# Alibaba Cloud

Elastic Container Instance Storage

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C-J Alibaba Cloud

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## **Document conventions**

Style	Description	Example
A Danger	A danger notice indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	Danger: Resetting will result in the loss of user configuration data.
O Warning	A warning notice indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	Warning: Restarting will cause business interruption. About 10 minutes are required to restart an instance.
C) Notice	A caution notice indicates warning information, supplementary instructions, and other content that the user must understand.	Notice: If the weight is set to 0, the server no longer receives new requests.
? Note	A note indicates supplemental instructions, best practices, tips, and other content.	Note: You can use Ctrl + A to select all files.
>	Closing angle brackets are used to indicate a multi-level menu cascade.	Click Settings> Network> Set network type.
Bold	Bold formatting is used for buttons , menus, page names, and other UI elements.	Click OK.
Courier font	Courier font is used for commands	Run the cd /d C:/window command to enter the Windows system folder.
Italic	Italic formatting is used for parameters and variables.	bae log listinstanceid Instance_ID
[] or [a b]	This format is used for an optional value, where only one item can be selected.	ipconfig [-all -t]
0 ( 11 )		

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# 1.Volume

Files in containers are temporarily stored on disks. In this case, when some special applications run in containers, these applications face some issues. First, when a container crashes, the files in the container are lost. This is because the container will be restarted in a clean state. Second, when multiple containers run in the same Elastic Container Instance (ECI), it is often necessary to share files among these containers. To resolve these issues, ECI allows you to use a volume to store files.

Currently, ECI supports the following types of volumes:

- ConfigFile
- emptyDir
- nfs
- FlexVolume

To use a volume, you need to declare the volume and then mount it to the target ECI.

#### Declare a volume in the ECI console

#### • ConfigFile

You can use a ConfigFile volume to deliver configuration data to an ECI.

The following figure shows the configuration of declaring a ConfigFile volume in the ECI console. Note that you can enter the configuration information in plaintext and the system automatically encodes the configuration information in Base64.

≡	<b>C-)</b> Alibaba Cloud		Q Search	Billing	Ticket	ICP	Enterprise	Support	Alibaba Cloud	>_	٥.	Ä	EN	0
	Volume Learn more	+ NFS Volume												
		Config File Volume												
		- Name test	0											
		Config File												
		Path Example: pod/config	Config File Enter content.											
		+ Add				1								
		+ Add												
		+ Empty Dir Volume												
		+ FlexVolume												
	-	Fhe volume names must be unique. You can add up	to 20 volumes.											
	Container Group	Always On Failure Never												
	Configuration								0000400	2.4				
						(	Pr	icing: ⑦ ¥ 🕻 1_3.333750折	Save ¥ 0.00008	04 /Sec 168 /Sec	cond		Previe	w

#### • emptyDir

An emptyDir volume is accessible to all containers in an ECI. It can be used to share data among all the containers in the ECI. When you delete an ECI to which an emptyDir volume is mounted, the data stored in the emptyDir volume is also deleted.

The following figure shows the configuration of declaring an emptyDir volume in the ECI console.

E C-J Alibaba Cloud		Q Search	Billing	Ticket	ICP	Enterprise	Support	Alibaba Cloud	>_	٥.	Ä	EN	0
	Empty Dir Volume												
	<ul> <li>Name Enter a name.</li> <li>Add</li> </ul>	_											

#### • nfs

An nfs volume allows you to mount a Network File System (NFS) to an ECI. Unlike an emptyDir volume, when you delete an ECI to which an nfs volume is mounted, the nfs volume is unmounted from the ECI and the data stored in the nfs volume is retained. This means that an nfs volume can be pre-populated with data to transfer the data among different ECIs.

😑 🕞 Alibaba Clo	ud		Q Search		Billing Ticket ICP Enterprise	Support Alibaba	Cloud Σ	Ф. Ä EN 🎯
NAS File System / File Syst	em / 096084bc6e							
← 096084bc	6e							
Basic Information	Mount Target							
Mounting Use								
Performance Monit	Mount Target Type	VPC	Switch	Mount Target	Mount Command	Permission Group	Status	Operations
	VPC.	vpc-	VSM-	*	sudo mount -t nfs -o vers=3,nolock,prot	VPC default permission group (all allowed)	✔ Available	Modify a Permission Group Disable   Client mounted   Delete
						~		

(?) Note You must create an NFS before you declare an nfs volume. We recommend that you create a file system and add a mount target in the Apsara File Storage NAS console. The target ECI must be deployed in the same Virtual Private Cloud (VPC) as that configured in the mount target. If you want to use other NFS services, make sure that the ECI can access the Internet. For more information, see Access the Internet.

The following figure shows the configuration of declaring an nfs volume in the ECI console.

≡	<b>C-)</b> Alibaba Cloud		Q Search	Billing	Ticket	ICP	Enterprise	Support	Alibaba Cloud	۶_	٥.	A	EN	0
	Volume Learn more	NFS Volume												
		Name Enter a name.     Add	Server Example: yournfsserver.cn-hangz	nou.nas.aliy	uncs.co Se	lect P	ath Example:	: /data/conta	iner.	Read Or	ly			

#### FlexVolume

FlexVolume is an out-of-tree volume plug-in for Kubernetes V1.2 and later. FlexVolume allows you to customize storage drivers.

Currently, you can set the driver to alicloud/disk for an ECI to use an Alibaba Cloud disk as a volume through FlexVolume. More types of drivers will be supported in the future.

#### Use a disk through FlexVolume

You can declare an existing disk or a new disk as a volume for an ECI. Each ECI can use only one disk.

Declare a new disk as a volume: You need to specify the storage size for the new disk. A disk of the specified size is created when the target ECI is created, and is deleted when the target ECI is deleted. This method is applicable to ECIs that require high I/O performance of the storage.

Declare an existing disk as a volume: If you declare an existing disk as a volume for an ECI, the data stored on the disk is retained when the ECI is deleted. This method is applicable to ECIs that are used to run database applications, such as MySQL and Redis.

The following figure shows the configuration of declaring an existing disk as a volume in the ECI console.

+ Empty Dir Volume
FlexVolume
- Name Enter a name. 🕐 Drive Type Disk File System ext4 - Disk ID d-bp1e22um2oz0ors024gd Change Disk -
Specify the disk ID or disk size. Valid disk sizes: 20 GIB to 500 GIB
The volume names must be unique. You can add up to 20 volumes.

The following figure shows the configuration of declaring a new disk as a volume in the ECI console.

	F enpry Or Volume
	Name Enter a name.     O Drive Type Disk File System ext4      Visk ID Select Disk ID Disk Size 20 GiB
т	Specify the disk ID or disk size. Valid disk sizes: 20 GiB to 500 GiB

#### Declare a volume in an API call

• Declare a ConfigFile volume in an API call.

```
Volume.1.Name=configfiledemo
Volume.1.Type=ConfigFileVolume // The volume type. It is a fixed value.
Volume.1.ConfigFileVolume.ConfigFileToPath.1.Content=bGl1bWk=
Volume.1.ConfigFileVolume.ConfigFileToPath.1.Path=configpath
```

Notice The configuration information of the volume must be encoded in Base64.

