Get started

Cloud Manager Automation

NetApp
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Table of Contents

Getting started

You can quickly get started using the Cloud Manager REST API by first preparing as described in Before you begin. You'll also need a client identifier to test the curl sample in Hello world. After that you can begin preparing to use the workflows and plan a deployment.

Hello world

You can issue a curl command to get started using the Cloud Volumes ONTAP REST API and confirm its availability.

The example provided below is very simple. The workflow samples later in this guide use a more robust format. As a start, see Understanding the workflow processes.

Before you begin

You must do the following:

- Determine the identifier to use for the `x-agent-id` request header as well as the related client ID. See Get the client and account identifiers.
- Acquire an access token for the `Authorization` request header. See Create user token.

Curl example

The following curl command retrieves information about the Cloud Manager server.

```
curl --location --request GET
'https://cloudmanager.cloud.netapp.com/occm/api/occm/system/about'
--header 'Content-Type: application/json' --header 'x-agent-id:
<AGENT_ID>' --header 'Authorization: Bearer <ACCESS_TOKEN>'
```

Output example

Information about the system is provided in the following format.

```
{
  "version": "string",
  "build": "string",
  "buildTimestamp": "integer",
  "systemId": "string",
  "environment": "string",
  "siteIdentifier": {
    "company": "string",
    "host": "string",
    "site": "string"
  },
  "serverTimeZone": {
    "timeZoneName": "string",
    "formattedTimeZone": "string"
  },
  "beta": "boolean",
  "releaseNumber": "integer",
  "simplicatorUrl": "string",
  "migrationPerformed": "boolean",
  "demoMode": "boolean",
  "usingDockerInfra": "boolean",
  "privateIp": "string"
}
```


Understanding the workflow processes

You should be familiar with the high-level organization and format of the Cloud Volumes ONTAP workflow processes before using them with a live cloud deployment.

Introduction

A ***workflow*** is a sequence of one or more steps needed to accomplish a specific administrative task or goal. With the Cloud Volumes ONTAP workflows, each step can be one of the following:

- REST API call
- Invocation of another workflow
- Miscellaneous task such as deciding on the size of a new volume

The workflows provided include the minimum steps and parameters needed to accomplish each task. You can use these workflows as a starting point and customize them for your environment as needed.

All the workflow examples are designed to be used with NetApp Cloud Volumes ONTAP.

High level organization of the workflows

At a high level, the workflows are organized based on three primary attributes. The organization is reflected in the navigation sidebar.

1. Cloud provider

Most of the workflows can be performed with one cloud provider. The supported cloud platforms include:

- Amazon Web Services
- Microsoft Azure
- Google Cloud Platform

2. Functional category

The workflows for each cloud provider (AWS, Azure, GCP) are placed in a specific functional category. The major categories as reflected in the navigation sidebar are presented below.

In addition to the workflows used with the specific cloud providers, there is also a set of common workflows that can be used with any cloud provider. See Common workflows for all cloud providers for more information about these workflows and how they are organized.

Working environments

A working environment is the context within which a Cloud Volumes ONTAP instance is deployed and run. These workflows allow you to create working environments and perform related administrative tasks. You can perform specific workflows to create a working environment based on your preferred licensing model (PAYGO or BYOL), remove a working environment, and retrieve the details of a working environment. In addition, you can configure the CIFS server when creating a volume that uses the CIFS protocol as part of creating a working environment.

Aggregates

An aggregate is the low-level structure for Cloud Volumes ONTAP storage. These workflows allow you to create aggregates and perform related administrative tasks.

Volumes

You can expose the storage volumes for use by your applications. You can perform these workflows to create a volume (using NFS, CIFS, or iSCSI protocol) as well as delete, retrieve, and modify an existing volume based on your storage requirements.

Metadata

The metadata workflows allow you to view and administer the basic configuration of your cloud environment.

Miscellaneous

A workflow that is not assigned to an existing functional category is considered *Miscellaneous*. For example, there is a workflow to create a cloud provider account. The cloud provider account securely stores and manages your cloud provider credentials and establishes an identity for users (such as InstanceProfile with AWS and ManagedIdentity with Azure). This account provides fine-grained authorization of the services and resources based on multiple critical conditions.

