NetApp

使用**Astra**資料儲存區
Astra Data Store

NetApp
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使用**Astra**資料儲存區

使用**kvecll**命令管理**Astra Data Store**預覽資產

您可以使用kubectl命令和Kubernetes API擴充功能來管理Astra Data Store預覽資產。

若要瞭解如何部署範例應用程式、請參閱 "部署測試應用程式"。

如需下列叢集維護資訊、請參閱 "管理叢集"：

- 將節點置於維護模式
- 更換磁碟機
- 新增節點
- 更換節點

您需要的是 **#8217**；需要的是什麼

- 您安裝的Astra Data Store預覽KECBECVL外掛程式 "安裝Astra Data Store預覽"

列出用於**Astra Data Store**預覽的**Kubernetes**自訂**API**資源

您可以使用Kubernetes內部的kubectl命令、與Astra Data Store預覽叢集互動並觀察其狀態。

「API-resources'」命令中列出的每個項目都代表Kubernetes自訂資源定義（CRD）、Astra Data Store預覽可在內部用於管理叢集。

此清單特別有助於取得每個Astra Data Store預覽物件的快取名稱、以減少您的輸入、如稍後所示。

1. 顯示用於Astra Data Store預覽的Kubernetes自訂API資源清單：

```
kubectl api-resources --api-group astrads.netapp.io
```

回應：

```
NAME                      SHORTNAMES  APIGROUP            NAMESPACED  KIND
astradsversions           adsve       astrads.netapp.io   true
AstraDSVersion
astradsclusters           adscl       astrads.netapp.io   true
AstraDSCluster
astradslicenses           adsli       astrads.netapp.io   true
AstraDSLicense
astradsnodeinfoes         adsni       astrads.netapp.io   true
AstraDSNodeInfo
astradsvolumes            adsvo       astrads.netapp.io   true
AstraDSVolume
astradsqospolicies        adsqp       astrads.netapp.io   true
AstraDSQosPolicy
astradsexportpolicies     adsep       astrads.netapp.io   true
AstraDSExportPolicy
astradsvolumesnapshots    adsvs       astrads.netapp.io   true
AstraDSVolumeSnapshot
astradsvolumefiles        adsvf       astrads.netapp.io   true
AstraDSVolumeFiles
astradsautosupports       adsas       astrads.netapp.io   true
AstraDSAutoSupport
astradsfaileddrives       adsfd       astrads.netapp.io   true
AstraDSFailedDrive
astradsnodemanagements    adsnm       astrads.netapp.io   true
AstraDSNodeManagement
```

2. 若要在Kubernetes叢集中取得所有目前的Astra Data Store預覽物件、請使用「kubectl Get ads -As」命令：

```
kubectl get ads -A
```

回應：

```
NAMESPACE        NAME                                               AGE
astrads-system   astradsqospolicy.astrads.netapp.io/bronze   45h
astrads-system   astradsqospolicy.astrads.netapp.io/gold      45h
astrads-system   astradsqospolicy.astrads.netapp.io/silver    45h


NAMESPACE        NAME
STATUS     VERSION        SERIAL NUMBER   MVIP            AGE
astrads-system   astradscluster.astrads.netapp.io/astrads-cluster-9f1
created    arda-9.11.1    e000000009      10.224.8.146   46h


NAMESPACE        NAME
```

```
AGE
astrads-system     astradsnodeinfo.astrads.netapp.io/englab.netapp.com
46h
astrads-system     astradsnodeinfo.astrads.netapp.io/englab.netapp.com
46h
astrads-system     astradsnodeinfo.astrads.netapp.io/englab.netapp.com
46h
astrads-system     astradsnodeinfo.astrads.netapp.io/englab.netapp.com
46h

NAMESPACE          NAME                                        AGE
astrads-system     astradsversion.astrads.netapp.io/astradsversion   46h

NAMESPACE          NAME                                        AGE
astrads-system     astradsvolumefiles.astrads.netapp.io/test23    27h
astrads-system     astradsvolumefiles.astrads.netapp.io/test234   27h
astrads-system     astradsvolumefiles.astrads.netapp.io/test2345  4h22m

NAMESPACE          NAME                                    SIZE    IP
CLUSTER          CREATED
astrads-system     astradsvolume.astrads.netapp.io/test234    21Gi
172.25.123.123    astrads-cluster-9f1  true
astrads-system     astradsvolume.astrads.netapp.io/test2345   21Gi
172.25.123.123    astrads-cluster-9f1  true

NAMESPACE          NAME
SEQUENCE COMPONENT      EVENT                    TRIGGER   PRIORITY  SIZE
STATE
astrads-system     astradsautosupport.astrads.netapp.io/controlplane-
adsclustercreatesuccess-20211214t 9        controlplane
adsclustercreatesuccess k8sEvent   notice    0      uploaded
astrads-system     astradsautosupport.astrads.netapp.io/controlplane-
daily-20211215t0                   15        controlplane   daily
periodic  notice    0      uploaded
astrads-system     astradsautosupport.astrads.netapp.io/controlplane-
daily-20211216t0                   20        controlplane   daily
periodic  notice    0      uploaded
astrads-system     astradsautosupport.astrads.netapp.io/storage-
callhome.dbs.cluster.cannot.sync.blocks 10       storage
callhome.dbs.cluster.cannot.sync.blocks  firetapEvent   emergency   0
uploaded

NAMESPACE          NAME                                    ADSCLUSTER
VALID PRODUCT          EVALUATION ENDDATE   VALIDATED
astrads-system     astradslicense.astrads.netapp.io/e0   astrads-cluster-
9f1 true  Astra Data Store true      2022-02-07 2021-12-16T20:43:23Z
```

3. 使用其中一個簡短名稱來顯示叢集中磁碟區的目前狀態：

```
kubectl get adsvo -A
```

回應：

```
NAMESPACE        NAME        SIZE    IP               CLUSTER
CREATED
astrads-system   test234     21Gi    172.25.138.109   astrads-cluster-
9f1c99f    true
astrads-system   test2345    21Gi    172.25.138.111   astrads-cluster-
9f1c99f    true
```

使用**KECBECVL**副檔名上的說明選項

「kubectl astrads」命令包含一個「-h」交換器、可提供使用方法和標記文件、方便您使用。

1. 顯示Astra Data Store preview kubecll副檔名中所有命令的說明：

```
kubectl astrads -h
```

回應：

```
A kubectl plugin for inspecting your AstraDS deployment

Usage:
  astrads [command]

Available Commands:
  asup        Manage AutoSupport
  clusters    Manage clusters
  drives      Manage drives in a cluster
  faileddrive Manage drive replacement in a cluster
  help        Help about any command
  license     Manage license in the astrads cluster
  maintenance Manage maintenance status of a node
  monitoring  Manage Monitoring Output
  nodes       Manage nodes in a cluster

Flags:
      --as string                     Username to impersonate for the
operation
      --as-group stringArray          Group to impersonate for the
```

```
operation, this flag can be
                                    repeated to specify multiple
groups.
    --cache-dir string              Default HTTP cache directory
                                    (default "/u/arda/.kube/http-
cache")
    --certificate-authority string  Path to a cert file for the
certificate authority
    --client-certificate string     Path to a client certificate file
for TLS
    --client-key string             Path to a client key file for TLS
    --cluster string                The name of the kubeconfig
cluster to use
    --context string                The name of the kubeconfig
context to use
  -h, --help                        help for astrads
    --insecure-skip-tls-verify        If true, the server's
certificate will not be checked

                                      for validity. This will make
your HTTPS connections insecure
    --kubeconfig string               Path to the kubeconfig file to
use for CLI requests.
  -n, --namespace string              If present, the namespace scope
for this CLI request
    --request-timeout string          The length of time to wait
before giving up on a single

                                      server request. Non-zero values
should contain a

                                      corresponding time unit (e.g.
1s, 2m, 3h).

                                      A value of zero means don't
timeout requests.

                                      (default "0")
  -s, --server string                 The address and port of the
Kubernetes API server
    --token string                    Bearer token for authentication
to the API server
    --user string                     The name of the kubeconfig user
to use
```

2. 如需命令的詳細資訊、請使用「astrads [command]-help]。

```
kubectl astrads asup collect --help
```

回應：

Collect the autosupport bundle by specifying the component to collect.
It will default to manual event.

```
Usage:
  astrads asup collect [flags]

Examples:
  # Control plane collection
    kubectl astrads collect --component controlplane example1

    # Storage collection for single node
    kubectl astrads collect --component storage --nodes node1 example2

    # Storage collection for all nodes
    kubectl astrads collect --component storage --nodes all example3

    # Collect but don't upload to support
    kubectl astrads collect --component controlplane --local example4

    NOTE:
    --component storage and --nodes <name> are mutually inclusive.
    --component controlplane and --nodes <name> are mutually
exclusive.

  Flags:
    -c, --component string     Specify the component to collect:
[storage , controlplane , vasaprovider, all]
    -d, --duration int         Duration is the duration in hours from
the startTime for collection
                                of AutoSupport.
                                This should be a positive integer
    -e, --event string         Specify the callhome event to trigger.
(default "manual")
    -f, --forceUpload          Configure an AutoSupport to upload if
it is in the compressed state
                                and not
                                uploading because it was created with
the 'local' option or if
                                automatic uploads of AutoSupports is
disabled
                                at the cluster level.
    -h, --help                 help for collect
    -l, --local                Only collect and compress the
autosupport bundle. Do not upload
                                to support.
                                Use 'download' to copy the collected
```

```
bundle after it is in
                              the 'compressed' state
      --nodes string         Specify nodes to collect for storage
component. (default "all")
    -t, --startTime string    StartTime is the starting time for
collection of AutoSupport.

                              This should be in the ISO 8601 date
time format.

                              Example format accepted:
                              2021-01-01T15:20:25Z, 2021-01-
01T15:20:25-05:00
    -u, --usermessage string   UserMessage is the additional message
to include in the

                              AutoSupport subject.
                              (default "Manual event trigger from
CLI")
```