#### • Declare an emptyDir volume in an API call.

```
Volume.1.Name=emptydirdemo
Volume.1.Type=EmptyDirVolume // The volume type. It is a fixed value.
```

#### • Declare an nfs volume in an API call.

```
Volume.1.Name=nfsdemo
Volume.1.Type=NFSVolume // The volume type. It is a fixed value.
Volume.1.NFSVolume.Path=/share
Volume.1.NFSVolume.Server=3f9cd4a596-naw76.cn-shanghai.nas.aliyuncs.com
Volume.1.NFSVolume.ReadOnly=False
```

• Declare an existing disk as a volume in an API call.

Volume.1.Name=flexvolumedemo
Volume.1.Type=FlexVolume // The volume type. It is a fixed value.
Volume.1.FlexVolume.Driver=alicloud/disk // The driver for using a disk.
Volume.1.FlexVolume.FsType=ext4 // The type of the file system. Valid values: ext3, ext4, a
nd xfs.
Volume.1.FlexVolume.Options={"volumeId":"d-bp1j17ifxfasvts3tf40"} // The volumeId parameter
specifies the ID of an existing disk.

#### Declare a new disk as a volume in an API call.

```
Volume.1.Name=flexvolumedemo
Volume.1.Type=FlexVolume // The volume type. It is a fixed value.
Volume.1.FlexVolume.Driver=alicloud/disk // The driver for using a disk.
Volume.1.FlexVolume.FsType=ext4 // The type of the file system. Valid values: ext3, ext4, a
nd xfs.
Volume.1.FlexVolume.Options={"volumeSize":"20"} // The volumeSize parameter specifies the s
torage size of the new disk. Valid values: 20 to 500. Unit: GiB.
```

#### Mount a volume to an ECI

To use a volume, you need to mount it to the target ECI.

When you mount a volume to a directory in an ECI, the existing data in the directory is overwritten with the data in the volume. Especially when you mount an emptyDir volume to a directory, all data in the directory is deleted. Exercise caution when you configure the directory.

• The following figure shows the configuration of mounting a volume in the ECI console.

vCPU         0.5 vCPU         0.5 vCPU         1 vCPU         2 vCPU         4 vCPU         8 vCPU         12 vCPU         16 vCPU         32 vCPU         64 vCPU           Memory         4 GiB         5 GiB         6 GiB         7 GiB         8 GiB         8 vCPU         12 vCPU         16 vCPU         32 vCPU         64 vCPU           Environment         +         Add         Variable         +         4 dia         +         4 dia         +         Add         +         Add         +         Add         +         Add         +         Add         +         Add         +         -         +         -         +         -         +         -
Memory 4 GiB 5 GiB 6 GiB 7 GiB 8 GiB Environment + Add Variable Protocol Port + Add
Environment + Add Variable Protocol Port + Add
Variable Protocol Port + Add
Working Example: /home/container/.
Directory Command Example: /bin/sh
Arguments Example: cp -r /pod-data/ /usr/share/
Volume – [Flex]disk-test – Mount Path: /data/ Read Only
+ Add

• The following sample code shows how to mount a volume in an API call:

```
Container.1.VolumeMount.1.Name=volumename // The name of the volume.
Container.1.VolumeMount.1.MountPath=/volume // The directory to which the volume is mount
ed.
Container.1.VolumeMount.1.ReadOnly=False
```

# 2.Use a disk as a volume

Elastic Container Instance (ECI) allows you to use an Alibaba Cloud disk as a volume.

In this case, set the volume type to the following value:

DiskVolume

#### API mode

When you call the CreateContainerGroup operation to create an ECI, you can specify a static disk or a dynamic disk as a volume of the ECI.

#### Use a static disk

A static disk refers to an existing disk. You can mount an existing disk to an ECI. When the ECI is deleted, the data on the disk is retained. This method is applicable to ECIs that are used to run database applications, such as MySQL and Redis.

```
Volume.N.Name=my-diskvolume1
Volume.N.Type=DiskVolume
Volume.N.DiskVolume.FsType=ext4
Volume.N.DiskVolume.DiskId=d-2ze4rk800li49moq5kxw
```

#### Use a dynamic disk

A dynamic disk is created when the target ECI is created, and is deleted when the target ECI is deleted. If an ECI requires high I/O performance of the storage and stores a large amount of temporary files in the storage, such as log files that do not need to be retained after the ECI is deleted, we recommend that you mount a dynamic disk to the ECI.

```
Volume.N.Name=my-diskvolume1
Volume.N.Type=DiskVolume
Volume.N.DiskVolume.FsType=ext4
Volume.N.DiskVolume.DiskSize=20
```

#### Parameter description:

- DiskId : the ID of the disk that you have created. ECI supports all types of disks. For more information, see Disk overview.
- DiskSize : the storage size of the disk to be dynamically created. Valid values: 20 to 500. Unit: GiB.
- If the declared disk is not formatted, the system automatically formats the disk to a type specified by the FsType parameter. Currently, only ext3, ext4, and xfs are supported.

Note:

- If the DiskId parameter is not set, the DiskSize parameter must be set. If both the parameters are set, the value of the DiskSize parameter is ignored.
- If you mount multiple disks to an ECI, the drive letters of these disks may change unexpectedly in certain cases, for example, when you unmount a disk. Therefore, you cannot mount multiple disks to an ECI currently.

- Except for a disk that is used to store image caches, each disk can be mounted to only one ECI.
- A dynamic disk is created and deleted along with the target ECI.

#### Sample code

• Use the ECI Python SDK V1.0.8 or later to create an ECI for running the MySQL application, whose data files are stored on disk d-2zefzudpm3649e\*\*\*\* .

```
from aliyunsdkeci.request.v20180808.CreateContainerGroupRequest import CreateContainerGro
upRequest
request = CreateContainerGroupRequest()
request.set SecurityGroupId(secureGroup-xxx)
request.set VSwitchId(vSwitch-xxx)
request.set ContainerGroupName (name-xxx)
request.set EipInstanceId(eip-xxx)
request.set RestartPolicy('Always')
# Declare two volumes. The first volume is of the DiskVolume type and is used to store My
SQL data files. The second volume is of the ConfigFileVolume type and is used to store th
e configuration file.
volume1 = \{
  'Name': 'mysql-data-volume',
 'Type': 'DiskVolume',
  'DiskVolume.FsType': 'ext4',
  'DiskVolume.DiskId': 'd-2zefzudpm3649e****',
}
# The value of the Content parameter must be encoded in Base64.
configFileToPath = {
  'Path': 'my.cnf',
  'Content': 'aGVsbG8qd29ybGQ=',
}
volume2 = \{
  'Name': 'mysql-config-volume',
  'Type': 'ConfigFileVolume',
 'ConfigFileVolume.ConfigFileToPaths': [configFileToPath],
}
# Set the two volumes for the ECI.
request.set Volumes([volume1, volume2])
# Mount the two volumes to directories in the ECI.
volume mount1 = {
  'Name': 'mysql-data-volume',
  'MountPath': '/var/lib/mysql',
 'ReadOnly': False,
}
volume mount2 = {
  'Name': 'mysql-config-volume',
  'MountPath': '/etc/mysql/conf.d/',
  'ReadOnly': False,
}
# Set the environment variable.
env ={
 'Key': 'MYSQL ROOT PASSWORD',
  'Value': '123456',
}
#Set the container port.
```

```
port = {
  'Protocol':'TCP',
  'Port': 3306,
}
# Set the container.
container = {
  'Image': 'mysql:5.7',
  'Name': 'mysgl',
  'Cpu': 0.5,
  'Memory': 1.0,
  'ImagePullPolicy': 'Always',
  'VolumeMounts': [volume mount1, volume mount2],
  'EnvironmentVars': [env],
  'Ports': [port],
}
request.set Containers([container])
response = eciClient.do_action_with_exception(request)
print response
```

