP",
        "image": " primary",
        "status": "installed",
        "is_current": true,
        "running_version": "1.2.3.4",
        "autoupdate": false,
        "last_update_status": "passed",
        "start_time": "2018-05-21T09:53:04+05:30",
        "percent_done": 100,
        "end_time": "2018-05-21T09:53:04+05:30",
        "in_progress": false
      }
    }
  }
],
"pending_version": "9.7.0",
"state": "pause_pending",
"elapsed_duration": 103,
"estimated_duration": 5220,
"status_details": [
  {
    "status": "in-progress",
    "issue": {
            "message": "Installing software image.",
            "code": 10551400
     },
    "start_time": "2019-01-08T02:54:36+05:30",
    "node": {
      "name": "node1"
    }
  },
  {
    "status": "in-progress",
    "issue": {
            "message": "Installing software image.",
            "code": 10551400
```

```
      },
      "start_time": "2019-01-08T02:54:36+05:30",
      "node": {
        "name": "node2"
      }
    }
  ],
  "update_details": [
    {
      "phase": "Pre-update checks",
      "status": "completed",
      "estimated_duration": 600,
      "elapsed_duration": 54,
      "node": {
        "name": "node1"
      }
    },
    {
      "phase": "Data ONTAP updates",
      "status": "pause-pending",
      "estimated_duration": 4620,
      "elapsed_duration": 49,
      "node": {
        "name": "node2"
      }
    },
    {
      "phase": "Data ONTAP updates",
      "status": "pause-pending",
      "estimated_duration": 4620,
      "elapsed_duration": 49
    }
  ],
  "_links": {
    "self": {
      "href": "/api/cluster/software"
    }
  }
  }
```


Downloading the software package

The following example shows how to download the software/firmware package from an HTTP or FTP server. Provide the `url`, `username`, and `password`, if required, to start the download of the package to the cluster.

```
# The API:
/api/cluster/software/download

# The call:
curl -X POST "https://<mgmt-
ip>/api/cluster/software/download?return_timeout=0" -H "accept:
application/json" -H "Content-Type: application/hal+json" -d '{ "url":
"http://server/package", "username": "admin", "password": "*********"}'

# The response:
{
"job": {
  "uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
  "_links": {
    "self": {
      "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
    }
  }
}
}
```

The call to download the software/firmware package returns the job UUID, including a HAL link to retrieve details about the job. The job object includes a `state` field and a message to indicate the progress of the job. When the job is complete and the application is fully created, the message indicates success and the job `state` field is set to `success`.

```
# The API:
/api/cluster/jobs/{uuid}

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/jobs/f587d316-5feb-11e8-b0e0-
005056956dfc" -H "accept: application/hal+json"

# The response:
{
"uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
"description": "POST /api/cluster/software/download",
"state": "success",
"message": "success",
"code": 0,
"_links": {
  "self": {
    "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
  }
}
}
```

Checking the progress of the software package being downloaded from an HTTP or FTP server

The following example shows how to retrieve the progress status of the software package being downloaded from a HTTP or FTP server.

```
# The API:
/api/cluster/software/download

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/software/download" -H "accept:
application/hal+json"

# The response:
{
"state": "running",
"message": "Package download in progress",
"code": 10551760,
"_links": {
  "self": {
    "href": "/api/cluster/software/download"
  }
}
}
```

HTTPS error codes

The following is a list of possible error codes that can be returned during a package download operation.

ONTAP Error Response Codes

Error Code	Description
2228324	Failed to access the remote zip file on node.
2228325	Cannot open local staging ZIP file
2228326	File copy to local staging failed.
2228327	Firmware file already exists.
2228328	Firmware update of node failed.
2228329	Attempt to start worker on node failed
2228330	Uploaded firmware file is not present.
2228331	Copy of file from webserver failed.
2228428	Firmware update completed with errors
2228429	Firmware update completed.
10551797	Internal error. Failed to check if file upload is enabled. Contact technical support for assistance.

Uploading a software/firmware package

The following example shows how to upload a software package.

```
# The API:
/api/cluster/software/upload

# The call:
curl -ku username:password -F "file=@image.tgz" -X POST "https://<mgmt-
ip>/api/cluster/software/upload?return_timeout=0"

