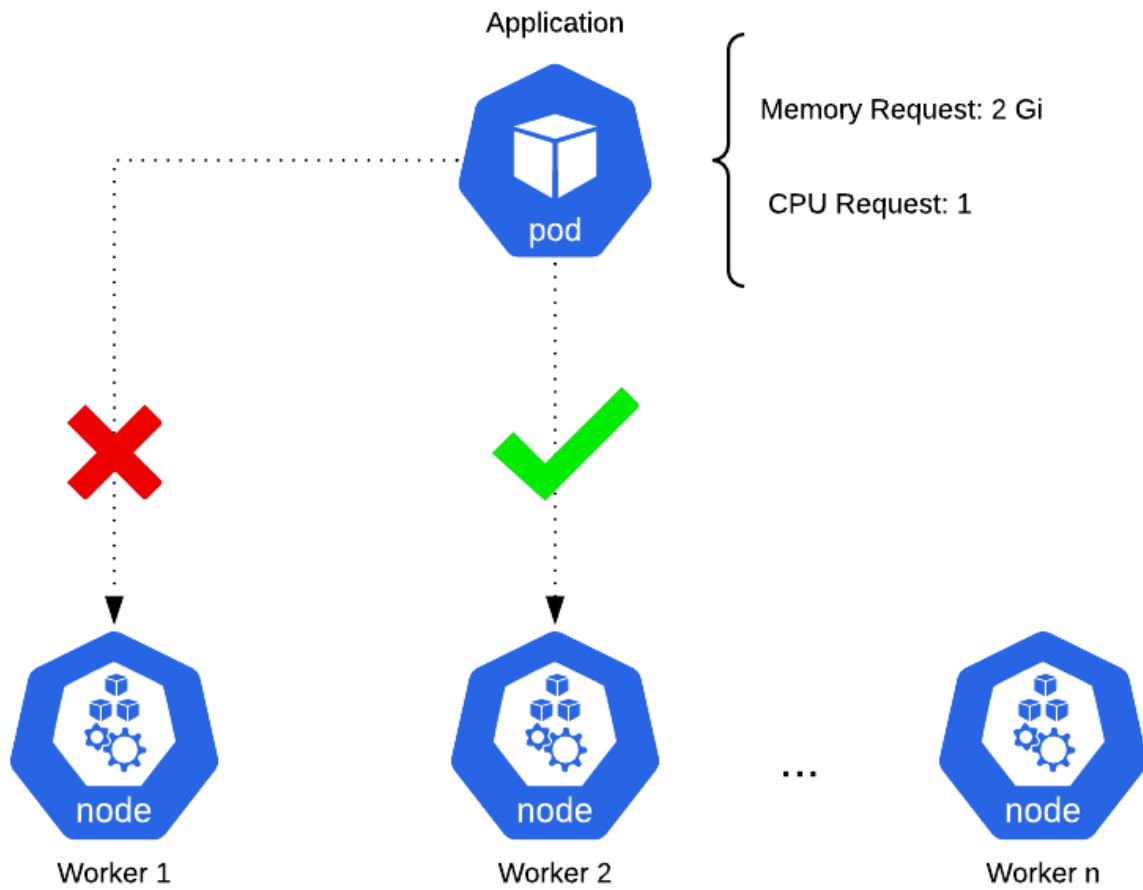
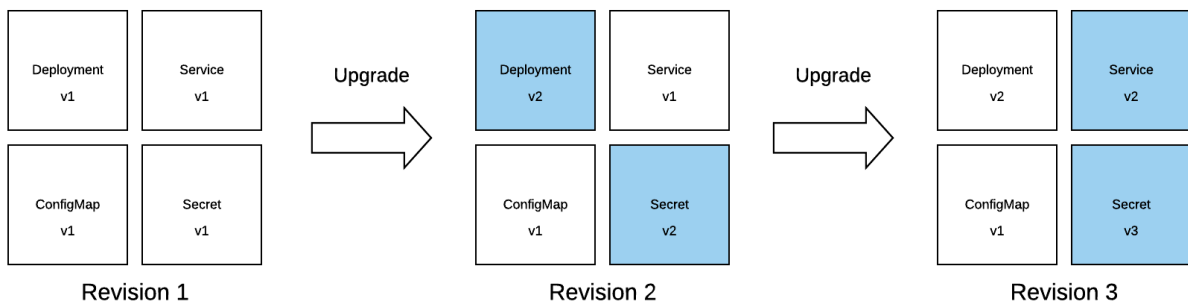


Chapter 1: Understanding Kubernetes and Helm



```
apiVersion: v1
kind: Deployment
metadata:
  name: my-k8s-app
spec:
  replicas: 1
  selector:
    matchLabels:
      app: my-k8s-app
  strategy:
    rollingUpdate:
      maxSurge: 25%
      maxUnavailable: 25%
  template:
    metadata:
      labels:
        app: my-k8s-app
    spec:
      containers:
        - image: my-k8s-app:v1
          imagePullPolicy: IfNotPresent
          name: app
```

```
apiVersion: v1
kind: Deployment
metadata:
  name: your-k8s-app
spec:
  replicas: 1
  selector:
    matchLabels:
      app: your-k8s-app
  strategy:
    rollingUpdate:
      maxSurge: 25%
      maxUnavailable: 25%
  template:
    metadata:
      labels:
        app: your-k8s-app
    spec:
      containers:
        - image: your-k8s-app:v3
          imagePullPolicy: IfNotPresent
          name: app
```
















Resource Name	Definition
Pod	The smallest deployable unit in Kubernetes. Encapsulates one or more containers.
Deployment	Used to deploy and manage a set of Pods. Maintains the desired amount of Pod replicas (1 by default).
StatefulSet	Similar to a Deployment resource, except a StatefulSet maintains a sticky identity for each Pod replica and can also provision PersistentVolumeClaims resources (explained further down in this table) unique to each Pod.
Service	Used to load-balance between Pod replicas.
Ingress	Provides external access to services within the cluster.
ConfigMap	Stores application configuration to decouple configuration from code.
Secret	Used to store sensitive data such as credentials and keys. Data stored in Secrets resources are only obfuscated using Base64 encoding, so administrators must ensure that proper access controls are in place.
PersistentVolumeClaim	A request for storage by a user. Used to provide persistence for running Pods.
Role	Represents a set of permissions to be allowed against the Kubernetes API.
RoleBinding	Grants the permissions defined in a role to a user or set of users.

dnf subcommands	Helm subcommands	Purpose
install	Install	Install an application and its dependencies.
upgrade	Upgrade	Upgrade an application to a newer version. Upgrade dependencies as specified by the target package.
downgrade	rollback	Revert an application to a previous version. Revert dependencies as specified by the target package.
remove	uninstall	Delete an application. Each tool has a different philosophy around handling dependencies.

