Unsupervised Operand Upgrade

Prerequisites

- Access to container registry hosting PostgreSQL images.
- Sufficient storage and resources allocated for the upgrade process.

Step 1: Create and Deploy Initial Cluster

A. Create

% vi cluster-upgrade.yaml

```
apiVersion: postgresql.k8s.enterprisedb.io/v1
kind: Cluster
metadata:
  name: cluster-upgrade
spec:
  instances: 3
  imageName: quay.io/enterprisedb/postgresql:16.1

  primaryUpdateStrategy: unsupervised

  storage:
    size: 1Gi
```

B. Deploy

% kubectl apply -f cluster-upgrade.yaml
cluster.postgresql.k8s.enterprisedb.io/cluster-upgrade created

C. Verify

% kubectl get pods

NAME	READY	STATUS	RESTARTS	AGE
cluster-upgrade-1	1/1	Running	0	75s
cluster-upgrade-2	1/1	Running	0	46s
cluster-upgrade-3	1/1	Running	0	20s

D. Check cluster status:

% kubectl cnp status cluster-upgrade

Cluster Summary
Name default/cluster-upgrade
System ID: 7464534123351683100
PostgreSQL Image: quay.io/enterprisedb/postgresql:16.1
Primary instance: cluster-upgrade-1
Primary start time: 2025-01-27 10:04:56 +0000 UTC (uptime 4m29s)
Status: Cluster in healthy state
Instances: 3

Ready instances: 3
Size: 127M
Current Write LSN: 0/6054420 (Timeline: 1 - WAL File: 000000010000000000000006)

Continuous Backup status
Not configured

Streaming Replication status
Replication Slots Enabled
Name Sent LSN Write LSN Flush LSN Replay LSN Write Lag Flush Lag Replay Lag State Sync State Sync Priority Replication Slot
--- -------- --------- --------- ---------- --------- --------- ---------- ----- ---------- ------------- ----------------
cluster-upgrade-2 0/6054420 0/6054420 0/6054420 0/6054420 00:00:00 00:00:00 00:00:00 streaming async 0 active
cluster-upgrade-3 0/6054420 0/6054420 0/6054420 0/6054420 00:00:00 00:00:00 00:00:00 streaming async 0 active

Instances status
Name Current LSN Replication role Status QoS Manager Version Node
--- ----------- --------------- ------ --- --------------- ----
cluster-upgrade-1 0/6054420 Primary OK BestEffort 1.25.0 kind-cnp-1.25.0-control-plane

```
cluster-upgrade-2  0/6054420    Standby (async)   OK
BestEffort  1.25.0          kind-cnp-1.25.0-control-
plane
cluster-upgrade-3  0/6054420    Standby (async)   OK
BestEffort  1.25.0          kind-cnp-1.25.0-control-
plane
```

E. verify the existing version:

```
% kubectl cnp psql cluster-upgrade
psql (16.1)
Type "help" for help.

postgres=# select version();
                                                version
-----------------------------------------------------------------------
--------------------------------
 PostgreSQL 16.1 on x86_64-pc-linux-gnu, compiled
by gcc (GCC) 8.5.0 20210514 (Red Hat 8.5.0-20),
64-bit
(1 row)
```

Step 2: Upgrade Cluster

1 Edit the cluster configuration to update the image: spec:

2 imageName: quay.io/enterprisedb/postgresql:16.3

% kubectl edit cluster cluster-upgrade -o yaml

While upgrade:

From:

imageName: quay.io/enterprisedb/postgresql:16.1

Change to:

imageName: quay.io/enterprisedb/postgresql:16.3

Step 3: Watch the pod status:

% kubectl get pods -L role -w

```
NAME                READY   STATUS            RESTARTS      AGE   ROLE
cluster-upgrade-1   1/1     Running           1 (12m ago)   32m   primary
cluster-upgrade-2   1/1     Running           1 (12m ago)   32m   replica
cluster-upgrade-3   0/1     PodInitializing   0             36s
cluster-upgrade-3   0/1     Running           0             97s
cluster-upgrade-3   0/1     Running           0             99s   replica
cluster-upgrade-3   0/1     Running           0             101s  replica
```

```
cluster-upgrade-3   1/1   Running            0
102s   replica
cluster-upgrade-2   1/1   Terminating        1 (13m
ago)   33m    replica
cluster-upgrade-2   0/1   Completed          1 (13m
ago)   33m    replica
cluster-upgrade-2   0/1   Completed          1 (13m
ago)   33m    replica
cluster-upgrade-2   0/1   Completed          1 (13m
ago)   33m    replica
cluster-upgrade-2   0/1   Pending            0          0s
cluster-upgrade-2   0/1   Pending            0          0s
cluster-upgrade-2   0/1   Init:0/1           0          0s
cluster-upgrade-2   0/1   Init:0/1           0          1s
cluster-upgrade-2   0/1   PodInitializing    0          2s
cluster-upgrade-2   0/1   Running            0          3s
cluster-upgrade-2   0/1   Running            0          3s
replica
cluster-upgrade-2   0/1   Running            0
10s    replica
cluster-upgrade-2   1/1   Running            0
11s    replica
cluster-upgrade-1   1/1   Terminating        1 (13m
ago)   33m    primary
cluster-upgrade-1   0/1   Completed          1 (13m
ago)   33m    primary
cluster-upgrade-1   0/1   Completed          1 (13m
ago)   33m    primary
cluster-upgrade-1   0/1   Completed          1 (13m
ago)   33m    primary
cluster-upgrade-1   0/1   Pending            0          0s
```

```
cluster-upgrade-1   0/1   Pending           0          0s
cluster-upgrade-1   0/1   Init:0/1          0          0s
cluster-upgrade-1   0/1   Init:0/1          0          1s
cluster-upgrade-1   0/1   PodInitializing   0          2s
cluster-upgrade-1   0/1   Running           0          3s
cluster-upgrade-1   0/1   Running           0          3s
primary
cluster-upgrade-1   0/1   Running           0
10s    primary
cluster-upgrade-1   1/1   Running           0
11s    primary
```

Step 4: In other terminal execute the below command and observe the current status of each pod

```
% kubectl describe pod cluster-upgrade-3

Events:
  Type    Reason     Age   From               Message
  ----    ------     ----  ----               -------
  Normal  Scheduled  87s   default-scheduler
Successfully assigned default/cluster-upgrade-3 to
kind-cnp-1.25.0-control-plane
  Normal  Pulled     87s   kubelet            Container
image "docker.enterprisedb.com/k8s_enterprise/edb-
postgres-for-kubernetes:1.25.0" already present on
machine
  Normal  Created    87s   kubelet            Created
container: bootstrap-controller
  Normal  Started    87s   kubelet            Started
```

container bootstrap-controller
  Normal Pulling 86s kubelet Pulling image "quay.io/enterprisedb/postgresql:16.3"

Step 5: Verify the cluster status

% kubectl cnp status cluster-upgrade

Cluster Summary
Name default/cluster-upgrade
System ID: 7464534123351683100
PostgreSQL Image: quay.io/enterprisedb/postgresql:16.3
Primary instance: cluster-upgrade-1
Primary start time: 2025-01-27 10:04:56 +0000 UTC (uptime 34m9s)
Status: Cluster in healthy state
Instances: 3
Ready instances: 3
Size: 175M
Current Write LSN: 0/9000D80 (Timeline: 1 - WAL File: 000000010000000000000009)

Continuous Backup status
Not configured

Streaming Replication status
Not available yet

Instances status
Name Current LSN Replication role

```
Status  QoS         Manager Version  Node
----              ----------  ---------------      ------  ---
--------------  ----
cluster-upgrade-1  0/9000D80    Primary              OK
BestEffort  1.25.0          kind-cnp-1.25.0-control-
plane
cluster-upgrade-2  0/90000A0    Standby (file based)
OK      BestEffort  1.25.0          kind-cnp-1.25.0-
control-plane
cluster-upgrade-3  0/90000A0    Standby (file based)
OK      BestEffort  1.25.0          kind-cnp-1.25.0-
control-plane
```

Step 5: Verify the database version

```
swapnilsuryawanshi@LAPTOP385PNIN runbook-cnp
% kubectl cnp psql cluster-upgrade
psql (16.3)
Type "help" for help.

postgres=#
postgres=# select version();
                                              version
-----------------------------------------------------------------------
---------------------------------
 PostgreSQL 16.3 on x86_64-pc-linux-gnu, compiled
by gcc (GCC) 8.5.0 20210514 (Red Hat 8.5.0-22),
64-bit
(1 row)
```

Expected Outcome

- The operand upgrade is performed successfully.
- The switchover is handled automatically by the operator.
- PostgreSQL version is updated from 16.1 to 16.3.
- The cluster remains in a healthy state throughout the process.
- Data consistency is maintained post-upgrade.