部署測試應用程式

以下是部署可搭配Astra Data Store預覽使用的測試應用程式的步驟。

在此範例中、我們使用Helm儲存庫部署Bitnami的MongoDB圖表。

您需要的是 **#8217** ；需要的是什麼

- Astra Data Store預覽叢集已部署及設定
- Trident安裝完成

步驟

1. 從Bitnami新增Helm repo：

   ```
   helm repo add bitnami https://charts.bitnami.com/bitnami
   ```

2. 部署MongoDB：

   ```
   helm install mongohelm4 --set persistence.storageClass=trident-csi
   bitnami/mongodb --namespace=ns-mongodb --create-namespace
   ```

3. 檢查MongoDB Pod的狀態：

   ```
   ~% kubectl get pods -n ns-mongodb
   NAME                         READY    STATUS    RESTARTS    AGE
   mongodb-9846ff8b7-rfr4r    1/1      Running   0           67s
   ```

4. 驗證MongoDB使用的持續磁碟區宣告（PVc）：

```
~% kubectl get pvc -n ns-mongodb
NAME        STATUS   VOLUME                      CAPACITY    ACCESS MODES
STORAGECLASS    AGE
mongodb   Bound    pvc-1133453a-e2f5-48a5  8Gi         RWO
trident-csi     97s
```

5. 使用kubecl命令「Get astradsvolume」列出磁碟區：

```
~% kubectl get astradsvolume pvc-1133453a-e2f5-48a5 -n astrads-system
NAME                        SIZE       IP             CLUSTER     CREATED
pvc-1133453a-e2f5-48a5   8830116Ki   10.192.2.192   jai-ads     true
```

6. 使用kubecl命令「desscribe astradsvolume」來描述磁碟區：

```
~% kubectl describe astradsvolume pvc-1133453a-e2f5-48a5 -n astrads-
system
Name:           pvc-1133453a-e2f5-48a5-a06c-d14b8aa7be07
Namespace:      astrads-system
Labels:         astrads.netapp.io/cluster=jai-ads
                astrads.netapp.io/mip=10.192.1.39
                astrads.netapp.io/volumeUUID=cf33fd38-a451-596c-b656-
61b8270d2b5e
                trident.netapp.io/cloud=on-prem
                trident.netapp.io/creator=trident-dev
              trident.netapp.io/performance=premium
Annotations:  provisioning: {"provisioning":{"cloud":"on-
prem","creator":"trident-dev","performance":"premium"}}
                trident:
                  {"trident":{"version":"21.10.0-test.jenkins-trident-
stable-v21.10-
2+e03219ce37294d9ba54ec476bbe788c1a7772548","backendUUID":"","platform":
...
API Version:  astrads.netapp.io/v1alpha1
Kind:         AstraDSVolume
Metadata:
  Creation Timestamp:  2021-12-08T19:35:26Z
  Finalizers:
    trident.netapp.io/astradsvolume-finalizer
    astrads.netapp.io/astradsvolume-finalizer
  Generation:  1
  Managed Fields:
    API Version:  astrads.netapp.io/v1alpha1
```

```
      Fields Type:  FieldsV1
      fieldsV1:
        f:metadata:
          f:labels:
            f:astrads.netapp.io/cluster:
            f:astrads.netapp.io/mip:
            f:astrads.netapp.io/volumeUUID:
        f:status:
          .:
          f:cluster:
          f:conditions:
          f:created:
          f:displayName:
          f:exportAddress:
          f:internalName:
          f:mip:
          f:permissions:
          f:qosPolicy:
          f:requestedSize:
          f:restoreCacheSize:
          f:size:
          f:snapshotReservePercent:
          f:state:
          f:volumePath:
          f:volumeUUID:
      Manager:      cluster-controller
      Operation:    Update
      Time:         2021-12-08T19:35:32Z
      API Version:  astrads.netapp.io/v1alpha1
      Fields Type:  FieldsV1
      fieldsV1:
        f:status:
          f:exportPolicy:
      Manager:      dms-controller
      Operation:    Update
      Subresource:  status
      Time:         2021-12-08T19:35:32Z
      API Version:  astrads.netapp.io/v1alpha1
      Fields Type:  FieldsV1
      fieldsV1:
        f:metadata:
          f:annotations:
            .:
            f:provisioning:
            f:trident:
          f:finalizers:
```

```
                  v:"trident.netapp.io/astradsvolume-finalizer":
            f:labels:
              .:
              f:trident.netapp.io/cloud:
              f:trident.netapp.io/creator:
              f:trident.netapp.io/performance:
        f:spec:
          .:
          f:cluster:
          f:displayName:
          f:exportPolicy:
          f:noSnapDir:
          f:permissions:
          f:qosPolicy:
          f:size:
          f:snapshotReservePercent:
          f:type:
          f:volumePath:
    Manager:         trident_orchestrator
    Operation:       Update
    Time:            2021-12-08T19:35:34Z
  Resource Version:  12007115
  UID:               d522ae4f-e793-49ed-bbe0-9112d7f9167b
Spec:
  Cluster:                  jai-ads
  Display Name:             pvc-1133453a-e2f5-48a5-a06c-d14b8aa7be07
  Export Policy:            pvc-1133453a-e2f5-48a5-a06c-d14b8aa7be07
  No Snap Dir:              true
  Permissions:              0777
  Qos Policy:               silver
  Size:                     9042036412
  Snapshot Reserve Percent: 5
  Type:                     ReadWrite
  Volume Path:              /pvc-1133453a-e2f5-48a5-a06c-d14b8aa7be07
Status:
  Cluster: jai-ads
  Conditions:
    Last Transition Time:  2021-12-08T19:35:32Z
    Message:               Volume is online
    Reason:                VolumeOnline
    Status:                True
    Type:                  AstraDSVolumeOnline
    Last Transition Time:  2021-12-08T19:35:32Z
    Message:               Volume creation request was successful
    Reason:                VolumeCreated
    Status:                True
```

```
      Type:                   AstraDSVolumeCreated
    Created:                  true
    Display Name:             pvc-1133453a-e2f5-48a5-a06c-d14b8aa7be07
    Export Address:           10.192.2.192
    Export Policy:            pvc-1133453a-e2f5-48a5-a06c-d14b8aa7be07
    Internal Name:            pvc_1133453a_e2f5_48a5_a06c_d14b8aa7be07
    Mip:                      10.192.1.192
    Permissions:              777
    Qos Policy:               silver
    Requested Size:           9042036412
    Restore Cache Size:       0
    Size:                     8830116Ki
    Snapshot Reserve Percent: 5
    State:                    online
    Volume Path:              /pvc-1133453a-e2f5-48a5-a06c-d14b8aa7be07
    Volume UUID:              cf33fd38-a451-596c-b656-61b8270d2b5e
  Events:
    Type     Reason          Age    From                  Message
    ----     ------          ----   ----                  -------
    Normal   VolumeCreated   3m9s   ADSClusterController   Volume creation
request was successful
```

管理叢集

您可以透過Astra Data Store預覽使用kubecl命令來管理叢集。

- [Add a node]
- [Place a node in maintenance mode]
- [Replace a node]
- [Replace a drive]

您需要的是 **#8217** ；需要的是什麼

- 安裝了kubectl和kubecl-astrads外掛程式的系統。請參閱 "安裝Astra Data Store預覽"。

新增節點

您要新增的節點應該是Kubernetes叢集的一部分、而且其組態應該類似於叢集中的其他節點。

步驟

1. 如果新節點的dataIP尚未納入ADSCluster CR、請執行下列步驟：

   a. 編輯astradscluster CR、並在「ads Data Networks Addresses（廣告資料網路位址）」欄位中新增額外的dataIP：

```
~% kubectl edit astradscluster <cluster-name> -n astrads-system
```

回應：

```
adsDataNetworks:
    -addresses:  dataIP1,dataIP2,dataIP3,dataIP4,*newdataIP*
```

　　a. 儲存CR。

　　b. 將節點新增至Astra Data Store預覽叢集：

```
~% kubectl astrads nodes add --cluster <cluster-name>
```

2. 否則、只要新增節點即可：

```
~% kubectl astrads nodes add --cluster <cluster-name>
```

3. 確認已新增節點：

```
~% kubectl astrads nodes list
```

將節點置於維護模式

當您需要執行主機維護或套件升級時、應將節點置於維護模式。

ⓘ　　節點必須已是Astra Data Store預覽叢集的一部分。

當節點處於維護模式時、您無法將節點新增至叢集。在此範例中、我們會將節點「nhcitj1525」置於維護模式。

步驟

1. 顯示節點詳細資料：

```
~% kubectl get nodes
```

回應：

```
NAME                STATUS   ROLES                    AGE      VERSION
nhcitjj1525         Ready    <none>                   3d18h    v1.20.0
nhcitjj1526         Ready    <none>                   3d18h    v1.20.0
nhcitjj1527         Ready    <none>                   3d18h    v1.20.0
nhcitjj1528         Ready    <none>                   3d18h    v1.20.0
scs000039783-1      Ready    control-plane,master     3d18h    v1.20.0
```

2. 確保節點尚未處於維護模式：

```
~% kubectl astrads maintenance list
```

回應（維護模式中沒有節點）：

```
NAME     NODE NAME   IN MAINTENANCE   MAINTENANCE STATE        MAINTENANCE
VARIANT
```

3. 啟用維護模式。

```
~% kubectl astrads maintenance create <cr-name> --node-name=<<node
-name>> --variant=Node
```

範例：

```
~% kubectl astrads maintenance create maint1 --node-name="nhcitjj1525"
--variant=Node
Maintenance mode astrads-system/maint1 created
```

4. 列出節點。

```
~% kubectl astrads nodes list
```

回應：

```
NODE NAME          NODE STATUS        CLUSTER NAME
nhcitjj1525        Added              ftap-astra-012
...
```

5. 檢查維護模式的狀態：

```
~% kubectl astrads maintenance list
```

回應：

```
NAME      NODE NAME        IN MAINTENANCE  MAINTENANCE STATE
MAINTENANCE VARIANT
node4   nhcitjj1525     true              ReadyForMaintenance      Node
```