Chapter 2: Preparing a Kubernetes and Helm Environment

 minikube-darwin-amd64	66 MB
 minikube-darwin-amd64.sha256	65 Bytes
 minikube-darwin-amd64.tar.gz	30.3 MB
 minikube-darwin-arm64	64.9 MB
 minikube-darwin-arm64.tar.gz	26 MB
 minikube-installer.exe	27.5 MB
 minikube-linux-386	58.7 MB
 minikube-linux-amd64	66.5 MB
 minikube-linux-amd64.sha256	65 Bytes
 minikube-linux-amd64.tar.gz	32.5 MB
 minikube-linux-arm	56.8 MB
 minikube-linux-arm.sha256	65 Bytes

VirtualBox 6.1.26 for Linux

-  [Oracle Linux 8 / Red Hat Enterprise Linux 8 / CentOS 8](#)
-  [Oracle Linux 7 / Red Hat Enterprise Linux 7 / CentOS 7](#)
-  [Oracle Linux 6 / Red Hat Enterprise Linux 6 / CentOS 6](#)
-  [Ubuntu 19.10 / 20.04 / 20.10 / 21.04](#)
-  [Ubuntu 18.04 / 18.10 / 19.04](#)
-  [Ubuntu 16.04](#)
-  [Debian 10](#)
-  [Debian 9](#)
-  [openSUSE 15.0](#)
-  [openSUSE 13.2 / Leap 42](#)
-  [Fedora 33 / 34](#)
-  [Fedora 32](#)
-  [All distributions](#) (built on EL6 and therefore not requiring recent system libraries)

Installation and Upgrading

Download Helm v3.6.3. The common platform binaries are here:

- [MacOS amd64](#) ([checksum](#) / 84a1ff17dd03340652d96e8be5172a921c97825fd278a2113c8233a4e8db5236)
- [MacOS arm64](#) ([checksum](#) / a50b499dbd0bbec90761d50974bf1e67cc6d503ea20d03b4a1275884065b7e9e)
- [Linux amd64](#) ([checksum](#) / 07c100849925623dc1913209cd1a30f0a9b80a5b4d6ff2153c609d11b043e262)
- [Linux arm](#) ([checksum](#) / 6918e573a70c309fbf6385a0a0d18d090c10b44d318724f1f73e47ede4809635)
- [Linux arm64](#) ([checksum](#) / 6fe647628bc27e7ae77d015da4d5e1c63024f673062ac7bc11453ccc55657713)
- [Linux i386](#) ([checksum](#) / e7bafc7dd870621a79f7f2ad0c92e45957817a371b738da4e590ccbc45983244)
- [Linux ppc64le](#) ([checksum](#) / 12ea5cdda8ee4a585230623254b997b28d4f9fb894ebf509b530af501366d0e9)
- [Linux s390x](#) ([checksum](#) / 1419787383c8062d5cb799d072c9ed10e1c3af66d0d2395832aafaf03d2d4bfb)
- [Windows amd64](#) ([checksum](#) / 797d2abd603a2646f2fb9c3fabba46f2fabae5cbd1eb87c20956ec5b4a2afc634)

Plugin Subcommand	Description	Usage
install	Installs one or more Helm plugins	helm plugin install \$URL
list	List-installed Helm plugins	helm plugin list
uninstall	Uninstalls one or more Helm plugins	helm plugin uninstall \$PLUGIN
update	Updates one or more Helm plugins	helm plugin update \$PLUGIN

Plugin Subcommand	Description	Usage
install	Installs one or more Helm plugins	helm plugin install \$URL
list	Lists installed Helm plugins	helm plugin list
uninstall	Uninstalls one or more Helm plugins	helm plugin uninstall \$PLUGIN
update	Updates one or more Helm plugins	helm plugin update \$PLUGIN

Operating System	Cache Path	Configuration Path	Data Path
Windows	%TEMP%\helm	%APPDATA%\helm	%APPDATA%\helm
macOS	\$HOME/Library/Caches/helm	\$HOME/Library/Preferences/helm	\$HOME/Library/helm
Linux	\$HOME/.cache/helm	\$HOME/.config/helm	\$HOME/.local/share/helm

Chapter 3: Installing Your First App with Helm


URL	CHART VERSION	APP VERSION	DESCRIPTION
https://artifacthub.io/packages/helm/kube-wordp...	0.1.0	1.1	this is my word
https://artifacthub.io/packages/helm/bitnami/wo...	12.1.6	5.8.0	Web publishing
https://artifacthub.io/packages/helm/groundhog2...	0.4.1	5.8.0-apache	A Helm chart fo
https://artifacthub.io/packages/helm/bitnami-ak...	12.1.1	5.8.0	Web publishing

```
- app_version: "1.1"
  description: this is my wordpress package
  url: https://artifacthub.io/packages/helm/kube-wordpress/wordpress
  version: 0.1.0
- app_version: 5.8.0
  description: Web publishing platform for building blogs and websites.
  url: https://artifacthub.io/packages/helm/bitnami/wordpress
  version: 12.1.6
- app_version: 5.8.0-apache
  description: A Helm chart for Wordpress on Kubernetes
  url: https://artifacthub.io/packages/helm/groundhog2k/wordpress
  version: 0.4.1
```

ArtifactHUB

Q Search packages

STATS SIGN UP SIGN IN



wordpress

ORG: Bitnami REPO: Helm chart Bitnami Verified Publisher

Web publishing platform for building blogs and websites.

SUBSCRIPTIONS: 3

WordPress

WordPress is one of the most versatile open source content management systems on the market. A publishing platform for building blogs and websites.

TL;DR

```
$ helm repo add bitnami https://charts.bitnami.com/bitnami
$ helm install my-release bitnami/wordpress
```

Introduction

This chart bootstraps a WordPress deployment on a Kubernetes cluster using the Helm package manager.

It also packages the Bitnami MariaDB chart which is required for bootstrapping a MariaDB deployment for the database requirements of the WordPress application, and the Bitnami Memcached chart that can be used to cache database queries.

INSTALL

TEMPLATES

VALUES SCHEMA

CHANGELOG

APPLICATION VERSION

5.8.0

CHART VERSIONS

12.1.6 (31 Aug 2021)

12.1.5 (31 Aug 2021)

12.1.4 (26 Aug 2021)

See all

```

- app_version: 0.0.9
  description: DEPRECATED Chart with custom templates used in Bitnami charts.
  name: bitnami/bitnami-common
  version: 0.0.9
- app_version: 2.1.2
  description: Apache Airflow is a platform to programmatically author, schedule and
    monitor workflows.
  name: bitnami/airflow
  version: 10.3.1
- app_version: 2.4.48
  description: Chart for Apache HTTP Server
  name: bitnami/apache
  version: 8.6.3
- app_version: 2.0.5
  description: Declarative, GitOps continuous delivery tool for Kubernetes.
  name: bitnami/argo-cd
  version: 1.0.3
- app_version: 3.1.18
  description: ASP.NET Core is an open-source framework created by Microsoft for building
    cloud-enabled, modern applications.
  name: bitnami/aspnet-core
  version: 1.3.16

```

NAME	CHART VERSION	APP VERSION	DESCRIPTION
bitnami/wordpress	12.1.4	5.8.0	Web publishing

NAME	CHART VERSION	APP VERSION	DESCRIPTION
bitnami/wordpress	12.1.6	5.8.0	Web publishing
bitnami/wordpress	12.1.5	5.8.0	Web publishing
bitnami/wordpress	12.1.4	5.8.0	Web publishing
bitnami/wordpress	12.1.3	5.8.0	Web publishing

```

annotations:
  category: CMS
apiVersion: v2
appVersion: 5.8.0
dependencies:
- condition: mariadb.enabled
  name: mariadb
  repository: https://charts.bitnami.com/bitnami
  version: 9.x.x
- condition: memcached.enabled
  name: memcached
  repository: https://charts.bitnami.com/bitnami
  version: 5.x.x
- name: common
  repository: https://charts.bitnami.com/bitnami
  tags:
  - bitnami-common
  version: 1.x.x
description: Web publishing platform for building blogs and websites.
home: https://github.com/bitnami/charts/tree/master/bitnami/wordpress
icon: https://bitnami.com/assets/stacks/wordpress/img/wordpress-stack-220x234.png
keywords:
- application
- blog
- cms
- http
- php
- web
- wordpress
maintainers:
- email: containers@bitnami.com
  name: Bitnami
name: wordpress
sources:
- https://github.com/bitnami/bitnami-docker-wordpress
- https://wordpress.org/
version: 12.1.6

```

WordPress

[WordPress](https://wordpress.org/) is one of the most versatile open source

TL;DR

```
```console
```

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

```
$ helm install my-release bitnami/wordpress
```

```
```
```

Introduction

This chart bootstraps a [WordPress](https://github.com/bitnami/bitnami-docker-wordpress) on a

It also packages the [Bitnami MariaDB chart](https://github.com/bitnami/charts/tree/master/bitnami/mariadb), the WordPress application, and the [Bitnami Memcached chart](https://github.com/bitnami/charts/tree/master/bitnami/memcached).