# The response:
{
"job": {
"uuid": "12db53fd-8326-11ea-91eb-005056bb16e5",
"_links": {
    "self": {
    "href": "/api/cluster/jobs/12db53fd-8326-11ea-91eb-005056bb16e5"
    }
 }
}
}
```

HTTPS error codes

The following is a list of possible error codes that can be returned during a package upload operation.

ONTAP Error Response Codes

Error Code	Description
2228324	Failed to access the remote zip file on node.
2228325	Cannot open local staging ZIP file
2228326	File copy to local staging failed.
2228327	Firmware file already exists.
2228328	Firmware update of node failed.
2228329	Attempt to start worker on node failed
2228330	Uploaded firmware file is not present.
2228331	Copy of file from webserver failed.
2228428	Firmware update completed with errors
2228429	Firmware update completed.
10551797	Internal error. Failed to check if file upload is enabled.

Error Code	Description
10551798	File upload is disabled. Enable file upload by setting "ApacheUploadEnabled 1" in the web services configuration file or contact technical support for assistance.
10551800	Internal error. Access permissions restrict file upload. This is likely due to a bad web jail setup. Contact technical support for assistance.
10551801	Internal error. A read/write error occurred when uploading this file. Contact technical support for assistance
10551802	An invalid argument was supplied to create a file handle. Try uploading the file again or contact technical support for assistance.
10551803	An unknown error occured. Retry file upload operation again or contact technical support for assistance.
10551804	Internal error. There is not sufficient space in the file upload directory to upload this file. Contact technical support for assistance.
10551805	Internal error in JAIL setup. Contact technical support for assistance.
10551806	Internal error. Failed to write to file in the webjail directory. Contact technical support for assistance.
10551807	The request must only contain a single file. More than one file per request is not supported.

Retrieving cluster software packages information

The following example shows how to retrieve the ONTAP software packages in a cluster.

```
# The API:
/api/cluster/software/packages

# The call:
curl -X GET "https://<mgmt-
ip>/api/cluster/software/packages?return_records=true&return_timeout=15"
-H "accept: application/hal+json"

# The response:
{
"records": [
  {
    "version": "9.7.0",
    "_links": {
      "self": {
        "href": "/api/cluster/software/packages/9.7.0"
      }
    }
  },
  {
    "version": "9.5.0",
    "_links": {
      "self": {
        "href": "/api/cluster/software/packages/9.5.0"
      }
    }
  }
],
"num_records": 2,
"_links": {
  "self": {
    "href": "/api/cluster/software/packages"
  }
}
}
```

The following example shows how to retrieve the details of a given cluster software package.

```
# The API:
/api/cluster/software/packages/{version}

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/software/packages/9.7.0" -H
"accept: application/hal+json"

# The response:
{
"version": "9.7.0",
"create_time": "2018-05-21T10:06:59+05:30",
"_links": {
  "self": {
    "href": "/api/cluster/software/packages/9.7.0"
  }
}
}
```

Deleting a cluster software package

The following example shows how to delete a package from the cluster. You need to provide the package version that you want to delete. The software package delete creates a job to perform the delete operation.

```
# The API:
/api/cluster/software/packages/{version}

# The call:
curl -X DELETE "https://<mgmt-ip>/api/cluster/software/packages/9.6.0" -H
"accept: application/hal+json"

# The response:
{
"job": {
  "uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
  "_links": {
    "self": {
      "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
    }
  }
}
}
```

The call to delete the package returns the job UUID, including a HAL link to retrieve details about the job. The job object includes a `state` field and a message to indicate the progress of the job. When the job is complete and the application is fully created, the message indicates success and the job `state` field is set to `success`.

```
# The API:
/api/cluster/jobs/{uuid}

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/jobs/f587d316-5feb-11e8-b0e0-
005056956dfc" -H "accept: application/hal+json"

# The response:
{
"uuid": "f587d316-5feb-11e8-b0e0-005056956dfc",
"description": "DELETE /api/cluster/software/packages/9.6.0",
"state": "success",
"message": "success",
"code": 0,
"_links": {
  "self": {
    "href": "/api/cluster/jobs/f587d316-5feb-11e8-b0e0-005056956dfc"
  }
}
}
```

HTTPS error codes

The following is a list of possible error codes that can be returned during a package delete operation.

ONTAP Error Response codes

Error codes	Description
10551315	Package store is empty
10551322	Error in retrieving package cleanup status
10551323	Error in cleaning up package information on a node
10551324	Error in cleaning up package information on both nodes
10551325	Package does not exist on the system
10551326	Error in deleting older package cleanup tasks
10551346	Package delete failed since a validation is in progress
10551347	Package delete failed since an update is in progress

Error codes	Description
10551367	A package synchronization is in progress
10551388	Package delete operation timed out

Retrieving software installation history information

The following example shows how to:

- retrieve the software package installation history information.
- display specific node level software installation history information.
- provide all the attributes by default in response when the self referential link is not present.