3. Single node and High availability workflows

Many of the workflows vary based on the type of the deployment.

Single node

The cluster consists of a single Cloud Volumes ONTAP instance or ONTAP node.

HA pair

The cluster consists of two linked Cloud Volumes ONTAP instances which together provide the ONTAP high availability (HA) feature.

If both versions of a workflow exist for an administrative task, they are included on the same page.

Base URLs and REST endpoint paths

The REST API calls in the workflows use different URLs and URL formats depending on the desired service and resource.

Every API call used in the workflows includes the resource path to the REST endpoint. The path is relative and appended to the appropriate **base** URL. Unless otherwise indicated for a specific API call, the base URL addresses the NetApp Cloud Manager service. You should always carefully review the curl examples provided in the workflows before using them.

Cloud Manager endpoints

The majority of the workflow REST API calls are made to the **NetApp Cloud Manager** service. The base URL of the SaaS interface is:

```
https://cloudmanager.netapp.com/
```

Auth0 authentication service

Some of the REST API calls used in the identity workflows are made to the **Auth0** token authentication service. The base URL is:

```
https://netapp-cloud-account.auth0.com/
```

Common parameters and variables

There are several parameters or variables common among the workflows.

Request headers

Nearly all the REST API calls used in the workflows require the following two request headers.

Rather than cite these headers as a prerequisite in every REST API call, they are considered a universal requirement. If a workflow does not use these headers or has different prerequisites, the section **Before you begin** is included at the top of the workflow and describes the prerequisites.

Authorization request header

To get a bearer token for this header, perform the appropriate workflow at Create a user token and extract the `access_token` value.

x-agent-id request header

This header contains the agent ID which is based on the client ID. See Get client and account identifiers for information about creating this value.

Presentation of common tokens and identifiers

Most of the variable tokens, identifiers, and other variables used in the sample REST API calls consist of long strings of letters, numbers, and special characters. They are considered *opaque* with no easily discernible content or meaning. Therefore, rather than including the actual original strings, smaller reserved keywords are used instead. This has several benefits:

- The curl and JSON samples are simpler and easier to understand.
- Because all keywords use the same format (including capital letters), you can quickly identify the content to insert or extract.
- No value is lost because the original values cannot be copied and used with an actual deployment.

A list of the keywords used in the workflow curl examples is presented in the table below.

Keyword	Description
<ACCESS_TOKEN>	An access token is a temporary string which establishes identity and access based on the OAuth2 standard.
<ID_TOKEN>	The ID token contains additional identity information for the user based on OpenID Connect (OIDC).
<CLIENT_ID>	This value uniquely identifies the user within a specific authorization domain.
<AGENT_ID>	The agent identifier is based on the client ID and is used to identify the user agent.
<ACCOUNT_ID>	This value identifies your NetApp account.
<NSS_KEY_ID>	This value identifies an entitlement key and is used by NetApp support.
<WORKING_ENV_ID>	This value identifies a working environment for the ONTAP runtime and so is synonymous with a Cloud Volumes ONTAP instance.
<SVM_NAME>	The name used for an ONTAP storage virtual machine.
<VOLUME_NAME>	The name used for an ONTAP storage volume.
<AGGR_NAME>	The aggregate name for a disk operation.
<REQUEST_ID>	This value is returned to the caller in the HTTP response and uniquely identifies the request.
<PROVIDER>	Abbreviation for the cloud provider.
<CLOUD_ACC_ID>	Account ID for the cloud provider.
<REFRESH_TOKEN>	NetApp refresh token used for federated authentication.