#### Virtual Kubelet mode

For more information about how to use a disk as a volume in Alibaba Cloud Container Service for Kubernetes, see Use static disks to create PVs for stateful services.

The following examples show how to specify a disk as a volume in the scenarios where pods are scheduled to the virtual-kubelet node in Alibaba Cloud Container Service for Kubernetes and Alibaba Cloud Serverless Kubernetes.

#### Use a dynamic disk

In the following sample code, the volumeType field specifies the type of the disk and the volumeSize field specifies the storage size of the disk.

• Specify a disk as a volume when you create a pod.

apiVersion: v1 kind: Pod metadata: name: my-nginx namespace: default spec: containers: - image: nginx name: nginx volumeMounts: - name: myhtml mountPath: "/usr/share/nginx/html" volumes: - name: myhtml flexVolume: driver: "alicloud/disk" fsType: "ext4" options: volumeType: "alicloud-disk-essd" volumeSize: "20Gi"

• Specify a disk as a volume when you create a deployment.

```
apiVersion: apps/v1
kind: Deployment
metadata:
 name: nginx-dynamic
  labels:
   app: nginx
spec:
  selector:
    matchLabels:
     app: nginx
  template:
    metadata:
     labels:
       app: nginx
    spec:
      containers:
      - name: nginx
       image: nginx
       volumeMounts:
         - name: myhtml
            mountPath: "/usr/share/nginx/html"
      volumes:
       - name: myhtml
         flexVolume:
           driver: "alicloud/disk"
           fsType: "ext4"
           options:
             volumeType: "alicloud-disk-essd"
              volumeSize: "20Gi"
```

#### Use a static disk

Assume that you have created a disk whose ID is d-1234567 . In the following sample code, the volumeId field specifies the ID of the disk.

apiVersion: v1 kind: Pod metadata: name: mysql namespace: default spec: containers: - image: mysql name: mysql volumeMounts: - name: mydata mountPath: "/var/lib/mysql" volumes: - name: mydata flexVolume: driver: "alicloud/disk" fsType: "ext4" options: volumeType: "alicloud-disk-essd" volumeId: "d-1234567"

#### Specify a disk as a volume when you create a StatefulSet (1)

- You can specify a disk as a volume by using the volumeClaimTemplates field in the configuration file of a StatefulSet.
- You need to manually create a persistent volume (PV).
  - Make sure that the disk with the ID d-1234567 is created in advance.
  - If the StatefulSet has multiple replicas, you need to create multiple disks and PVs.
  - Set the volumeId field to the ID of the disk that you have created.

```
apiVersion: v1
kind: PersistentVolume
metadata:
   name: d-1234567
spec:
   capacity:
   storage: 20Gi
   accessModes:
        - ReadWriteOnce
   flexVolume:
   driver: "alicloud/disk"
   fsType: "ext4"
   options:
        volumeId: "d-1234567"
```

- Create the zookeeper StatefulSet with three replicas.
  - If you set the volumeClaimTemplates field, the system automatically creates persistent volume claims (PVCs) and binds them to PVs accordingly.

• In the following sample code, only the storage size requirement is specified for the PVs to which PVCs are bound. That is, the storage size of the PVs must not be smaller than that specified by the storage field.

```
apiVersion: apps/v1beta2
kind: StatefulSet
metadata:
 name: zookeeper
spec:
 selector:
 matchLabels:
     app: zookeeper
  replicas: 3
 serviceName: zookeeper-server
 template:
 metadata:
     labels:
       app: zookeeper
  spec:
     containers:
      - env:
        - name: ZOOKEEPER SERVERS
         value: "3"
       image: "komljen/zookeeper:3.4.10"
       imagePullPolicy: IfNotPresent
       name: zookeeper
       ports:
        - containerPort: 2181
         name: client
        - containerPort: 2888
         name: server
        - containerPort: 3888
         name: leader-election
       readinessProbe:
         exec:
           command:
            - /opt/zookeeper/bin/zkOK.sh
          initialDelaySeconds: 10
          timeoutSeconds: 2
          periodSeconds: 5
        livenessProbe:
          exec:
           command:
            - /opt/zookeeper/bin/zkOK.sh
          initialDelaySeconds: 120
          timeoutSeconds: 2
          periodSeconds: 5
        volumeMounts:
        - mountPath: /data
          name: zookeeper-vol
      restartPolicy: Always
 volumeClaimTemplates:
  - metadata:
     name: zookeeper-vol
```

#### Storage-Use a disk as a volume

spec: accessModes: - ReadWriteOnce resources: requests: storage: 15Gi apiVersion: v1 kind: Service metadata: name: zookeeper spec: ports: - name: client port: 2181 targetPort: 2181 selector: app: zookeeper apiVersion: v1 kind: Service metadata: name: zookeeper-server spec: clusterIP: None ports: - name: server port: 2888 targetPort: 2888 - name: leader-election port: 3888 targetPort: 3888 selector: app: zookeeper

