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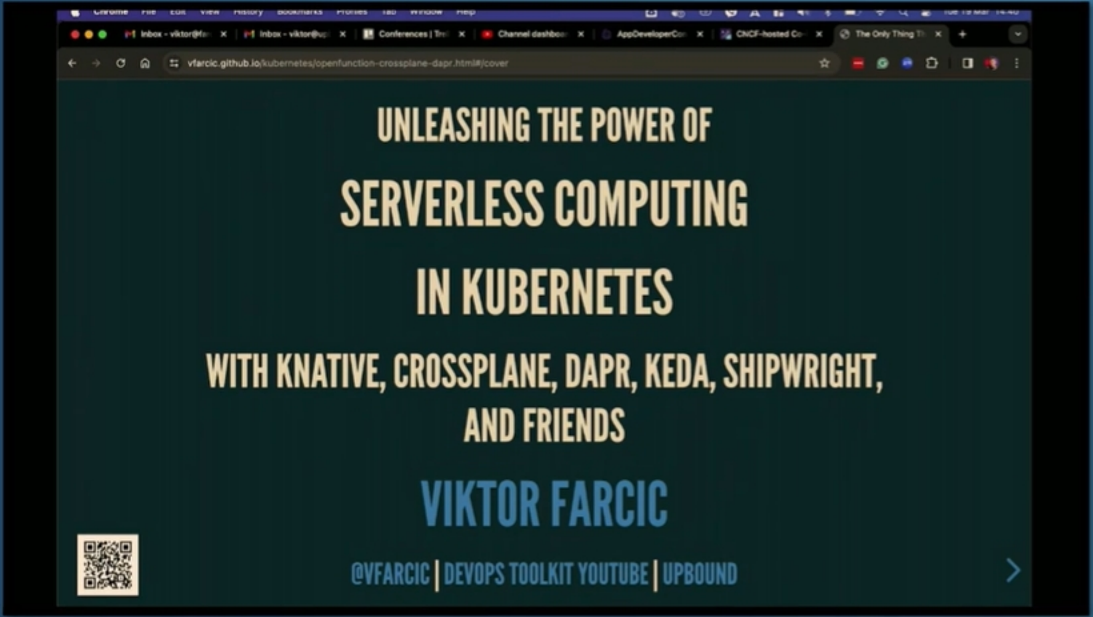
Unleashing the Power of Serverless on Kubernetes with Knative, Crossplane, Dapr, KEDA, and Friends

Viktor Farcic, Upbound



UNLEASHING THE POWER OF

SERVERLESS COMPUTING

IN KUBERNETES

WITH KNATIVE, CROSSPLANE, DAPR, KEDA, SHIPWRIGHT, AND FRIENDS

VIKTOR FARCIC

@VFARCIC | DEVOPS TOOLKIT YOUTUBE | UPBOUND

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vfarcic.github.io/kubernetes/openfunction-crossplane-dapr.html#/1

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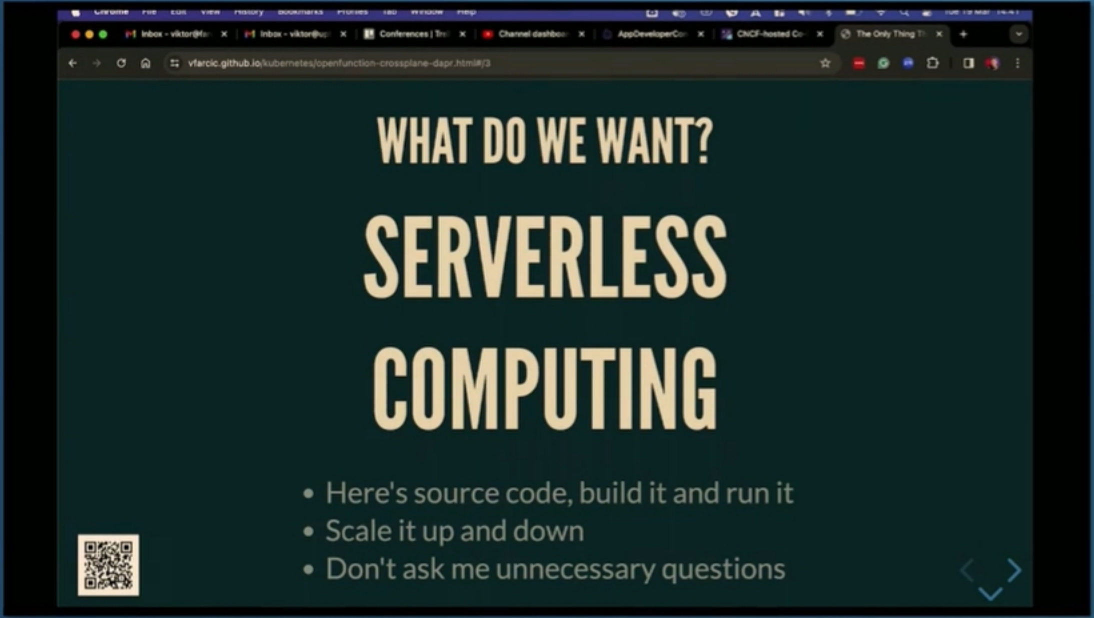
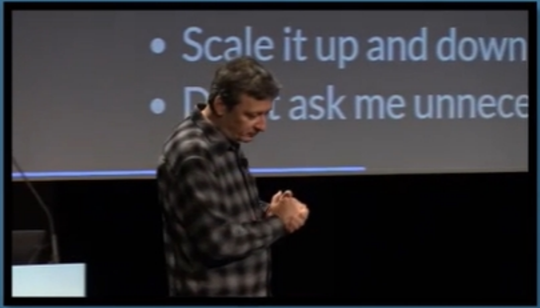


