



# **Install Astra Control Center**

## **Astra Control Center**

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# Install Astra Control Center using the standard process

To install Astra Control Center, download the installation bundle from the NetApp Support Site and perform the following steps to install Astra Control Center Operator and Astra Control Center in your environment. You can use this procedure to install Astra Control Center in internet-connected or air-gapped environments.

For Red Hat OpenShift environments, you can use an [alternative procedure](#) to install Astra Control Center using OpenShift OperatorHub.

## What you'll need

- [Before you begin installation, prepare your environment for Astra Control Center deployment.](#)
- If you have configured or want to configure pod security policies in your environment, familiarize yourself with pod security policies and how they affect Astra Control Center installation. See [Understand pod security policy restrictions](#).
- Ensure all cluster operators are in a healthy state and available.

```
kubectl get clusteroperators
```

- Ensure all API services are in a healthy state and available:

```
kubectl get apiservices
```

- Ensure the Astra FQDN you plan to use is routable to this cluster. This means that you either have a DNS entry in your internal DNS server or you are using a core URL route that is already registered.
- If a cert-manager already exists in the cluster, you need to perform some [prerequisite steps](#) so that Astra Control Center does not install its own cert-manager.

## About this task

The Astra Control Center installation process does the following:

- Installs the Astra components into the `netapp-acc` (or custom-named) namespace.
- Creates a default account.
- Establishes a default administrative user email address and default one-time password. This user is assigned the Owner role in the system that is needed for first time login to the UI.
- Helps you determine that all Astra Control Center pods are running.
- Installs the Astra UI.



(Applies to the Astra Data Store Early Access Program (EAP) release only) If you intend to manage Astra Data Store using Astra Control Center and enable VMware workflows, deploy Astra Control Center only on the `pcloud` namespace and not on the `netapp-acc` namespace or a custom namespace described in the steps of this procedure.



Do not execute the following command during the entirety of the installation process to avoid deleting all Astra Control Center pods: `kubectl delete -f astra_control_center_operator_deploy.yaml`



If you are using Red Hat's Podman instead of Docker Engine, Podman commands can be used in place of Docker commands.

## Steps

To install Astra Control Center, do the following steps:

- [Download and unpack the Astra Control Center bundle](#)
- [Install the NetApp Astra kubectl plugin](#)
- [Add the images to your local registry](#)
- [Set up namespace and secret for registries with auth requirements](#)
- [Install the Astra Control Center operator](#)
- [Configure Astra Control Center](#)
- [Complete Astra Control Center and operator installation](#)
- [Verify system status](#)
- [Set up ingress for load balancing](#)
- [Log in to the Astra Control Center UI](#)

## Download and unpack the Astra Control Center bundle

1. Download the Astra Control Center bundle (`astra-control-center-[version].tar.gz`) from the [NetApp Support Site](#).
2. Download the zip of Astra Control Center certificates and keys from the [NetApp Support Site](#).
3. (Optional) Use the following command to verify the signature of the bundle:

```
openssl dgst -sha256 -verify AstraControlCenter-public.pub -signature  
astra-control-center-[version].tar.gz.sig astra-control-center-  
[version].tar.gz
```

4. Extract the images:

```
tar -vxzf astra-control-center-[version].tar.gz
```

## Install the NetApp Astra kubectl plugin

The NetApp Astra `kubectl` command line plugin saves time when performing common tasks associated with deploying and upgrading Astra Control Center.

### What you'll need

NetApp provides binaries for the plugin for different CPU architectures and operating systems. You need to know which CPU and operating system you have before you perform this task. On Linux and Mac operating systems, you can use the `uname -a` command to gather this information.

### Steps

1. List the available NetApp Astra `kubectl` plugin binaries, and note the name of the file you need for your operating system and CPU architecture:

```
ls kubectl-astra/
```

2. Copy the file to the same location as the standard `kubectl` utility. In this example, the `kubectl` utility is located in the `/usr/local/bin` directory. Replace `<binary-name>` with the name of the file you need:

```
cp kubectl-astra/<binary-name> /usr/local/bin/kubectl-astra
```

## Add the images to your local registry

1. Complete the appropriate step sequence for your container engine:

## Docker

1. Change to the Astra directory:

```
cd acc
```

2. Push the package images in the Astra Control Center image directory to your local registry. Make the following substitutions before running the command:

- Replace BUNDLE\_FILE with the name of the Astra Control bundle file (for example, acc.manifest.yaml).
- Replace MY\_REGISTRY with the URL of the Docker repository.
- Replace MY\_REGISTRY\_USER with the user name.
- Replace MY\_REGISTRY\_TOKEN with an authorized token for the registry.

```
kubectl astra packages push-images -m BUNDLE_FILE -r MY_REGISTRY  
-u MY_REGISTRY_USER -p MY_REGISTRY_TOKEN
```

## Podman

1. Log in to your registry:

```
podman login [your_registry_path]
```

2. Run the following script, making the <YOUR\_REGISTRY> substitution as noted in the comments:

```
# You need to be at the root of the tarball.
# You should see these files to confirm correct location:
#   acc.manifest.yaml
#   acc/

# Replace <YOUR_REGISTRY> with your own registry (e.g
registry.customer.com or registry.customer.com/testing, etc..)
export REGISTRY=<YOUR_REGISTRY>
export PACKAGENAME=acc
export PACKAGEVERSION=22.08.1-26
export DIRECTORYNAME=acc
for astraImageFile in $(ls ${DIRECTORYNAME}/images/*.tar) ; do
    # Load to local cache
    astraImage=$(podman load --input ${astraImageFile} | sed 's/Loaded
image(s): //'')

    # Remove path and keep imageName.
    astraImageNoPath=$(echo ${astraImage} | sed 's:.*/::')

    # Tag with local image repo.
    podman tag ${astraImage} ${REGISTRY}/netapp/astra/${PACKAGENAME}
/${PACKAGEVERSION}/${astraImageNoPath}

    # Push to the local repo.
    podman push ${REGISTRY}/netapp/astra/${PACKAGENAME}/
${PACKAGEVERSION}/${astraImageNoPath}
done
```