#### Specify a disk as a volume when you create a StatefulSet (2)

You can also specify a disk as a volume by using the persistentVolumeClaim field in the configuration file of a StatefulSet.

```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
   name: zookeeper-vol
spec:
   storageClassName: alicloud-disk-essd
   accessModes:
        - ReadWriteOnce
   resources:
        requests:
        storage: 20Gi
----
```

```
apiVersion: apps/vlbeta2
kind: StatefulSet
metadata:
 name: zookeeper
spec:
  selector:
   matchLabels:
     app: zookeeper
  replicas: 3
  serviceName: zookeeper-server
  template:
    metadata:
      labels:
       app: zookeeper
    spec:
      containers:
      - env:
        - name: ZOOKEEPER_SERVERS
         value: "3"
        image: "komljen/zookeeper:3.4.10"
        imagePullPolicy: IfNotPresent
        name: zookeeper
        ports:
        - containerPort: 2181
          name: client
        - containerPort: 2888
         name: server
        - containerPort: 3888
          name: leader-election
        readinessProbe:
          exec:
            command:
            - /opt/zookeeper/bin/zkOK.sh
          initialDelaySeconds: 10
          timeoutSeconds: 2
          periodSeconds: 5
        livenessProbe:
          exec:
            command:
            - /opt/zookeeper/bin/zkOK.sh
          initialDelaySeconds: 120
          timeoutSeconds: 2
          periodSeconds: 5
        volumeMounts:
        - mountPath: /data
          name: zookeeper-data
      restartPolicy: Always
      volumes:
      - name: zookeeper-data
       persistentVolumeClaim:
         claimName: zookeeper-vol
___
apiVersion: v1
kind: Service
```

metadata: name: zookeeper spec: ports: - name: client port: 2181 targetPort: 2181 selector: app: zookeeper \_\_\_ apiVersion: v1 kind: Service metadata: name: zookeeper-server spec: clusterIP: None ports: - name: server port: 2888 targetPort: 2888 - name: leader-election port: 3888 targetPort: 3888 selector: app: zookeeper

For more information about the example, visit https://github.com/AliyunContainerService/serverless-k8s-examples/tree/master/pvc.

# 3.Create custom temporary storage space

By default, Elastic Container Instance provides20 GiBof storage space free of charge. If you require more storage space, you can create custom-sized temporary storage space. This topic describes how to create temporary storage space.

#### **Background information**

By default, Elastic Container Instance provides 20 GiB of storage space free of charge. If you require more storage space, you can create custom-sized temporary storage space. The created temporary storage space is billed at the pay-as-you-go price of performance level-1 (PL1) enhanced SSDs (ESSDs). The price of PL1 ESSDs varies based on region. For more information, see the Pricing tab of the Elastic Compute Service product page.

#### Kubernetes mode

In scenarios in which Kubernetes is involved, you can use one of the following methods to create temporary storage space:

• Method 1: Add annotations

You can add annotations to specify the value of the k8s.aliyun.com/eci-extra-ephemeral-storage field to the size of the temporary storage space that you want to create.

• Method 2: Specify an emptyDir volume

You can specify an emptyDir volume to create temporary storage space. If the specified size of the emptyDir volume does not exceed 20 GiB, no temporary storage space is created. If the specified size of emptyDir volume exceeds 20 GiB, temporary storage space is created for the excess size.

• Method 3: Use resource requests

You can use resource requests to declare the size of ephemeral storage for a container. If the declared size does not exceed 20 GiB, no temporary storage space is created. If the declared size exceeds 20 GiB, temporary storage space is created for the excess size.

#### ? Note

The preceding methods can be used to create temporary storage space, but the temporary storage space created by each method may be different.

- When you add annotations to create temporary storage space, the size of the created temporary storage space is the size that you specify.
- When you specify an emptyDir volume or declare the storage space of a container in a resource request to create temporary storage space, the size of the created temporary storage space may be different from the value that you specify due to the image cache.

#### The following procedure describes how to configure the size of temporary storage space:

1. Prepare a YAML file.

In the following examples, the YAML file is named extra-storage.yaml. The following examples show the content of the YAML file of the preceding methods:

#### • Example 1: Add annotations

```
apiVersion: v1
kind: Pod
metadata:
    name: test
    annotations:
        k8s.aliyun.com/eci-extra-ephemeral-storage: "30Gi"# Specify the size of temporary
storage space.
spec:
    containers:
    - name: nginx
    image: nginx:latest
    imagePullPolicy: IfNotPresent
    restartPolicy: Always
```

#### • Example 2: Specify an emptyDir volume

```
apiVersion: v1
kind: Pod
metadata:
 name: test
spec:
 containers:
  - image: nginx:latest
   name: nginx
   volumeMounts:
    - mountPath: /extra-storage
     name: cache-volume
  volumes:
  - name: cache-volume
    emptyDir:
     sizeLimit: 50Gi
                      # Specify the size of the emptyDir volume. If the specified
size of emptyDir volume exceeds 20 GiB, temporary storage space is created for the ex
cess size.
```

#### • Example 3: Specify the resource request of a container

```
apiVersion: v1
kind: Pod
metadata:
  name: test
spec:
  containers:
    - name: nginx
    image: nginx:latest
    imagePullPolicy: IfNotPresent
    resources:
       requests:
        ephemeral-storage: 50Gi  # Declare the size of ephemeral storage in the resou
rce request of the container. If the size of ephemeral storage exceeds 20 GiB, tempor
    ary storage space is created for the excess size.
```

2. Create a pod.

kubectl apply -f extra-storage.yaml

- 3. Check whether the temporary storage space takes effect.
  - Check the size of the temporary storage space.

kubectl describe pod test grep k8s.aliyun.com/eci-extra-ephemeral-storage

The following output indicates that 30 GiB of temporary storage space is created:

k8s.aliyun.com/eci-extra-ephemeral-storage: 30Gi

 Run the exec command to check whether the file system partitions of the container are extended.

kubectl exec -it test -- sh

df -h

The following output indicates that the total storage space is about 70 GiB, which consists of 20 GiB of the system disk that is occupied by the operating system, 20 GiB of default available storage space, and 30 GiB of temporary storage space.

Size	Used	Avail	Use%	Mounted on
69G	4.7G	61G	8%	/
64M	0	64M	0%	/dev
1.9G	0	1.9G	0%	/sys/fs/cgroup
69G	4.7G	61G	8%	/etc/hosts
64M	0	64M	0%	/dev/shm
1.9G	12K	1.9G	1%	/run/secrets/kubernetes.io/serviceaccount
1.9G	0	1.9G	0%	/proc/acpi
1.9G	0	1.9G	0%	/sys/firmware
	Size 69G 64M 1.9G 69G 64M 1.9G 1.9G	Size Used 69G 4.7G 64M 0 1.9G 0 69G 4.7G 64M 0 1.9G 12K 1.9G 0 1.9G 0	Size Used Avail 69G 4.7G 61G 64M 0 64M 1.9G 0 1.9G 69G 4.7G 61G 64M 0 64M 1.9G 12K 1.9G 1.9G 0 1.9G 1.9G 0 1.9G	Size         Used Avail         Use%           69G         4.7G         61G         8%           64M         0         64M         0%           1.9G         0         1.9G         0%           69G         4.7G         61G         8%           64M         0         64M         0%           1.9G         0.64M         0%         1.9G         1%           1.9G         0         1.9G         0%         1.9G         0%           1.9G         0         1.9G         0%         0%         0%

#### API mode

When you call the CreateContainerGroup API operation to create an elastic container instance, you can use the EphemeralStorage parameter to specify the size of temporary storage space. The following table describes the parameter. For more information, see CreateContainerGroup.

Paramet e r	Туре	Required	Example	Description
EphemeralS torage	Integer	No	50	The size of the temporary storage space. Unit: GiB.

