



KubeCon



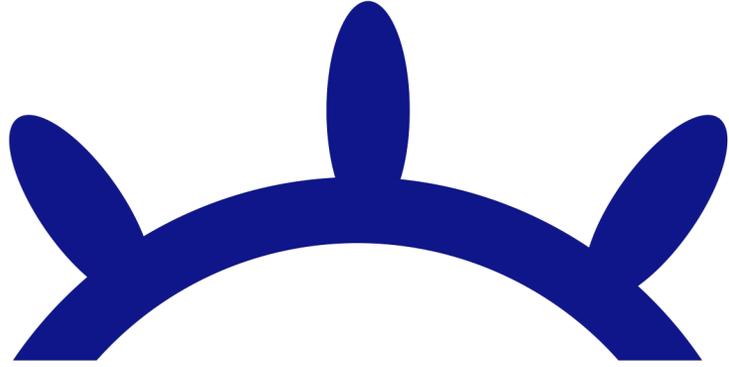
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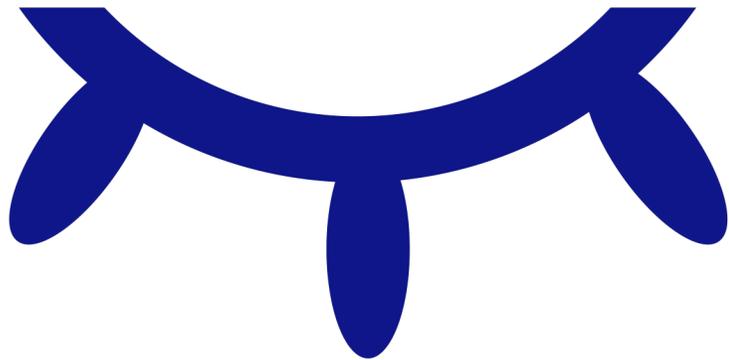
An Introduction to Helm

Josh Dolitsky
Matt Farina





HELM



Introductions



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CloudNativeCon

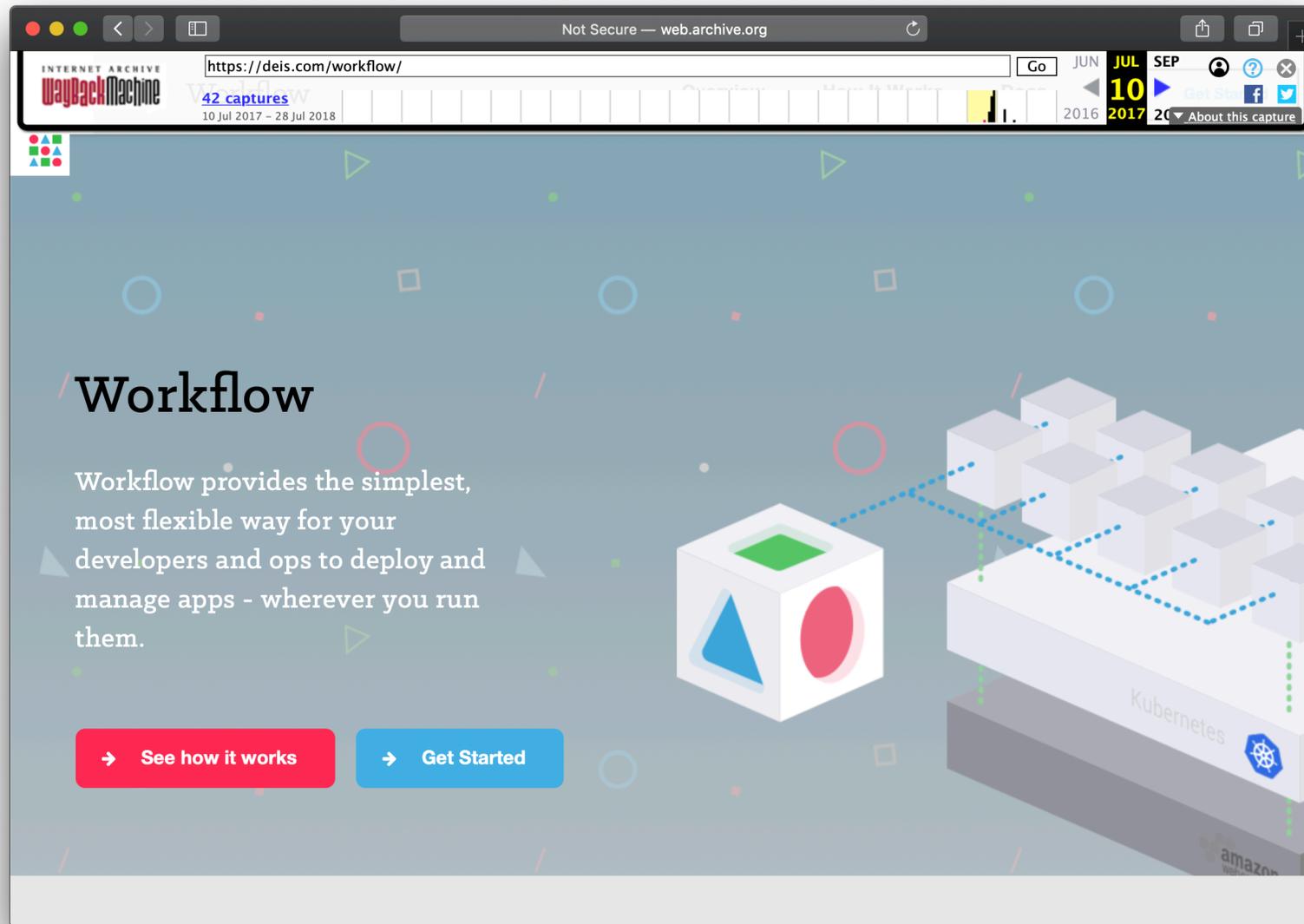
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Matt Farina - @mattfarina
Samsung SDS
Helm Maintainer



Josh Dolitsky - @jdolitsky
Blood Orange
Helm Maintainer



Where Helm Came From – Deis Workflow Is In The Past

What is Helm?

The package manager for Kubernetes

What Is A Package Manager?



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A package manager or package-management system is a collection of software tools that automates the process of installing, upgrading, configuring, and removing computer programs for a computer's operating system in a consistent manner.

Source: Wikipedia

Helm helps you manage Kubernetes applications — Helm Charts help you define, install, and upgrade even the most complex Kubernetes application.

Charts are easy to create, version, share, and publish — so start using Helm and stop the copy-and-paste.

Source: helm.sh

Package Management: Tooling that enables someone who has knowledge of an application and a platform to package up an application so that someone else who has neither extensive knowledge of the application or the way it needs to be run on the platform can use it.