Bitnami charts can be used with [Kubeapps](https://kubernetes.io/docs/concepts/extend-kubernetes/user-tools/kubeapps/) for deployment and management on top of the [BKPR](https://kubeprod.io/).


```

## @section WordPress Image parameters

## Bitnami WordPress image
## ref: https://hub.docker.com/r/bitnami/wordpress/tags/
## @param image.registry WordPress image registry
## @param image.repository WordPress image repository
## @param image.tag WordPress image tag (immutable tags are recommended)
## @param image.pullPolicy WordPress image pull policy
## @param image.pullSecrets WordPress image pull secrets
## @param image.debug Enable image debug mode
##
image:
  registry: docker.io
  repository: bitnami/wordpress
  tag: 5.8.0-debian-10-r24
  ## Specify a imagePullPolicy
  ## Defaults to 'Always' if image tag is 'latest', else set to 'IfNotPresent'
  ## ref: http://kubernetes.io/docs/user-guide/images/#pre-pulling-images
  ##
  pullPolicy: IfNotPresent
  ## Optionally specify an array of imagePullSecrets.
  ## Secrets must be manually created in the namespace.
  ## ref: https://kubernetes.io/docs/tasks/configure-pod-container/pull-image-
  ## e.g:
  ## pullSecrets:
  ##   - myRegistryKeySecretName
  ##
  pullSecrets: []
  ## Enable debug mode
  ##
  debug: false

```

```

## @param wordpressUsername WordPress username
##
wordpressUsername: user
## @param wordpressPassword WordPress user password
## Defaults to a random 10-character alphanumeric string if not set
##
wordpressPassword: ""
## @param existingSecret Name of existing secret containing WordPress credentials
## NOTE: Must contain key `wordpress-password`
## NOTE: When it's set, the `wordpressPassword` parameter is ignored
##
existingSecret: ""
## @param wordpressEmail WordPress user email
##
wordpressEmail: user@example.com
## @param wordpressFirstName WordPress user first name
##
wordpressFirstName: FirstName
## @param wordpressLastName WordPress user last name
##
wordpressLastName: LastName
## @param wordpressBlogName Blog name
##
wordpressBlogName: User's Blog!

```

```
## @section Traffic Exposure Parameters

## WordPress service parameters
##
service:
  ## @param service.type WordPress service type
  ##
  type: LoadBalancer
```

```
NAME: wordpress
LAST DEPLOYED: Mon Sep  6 13:03:45 2021
NAMESPACE: chapter3
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
** Please be patient while the chart is being deployed **

Your WordPress site can be accessed through the following DNS name from within your
    wordpress.chapter3.svc.cluster.local (port 80)

To access your WordPress site from outside the cluster follow the steps below:

1. Get the WordPress URL by running these commands:

    export NODE_PORT=$(kubectl get --namespace chapter3 -o jsonpath="{.spec.ports[0].
    export NODE_IP=$(kubectl get nodes --namespace chapter3 -o jsonpath="{.items[0].s
    echo "WordPress URL: http://$NODE_IP:$NODE_PORT/"
    echo "WordPress Admin URL: http://$NODE_IP:$NODE_PORT/admin"

2. Open a browser and access WordPress using the obtained URL.

3. Login with the following credentials below to see your blog:

    echo Username: helm-user
    echo Password: $(kubectl get secret --namespace chapter3 wordpress -o jsonpath="{.
```

| NAME | NAMESPACE | REVISION | UPDATED |
|-----------|-----------|----------|---|
| wordpress | chapter3 | 1 | 2021-09-06 13:03:45.905520214 -0500 CDT |

```
# Source: wordpress/templates/svc.yaml
apiVersion: v1
kind: Service
metadata:
  name: wordpress
  namespace: "chapter3"
  labels:
    app.kubernetes.io/name: wordpress
    helm.sh/chart: wordpress-12.1.6
    app.kubernetes.io/instance: wordpress
    app.kubernetes.io/managed-by: Helm
spec:
  type: NodePort
  externalTrafficPolicy: "Cluster"
  ports:
    - name: http
      port: 80
      protocol: TCP
      targetPort: http
    - name: https
      port: 443
      protocol: TCP
      targetPort: https
  selector:
    app.kubernetes.io/name: wordpress
    app.kubernetes.io/instance: wordpress
```

```
- name: WORDPRESS_USERNAME
  value: "helm-user"
- name: WORDPRESS_PASSWORD
  valueFrom:
    secretKeyRef:
      name: wordpress
      key: wordpress-password
- name: WORDPRESS_EMAIL
  value: "helm-user@example.com"
- name: WORDPRESS_FIRST_NAME
  value: "Helm_is"
- name: WORDPRESS_LAST_NAME
  value: "Fun"
- name: WORDPRESS_HTACCESS_OVERRIDE_NONE
  value: "no"
- name: WORDPRESS_ENABLE_HTACCESS_PERSISTENCE
  value: "no"
- name: WORDPRESS_BLOG_NAME
  value: "Learn Helm!"
```

```
USER-SUPPLIED VALUES:
service:
  type: NodePort
wordpressBlogName: Learn Helm!
wordpressEmail: helm-user@example.com
wordpressFirstName: Helm_is
wordpressLastName: Fun
wordpressPassword: my-password
wordpressUsername: helm-user
```

```
COMPUTED VALUES:
affinity: {}
allowEmptyPassword: true
allowOverrideNone: false
apacheConfiguration: ""
args: []
autoscaling:
  enabled: false
  maxReplicas: 11
  minReplicas: 1
  targetCPU: 50
  targetMemory: 50
clusterDomain: cluster.local
command: []
common:
  exampleValue: common-chart
global:
  imagePullSecrets: []
  imageRegistry: ""
  storageClass: ""
```

| NAME | READY | UP-TO-DATE | AVAILABLE | AGE |
|-----------|-------|------------|-----------|------|
| wordpress | 1/1 | 1 | 1 | 3h3m |

LEARN HELM!

Just another WordPress site

Hello world!

Welcome to WordPress. This is your first post. Edit or delete it, then start writing!

Published September 6, 2021

Categorized as Uncategorized

Welcome to WordPress. This is your first post. Edit or delete it, then start writing!