```
# The API:
/api/cluster/software/history

# The call:
curl -X GET "https://<mgmt-ip>/api/cluster/software/history" -H "accept:
application/hal+json"

# The response:
{
"node": {
  "uuid": "58cd3a2b-af63-11e8-8b0d-0050568e7279",
  "name": "sti70-vsim-ucs165n",
  "_links": {
    "self": {
      "href": "/api/cluster/nodes/58cd3a2b-af63-11e8-8b0d-0050568e7279"
    }
  }
},
"start_time": "2018-09-03T16:18:46+05:30",
"state": "successful",
"from_version": "9.4.0",
"to_version": "9.5.0",
"end_time": "2018-05-21T10:14:51+05:30"
}
```

Retrieve the cluster software profile

GET `/cluster/software`

Introduced In: 9.6

Retrieves the software profile of a cluster.

Related ONTAP commands

- `cluster image show`
- `cluster image show-update-progress`
- `system node image package show`

Learn more

- DOC /cluster/software

Parameters

Name	Type	In	Required	Description
fields	array[string]	query	False	Specify the fields to return.
return_timeout	integer	query	False	The number of seconds to allow the call to execute before returning. When iterating over a collection, the default is 15 seconds. ONTAP returns earlier if either max records or the end of the collection is reached. • Default value: 1 • Max value: 120 • Min value: 0

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
action	string	User triggered action to apply to the install operation
elapsed_duration	integer	Elapsed time during the upgrade or validation operation
estimated_duration	integer	Overall estimated time for completion of the upgrade or validation operation.
metrocluster	metrocluster	
nodes	array[software_node_reference]	List of nodes, active versions, and firmware update progressions.
pending_version	string	Version being installed on the system. • example: ONTAP_X_1 • readOnly: 1 • Introduced in: 9.6
post_update_checks	array[software_validation_reference]	List of failed post-update checks' warnings, errors, and advice.
state	string	Operational state of the upgrade
status_details	array[software_status_details_reference]	Display status details.
update_details	array[software_update_details_reference]	Display update progress details.
validation_results	array[software_validation_reference]	List of validation warnings, errors, and advice.
version	string	Version of ONTAP installed and currently active on the system. During PATCH, using the 'validate_only' parameter on the request executes pre-checks, but does not perform the full installation. • example: ONTAP_X • Introduced in: 9.6

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "action": "pause",
  "elapsed_duration": 2140,
  "estimated_duration": 5220,
  "metrocluster": {
    "clusters": [
      {
        "elapsed_duration": 2140,
        "estimated_duration": 3480,
        "name": "cluster_A",
        "state": "in_progress"
      }
    ],
    "progress_details": {
      "message": "Switchover in progress"
    },
    "progress_summary": {
      "message": "MetroCluster updated successfully."
    }
  },
  "nodes": [
    {
      "firmware": {
        "cluster_fw_progress": [
          {
            "job": {
              "_links": {
                "self": {
                  "href": "/api/resourcelink"
                }
              },
              "uuid": "string"
            },
            "update_state": [
              {
                "attempts": 3,
                "code": 2228325,
                "message": "Cannot open local staging ZIP file
disk_firmware.zip",
```

```
            "status": "string",
            "worker_node": {
              "_links": {
                "self": {
                  "href": "/api/resourcelink"
                }
              },
              "name": "node1",
              "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
            }
          }
        ],
        "update_type": "string",
        "zip_file_name": "disk_firmware.zip"
      }
    ],
    "disk": {
      "average_duration_per_disk": 120,
      "num_waiting_download": 0,
      "total_completion_estimate": 0,
      "update_status": "running"
    },
    "dqp": {
      "file_name": "qual_devices_v3",
      "record_count": {
        "alias": 200,
        "device": 29,
        "drive": 680,
        "system": 3
      },
      "revision": "20200117",
      "version": "3.18"
    },
    "shelf": {
      "in_progress_count": 2,
      "update_status": "running"
    },
    "sp_bmc": {
      "autoupdte": "",
      "end_time": "2020-05-17T20:00:00Z",
      "fw_type": "SP",
      "image": "primary",
      "is_current": 1,
      "last_update_state": "passed",
      "percent_done": 100,
      "running_version": "1.2.3.4",
```

```
          "start_time": "2020-05-17T20:00:00Z",
          "state": "installed"
        }
      },
      "name": "node1",
      "software_images": [
        {
          "package": "image.tgz"
        }
      ],
      "version": "ONTAP_X"
    }
  ],
  "pending_version": "ONTAP_X_1",
  "post_update_checks": [
    {
      "action": {
        "message": "Use NFS hard mounts, if possible."
      },
      "issue": {
        "message": "Cluster HA is not configured in the cluster."
      },
      "status": "warning",
      "update_check": "nfs_mounts"
    }
  ],
  "state": "completed",
  "status_details": [
    {
      "action": {
        "message": "string"
      },
      "end_time": "2019-02-02T19:00:00Z",
      "issue": {
        "code": 10551399,
        "message": "Image update complete"
      },
      "name": "initialize",
      "node": {
        "name": "node1"
      },
      "start_time": "2019-02-02T19:00:00Z",
      "state": "failed"
    }
  ],
  "update_details": [
```

```
      {
        "elapsed_duration": 2100,
        "estimated_duration": 4620,
        "node": {
          "name": "node1"
        },
        "phase": "Post-update checks",
        "state": "failed"
      }
    ],
    "validation_results": [
      {
        "action": {
          "message": "Use NFS hard mounts, if possible."
        },
        "issue": {
          "message": "Cluster HA is not configured in the cluster."
        },
        "status": "warning",
        "update_check": "nfs_mounts"
      }
    ],
    "version": "ONTAP_X"
}
```