在「維護中」模式的開頭是「假」、並變更為「真」。「維護狀態」從「準備維護」改為「就緒維護」。

6. 節點維護完成後、請停用維護模式：

```
~% kubectl astrads maintenance update maint1 --node-name="nhcitjj1525"
--variant=None
```

7. 確保節點不再處於維護模式：

```
~% kubectl astrads maintenance list
```

更換節點

使用KECBECVL命令搭配Astra Data Store預覽、以取代叢集中故障的節點。

步驟

1. 列出所有節點：

```
~% kubectl astrads nodes list
```

回應：

```
NODE NAME            NODE STATUS    CLUSTER NAME
sti-rx2540-534d..    Added         cluster-multinodes-21209
sti-rx2540-535d...   Added         cluster-multinodes-21209
...
```

2. 描述叢集：

```
~% kubectl astrads clusters list
```

回應：

```
CLUSTER NAME                  CLUSTER STATUS   NODE COUNT
cluster-multinodes-21209   created          4
```

3. 驗證故障節點上的「Node HA（節點HA）」是否標記為「假」：

```
~% kubectl describe astradscluster -n astrads-system
```

回應：

```
Name:          cluster-multinodes-21209
Namespace:     astrads-system
Labels:        <none>
Annotations:   kubectl.kubernetes.io/last-applied-configuration:

{"apiVersion":"astrads.netapp.io/v1alpha1","kind":"AstraDSCluster","meta
data":{"annotations":{},"name":"cluster-multinodes-21209","namespa...
API Version:   astrads.netapp.io/v1alpha1
Kind:          AstraDSCluster

State:                Disabled
Variant:              None
Node HA:              false
Node ID:              4
Node Is Reachable:    false
Node Management IP:   172.21.192.192
Node Name:            sti-rx2540-532d.ctl.gdl.englab.netapp.com
Node Role:            Storage
Node UUID:            6f6b88f3-8411-56e5-b1f0-a8e8d0c946db
Node Version:         12.75.0.6167444
Status:               Added
```

4. 修改astradscluster cr,將「AdsNode Count」的值減至3、以移除故障節點：

```
cat manifests/astradscluster.yaml
```

回應：

```
apiVersion: astrads.netapp.io/v1alpha1
kind: AstraDSCluster
metadata:
```

```
    name: cluster-multinodes-21209
    namespace: astrads-system
spec:
  # ADS Node Configuration per node settings
  adsNodeConfig:
    # Specify CPU limit for ADS components
    # Supported value: 9
    cpu: 9
    # Specify Memory Limit in GiB for ADS Components.
    # Your kubernetes worker nodes need to have at least this much RAM
free
    # for ADS to function correctly
    # Supported value: 34
    memory: 34
    # [Optional] Specify raw storage consumption limit. The operator
will only select drives for a node up to this limit
    capacity: 600
    # [Optional] Set a cache device if you do not want auto detection
e.g. /dev/sdb
    # cacheDevice: ""
    # Set this regex filter to select drives for ADS cluster
    # drivesFilter: ".*"

  # [Optional] Specify node selector labels to select the nodes for
creating ADS cluster
  # adsNodeSelector:
  #   matchLabels:
  #     customLabelKey: customLabelValue

  # Specify the number of nodes that should be used for creating ADS
cluster
  adsNodeCount: 3

  # Specify the IP address of a floating management IP routable from any
worker node in the cluster
  mvip: "172..."

  # Comma separated list of floating IP addresses routable from any host
where you intend to mount a NetApp Volume
  # at least one per node must be specified
  # addresses: 10.0.0.1,10.0.0.2,10.0.0.3,10.0.0.4,10.0.0.5
  # netmask: 255.255.255.0
  adsDataNetworks:
    - addresses: "172..."
      netmask: 255.255.252.0
```

```
  # [Optional] Provide a k8s label key that defines which protection
domain a node belongs to
  # adsProtectionDomainKey: ""

  # [Optional] Provide a monitoring config to be used to setup/configure
a monitoring agent.
  monitoringConfig:
   namespace: "netapp-monitoring"
   repo: "docker.repo.eng.netapp.com/global/astra"

  autoSupportConfig:
    # AutoUpload defines the flag to enable or disable AutoSupport
upload in the cluster (true/false)
    autoUpload: true
    # Enabled defines the flag to enable or disable automatic
AutoSupport collection.
    # When set to false, periodic and event driven AutoSupport
collection would be disabled.
    # It is still possible to trigger an AutoSupport manually while
AutoSupport is disabled
    # enabled: true
    # CoredumpUpload defines the flag to enable or disable the upload of
coredumps for this ADS Cluster
    # coredumpUpload: false
    # HistoryRetentionCount defines the number of local (not uploaded)
AutoSupport Custom Resources to retain in the cluster before deletion
    historyRetentionCount: 25
    # DestinationURL defines the endpoint to transfer the AutoSupport
bundle collection
    destinationURL: "https://testbed.netapp.com/put/AsupPut"
    # ProxyURL defines the URL of the proxy with port to be used for
AutoSupport bundle transfer
    # proxyURL:
    # Periodic defines the config for periodic/scheduled AutoSupport
objects
    periodic:
      # Schedule defines the Kubernetes Cronjob schedule
      - schedule: "0 0 * * *"
        # PeriodicConfig defines the fields needed to create the
Periodic AutoSupports
        periodicconfig:
        - component:
            name: storage
            event: dailyMonitoring
          userMessage: Daily Monitoring Storage AutoSupport bundle
          nodes: all
```

```
        - component:
            name: controlplane
            event: daily
          userMessage: Daily Control Plane AutoSupport bundle
```

5. 驗證節點是否已從叢集移除：

```
~% kubectl get nodes --show-labels
```

回應：

```
NAME                                STATUS    ROLES
AGE    VERSION   LABELS
sti-astramaster-237   Ready control-plane,master   24h   v1.20.0

sti-rx2540-532d        Ready  <none>                24h   v1.20.0
sti-rx2540-533d        Ready  <none>                24h
```

```
~% kubectl astrads nodes list
```

回應：

```
NODE NAME          NODE STATUS      CLUSTER NAME
sti-rx2540-534d    Added            cluster-multinodes-21209
sti-rx2540-535d    Added            cluster-multinodes-21209
sti-rx2540-536d    Added            cluster-multinodes-21209
```

```
~% kubectl get nodes --show-labels
```

回應：

```
NAME                STATUS   ROLES                AGE    VERSION
LABELS
sti-astramaster-237 Ready    control-plane,master   24h   v1.20.0
beta.kubernetes.io/arch=amd64,
sti-rx2540-532d      Ready    <none>                 24h   v1.20.0
astrads.netapp.io/node-removal
```

```
~% kubectl describe astradscluster -n astrads-system
```

回應：

```
Name:           cluster-multinodes-21209
Namespace:      astrads-system
Labels:         <none>
Kind:           AstraDSCluster
Metadata:
...
```

6. 修改叢集CR、將節點新增至叢集以進行更換。節點數會遞增至4。確認已挑選新節點進行新增。

```
rvi manifests/astradscluster.yaml
cat manifests/astradscluster.yaml
apiVersion: astrads.netapp.io/v1alpha1
kind: AstraDSCluster
metadata:
  name: cluster-multinodes-21209
  namespace: astrads-system
```

```
~% kubectl apply -f manifests/astradscluster.yaml
```

回應：

```
astradscluster.astrads.netapp.io/cluster-multinodes-21209 configured
```

```
~% kubectl get pods -n astrads-system
```

回應：

```
NAME                                READY   STATUS    RESTARTS   AGE
astrads-cluster-controller...       1/1     Running   1          24h
astrads-deployment-support...       3/3     Running   0          24h
astrads-ds-cluster-multinodes-21209 1/1     Running
```

```
~% kubectl astrads nodes list
```

回應：

```
NODE NAME                  NODE STATUS        CLUSTER NAME
sti-rx2540-534d...         Added              cluster-multinodes-21209
sti-rx2540-535d...         Added              cluster-multinodes-21209
```

```
~% kubectl astrads clusters list
```

回應：

```
CLUSTER NAME                       CLUSTER STATUS   NODE COUNT
cluster-multinodes-21209           created          4
```

```
~% kubectl astrads drives list
```

回應：

```
DRIVE NAME      DRIVE ID      DRIVE STATUS   NODE NAME       CLUSTER NAME
scsi-36000..  c3e197f2... Active            sti-rx2540... cluster-
multinodes-21209
```

更換磁碟機

當叢集中的磁碟機故障時、必須儘快更換磁碟機、以確保資料完整性。當磁碟機故障時、您會在叢集CR節點狀態、叢集健全狀況資訊和度量端點中看到故障磁碟機資訊。

顯示**nodeStatuses.driveStatuses**中故障磁碟機的叢集範例

```
$ kubectl get adscl -A -o yaml
```

回應：

```
...
apiVersion: astrads.netapp.io/v1alpha1
kind: AstraDSCluster
...
nodeStatuses:
  - driveStatuses:
    - driveID: 31205e51-f592-59e3-b6ec-185fd25888fa
      driveName: scsi-36000c290ace209465271ed6b8589b494
      drivesStatus: Failed
    - driveID: 3b515b09-3e95-5d25-a583-bee531ff3f31
      driveName: scsi-36000c290ef2632627cb167a03b431a5f
      drivesStatus: Active
    - driveID: 0807fa06-35ce-5a46-9c25-f1669def8c8e
      driveName: scsi-36000c292c8fc037c9f7e97a49e3e2708
      drivesStatus: Active
...
```