## Set up namespace and secret for registries with auth requirements

1. Export the KUBECONFIG for the Astra Control Center host cluster:

```
export KUBECONFIG=[file path]
```

2. If you use a registry that requires authentication, you need to do the following:

- a. Create the netapp-acc-operator namespace:

```
kubectl create ns netapp-acc-operator
```

Response:

```
namespace/netapp-acc-operator created
```

- b. Create a secret for the netapp-acc-operator namespace. Add Docker information and run the following command:



The placeholder `your_registry_path` should match the location of the images that you uploaded earlier (for example, `[Registry_URL]/netapp/astra/astracc/22.08.1-26`).

```
kubectl create secret docker-registry astra-registry-cred -n netapp-acc-operator --docker-server=[your_registry_path] --docker-username=[username] --docker-password=[token]
```

Sample response:

```
secret/astra-registry-cred created
```



If you delete the namespace after the secret is generated, you need to regenerate the secret for the namespace after the namespace is recreated.

- c. Create the netapp-acc (or custom named) namespace.

```
kubectl create ns [netapp-acc or custom namespace]
```

Sample response:

```
namespace/netapp-acc created
```

- d. Create a secret for the netapp-acc (or custom named) namespace. Add Docker information and run the following command:

```
kubectl create secret docker-registry astra-registry-cred -n [netapp-acc or custom namespace] --docker-server=[your_registry_path] --docker-username=[username] --docker-password=[token]
```

Response

```
secret/astra-registry-cred created
```

- e. (Optional) If you want the cluster to be automatically managed by Astra Control Center after



installation, make sure that you provide the kubeconfig as a secret within the Astra Control Center namespace you intend to deploy into using this command:

```
kubectl create secret generic [acc-kubeconfig-cred or custom secret name] --from-file=<path-to-your-kubeconfig> -n [netapp-acc or custom namespace]
```

## Install the Astra Control Center operator

1. Change the directory:

```
cd manifests
```

2. Edit the Astra Control Center operator deployment YAML (astra\_control\_center\_operator\_deploy.yaml) to refer to your local registry and secret.

```
vim astra_control_center_operator_deploy.yaml
```



An annotated sample YAML follows these steps.

- a. If you use a registry that requires authentication, replace the default line of `imagePullSecrets: []` with the following:

```
imagePullSecrets:
- name: <astra-registry-cred>
```

- b. Change `[your_registry_path]` for the `kube-rbac-proxy` image to the registry path where you pushed the images in a [previous step](#).
- c. Change `[your_registry_path]` for the `acc-operator-controller-manager` image to the registry path where you pushed the images in a [previous step](#).
- d. (For installations using Astra Data Store preview) See this known issue regarding [storage class provisioners and additional changes you will need to make to the YAML](#).

```

apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    control-plane: controller-manager
    name: acc-operator-controller-manager
    namespace: netapp-acc-operator
spec:
  replicas: 1
  selector:
    matchLabels:
      control-plane: controller-manager
  template:
    metadata:
      labels:
        control-plane: controller-manager
    spec:
      containers:
        - args:
            - --secure-listen-address=0.0.0.0:8443
            - --upstream=http://127.0.0.1:8080/
            - --logtostderr=true
            - --v=10
            image: [your_registry_path]/kube-rbac-proxy:v4.8.0
          name: kube-rbac-proxy
          ports:
            - containerPort: 8443
              name: https
        - args:
            - --health-probe-bind-address=:8081
            - --metrics-bind-address=127.0.0.1:8080
            - --leader-elect
          command:
            - /manager
          env:
            - name: ACCOP_LOG_LEVEL
              value: "2"
            image: [your_registry_path]/acc-operator:[version x.y.z]
          imagePullPolicy: IfNotPresent
      imagePullSecrets: []

```

### 3. Install the Astra Control Center operator:

```
kubectl apply -f astra_control_center_operator_deploy.yaml
```

Sample response:

```
namespace/netapp-acc-operator created
customresourcedefinition.apiextensions.k8s.io/astracontrolcenters.astra.
netapp.io created
role.rbac.authorization.k8s.io/acc-operator-leader-election-role created
clusterrole.rbac.authorization.k8s.io/acc-operator-manager-role created
clusterrole.rbac.authorization.k8s.io/acc-operator-metrics-reader
created
clusterrole.rbac.authorization.k8s.io/acc-operator-proxy-role created
rolebinding.rbac.authorization.k8s.io/acc-operator-leader-election-
rolebinding created
clusterrolebinding.rbac.authorization.k8s.io/acc-operator-manager-
rolebinding created
clusterrolebinding.rbac.authorization.k8s.io/acc-operator-proxy-
rolebinding created
configmap/acc-operator-manager-config created
service/acc-operator-controller-manager-metrics-service created
deployment.apps/acc-operator-controller-manager created
```

#### 4. Verify pods are running:

```
kubectl get pods -n netapp-acc-operator
```

## Configure Astra Control Center

1. Edit the Astra Control Center custom resource (CR) file (`astra_control_center_min.yaml`) to make account, autoSupport, registry, and other necessary configurations:



`astra_control_center_min.yaml` is the default CR and is suitable for most installations. Familiarize yourself with all [CR options and their potential values](#) to ensure you deploy Astra Control Center correctly for your environment. If additional customizations are required for your environment, you can use `astra_control_center.yaml` as an alternative CR.

```
vim astra_control_center_min.yaml
```



If you are using a registry that does not require authorization, you must delete the `secret` line within `imageRegistry` or the installation will fail.