Published September 6, 2021

By helm-user

Categorized as Uncategorized



Username or Email Address

Password

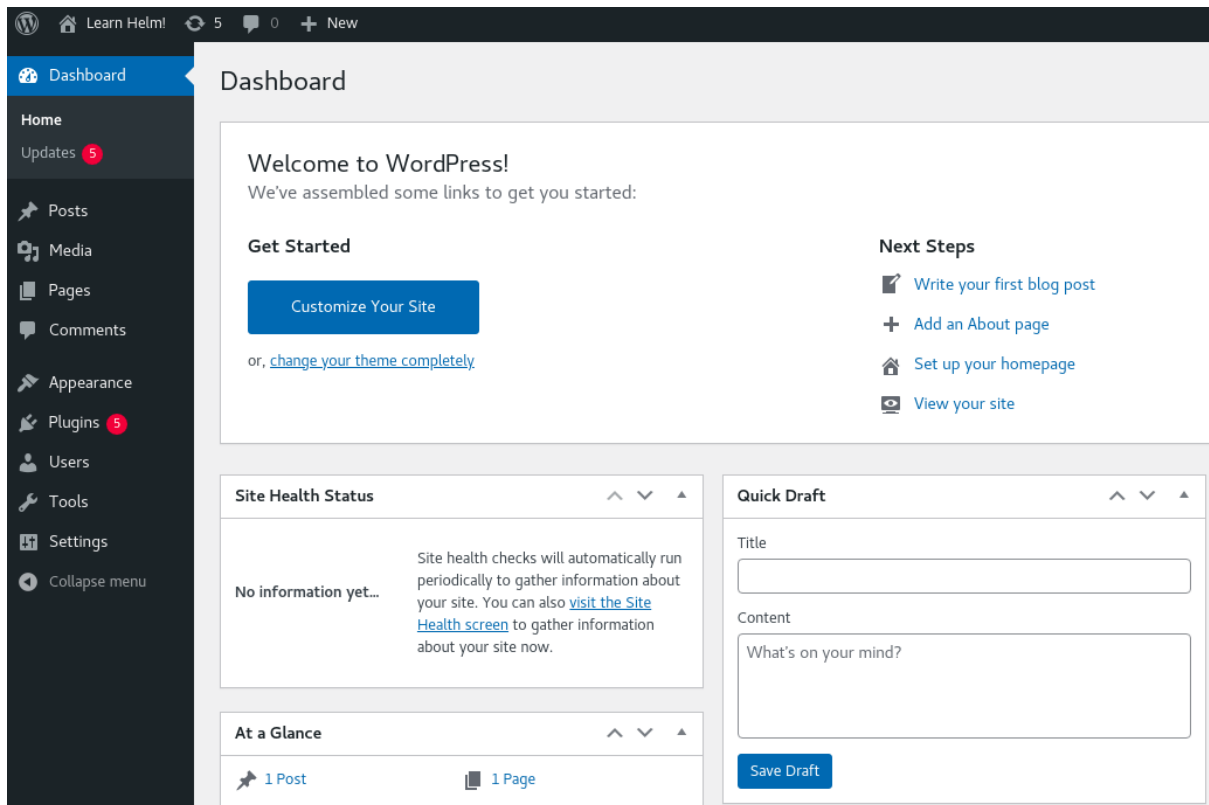


☐ Remember Me

Log In

[Lost your password?](#)

[← Go to Learn Helm!](#)



Name

Username Usernames cannot be changed.

First Name

Last Name

Nickname (required)

Display name publicly as

Contact Info

Email (required)

If you change this, we will send you an email at your new address to confirm it. The new address will not become active until confirmed.

```
## @param replicaCount Number of WordPress replicas to deploy
## NOTE: ReadWriteMany PVC(s) are required if replicaCount > 1
##
replicaCount: 1
```



```
## WordPress containers' resource requests and limits
## ref: http://kubernetes.io/docs/user-guide/compute-resources/
## @param resources.limits The resources limits for the WordPress container
## @param resources.requests [object] The requested resources for the WordPress container
##
resources:
  limits: {}
  requests:
    memory: 512Mi
    cpu: 300m
```

```
Release "wordpress" has been upgraded. Happy Helming!
NAME: wordpress
LAST DEPLOYED: Mon Sep  6 19:15:17 2021
NAMESPACE: chapter3
STATUS: deployed
REVISION: 2
TEST SUITE: None
NOTES:
** Please be patient while the chart is being deployed **

Your WordPress site can be accessed through the following DNS name from within your cluster:

    wordpress.chapter3.svc.cluster.local (port 80)

To access your WordPress site from outside the cluster follow the steps below:

1. Get the WordPress URL by running these commands:

    export NODE_PORT=$(kubectl get --namespace chapter3 -o jsonpath="{.spec.ports[0].nodePort}")
    export NODE_IP=$(kubectl get nodes --namespace chapter3 -o jsonpath="{.items[0].status.addresses[0].address}")
    echo "WordPress URL: http://$NODE_IP:$NODE_PORT/"
    echo "WordPress Admin URL: http://$NODE_IP:$NODE_PORT/admin"

2. Open a browser and access WordPress using the obtained URL.

3. Login with the following credentials below to see your blog:

    echo Username: helm-user
    echo Password: $(kubectl get secret --namespace chapter3 wordpress -o jsonpath="{.data.wordpress-password}")
```

```
USER-SUPPLIED VALUES:
replicaCount: 2
resources:
  requests:
    cpu: 100m
    memory: 256Mi
service:
  type: NodePort
wordpressBlogName: Learn Helm!
wordpressEmail: helm-user@example.com
wordpressFirstName: Helm_is
wordpressLastName: Fun
wordpressPassword: my-password
wordpressUsername: helm-user
```

```
USER-SUPPLIED VALUES:
replicaCount: 1
wordpressPassword: my-password
wordpressUsername: helm-user
```



```
USER-SUPPLIED VALUES:
replicaCount: 2
resources:
  requests:
    cpu: 100m
    memory: 256Mi
service:
  type: NodePort
wordpressBlogName: Learn Helm!
wordpressEmail: helm-user@example.com
wordpressFirstName: Helm_is
wordpressLastName: Fun
wordpressPassword: my-password
wordpressUsername: helm-user
```

```
USER-SUPPLIED VALUES:
replicaCount: 2
resources:
  requests:
    cpu: 100m
    memory: 256Mi
service:
  type: NodePort
wordpressBlogName: Learn Helm!
wordpressEmail: helm-user@example.com
wordpressFirstName: Helm_is
wordpressLastName: Fun
wordpressPassword: my-password
wordpressUsername: helm-user
```

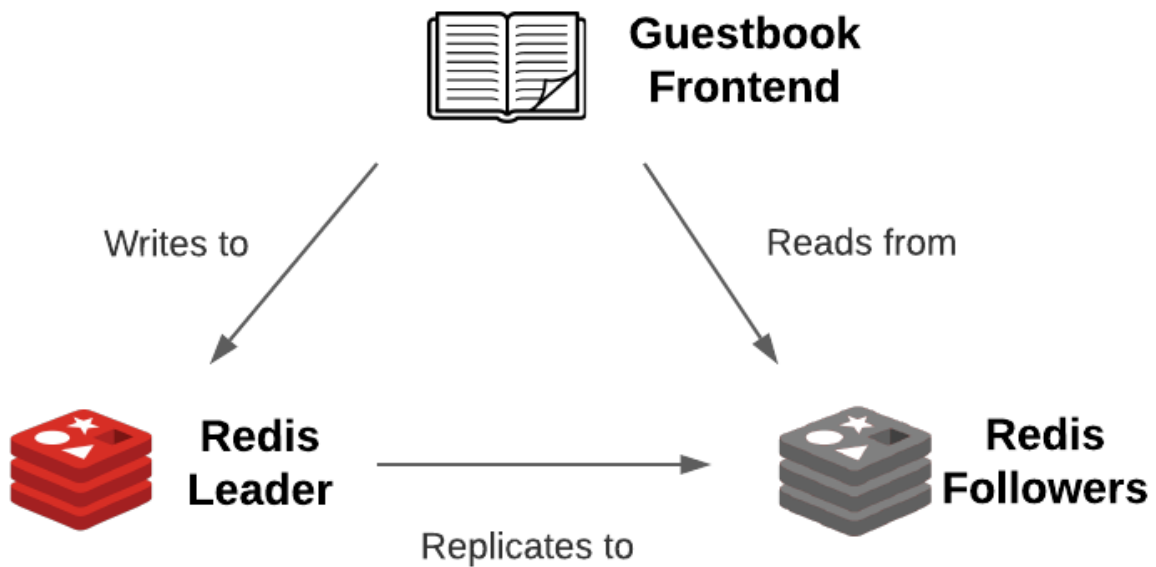
| REVISION | STATUS | DESCRIPTION |
|----------|------------|------------------|
| 1 | superseded | Install complete |
| 2 | superseded | Upgrade complete |
| 3 | superseded | Upgrade complete |
| 4 | deployed | Upgrade complete |