故障磁碟機CR會在叢集中自動建立、名稱對應於故障磁碟機的UUID。

```
$ kubectl get adsfd -A -o yaml
```

回應：

```
...
apiVersion: astrads.netapp.io/v1alpha1
kind: AstraDSFailedDrive
metadata:
    name: c290a-5000-4652c-9b494
    namespace: astrads-system
spec:
  executeReplace: false
  replaceWith: ""
 status:
   cluster: arda-6e4b4af
   failedDriveInfo:
     failureReason: AdminFailed
     inUse: false
     name: scsi-36000c290ace209465271ed6b8589b494
     path: /dev/disk/by-id/scsi-36000c290ace209465271ed6b8589b494
     present: true
     serial: 6000c290ace209465271ed6b8589b494
     node: sti-rx2540-300b.ctl.gdl.englab.netapp.com
   state: ReadyToReplace
```

```
~% kubectl astrads faileddrive list --cluster arda-6e4b4af
```

回應：

```
NAME          NODE                              CLUSTER        STATE
AGE
6000c290     sti-rx2540-300b.lab.netapp.com    ard-6e4b4af    ReadyToReplace
13m
```

步驟

1. 使用「kubectl astrads show-replacement」命令列出可能的更換磁碟機、該命令可篩選符合更換限制的磁碟機（未在叢集內使用、未掛載、無分割區、等於或大於故障磁碟機）。

   若要列出所有磁碟機而不篩選可能的更換磁碟機、請在「show -replacement」命令中新增「-all」。

   ```
   ~%  kubectl astrads faileddrive show-replacements --cluster ard-6e4b4af
   --name 6000c290
   ```

   回應：

   ```
   NAME   IDPATH              SERIAL   PARTITIONCOUNT   MOUNTED   SIZE
   sdh    /scsi-36000c29417   45000c   0                false     100GB
   ```

2. 使用「放置」命令、以通過的序號取代磁碟機。命令會完成替換、如果經過「-wait」時間、則會失敗。

   ```
   ~% kubectl astrads faileddrive replace --cluster arda-6e4b4af --name
   6000c290 --replaceWith 45000c --wait
   Drive replacement completed successfully
   ```

   ⓘ 如果使用不適當的「-replaceWith」序號來執行「kubectl astrads故障磁碟機更換」、則會出現類似以下的錯誤：

```
~% kubectl astrads replacedrive replace --cluster astrads-cluster-
f51b10a --name 6000c2927 --replaceWith BAD_SERIAL_NUMBER
Drive 6000c2927 replacement started
Failed drive 6000c2927 has been set to use BAD_SERIAL_NUMBER as a
replacement
...
Drive replacement didn't complete within 25 seconds
Current status: {FailedDriveInfo:{InUse:false Present:true Name:scsi-
36000c2 FiretapUUID:444a5468 Serial:6000c Path:/scsi-36000c
FailureReason:AdminFailed Node:sti-b200-0214a.lab.netapp.com}
Cluster:astrads-cluster-f51b10a State:ReadyToReplace
Conditions:[{Message: "Replacement drive serial specified doesn't
exist", Reason: "DriveSelectionFailed", Status: False, Type:' Done"]}
```

3. 若要重新執行磁碟機更換、請使用之前的命令「-force」：

```
~%  kubectl astrads replacedrive replace --cluster astrads-cluster-
f51b10a --name 6000c2927 --replaceWith VALID_SERIAL_NUMBER --force
```

以取得更多資訊

- "使用kvecll命令管理Astra Data Store預覽資產"

利用功能表監控指標**Cloud Insights**

您可以使用Cloud Insights 支援功能來監控Astra Data Store預覽指標。

- [Complete Cloud Insights connection prerequisite tasks]
- [Acquisition Unit storage]
- [Download and run the installation script]
- [Edit the Cloud Insights connection]
- [Disconnect from Cloud Insights]

以下是顯示在畫面上的Astra Data Store預覽指標範例Cloud Insights
：
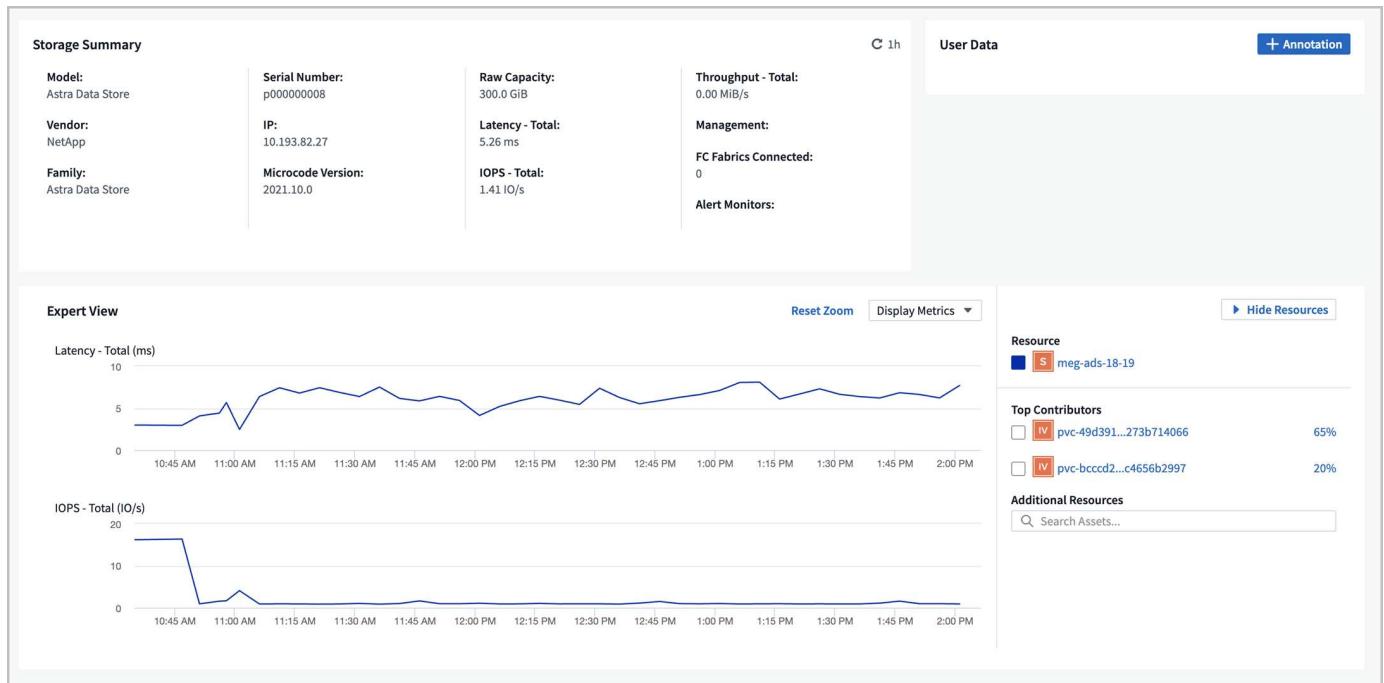
您也可以使用、顯示Astra Data Store預覽中產生的度量清單 [Open Metrics API help]。

完成**Cloud Insights** 連線先決條件工作

在將Astra Data Store與Cloud Insights 支援功能整線之前、您必須先完成下列工作：

- "安裝Astra Data Store監控操作員" 這是Astra Data Store預覽安裝說明的一部分。
- "安裝kubecl-astrads二進位檔" 這是Astra Data Store預覽安裝說明的一部分。
- "建立Cloud Insights 一個不一樣的帳戶"。
- 請確認下列命令可用：「awk、curl、grep」和「jq」

收集下列資訊：

- * Cloud Insights 具備類別讀寫權限的API存取權杖*：擷取單元、資料收集、資料擷取和記錄擷取。這將用於讀取/寫入作業、設定擷取單位、以及設定資料擷取程序。
- * Kubernetes API伺服器IP位址和連接埠*。這是用來監控Astra Data Store預覽叢集。
- * Kubernetes API權杖*。這是用來呼叫Kubernetes API。
- 持續磁碟區組態。有關如何配置持續磁碟區的資訊。

擷取單元儲存

擷取單元需要三個持續磁碟區來儲存安裝檔案、組態資料和記錄。監控操作員使用預設儲存類別來建立持續的Volume宣告。您可以在執行安裝程式指令碼時、使用「-s」選項來指定不同的儲存類別名稱。

如果您的Kubernetes叢集沒有儲存資源配置程式（例如NetApp Trident）、您可以在執行安裝程式指令碼時、使用「-r」選項來提供本機檔案系統路徑。設定「-r」選項時、安裝程式指令碼會在所提供的目錄內建立三個持續磁碟區。此目錄需要至少150 GB的可用空間。

下載並執行安裝指令碼

提供Bash指令碼、可透過監控操作員啟用Astra Data Store預覽監控功能。Cloud Insights安裝指令碼會安裝擷取單元、其中含有Astra Data Store Collector、Telegraf代理程式及Fluent位元代理程式。

下載時、將會在安裝程式指令碼中內嵌選定的「更新網域名稱」和「選定的更新API存取權杖」Cloud Insights Cloud Insights 。

然後、會以下列方式傳送指標：

- Telegraf會將指標傳送到Cloud Insights 這個數據湖。
- Fluent位元會將記錄傳送至記錄擷取服務。

顯示安裝程式指令碼說明

安裝程式指令碼的完整說明文字如下所示：

顯示安裝程式指令碼說明文字：

```
./cloudinsights-ads-monitoring.sh -h
```

回應：

```
USAGE: cloudinsights-ads-monitoring.sh [OPTIONS]
Configure monitoring of Astra Data Store by Cloud Insights.
OPTIONS:
  -h                      Display this help message.
  -d ci_domain_name       Cloud Insights tenant domain name.
  -i kubernetes_ip        Kubernetes API server IP address.
  -k ci_api_key           Cloud Insights API Access Token.
  -n namespace            Namespace for monitoring components. (default:
netapp-monitoring)
  -p kubernetes_port      Kubernetes API server port. (default: 6443)
  -r root_pv_dir          Create 3 Persistent Volumes in this directory
for the Acquisition Unit.
                          Only specify this option if there is no Storage
Provisioner installed and the PVs do not already exist.
  -s storage_class        Storage Class name for provisioning Acquisition
Unit PVs. If not specified, the default storage class will be used.
  -t kubernetes_token     Kubernetes API server token.
```