You can also use an SDK to create an elastic container instance. The following sample code shows how to use SDK for Python to create an elastic container instance that has temporary storage space:

```
#!/usr/bin/env python
#coding=utf-8
from aliyunsdkcore.client import AcsClient
from aliyunsdkcore.acs exception.exceptions import ClientException
from \ aliyunsdkcore.acs\_exception.exceptions \ import \ ServerException
from aliyunsdkeci.request.v20180808.CreateContainerGroupRequest import CreateContainerGroup
Request
client = AcsClient('<accessKeyId>', '<accessSecret>', 'cn-hangzhou')
request = CreateContainerGroupRequest()
request.set accept format('json')
request.set SecurityGroupId("sg-uf6biempwqvodk7****")
request.set_VSwitchId("vsw-uf6mhqg2wiq9iifhn****")
request.set ContainerGroupName("test")
request.set_Containers([
 {
   "Image": "nginx",
   "Name": "nginx"
}
])
request.set EphemeralStorage(50) # Specify the size of the temporary storage space.
response = client.do_action_with_exception(request)
# python2: print(response)
print(str(response, encoding='utf-8'))
```

# 4.Automatically evict pods whose temporary storage spaces are insufficient

This topic describes how to configure an elastic container instance to allow the instance to automatically evict pods whose temporary storage spaces are insufficient in scenarios in which Kubernetes is involved. This ensures sufficient temporary storage spaces for your business operation.

#### Scenarios

This topic is applicable to the scenarios in which Kubernetes is involved. Make sure that you have connected Elastic Container Instance to Kubernetes before you perform the operations described in this topic. For more information, see the following topics:

- Connect Kubernetes to Elastic Container Instance
- Overview

#### Description

By default, when the temporary storage space of an elastic container instance-based pod is insufficient, the system does not handle this situation. The insufficiency of the temporary storage space of the pod may affect the operation of your business. Elastic Container Instance allows you to

add the k8s.aliyun.com/eci-eviction-enable: "true" annotation to pods based on the eviction

and scheduling mechanisms of Kubernetes. If the temporary storage space of a pod is less than 100 MiB, the system automatically evicts the pod. The status of the pod changes to Failed.

Typically, business applications are deployed on Deployments. If the pod to be evicted is managed by a Deployment, the Deployment automatically creates a new pod, as shown in the following figure.



#### Sample configurations

You must add the k8s.aliyun.com/eci-eviction-enable: "true" annotation to the metadata of a pod. For example, you must add the annotation to the spec.template.metadata section when you configure a Deployment. The following code provides a sample YAML file.

```
apiVersion: apps/v1
kind: Deployment
metadata:
 name: nginx
  labels:
   app: nginx
spec:
 replicas: 4
  selector:
   matchLabels:
    app: nginx
  template:
    metadata:
     name: nginx-test
     annotations:
       k8s.aliyun.com/eci-eviction-enable: "true" # Specify the system to automatically ev
ict pods whose temporary storage spaces are insufficient.
     labels:
       app: nginx
       alibabacloud.com/eci: "true"
    spec:
     containers:
      - name: nginx
       image: registry-vpc.cn-beijing.aliyuncs.com/eci_open/nginx:1.14.2
```

# 5.Configure volumes for an ECI in Kubernetes

# 5.1. Use Alibaba Cloud storage services in ACK

Container Service for Kubernetes (ACK) allows you to use Alibaba Cloud storage services such as disks, Apsara File Storage NAS, and Object Storage Service (OSS) by using the Container Storage Interface (CSI) and FlexVolume plug-ins. This topic describes the volume plug-ins supported by ACK and how to use Alibaba Cloud storage services.

#### Volume plug-ins

ACK supports CSI and FlexVolume plug-ins. When you create a cluster, you can choose the CSI or FlexVolume plug-in based on the Kubernetes version of the cluster. The following table describes the CSI and FlexVolume plug-ins.

Plug-in	Description
CSI	<ul> <li>The Kubernetes community recommends the CSI plug-ins. CSI consists of the following parts:</li> <li>CSI-Plugin: allows you to mount and unmount volumes.</li> <li>CSI-Provisioner: automatically creates disk volumes and NAS volumes.</li> </ul>
FlexVolume	<ul> <li>FlexVolume is a traditional mechanism developed by the Kubernetes community to extend data volumes. FlexVolume consists of the following parts:</li> <li>FlexVolume: allows you to mount and unmount volumes.</li> <li>Disk-Controller: automatically creates disk volumes.</li> <li>Nas-Controller: automatically creates NAS volumes.</li> </ul>

#### ? Note

- We recommend that you use CSI for newly created clusters.
- You cannot use FlexVolume and CSI in the same cluster.
- You cannot change the plug-in from FlexVolume to CSI for a cluster.

#### Use Alibaba Cloud storage services

Alibaba Cloud provides low-cost, high-reliability, and highly-availability storage services for a wide range of storage resources such as blocks, files, and objects. You can use the appropriate storage services based on the storage requirements. The following table describes the Alibaba Cloud storage services.

Clou d stor age servi ce	Description	References for CSI	References for FlexVolume
Disk	Disks are block-level Elastic Block Storage (EBS) devices that use a distributed multi-replica mechanism to provide low latency, high performance, high durability, and high reliability. You can create, release, and resize disks at any time. For more information, see Disks. Disks cannot be shared. A disk can be mounted only to a single pod. Both statically and dynamically provisioned volumes can be mounted to pods.	Disk volume overview	Disk volume overview
NAS	NAS is a distributed file system that supports both the Network File System (NFS) and Server Message Block (SMB) protocols and features shared access, elastic scalability, high reliability, and high performance. For more information, see What is NAS? NAS is a shared storage service. A NAS file system can be mounted to multiple pods. Both statically and dynamically provisioned volumes can be mounted to pods.	NAS volume overview	NAS volume overview
OSS	OSS is a secure, cost-effective, and high-durability cloud storage service provided by Alibaba Cloud to store large volumes of unstructured data such as images and audio and video data. For more information, see What is OSS? OSS is a shared storage service. An OSS volume can be mounted to multiple pods. Only statically provisioned volumes can be mounted to pods.	OSS volume overview	OSS volume overview

# 5.2. Use Alibaba Cloud storage services in ACK

Container Service for Kubernetes (ACK) allows you to use Alibaba Cloud storage services such as disks, Apsara File Storage NAS, and Object Storage Service (OSS) by using the Container Storage Interface (CSI) and FlexVolume plug-ins. This topic describes the volume plug-ins supported by ACK and how to use Alibaba Cloud storage services.

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FlexVolume	<ul> <li>FlexVolume is a traditional mechanism developed by the Kubernetes community to extend data volumes. FlexVolume consists of the following parts:</li> <li>FlexVolume: allows you to mount and unmount volumes.</li> <li>Disk-Controller: automatically creates disk volumes.</li> <li>Nas-Controller: automatically creates NAS volumes.</li> </ul>

#### ? Note

- We recommend that you use CSI for newly created clusters.
- You cannot use FlexVolume and CSI in the same cluster.
- You cannot change the plug-in from FlexVolume to CSI for a cluster.