An apt example



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```
$ sudo apt update  
$ sudo apt install mariadb-server
```

An apt example



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```
$ sudo apt-get install wget ca-certificates
$ wget --quiet -O - https://www.postgresql.org/media/keys/ACCC4CF8.asc
  | sudo apt-key add -
$ sudo sh -c 'echo "deb http://apt.postgresql.org/pub/repos/apt/
`lsb_release -cs`-pgdg main" >> /etc/apt/sources.list.d/pgdg.list'

$ sudo apt-get update
$ sudo apt-get install postgresql postgresql-contrib
```

With Helm...



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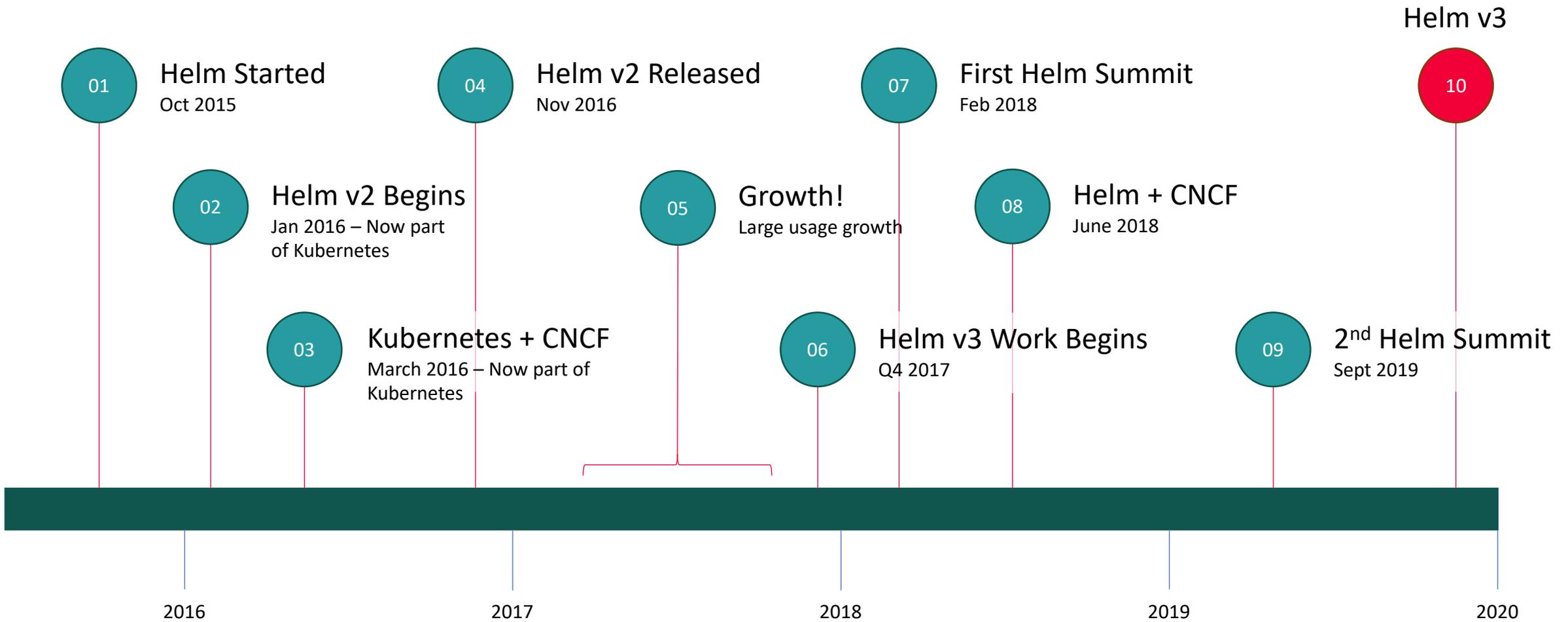
```
$ helm repo add bitnami https://charts.bitnami.com
$ helm install mymaria bitnami/mariadb
```

Is Helm trustworthy?

Many tools come, go, and make major changes in the cloud native space.
Can you trust Helm to use in your toolchain?

“To conclude, in light of the findings stemming from this CNCF-funded project, Cure53 can only state that the Helm project projects the impression of being highly mature. This verdict is driven by a number of different factors described above and essentially means that ***Helm can be recommended for public deployment***, particularly when properly configured and secured in accordance to recommendations specified by the development team.”

From First Helm Security Audit Report (emphasis added)