執行安裝指令碼

1. 如果Cloud Insights 您還沒有這個帳戶、請建立一個這個帳戶。
2. 登入Cloud Insights 到

3. 在「支援資料」功能表中、按一下「管理」>「資料收集器」Cloud Insights 。

4. 按一下「**+**資料收集器」以新增收集器。
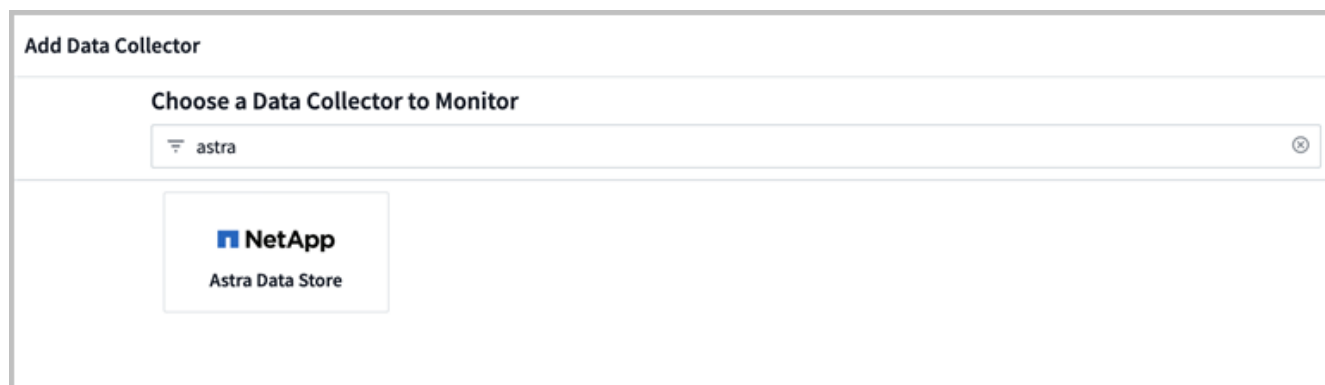
5. 按一下「* Astra Data Store*」方塊。

6. 選取正確Cloud Insights 的「循環API」存取權杖、或建立新的權杖。

7. 請依照指示下載安裝程式指令碼、更新權限、然後執行指令碼。

   此指令碼包含Cloud Insights 您的URL、以及所選Cloud Insights 的循環API存取權杖。

8. 指令碼完成後、按一下*完成設定*。

安裝指令碼完成後、Astra Data Store收集器會出現在資料集區清單中。

如果指令碼因為錯誤而結束、您可以在錯誤解決之後再次執行。如果您的環境未使用預設設定、指令碼可支援其他參數、例如監控操作員命名空間和Kubernetes API伺服器連接埠。請使用「./cloudinsights-ads-monitoring.sh -h」中的「-h」選項查看使用量和說明文字。

安裝指令碼會在組態成功時產生類似的輸出：

```
Configuring Cloud Insights monitoring for Astra Data Store . . .
Configuring monitoring namespace
...
Configuring output sink and Fluent Bit plugins
Configuring Telegraf plugins
Configuring Acquisition Unit
...
Acquisition Unit has been installed successfully.
Configuring Astra Data Store data collector
Astra Data Store collector data '<CLUSTER_NAME>' created
Configuration done!
```

代理程式CR範例

以下是執行安裝程式指令碼後、「monitoring NetApp」代理程式CR的外觀範例。

```
spec:
 au:
   isEnabled: true
   storageClassName: auto-sc
 cluster-name: meg-ads-21-22-29-30
 docker-repo: docker.repo.eng.netapp.com/global/astra
 fluent-bit:
 - name: ads-tail
   outputs:
   - sink: ADS_STDOUT
   substitutions:
   - key: TAG
     value: firetapems
   - key: LOG_FILE
     values:
     - /var/log/firetap/*/ems/ems
     - /var/log/firetap/ems/*/ems/ems
   - key: ADS_CLUSTER_NAME
     value: meg-ads-21-22-28-29-30
 - name: agent
 - name: ads-tail-ci
   outputs:
```

```
    - sink: CI
    substitutions:
    - key: TAG
      value: netapp.ads
    - key: LOG_FILE
      values:
      - /var/log/firetap/*/ems/ems
      - /var/log/firetap/ems/*/ems/ems
    - key: ADS_CLUSTER_NAME
      value: meg-ads-21-22-28-29-30
  output-sink:
  - api-key: abcd
    domain-name: bzl9ngz.gst-adsdemo.ci-dev.netapp.com
    name: CI
  serviceAccount: sa-netapp-monitoring
  telegraf:
  - name: ads-open-metric
    outputs:
    - sink: CI
    run-mode:
    - ReplicaSet
    substitutions:
    - key: URLS
      values:
      - http://astrads-metrics-service.astrads-
system.svc.cluster.local:9341
    - key: METRIC_TYPE
      value: ads-metric
    - key: ADS_CATEGORY
      value: netapp_ads
    - key: ADS_CLUSTER_NAME
      value: meg-ads-21-22-28-29-30
  - name: agent
status:
  au-pod-status: UP
  au-uuid: eddeccc6-3aa3-4dd2-a98c-220085fae6a9
```

編輯**Cloud Insights** 此鏈接

您稍後可以編輯Kubernetes API權杖或Cloud Insights 是使用此功能的循環API存取權杖：

- 如果您想要更新Kubernetes API權杖、您應該從Cloud Insights 這個UI編輯Astra Data Store收集器。

- 如果您想要更新Cloud Insights 遙測和記錄所用的循環API存取權杖、您應該使用kubectl命令來編輯監控操作員CR。

更新**Kubernetes API**權杖

1. 登入Cloud Insights 到
2. 選取*管理*>*資料收集器*以存取「資料收集器」頁面。
3. 尋找Astra Data Store叢集的項目。
4. 按一下頁面右側的功能表、然後選取*編輯*。
5. 使用新值更新Kubernetes API Token欄位。
6. 選取*儲存Collector *。

更新**Cloud Insights** 程式：更新程式碼

1. 登入Cloud Insights 到
2. 選取「管理>* API存取*」、然後按一下「**+ API**存取權杖」、即可建立新Cloud Insights 的「循環API存取權杖」。
3. 編輯Agent CR:

```
kubectl --namespace netapp-monitoring edit agent agent-monitoring-netapp
```

4. 找到"output-sink（輸出接收器）"區段、找到名稱為"CI"的項目。
5. 如需標籤「API-金鑰」、請將目前值改為全新Cloud Insights 的REAPI存取權杖。

   此區段如下所示：

```
output-sink:
 - api-key: <api key value>
   domain-name: <tenant url>
   name: CI
```

6. 儲存並結束編輯器視窗。

監控營運者將更新Telegraf和Fluent位元、以使用新Cloud Insights 的版的更新版的BIOS API存取權杖。

中斷**Cloud Insights** 與該功能的連線

若要中斷Cloud Insights 與功能表的連線、您必須Cloud Insights 先從功能表上刪除Astra Data Store收集器。完成後、您可以從監控操作員移除擷取單元、Telegraf和Fluent位元組態。

移除**Astra Data Store**預覽收集器

1. 登入Cloud Insights 到
2. 選取*管理*>*資料收集器*以存取「資料收集器」頁面。
3. 尋找Astra Data Store叢集的項目。

4. 選取畫面右側的功能表、然後選取*刪除*。

5. 按一下確認頁面上的*刪除*。

移除擷取單元、**Telegraf**和**Fluent**位元

1. 編輯Agent CR:

```
kubectl --namespace netapp-monitoring edit agent agent-monitoring-netapp
```

2. 找到「au」區段、並將「isEnabled」設為「假」

3. 找到「Fluent位元」區段、然後移除名為「ads tail-CI」的外掛程式。如果沒有其他外掛程式、您可以移除「Fluent位元」區段。

4. 找到「Telewraf」區段、移除名為「ads開放式指標」的外掛程式。如果沒有其他外掛程式、您可以移除「Telewraf」區段。

5. 找到「output-sink（輸出接收器）」區段、然後移除名為「CI」的接收器。

6. 儲存並結束編輯器視窗。

   監控操作員將更新Telegraf和Fluent位元組態、並刪除擷取單元Pod。

7. 如果您將本機目錄用於擷取單元PV、而非儲存資源配置程式、請刪除PV：

```
kubectl delete pv au-lib au-log au-pv
```

   然後、刪除正在執行擷取單元的節點上的實際目錄。

8. 在擷取單元Pod刪除之後、您可以從Cloud Insights 功能表中刪除擷取單元。
   a. 在「支援資料」功能表中、選取*管理*>*資料收集器*。Cloud Insights
   b. 按一下「擷取單位」標籤。
   c. 按一下擷取設備Pod旁的功能表。
   d. 選擇*刪除*。