WHAT DO WE WANT?

SERVERLESS COMPUTING

- Here's source code, build it and run it
- Scale it up and down
- Don't ask me unnecessary questions



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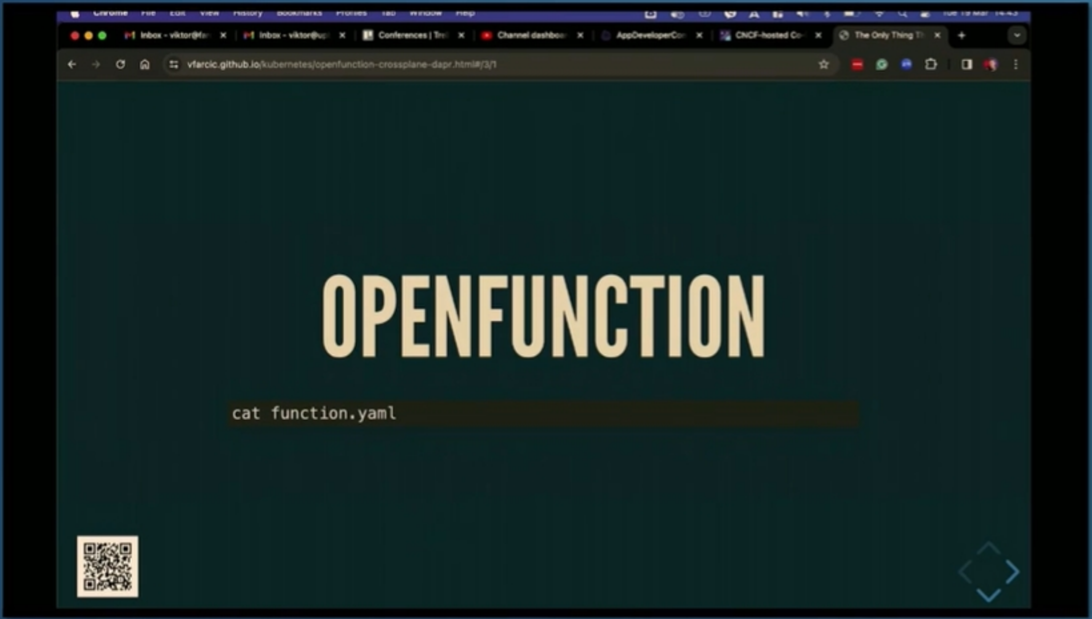

OPENFUNCTION

```
cat function.yaml
```

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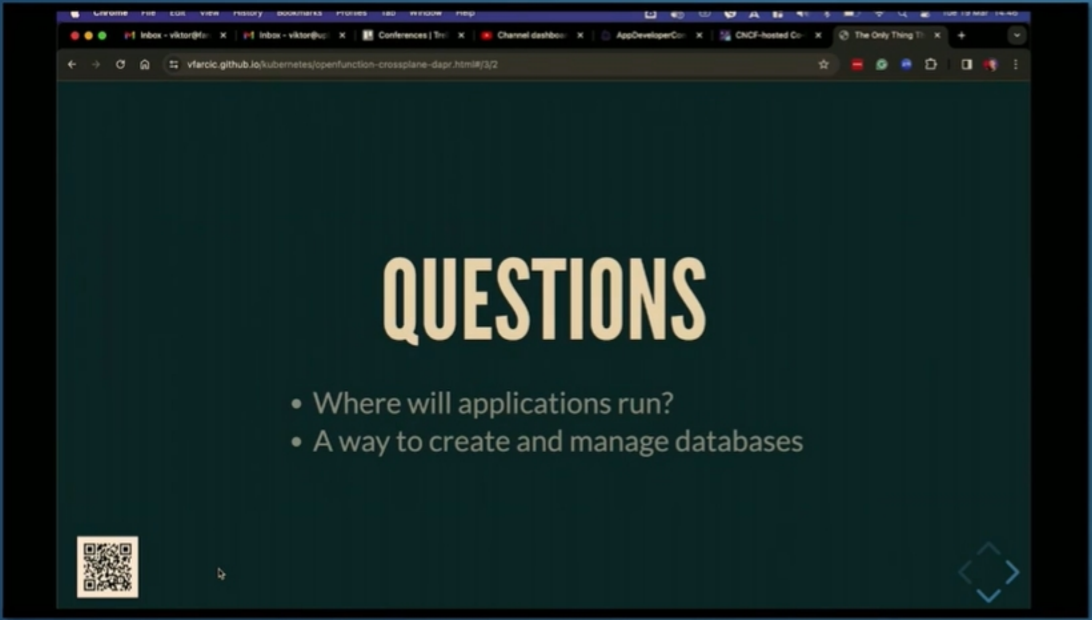