1+ Million Downloads Per Month

Semantic Versioning

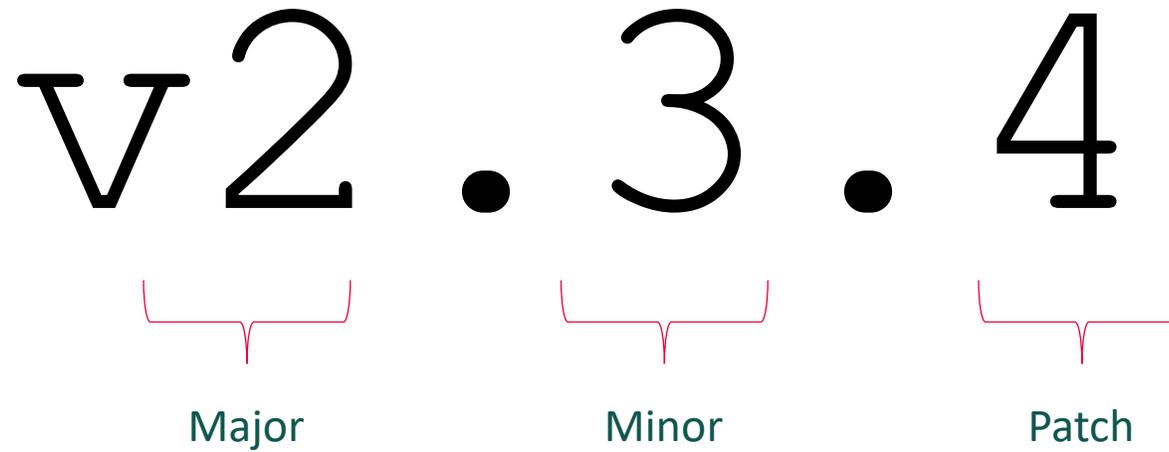


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Helm v2 Support

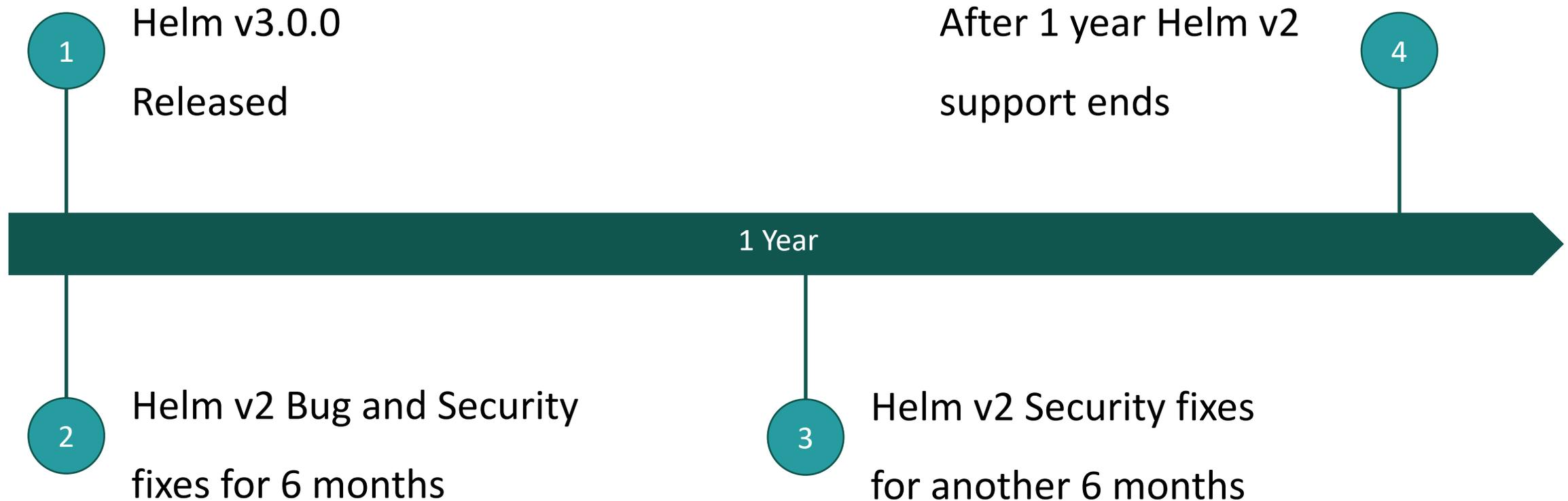


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Release Candidates



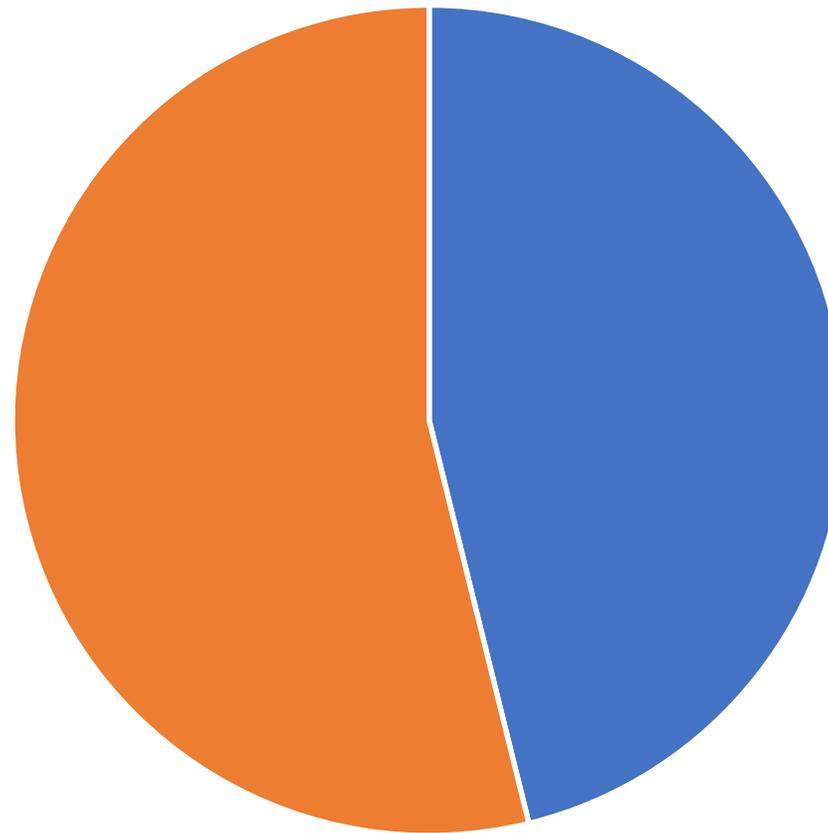
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Releases



■ Stable ■ Release Candidate

Power Users



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CNCF Help Log In

Home
Messages
Hashtags
Subgroups



CLOUD NATIVE COMPUTING FOUNDATION

cncf-helm-power-users@lists.cncf.io

Group Description

Helm Power Users Mailing List

Group Information

- 43 Members
- 8 Topics, Last Post: Oct 31
- Started on 1/31/18
- [Feed](#)

Group Settings

- This is a subgroup of [main](#).
- All subscribers can post to the group.
- ✓ Posts to this group do not require approval from the moderators.
- ↩ Messages are set to reply to sender.
- 🔒 Subscriptions to this group do not require approval from the moderators.
- 📁 Archives are visible to anyone.
- 📖 Wiki is visible to subscribers only.
- 🔒 Members can edit their messages.
- 🔒 Members can set their subscriptions to no email.

Top Hashtags [\[See All\]](#)

Maintainers



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15

Companies Employing
Project Maintainers

29

Total Project
Maintainers

Signed Releases



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-----BEGIN PGP SIGNATURE-----

```
iQIzBAABCgAdFiEEcR8o1RDh4Ly9X2v+IDboC/ukaQkFAI3C6XEACgkQIDboC/uk
aQmqLQ//W6TsRCdpzKyophKfdKX9YgG/cnd240w03LMT5M3zS4vdtN9RT4hDNW+L
n4FC4NoWUUdP7Uh4Erll+IjQlidKikwx9WCaV8WTfeRR7mHZWAdJ7oqW649MOY5a
3E7HeUG/9mjG6Otn2ElkBn1+LYYNqmWqe4pcHVzl1guGkimn6X6qoljKr2M5lLm
E4rJ+PXz+mVAakQe55SX9Dr9rrJlt8+DfIFgxs9Lc/Rj0uOu3qoHTACCTPG2SprZ
K3vUJfJbkq0YY1JxybvEnrnG4ihvKCTgctu+Br07KvWRW4xRFpwHf0mdu7XEAQ/O
CFX+rpGA0D2uf+aSqR2hZcYd6N9+653+1oMtpMye9Ujn7VHzPuTgAkEiirPxxZ5q
69TdcMsvAvdB0gV9DNQrjLfwvArSwhuNfkEA1magDvwFcDEc4x1ejp6BB8RF40BC
n5aPNqKW2VW3MhliSlnCSTXxyWztHQ2rxvXAyxaoEMLjz4iuo80GVhlXx34HaChc
NWFBiVHXPqfm+yCJqXbmmZAghUuPFCHheetwJEf1N5uKTr13INnorvjviWqPAC/Hk
kvsqMFtC/kEeGvFQvNEhzbjTrjjUao97VGiscf1N3gezWjL1A2sZ8M30bzDEAf0m
k4XKimgtCELKresFU5YN14KiCt6wQDmCBqbAvIUUA6GhtEHytBMg=
=8M2+
```