#### Use Alibaba Cloud storage services

Alibaba Cloud provides low-cost, high-reliability, and highly-availability storage services for a wide range of storage resources such as blocks, files, and objects. You can use the appropriate storage services based on the storage requirements. The following table describes the Alibaba Cloud storage services.

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Disk	Disks are block-level Elastic Block Storage (EBS) devices that use a distributed multi-replica mechanism to provide low latency, high performance, high durability, and high reliability. You can create, release, and resize disks at any time. For more information, see Disks. Disks cannot be shared. A disk can be mounted only to a single pod. Both statically and dynamically provisioned volumes can be mounted to pods.	Disk volume overview	Disk volume overview
NAS	NAS is a distributed file system that supports both the Network File System (NFS) and Server Message Block (SMB) protocols and features shared access, elastic scalability, high reliability, and high performance. For more information, see What is NAS? NAS is a shared storage service. A NAS file system can be mounted to multiple pods. Only statically provisioned volumes can be mounted to pods. <b>?</b> Note Pods in the ASK clusters are ECI pods. Dynamically provisioned volumes cannot be mounted to pods because ECI does not support privileged permissions.	NAS volume overview	NAS volume overview

### 5.3. Without using a PVC

### 5.3.1. Mount a disk as a volume

Disks are block-level storage products provided by Alibaba Cloud. Disks feature low latency, high performance, high durability, and high reliability. You can choose to use or not to use a Persistent VolumeClaim (PVC) to mount a disk to an elastic container instance-based pod in an Alibaba Cloud Container Service for Kubernetes (ACK) or Alibaba Cloud Serverless Kubernetes (ASK) cluster. If you do not use a PVC to mount a disk, you can create and mount a disk or mount an existing disk when you create a pod. This topic describes how to mount a disk to an elastic container instance-based pod without using a PVC.

#### Prerequisites

Virtual Kubelet (VK) is deployed in the ACK or ASK cluster.

#### ? Note

By default, VK is integrated into ASK clusters. If you use a cluster of another type, you must manually deploy VK. For more information, see Connect an elastic container instance to a Kubernetes cluster.

#### Precautions

- Disks cannot be shared. You can mount a disk to only one pod.
- A disk cannot be mounted to a pod that resides in a zone different from the disk.

#### Create and mount a disk when you create a pod

- 1. Connect to the ACK or ASK cluster.
- 2. Prepare the YAML file.

Create a file named test-ack-disk.yaml and copy the following template into the file:

```
apiVersion: v1
kind: Pod
metadata:
 name: test-ack-disk
 labels:
   alibabacloud.com/eci: "true"
spec:
 containers:
  - image: registry-vpc.cn-beijing.aliyuncs.com/eci_open/nginx:1.14.2
   name: test-container
   volumeMounts:
   - mountPath: /cache-test
     name: cache-volume
 volumes:
  - name: cache-volume
   csi:
     driver: diskplugin.csi.alibabacloud.com
     fsType: ext4
     volumeAttributes:
       volumeSize: "20"
```

### The following table describes the disk attribute parameters that can be configured in volumeAttributes:

Parameter	Description
volumeSize	The size of the disk. Unit: GiB. Valid values: 20 to 32768. This parameter is required.

Parameter	Description
performanceLevel	The performance level of the disk. For more information, see EBS performance.
deleteWithInstance	Specifies whether to release the disk when the instance to which the disk is mounted is released.
encrypted	Specifies whether to encrypt the disk. Default value: false. For more information, see Encryption overview.
kmsKeyld	The ID of the Key Management Service (KMS) key for encrypted disks.

3. Create and mount a disk while you create an elastic container instance-based pod.

```
kubectl create -f test-ack-disk.yaml
```

#### 4. View the results.

i. View the pod.

kubectl get pods -o wide

The following command output is expected to return:

NAME	READY	STATUS	RESTARTS	AGE	IP	NODE
NOMINATED NODE READINESS GA		ESS GATES				
test-ack-disk	1/1	Running	0	84s	172.16.XX.XXX	virtual-kubelet-
cn-beijing-k	<none></none>	<	none>			

Check the file directories in the pod and verify that the /cache-test mount directory is

generated for the disk.

```
shell@Alioloud:~$ kubectl exec -it test-ack-disk -- bash
root@test-ack-disk:/# 1s
bin boot cache-test dev etc home lib lib64 media mnt opt proc root run sbin srv sys tmp usr var
root@test-ack-disk:/# 1s /cache-test
lost+found
```

ii. View the disk.

Log on to the ECS console and select the region in which the VK resides. On the Disks page, a disk that is named cache-volume and is 20 GiB in size is automatically created.

#### Mount an existing disk when you create a pod

Before you mount an existing disk, make sure that the disk is not partitioned and formatted, and the disk resides in the same region and zone as the VK.

#### ? Note

The name of the VK node shows the zone in which the VK resides. For example, the virtual-kubeletcn-beijing-k node name indicates that the VK is deployed in Beijing Zone K.

- 1. Obtain the ID of the disk.
  - i. Log on to the ECS console.
  - ii. On the Disks page, find an existing disk and record the ID of the disk.

Make sure that the disk is in the **Pending** state.

2. Prepare the YAML file.

Create a file named disk-test-ack.yaml and copy the following template into the file:

```
apiVersion: v1
kind: Pod
metadata:
 name: disk-test-ack
 labels:
   alibabacloud.com/eci: "true"
spec:
 containers:
  - image: registry-vpc.cn-beijing.aliyuncs.com/eci open/nginx:1.14.2
   name: test-container
   volumeMounts:
    - mountPath: /cache-test
     name: cache-volume
 volumes:
  - name: cache-volume
    csi:
     driver: diskplugin.csi.alibabacloud.com
     fsType: ext4
     volumeAttributes:
       volumeId: "d-2ze2qt6x88mv2ih8****"
```

In volumeAttributes, you must use the volumeId parameter to specify the disk to be mounted.

3. Create an elastic container instance-based pod and mount the disk to the pod.

kubectl create -f disk-test-ack.yaml

4. View the results.

#### i. View the pod.

kubectl get pods -o wide

The following command output is expected to return:

NAME	READY	STATUS	RESTARTS	AGE	IP	NODE
NOMINATED NODE	READIN	ESS GATES				
disk-test-ack	1/1	Running	0	32s	172.16.XX.XXX	virtual-kubelet-
cn-beijing-k	<none></none>	<	none>			

Check the file directories in the pod and verify that the /cache-test mount directory is

#### generated for the disk.

```
shell@Alicloud:~$ kubectl exec -it disk-test-ack -- bash
root@disk-test-ack:/# ls
bin boot cache-test dev etc home lib lib64 media mnt opt proc root run sbin srv sys tmp usr var
root@disk-test-ack:/# ls /cache-test
lost+found
```

ii. View the disk.