- a. Change `[your_registry_path]` to the registry path where you pushed the images in the previous step.
- b. Change the `accountName` string to the name you want to associate with the account.

- c. Change the `astraAddress` string to the FQDN you want to use in your browser to access Astra. Do not use `http://` or `https://` in the address. Copy this FQDN for use in a [later step](#).
- d. Change the `email` string to the default initial administrator address. Copy this email address for use in a [later step](#).
- e. Change `enrolled for AutoSupport` to `false` for sites without internet connectivity or retain `true` for connected sites.
- f. If you use an external cert-manager, add the following lines to `spec`:

```
spec:
  crds:
    externalCertManager: true
```

- g. (Optional) Add a first name `firstName` and last name `lastName` of the user associated with the account. You can perform this step now or later within the UI.
- h. (Optional) Change the `storageClass` value to another Trident `storageClass` resource if required by your installation.
- i. (Optional) If you want the cluster to be automatically managed by Astra Control Center after installation and you have already [created the secret containing the kubeconfig for this cluster](#), provide the name of the secret by adding a new field to this YAML file called `astraKubeConfigSecret`: `"acc-kubeconfig-cred` or `custom secret name"`
- j. Complete one of the following steps:

- **Other ingress controller (`ingressType:Generic`):** This is the default action with Astra Control Center. After Astra Control Center is deployed, you will need to configure the ingress controller to expose Astra Control Center with a URL.

The default Astra Control Center installation sets up its gateway (`service/traefik`) to be of the type `ClusterIP`. This default installation requires you to additionally set up a Kubernetes IngressController/Ingress to route traffic to it. If you want to use an ingress, see [Set up ingress for load balancing](#).

- **Service load balancer (`ingressType:AccTraefik`):** If you don't want to install an IngressController or create an Ingress resource, set `ingressType` to `AccTraefik`.

This deploys the Astra Control Center `traefik` gateway as a Kubernetes LoadBalancer type service.

Astra Control Center uses a service of the type "LoadBalancer" (`svc/traefik` in the Astra Control Center namespace), and requires that it be assigned an accessible external IP address. If load balancers are permitted in your environment and you don't already have one configured, you can use MetalLB or another external service load balancer to assign an external IP address to the service. In the internal DNS server configuration, you should point the chosen DNS name for Astra Control Center to the load-balanced IP address.



For details about the service type of "LoadBalancer" and ingress, see [Requirements](#).

```
apiVersion: astra.netapp.io/v1
kind: AstraControlCenter
metadata:
  name: astra
spec:
  accountName: "Example"
  astraVersion: "ASTRA_VERSION"
  astraAddress: "astra.example.com"
  astraKubeConfigSecret: "acc-kubeconfig-cred or custom secret name"
  ingressType: "Generic"
  autoSupport:
    enrolled: true
  email: "[admin@example.com]"
  firstName: "SRE"
  lastName: "Admin"
  imageRegistry:
    name: "[your_registry_path]"
    secret: "astra-registry-cred"
  storageClass: "ontap-gold"
```

## Complete Astra Control Center and operator installation

1. If you didn't already do so in a previous step, create the `netapp-acc` (or custom) namespace:

```
kubectl create ns [netapp-acc or custom namespace]
```

Sample response:

```
namespace/netapp-acc created
```

2. Install Astra Control Center in the `netapp-acc` (or your custom) namespace:

```
kubectl apply -f astra_control_center_min.yaml -n [netapp-acc or custom namespace]
```

Sample response:

```
astracontrolcenter.astra.netapp.io/astra created
```

## Verify system status



If you prefer to use OpenShift, you can use comparable `oc` commands for verification steps.

1. Verify that all system components installed successfully.

```
kubect1 get pods -n [netapp-acc or custom namespace]
```

Each pod should have a status of `Running`. It may take several minutes before the system pods are deployed.

## Sample response

NAME	READY	STATUS	RESTARTS
AGE			
acc-helm-repo-6b44d68d94-d8m55 13m	1/1	Running	0
activity-78f99ddf8-hltct 10m	1/1	Running	0
api-token-authentication-457nl 9m28s	1/1	Running	0
api-token-authentication-dgwsz 9m28s	1/1	Running	0
api-token-authentication-hmqqc 9m28s	1/1	Running	0
asup-75fd554dc6-m6qzh 9m38s	1/1	Running	0
authentication-6779b4c85d-92gds 8m11s	1/1	Running	0
bucket-service-7cc767f8f8-lqwr8 9m31s	1/1	Running	0
certificates-549fd5d6cb-5kmd6 9m56s	1/1	Running	0
certificates-549fd5d6cb-bkjh9 9m56s	1/1	Running	0
cloud-extension-7bcb7948b-hn8h2 10m	1/1	Running	0
cloud-insights-service-56ccf86647-fgg69 9m46s	1/1	Running	0
composite-compute-677685b9bb-7vgsf 10m	1/1	Running	0
composite-volume-657d6c5585-dnq79 9m49s	1/1	Running	0
credentials-755fd867c8-vrlmt 11m	1/1	Running	0
entitlement-86495cdf5b-nwhh2 10m	1/1	Running	2
features-5684fb8b56-8d6s8 10m	1/1	Running	0
fluent-bit-ds-rhx7v 7m48s	1/1	Running	0
fluent-bit-ds-rjms4 7m48s	1/1	Running	0
fluent-bit-ds-zf5ph 7m48s	1/1	Running	0
graphql-server-66d895f544-w6hjd 3m29s	1/1	Running	0