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	

software_mcc_reference

Name	Type	Description
elapsed_duration	integer	Elapsed duration of update time (in seconds) of MetroCluster.
estimated_duration	integer	Estimated duration of update time (in seconds) of MetroCluster.
name	string	Name of the site in MetroCluster.
state		Upgrade state of MetroCluster.

progress_details

Name	Type	Description
message	string	MetroCluster update progress details.

progress_summary

Name	Type	Description
message	string	MetroCluster update progress summary.

metrocluster

Name	Type	Description
clusters	array[software_mcc_reference]	List of MetroCluster sites, statuses, and active ONTAP versions. • readOnly: 1 • Introduced in: 9.6
progress_details	progress_details	
progress_summary	progress_summary	

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.

worker_node

Name	Type	Description
_links	_links	
name	string	
uuid	string	

firmware_update_progress_state

Name	Type	Description
attempts	integer	
code	integer	Code corresponding to the status message.
message	string	Error message returned when a cluster firmware update job fails.
status	string	
worker_node	worker_node	

firmware_update_progress

Name	Type	Description
job	job_link	

Name	Type	Description
update_state	array[firmware_update_progress_state]	
update_type	string	Specifies the type of update.
zip_file_name	string	

firmware_disk

Name	Type	Description
average_duration_per_disk	integer	Average firmware update duration per disk (in seconds).
num_waiting_download	integer	The number of disks waiting to download the firmware update.
total_completion_estimate	integer	Estimated firmware update duration to completion (in minutes).
update_status		Status of the background disk firmware update.

firmware_dqp_record_count

Name	Type	Description
alias	integer	Alias record count
device	integer	Device record count
drive	integer	Drive record count
system	integer	System record count

firmware_dqp

Name	Type	Description
file_name	string	Firmware file name
record_count	firmware_dqp_record_count	
revision	string	Firmware revision
version	string	Firmware version

firmware_shelf

Name	Type	Description
in_progress_count	integer	
update_status		Status of the shelf firmware update.

firmware_sp_bmc

Name	Type	Description
autoupdte	boolean	
end_time	string	
fw_type	string	
image	string	
in_progress	boolean	
is_current	boolean	
last_update_state	string	
percent_done	integer	
running_version	string	
start_time	string	
state	string	

firmware

Name	Type	Description
cluster_fw_progress	array[firmware_update_progress]	
disk	firmware_disk	
dqp	firmware_dqp	
shelf	firmware_shelf	
sp_bmc	firmware_sp_bmc	

software_images

Name	Type	Description
package	string	Package file name.

software_node_reference

Name	Type	Description
firmware	firmware	
name	string	Name of the node.
software_images	array[software_images]	List of software image information.
version	string	ONTAP version of the node. • example: ONTAP_X • readOnly: 1 • Introduced in: 9.6

action

Name	Type	Description
message	string	Specifies the corrective action to take to resolve an error.

issue

Name	Type	Description
message	string	Details of the error or warning encountered by the update checks.

software_validation_reference

Name	Type	Description
action	action	
issue	issue	
status	string	Status of the update check.
update_check	string	Name of the update check.

action

Name	Type	Description
code	integer	Error code corresponding the status error

Name	Type	Description
message	string	Corrective action to be taken to resolve the status error.

issue

Name	Type	Description
code	integer	Error code corresponding to update status
message	string	Update status details

node

Name	Type	Description
name	string	Name of the node to be retrieved for status details.

software_status_details_reference

Name	Type	Description
action	action	
end_time	string	End time for each status phase.
issue	issue	
name	string	Name of the phase to be retrieved for status details.
node	node	
start_time	string	Start time for each status phase.
state	string	Status of the phase

node

Name	Type	Description
name	string	Name of the node to be retrieved for update details.

software_update_details_reference

Name	Type	Description
elapsed_duration	integer	Elapsed duration for each update phase
estimated_duration	integer	Estimated duration for each update phase
node	node	
phase	string	Phase details
state	string	State of the update phase

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

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

Update the cluster software version

PATCH `/cluster/software`

Introduced In: 9.6

Updates the cluster software version. Important note:

- Setting 'version' triggers the package installation.
- To validate the package for installation but not perform the installation, use the `validate_only` field on the request.

Required properties

- `version` - Software version to be installed on the cluster.