QUESTIONS

- Where will applications run?
- A way to create and manage databases

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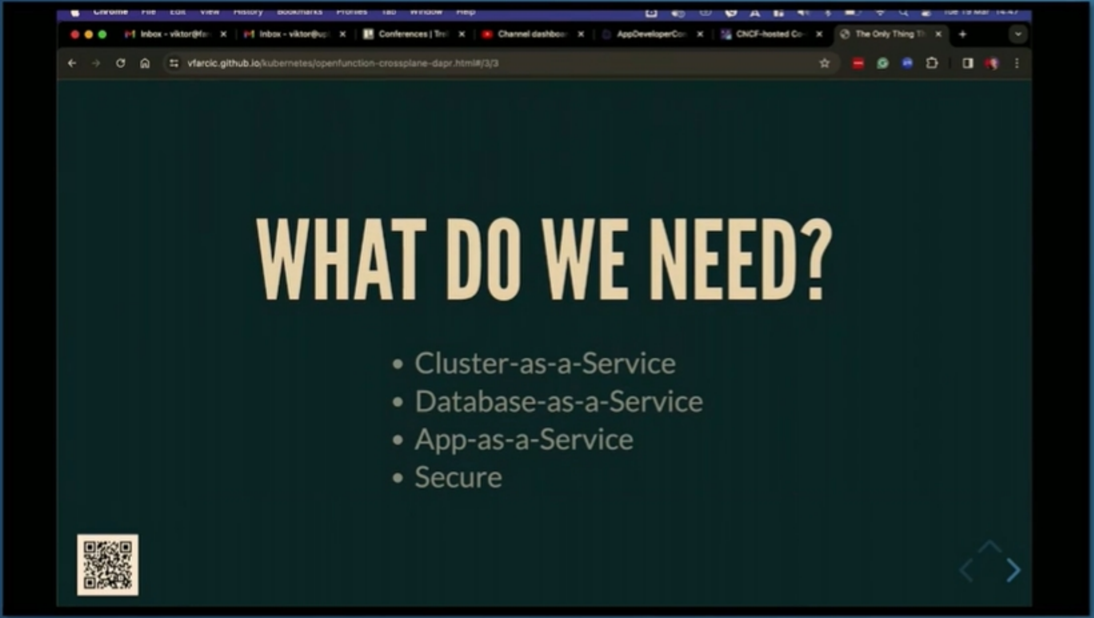

WHAT DO WE NEED?

- Cluster-as-a-Service
- Database-as-a-Service
- App-as-a-Service
- Secure

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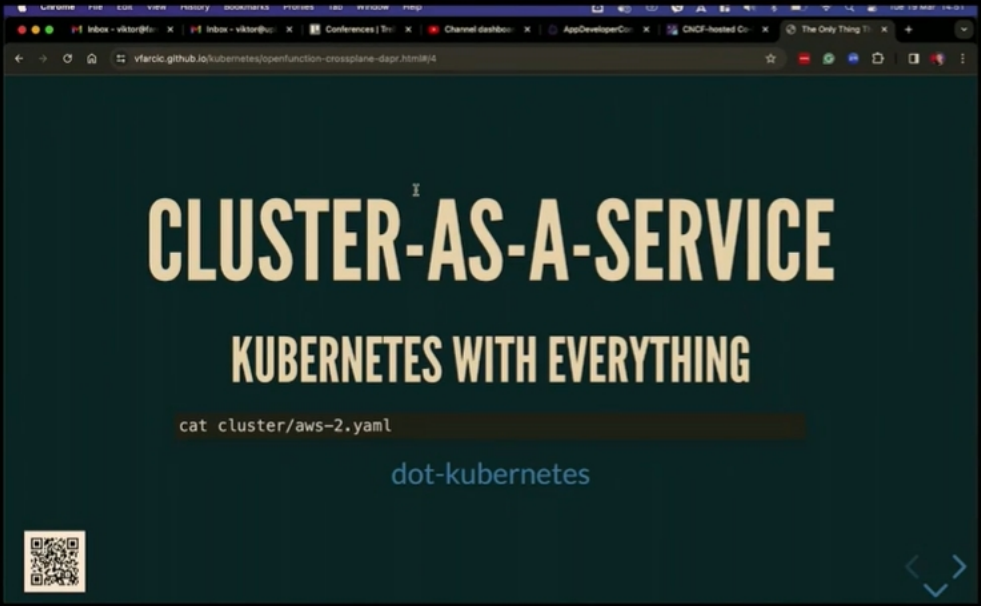
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vfarcic.github.io/kubernetes/openfunction-crossplane-dapr.html#/4