identity-744df448d5-rlcmm	1/1	Running	0
10m			
influxdb2-0	1/1	Running	0
13m			
keycloak-operator-75c965cc54-z7csw	1/1	Running	0
8m16s			
krakend-798d6df96f-9z2sk	1/1	Running	0
3m26s			
license-5fb7d75765-f8mjg	1/1	Running	0
9m50s			
login-ui-7d5b7df85d-l2s7s	1/1	Running	0
3m20s			
loki-0	1/1	Running	0
13m			
metrics-facade-599b9d7fcc-gtmgl	1/1	Running	0
9m40s			
monitoring-operator-67cc74f844-cdplp	2/2	Running	0
8m11s			
nats-0	1/1	Running	0
13m			
nats-1	1/1	Running	0
13m			
nats-2	1/1	Running	0
12m			
nautilus-769f5b74cd-k5jxm	1/1	Running	0
9m42s			
nautilus-769f5b74cd-kd9gd	1/1	Running	0
8m59s			
openapi-84f6ccd8ff-76kvp	1/1	Running	0
9m34s			
packages-6f59fc67dc-4g2f5	1/1	Running	0
9m52s			
polaris-consul-consul-server-0	1/1	Running	0
13m			
polaris-consul-consul-server-1	1/1	Running	0
13m			
polaris-consul-consul-server-2	1/1	Running	0
13m			
polaris-keycloak-0	1/1	Running	0
8m7s			
polaris-keycloak-1	1/1	Running	0
5m49s			
polaris-keycloak-2	1/1	Running	0
5m15s			
polaris-keycloak-db-0	1/1	Running	0
8m6s			



polaris-keycloak-db-1	1/1	Running	0
5m49s			
polaris-keycloak-db-2	1/1	Running	0
4m57s			
polaris-mongodb-0	2/2	Running	0
13m			
polaris-mongodb-1	2/2	Running	0
12m			
polaris-mongodb-2	2/2	Running	0
12m			
polaris-ui-565f56bf7b-zwr8b	1/1	Running	0
3m19s			
polaris-vault-0	1/1	Running	0
13m			
polaris-vault-1	1/1	Running	0
13m			
polaris-vault-2	1/1	Running	0
13m			
public-metrics-6d86d66444-2wbz1	1/1	Running	0
9m30s			
storage-backend-metrics-77c5d98dcd-dbhg5	1/1	Running	0
9m44s			
storage-provider-78c885f57c-6zcv4	1/1	Running	0
9m36s			
telegraf-ds-212m9	1/1	Running	0
7m48s			
telegraf-ds-qfzgh	1/1	Running	0
7m48s			
telegraf-ds-shrms	1/1	Running	0
7m48s			
telegraf-rs-bjpkt	1/1	Running	0
7m48s			
telemetry-service-6684696c64-qzfdf	1/1	Running	0
10m			
tenancy-6596b6c54d-vmppm	1/1	Running	0
10m			
traefik-7489dc59f9-6mnst	1/1	Running	0
3m19s			
traefik-7489dc59f9-xrkkg	1/1	Running	0
3m4s			
trident-svc-6c8dc458f5-jswcl	1/1	Running	0
10m			
vault-controller-6b954f9b76-gz9nm	1/1	Running	0
11m			

2. (Optional) To ensure the installation is completed, you can watch the `acc-operator` logs using the following command.

```
kubectl logs deploy/acc-operator-controller-manager -n netapp-acc-operator -c manager -f
```



`accHost` cluster registration is one of the last operations, and if it fails it will not cause deployment to fail. In the event of a cluster registration failure indicated in the logs, you can attempt registration again through the add cluster workflow [in the UI](#) or API.

3. When all the pods are running, verify that the installation was successful (`READY` is `True`) and get the one-time password you will use when you log in to Astra Control Center:

```
kubectl get AstraControlCenter -n netapp-acc
```

Response:

NAME	UUID	VERSION	ADDRESS
READY			
astra	ACC-9aa5fdae-4214-4cb7-9976-5d8b4c0ce27f	22.08.1-26	
10.111.111.111	True		



Copy the UUID value. The password is `ACC-` followed by the UUID value (`ACC-[UUID]` or, in this example, `ACC-9aa5fdae-4214-4cb7-9976-5d8b4c0ce27f`).

## Set up ingress for load balancing

You can set up a Kubernetes ingress controller that manages external access to services, such as load balancing in a cluster.

This procedure explains how to set up an ingress controller (`ingressType:Generic`). This is the default action with Astra Control Center. After Astra Control Center is deployed, you will need to configure the ingress controller to expose Astra Control Center with a URL.



If you don't want to set up an ingress controller, you can set `ingressType:AccTraefik`. Astra Control Center uses a service of the type "LoadBalancer" (`svc/traefik` in the Astra Control Center namespace), and requires that it be assigned an accessible external IP address. If load balancers are permitted in your environment and you don't already have one configured, you can use MetalLB or another external service load balancer to assign an external IP address to the service. In the internal DNS server configuration, you should point the chosen DNS name for Astra Control Center to the load-balanced IP address. For details about the service type of "LoadBalancer" and ingress, see [Requirements](#).