Chapter 4: Scaffolding a New Helm Chart

Guestbook

Guestbook

Hello world!



```

apiVersion: v2
name: guestbook
description: A Helm chart for Kubernetes

# A chart can be either an 'application' or a 'library' chart.
#
# Application charts are a collection of templates that can be packaged into versioned archives
# to be deployed.
#
# Library charts provide useful utilities or functions for the chart developer. They're included as
# a dependency of application charts to inject those utilities and functions into the rendering
# pipeline. Library charts do not define any templates and therefore cannot be deployed.
type: application

# This is the chart version. This version number should be incremented each time you make changes
# to the chart and its templates, including the app version.
# Versions are expected to follow Semantic Versioning (https://semver.org/)
version: 0.1.0

# This is the version number of the application being deployed. This version number should be
# incremented each time you make changes to the application. Versions are not expected to
# follow Semantic Versioning. They should reflect the version the application is using.
# It is recommended to use it with quotes.
appVersion: "1.16.0"

```

| NAME | CHART VERSION | APP VERSION | DESCRIPTION |
|-------------------|---------------|-------------|--|
| bitnami/wordpress | 12.1.4 | 5.8.0 | Web publishing platform for building blogs and ... |

LINKS

🏠 [Homepage](#)

🔗 [Source](#)

🔗 [Source](#)

MAINTAINERS

📦 [Bitnami](#)

CONTAINERS IMAGES

📦 [docker.io/bitnami/w...](#) 📄

📦 [docker.io/bitnami/m...](#) 📄

DEPENDENCIES

📦 [mariadb@9.x.x](#)

📦 [common@1.x.x](#)

KEYWORDS

[application](#)
[blog](#)
[cms](#)

[http](#)
[php](#)
[web](#)

[wordpress](#)

annotations:
 category: CMS
apiVersion: v2
appVersion: 5.8.0
dependencies:
- condition: mariadb.enabled
 name: mariadb
 repository: https://charts.bitnami.com/bitnami
 version: 9.x.x
- condition: memcached.enabled
 name: memcached
 repository: https://charts.bitnami.com/bitnami
 version: 5.x.x
- name: common
 repository: https://charts.bitnami.com/bitnami
 tags:
 - bitnami-common
 version: 1.x.x
description: Web publishing platform for building blogs and websites.
home: https://github.com/bitnami/charts/tree/master/bitnami/wordpress
icon: https://bitnami.com/assets/stacks/wordpress/img/wordpress-stack-220x234.png
keywords:
- application
- blog
- cms
- http
- php
- web
- wordpress
maintainers:
- email: containers@bitnami.com
 name: Bitnami
name: wordpress
sources:
- https://github.com/bitnami/bitnami-docker-wordpress
- https://wordpress.org/
version: 12.1.4

apiVersion: v2
name: guestbook
description: An application used for keeping a running record of guests
type: application
version: 0.1.0

| Key | Value |
|-------------------------|-------|
| resources.limits.cpu | 100m |
| resources.limits.memory | 512Mi |

| File/Directory | Definition | Required? |
|--|---|---|
| charts/ | A directory that contains dependencies or Helm charts that the parent chart depends on. | No |
| Chart.yaml | A file that contains metadata about the Helm chart. | Yes |
| .helmignore | A file that contains a list of files and directories that should be omitted from the Helm chart's packaging. | No |
| templates/ | A directory that contains Golang templates, which are primarily used for generating Kubernetes resources. | Yes, unless the chart contains dependencies |
| templates/*.yaml | A template file used to generate a Kubernetes resource. | Yes, unless the chart contains dependencies |
| templates/_*.tpl | A file that contains boilerplate helper templates. | No |
| templates/NOTES.txt | A template file that is used to generate usage instructions after chart installation. | No |
| templates/tests/ (or more generically, templates/*/) | A folder used for grouping different templates. This is strictly for aesthetics and has no effect on how the Helm chart operates – for example, templates/tests is used to group templates that are used for testing. | No |
| values.yaml | A file that contains the chart's default values. | No, but every chart should contain this file as a best practice |

| File/Directory | Definition | Required? |
|--------------------|---|--|
| Chart.lock | A file used to save, or lock in, the previously applied dependency versions. | No |
| crds/ | A directory that contains Custom Resource Definition (CRD) YAML resources. These CRD resources will be installed before those under templates/. | No |
| README.md | A file that contains installation and usage information about the Helm chart. | No, but every Helm chart should contain this file as a best practice |
| LICENSE | A file that contains the chart's license, which provides information about usage and redistribution rights. | No |
| values.schema.json | A file that contains the chart's values schema in the JSON format. Used to provide input validation. | No |

| Field | Description | Required? |
|-------------|--|-----------|
| apiVersion | The chart API version | Yes |
| name | The name of the Helm chart | Yes |
| description | A brief description of the Helm chart | No |
| type | The type of Helm chart (either <code>Application</code> or <code>Library</code>) | No |
| version | The version of the Helm chart, in SemVer format. | Yes |
| appVersion | The version of the application that the Helm chart deploys. This does not need to be in the SemVer format. | No |

| Field | Description | Required? |
|--------------|--|-----------|
| kubeVersion | A range of compatible Kubernetes versions in the SemVer format. | No |
| keywords | A list of keywords used to describe the Helm chart. Keywords are also used to provide search terms for the <code>helm search</code> command. | No |
| home | The URL to the Helm chart's home page. | No |
| sources | A list of URLs that link to source code used by the Helm chart. | No |
| dependencies | A list of charts that your Helm chart is reliant on. | No |
| maintainers | A list of Helm chart maintainers. | No |
| icon | An icon in SVG or PNG format used to represent the Helm chart. Displayed on the chart's Artifact Hub page. | No |
| deprecated | Indicates whether the Helm chart has been deprecated. | No |
| annotations | A list of annotations used to provide custom metadata. | No |

Chapter 5: Helm Dependency Management

| NAME | VERSION | REPOSITORY | STATUS |
|---------|---------|---|---------|
| mariadb | 9.5.0 | https://raw.githubusercontent.com/bitnami/charts/archive-full-index/bitnami | missing |

```
Hang tight while we grab the latest from your chart repositories...
...Successfully got an update from the "bitnami" chart repository
Update Complete. *Happy Helming!*
Saving 1 charts
Downloading mariadb from repo https://raw.githubusercontent.com/bitnami/charts/archive-full-index/bitnami
Deleting outdated charts
```

| NAME | VERSION | REPOSITORY | STATUS |
|---------|---------|---|--------|
| mariadb | 9.5.0 | https://raw.githubusercontent.com/bitnami/charts/archive-full-index/bitnami | ok |

```
dependencies:
- name: mariadb
  repository: https://raw.githubusercontent.com/bitnami/charts/archive-full-index/bitnami
  version: 9.5.0
digest: sha256:6621adebbb98601072b13d904b11f42e31919298a590713229f6061795606fcd
generated: "2022-07-17T18:34:20.093658-05:00"
```

```
dependencies:
- name: mariadb
  repository: https://raw.githubusercontent.com/bitnami/charts/archive-full-index/bitnami
  version: 9.8.1
digest: sha256:07240684a9a393cbe1a7c7d8e9905c25f97e7d82139677e0c1df8af1c7c9bbd6
generated: "2022-07-17T18:37:02.86214-05:00"
```

| NAME | CHART VERSION | APP VERSION | DESCRIPTION |
|---------------|---------------|-------------|--------------|
| bitnami/redis | 15.5.1 | 6.2.6 | Open source, |
| bitnami/redis | 15.5.0 | 6.2.6 | Open source, |
| bitnami/redis | 15.4.2 | 6.2.6 | Open source, |
| bitnami/redis | 15.4.1 | 6.2.6 | Open source, |
| bitnami/redis | 15.4.0 | 6.2.5 | Open source, |
| bitnami/redis | 15.3.3 | 6.2.5 | Open source, |

| Field | Description | Required? |
|---------------|---|-----------|
| Name | The name of the dependency chart | Yes |
| Repository | The location where the dependency chart resides | Yes |
| Version | The chart dependency version | Yes |
| Condition | A Boolean value that determines whether the dependency should be included or not | No |
| Tags | A list of Boolean values that determine whether the chart should be included or not | No |
| import-values | A mapping of source values to parent values | No |
| Alias | An alternative name to give the dependency | No |

| Command | Description |
|-------------------------------------|---|
| <code>helm dependency list</code> | Lists the dependencies for the given chart. |
| <code>helm dependency update</code> | Downloads the dependencies listed in <code>Chart.yaml</code> and generates a <code>Chart.lock</code> file. |
| <code>helm dependency build</code> | Downloads the dependencies listed in <code>Chart.lock</code> . If the <code>Chart.lock</code> file is not found, then this command will mirror the behavior of the <code>helm dependency update</code> command. |