CLUSTER-AS-A-SERVICE

KUBERNETES WITH EVERYTHING

```
cat cluster/aws-2.yaml
```

dot-kubernetes

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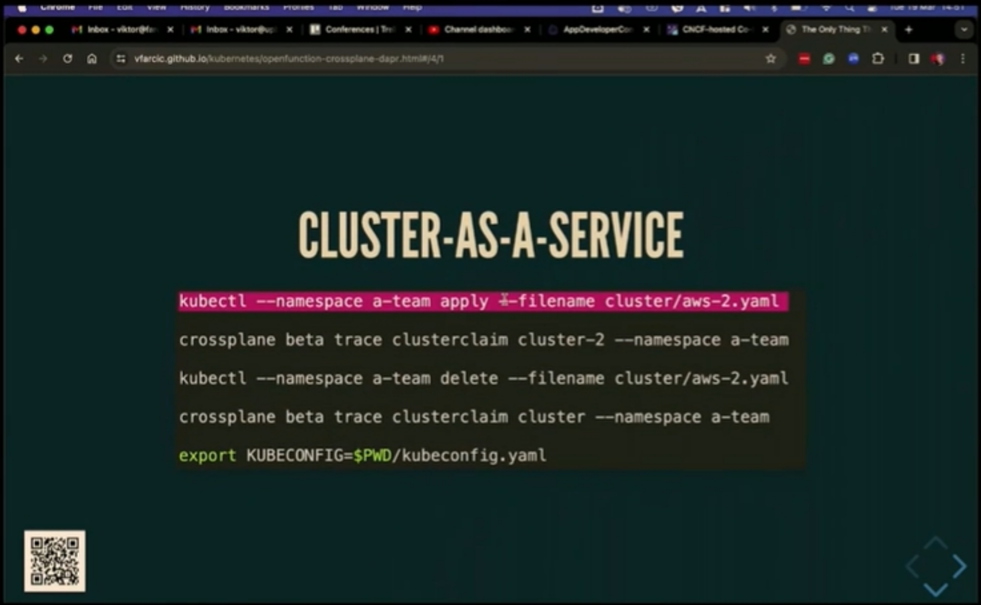

CLUSTER-AS-A-SERVICE

```
kubectl --namespace a-team apply --filename cluster/aws-2.yaml

crossplane beta trace clusterclaim cluster-2 --namespace a-team

kubectl --namespace a-team delete --filename cluster/aws-2.yaml

crossplane beta trace clusterclaim cluster --namespace a-team

export KUBECONFIG=$PWD/kubeconfig.yaml
```