The steps differ depending on the type of ingress controller you use:

- Istio ingress
- Nginx ingress controller
- OpenShift ingress controller

### What you'll need

- The required [ingress controller](#) should already be deployed.
- The [ingress class](#) corresponding to the ingress controller should already be created.
- You are using Kubernetes versions between and including v1.19 and v1.22.

### Steps for Istio ingress

1. Configure Istio ingress.



This procedure assumes that Istio is deployed using the "default" configuration profile.

2. Gather or create the desired certificate and private key file for the Ingress Gateway.

You can use a CA-signed or self-signed certificate. The common name must be the Astra address (FQDN).

Sample command:

```
openssl req -x509 -nodes -days 365 -newkey rsa:2048
-keyout tls.key -out tls.crt
```

3. Create a secret `tls` secret name of type `kubernetes.io/tls` for a TLS private key and certificate in the `istio-system` namespace as described in [TLS secrets](#).

Sample command:

```
kubectl create secret tls [tls secret name]
--key="tls.key"
--cert="tls.crt" -n istio-system
```



The name of the secret should match the `spec.tls.secretName` provided in `istio-ingress.yaml` file.

4. Deploy an ingress resource in `netapp-acc` (or custom-named) namespace using either the `v1beta1` (deprecated in Kubernetes version less than or 1.22) or `v1` resource type for either a deprecated or a new schema:

Output:

```

apiVersion: networking.k8s.io/v1beta1
kind: IngressClass
metadata:
  name: istio
spec:
  controller: istio.io/ingress-controller
---
apiVersion: networking.k8s.io/v1beta1
kind: Ingress
metadata:
  name: ingress
  namespace: istio-system
spec:
  ingressClassName: istio
  tls:
  - hosts:
    - <ACC address>
    secretName: [tls secret name]
  rules:
  - host: [ACC address]
    http:
      paths:
      - path: /
        pathType: Prefix
        backend:
          serviceName: traefik
          servicePort: 80

```

For the v1 new schema, follow this sample:

```
kubectl apply -f istio-Ingress.yaml
```

Output:

```

apiVersion: networking.k8s.io/v1
kind: IngressClass
metadata:
  name: istio
spec:
  controller: istio.io/ingress-controller
---
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: ingress
  namespace: istio-system
spec:
  ingressClassName: istio
  tls:
  - hosts:
    - <ACC address>
    secretName: [tls secret name]
  rules:
  - host: [ACC address]
    http:
      paths:
      - path: /
        pathType: Prefix
        backend:
          service:
            name: traefik
            port:
              number: 80

```

5. Deploy Astra Control Center as usual.

6. Check the status of the ingress:

```
kubectl get ingress -n netapp-acc
```

Response:

NAME	CLASS	HOSTS	ADDRESS	PORTS	AGE
ingress	istio	astra.example.com	172.16.103.248	80, 443	1h

### Steps for Nginx ingress controller

1. Create a secret of type `kubernetes.io/tls` for a TLS private key and certificate in `netapp-acc` (or custom-named) namespace as described in [TLS secrets](#).

2. Deploy an ingress resource in `netapp-acc` (or custom-named) namespace using either the `v1beta1` (deprecated in Kubernetes version less than or 1.22) or `v1` resource type for either a deprecated or a new schema:
  - a. For a `v1beta1` deprecated schema, follow this sample:

```
apiVersion: extensions/v1beta1
Kind: IngressClass
metadata:
  name: ingress-acc
  namespace: [netapp-acc or custom namespace]
  annotations:
    kubernetes.io/ingress.class: [class name for nginx controller]
spec:
  tls:
  - hosts:
    - <ACC address>
    secretName: [tls secret name]
  rules:
  - host: [ACC address]
    http:
      paths:
      - backend:
          serviceName: traefik
          servicePort: 80
          pathType: ImplementationSpecific
```

- b. For the `v1` new schema, follow this sample:

```

apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: netapp-acc-ingress
  namespace: [netapp-acc or custom namespace]
spec:
  ingressClassName: [class name for nginx controller]
  tls:
  - hosts:
    - <ACC address>
    secretName: [tls secret name]
  rules:
  - host: <ACC address>
    http:
      paths:
      - path:
        backend:
          service:
            name: traefik
            port:
              number: 80
          pathType: ImplementationSpecific

```

### Steps for OpenShift ingress controller

1. Procure your certificate and get the key, certificate, and CA files ready for use by the OpenShift route.
2. Create the OpenShift route:

```

oc create route edge --service=traefik
--port=web -n [netapp-acc or custom namespace]
--insecure-policy=Redirect --hostname=<ACC address>
--cert=cert.pem --key=key.pem

```

## Log in to the Astra Control Center UI

After installing Astra Control Center, you will change the password for the default administrator and log in to the Astra Control Center UI dashboard.

### Steps

1. In a browser, enter the FQDN you used in the `astraAddress` in the `astra_control_center_min.yaml` CR when [you installed Astra Control Center](#).
2. Accept the self-signed certificates when prompted.



You can create a custom certificate after login.

3. At the Astra Control Center login page, enter the value you used for `email` in `astra_control_center_min.yaml` CR when [you installed Astra Control Center](#), followed by the one-time password (`ACC-[UUID]`).



If you enter an incorrect password three times, the admin account will be locked for 15 minutes.

4. Select **Login**.
5. Change the password when prompted.



If this is your first login and you forget the password and no other administrative user accounts have yet been created, contact NetApp Support for password recovery assistance.

6. (Optional) Remove the existing self-signed TLS certificate and replace it with a [custom TLS certificate signed by a Certificate Authority \(CA\)](#).

## Troubleshoot the installation

If any of the services are in `Error` status, you can inspect the logs. Look for API response codes in the 400 to 500 range. Those indicate the place where a failure happened.