Recommended optional parameters

- `validate_only` - Required to validate a software package before an upgrade.
- `skip_warnings` - Used to skip validation warnings when starting a software upgrade.
- `action` - Used to pause, resume, or cancel an ongoing software upgrade.
- `stabilize_minutes` - Specifies a custom value between 1 to 60 minutes that allows each node a specified amount of time to stabilize after a reboot; the default is 8 minutes.
- `estimate_only` - Estimates the time duration; does not perform any update.
- `nodes_to_update` - Specifies a subset of the cluster's nodes for update.
- `show_validation_details` - If the value is set to true, then all validation details will be shown in the output.

Related ONTAP commands

- `cluster image validate`
- `cluster image update`
- `cluster image pause-update`
- `cluster image resume-update`
- `cluster image cancel-update`

Learn more

- DOC /cluster/software

Parameters

Name	Type	In	Required	Description
skip_warnings	boolean	query	False	Ignore warnings and proceed with the install.

Name	Type	In	Required	Description
action	string	query	False	Requests an upgrade to pause, resume, or cancel. Note that not all upgrades support these actions. An upgrade can only be resumed if it is in the paused state. When a request to cancel an upgrade is successful, the upgrade state changes to either `success` or `failure`. • enum: ["pause", "resume", "cancel"]
stabilize_minutes	integer	query	False	Sets a custom value between 1 to 60 minutes for the upgrade, allowing each node a specified amount of time to stabilize after a reboot. • Introduced in: 9.8
estimate_only	boolean	query	False	Generates an estimate of the time required for the overall update operation for the specified package. No update is performed when this option is used. The default is false. • Introduced in: 9.9

Name	Type	In	Required	Description
force_rolling	boolean	query	False	Forces a rolling upgrade on the cluster. This option is not applicable for a single-node cluster and for a two-node MetroCluster. The default is false. • Introduced in: 9.9
nodes_to_update	string	query	False	A comma separated list of node names to be updated. The nodes must be a part of a HA Pair. The default is all nodes. • Introduced in: 9.9
show_validation_details	boolean	query	False	If the value is set to true, then all validation details will be shown in the output. • Introduced in: 9.11
pause_after	string	query	False	The pause after specified tasks option. When ANDU is paused user interaction is required to resume the update. The default is none. • Introduced in: 9.9 • enum: ["none", "takeover_giveback", "all"]

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. • Default value: 1 • Max value: 120 • Min value: 0
validate_only	boolean	query	False	Validate the operation and its parameters, without actually performing the operation.

Request Body

Name	Type	Description
action	string	User triggered action to apply to the install operation
elapsed_duration	integer	Elapsed time during the upgrade or validation operation

Name	Type	Description
estimated_duration	integer	Overall estimated time for completion of the upgrade or validation operation.
metrocluster	metrocluster	
nodes	array[software_node_reference]	List of nodes, active versions, and firmware update progressions.
pending_version	string	Version being installed on the system. • example: ONTAP_X_1 • readOnly: 1 • Introduced in: 9.6
post_update_checks	array[software_validation_reference]	List of failed post-update checks' warnings, errors, and advice.
state	string	Operational state of the upgrade
status_details	array[software_status_details_reference]	Display status details.
update_details	array[software_update_details_reference]	Display update progress details.
validation_results	array[software_validation_reference]	List of validation warnings, errors, and advice.
version	string	Version of ONTAP installed and currently active on the system. During PATCH, using the 'validate_only' parameter on the request executes pre-checks, but does not perform the full installation. • example: ONTAP_X • Introduced in: 9.6

Example request


```
{
  "action": "pause",
  "elapsed_duration": 2140,
  "estimated_duration": 5220,
  "metrocluster": {
    "clusters": [
      {
        "elapsed_duration": 2140,
        "estimated_duration": 3480,
        "name": "cluster_A",
        "state": "in_progress"
      }
    ],
    "progress_details": {
      "message": "Switchover in progress"
    },
    "progress_summary": {
      "message": "MetroCluster updated successfully."
    }
  },
  "nodes": [
    {
      "name": "node1",
      "software_images": [
        {
          "package": "image.tgz"
        }
      ],
      "version": "ONTAP_X"
    }
  ],
  "pending_version": "ONTAP_X_1",
  "post_update_checks": [
    {
      "action": {
        "message": "Use NFS hard mounts, if possible."
      },
      "issue": {
        "message": "Cluster HA is not configured in the cluster."
      },
      "status": "warning",
      "update_check": "nfs_mounts"
    }
  ],
```

```
  "state": "completed",
  "status_details": [
    {
      "action": {
        "message": "string"
      },
      "end_time": "2019-02-02T19:00:00Z",
      "issue": {
        "code": 10551399,
        "message": "Image update complete"
      },
      "name": "initialize",
      "node": {
        "name": "node1"
      },
      "start_time": "2019-02-02T19:00:00Z",
      "state": "failed"
    }
  ],
  "update_details": [
    {
      "elapsed_duration": 2100,
      "estimated_duration": 4620,
      "node": {
        "name": "node1"
      },
      "phase": "Post-update checks",
      "state": "failed"
    }
  ],
  "validation_results": [
    {
      "action": {
        "message": "Use NFS hard mounts, if possible."
      },
      "issue": {
        "message": "Cluster HA is not configured in the cluster."
      },
      "status": "warning",
      "update_check": "nfs_mounts"
    }
  ],
  "version": "ONTAP_X"
}
```

