

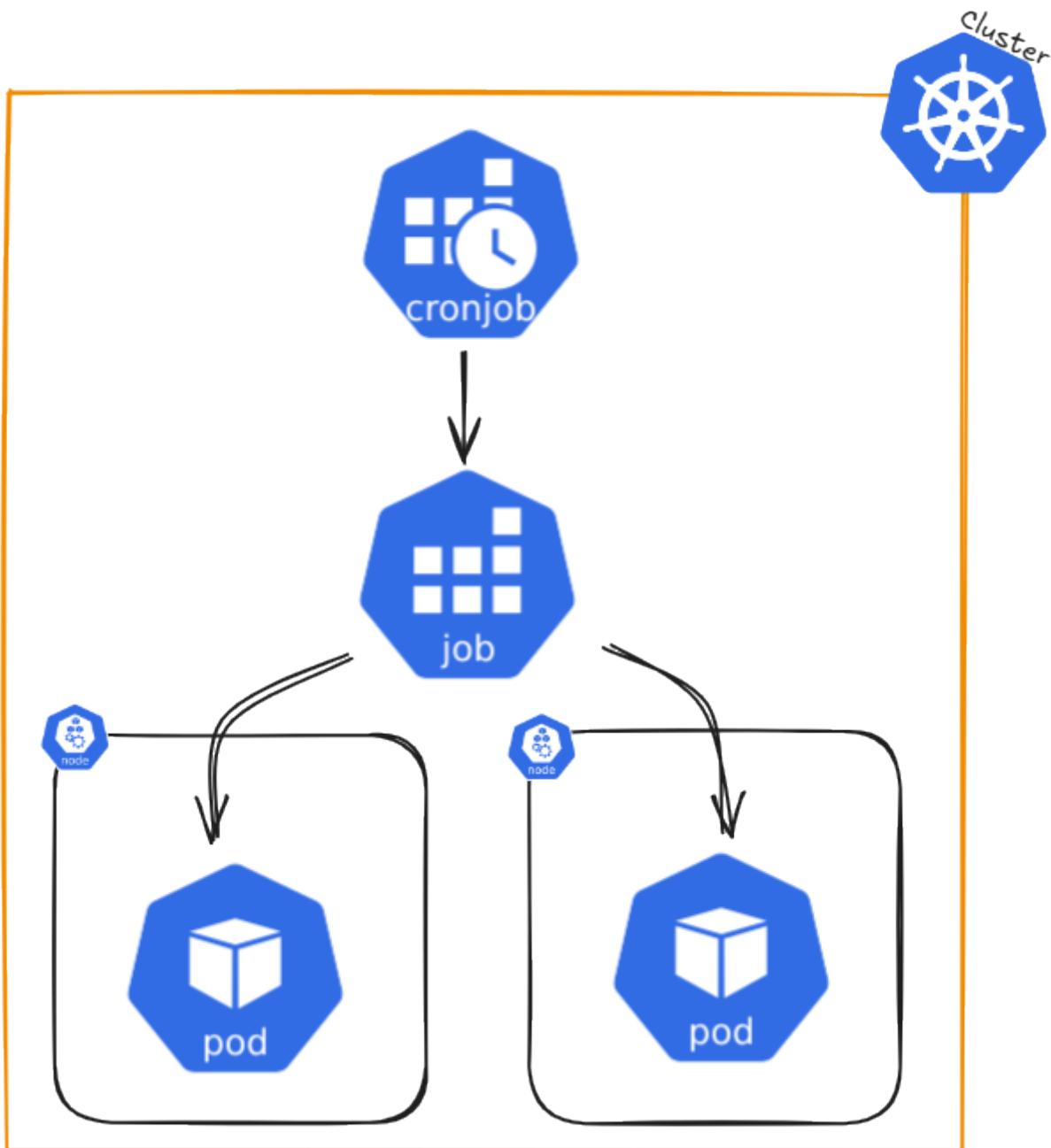
Job / Cronjob



Useful Links

- [Kubernetes Official Documentation](#)

Architecture



Detailed Description

A Job creates one or more Pods and keeps retrying them until a specified number successfully finish. Once the desired number of successful completions is reached, the Job is complete. Deleting a Job also deletes the Pods it created, while suspending it will stop active Pods until the Job is resumed.