### Steps

1. To inspect the Astra Control Center operator logs, enter the following:

```
kubectl logs --follow -n netapp-acc-operator $(kubectl get pods -n netapp-acc-operator -o name) -c manager
```

## What's next

Complete the deployment by performing [setup tasks](#).

## Understand Astra Control Center cluster CR options

You can use the following Astra Control Center cluster CR options to create custom configurations during deployment.

Setting	Type	Use	Value Example	Description
<code>astraVersion</code>	string	Required	1.5.2	Version of AstraControlCenter to deploy. You are provided a Helm repository with a corresponding version.



Setting	Type	Use	Value Example	Description
astraAddress	string	Required	astra.example.com	Defines how Astra will be found in the data center. This IP address and/or DNS A record must be created prior to provisioning Astra Control Center.
accountName	string	Required	Example	Astra Control Center account name. There can be only one.
email	string	Required	<a href="#">admin@example.com</a>	The username of the administrator to be added as the first user of Astra. This email address will be notified by Astra Control as events warrant.
firstName	string	Required	SRE	The first name of the administrator supporting Astra.
lastName	string	Required	Admin	The last name of the administrator supporting Astra.
storageClass	string	Optional (this is the default value)	ontap-gold	The storage class to be used for PVCs. If not set, the default storage class will be used.
volumeReclaimPolicy	Undefined	Optional	Retain	Reclaim policy to be set for persistent volumes.
astraResourcesScaler	string	Required	Default	Scaling options for AstraControlCenter Resource limits. See <a href="#">setting complexities</a> to understand how this settings affects others settings.

Setting	Type	Use	Value Example	Description
astraKubeConfigSecret	string	Required	acc-kubeconfig-cred	If this value is present and a secret exists, the operator will attempt to add that KubeConfig to become the first managed cluster.
ingressType	string	Optional	Generic (this is the default value)	The type of ingress Astra Control Center should be configured for. Valid values are <code>Generic</code> and <code>AccTraefik</code> . See <a href="#">setting complexities</a> to understand how this settings affects others settings.
avpDeploy	Boolean	Optional	true (this is the default value)	Option that allows a user to disable deployment of Astra Plugin for VMware vSphere operator.
imageRegistry	Undefined	Optional		The container image registry that is hosting the Astra application images, Astra Control Center Operator, and Astra Control Center Helm Repository.
imageRegistry.name	string	Required if you are using imageRegistry	example.registry.com/astra	The name of the image registry. Do not prefix with protocol.
imageRegistry.secret	string	Required if you are using imageRegistry	astra-registry-cred	The name of the Kubernetes secret used to authenticate with the image registry.
autoSupport	Undefined	Required		Indicates participation status in NetApp's proactive support application, NetApp Active IQ. An internet connection is required (port 442) and all support data is anonymized.

Setting	Type	Use	Value Example	Description
autoSupport.enrolled	Boolean	Optional, but either <code>enrolled</code> or <code>url</code> fields must be selected	false (this value is the default)	Enrolled determines if you want to send anonymous data to NetApp for support purposes. The default election is <code>false</code> and indicates no support data will be sent to NetApp.
autoSupport.url	string	Optional, but either <code>enrolled</code> or <code>url</code> fields must be selected	<a href="https://support.netapp.com/asupprod/post/1.0/postAsup">https://support.netapp.com/asupprod/post/1.0/postAsup</a>	URL determines where the anonymous data will be sent.
crds	Undefined	Undefined		Options for how Astra Control Center should handle CRDs.
crds.externalTraefik	Boolean	Optional	True (this value is the default)	By default, Astra Control Center will install the required Traefik CRDs. CRDs are cluster-wide objects and installing them may have an impact on other parts of the cluster. You can use this flag to signal to Astra Control Center that these CRDs will be installed and managed by the cluster administrator outside of Astra Control Center.

Setting	Type	Use	Value Example	Description
crds.externalCertManager	Boolean	Optional	True (this value is the default)	By default, Astra Control Center will install the required cert-manager CRDs. CRDs are cluster-wide objects and installing them may have an impact on other parts of the cluster. You can use this flag to signal to Astra Control Center that these CRDs will be installed and managed by the cluster administrator outside of Astra Control Center.
crds.shouldUpgrade	Boolean	Optional	Undefined	Determines if CRDs should be upgraded when Astra Control Center is upgraded.
mtls				Options for how Astra Control Center should implement service to service mTLS in the cluster. See <a href="#">setting complexities</a> to understand how this settings affects others settings
mtls.enabled	Boolean	Optional	true (this value is the default)	By default, Astra Control Center uses mTLS for service-to-service communication. This option should be disabled when using a service mesh to encrypt service-to-service communication instead.

Setting	Type	Use	Value Example	Description
<code>mtls.certDuration</code>	string	Optional	2140h (this value is the default duration)	The duration of time in hours to use as a certificate lifespan when issuing service TLS certificates. This setting only works when <code>mtls.enabled</code> is set to <code>true</code> .

## Configuration combinations and incompatibilities

Some Astra Control Center cluster CR configuration settings greatly affect the way Astra Control Center is installed and could conflict with other settings. The content that follows describes important configuration settings and how to avoid incompatible combinations.

### **`astraResourcesScaler`**

By default, Astra Control Center deploys with resource requests set for most of the components within Astra. This configuration allows the Astra Control Center software stack to perform better in environments under increased application load and scale.

However, in scenarios using smaller development or test clusters, the CR field `AstraResourcesScaler` may be set to `Off`. This disables resource requests and allows for deployment on smaller clusters.