Response

```
Status: 202, Accepted
```

Name	Type	Description
job	job_link	

Example response


```
{
  "job": {
    "uuid": "string"
  }
}
```


Error

```
Status: Default, Error
```

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

software_mcc_reference

Name	Type	Description
elapsed_duration	integer	Elapsed duration of update time (in seconds) of MetroCluster.
estimated_duration	integer	Estimated duration of update time (in seconds) of MetroCluster.
name	string	Name of the site in MetroCluster.
state		Upgrade state of MetroCluster.

progress_details

Name	Type	Description
message	string	MetroCluster update progress details.

progress_summary

Name	Type	Description
message	string	MetroCluster update progress summary.

metrocluster

Name	Type	Description
clusters	array[software_mcc_reference]	List of MetroCluster sites, statuses, and active ONTAP versions. • readOnly: 1 • Introduced in: 9.6
progress_details	progress_details	

Name	Type	Description
progress_summary	progress_summary	

job_link

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

worker_node

Name	Type	Description
name	string	
uuid	string	

firmware_update_progress_state

Name	Type	Description
attempts	integer	
code	integer	Code corresponding to the status message.
message	string	Error message returned when a cluster firmware update job fails.
status	string	
worker_node	worker_node	

firmware_update_progress

Name	Type	Description
job	job_link	
update_state	array[firmware_update_progress_state]	
update_type	string	Specifies the type of update.
zip_file_name	string	

firmware_disk

Name	Type	Description
average_duration_per_disk	integer	Average firmware update duration per disk (in seconds).
num_waiting_download	integer	The number of disks waiting to download the firmware update.
total_completion_estimate	integer	Estimated firmware update duration to completion (in minutes).
update_status		Status of the background disk firmware update.

firmware_dqp_record_count

Name	Type	Description
alias	integer	Alias record count
device	integer	Device record count
drive	integer	Drive record count
system	integer	System record count

firmware_dqp

Name	Type	Description
file_name	string	Firmware file name
revision	string	Firmware revision
version	string	Firmware version

firmware_shelf

Name	Type	Description
in_progress_count	integer	
update_status		Status of the shelf firmware update.

firmware_sp_bmc

Name	Type	Description
autoupdte	boolean	
end_time	string	
fw_type	string	
image	string	
in_progress	boolean	
is_current	boolean	
last_update_state	string	
percent_done	integer	
running_version	string	
start_time	string	
state	string	

firmware

Name	Type	Description
cluster_fw_progress	array[firmware_update_progress]	

software_images

Name	Type	Description
package	string	Package file name.

software_node_reference

Name	Type	Description
name	string	Name of the node.
software_images	array[software_images]	List of software image information.
version	string	ONTAP version of the node. • example: ONTAP_X • readOnly: 1 • Introduced in: 9.6

action

Name	Type	Description
message	string	Specifies the corrective action to take to resolve an error.

issue

Name	Type	Description
message	string	Details of the error or warning encountered by the update checks.

software_validation_reference

Name	Type	Description
action	action	
issue	issue	
status	string	Status of the update check.
update_check	string	Name of the update check.

action

Name	Type	Description
code	integer	Error code corresponding the status error
message	string	Corrective action to be taken to resolve the status error.

issue

Name	Type	Description
code	integer	Error code corresponding to update status
message	string	Update status details

node

Name	Type	Description
name	string	Name of the node to be retrieved for status details.

software_status_details_reference

Name	Type	Description
action	action	
end_time	string	End time for each status phase.
issue	issue	
name	string	Name of the phase to be retrieved for status details.
node	node	
start_time	string	Start time for each status phase.
state	string	Status of the phase

node

Name	Type	Description
name	string	Name of the node to be retrieved for update details.

