

Delivering Kubernetes Apps with Helm

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Agenda

— — —

- Intro to Kubernetes
- Intro to Helm
- Helm Demo
- Chart Package and Repositories
- Lessons learned

Kubernetes

Production-Grade Container Orchestration Platform

Google does it, so can you

Integrates with GCE, AWS, Azure, OpenStack, etc.

Backed by a large open source community



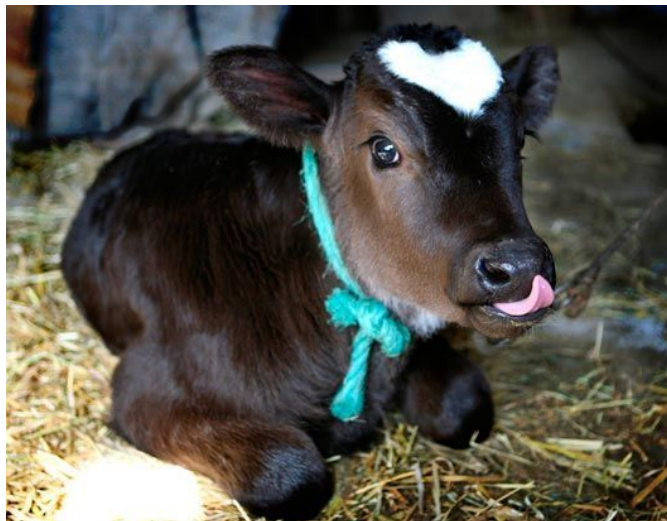
Kubernetes Objects

Pods are the smallest deployable units of computing



No pet cows

— — —



Services

Pods will come and go, but services will never leave you

Example: Kubernetes resource

— — —

```
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  minReadySeconds: 5
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.7.9
        ports:
        - containerPort: 80
```

Moar YAML

— — —

```
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  name: newbie-bobcat-jenkins
  labels:
    heritage: "Tiller"
    release: "newbie-bobcat"
    chart: "jenkins-0.1.14"
    component: "newbie-bobcat-jenkins-master"
spec:
  replicas: 1
  strategy:
    type: RollingUpdate
  selector:
    matchLabels:
      component: "newbie-bobcat-jenkins-master"
  template:
    metadata:
      labels:
        heritage: "Tiller"
        release: "newbie-bobcat"
        chart: "jenkins-0.1.14"
        component: "newbie-bobcat-jenkins-master"
    annotations:
      spec:
    securityContext:
      runAsUser: 0
    containers:
      - name: newbie-bobcat-jenkins
        image: "gcr.io/kubernetes-charts-ci/jenkins-master-k8s:v0.6.0"
        imagePullPolicy: "Always"
        args: [ "--argumentsRealm.passwd.${ADMIN_USER}=${ADMIN_PASSWORD}", "--argumentsRealm.roles.${ADMIN_USER}=admin" ]
        env:
          - name: JAVA_OPTS
            value: ""
          - name: ADMIN_PASSWORD
            valueFrom:
              secretKeyRef:
                name: newbie-bobcat-jenkins
                key: jenkins-admin-password
          - name: ADMIN_USER
            valueFrom:
              secretKeyRef:
                name: newbie-bobcat-jenkins
                key: jenkins-admin-user
        ports:
          - containerPort: 8080
            name: http
          - containerPort: 50000
            name: slavelistener
        resources:
          requests:
            cpu: "200m"
```


Kubernetes' tools let you build your furniture from scratch.



**Most of us don't want to build our furniture from
scratch**

IKEA

We need a tool to
manage a group of
resources as one
unit.