-----END PGP SIGNATURE-----

Supported Operating Systems



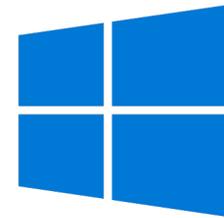
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macOS



Windows

Digging In To Helm

Helm Charts



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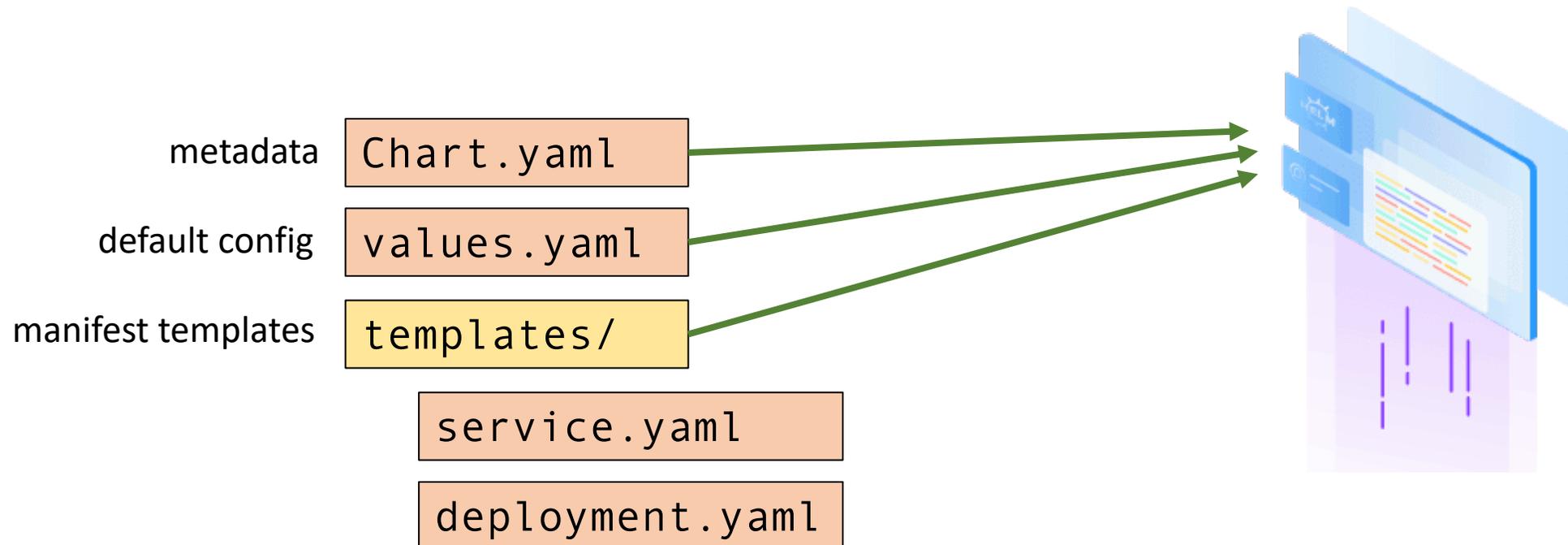


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Helm packages are referred to as **charts** – deployable units for Kubernetes-bound applications.

Charts are comprised of a collection of files (mostly YAML) at well-known locations.



Creating a Chart



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Helm provides a command to scaffold out a typical chart layout:

```
helm create myapp
```



```
myapp/  
├── Chart.yaml  
├── charts  
├── templates  
│   ├── NOTES.txt  
│   ├── _helpers.tpl  
│   ├── deployment.yaml  
│   ├── ingress.yaml  
│   ├── service.yaml  
│   ├── serviceaccount.yaml  
│   └── tests  
│       └── test-connection.yaml  
└── values.yaml
```

```
# Source: Chart.yaml
apiVersion: v2
name: myapp
description: A Helm chart for Kubernetes
type: application
version: 0.1.0
appVersion: 1.16.0
```

```
# Source: Chart.yaml
apiVersion: v2
name: myapp
description: A Helm chart for Kubernetes
type: application
version: 0.1.0
appVersion: 1.16.0

# List any chart dependencies
dependencies:
- name: mariadb
  version: 7.0.1
  repository: https://charts.bitnami.com
```

```
# Source: values.yaml
replicaCount: 1

image:
  repository: nginx
  tag: 1.17.5-alpine

service:
  type: ClusterIP
  port: 80

secretRef: my-existing-secret
```

```
# Source: templates/deployment.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: {{ include "myapp.fullname" . }}
  labels:
    {{- include "myapp.labels" . | nindent 4 }}
spec:
  replicas: {{ .Values.replicaCount }}
  selector:
    matchLabels:
      {{- include "myapp.selectorLabels" . | nindent 6 }}
  template:
    metadata:
      labels:
        {{- include "myapp.selectorLabels" . | nindent 8 }}
    spec:
      containers:
        - name: {{ .Chart.Name }}
          image: {{ .Values.image.repo }}:{{ .Values.image.tag }}
```

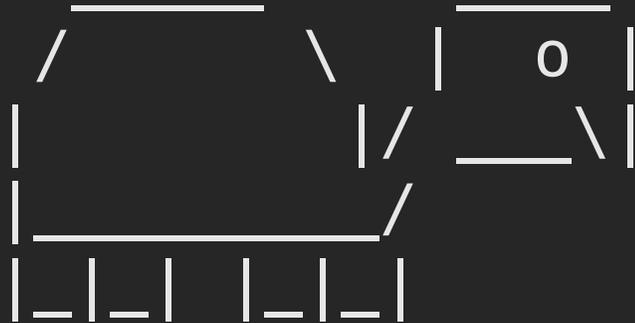
```
# Source: templates/_helpers.tpl
```

```
{{- define "myapp.selectorLabels" -}}  
app.kubernetes.io/name: {{ include "myapp.name" . }}  
app.kubernetes.io/instance: {{ .Release.Name }}  
{{- end -}}
```

```
# Source: templates/test/test-connection.yaml
apiVersion: v1
kind: Pod
metadata:
  name: "{{ include \"myapp.fullname\" . }}-test-connection"
  labels:
    {{ include \"myapp.labels\" . | nindent 4 }}
  annotations:
    "helm.sh/hook": test-success
spec:
  containers:
    - name: wget
      image: busybox
      command: ['wget']
      args: ['{{ include \"myapp.fullname\" . }}:{{ .Values.service.port }}']
      restartPolicy: Never
```

```
# Source: templates/NOTES.txt
```

Your installation was successful!