software_update_details_reference

Name	Type	Description
elapsed_duration	integer	Elapsed duration for each update phase
estimated_duration	integer	Estimated duration for each update phase
node	node	
phase	string	Phase details
state	string	State of the update phase

software_reference

Name	Type	Description
action	string	User triggered action to apply to the install operation
elapsed_duration	integer	Elapsed time during the upgrade or validation operation
estimated_duration	integer	Overall estimated time for completion of the upgrade or validation operation.
metrocluster	metrocluster	
nodes	array[software_node_reference]	List of nodes, active versions, and firmware update progressions.
pending_version	string	Version being installed on the system. • example: ONTAP_X_1 • readOnly: 1 • Introduced in: 9.6
post_update_checks	array[software_validation_reference]	List of failed post-update checks' warnings, errors, and advice.
state	string	Operational state of the upgrade
status_details	array[software_status_details_reference]	Display status details.
update_details	array[software_update_details_reference]	Display update progress details.
validation_results	array[software_validation_reference]	List of validation warnings, errors, and advice.
version	string	Version of ONTAP installed and currently active on the system. During PATCH, using the 'validate_only' parameter on the request executes pre-checks, but does not perform the full installation. • example: ONTAP_X • Introduced in: 9.6

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

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

Retrieve software or firmware download status

GET `/cluster/software/download`

Introduced In: 9.7

Retrieves the software or firmware download status.

Related ONTAP commands

- `cluster image package check-download-progress`

Learn more

- DOC /cluster/software

Parameters

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

Name	Type	In	Required	Description
return_timeout	integer	query	False	The number of seconds to allow the call to execute before returning. When iterating over a collection, the default is 15 seconds. ONTAP returns earlier if either max records or the end of the collection is reached. • Default value: 1 • Max value: 120 • Min value: 0

Response

```
Status: 200, Ok
```

Name	Type	Description
code	integer	Code corresponds to download message
message	string	Download progress details
state	string	Download status of the package

Example response


```
{
  "code": 10551496,
  "message": "Package download in progress",
  "state": "success"
}
```


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

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.

Download a software or firmware package

POST `/cluster/software/download`

Introduced In: 9.6

Downloads a software or firmware package from the server.

Required properties

- `url` - URL location of the software package

Recommended optional parameters

- `username` - Username of HTTPS/FTP server
- `password` - Password of HTTPS/FTP server

Related ONTAP commands

- `cluster image package get`

Learn more

- DOC /cluster/software

Parameters

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. • Default value: 1 • Max value: 120 • Min value: 0

Request Body

Name	Type	Description
password	string	Password for download
url	string	HTTP or FTP URL of the package through a server
username	string	Username for download

Example request


```
{
  "password": "admin_password",
  "url": "http://server/package",
  "username": "admin"
}
```


Response

```
Status: 202, Accepted
```

Name	Type	Description
job	job_link	

Example response


```
{
  "job": {
    "uuid": "string"
  }
}
```


Error

```
Status: Default, Error
```

Definitions

See Definitions

software_package_download

Name	Type	Description
password	string	Password for download
url	string	HTTP or FTP URL of the package through a server
username	string	Username for download

href

Name	Type	Description
href	string	

_links

job_link

Name	Type	Description
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

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

Retrieve software installation request history details

GET `/cluster/software/history`

Introduced In: 9.6

Retrieves the history details for software installation requests.

Related ONTAP commands

- `cluster image show-update-history`

Learn more

- DOC /cluster/software

Parameters

Name	Type	In	Required	Description
end_time	string	query	False	Filter by end_time • Introduced in: 9.7
to_version	string	query	False	Filter by to_version • Introduced in: 9.7
from_version	string	query	False	Filter by from_version • Introduced in: 9.7
start_time	string	query	False	Filter by start_time • Introduced in: 9.7

Name	Type	In	Required	Description
node.uuid	string	query	False	Filter by node.uuid • Introduced in: 9.7
node.name	string	query	False	Filter by node.name • Introduced in: 9.7
state	string	query	False	Filter by state • Introduced in: 9.7
fields	array[string]	query	False	Specify the fields to return.
max_records	integer	query	False	Limit the number of records returned.
return_records	boolean	query	False	The default is true for GET calls. When set to false, only the number of records is returned. • Default value: 1
return_timeout	integer	query	False	The number of seconds to allow the call to execute before returning. When iterating over a collection, the default is 15 seconds. ONTAP returns earlier if either max records or the end of the collection is reached. • Default value: 1 • Max value: 120 • Min value: 0

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

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
num_records	integer	
records	array[software_history]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "end_time": "2019-02-02T20:00:00Z",
      "from_version": "ONTAP_X1",
      "node": {
        "_links": {
          "self": {
            "href": "/api/resourcelink"
          }
        },
        "name": "node1",
        "uuid": "1cd8a442-86d1-11e0-ae1c-123478563412"
      },
      "start_time": "2019-02-02T19:00:00Z",
      "state": "successful",
      "to_version": "ONTAP_X2"
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	error	

Example error


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


Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

Name	Type	Description
next	href	
self	href	

_links

Name	Type	Description
self	href	

node

Name	Type	Description
_links	_links	
name	string	
uuid	string	

software_history

Name	Type	Description
end_time	string	Completion time of this installation request.
from_version	string	Previous version of node • example: ONTAP_X1 • readOnly: 1 • Introduced in: 9.7
node	node	
start_time	string	Start time of this installation request.
state	string	Status of this installation request.