For a simple task, you can create a Job to run a single Pod, which will restart if it fails or is deleted (e.g., due to a node failure). Jobs can also run multiple Pods at the same time.

the job name `.metadata.name` should follow rules for DNS subdomain (ideally stricter rules but cannot be longer 63 chars)

- Non-parallel Jobs:
 - The Job creates only one Pod
 - The Job is complete when the Pod successfully finishes
- Parallel Jobs with a fixed completion count:
 - Set `.spec.completions` to a number greater than 0. (e.g. completions: 5)
 - The Job is complete when the specified number of Pods have finished successfully.
 - Optionally, set `.spec.completionMode` to "Indexed" if each Pod has a specific role or task
- Parallel Jobs with a work queue:
 - Leave `.spec.completions` unset
 - Set `.spec.parallelism` to the number of Pods that can run simultaneously (e.g. parallelism: 3 - default: 1 - parallelism: 0 will pause the job)
 - The Pods coordinate with each other or an external service to divide the work
 - Once any Pod finishes successfully, no new Pods are started, and the Job is complete when all Pods stop
- Restart policy
 - In `.spec.template.spec.restartPolicy`, you must set an appropriate restart policy: (Never or OnFailure)
- For Jobs with `.spec.completions`, you can set `.spec.completionMode`:
 - `NonIndexed` (default): All Pods are identical, and the Job completes when the specified number of successful Pods (`.spec.completions`) is reached.
 - `Indexed`: Each Pod gets a unique index (from 0 to `.spec.completions - 1`), which is available via:
 - Pod annotation: `batch.kubernetes.io/job-completion-index`.
 - Pod label (from Kubernetes v1.28 onwards): `batch.kubernetes.io/job-completion-index`.
 - Environment variable: `JOB_COMPLETION_INDEX`.
 - Pod hostname: Follows the pattern `$(job-name)-$(index)`.

Example: Non-parallel Job (Single Pod):

```

apiVersion: batch/v1
kind: Job
metadata:
  name: single-task-job
spec:
  template:
    spec:

```

```
containers:
- name: worker
  image: busybox
  command: ["echo", "Hello World"]
restartPolicy: Never
```

Parallel Job with Fixed Completions:

```
apiVersion: batch/v1
kind: Job
metadata:
name: fixed-task-job
spec:
  completions: 5
  parallelism: 2
  template:
    spec:
      containers:
      - name: worker
        image: busybox
        command: ["echo", "Processing task"]
      restartPolicy: OnFailure
```

Parallel Job with Work Queue:

```
apiVersion: batch/v1
kind: Job
metadata:
name: work-queue-job
spec:
  parallelism: 3
  template:
    spec:
      containers:
      - name: worker
        image: busybox
```

```
command: ["fetch-and-process-task"]
restartPolicy: Never
```

Indexed CompletionMode:

```
apiVersion: batch/v1
kind: Job
metadata:
name: indexed-job
spec:
completions: 3          # Job completes when all 3 indexed Pods have succeeded
parallelism: 2          # At most 2 Pods run simultaneously
completionMode: Indexed
template:
spec:
containers:
- name: worker
image: busybox
command:
- /bin/sh
- -c
- |
    echo "Processing task for index $JOB_COMPLETION_INDEX"
restartPolicy: Never
```

If you want to run a Job on a schedule, use a CronJob.

Command Reference Guide

Remember to use dry-run and tee to check the configuration of each command first.

```
--dry-run=client -o yaml | tee nginx-deployment.yaml
```

Create a Namespace using a YAML file (declarative method)

```
apiVersion: v1
kind: Namespace
metadata:
  name: dev
  labels:
    name: dev
---
apiVersion: v1
kind: Namespace
metadata:
  name: prod
  labels:
    name: prod
```

```
# Create namespaces
kubectl create -f namespace.yaml

# Get namespaces
kubectl get namespaces --show-labels

# Add context spaces (First get user and clustername)
kubectl config view
CLUSTER_NAME=$(kubectl config view --raw -o jsonpath='{.clusters[0].name}')
USER_NAME=$(kubectl config view --raw -o jsonpath='{.users[0].name}')
kubectl config set-context dev --namespace=dev --cluster=$CLUSTER_NAME --user=$USER_NAME
kubectl config set-context prod --namespace=prod --cluster=$CLUSTER_NAME --user=$USER_NAME
# We added two new request contexts (dev and prod)
kubectl config view

# Switch context
kubectl config use-context dev

# Check current context
kubectl config current-context

# Create deployment in context dev and check pods
kubectl create deployment nginx-deployment --image=nginxdemos/hello --port=80
kubectl get pods
```

```
# Switch context and check pods
```

```
kubectl config use-context prod
```

```
kubectl get pods
```

```
# Delete context
```

```
kubectl config use-context default
```

```
kubectl config delete-context dev
```

```
kubectl config delete-context prod
```

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