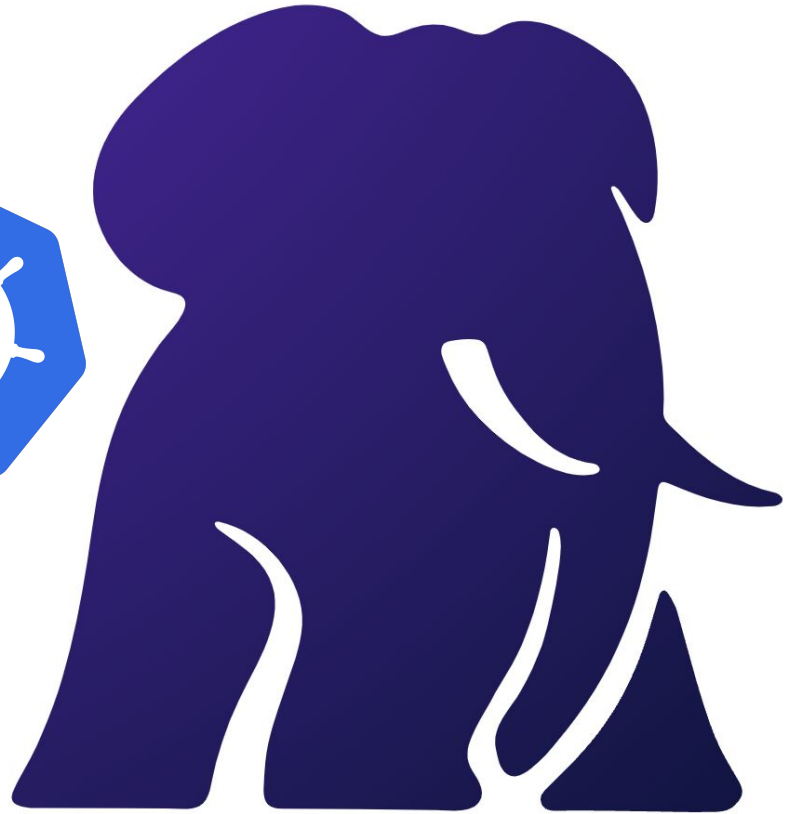
CNPG

Cloud Native Postgres



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jOpenSpace,
Telč, 5.10.2024

Postgres v Kubernetes

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Co chceme od provozu v Kubernetes

- Deklarativní setup & GitOps
- Vysokou dostupnost aplikací
- Minimalizace manuálních tasků
- ...

Co chceme od databáze

- Vysokou dostupnost
- Automatický failover
- Zálohy
- Point In Time Recovery
- ...

Možnosti Postgresu v Kubernetes

- StatefulSet
- Bitnami Helm Chart
- Zalando Operator
- CloudNativePG 🎉🎉

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Run PostgreSQL.
The Kubernetes way.

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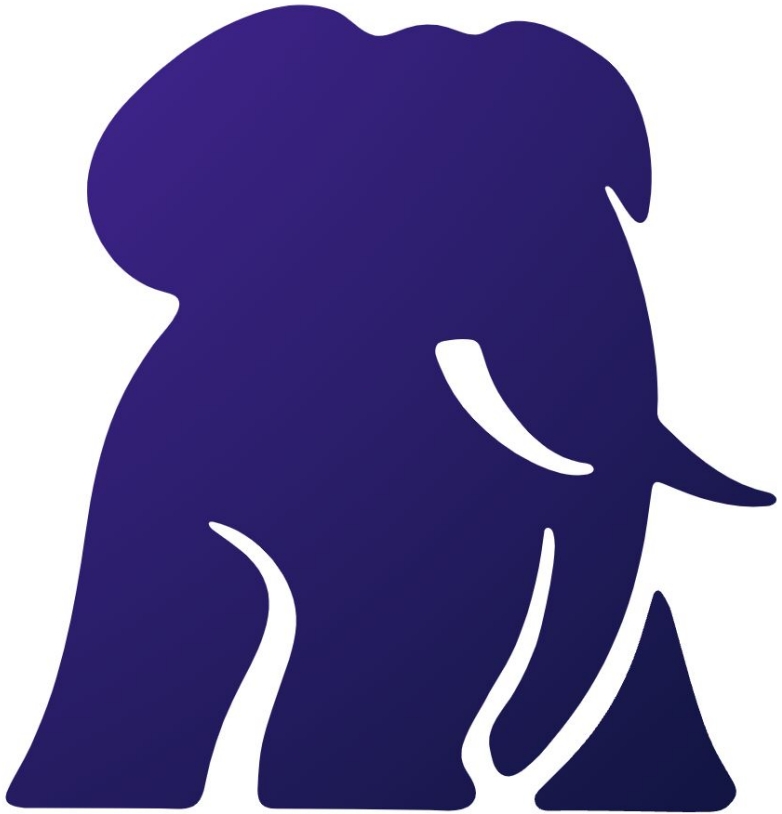

