Scaling stateless apps: Easy
$ kubectl scale deploy/web --replicas=3
scale up

ReplicaSet
- app=web, env=prod
desired=3

Pod
- app=web
- env=prod
count=1
ReplicaSet
- app=web, env=prod

desired=3

start

Pod
- app=web
- env=prod

count=3
What about apps that... store data?
Or have their own notion of a “cluster”?

Databases?
Running a database is easy
Running it over time is harder
- Resize/Upgrade
- Reconfigure
- Backup
- Healing
Every application on any platform must be **installed**, **configured**, **managed**, and **upgraded** over time.

Patching is critical to security.
“Anything not automated is slowing you down.”
If only k8s knew...
Grant Doe
DBA
Madrid, Madrid, Spain

MEET THIS GUY

Experience

DBA
Oracle
Jun 2008 – Present - 10 yrs 6 mos

Senior Oracle Database Administrator
Oracle
Nov 2017 – Present - 9 yrs
Operators are **automated software managers** for Kubernetes applications:

- Install and Lifecycle
The recipe
Extend Kubernetes
Application-specific controllers that extend the Kubernetes API to create, configure, and manage instances of complex stateful applications on behalf of a Kubernetes user.
Extend the Kubernetes API through the Custom Resource Definition (CRD) mechanism

```yaml
kind: ProductionReadyDatabase
apiVersion: database.example.com/v1alpha1
metadata:
  name: my-production-ready-database
spec:
  clusterSize: 3
  readReplicas: 2
  version: v4.0.1
[...]
```
Extend the Kubernetes API through the **Custom Resource Definition (CRD)** mechanism.
Reconciling desired state for your application
Keep Operators up to date
An Operator for Operators
Over-the-air updates
Kubernetes Marketplace

Featured Services
- **etcd**
  provided by Red Hat, Inc.
  A distributed, reliable key-value store for the most critical data of a distributed system.

- **Prometheus Operator**
  provided by Red Hat, Inc.
  Manages Prometheus and Alertmanager clusters natively on Kubernetes.

- **Vitess MySQL**
  provided by PlanetScale
  Vitess is a database clustering system for horizontal scaling of MySQL.

Databases
- **Couchbase Enterprise**
  provided by Couchbase
  The system of engagement database for web, mobile and IoT.

- **MongoDB Operator**
  provided by MongoDB
  NoSQL document-oriented database for content-driven applications.

- **Vitess MySQL**
  provided by PlanetScale
  Vitess is a database clustering system for horizontal scaling of MySQL.
Build your own operator
Makes it easier to build Operators
1. Scaffolding and code generation to bootstrap new projects
2. Extension points that cover common Operator use cases
3. High level APIs and abstractions to write operational logic
Also **ansible**

- operator-sdk new
- Add Ansible Roles/Playbooks + Watches file
- operator-sdk build
Also **helm**

- `operator-sdk new`
- Add Charts
- `operator-sdk build`
Thanks for attending.

Automating with Operators

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Red Hat
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