To access your application, go to:
{{ .Values.ingress.host }}

Templates



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Files under the **templates/** directory are treated as dynamic YAML templates using the Go template language with some added functionality.

YAML templating prevents config duplication, and allows you to install the same chart in dev, staging, and production environments.

Values



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Values files contain a collection of key-values that represent the configuration settings for a chart.

values.yaml is the default, baseline values file.

Override default configuration of the chart by using additional values files or individual key-value pairs.

Templates + Values =



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The templates are rendered at install time against provided values, resulting in static, valid Kubernetes YAML.

```
# Source: templates/deployment.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: {{ include "myapp.fullname" . }}
  labels:
  {{- include "myapp.labels" . | nindent 2 }}
spec:
  replicas: {{ .Values.replicaCount }}
  selector:
    matchLabels:
      {{- include "myapp.selectorLabels" . | nindent 2 }}
  template:
    metadata:
      labels:
      {{- include "myapp.selectorLabels" . | nindent 2 }}
    spec:
      containers:
      - name: {{ .Chart.Name }}
        image: {{ .Values.image.repo }}:{{ .Values.image.tag }}
```

```
# Source: values.yaml
replicaCount: 1

image:
  repository: nginx
  tag: 1.17.5-alpine

service:
  type: ClusterIP
  port: 80

secretRef: my-existing-secret
```

```
# Source: myvals.yaml
image:
  tag: customtag
```

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: myrelease-myapp
  labels:
    helm.sh/chart: myapp-0.1.0
    app.kubernetes.io/name: myapp
    app.kubernetes.io/instance: myrelease
    app.kubernetes.io/version: "1.16.0"
    app.kubernetes.io/managed-by: Helm
spec:
  replicas: 1
  selector:
    matchLabels:
      app.kubernetes.io/name: myapp
      app.kubernetes.io/instance: myrelease
  template:
    metadata:
      labels:
        app.kubernetes.io/name: myapp
        app.kubernetes.io/instance: myrelease
    spec:
      containers:
      - name: myapp
        image: nginx:customtag
```

Installing a Chart



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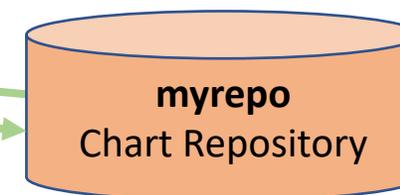
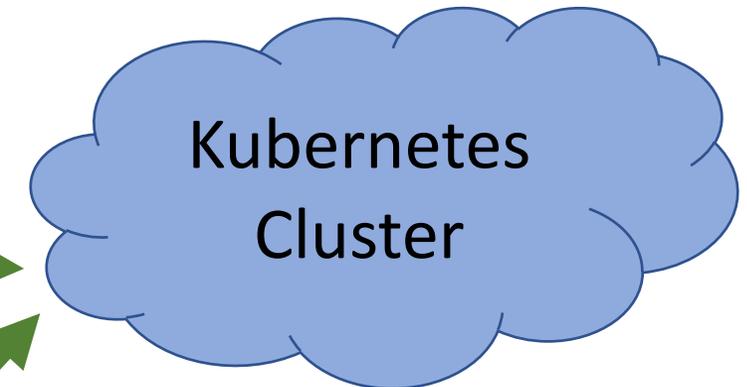
In an environment where you are authenticated against a running Kubernetes cluster, use Helm to install a chart from a chart directory, or from a remote *chart repository*.

1. From a chart directory:

```
helm install myrelease ./myapp
```

2. From a remote chart repository:

```
helm install myrelease myrepo/myapp
```



Using Custom Values



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Pass along any number of values files or individual key-value pairs in order to override chart defaults, overlaid from left to right

1. Using a values file:

```
helm install myrelease ./myapp -f custom.yaml
```

2. Using individual key-value pair:

```
helm install myrelease ./myapp --set image.tag=master
```

3. Advanced usage:

```
helm install myrelease ./myapp \  
  -f staging.yaml \  
  -f us-east-1.yaml \  
  --set tracing.enabled=true
```

Check release status



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Determine the status of an individual release, check if the installation of your chart was successful.

```
helm status myrelease
```

```
NAME: myrelease  
LAST DEPLOYED: Mon Nov 11 18:07:06 2019  
NAMESPACE: default  
STATUS: deployed  
REVISION: 1  
NOTES:  
  echo "Visit http://127.0.0.1:8080 to use your application"  
  kubectl --namespace default port-forward $POD_NAME 8080:80
```

See what's running



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Helm has the ability to track all applications that have been installed in the cluster using Helm.

```
helm list
```

NAME	NAMESPACE	REVISION	UPDATED	STATUS	CHART	APP VERSION
myrelease	default	1	2019-11-11 18:07:06.805602 -0600 CST	deployed	myapp-0.1.0	1.16.0
wordpress	default	1	2019-11-11 18:53:59.674758 -0600 CST	deployed	wordpress-7.6.7	5.2.4

Upgrading a release



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Create a new revision of your release by updating either the template sources or configuration values.

```
helm upgrade myrelease ./myapp --set image.tag=1.16.1-alpine
```



```
Release "myrelease" has been upgraded. Happy Helming!  
NAME: myrelease  
LAST DEPLOYED: Mon Nov 11 19:14:13 2019  
NAMESPACE: default  
STATUS: deployed  
REVISION: 2  
NOTES:  
  echo "Visit http://127.0.0.1:8080 to use your application"  
  kubectl --namespace default port-forward $POD_NAME 8080:80
```

Rollback a release



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Helm tracks every revision made on releases. When something goes wrong, revert back to a working version.

```
helm rollback myrelease 1
```



```
Rollback was a success! Happy Helming!
```

Remove a release



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Remove all Kubernetes resources from the cluster that were created as part of a release.

