Kubernetes Task: Explore DaemonSet, CronJob, and Job

Objective:

```
Understand and implement **DaemonSet**, **CronJob**, and **Job** in
Kubernetes to manage node-level workloads and scheduled tasks.
```

Task List:

Task 1: Create a DaemonSet

```yaml
apiVersion: apps/v1
kind: DaemonSet
metadata:
  name: busybox-daemon
spec:
  selector:
    matchLabels:
      app: busybox-daemon
  template:
    metadata:
      labels:
        app: busybox-daemon
    spec:
      containers:
      - name: busybox
        image: busybox
        command: ["/bin/sh", "-c"]
        args: ["while true; do echo Daemon running on $(hostname); sleep
30; done"]
```

```
controlplane ~ ➜ sudo vi daemonset-busybox.yaml

controlplane ~ ➜ kubectl apply -f daemonset-busybox.yaml
daemonset.apps/busybox-ds created

controlplane ~ ➜ kubectl get daemonset
NAME         DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR   AGE
busybox-ds   2         2         2       2            2           <none>          14s

controlplane ~ ➜ kubectl get pods -o wide
NAME               READY   STATUS    RESTARTS   AGE   IP           NODE     NOMINATED NODE
READINESS GATES
busybox-ds-hgqsc   1/1     Running   0          29s   172.17.1.2   node01   <none>
<none>
busybox-ds-jj22q   1/1     Running   0          29s   172.17.3.2   node02   <none>
<none>
```

```
controlplane ~ ➜ cat daemonset-busybox.yaml
apiVersion: apps/v1
kind: DaemonSet
metadata:
  name: busybox-ds
  labels:
    app: busybox
spec:
  selector:
    matchLabels:
      name: busybox
  template:
    metadata:
      labels:
        name: busybox
    spec:
      containers:
      - name: busybox
        image: busybox
        command: ["/bin/sh", "-c"]
        args: ["while true; do echo Daemon running on $(hostname); sleep 30; done"]
        resources:
          limits:
            memory: "128Mi"
            cpu: "100m"
```



```
Task 2: Understand and Apply Cron Syntax

Cron Format:
┌──────────── minute (0 - 59)
│ ┌──────────── hour (0 - 23)
```

```
| | ┌──────────── day of the month (1 - 31)
| | | ┌──────────── month (1 - 12)
| | | | ┌──────────── day of the week (0 - 6)
| | | | |
* * * * *
```

Task 3: Create a CronJob:

```
controlplane ~ ➜ sudo vi cronjob.yaml

controlplane ~ ➜ kubectl apply -f cronjob.yaml
cronjob.batch/print-msg created

controlplane ~ ➜ kubectl get cronjobs
NAME        SCHEDULE      TIMEZONE   SUSPEND   ACTIVE   LAST SCHEDULE   AGE
print-msg   */5 * * * *   <none>     False     0        <none>          18s
```

CronJob YAML

```yaml
apiVersion: batch/v1
kind: CronJob
metadata:
  name: print-message
spec:
  schedule: "*/5 * * * *"
  jobTemplate:
    spec:
      template:
        spec:
          containers:
          - name: print
            image: busybox
            args:
            - /bin/sh
            - -c
            - echo "40daysofkubernetes"
          restartPolicy: OnFailure
```

Task 4: Verify Output:

```
kubectl logs <job-pod-name>
```

```
controlplane ~ ✖ kubectl get jobs --watch
^[[ANAME                  STATUS     COMPLETIONS   DURATION   AGE
print-msg-29228070   Running   0/1                      0s
print-msg-29228070   Running   0/1           0s         0s
print-msg-29228070   Running   0/1           4s         4s
print-msg-29228070   Complete   1/1           4s         4s
```

```
controlplane ~ ✖ kubectl get pods --selector=job-name=print-msg-29228070
NAME                       READY   STATUS      RESTARTS   AGE
print-msg-29228070-qdl5s   0/1     Completed   0          2m12s
```

```
controlplane ~ ✖ kubectl get pods --selector=job-name=print-msg-29228070
NAME                       READY   STATUS      RESTARTS   AGE
print-msg-29228070-qdl5s   0/1     Completed   0          4m20s

controlplane ~ ➜ print-msg-29228070-qdl5s
-bash: print-msg-29228070-qdl5s: command not found

controlplane ~ ✖ kubectl logs print-msg-29228070-qdl5s
40daysofkubernetes
```

Task 6: Document Learnings

✅ What is a DaemonSet?

- Runs one Pod **per node**.
- Used for log collectors, monitoring agents, etc.

✅ What is a CronJob?

- Scheduled job using **cron syntax**.

- Useful for recurring tasks (backups, cleanup, etc.)

✅ **CronJob vs Job**

Feature	Job	CronJob
Run Type	One-time	Scheduled (repeating)
Triggered by	Manual (kubectl/app)	Time schedule (cron syntax)
Use Case	Data migration, batch task	Cleanup, recurring jobs

✅ **Cron Expression:** `*/5 * * * *`

- Runs every 5 minutes.

📢 Task 7: Share Publicly

Sample LinkedIn Post:

🚀 **Day X of #40DaysOfKubernetes** Today, I explored:

✅ DaemonSet: Running containers on **every node**
✅ CronJob: Automating tasks with cron-style schedules
✅ Job: One-time task execution

🛠️ Used `busybox` to print messages and verified logs.
📘 Learned `*/5 * * * *` cron syntax.
🔍 Understood real-world use cases of DaemonSet, CronJob, and Jobs.