監控操作員會更新Telegraf和Fluent位元組態、並移除擷取單元。

Open Metrics API說明

以下是可用來從Astra Data Store預覽收集度量的API清單。

- 「說明」行說明指標。
- 「類型」行指出度量是量表還是計數器。

```
# HELP astrads_cluster_capacity_logical_percent Percentage cluster logical
capacity that is used (0-100)
```

```
# TYPE astrads_cluster_capacity_logical_percent gauge
# HELP astrads_cluster_capacity_max_logical Max Logical capacity of the
cluster in bytes
# TYPE astrads_cluster_capacity_max_logical gauge
# HELP astrads_cluster_capacity_max_physical The sum of the space in the
cluster in bytes for storing data after provisioning efficiencies, data
reduction algorithms and replication schemes are applied
# TYPE astrads_cluster_capacity_max_physical gauge
# HELP astrads_cluster_capacity_ops The IO operations capacity of the
cluster
# TYPE astrads_cluster_capacity_ops gauge
# HELP astrads_cluster_capacity_physical_percent The percentage of cluster
physical capacity that is used (0-100)
# TYPE astrads_cluster_capacity_physical_percent gauge
# HELP astrads_cluster_capacity_used_logical The sum of the bytes of data
in all volumes in the cluster before provisioning efficiencies, data
reduction algorithms and replication schemes are applied
# TYPE astrads_cluster_capacity_used_logical gauge
# HELP astrads_cluster_capacity_used_physical Used Physical capacity of a
cluster in bytes
# TYPE astrads_cluster_capacity_used_physical gauge
# HELP astrads_cluster_other_latency The sum of the accumulated latency in
seconds for other IO operations of all the volumes in a cluster. Divide by
astrads_cluster_other_ops to get the average latency per other operation
# TYPE astrads_cluster_other_latency counter
# HELP astrads_cluster_other_ops The sum of the other IO operations of all
the volumes in a cluster
# TYPE astrads_cluster_other_ops counter
# HELP astrads_cluster_read_latency The sum of the accumulated latency in
seconds of read IO operations of all the volumes in a cluster. Divide by
astrads_cluster_read_ops to get the average latency per read operation
# TYPE astrads_cluster_read_latency counter
# HELP astrads_cluster_read_ops The sum of the read IO operations of all
the volumes in a cluster
# TYPE astrads_cluster_read_ops counter
# HELP astrads_cluster_read_throughput The sum of the read throughput of
all the volumes in a cluster in bytes
# TYPE astrads_cluster_read_throughput counter
# HELP astrads_cluster_storage_efficiency Efficacy of data reduction
technologies. (logical used / physical used)
# TYPE astrads_cluster_storage_efficiency gauge
# HELP astrads_cluster_total_latency The sum of the accumulated latency in
seconds of all IO operations of all the volumes in a cluster. Divide by
astrads_cluster_total_ops to get average latency per operation
# TYPE astrads_cluster_total_latency counter
# HELP astrads_cluster_total_ops The sum of the IO operations of all the
```

```
volumes in a cluster
# TYPE astrads_cluster_total_ops counter
# HELP astrads_cluster_total_throughput The sum of the read and write
throughput of all the volumes in a cluster in bytes
# TYPE astrads_cluster_total_throughput counter
# HELP astrads_cluster_utilization_factor The ratio of the current cluster
IO operations based on recent IO sizes to the cluster iops capacity. (0.0
- 1.0)
# TYPE astrads_cluster_utilization_factor gauge
# HELP astrads_cluster_volume_used The sum of used capacity of all the
volumes in a cluster in bytes
# TYPE astrads_cluster_volume_used gauge
# HELP astrads_cluster_write_latency The sum of the accumulated latency in
seconds of write IO operations of all the volumes in a cluster. Divide by
astrads_cluster_write_ops to get the average latency per write operation
# TYPE astrads_cluster_write_latency counter
# HELP astrads_cluster_write_ops The sum of the write IO operations of all
the volumes in a cluster
# TYPE astrads_cluster_write_ops counter
# HELP astrads_cluster_write_throughput The sum of the write throughput of
all the volumes in a cluster in bytes
# TYPE astrads_cluster_write_throughput counter
# HELP astrads_disk_base_seconds Base for busy, pending and queued.
Seconds since collection began
# TYPE astrads_disk_base_seconds counter
# HELP astrads_disk_busy Seconds the disk was busy. 100 *
(astrads_disk_busy / astrads_disk_base_seconds) = percent busy (0-100)
# TYPE astrads_disk_busy counter
# HELP astrads_disk_capacity Raw Capacity of a disk in bytes
# TYPE astrads_disk_capacity gauge
# HELP astrads_disk_io_pending Summation of the count of pending io
operations for a disk times time. Divide by astrads_disk_base_seconds to
get the average pending operation count
# TYPE astrads_disk_io_pending counter
# HELP astrads_disk_io_queued Summation of the count of queued io
operations for a disk times time. Divide by astrads_disk_base_seconds to
get the average queued operations count
# TYPE astrads_disk_io_queued counter
# HELP astrads_disk_read_latency Total accumulated latency in seconds for
disk reads. Divide by astrads_disk_read_ops to get the average latency per
read operation
# TYPE astrads_disk_read_latency counter
# HELP astrads_disk_read_ops Total number of read operations for a disk
# TYPE astrads_disk_read_ops counter
# HELP astrads_disk_read_throughput Total bytes read from a disk
# TYPE astrads_disk_read_throughput counter
```

```
# HELP astrads_disk_write_latency Total accumulated latency in seconds for
disk writes. Divide by astrads_disk_write_ops to get the average latency
per write operation
# TYPE astrads_disk_write_latency counter
# HELP astrads_disk_write_ops Total number of write operations for a disk
# TYPE astrads_disk_write_ops counter
# HELP astrads_disk_write_throughput Total bytes written to a disk
# TYPE astrads_disk_write_throughput counter
# HELP astrads_value_scrape_duration Duration to scrape values
# TYPE astrads_value_scrape_duration gauge
# HELP astrads_volume_capacity_available The minimum of the available
capacity of a volume and the available capacity of the cluster in bytes
# TYPE astrads_volume_capacity_available gauge
# HELP astrads_volume_capacity_available_logical Logical available
capacity of a volume in bytes
# TYPE astrads_volume_capacity_available_logical gauge
# HELP astrads_volume_capacity_percent Percentage of volume capacity
available (0-100). (capacity available / provisioned) * 100
# TYPE astrads_volume_capacity_percent gauge
# HELP astrads_volume_capacity_provisioned Provisioned capacity of a
volume in bytes after setting aside the snapshot reserve. (size - snapshot
reserve = provisioned)
# TYPE astrads_volume_capacity_provisioned gauge
# HELP astrads_volume_capacity_size Total capacity of a volume in bytes
# TYPE astrads_volume_capacity_size gauge
# HELP astrads_volume_capacity_snapshot_reserve_percent Snapshot reserve
percentage of a volume (0-100)
# TYPE astrads_volume_capacity_snapshot_reserve_percent gauge
# HELP astrads_volume_capacity_snapshot_used The amount of volume snapshot
data that is not in the active file system in bytes
# TYPE astrads_volume_capacity_snapshot_used gauge
# HELP astrads_volume_capacity_used Used capacity of a volume in bytes.
This is bytes in the active filesystem unless snapshots are consuming more
than the snapshot reserve. (bytes in the active file system + MAX(0,
snapshot_used-(snapshot_reserve_percent/100*size))
# TYPE astrads_volume_capacity_used gauge
# HELP astrads_volume_other_latency Total accumulated latency in seconds
for operations on a volume that are neither read or write. Divide by
astrads_volume_other_ops to get the average latency per other operation
# TYPE astrads_volume_other_latency counter
# HELP astrads_volume_other_ops Total number of operations for a volume
that are neither read or write
# TYPE astrads_volume_other_ops counter
# HELP astrads_volume_read_latency Total accumulated read latency in
seconds for a volume. Divide by astrads_volume_read_ops to get the average
latency per read operation
```

```
# TYPE astrads_volume_read_latency counter
# HELP astrads_volume_read_ops Total number of read operations for a
volume
# TYPE astrads_volume_read_ops counter
# HELP astrads_volume_read_throughput Total read throughput for a volume
in bytes
# TYPE astrads_volume_read_throughput counter
# HELP astrads_volume_total_latency Total accumulated latency in seconds
for all operations on a volume. Divide by astrads_volume_total_ops to get
the average latency per operation
# TYPE astrads_volume_total_latency counter
# HELP astrads_volume_total_ops Total number of operations for a volume
# TYPE astrads_volume_total_ops counter
# HELP astrads_volume_total_throughput Total thoughput for a volume in
bytes
# TYPE astrads_volume_total_throughput counter
# HELP astrads_volume_write_latency Total accumulated write latency in
seconds for volume. Divide by astrads_volume_write_ops to get the average
latency per write operation
# TYPE astrads_volume_write_latency counter
# HELP astrads_volume_write_ops Total number of write operations for a
volume
# TYPE astrads_volume_write_ops counter
# HELP astrads_volume_write_throughput Total write thoughput for a volume
in bytes
# TYPE astrads_volume_write_throughput counter
```

使用**Prometheus**和**Grafana**監控指標

您可以使用Prometheus和Grafana監控Astra Data Store預覽指標。您可以設定Prometheus、從Astra Data Store預覽Kubernetes叢集度量端點收集度量、也可以使用Grafana來視覺化度量資料。

您需要的是 **#8217** ；需要的是什麼

- 請確定您已在Astra Data Store預覽叢集或其他可與Astra Data Store預覽叢集通訊的叢集上下載並安裝Prometheus和Grafana套件。請依照正式文件中的指示安裝每個工具：

  - "安裝Prometheus"

  - "安裝Grafana"

- Prometheus和Grafana需要能夠與Astra Data Store預覽Kubernetes叢集通訊。如果未在Astra Data Store預覽叢集上安裝Prometheus和Grafana、您必須確保它們能與Astra Data Store預覽叢集上執行的度量服務通訊。

設定**Prometheus**

Astra Data Store預覽會在Kubernetes叢集中的TCP連接埠9341上公開度量服務。您必須設定Prometheus、才能從此服務收集指標。

1. 編輯Prometheus安裝的「Prometheus.yml」組態檔案。

2. 新增指向Astra Data Store預覽服務名稱及其連接埠的服務目標。例如：

```
scrape_configs:
static_configs:
- targets: ['astrads-metrics-service.astrads-system:9341']
```

3. 啟動Prometheus服務。

設定**Grafana**

您可以設定Grafana以顯示Prometheus收集的指標。

步驟

1. 編輯Grafana安裝的「datasourses.yaml」組態檔。

2. 將Prometheus新增為資料來源。例如：

```
apiVersion: 1

datasources:
  - name: astradatastore-prometheus
    type: prometheus
    access: proxy
    url: http://localhost:9090
    jsonData:
      manageAlerts: false
```

3. 啟動Grafana服務。

4. 請依照Grafana文件中的指示進行 "開始使用"。

匯入**Grafana**儀表板範本

您下載以安裝Astra Data Store預覽的套裝組合檔案包含Grafana儀表板範本檔案、可從Grafana匯入。這些儀表板範本可協助您查看Astra Data Store預覽中可用的度量類型、以及如何檢視這些資料。