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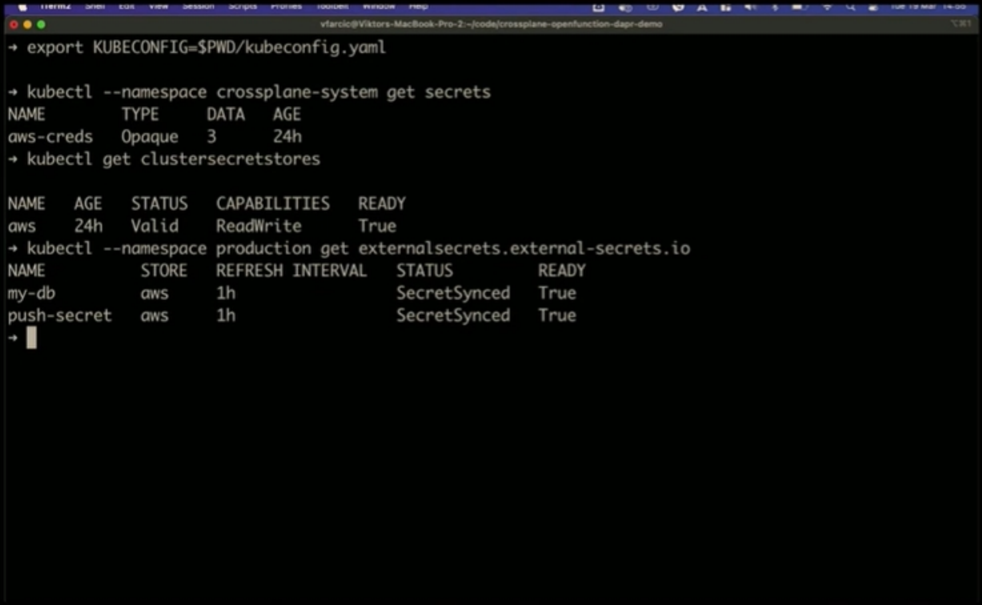
vfarcic@Viktors-MacBook-Pro-2:~/code/crossplane-openfunction-dapr-demo

```
→ export KUBECONFIG=$PWD/kubeconfig.yaml

→ kubectl --namespace crossplane-system get secrets
NAME        TYPE     DATA   AGE
aws-creds   Opaque   3      24h
→ kubectl get clustersecretstores

NAME   AGE   STATUS   CAPABILITIES   READY
aws    24h   Valid    ReadWrite      True
→ kubectl --namespace production get externalsecrets.external-secrets.io
NAME          STORE   REFRESH INTERVAL   STATUS         READY
my-db         aws     1h                 SecretSynced   True
push-secret   aws     1h                 SecretSynced   True
→
```

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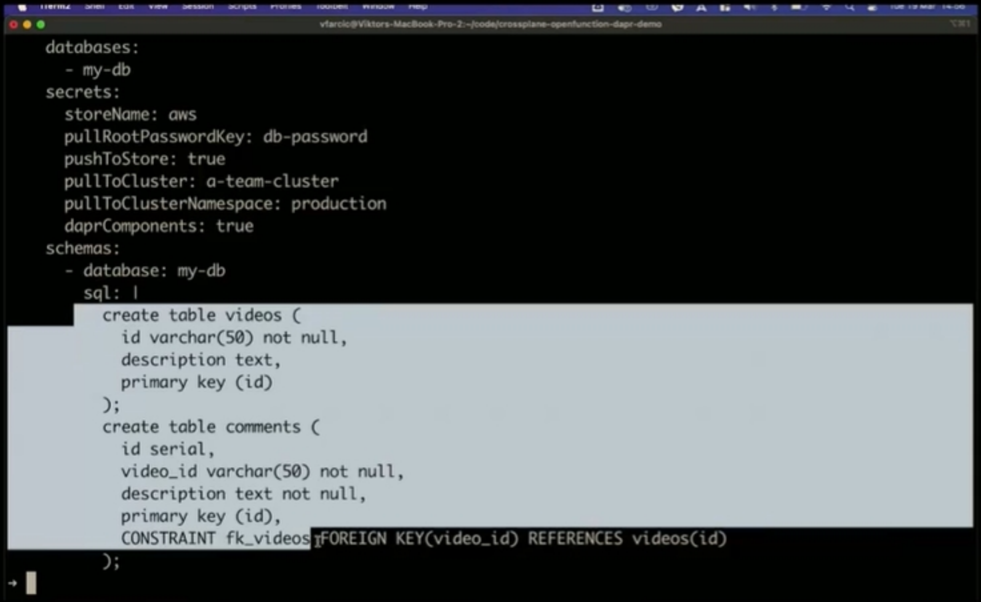
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```
    databases:
      - my-db
    secrets:
      storeName: aws
      pullRootPasswordKey: db-password
      pushToStore: true
      pullToCluster: a-team-cluster
      pullToClusterNamespace: production
      daprComponents: true
    schemas:
      - database: my-db
        sql: |
          create table videos (
            id varchar(50) not null,
            description text,
            primary key (id)
          );
          create table comments (
            id serial,
            video_id varchar(50) not null,
            description text not null,
            primary key (id),
            CONSTRAINT fk_videos FOREIGN KEY(video_id) REFERENCES videos(id)
          );
→
```

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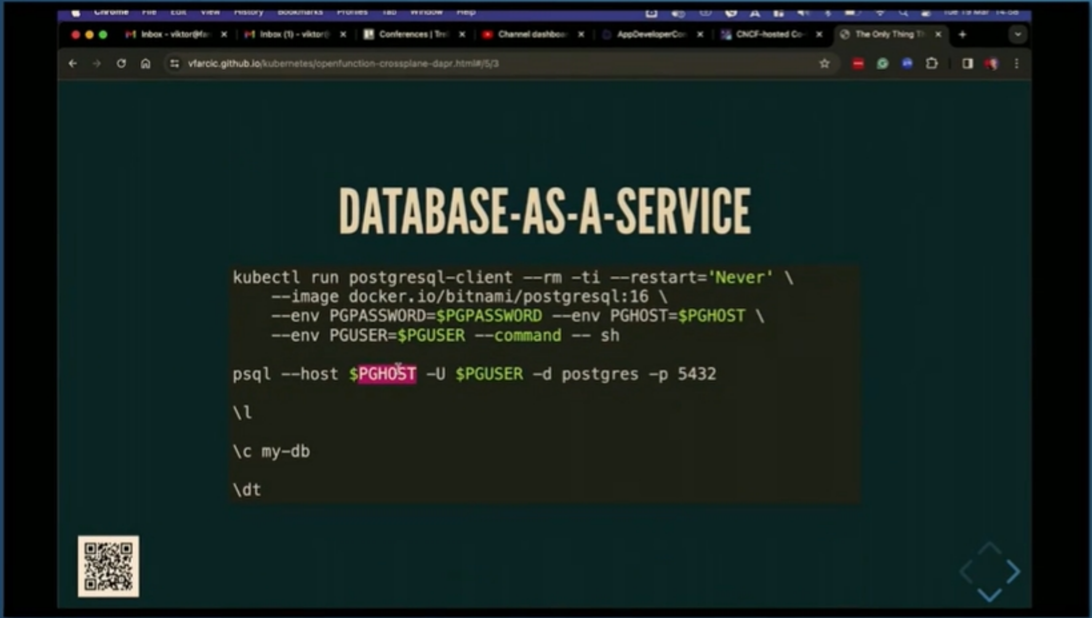

DATABASE-AS-A-SERVICE