Chapter 6: Understanding Helm Templates

```
1  {
2    "$schema": "http://json-schema.org/draft-07/schema",
3    "required": [
4      "image",
5      "service"
6    ],
7    "properties": {
8      "image": {
9        "type": "object",
10       "required": [
11         "repository",
12         "tag"
13       ],
14       "properties": {
15         "repository": {
16           "type": "string"
17         },
18         "tag": {
19           "type": "string"
20         }
21       }
22     },
23     "service": {
24       "type": "object",
25       "required": ["type", "port"],
26       "properties": {
27         "type": {
28           "type": "string",
29           "enum": ["ClusterIP", "NodePort"]
30         },
31         "port": {
32           "type": "integer",
33           "minimum": 8080
34         }
35       }
36     }
37   }
38 }
```

Guestbook

Hello world!

| Object | Definition |
|---------------|---|
| .Values | Used to access values in the values.yaml file or values that were provided using the --values and --set flags |
| .Release | Used to access metadata about the Helm release, such as its name, namespace, and revision number |
| .Chart | Used to access metadata about the Helm chart, such as its name and version |
| .Template | Used to access metadata about chart templates, such as their filename and path |
| .Capabilities | Used to access information about the Kubernetes cluster |
| .Files | Used to access arbitrary files within a Helm chart directory |
| . | The root object |

| Object | Description |
|--------------------|---|
| .Release.Name | The release name |
| .Release.Namespace | The namespace to be released into |
| .Release.IsUpgrade | This is set to true if the current operation is an upgrade or rollback |
| .Release.IsInstall | This is set to true if the current operation is an install |
| .Release.Revision | The revision number for this release |
| .Release.Service | The service that is rendering the template (this is always equivalent to the "Helm" string) |

| Function | Description | Example |
|---------------|--|---|
| Printf | Returns a string based upon a formatting string and arguments | printf "A cat named %s has %d lives." \$name \$numLives |
| Default | Assigns a string "placeholder" if the content of \$value is nil or empty | default "placeholder" \$value |
| List | Returns a new list based upon a series of inputs | list "ClusterIP" "NodePort" "LoadBalancer" |
| has | Determines if an element is present in a list | has 4 \$list |
| b64enc/b64dec | Encodes or decodes with Base64. Useful when working with Secrets. | b64enc \$mySecret |
| atoi | Convert a string to an integer | atoi \$myIntegerString |
| add | Adds a list of integers | add 1 2 3 |
| upper/lower | Convert the entire string to uppercase or lowercase | upper \$myString |
| now | Gets the current date and time | Now |
| date | Formats a date in the specified format | now date "2006-01-02" |

| Object | Validation |
|---------------------------------------|--|
| <code>.Values.image</code> | Ensures that the <code>image</code> object exists |
| <code>.Values.image.repository</code> | Ensures that the <code>image.repository</code> value exists and is a string |
| <code>.Values.image.tag</code> | Ensures that the <code>image.tag</code> value exists and is a string |
| <code>.Values.service</code> | Ensures that the <code>service</code> object exists |
| <code>.Values.service.type</code> | Ensures that the <code>service.type</code> value exists and is set to either <code>ClusterIP</code> or <code>NodePort</code> |
| <code>.Values.service.port</code> | Ensures that the <code>service.port</code> value exists and is greater than or equal to 8080 |

Chapter 7: Helm Lifecycle Hooks

```
1  {{- if .Values.redis.master.persistence.enabled }}
2  apiVersion: v1
3  kind: PersistentVolumeClaim
4  metadata:
5    name: {{ include "guestbook.fullname" . }}-{{ .Values.redis.fullnameOverride }}-backup-{{ sub .Release.Revision 1 }}
6    labels:
7      {{- include "guestbook.labels" . | nindent 4 }}
8    annotations:
9      "helm.sh/hook": pre-upgrade
10     "helm.sh/hook-weight": "0"
11  spec:
12    accessModes:
13      - ReadWriteOnce
14    resources:
15      requests:
16        storage: {{ .Values.redis.master.persistence.size }}
17  {{- end }}
```

```
1  {{- if .Values.redis.master.persistence.enabled }}
2  apiVersion: batch/v1
3  kind: Job
4  metadata:
5    name: {{ include "guestbook.fullname" . }}-{{ .Values.redis.fullnameOverride }}-backup-{{ sub .Release.Revision 1 }}
6    labels:
7      {{- include "guestbook.labels" . | nindent 4 }}
8    annotations:
9      "helm.sh/hook": pre-upgrade
10     "helm.sh/hook-weight": "1"
11     "helm.sh/hook-delete-policy": before-hook-creation, hook-succeeded
12  spec:
13    template:
14      spec:
15        containers:
16          - name: backup
17            image: redis:alpine3.15
18            command: ["/bin/sh", "-c"]
19            args:
20              - |-
21                redis-cli -h {{ .Values.redis.fullnameOverride }}-master save
22                cp /data/dump.rdb /backup/dump.rdb
23            volumeMounts:
24              - name: redis-data
25                mountPath: /data
26              - name: backup
27                mountPath: /backup
28            restartPolicy: Never
29        volumes:
30          - name: redis-data
31            persistentVolumeClaim:
32              claimName: redis-data-{{ .Values.redis.fullnameOverride }}-master-0
33          - name: backup
34            persistentVolumeClaim:
35              claimName: {{ include "guestbook.fullname" . }}-{{ .Values.redis.fullnameOverride }}-backup-{{ sub .Release.Revision 1 }}
36  {{- end }}
```

```
1  apiVersion: v1
2  kind: ServiceAccount
3  metadata:
4    name: {{ include "guestbook.fullname" . }}-rollout
5    labels:
6      {{- include "guestbook.labels" . | nindent 4 }}
7    annotations:
8      "helm.sh/hook": pre-rollback
9      "helm.sh/hook-delete-policy": before-hook-creation,hook-succeeded
10     "helm.sh/hook-weight": "0"
```

```
1  apiVersion: rbac.authorization.k8s.io/v1
2  kind: RoleBinding
3  metadata:
4    name: {{ include "guestbook.fullname" . }}-rollout
5    labels:
6      {{- include "guestbook.labels" . | nindent 4 }}
7    annotations:
8      "helm.sh/hook": pre-rollback
9      "helm.sh/hook-delete-policy": before-hook-creation,hook-succeeded
10     "helm.sh/hook-weight": "1"
11  roleRef:
12    apiGroup: rbac.authorization.k8s.io
13    kind: ClusterRole
14    name: edit
15  subjects:
16  - apiGroup: ""
17    kind: ServiceAccount
18    name: {{ include "guestbook.fullname" . }}-rollout
19    namespace: {{ .Release.Namespace }}
```

```
1  {{- if .Values.redis.master.persistence.enabled }}
2  apiVersion: batch/v1
3  kind: Job
4  metadata:
5    name: {{ include "guestbook.fullname" . }}-{{ .Values.redis.fullnameOverride }}-restore-{{ .Release.Revision }}
6    labels:
7      {{- include "guestbook.labels" . | nindent 4 }}
8    annotations:
9      "helm.sh/hook": pre-rollback
10     "helm.sh/hook-delete-policy": before-hook-creation,hook-succeeded
11     "helm.sh/hook-weight": "2"
12 spec:
13   template:
14     spec:
15       serviceAccountName: {{ include "guestbook.fullname" . }}-rollout
16       initContainers:
17         ## This will reload the master's database with the backup dump.rdb file
18         - name: restore-master-state
19           image: redis:alpine3.15
20           command: ["/bin/sh", "-c"]
21           args:
22             - |-
23               cp /backup/dump.rdb /data/dump.rdb
24               redis-cli -h {{ .Values.redis.fullnameOverride }}-master debug reload nosave
25       volumeMounts:
26         - name: redis-data
27           mountPath: /data
28         - name: backup
29           mountPath: /backup
30       containers:
31         ## This will roll out new Replica pods
32         - name: rollout-new-replicas
33           image: bitnami/kubect1
34           command: ["/bin/sh", "-c"]
35           args:
36             - |-
37               kubect1 rollout restart statefulset {{ .Values.redis.fullnameOverride }}-replicas
38       restartPolicy: Never
39       volumes:
40         - name: redis-data
41           persistentVolumeClaim:
42             claimName: redis-data-{{ .Values.redis.fullnameOverride }}-master-0
43         - name: backup
44           persistentVolumeClaim:
45             claimName: {{ include "guestbook.fullname" . }}-{{ .Values.redis.fullnameOverride }}-backup-{{ .Release.Revision }}
46 {{- end }}
```