### **`ingressType`**

There are two valid values for `ingressType`:

- Generic
- AccTraefik

#### **Generic (default)**

When `ingressType` is set to `Generic`, Astra Control does not install any ingress resources. The assumption is that the user has a common way of securing and routing traffic through their network to applications running on Kubernetes clusters and they want to use the same mechanisms here. When the user creates an ingress to route traffic to Astra Control, the ingress needs to point to the internal traefik service on port 80. Here is an example of an Nginx ingress resource that works with the `Generic` `ingressType` setting.

```

apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: netapp-acc-ingress
  namespace: [netapp-acc or custom namespace]
spec:
  ingressClassName: [class name for nginx controller]
  tls:
  - hosts:
    - <ACC address>
    secretName: [tls secret name]
  rules:
  - host: <ACC address>
    http:
      paths:
      - path:
        backend:
          service:
            name: traefik
            port:
              number: 80
          pathType: ImplementationSpecific

```



When mTLS is disabled using the `mtls.enabled` setting in the CR, you must use `ingressType: Generic`.

### AccTraefik

When `ingressType` is set to `AccTraefik`, Astra Control Center deploys its Traefik gateway as a Kubernetes LoadBalancer type service. Users need to provide an external Load Balancer (like MetalLB) for Astra Control Center to get an external IP.

### mtls

The settings used in the CR determine how intra-application communication is secured. It is very important for the user to know ahead of time whether they will be using a service mesh or not.

- `enabled=true`: When this setting is enabled, Astra will deploy an internal service-to-service communication network that secures all traffic within the application.



Do not cover Astra Control Center in a service mesh while this setting is `true`.

- `enabled=false`: When this setting is disabled, Astra Control Center will not secure internal traffic and you must secure Astra namespaces independently with a service mesh.



When mTLS is disabled using the `mtls.enabled` setting in the CR, you must use `ingressType: Generic`.



If no service mesh is used and this setting is disabled, internal communication will be unsecure.

## Understand pod security policy restrictions

Astra Control Center supports privilege limitation through pod security policies (PSPs). Pod security policies enable you to limit what users or groups are able to run containers and what privileges those containers can have.

Some Kubernetes distributions, such as RKE2, have a default pod security policy that is too restrictive, and causes problems when installing Astra Control Center.

You can use the information and examples included here to understand the pod security policies that Astra Control Center creates, and configure pod security policies that provide the protection you need without interfering with Astra Control Center functions.

### PSPs installed by Astra Control Center

Astra Control Center creates several pod security policies during installation. Some of these are permanent, and some of them are created during certain operations and are removed once the operation is complete.

#### PSPs created during installation

During Astra Control Center installation, the Astra Control Center operator installs a custom pod security policy, a Role object, and a RoleBinding object to support the deployment of Astra Control Center services in the Astra Control Center namespace.

The new policy and objects have the following attributes:

```
kubectl get psp
```

NAME	FSGROUP	SUPGROUP	PRIV	READONLYROOTFS	CAPS	VOLUMES	SELINUX	RUNASUSER
avp-psp			false				RunAsAny	RunAsAny
RunAsAny	RunAsAny	false		*				
netapp-astra-deployment-psp			false				RunAsAny	RunAsAny
RunAsAny	RunAsAny	false		*				

```
kubectl get role
```

NAME	CREATED AT
netapp-astra-deployment-role	2022-06-27T19:34:58Z

```
kubectl get rolebinding
```

NAME	AGE	ROLE
netapp-astra-deployment-rb	32m	Role/netapp-astra-deployment-role

## PSPs created during backup operations

During backup operations, Astra Control Center creates a dynamic pod security policy, a ClusterRole object, and a RoleBinding object. These support the backup process, which happens in a separate namespace.

The new policy and objects have the following attributes:

```
kubectl get psp
```

NAME	SELINUX	RUNASUSER	PRIV	FSGROUP	CAPS	SUPGROUP	READONLYROOTFS	VOLUMES
netapp-astra-backup			false		DAC_READ_SEARCH			
RunAsAny	RunAsAny	RunAsAny	RunAsAny	RunAsAny	RunAsAny	false	*	

  

```
kubectl get role
```

NAME	CREATED AT
netapp-astra-backup	2022-07-21T00:00:00Z

  

```
kubectl get rolebinding
```

NAME	ROLE	AGE
netapp-astra-backup	Role/netapp-astra-backup	62s

## PSPs created during cluster management

When you manage a cluster, Astra Control Center installs the netapp-monitoring operator in the managed cluster. This operator creates a pod security policy, a ClusterRole object, and a RoleBinding object to deploy telemetry services in the Astra Control Center namespace.

The new policy and objects have the following attributes:



```
kubectl get psp
```

NAME		PRIV	CAPS		
SELINUX	RUNASUSER	FSGROUP	SUPGROUP	READONLYROOTFS	
VOLUMES					
netapp-monitoring-ppsp-nkmo		true	AUDIT_WRITE,NET_ADMIN,NET_RAW		
RunAsAny	RunAsAny	RunAsAny	RunAsAny	false	*

```
kubectl get role
```

NAME	CREATED AT
netapp-monitoring-role-privileged	2022-07-21T00:00:00Z

```
kubectl get rolebinding
```

NAME	ROLE
netapp-monitoring-role-binding-privileged	Role/netapp-monitoring-role-privileged
	2m5s

## Enable network communication between namespaces

Some environments use NetworkPolicy constructs to restrict traffic between namespaces. The Astra Control Center operator, Astra Control Center, and the Astra Plugin for VMware vSphere are all in different namespaces. The services in these different namespaces need to be able to communicate with one another. To enable this communication, follow these steps.