The Package Manager for Kubernetes

 Packages == Charts

Charts

- Are **application definitions**
- Consist of...
 - Metadata
 - Kubernetes resource definitions
 - Documentation
- Live in chart repositories

Let's take Helm for a spin

— — —



Grab Helm on Github

github.com/kubernetes/helm

Getting Started is Simple

`$ helm init`

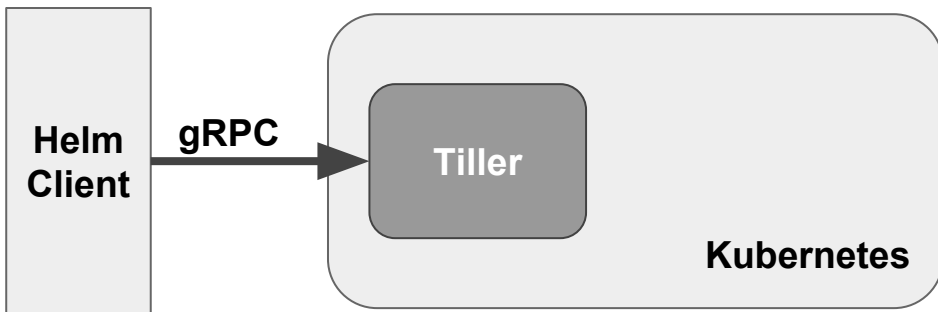
Helm & Tiller

Like peanut butter & jelly



Tiller

- Server-side component
- Stores the state of your app deployments
- Helps manage app deployments in your cluster



Demo

— — —

[link here]

We saw how...

— — —

- Kubernetes manifests are painful
- Helm makes this easier
- Installed a chart

Discover & launch great
Kubernetes-ready apps

68 charts ready to deploy



artifactory

v4.16.1 | incubator



aws-cluster-autoscaler

v0.2.0 | stable



chaoskube

v0.4.0 | stable



chronograf

v0.1.2 | stable



cockroachdb

v0.2.2 | stable



concourse

v0.1.3 | stable



consul

v0.1.4 | incubator



datadog

v0.2.1 | stable



dokuwiki

v0.1.2 | stable



drupal

v0.4.3 | stable



elasticsearch

v0.1.4 | incubator



etcd

v0.1.3 | incubator



etcd-operator

v0.1.1 | stable



factorio

v0.1.4 | stable



gcloud-endpoints

v0.1.0 | stable



ghost

v0.4.5 | stable



gitlab-ce

v0.1.5 | stable



grafana

v0.2.3 | stable



influxdb

v0.2.1 | stable



jasperreports

v0.1.3 | stable



github.com/kubernetes/charts

The screenshot shows the GitHub repository page for `kubernetes/charts`. At the top, the repository name is displayed with navigation icons. Below this, there are tabs for `<> Code`, `Issues 66`, `Pull requests 107`, `Projects 0`, `Pulse`, and `Graphs`. On the right, there are buttons for `Watch 52`, `Star 333`, `Fork`, and `249`. The main content area is titled "Curated applications for Kubernetes" and includes tabs for `kubernetes`, `charts`, and `helm`. Below the tabs, there is a summary bar showing `700 commits`, `2 branches`, `0 releases`, `93 contributors`, and `Apache-2.0`. A progress bar is also visible. Below the summary bar, there are buttons for `Branch: master`, `New pull request`, `Find file`, and `Clone or download`. The commit history section shows a commit by `databus23` with the message `concourse: remove public part of signing key (#596)`. Below this, there is a table of files and their commit messages. The `README.md` file is highlighted, and its content is shown below the table.

kubernetes / charts

Watch 52 Star 333 Fork 249

<> Code Issues 66 Pull requests 107 Projects 0 Pulse Graphs

Curated applications for Kubernetes

kubernetes charts helm

700 commits 2 branches 0 releases 93 contributors Apache-2.0

Branch: master New pull request Find file Clone or download

databus23 committed with mgoodness concourse: remove public part of signing key (#596) Latest commit 0e646ac 7 days ago

incubator	Don't run Zookeeper as a shell subprocess (#620)	7 days ago
stable	concourse: remove public part of signing key (#596)	7 days ago
test	fix test flake (#605)	11 days ago
.gitignore	reading resources from Values	4 months ago
CONTRIBUTING.md	Describe skipped deployment exception (#558)	9 days ago
LICENSE	Add LICENSE and CONTRIBUTING.md	a year ago
README.md	add review process documentation (#545)	15 days ago

README.md

Helm Charts

Use this repository to submit official Charts for Kubernetes Helm. Charts are curated application definitions for Kubernetes Helm. For more information about installing and using Helm, see its [README.md](#). To get a quick introduction to Charts see this [chart document](#).