JSON input for curl command

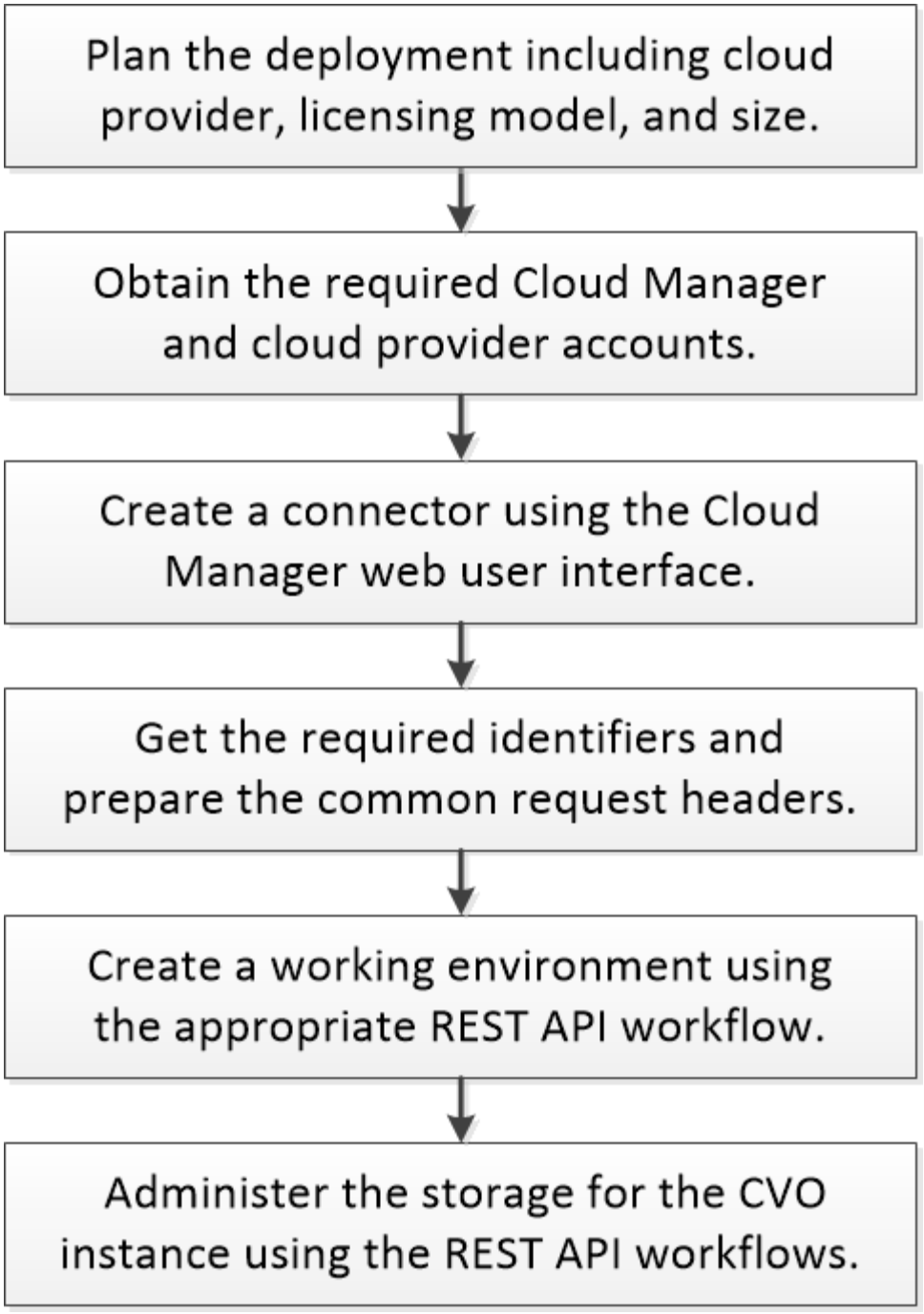
In many cases, a workflow step accepts JSON input in the request body of the REST API call. This input is indicated in the curl command through the `-d` option, with the corresponding sample included in the **JSON input example** section.

Working environment status requirements

Many of the workflows require the working environment to have a specific status (such as `ON` or `DEGRADED`) before the REST API call can be performed. Review the API reference content for details about the requirements for each API call.

Typical Cloud Volumes ONTAP deployment

A summary of the major steps needed to deploy and administer a Cloud Volumes ONTAP instance using the Cloud Manager REST API is presented below.


Plan the deployment including cloud provider, licensing model, and size.
Obtain the required Cloud Manager and cloud provider accounts.
Create a connector using the Cloud Manager web user interface.
Get the required identifiers and prepare the common request headers.
Create a working environment using the appropriate REST API workflow.
Administer the storage for the CVO instance using the REST API workflows.