### Steps

1. Delete any NetworkPolicy resources that exist in the Astra Control Center namespace:

```
kubectl get networkpolicy -n netapp-acc
```

2. For each NetworkPolicy object that is returned by the preceding command, use the following command to delete it. Replace <OBJECT\_NAME> with the name of the returned object:

```
kubectl delete networkpolicy <OBJECT_NAME> -n netapp-acc
```

3. Apply the following resource file to configure the acc-avp-network-policy object to allow Astra Plugin for VMware vSphere services to make requests to Astra Control Center services. Replace the information in brackets <> with information from your environment:

```

apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: acc-avp-network-policy
  namespace: <ACC_NAMESPACE_NAME> # REPLACE THIS WITH THE ASTRA CONTROL
CENTER NAMESPACE NAME
spec:
  podSelector: {}
  policyTypes:
    - Ingress
  ingress:
    - from:
      - namespaceSelector:
          matchLabels:
            kubernetes.io/metadata.name: <PLUGIN_NAMESPACE_NAME> #
REPLACE THIS WITH THE ASTRA PLUGIN FOR VMWARE VSPHERE NAMESPACE NAME

```

4. Apply the following resource file to configure the acc-operator-network-policy object to allow the Astra Control Center operator to communicate with Astra Control Center services. Replace the information in brackets <> with information from your environment:

```

apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: acc-operator-network-policy
  namespace: <ACC_NAMESPACE_NAME> # REPLACE THIS WITH THE ASTRA CONTROL
CENTER NAMESPACE NAME
spec:
  podSelector: {}
  policyTypes:
    - Ingress
  ingress:
    - from:
      - namespaceSelector:
          matchLabels:
            kubernetes.io/metadata.name: <NETAPP-ACC-OPERATOR> #
REPLACE THIS WITH THE OPERATOR NAMESPACE NAME

```

## Remove resource limitations

Some environments use the ResourceQuotas and LimitRanges objects to prevent the resources in a namespace from consuming all available CPU and memory on the cluster. Astra Control Center does not set maximum limits, so it will not be in compliance with those resources. You need to remove them from the namespaces where you plan to install Astra Control Center.

You can use the following steps to retrieve and remove these quotas and limits. In these examples, the command output is shown immediately after the command.

## Steps

1. Get the resource quotas in the netapp-acc namespace:

```
kubectl get quota -n netapp-acc
```

Response:

NAME	AGE	REQUEST	LIMIT
Pods-high	16s	requests.cpu: 0/20, requests.memory: 0/100Gi limits.cpu: 0/200, limits.memory: 0/1000Gi	
Pods-low	15s	requests.cpu: 0/1, requests.memory: 0/1Gi limits.cpu: 0/2, limits.memory: 0/2Gi	
Pods-medium	16s	requests.cpu: 0/10, requests.memory: 0/20Gi limits.cpu: 0/20, limits.memory: 0/200Gi	

2. Delete all of the resource quotas by name:

```
kubectl delete resourcequota Pods-high -n netapp-acc
```

```
kubectl delete resourcequota Pods-low -n netapp-acc
```

```
kubectl delete resourcequota Pods-medium -n netapp-acc
```

3. Get the limit ranges in the netapp-acc namespace:

```
kubectl get limits -n netapp-acc
```

Response:

NAME	CREATED AT
cpu-limit-range	2022-06-27T19:01:23Z

4. Delete the limit ranges by name:

```
kubectl delete limitrange cpu-limit-range -n netapp-acc
```

# Configure an external cert-manager

If a cert-manager already exists in your Kubernetes cluster, you need to perform some prerequisite steps so that Astra Control Center does not install its own cert-manager.

## Steps

1. Confirm that you have a cert-manager installed:

```
kubectl get pods -A | grep 'cert-manager'
```

Sample response:

```
cert-manager    essential-cert-manager-84446f49d5-sf2zd    1/1
Running        0      6d5h
cert-manager    essential-cert-manager-cainjector-66dc99cc56-9ldmt    1/1
Running        0      6d5h
cert-manager    essential-cert-manager-webhook-56b76db9cc-fjqrq    1/1
Running        0      6d5h
```

2. Create a certificate/key pair for the astraAddress FQDN:

```
openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout tls.key -out
tls.crt
```

Sample response:

```
Generating a 2048 bit RSA private key
.....+++
.....+++
writing new private key to 'tls.key'
```

3. Create a secret with previously generated files:

```
kubectl create secret tls selfsigned-tls --key tls.key --cert tls.crt -n
<cert-manager-namespace>
```

Sample response:

```
secret/selfsigned-tls created
```

4. Create a ClusterIssuer file that is **exactly** the following but includes the namespace location where your cert-manager pods are installed:

```
apiVersion: cert-manager.io/v1
kind: ClusterIssuer
metadata:
  name: astra-ca-clusterissuer
  namespace: <cert-manager-namespace>
spec:
  ca:
    secretName: selfsigned-tls
```

```
kubectl apply -f ClusterIssuer.yaml
```

Sample response:

```
clusterissuer.cert-manager.io/astra-ca-clusterissuer created
```

5. Verify that the ClusterIssuer has come up correctly. Ready must be True before you can proceed:

```
kubectl get ClusterIssuer
```

Sample response:

NAME	READY	AGE
astra-ca-clusterissuer	True	9s

6. Complete the [Astra Control Center installation process](#). There is a [required configuration step for the Astra Control Center cluster YAML](#) in which you change the CRD value to indicate that the cert-manager is externally installed. You must complete this step during installation so that Astra Control Center recognizes the external cert-manager.

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