Official Chart Repository

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- Ready-to-deploy apps
 - Up-to-date
 - Secure
- Community contributed
- Define best practices

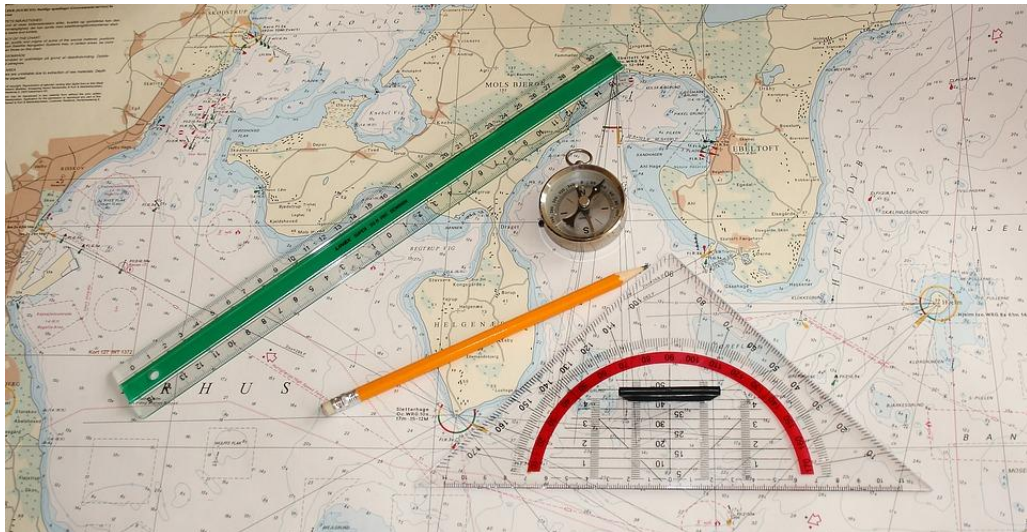
Your First Chart

`$ helm create myapp`

Navigating a Chart

myapp

- Chart.yaml
- README.md
- charts
- templates
- values.yaml



Templates

```
myapp
├── Chart.yaml
├── README.md
├── charts
├── templates
│   ├── deployment.yaml
│   └── svc.yaml
└── values.yaml
```



+

Go templating

Configuration

myapp

- Chart.yaml
- README.md
- charts
- templates
- values.yaml

values.yaml

```
image: mycompany/myapp:1.0.0
imagePullPolicy: IfNotPresent
service:
  port: 80
```

templates/deployment.yaml

```
apiVersion: extensions/v1beta1
kind: Deployment
spec:
  template:
    spec:
      containers:
        - name: {{ .Chart.Name }}
          image: "{{ .Values.image }}"
          imagePullPolicy: {{ .Values.imagePullPolicy }}
          ports:
            - containerPort: {{ .Values.service.port }}
```