Log on to the ECS console and select the region in which the VNode resides. On the Disks page, the status of the disk has changed to In Use.

#### 5.3.2. Mount a NAS file system as a volume

Apsara File Storage NAS (NAS) is a distributed file system provided by Alibaba Cloud. NAS supports shared access and auto scaling. NAS features high reliability and high performance. You can choose to use or not to use a Persistent VolumeClaim (PVC) to mount a NAS file system to an elastic container instance-based pod in an Alibaba Cloud Container Service for Kubernetes (ACK) or Alibaba Cloud Serverless Kubernetes (ASK) cluster. This topic describes how to mount a NAS file system to multiple elastic container instance-based pods without using a PVC.

#### Prerequisites

Virtual Kubelet (VK) is deployed in the ACK or ASK cluster.

#### ? Note

By default, VK is integrated into ASK clusters. If you use a cluster of another type, you must manually deploy VK. For more information, see Connect an elastic container instance to a Kubernetes cluster.

#### Precautions

- NAS is a shared storage service. You can mount a NAS file system to multiple pods. If a NAS file system is mounted to multiple pods, the data in the file system is shared by the pods. In this case, an application must be able to synchronize data across these pods when data modifications are made to multiple pods.
- Do not delete the mount target before you unmount the NAS file system. If you delete the mount target, an operating system hang may occur.

#### Configuration examples

1. Obtain the information about the mount target of a NAS file system.

If you have not created a NAS file system or a mount target, create a NAS file system and mount target in the NAS console. When you create a NAS file system and mount target, select the region in which the cluster resides and the VPC to which the cluster belongs. For more information, see Create a file system and Manage mount targets.

- i. Log on to the NAS console.
- ii. Select the region in which the cluster resides.
- iii. On the File System List page, find the NAS file system that you want to mount, and click the ID of the file system.
- iv. On the details page of the file system, click **Mount Targets**, and then copy the mount target in the **Mount Target** column.
- 2. Prepare the YAML file.

Create a file named test-ack-nas.yaml and copy the following template into the file:

```
apiVersion: apps/v1
kind: Deployment
metadata:
 name: test-ack-nas
 labels:
    alibabacloud.com/eci: "true"
spec:
 replicas: 2
 selector:
   matchLabels:
     alibabacloud.com/eci: "true"
  template:
   metadata:
      labels:
       alibabacloud.com/eci: "true"
    spec:
      containers:
      - name: nginx
       image: registry-vpc.cn-beijing.aliyuncs.com/eci_open/nginx:1.14.2
       ports:
       - containerPort: 80
        volumeMounts:
          - name: cache-volume
           mountPath: /cache-test
      volumes:
        - name: cache-volume
          csi:
            driver: nasplugin.csi.alibabacloud.com
           fsType: nas
            volumeAttributes:
              server: "0389a***-nh7m.cn-beijing.extreme.nas.aliyuncs.com"
              path: "/"
              vers: "3"
              options: "nolock, tcp, noresvport"
```

The following table describes the NAS file system attribute parameters that can be configured in volumeAttributes.

Parameter	Description						
server	The mount target of the NAS file system.						
path	The subdirectory of the NAS file system that you want to mount. If you want to mount an Extreme NAS file system, set this parameter to a subdirectory of the /share directory. Example: /share/path1 .						
vers	The version number of the Network File System (NFS) protocol that is used to mount the NAS file system. We recommend that you use NFS v3. Extreme NAS supports only NFS v3.						
options	Options that can be used when you mount the NAS file system. We recommend that you use the recommended options for the NAS service. Example: nolock, tcp, noresvport .						

#### 3. Create two elastic container instance-based pods and mount the NAS file system to the pods.

kubectl create -f test-ack-nas.yaml

#### 4. View the results.

kubectl get pods -o wide

#### The following command output is expected to return:

NAME	READY	STATUS	RESTARTS	AGE	IP	NODE
NOMINATED NODE READINESS GATE	S					
test-ack-nas-6bb987f4b8-mc7px	1/1	Running	0	64s	172.16.XX.XXX	virt
ual-kubelet-cn-beijing-k <none> <none></none></none>						
test-ack-nas-6bb987f4b8-vnl7c	1/1	Running	0	64s	172.16.XX.XXX	virt
ual-kubelet-cn-beijing-k <non< td=""><td>e&gt;</td><td><none< td=""><td>&gt;</td><td></td><td></td><td></td></none<></td></non<>	e>	<none< td=""><td>&gt;</td><td></td><td></td><td></td></none<>	>			

Check the file directories in the pod and verify that the /cache-test mount directory is

generated for the NAS file system. In addition, verify that the files written to one pod are displayed in the other pod. This indicates that the two pods share the NAS file system.

shell@Alicloud:~\$ kubectl exec -it test-ack-nas-6bb987f4b8-mc7px bash
root@test-ack-nas-6bb987f4b8-mc7px:/# ls
bin boot cache-test dev etc home lib lib64 media mnt opt proc root run sbin srv sys tmp usr var
root@test-ack-nas-6bb987f4b8-mc7px:/# ls /cache-test
root@test-ack-nas-6bb987f4b8-mc7px:/# echo "hello nas">/cache-test/ack-nas
root@test-ack-nas-6bb987f4b8-mc7px:/# ls /cache-test
ack-nas
root@test-ack-nas-6bb987f4b8-mc7px:/# cat /cache-test/ack-nas
hello_nas
root@test-ack-nas-6bb987f4b8-mc7px:/# exit
exit
<mark>shell@Alicloud:~</mark> \$ kubectl exec -it test-ack-nas-6bb987f4b8-vnl7c bash
root@test-ack-nas-6bb987f4b8-vnl7c:/# ls /cache-test
ack-nas
root@test-ack-nas-6bb987f4b8-vnl7c:/# cat /cache-test/ack-nas
hello nas

### 5.3.3. Mount an OSS bucket as a volume

Object Storage Service (OSS) is a secure, cost-effective, and highly reliable Alibaba Cloud storage service that allows you to store large volumes of unstructured data, such as images and audio and video data. You can choose to use or not to use a Persistent VolumeClaim (PVC) to mount an OSS bucket to an elastic container instance-based pod in an Alibaba Cloud Container Service for Kubernetes (ACK) or Alibaba Cloud Serverless Kubernetes (ASK) cluster. This topic describes how to mount an OSS bucket to multiple elastic container instance-based pods without using a PVC.

#### Prerequisites

Virtual Kubelet (VK) is deployed in the ACK or ASK cluster.

#### ? Note

By default, VK is integrated into ASK clusters. If you use a cluster of another type, you must manually deploy VK. For more information, see Connect an elastic container instance to a Kubernetes cluster.

#### Precautions

- OSS is a shared storage service. You can mount an OSS bucket to multiple pods.
- We recommend that you store no more than 1,000 files in a mount directory. If you store a large number of files in the mount directory, the OSSFS driver consumes excess memory. This may cause out of memory (OOM) errors in pods.