```
helm delete myrelease
```

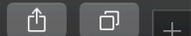


```
release "myrelease" uninstalled
```

More To Helm...



hub.helm.sh



Helm Hub

Charts • About

Discover & launch great
Kubernetes-ready apps

Search charts...

867 charts ready to deploy



mogaal/adminer
4.7.3



aerospike/aerospike
4.7.0.2



stable/aerospike
v4.5.0.5



aerospike/aerospike-enterprise
4.7.0.2



hub.helm.sh/charts/bitnami/mariadb

Helm Hub

Search charts... Charts About



mariadb

10.3.20 - bitnami

Fast, reliable, scalable, and easy to use open-source relational database system. MariaDB Server is intended for mission-critical, heavy-load production systems as well as for embedding into mass-deployed software. Highly available MariaDB cluster.

MariaDB

MariaDB is one of the most popular database servers in the world. It's made by the original developers of MySQL and guaranteed to stay open source. Notable users include Wikipedia, Facebook and Google.

MariaDB is developed as open source software and as a relational database it provides an SQL interface for accessing data. The latest versions of MariaDB also include GIS and JSON features.

TL;DR;

```
$ helm install stable/mariadb
```

Introduction

This chart bootstraps a [MariaDB](#) replication cluster deployment on a [Kubernetes](#) cluster using the [Helm](#) package manager.

Bitnami charts can be used with [Kubeapps](#) for deployment and management of Helm Charts in clusters. This chart has been tested to work with NGINX Ingress, cert-manager, fluentd and Prometheus on top of the [BKPR](#).

Prerequisites

- Kubernetes 1.12+
- Helm 2.11+ or Helm 3.0-beta3+

Install

Helm CLI

Add bitnami repository

```
helm repo add bitnami https
```

Install chart

```
helm install bitnami/mariadb
```

[Need Helm?](#)

Chart Versions

- 7.0.1 - Nov 11, 2019
- 7.0.0 - Nov 9, 2019
- 6.13.0 - Nov 8, 2019
- 6.12.2 - Nov 2, 2019
- 6.12.1 - Oct 24, 2019

[show all...](#)

github.com

Why GitHub? Enterprise Explore Marketplace Pricing Search Sign in Sign up

helm / hub Watch 16 Star 114 Fork 102

Code Issues 12 Pull requests 2 Projects 0 Security Insights

For the distributed charts search at hub.helm.sh <https://hub.helm.sh>

cnf helm

358 commits 3 branches 0 releases 88 contributors Apache-2.0

Branch: master New pull request Find file Clone or download

mattfarina Merge pull request #172 from cryptlex/master Latest commit 9cc9704 2 days ago

.circleci	Bumping monocular to 1.8.2	2 months ago
config	Merge branch 'master' into master	2 days ago
docs	Consistently format markdown (vscode Shift-Option-F)	7 months ago
LICENSE	Add ALv2 license	11 months ago
README.md	add helm china mirror hub	3 months ago
Repositories.md	Consistently format markdown (vscode Shift-Option-F)	7 months ago
code-of-conduct.md	Helm code of conduct	last year
repos.yaml	Merge branch 'master' into master	2 days ago

README.md

github.com

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helm / monocular Watch 56 Star 1.3k Fork 194

Code Issues 83 Pull requests 8 Projects 1 Wiki Security Insights

Search and discovery UI for Helm Chart repositories

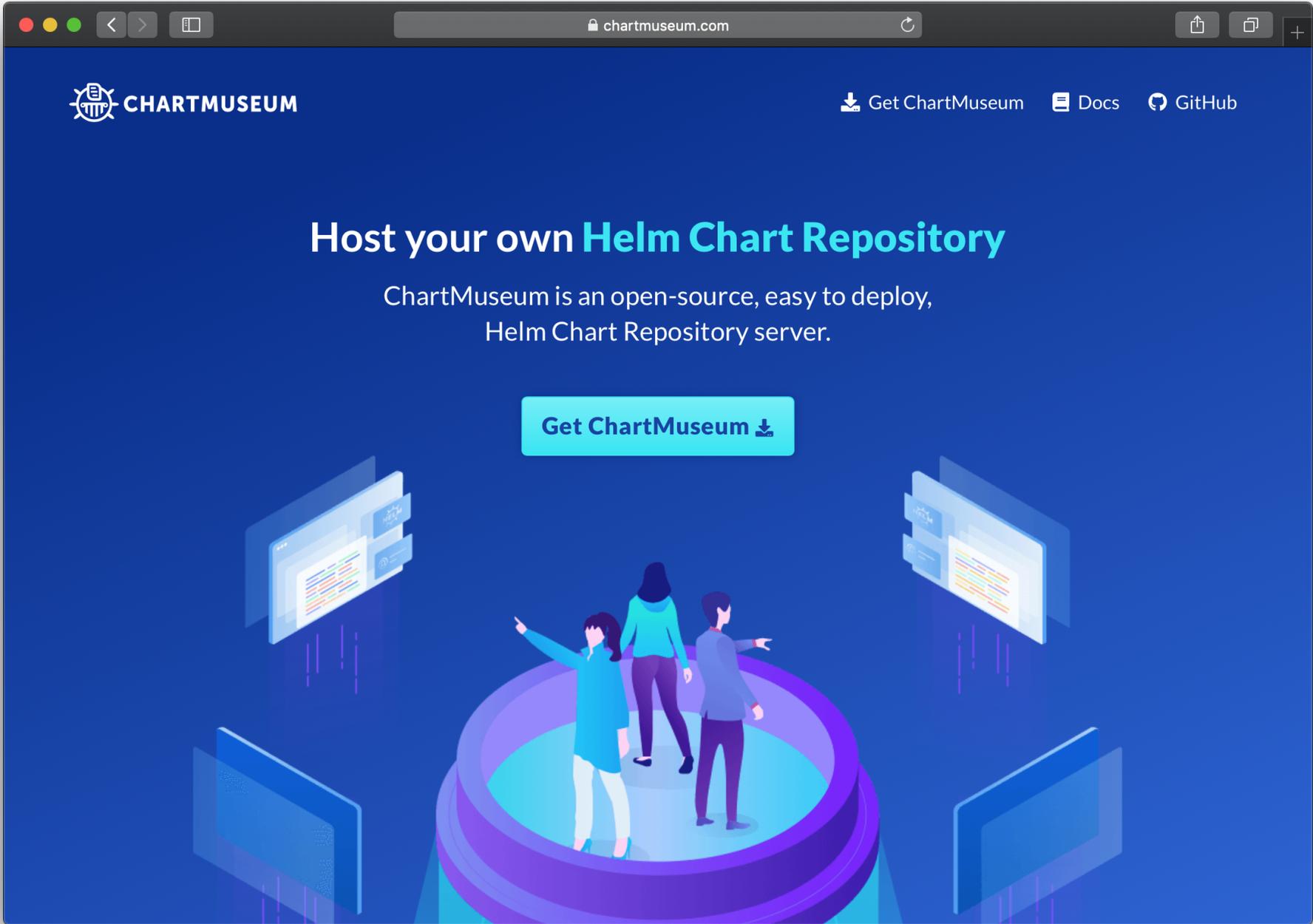
chart helm kubernetes docker charts-repositories

393 commits 4 branches 34 releases 46 contributors Apache-2.0

Branch: master New pull request Find file Clone or download

WyrHaximus and prydonius Update quickstart URL to https://helm.sh/docs/using_helm/#quickstart (#... Latest commit 77b7967 3 days ago

.circleci	Add GoCenter as GOPROXY to speed up go builds (#617)	8 months ago
chart/monocular	chart: bump to 1.4.13 [skip ci]	22 days ago
cmd	Populate and serve values.schema.json if exists (#645)	last month
dev_env/ui	remove existing Monocular API implementation (#518)	last year
docs	Add GoCenter as GOPROXY to speed up go builds (#617)	8 months ago
frontend	Update quickstart URL to https://helm.sh/docs/using_helm/#quickstart (#...	3 days ago
scripts	fix sed for updating image tag reference in chart (#562)	last year
.dockerignore	Switch to circleci (#539)	last year
.gitignore	remove existing Monocular API implementation (#518)	last year



Host your own Helm Chart Repository

ChartMuseum is an open-source, easy to deploy,
Helm Chart Repository server.

[Get ChartMuseum](#) 

github.com

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helm / chart-testing Watch 14 Star 292 Fork 50

Code Issues 16 Pull requests 4 Security Insights

CLI tool for linting and testing Helm charts

helm docker testing linting kubernetes golang

105 commits 3 branches 11 releases 21 contributors Apache-2.0

Branch: master New pull request Find file Clone or download

anguiculus and scottrigby Migrate to Go modules (#183) Latest commit 5b7b21e 5 days ago

.circleci	Migrate to Go modules (#183)	5 days ago
.github	Add github templates (#52)	11 months ago
ct	Migrate to Go modules (#183)	5 days ago
doc	Add option to skip upgrade testing of deleted/renamed values files (#132)	8 months ago
etc	Factor out testing code from charts (#1)	last year
examples	Prepare release v2.4.0 (#180)	5 days ago
pkg	Migrate to Go modules (#183)	5 days ago
.dockerignore	Re-write it in Go (#35)	last year
.editorconfig	Re-write it in Go (#35)	last year

github.com/helm/helm-2to3/blob/master/README.md

Why GitHub? Enterprise Explore Marketplace Pricing Search Sign in Sign up

helm / helm-2to3 Watch 9 Star 101 Fork 10

Code Issues 2 Pull requests 0 Projects 0 Security Insights

Branch: master helm-2to3 / README.md Find file Copy path

bacongobbler fix(*): update gopath to use github.com/helm convention 5197544 12 days ago

3 contributors

214 lines (162 sloc) | 10.3 KB Raw Blame History

Helm 2to3 Plugin

License Apache 2.0 go report A+ PASSED release v0.1.10