Name	Type	Description
to_version	string	Updated version of node • example: ONTAP_X2 • readOnly: 1 • Introduced in: 9.7

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

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

Retrieve cluster software packages

GET `/cluster/software/packages`

Introduced In: 9.6

Retrieves the software packages for a cluster.

Related ONTAP commands

- `cluster image package show-repository`

Learn more

- DOC /cluster/software

Parameters

Name	Type	In	Required	Description
create_time	string	query	False	Filter by create_time • Introduced in: 9.7
version	string	query	False	Filter by version • Introduced in: 9.7
fields	array[string]	query	False	Specify the fields to return.
max_records	integer	query	False	Limit the number of records returned.
return_records	boolean	query	False	The default is true for GET calls. When set to false, only the number of records is returned. • Default value: 1
return_timeout	integer	query	False	The number of seconds to allow the call to execute before returning. When iterating over a collection, the default is 15 seconds. ONTAP returns earlier if either max records or the end of the collection is reached. • Default value: 1 • Max value: 120 • Min value: 0
order_by	array[string]	query	False	Order results by specified fields and optional [asc

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
num_records	integer	
records	array[software_package]	

Example response


```
{
  "_links": {
    "next": {
      "href": "/api/resourcelink"
    },
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "records": [
    {
      "_links": {
        "self": {
          "href": "/api/resourcelink"
        }
      },
      "create_time": "2019-02-04T19:00:00Z",
      "version": "ONTAP_X"
    }
  ]
}
```


Error

```
Status: Default, Error
```

Name	Type	Description
error	error	

Example error


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


Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

Name	Type	Description
next	href	
self	href	

_links

Name	Type	Description
self	href	

software_package

Name	Type	Description
_links	_links	
create_time	string	Indicates when this package was loaded
version	string	Version of this package • example: ONTAP_X • readOnly: 1 • Introduced in: 9.6

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

Name	Type	Description
arguments	array[error_arguments]	Message arguments

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

Delete a software package from the cluster

DELETE `/cluster/software/packages/{version}`

Introduced In: 9.6

Deletes a software package from the cluster. The delete operation fails if the package is currently installed.

Related ONTAP commands

- `cluster image package delete`

Learn more

- DOC /cluster/software

Parameters

Name	Type	In	Required	Description
version	string	path	True	

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. • Default value: 1 • Max value: 120 • Min value: 0

Response

```
Status: 202, Accepted
```

Error

```
Status: Default
```

ONTAP error response codes

Error codes	Description
10551315	Package store is empty

Error codes	Description
10551322	Error in retrieving package cleanup status
10551323	Error in cleaning up package information on a node
10551324	Error in cleaning up package information on multiple nodes
10551325	Package does not exist on the system
10551326	Error in deleting older package cleanup tasks. Clean up images from the store and retry
10551346	Package delete failed since a validation is in progress
10551347	Package delete failed since an update is in progress
10551367	A package synchronization is in progress
10551388	Package delete operation timed out

Name	Type	Description
error	error	

Example error


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


Definitions

See Definitions

error_arguments

Name	Type	Description
code	string	Argument code
message	string	Message argument

error

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

Retrieve software package information

GET `/cluster/software/packages/{version}`

Introduced In: 9.6

Retrieves the software package information.

Related ONTAP commands

- `cluster image package show-repository`

Learn more

- DOC /cluster/software

Parameters

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

Response

```
Status: 200, Ok
```

Name	Type	Description
_links	_links	
create_time	string	Indicates when this package was loaded
version	string	Version of this package • example: ONTAP_X • readOnly: 1 • Introduced in: 9.6

Example response


```
{
  "_links": {
    "self": {
      "href": "/api/resourcelink"
    }
  },
  "create_time": "2019-02-04T19:00:00Z",
  "version": "ONTAP_X"
}
```


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	

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.

Upload a software or firmware package located on the local file system

POST `/cluster/software/upload`

Introduced In: 9.8

Uploads a software or firmware package located on the local filesystem.

Related ONTAP commands

- `cluster image package get`

Learn more

- DOC /cluster/software

Parameters

Name	Type	In	Required	Description
file	file	formData	False	Info specification
return_records	boolean	query	False	The default is false. If set to true, the records are returned. • Default value:
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. • Default value: 1 • Max value: 120 • Min value: 0

Response

```
Status: 202, Accepted
```

Name	Type	Description
job	job_link	

Example response


```
{
  "job": {
    "uuid": "string"
  }
}
```


Error

```
Status: Default, Error
```

Definitions

See Definitions

href

Name	Type	Description
href	string	

_links

job_link

Name	Type	Description
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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