```
kubectl run postgresql-client --rm -ti --restart='Never' \
    --image docker.io/bitnami/postgresql:16 \
    --env PGPASSWORD=$PGPASSWORD --env PGHOST=$PGHOST \
    --env PGUSER=$PGUSER --command -- sh

psql --host $PGHOST -U $PGUSER -d postgres -p 5432

\l

\c my-db

\dt
```

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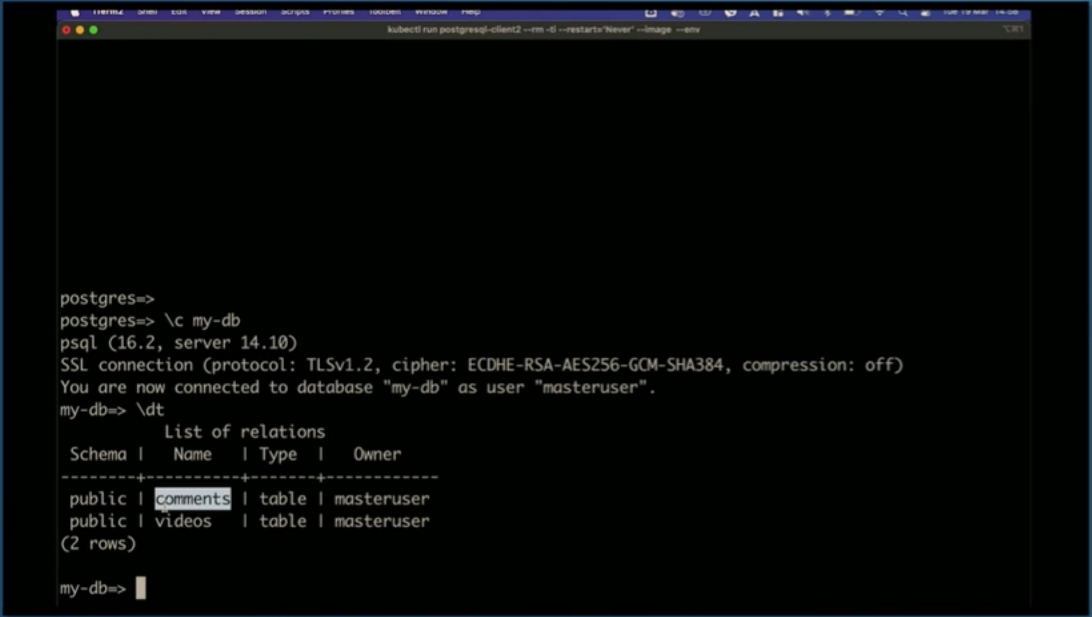

iTerm2 Shell Edit View Session Scripts Profiles Toolbelt Window Help
kubectl run postgresql-client2 --rm -ti --restart='Never' --image --env