```
graph LR; A[Helm v2] --> B[Helm v3]; C[Migrates]; D[Configuration: chart starters, plugins, repositories]; E[Releases];
```

Helm v2

Helm v3

Migrates

Configuration:
chart starters, plugins, repositories

Releases

github.com/helm/chart-releaser/blob/master/README.md

Why GitHub? Enterprise Explore Marketplace Pricing Search Sign in Sign up

helm / chart-releaser Watch 5 Star 59 Fork 10

Code Issues 5 Pull requests 1 Security Insights

Branch: master chart-releaser / README.md Find file Copy path

unguiculus Update docs (#33) 452a96e on May 10

4 contributors

147 lines (99 sloc) | 4.39 KB Raw Blame History

Chart Releaser

License Apache 2.0 **PASSED**

Helps Turn GitHub Repositories into Helm Chart Repositories

`cr` is a tool designed to help GitHub repos self-host their own chart repos by adding Helm chart artifacts to GitHub Releases named for the chart version and then creating an `index.yaml` file for those releases that can be hosted on GitHub Pages (or elsewhere!).

Installation

Binaries (recommended)

Download your preferred asset from the [releases page](#) and install manually.

Go get (for contributing)

```
$ # clone repo to some directory outside GOPATH
$ git clone github.com/helm/chart-releaser
$ go mod download
$ go install
```

Beyond the Helm Project

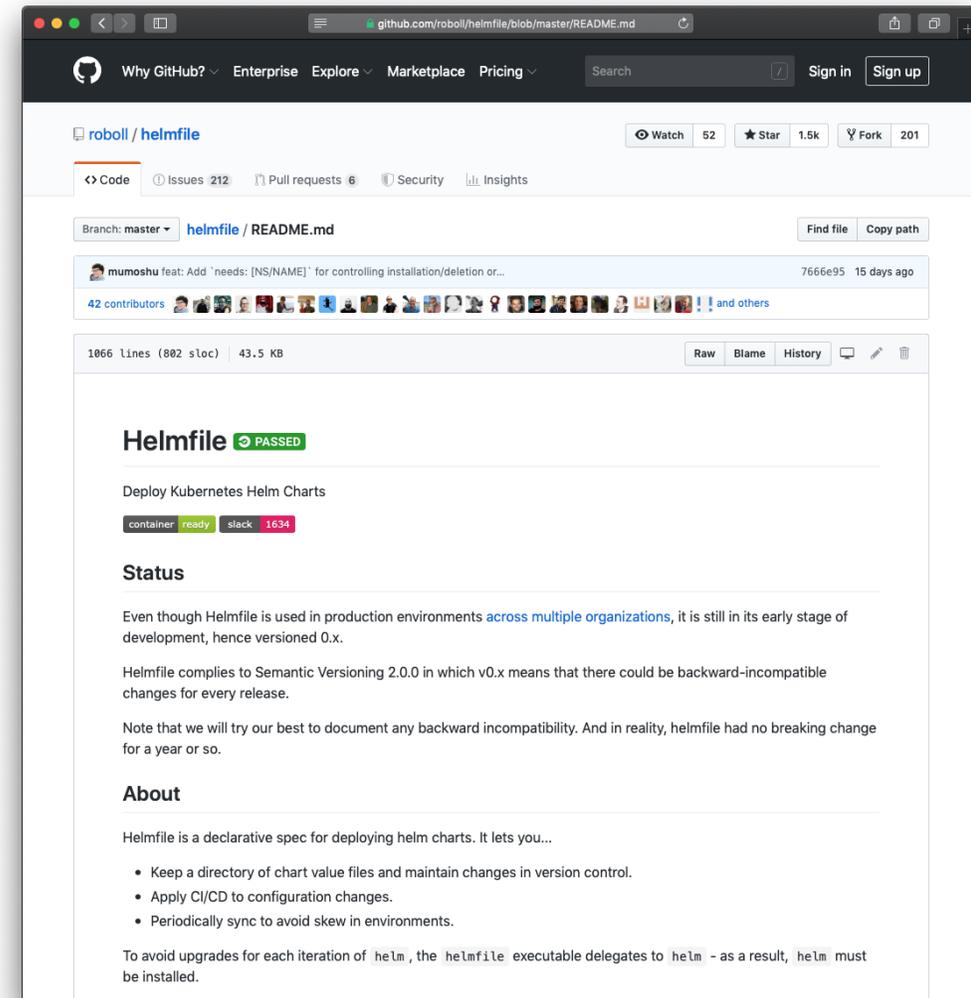


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Cloud Native Experiments



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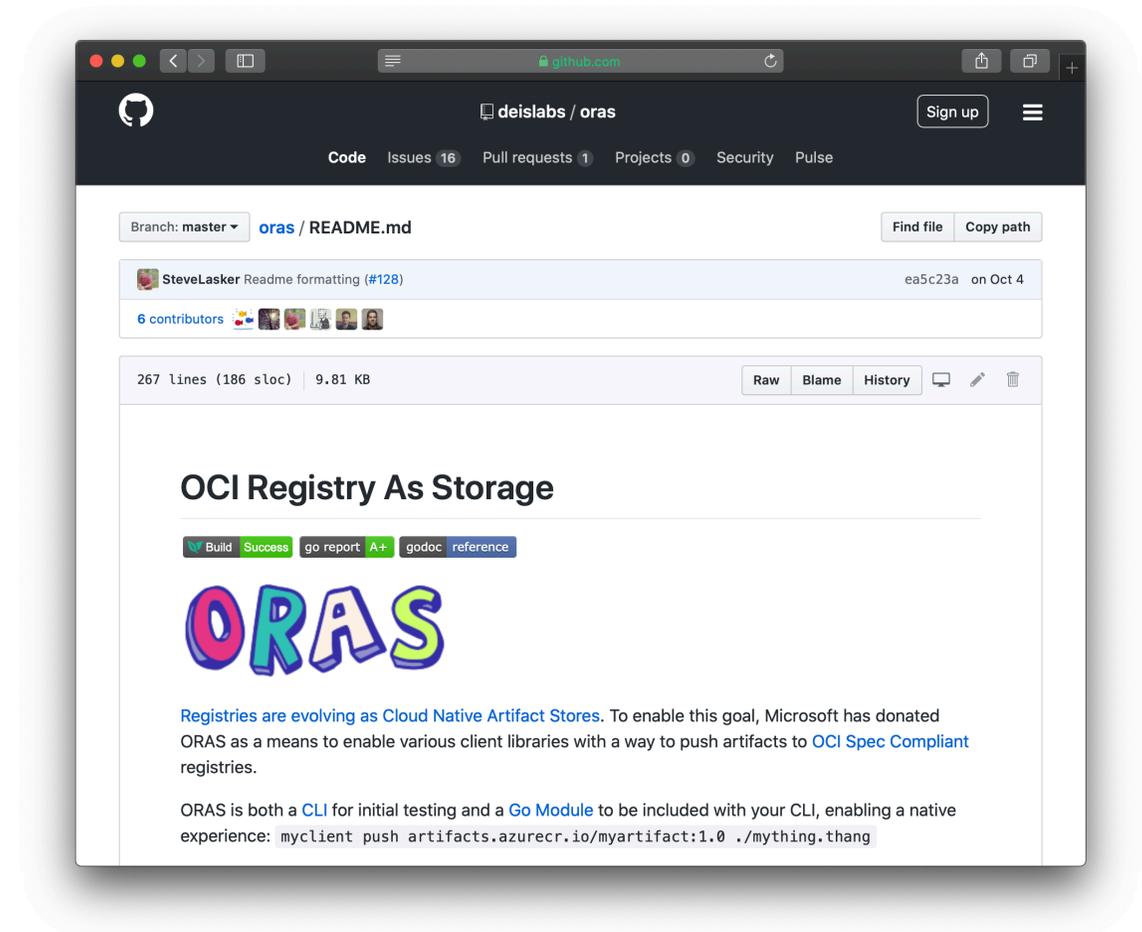


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OPEN CONTAINER INITIATIVE



Notice: Check The Version

Helm v3 was just released. Many plugins, tools, Stack Overflow answers, and other details you find may still be focused on Helm v2.

Engage with Helm



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- Kubernetes Slack
 - #helm-users
 - #helm-dev
 - #charts
- Mailing List – <https://lists.cncf.io/g/cncf-helm>
- Twitter – <https://twitter.com/helmpack>
- YouTube – <https://www.youtube.com/helmpack>
- Developer Call – Thursday at 9:30am PT

The screenshot shows a YouTube playlist page for 'Helm Community Meetings'. The page features a video player at the top with a 'PLAY ALL' button. Below the player, the playlist title 'Helm Community Meetings' is displayed, along with '91 videos · 154 views · Last updated on Oct 31, 2019'. A 'SUBSCRIBE' button is visible. The main content is a list of 12 video items, each with a thumbnail, title, duration, and uploader information. The items are:

- Helm Developer Call 20191031 (16:38) Added by Matthew Fisher