步驟

1. 開啟Astra Data Store preview ".tar.gz"套裝組合。

2. 開啟「manifest」目錄。

3. 擷取「grafana_cluster・json」和「grafana_volume・json」檔案。

4. 使用Grafana網路UI、 "將儀表板範本檔案匯入至Grafana"。

設定及監控事件記錄

若要監控事件管理系統（EMS）記錄、您可以執行下列高層級工作：

- [Configure monitoring in the Astra Data Store preview cluster custom resource (CR)]
- [Set up Cloud Insights]
- [Stream event logs to Elastic]。

在**Astra Data Store**預覽叢集自訂資源（**CR**）中設定監控

如果尚未在Astra Data Store預覽叢集CR上設定監控選項、您可以使用「astrads」擴充功能來設定。

輸入：

```
~% kubectl astrads monitoring setup -n <NAMESPACE OF AGENT INSTALLED>
    -r <DOCKER REPO TO FIND FLUENT/TELEGRAF ETC IMAGES>
```

其中：

- 安裝代理程式的命名空間：輸入監控代理程式的命名空間、這是監控操作員監控NetApp CR的預設名稱。
- 您可以選擇在Docker登錄中設定Fluent或Telegraf影像所在的位置。根據預設、路徑會設
  為「docker.repo.eng.netapp.com/global/astra`」、您可以變更此路徑。

設定**Cloud Insights** 功能

若要檢視記錄、Cloud Insights 可選用設定功能不需使用；不過、使用Cloud Insights 畫面來檢視資料是很有幫
助的。請參閱 "如何設定NetApp Cloud Insights 解決方案" 用於Astra Data Store預覽。

串流事件記錄至**Elastic**

若要將EMS事件和其他Pod記錄串流至第三方端點（例如Elastic）、請使用「astrads」延伸功能。

輸入：

```
~% kubectl astrads monitoring --host <ELASTIC HOST NAME> --port <ELASTIC
HOST PORT> es
```

> (i) 彈性主機名稱可以是IP位址。

使用**Astra Control Center**搭配**Astra Data Store**預覽

您可以使用Astra Control Center使用者介面（UI）來執行Astra Data Store預覽工作。

設定**Astra Control Center**進行**Astra Data Store**預覽

若要使用Astra Control Center UI進行Astra Data Store預覽、您必須完成下列工作：

- "將執行Astra Data Store的基礎Kubernetes叢集新增至Astra Control Center"。
- "將Astra Data Store預覽新增為Astra Control Center的儲存後端"。

> ⓘ 如果您新增儲存後端、但沒有具備Astra Data Store預覽功能的Kubernetes叢集、則必須先新增叢集。

您可以在**Astra**控制中心做什麼

設定Astra Control Center for Astra Data Store預覽之後、您就可以使用Astra Control Center UI來完成下列工作：

- "使用Astra Control Center監控Astra Data Store預覽資產的健全狀況"。
- "管理Astra Data Store預覽後端儲存設備"。
- "監控節點、磁碟和持續磁碟區宣告（PVCS）"。

以取得更多資訊

- "Astra系列簡介"
- "Astra Control Center文件"
- "Astra Control API"

使用自動指令碼解除安裝**Astra Data Store**預覽

若要解除安裝Astra Data Store預覽和控制面板、您必須移除工作負載、繫結、磁碟區、匯出原則、Astra Data Store叢集、授權、部署環境、以及Astra Data Store預覽命名空間。

或者、您也可以 "無需指令碼即可解除安裝Astra Data Store預覽"。

您需要的是 **#8217** ；需要的是什麼

- root系統管理權限

Astra Data Store預覽解除安裝程序會引導您完成下列高層級步驟：

- [Remove existing workloads and bindings]
- [Uninstall Astra Data Store cluster]
- [Validate the removal of the astrads-system namespace]
- [Ensure containers are not running on worker nodes]
- [Delete OpenShift Container Platform resources]
- [Troubleshoot the Astra Data Store preview uninstall process]

移除現有的工作負載和繫結

在解除安裝Astra Data Store預覽之前、您必須先移除下列項目

- 所有使用Astra Data Store預覽做為儲存後端的應用程式工作負載
- Trident繫結使用Astra Data Store預覽做為後端

如此可確保Kubernetes環境保持乾淨狀態、這在重新安裝時非常重要。

解除安裝**Astra Data Store**叢集

若要解除安裝Astra Data Store預覽、您可以使用從NetApp支援網站下載的Astra Data Store tar檔案中的「uninstall.sh」指令碼。

1. 在「manifest」目錄中找到「uninstall.sh」。
2. 執行下列「shed（已執行）"命令：

```
sed -i -e 's~netappsdsoperator.yaml~astradsoperator.yaml~' uninstall.sh
```

3. 執行下列指令碼、指出您要解除安裝的項目：

```
./uninstall.sh

You must run this script with an argument specifying what should be
uninstalled
To uninstall the ADS cluster run ./uninstall.sh cluster
To uninstall everything run ./uninstall all
```

4. 如果您只想卸載叢集、請輸入「uninstall.sh <cluster >」

   否則、如果您想要解除安裝所有項目、請輸入「uninstall.sh」

   > ⓘ 在大多數情況下、您都會將所有項目解除安裝。如果您想在之後重新部署叢集、可能只想要解除安裝叢集。

5. 出現提示時、請確認您要繼續、然後輸入「eraseDDATA」

   回應：

```
./uninstall.sh all

Enter 'erasedata' to confirm you want proceed with the uninstall:
erasedata
+-------------------------------------------------+
| Wed Feb  2 10:14:01 EST 2022                    |
```

```
| ADS cluster uninstall started                       |
+-----------------------------------------------------+
Deleting astradsvolumes
Deleted astradsvolumes
Deleting astradsexportpolicies
Deleted astradsexportpolicies
Deleting astradsvolumesnapshots
Deleted astradsvolumesnapshots
Deleting astradsclusters
Deleting astradsclusters
Deleting astradslicenses
Deleted astradslicenses


+-----------------------------------------------------+
| Wed Feb  2 10:15:18 EST 2022                        |
| ADS cluster uninstall done                          |
+-----------------------------------------------------+


+-----------------------------------------------------+
| Wed Feb  2 10:15:18 EST 2022                        |
| ADS system uninstall started                        |
+-----------------------------------------------------+
Removing astradsversion
astradsversion.astrads.netapp.io "astradsversion" deleted
Removed astradsversion
Removing daemonsets
daemonset.apps "astrads-ds-nodeinfo-astradsversion" deleted
Removed daemonsets
Removing deployments
deployment.apps "astrads-cluster-controller" deleted
deployment.apps "astrads-license-controller" deleted
deployment.apps "astrads-operator" deleted
Removed deployments
Removing all other AstraDS resources
namespace "astrads-system" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsautosupports.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradscloudsnapshots.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsclusters.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsexportpolicies.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsfaileddrives.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
```

```
"astradslicenses.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsnfsoptions.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsnodeinfoes.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsnodemanagements.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsqospolicies.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsversions.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsvolumefiles.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsvolumes.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsvolumesnapshots.astrads.netapp.io" deleted
role.rbac.authorization.k8s.io "astrads-astrads-system-admin-role"
deleted
role.rbac.authorization.k8s.io "astrads-astrads-system-reader-role"
deleted
role.rbac.authorization.k8s.io "astrads-astrads-system-writer-role"
deleted
role.rbac.authorization.k8s.io "astrads-leader-election-role" deleted
role.rbac.authorization.k8s.io "astrads-manager-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astrads-admin-
clusterrole" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astrads-reader-
clusterrole" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astrads-writer-
clusterrole" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsautosupport-
editor-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsautosupport-
viewer-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradscloudsnapshot-
editor-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradscloudsnapshot-
viewer-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradscluster-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradscluster-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsexportpolicy-
editor-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsexportpolicy-
```

```
viewer-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsfaileddrive-
editor-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsfaileddrive-
viewer-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradslicense-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradslicense-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsnfsoption-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsnfsoption-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsnodeinfo-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsnodeinfo-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsnodemanagement-
editor-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsnodemanagement-
viewer-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsqospolicy-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsversion-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsversion-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsvolume-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsvolume-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsvolumefile-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsvolumefile-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsvolumesnapshot-
editor-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsvolumesnapshot-
viewer-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-manager-role" deleted
rolebinding.rbac.authorization.k8s.io "astrads-astrads-admin-
rolebinding" deleted
rolebinding.rbac.authorization.k8s.io "astrads-astrads-reader-
rolebinding" deleted
rolebinding.rbac.authorization.k8s.io "astrads-astrads-writer-
rolebinding" deleted
```

```
rolebinding.rbac.authorization.k8s.io "astrads-leader-election-
rolebinding" deleted
rolebinding.rbac.authorization.k8s.io "astrads-manager-rolebinding"
deleted
clusterrolebinding.rbac.authorization.k8s.io "astrads-astrads-admin-
rolebinding" deleted
clusterrolebinding.rbac.authorization.k8s.io "astrads-astrads-reader-
rolebinding" deleted
clusterrolebinding.rbac.authorization.k8s.io "astrads-astrads-writer-
rolebinding" deleted
clusterrolebinding.rbac.authorization.k8s.io "astrads-manager-
rolebinding" deleted
configmap "astrads-autosupport-cm" deleted
configmap "astrads-firetap-cm" deleted
configmap "astrads-kevents-asup" deleted
configmap "astrads-metrics-cm" deleted
secret "astrads-autosupport-certs" deleted
+-------------------------------------------------+
| Wed Feb  2 10:16:36 EST 2022                    |
| ADS system uninstall done                       |
+-------------------------------------------------+
```

驗證刪除**astrad-system**命名空間

請確定下列命令沒有傳回任何結果：

```
kubectl get ns | grep astrads-system
```

確保容器未在工作節點上執行

驗證「fifetap」或「netwd」等容器是否未在工作節點上執行。在每個節點上執行下列項目。

```
ssh <mynode1>
# runc list
```