```
postgres=>
postgres=> \c my-db
psql (16.2, server 14.10)
SSL connection (protocol: TLSv1.2, cipher: ECDHE-RSA-AES256-GCM-SHA384, compression: off)
You are now connected to database "my-db" as user "masteruser".
my-db=> \dt
           List of relations
 Schema |   Name   | Type  |   Owner
--------+----------+-------+------------
 public | comments | table | masteruser
 public | videos   | table | masteruser
(2 rows)

my-db=>
```

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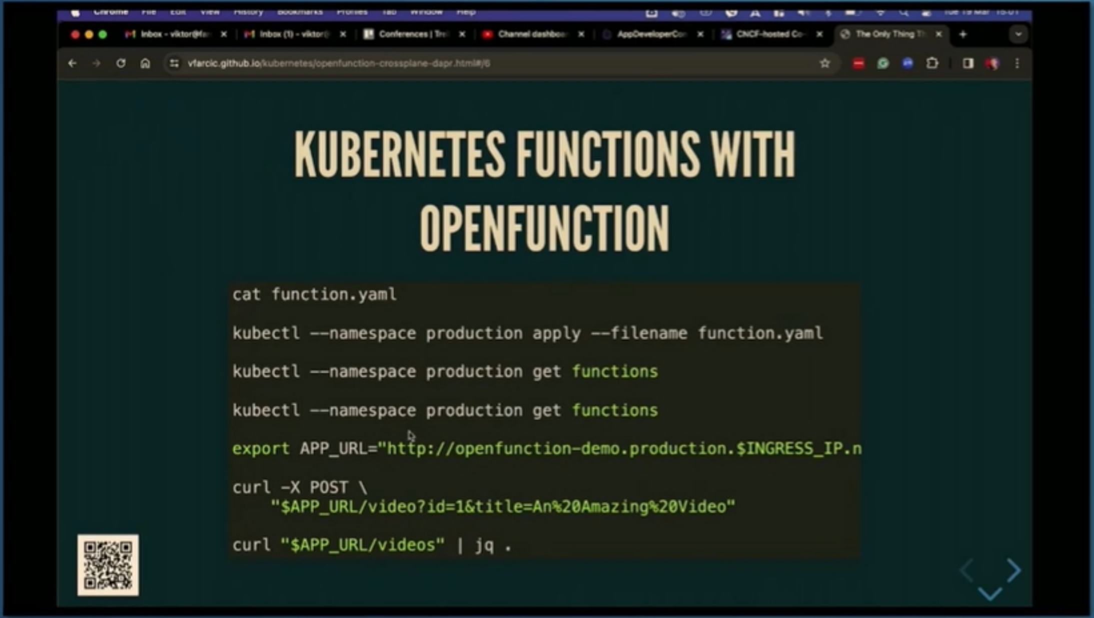
vfarcic.github.io/kubernetes/openfunction-crossplane-dapr.html#/6

KUBERNETES FUNCTIONS WITH OPENFUNCTION

```
cat function.yaml

kubectl --namespace production apply --filename function.yaml

kubectl --namespace production get functions

kubectl --namespace production get functions

export APP_URL="http://openfunction-demo.production.$INGRESS_IP.n

curl -X POST \
    "$APP_URL/video?id=1&title=An%20Amazing%20Video"

curl "$APP_URL/videos" | jq .
```

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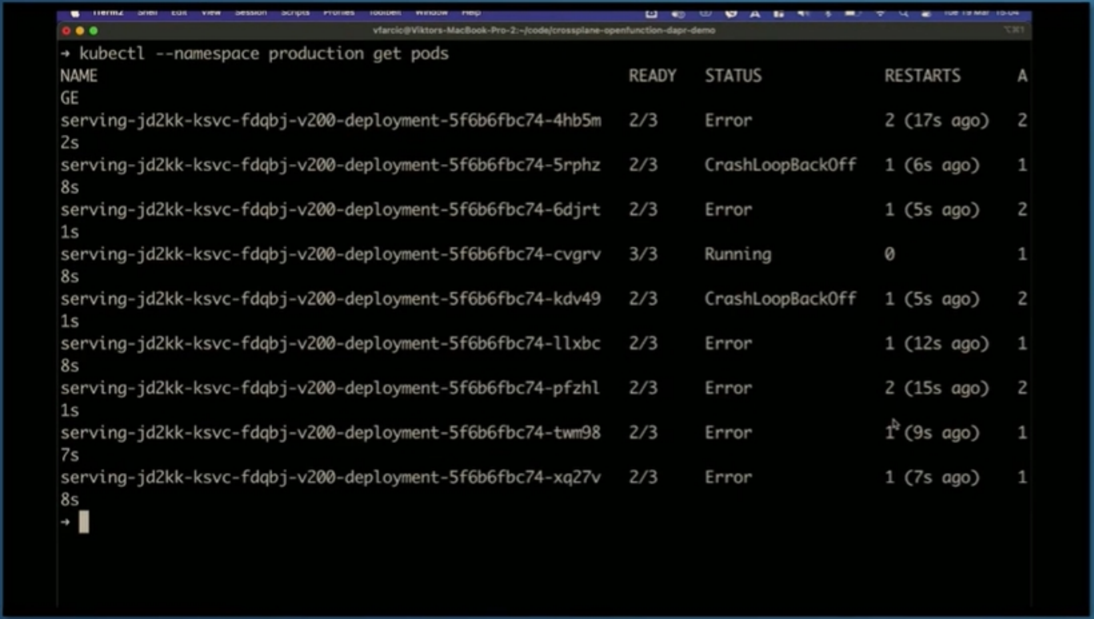

vfarcic@Viktors-MacBook-Pro-2:~/code/crossplane-openfunction-dapr-demo