- Helm Developer Call 20190829 (22:23) Added by Adam Reese
- Helm Developer Call 20190801 (34:03) Added by Matthew Fisher
- Helm Developer Call 20190725 (29:12) Added by Matt Farina
- Helm Developer Call 20190718 (31:36) Added by Matt Farina
- Helm Developer Call 20190711 (20:12) Added by Matt Farina
- Helm Developer Call 20190627 (27:37) Added by Matt Farina
- Helm Developer Call 20190620 (30:04) Added by Matt Farina
- Helm Developer Call 20190613 (31:37) Added by Matt Farina
- Charts Chat 20190611 (12:54) Added by Matt Farina
- Charts Chat 20190528 (28:05) Added by Matt Farina
- Helm Developer Call 20190606 (37:20) Added by Matthew Fisher

Come to the booth!



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Helm 3 Deep Dive



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Wednesday, November 20 • 4:25pm - 5:00pm

✓ Helm 3 Deep Dive - Taylor Thomas, Microsoft Azure & Martin Hickey, IBM

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It has landed. Helm v3 has released! For many people this has been a highly anticipated release, longing for the removal of Tiller. Helm v3 however is more than just this. In this session, you will learn about the new features and the new architecture to support these features. We will discuss the architecture and how the CLI and library has changed to improve usability We will also look at other features like the additions to charts and the new client security model. Worried about migration? That's covered too!

If this whets your appetite then this is the talk for you, especially if you are deep down the highway to Helm. Come along and join the discussion about the new Helm release.

Speakers



Martin Hickey

Senior Software Engineer, IBM

Martin works on the Open Technology team at IBM focusing on open source software. He is a regular contributor to open source and a core maintainer for Helm. He has also contributed previously to the OpenStack and Elastic communities. Martin enjoys speaking at conferences and meet-ups... [Read More →](#)



Taylor Thomas

Senior Software Engineer, Microsoft

Taylor Thomas is a Senior Software Engineer working on Azure Kubernetes Service at Microsoft. He has been involved with containers and Kubernetes platforms at Intel and Nike and is one of the core maintainers of Helm. He currently lives in the Utah area and enjoys hiking and camp... [Read More →](#)

Wednesday November 20, 2019 4:25pm - 5:00pm

[Room 30ABCDE - San Diego Convention Center Upper Level](#)

● [Maintainer Track Sessions](#)

Experience Level [Intermediate \(Mid-level experience\)](#)

Questions?