“CloudNativePG is the Kubernetes operator that covers the full lifecycle of a highly available PostgreSQL database cluster with a primary/standby architecture, using native streaming replication.“ – cnpg.io

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Co je CNPG

- Postgres Operator
- from EDB, community driven

```yaml
apiVersion: postgresql.cnpg.io/v1
kind: Cluster
metadata:
  name: cluster-example
spec:
  instances: 3

  storage:
    size: 1G
```

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Klíčové vlastnosti CNPG

- Deklarativní konfigurace
- Cloud Native - navrženo na provoz v Kubernetes
- High Availability
- Disaster Recovery & Point in Time recovery
- Monitoring - Prometheus Exporter & logy v JSONu
- PgBouncer
- Declarative - Postgres Operations

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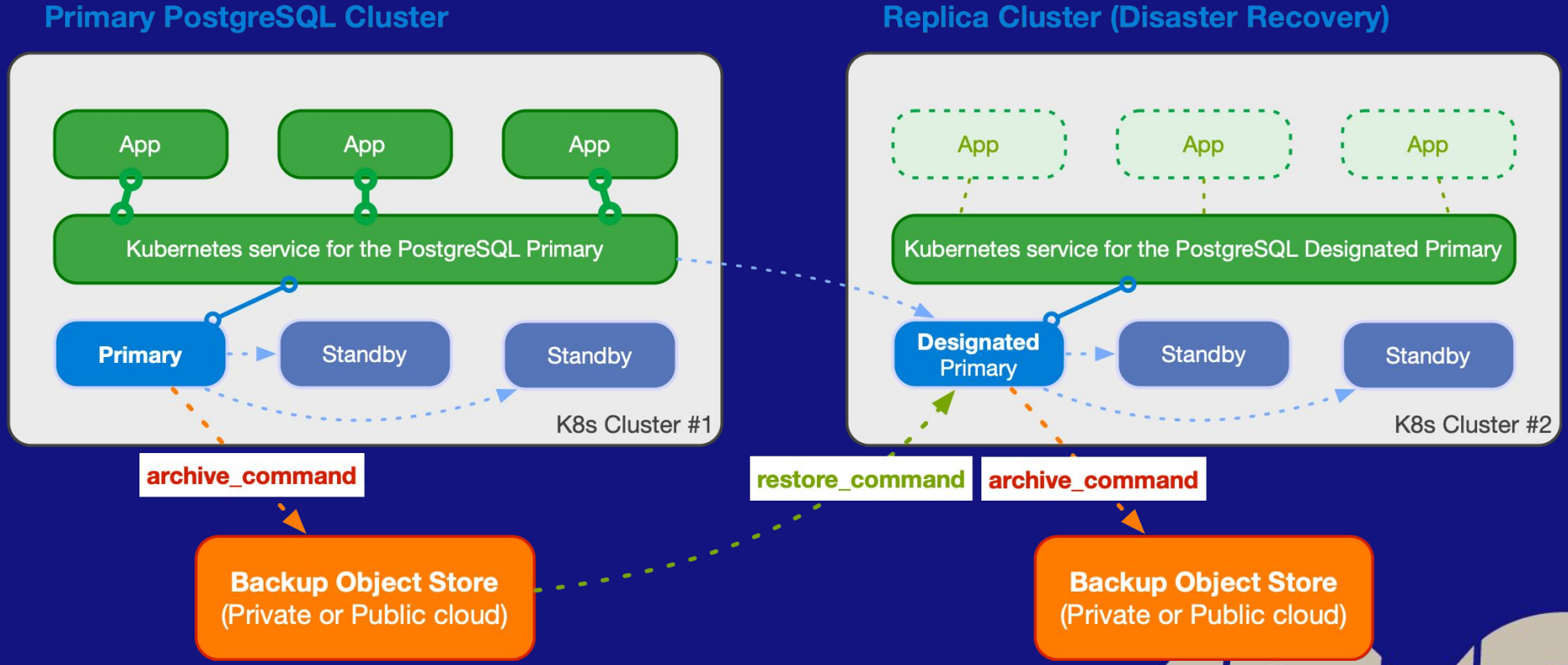
Backups