```
→ kubectl --namespace production get pods
NAME                                                READY   STATUS             RESTARTS      A
GE
serving-jd2kk-ksvc-fdqbj-v200-deployment-5f6b6fbc74-4hb5m   2/3     Error              2 (17s ago)   2
2s
serving-jd2kk-ksvc-fdqbj-v200-deployment-5f6b6fbc74-5rphz   2/3     CrashLoopBackOff   1 (6s ago)    1
8s
serving-jd2kk-ksvc-fdqbj-v200-deployment-5f6b6fbc74-6djrt   2/3     Error              1 (5s ago)    2
1s
serving-jd2kk-ksvc-fdqbj-v200-deployment-5f6b6fbc74-cvgrv   3/3     Running            0             1
8s
serving-jd2kk-ksvc-fdqbj-v200-deployment-5f6b6fbc74-kdv49   2/3     CrashLoopBackOff   1 (5s ago)    2
1s
serving-jd2kk-ksvc-fdqbj-v200-deployment-5f6b6fbc74-llxbc   2/3     Error              1 (12s ago)   1
8s
serving-jd2kk-ksvc-fdqbj-v200-deployment-5f6b6fbc74-pfzhl   2/3     Error              2 (15s ago)   2
1s
serving-jd2kk-ksvc-fdqbj-v200-deployment-5f6b6fbc74-twm98   2/3     Error              1 (9s ago)    1
7s
serving-jd2kk-ksvc-fdqbj-v200-deployment-5f6b6fbc74-xq27v   2/3     Error              1 (7s ago)    1
8s
→ 
```

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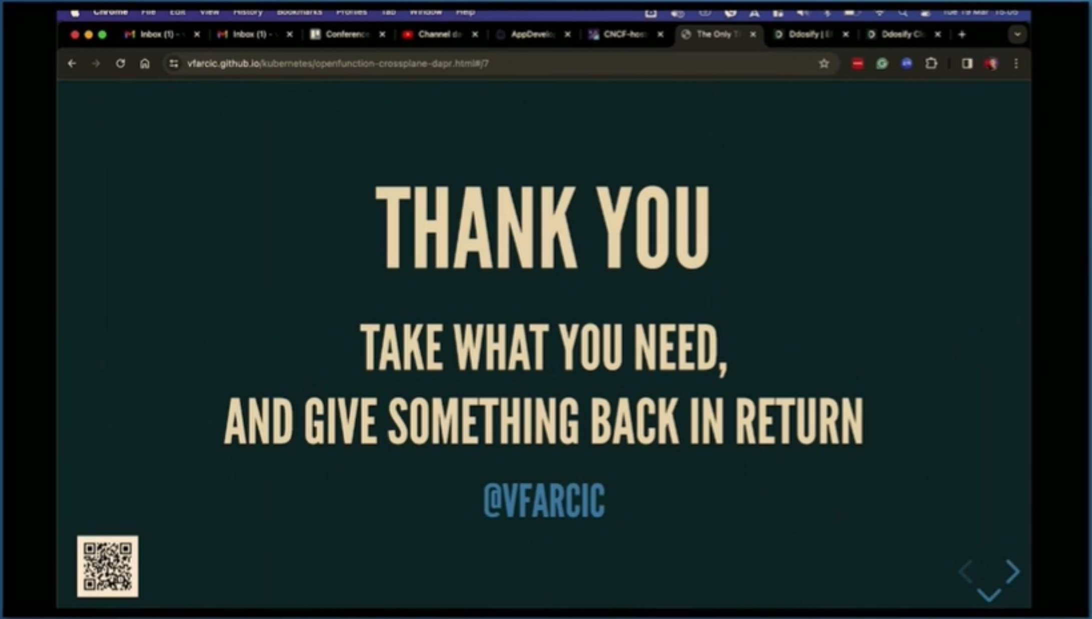
vfarcic.github.io/kubernetes/openfunction-crossplane-dapr.html#/7

THANK YOU

TAKE WHAT YOU NEED,
AND GIVE SOMETHING BACK IN RETURN

@VFARCIC

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