刪除**OpenShift Container Platform**資源

如果您在Red Hat OpenShift Container Platform（OCP）上安裝Astra Data Store預覽、則可以解除安裝OCP安全內容限制（SCC）和角色繫結資源。

OpenShift使用安全內容限制（SCC）來控制Pod可以執行的動作。

完成標準的解除安裝程序之後、請完成下列步驟。

1. 移除SCC資源：

```
oc delete -f ads_privileged_scc.yaml
```

2. 移除角色繫結資源：

```
oc delete -f oc_role_bindings.yaml
```

> (i) 請忽略這些步驟中的「找不到資源」錯誤。

3. 從所有Kubernetes節點移除「/var/lib/kubelet/config.yaml」。

Astra Data Store預覽解除安裝程序疑難排解

Kubernetes v1.20中的Astra Data Store預覽解除安裝程序、偶爾會導致Pod處於終止狀態。

如果發生此問題、請執行下列命令、強制刪除「astrad-system」命名空間中的所有Pod：

```
kubectl delete pods --all  -n astrads-system   --force --grace-period 0
```

無需指令碼即可解除安裝**Astra Data Store**預覽

若要在不使用自動指令碼的情況下手動解除安裝Astra Data Store預覽、您將會移除工作負載、繫結、磁碟區、匯出原則、叢集、 授權、部署環境及Astra Data Store預覽命名空間。

或者、您也可以 "使用指令碼解除安裝Astra Data Store預覽"。

您需要的是 **#8217** ；需要的是什麼

- root系統管理權限

Astra Data Store預覽解除安裝程序會引導您完成下列高層級步驟：

- [Remove existing workloads and bindings]
- [Uninstall the Astra Data Store preview cluster and control plane]
- [Delete the license]
- [Delete the Astra Data Store preview installation]
- [Validate the removal of the astrads-system namespace]
- [Ensure containers are not running on worker nodes]
- [Delete OpenShift Container Platform resources]
- [Troubleshoot the Astra Data Store preview uninstall process]

移除現有的工作負載和繫結

在解除安裝Astra Data Store預覽之前、您必須先移除下列項目

- 所有使用Astra Data Store預覽做為儲存後端的應用程式工作負載
- Trident繫結使用Astra Data Store預覽做為後端

如此可確保Kubernetes環境保持乾淨狀態、這在重新安裝時非常重要。

解除安裝**Astra Data Store**預覽叢集和控制面板

請依照下列步驟手動解除安裝Astra Data Store預覽。

刪除磁碟區並匯出原則

刪除叢集之前、您應該刪除Astra Data Store預覽磁碟區和匯出原則。

> 💡 如果您未先刪除磁碟區和匯出原則、叢集刪除程序會暫停、直到Astra Data Store預覽磁碟區物件遭到刪除為止。在開始刪除叢集之前移除這些項目會更有效率。

步驟

1. 刪除磁碟區：

```
~% kubectl delete astradsvolumes --all -A
~% kubectl get astradsvolumes -A
```

2. 刪除匯出原則：

```
~% kubectl delete astradsexportpolicies --all -A
~% kubectl get astradsexportpolicies -A
```

刪除**Astra Data Store**預覽叢集

刪除叢集只會刪除Astra Data Store預覽叢集物件自訂資源（CR）以及叢集範圍的資源。

> ⓘ 即使刪除叢集、運算子、nodeinfo Pod和叢集控制器（即Kubernetes範圍內的資源）仍會保留。

刪除叢集也會從節點解除安裝基礎作業系統、這會停止「fifetap」和「netwd」服務。

卸載程式需要大約一分鐘的時間才能完成。然後、Astra Data Store預覽叢集範圍內的資源便會開始移除。

1. 刪除叢集：

```
~% kubectl delete astradsclusters --all -A
~% kubectl get astradsclusters -A
```

刪除授權

1. 對叢集中的每個工作節點執行SSH、並驗證「fifetap」或「netwd」未在工作節點中執行。

2. 刪除Astra Data Store預覽授權：

```
~% kubectl delete astradslicenses --all -A
~% kubectl get astradslicenses -A
```

刪除**Astra Data Store**預覽安裝

刪除叢集中的控制器、運算子、命名空間和支援Pod。

1. 刪除Astra Data Store預覽安裝物件：

```
~% kubectl delete astradsversion astradsversion -n astrads-system
~% kubectl get astradsversion -n astrads-system
```

2. 刪除資料儲存示範與所有Astra Data Store預覽控制器資源：

```
~% kubectl delete ds --all -n astrads-system
~% kubectl get ds -n astrads-system

~% kubectl delete deployments --all -n astrads-system
~% kubectl get deployments -n astrads-system
```

3. 刪除剩餘成品和運算子yaml檔案：

```
~% kubectl delete -f ./manifests/astradsoperator.yaml
~% kubectl get pods -n astrads-system
```

驗證刪除**astrad-system**命名空間

請確定下列命令沒有傳回任何結果：

```
~% kubectl get ns | grep astrads-system
```

確保容器未在工作節點上執行

驗證「fifetap」或「netwd」等容器是否未在工作節點上執行。在每個節點上執行下列項目。

```
ssh <mynode1>
# runc list
```

刪除**OpenShift Container Platform**資源

如果您在Red Hat OpenShift Container Platform（OCP）上安裝Astra Data Store預覽、則可以解除安裝OCP安全內容限制（SCC）和角色繫結資源。

OpenShift使用安全內容限制（SCC）來控制Pod可以執行的動作。

完成標準的解除安裝程序之後、請完成下列步驟。

1. 移除SCC資源：

   ```
   oc delete -f ads_privileged_scc.yaml
   ```

2. 移除角色繫結資源：

   ```
   oc delete -f oc_role_bindings.yaml
   ```

   > ⓘ　請忽略這些步驟中的「找不到資源錯誤」。

3. 從所有Kubernetes節點移除「/var/lib/kubelet/config.yaml」。

手動刪除範例

以下是執行手動解除安裝指令碼的範例。

```
$ kubectl delete astradsvolumes --all -A
No resources found
$ kubectl delete astradsexportpolicies --all -A
No resources found
$ kubectl delete astradsclusters --all -A
astradscluster.astrads.netapp.io "astrads-sti-c6220-09-10-11-12" deleted

$ kubectl delete astradslicenses --all -A
astradslicense.astrads.netapp.io "e900000005" deleted

$ kubectl delete astradsdeployment astradsdeployment -n astrads-system
astradsdeployment.astrads.netapp.io "astradsdeployment" deleted
```

```
$ kubectl delete ds --all -n astrads-system
daemonset.apps "astrads-ds-astrads-sti-c6220-09-10-11-12" deleted
daemonset.apps "astrads-ds-nodeinfo-astradsdeployment" deleted
daemonset.apps "astrads-ds-support" deleted

$ kubectl delete deployments --all -n astrads-system
deployment.apps "astrads-cluster-controller" deleted
deployment.apps "astrads-deployment-support" deleted
deployment.apps "astrads-license-controller" deleted
deployment.apps "astrads-operator" deleted

$ kubectl delete -f /.../firetap/sds/manifests/netappsdsoperator.yaml
namespace "astrads-system" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsautosupports.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradscloudsnapshots.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsclusters.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsdeployments.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsexportpolicies.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsfaileddrives.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradslicenses.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsnfsoptions.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsnodeinfoes.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsqospolicies.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsvolumefiles.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsvolumes.astrads.netapp.io" deleted
customresourcedefinition.apiextensions.k8s.io
"astradsvolumesnapshots.astrads.netapp.io" deleted
role.rbac.authorization.k8s.io "astrads-leader-election-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradscloudsnapshot-
editor-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradscloudsnapshot-
viewer-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradscluster-editor-role"
```

```
deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradscluster-viewer-role"
deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradslicense-editor-role"
deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradslicense-viewer-role"
deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsvolume-editor-role"
deleted
clusterrole.rbac.authorization.k8s.io "astrads-astradsvolume-viewer-role"
deleted
clusterrole.rbac.authorization.k8s.io "astrads-autosupport-editor-role"
deleted
clusterrole.rbac.authorization.k8s.io "astrads-autosupport-viewer-role"
deleted
clusterrole.rbac.authorization.k8s.io "astrads-manager-role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-metrics-reader" deleted
clusterrole.rbac.authorization.k8s.io "astrads-netappexportpolicy-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-netappexportpolicy-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-netappsdsdeployment-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-netappsdsdeployment-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-netappsdsnfsoption-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-netappsdsnfsoption-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-netappsdsnodeinfo-editor-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-netappsdsnodeinfo-viewer-
role" deleted
clusterrole.rbac.authorization.k8s.io "astrads-proxy-role" deleted
rolebinding.rbac.authorization.k8s.io "astrads-leader-election-
rolebinding" deleted
clusterrolebinding.rbac.authorization.k8s.io "astrads-manager-rolebinding"
deleted
clusterrolebinding.rbac.authorization.k8s.io "astrads-proxy-rolebinding"
deleted
configmap "astrads-autosupport-cm" deleted
configmap "astrads-firetap-cm" deleted
configmap "astrads-fluent-bit-cm" deleted
configmap "astrads-kevents-asup" deleted
configmap "astrads-metrics-cm" deleted
service "astrads-operator-metrics-service" deleted
```

```
 Error from server (NotFound): error when deleting
"/.../export/firetap/sds/manifests/netappsdsoperator.yaml":
deployments.apps "astrads-operator" not found

$ kubectl get ns | grep astrads-system


[root@sti-rx2540-535c ~]# runc list
ID      PID     STATUS    BUNDLE     CREATED    OWNER
```

Astra Data Store預覽解除安裝程序疑難排解

Kubernetes v1.20中的Astra Data Store預覽解除安裝程序、偶爾會導致Pod處於終止狀態。

如果發生此問題、請執行下列命令、強制刪除「astrad-system」命名空間中的所有Pod：

```
kubectl delete pods --all  -n astrads-system   --force --grace-period 0
```