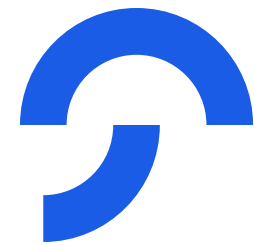
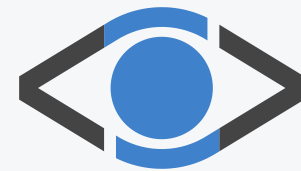


Introduction to K8up

February 23rd, 2023

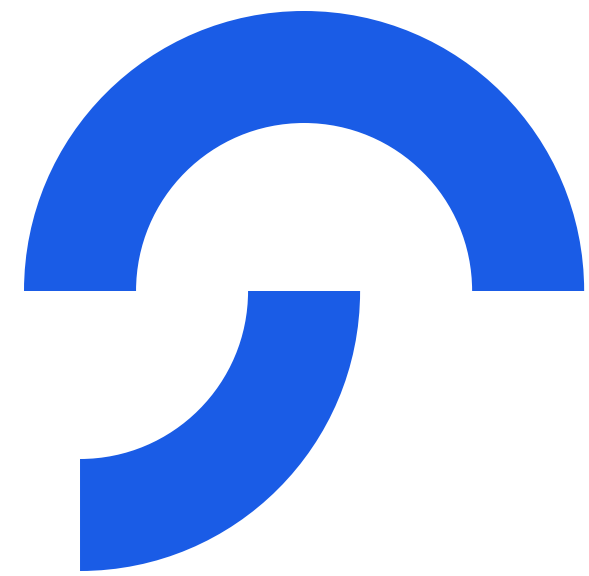


k8up



VSHN

Adrian Kosmaczewski, Developer Relations



k8up

 Répétez avec moi: /keɪtæp/



BaaS

Backup as a Service

What is K8up?

- A Backup Operator for Kubernetes & OpenShift
- Used internally at VSHN since 2018
- Uses [restic](#) under the hood
- Current version: 2.5.3 (February 17th, 2023)
- **k8up.io** and **github.com/k8up-io**



CLOUD NATIVE COMPUTING FOUNDATION

K8up is a CNCF Sandbox project since November 2021

Where does it store backups?

- Any S3-compatible backend
- Any restic-compatible backend

How does it work?

K8up backs all PVCs in the same namespace

1. Create backup credentials
2. Trigger a backup or set up a backup schedule
3. No step 3!

1. PVC Resource

```
kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: app-data
  labels:
    app.kubernetes.io/name: demo-app
  annotations:
    k8up.io/backup: "true" ❶
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: "1Gi"
```

❶ Annotation required for K8up

2. Backup Credentials

```
apiVersion: v1
kind: Secret
metadata:
  name: backup-repo
type: Opaque
stringData:
  password: p@ssw0rd 1
```

1 A really secure password!

```
apiVersion: k8up.io/v1
kind: Schedule
metadata:
  name: schedule-test
spec:
  failedJobsHistoryLimit: 2
  successfulJobsHistoryLimit: 2
  backend:
    repoPasswordSecretRef:
      name: backup-repo
      key: password
  s3:
    endpoint: https://sos-ch-gva-2.exo.io
    bucket: my-bucket-change-name
    accessKeyIDSecretRef:
      name: objectbucket-creds
      key: AWS_ACCESS_KEY_ID
    secretAccessKeySecretRef:
      name: objectbucket-creds
      key: AWS_SECRET_ACCESS_KEY
  backup:
    schedule: '*/*/*/*/*' ①
    failedJobsHistoryLimit: 2
    successfulJobsHistoryLimit: 2
```

① A backup every minute!

Backend Object

```
backend:  
  repoPasswordSecretRef:  
    name: backup-repo  
    key: password  
  s3:  
    endpoint: https://sos-ch-gva-2.exo.io  
    bucket: my-bucket-change-name  
    accessKeyIDSecretRef:  
      name: objectbucket-creds  
      key: AWS_ACCESS_KEY_ID  
    secretAccessKeySecretRef:  
      name: objectbucket-creds  
      key: AWS_SECRET_ACCESS_KEY
```

Schrodinger's Backup

“The condition of any backup is unknown until a restore is attempted.”

@nixcraft

twitter.com/nixcraft/status/613636528439345152

Restore

```
apiVersion: k8up.io/v1
kind: Restore
metadata:
  name: restore-wordpress
spec:
  snapshot: SNAPSHOT_ID
  restoreMethod:
    folder:
      claimName: wordpress-pvc 1
  backend:
    repoPasswordSecretRef:
      name: backup-repo
      key: password
  s3:
    endpoint: https://sos-ch-gva-2.exo.io
    bucket: my-bucket-change-name
    accessKeyIDSecretRef:
      name: objectbucket-creds
      key: AWS_ACCESS_KEY_ID
    secretAccessKeySecretRef:
      name: objectbucket-creds
      key: AWS_SECRET_ACCESS_KEY
```

1 PVC where the restoration takes place

Manual Restore via restic

```
$ export RESTIC_REPOSITORY=s3:http://location/of/the/backup
$ export RESTIC_PASSWORD=p@assword
$ export AWS_ACCESS_KEY_ID=XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
$ export AWS_SECRET_ACCESS_KEY=XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

$ restic snapshots
repository dec6d66c opened successfully, password is correct
ID          Date                Host                Tags                Directory
-----
5ed64a2d    2018-06-08 09:18:34  macbook-vshn.local  /data
-----
1 snapshots

$ restic restore 5ed64a2d --target /restore
```


Pre-Backup Pods

```
apiVersion: k8up.io/v1
kind: PreBackupPod
metadata:
  name: mysqldump
spec:
  backupCommand: sh -c 'mysqldump -u$USER -p$PW -h $DB_HOST --all-databases'
  pod:
    spec:
      containers:
        - env:
            - name: USER
              value: dumper
            - name: PW
              value: topsecret
            - name: DB_HOST
              value: mariadb.example.com
          image: mariadb
          command:
            - 'sleep'
            - 'infinity'
          imagePullPolicy: Always
        name: mysqldump
```

Demo!

Other Features

- Backup of all PVCs in the same namespace as the Schedule object
- "Application-Aware" backups
 - Backup of data piped through stdin
- Regularly checks for data sanity using `restic check`
- Archive feature on a dedicated location (for example AWS Glacier)
- Default backup mechanism on APPUiO Cloud

APPUiO CLOUD



Annotation-Aware Backups

```
---  
# ...  
template:  
  metadata:  
    labels:  
      app: mariadb  
  annotations:  
    appuio.ch/backupcommand: mysqldump -uroot -psecure --all-databases  
# ...  
---
```

Roadmap

- Backup of RWO storage
 - Already in 2.6.0-rc2, released today!
- k8up CLI
- Better visibility of backups
 - List available snapshots directly in Kubernetes
- Usability improvements
 - Specify in which container to run backup commands

How to Contribute?

- github.com/vshn/k8up
- Go
- Your favorite IDE (with a Go plugin)
- Docker
- make
- Kind

Thanks!



Adrian Kosmaczewski, Developer Relations – adrian@vshn.ch

VSHN AG – Neugasse 10 – CH-8005 Zürich – +41 44 545 53 00 – vshn.ch – info@vshn.ch