Guestbook

Messages

Submit

This was deployed using the Guestbook Helm chart!

Guestbook

Messages

Submit

This was deployed using the Guestbook Helm chart!
This message should disappear after the rollback

Guestbook

Messages

Submit

This was deployed using the Guestbook Helm chart!

| Annotation Value | Description |
|------------------|--|
| pre-install | Executes after templates are rendered but before any resources are created in Kubernetes. |
| post-install | Executes after all resources are created in Kubernetes. |
| pre-delete | Executes due to a deletion request before any resources are deleted from Kubernetes. |
| post-delete | Executes due to a deletion request after all the release's resources have been deleted. |
| pre-upgrade | Executes due to an upgrade request after templates are rendered but before any resources are updated. |
| post-upgrade | Executes due to an upgrade after all the resources have been upgraded. |
| pre-rollback | Executes due to a rollback request after templates are rendered but before any resources are rolled back. |
| post-rollback | Executes due to a rollback request after all resources have been modified. |
| Test | Executes when the <code>helm test</code> subcommand is invoked. This will be discussed in more detail in Chapter 9, Testing Helm Charts. |

| Annotation Value | Description |
|----------------------|--|
| before-hook-creation | Deletes the previous resources before the hook is launched (this is the default) |
| hook-succeeded | Deletes the resources after the hook is successfully executed |
| hook-failed | Deletes the resources if the hook failed during execution |


Chapter 8: Publishing to a Helm Chart Repository

Create a new repository


A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository](#).

Owner *

Repository name *


 deweya

 /


Chart-Repository-Example 

Great repository names are short and memorable. Need inspiration? How about **studious-octo-invention**?

Description (optional)

☒  **Public**

Anyone on the internet can see this repository. You choose who can commit.

☐  **Private**

You choose who can see and commit to this repository.

Initialize this repository with:

Skip this step if you're importing an existing repository.

☒ **Add a README file**


This is where you can write a long description for your project. [Learn more](#).

☐ **Add .gitignore**

Choose which files not to track from a list of templates. [Learn more](#).

☐ **Choose a license**

A license tells others what they can and can't do with your code. [Learn more](#).

This will set  **main** as the default branch. Change the default name in your [settings](#).

Create repository

<> Code

Issues

Pull requests

Actions

Projects

Wiki

Security

Insights

Settings

General

Access

Collaborators

Moderation options

Code and automation

Branches

Actions


Webhooks

Environments

Pages


GitHub Pages


GitHub Pages is designed to host your personal, organization, or project pages from a GitHub repository.

 Your site is ready to be published at <https://deweya.github.io/Chart-Repository-Example/>

Source

Your GitHub Pages site is currently being built from the **main** branch. [Learn more](#).

 Branch: **main**

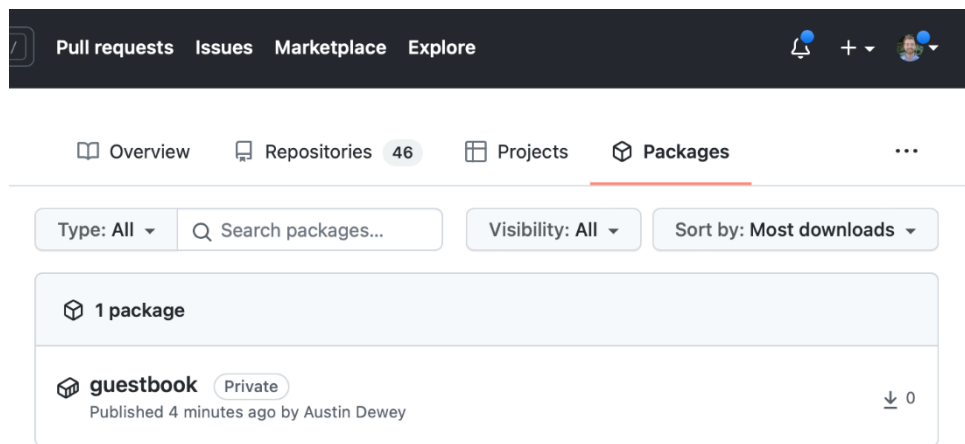
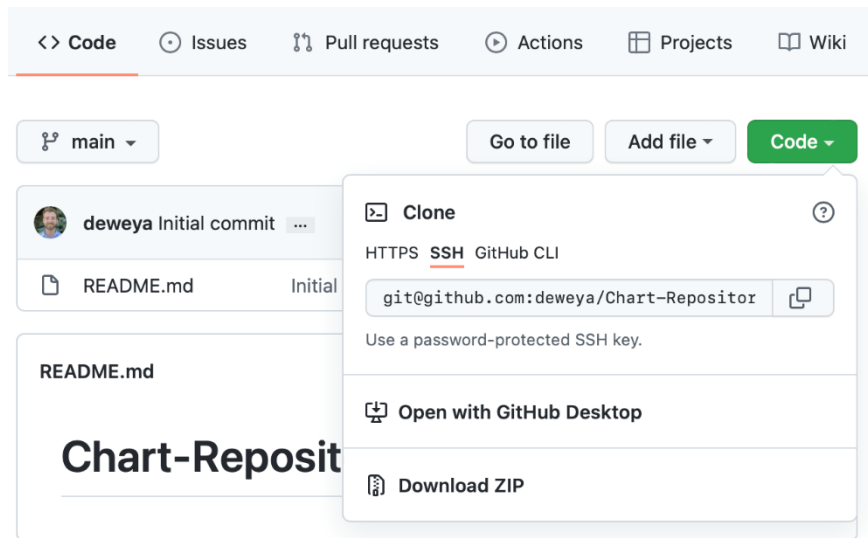
 / (root)

Save

Theme Chooser

Select a theme to publish your site with a Jekyll theme. [Learn more](#).