- Zálohuje do Object Storage
  - S3, Azure Blob, ...
- WAL Backup (pro Point in time recovery)
- Scheduled & On Demand Backups

```yaml
apiVersion: postgresql.cnpg.io/v1
kind: Cluster
[...]
spec:
  backup:
    barmanObjectStore:
      [...]
      wal:
        compression: gzip
        encryption: AES256
```

```yaml
apiVersion: postgresql.cnpg.io/v1
kind: Cluster
[...]
spec:
  backup:
    barmanObjectStore:
      destinationPath: "<destination path here>"
      s3Credentials:
        accessKeyId:
          name: aws-creds
          key: ACCESS_KEY_ID
        secretAccessKey:
          name: aws-creds
          key: ACCESS_SECRET_KEY
    retentionPolicy: "30d"
```



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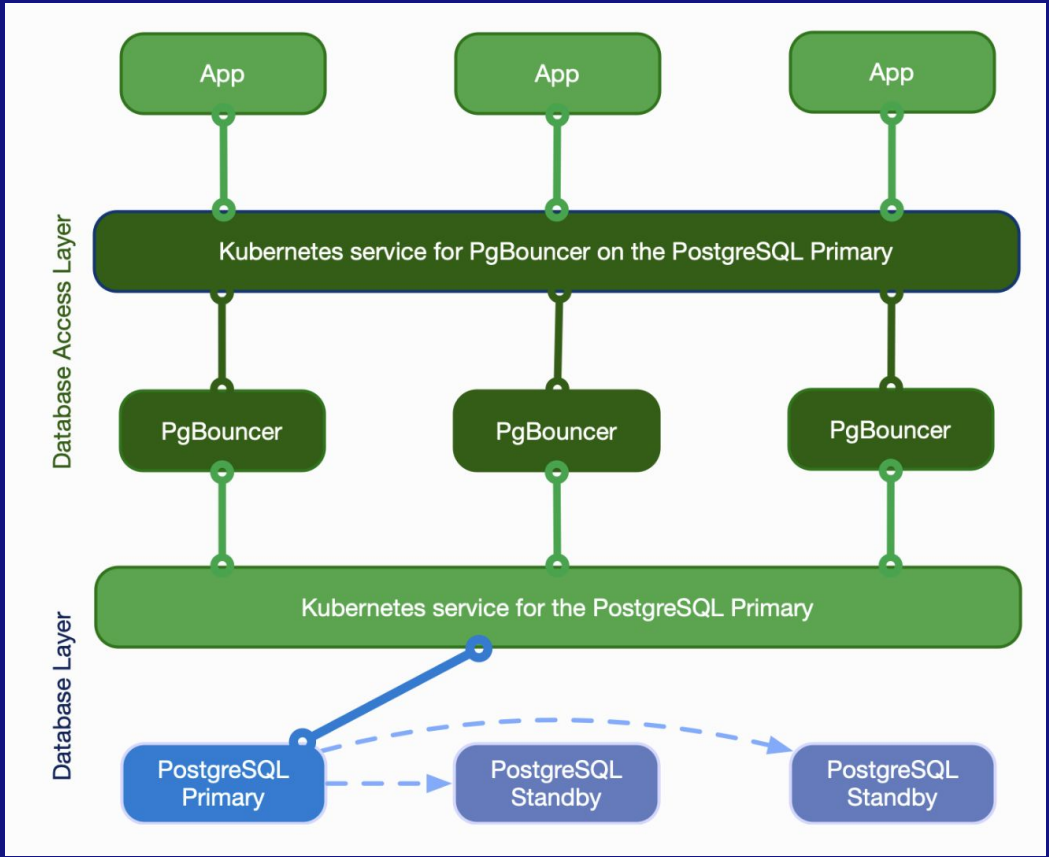
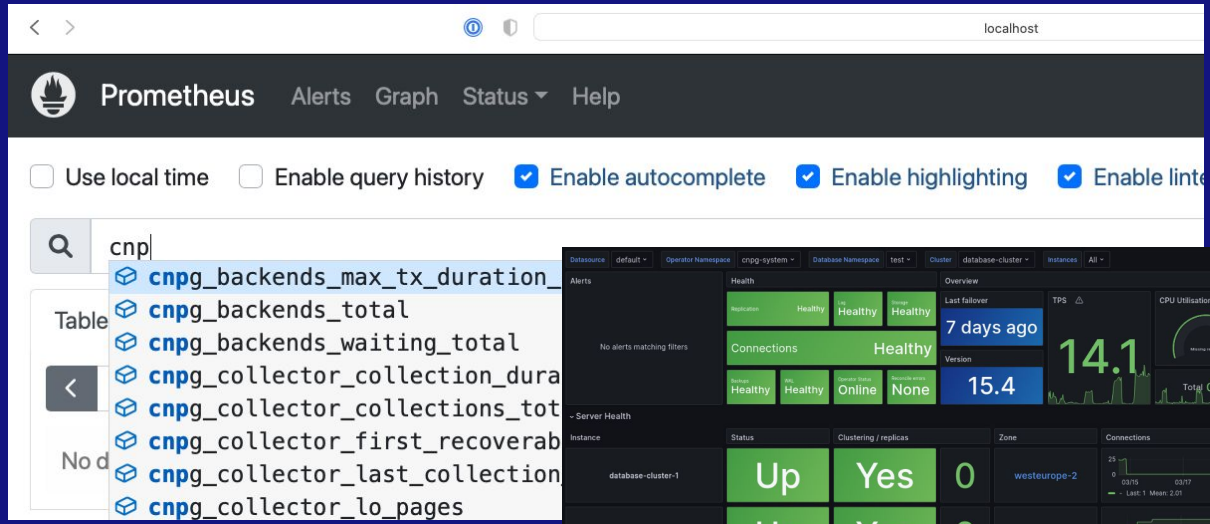
PgBouncer




```yaml
apiVersion: postgresql.cnpg.io/v1
kind: Pooler
metadata:
  name: pooler-example-rw
spec:
  cluster:
    name: cluster-example

  instances: 3
  type: rw
  pgbouncer:
    poolMode: session
    parameters:
      max_client_conn: "1000"
      default_pool_size: "10"
```