Configuration

myapp

- Chart.yaml
- README.md
- charts
- templates
- values.yaml

values.yaml

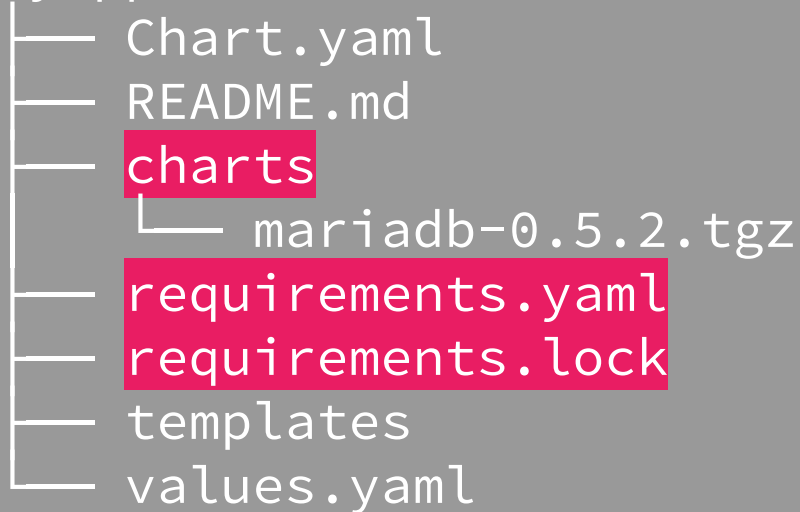
```
image: mycompany/myapp:1.0.0
imagePullPolicy: IfNotPresent
service:
  port: 80
```

```
$ helm install --set service.port=8080 \
  ./myapp
```

```
$ helm install -f myvalues.yaml ./myapp
```

Dependencies

myapp



requirements.yaml

```
dependencies:
- name: mariadb
  version: 0.5.2
  repository: http://storage.googleapis.com/kubernetes-charts
```

\$ helm dependencies update

Chart Docs

```
myapp
├── Chart.yaml
├── README.md
├── charts
├── templates
│   └── NOTES.txt
└── values.yaml
```

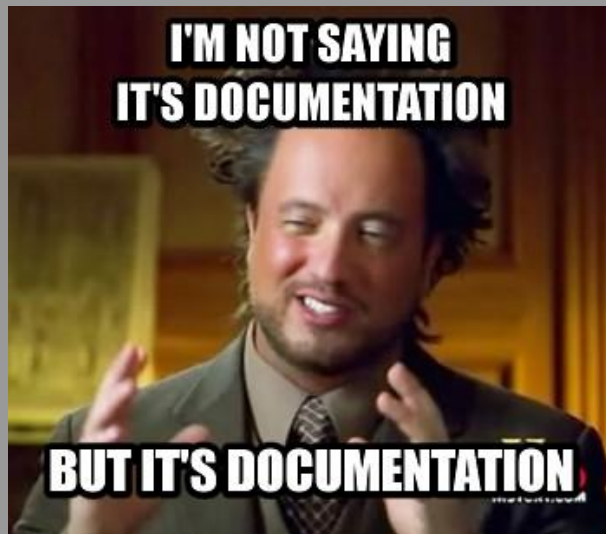


Chart Metadata

myapp

- **Chart.yaml**
- README.md
- charts
- templates
- values.yaml

```
name: mariadb
version: 0.5.2
description: Chart for MariaDB
keywords:
- mariadb
- mysql
- database
- sql
home: https://mariadb.org
sources:
- https://github.com/bitnami/bitnami-docker-mariadb
maintainers:
- name: Bitnami
  email: containers@bitnami.com
engine: gotpl
```

Host Your Very Own Charts

— — —

- [github.com/kubernetes/helm docs](https://github.com/kubernetes/helm/docs)
- `$ helm repo add mycompany charts.mycompany.com`
- `$ helm install mycompany/myapp`

Helm Today

- Over 100 contributors
- Over 1.5 years old
- First project to graduate from Kubernetes Incubator



Lessons Learned/Helm History

— — —

- Timing is everything
- Making it dance
- Finding our users
- Past iterations

Lessons Learned: Official Charts Repository

— — —

- Influx of submissions
- Version conflicts
- Mass changes
- Inconsistent configurations

Improvements: Official Charts Repository

— — —

- Labeling PRs
- Milestones
- Weekly Maintainer Syncs

Charts 2.0

— — —



- Functional testing
- Common/Base chart

Thank You!

Slack channel with 1000 members
Kubernetes/#Helm

Public dev meetings
Thursdays @ 9:30 pacific

Weekly updates & demos at SIG-Apps meetings
Mondays @ 9am pacific