#### **Configuration examples**

1. Obtain the information about the OSS bucket.

If you have not created an OSS bucket, create an OSS bucket in the OSS console. For more information, see Create buckets.

- i. Log on to the OSS console.
- ii. On the **Buckets** page, find the bucket that you want to mount and click the name of the bucket.
- iii. On the details page of the bucket, click **Overview** in the left-side navigation pane. Copy an endpoint in the Endpoint column of the **Domain Names** section.

If the bucket and cluster reside in the same region, copy a VPC or an internal endpoint. If the bucket and cluster reside in different regions, copy a public endpoint.

- 2. Use one of the following methods to grant the permissions to manage the OSS bucket:
  - Method 1: (Recommended) Use a RAM role to grant permissions.

Create a RAM role and grant the RAM role the permissions to manage the OSS bucket. When you create a RAM role, select **Alibaba Cloud Service** for the Select Trusted Entity parameter, **Normal Service Role** for the Role Type parameter, and **Elastic Compute Service** for the Select Trusted Service parameter. When you grant permissions to the RAM role, attach the **AliyunOSSFullAccess** policy to the RAM role.

For more information, see Create a RAM role for a trusted Alibaba Cloud service and Grant permissions to a RAM role.

• Method 2: Use your AccessKey pair to grant permissions.

Obtain the AccessKey ID and AccessKey secret. For more information, see Obtain an AccessKey pair.

3. Prepare the YAML file.

Create a file named test-ack-oss.yaml and copy the following template into the file:

```
apiVersion: apps/v1
kind: Deployment
metadata:
 name: test-ack-oss
 labels:
   alibabacloud.com/eci: "true"
spec:
 replicas: 2
 selector:
   matchLabels:
     alibabacloud.com/eci: "true"
  template:
   metadata:
     labels:
       alibabacloud.com/eci: "true"
    spec:
     containers:
      - name: nginx
       image: registry-vpc.cn-beijing.aliyuncs.com/eci_open/nginx:1.14.2
       ports:
       - containerPort: 80
        volumeMounts:
          - name: cache-volume
           mountPath: /cache-test
     volumes:
        - name: cache-volume
         csi:
           driver: ossplugin.csi.alibabacloud.com
           fsType: fuse
            volumeAttributes:
             bucket: "oss-test"
             url: "oss-cn-beijing-internal.aliyuncs.com"
             otherOpts: "-o max_stat_cache_size=0 -o allow_other -o connect_timeout=5
-o readwrite timeout=5"
             ramRole: "<your RAM Role Name>"
```

In the preceding example, a RAM role is used to grant permissions. If you want to use your AccessKey pair to grant permissions, replace ramRole: "<Your RAM role name>" with the following lines:

```
akId: "<your AccessKey ID>"
akSecret: "<your AccessKey Secret>"
```

The following table describes the OSS bucket attribute parameters that can be configured in volumeAttributes.

Parameter	Description					
bucket	The name of the OSS bucket. You can mount only OSS buckets. You cannot mount the subdirectories or files in OSS buckets.					
url	<ul> <li>The endpoint of the OSS bucket.</li> <li>If the bucket and cluster reside in the same region, use the VPC or internal endpoint.</li> <li>If the bucket and cluster reside in different regions, use the public endpoint.</li> </ul>					
otherOpts	The custom options that are specified to mount the OSS bucket. Format: -o *** -o *** . Example: -o max_stat_cache_size=0 -o allow_other .					
ramRole	The RAM role that is used to grant permissions. Specify this parameter if you use a RAM role to grant permissions.					
akld and akSecret	The AccessKey ID and AccessKey secret that are used to grant permissions. Set the parameters if you use your AccessKey pair to grant permissions.					

4. Create two elastic container instance-based pods and mount the OSS bucket to the pods.

kubectl create -f test-ack-oss.yaml

#### 5. View the results.

kubectl get pods -o wide

#### The following command output is expected to return:

NAME	READY	STATUS	RESTARTS	AGE	IP
NODE	NOMINATED	NODE REA	ADINESS GATH	ES	
test-ack-oss-655db9d64d-5q7d9	1/1	Running	0	46s	172.16.XX.XXX
virtual-kubelet-cn-beijing-k	<none></none>	<nc< td=""><td>one&gt;</td><td></td><td></td></nc<>	one>		
test-ack-oss-655db9d64d-m5vct	1/1	Running	0	46s	172.16.XX.XXX
virtual-kubelet-cn-beijing-k	<none></none>	<nc< td=""><td>one&gt;</td><td></td><td></td></nc<>	one>		

Check the file directories in the pod and verify that the /cache-test mount directory is

generated for the OSS bucket. In addition, verify that the files written to one pod are displayed in the other pod. This indicates that the two pods share the OSS bucket.

# 5.4. Use FlexVolume to mount standard output logs

This topic describes how to use FlexVolume to mount standard output logs of a container to an elastic container instance. You must have root permissions to perform this operation.

#### Prerequisites

Virtual Kubelet is deployed in your Kubernetes cluster.

#### ? Note

By default, Alibaba Cloud Serverless Kubernetes (ASK) clusters are integrated with Virtual Kubelet. For other types of clusters, you must deploy Virtual Kubelet in the clusters. For more information, see Connect Kubernetes to Elastic Container Instance.

#### Configuration example

Elastic Container Instance allows you to use FlexVolume to mount standard output logs of a container to an elastic container instance. You must have root permissions to perform this operation. The following example shows the configuration procedure:

1. Prepare the YAML configuration file.

vim flexvolume\_stdlog.yaml

The following example shows the content of the flexvolume\_stdlog.yaml file.

apiVersion: v1 kind: Pod metadata: name: test-flexvolume-stdlog spec: containers: - image: nginx:latest name: test-container volumeMounts: - mountPath: /cache-test name: cache-volume volumes: - name: cache-volume flexVolume: driver: alicloud/pod-stdlog

#### 2. Deploy a pod.

kubectl create -f flexvolume stdlog.yaml

3. View the mount result.

Run the ls command to view the file directory in the pod. The standard output logs of the container are mounted to the /cache-test directory of the pod. You can use the logs in the

container.

```
shell@Alioloud:-$ kubectl get pod test-flexvolume-stdlog
NAME READY STATUS RESTARTS AGE
test-flexvolume-stdlog 1/1 Running 0 10m
shell@Alioloud:-$ kubectl exec -it test-flexvolume-stdlog bash
kubectl exec [POD] [COMMAND] is DEPRECATED and will be removed in a future version. Use kubectl exec [POD] -- [COMMAND] instead.
root@test-flexvolume-stdlog:/# ls -1 /cache-test/
total 4
  otal 4
total 4
drwxr-xxr-x 2 root root 4096 Aug 24 09:06 test-container
root@test-flexvolume-stdlog:/# 1s -1 /cache-test/test-container/
   otal 4
                        1 root root 1894 Aug_24 09:06 0.log
```