Monitoring v Prometheu



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```
❯ kubectl cnpg status dataproxy-db
Cluster Summary
Name:               dataproxy-db
Namespace:          openhes-dev
System ID:          7364695038436229151
PostgreSQL Image:   ghcr.io/cloudnative-pg/postgresql:16.2
Primary instance:   dataproxy-db-1
Primary start time: 2024-06-03 15:54:23 +0000 UTC (uptime 74h27m23s)
Status:             Cluster in healthy state
Instances:          2
Ready instances:    2
Current Write LSN:  1F/4F041B78 (Timeline: 3 - WAL File: 000000030000001F0000004F)

Certificates Status
Certificate Name          Expiration Date               Days Left Until Expiration
----------------          ---------------               --------------------------
dataproxy-db-ca           2024-08-01 08:52:20 +0000 UTC  55.60
dataproxy-db-replication  2024-08-01 08:52:20 +0000 UTC  55.60
dataproxy-db-server       2024-08-01 08:52:20 +0000 UTC  55.60

Continuous Backup status
Not configured

Physical backups
No running physical backups found

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
----           --------     ---------    ---------    ----------   ---------        ---------        ----------       -----      ----------  -------------  ----------------
dataproxy-db-2  1F/4F041B78  1F/4F041B78  1F/4F041B78  1F/4F041B78  00:00:00.000741  00:00:00.007159  00:00:00.007191  streaming  quorum      1              active

Unmanaged Replication Slot Status
No unmanaged replication slots found

Managed roles status
No roles managed

Tablespaces status
No managed tablespaces

Pod Disruption Budgets status
Name                Role     Expected Pods  Current Healthy  Minimum Desired Healthy  Disruptions Allowed
----                ----     -------------  ---------------  -----------------------  -------------------
dataproxy-db-primary  primary  1              1                1                        0
```

cnpg.io

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