Choose a theme



| Command | Description |
|----------------------|-------------------------------------|
| helm registry login | Log in to a registry |
| helm registry logout | Log out of a registry |
| helm push | Push a packaged chart to a registry |
| helm pull | Pull a chart from a registry |

Chapter 9: Testing Helm Charts

```
---
# Source: guestbook/charts/redis/templates/serviceaccount.yaml
apiVersion: v1
kind: ServiceAccount
automountServiceAccountToken: true
metadata:
  name: redis
  namespace: "default"
  labels:
    app.kubernetes.io/name: redis
    helm.sh/chart: redis-15.5.5
    app.kubernetes.io/instance: my-guestbook
    app.kubernetes.io/managed-by: Helm
---
# Source: guestbook/templates/serviceaccount.yaml
apiVersion: v1
kind: ServiceAccount
metadata:
  name: my-guestbook
  labels:
    helm.sh/chart: guestbook-0.1.0
    app.kubernetes.io/name: guestbook
```

```
556:81      error    line too long (92 > 80 characters) (line-length)
557:81      error    line too long (89 > 80 characters) (line-length)
558:81      error    line too long (90 > 80 characters) (line-length)
559:81      error    line too long (89 > 80 characters) (line-length)
561:1       error    trailing spaces (trailing-spaces)
567:1       error    trailing spaces (trailing-spaces)
581:1       error    trailing spaces (trailing-spaces)
644:23      error    trailing spaces (trailing-spaces)
723:1       error    wrong indentation: expected 2 but found 0 (indentation)
```

v3.5.1 Latest

Changelog

- [c891fb0](#) update helm to v3.8.1 (#409)
- [85c1301](#) Updates to github actions (#406)
- [dab9974](#) Bump github.com/anchore/syft from 0.34.0 to 0.41.4 (#405)
- [9eeb997](#) Bump golang.org/x/tools from 0.1.8 to 0.1.9 (#387)
- [c255a37](#) docs(README): use the host network in docker example (#395)
- [4c4e8aa](#) fix: add unit to extra arg help message (#391)
- [a682e3e](#) Bump github.com/goreleaser/goreleaser from 1.2.5 to 1.6.1 (#404)
- [0a093e4](#) Update docs with example using ct with local repo (#389)
- [a1f103a](#) Bump golang.org/x/tools from 0.1.7 to 0.1.8 (#377)
- [33efbc5](#) Bump github.com/spf13/viper from 1.10.0 to 1.10.1 (#379)
- [8591821](#) Update golang to 1.17 and some goreleaser/docker file updates (#375)
- [f9ff9a0](#) Make description optional in chart_schema (#372)

▼ Assets 19

| | |
|--|---------|
|  chart-testing_3.5.1_darwin_amd64.tar.gz | 5.64 MB |
|  chart-testing_3.5.1_darwin_amd64.tar.gz.sbom | 20.5 KB |
|  chart-testing_3.5.1_darwin_arm64.tar.gz | 5.42 MB |

```
On branch chart-testing-example
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   helm-charts/charts/nginx/Chart.yaml

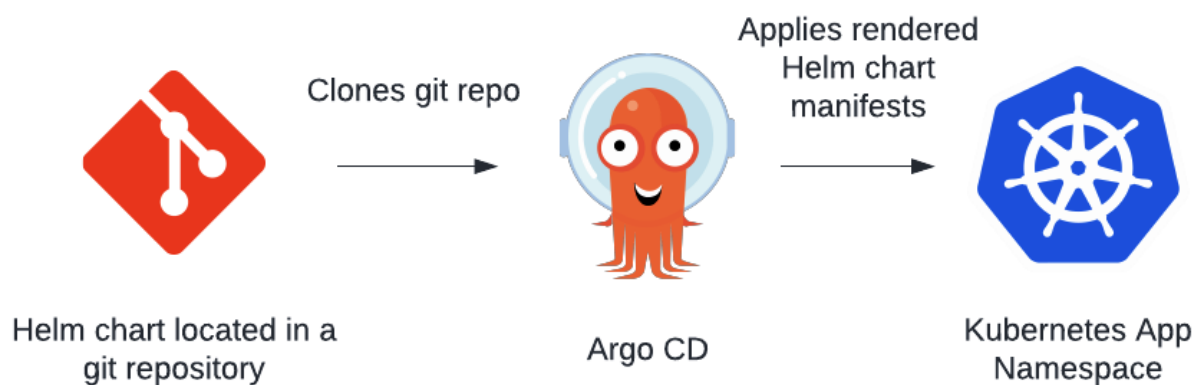
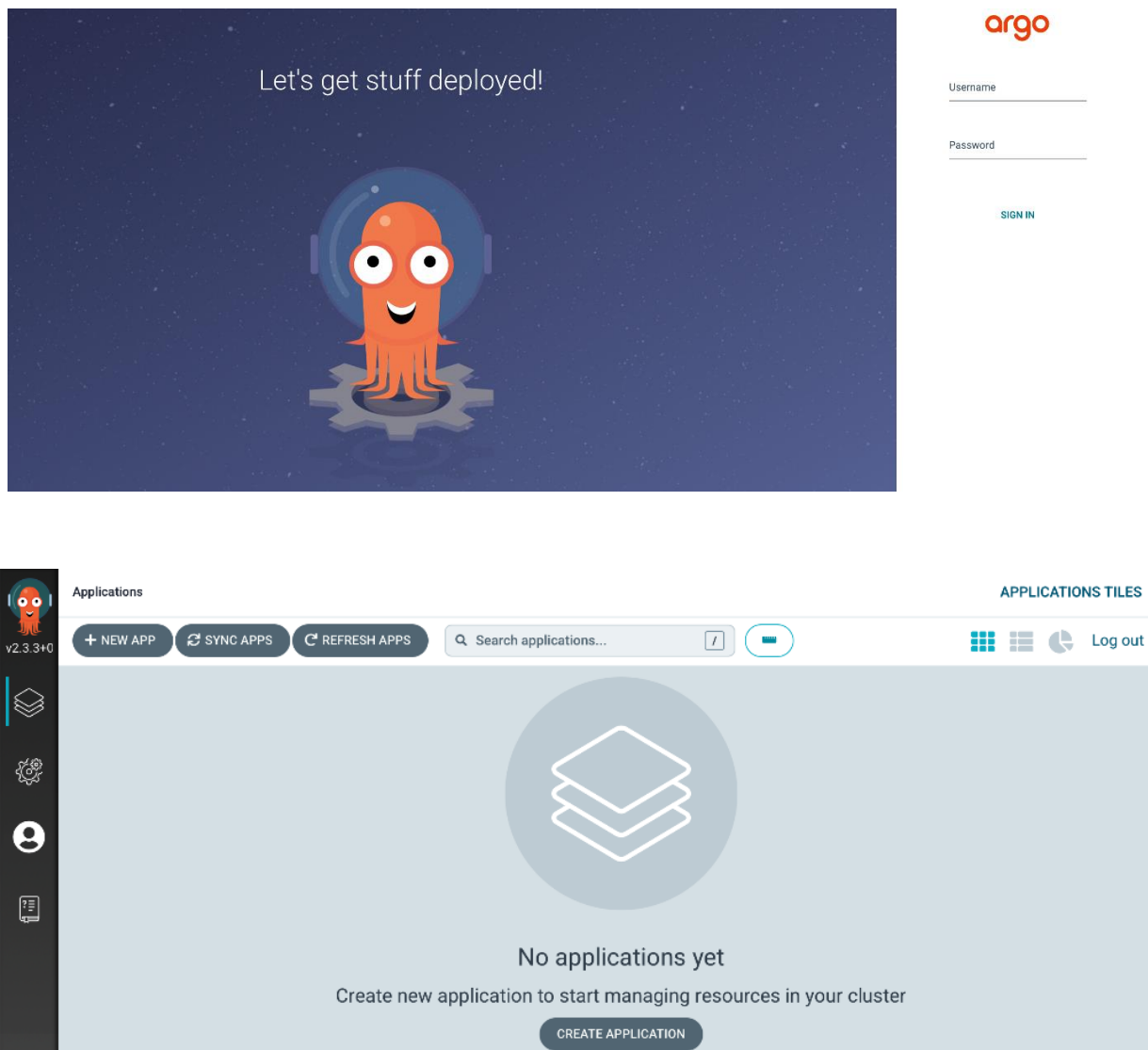
no changes added to commit (use "git add" and/or "git commit -a")
```

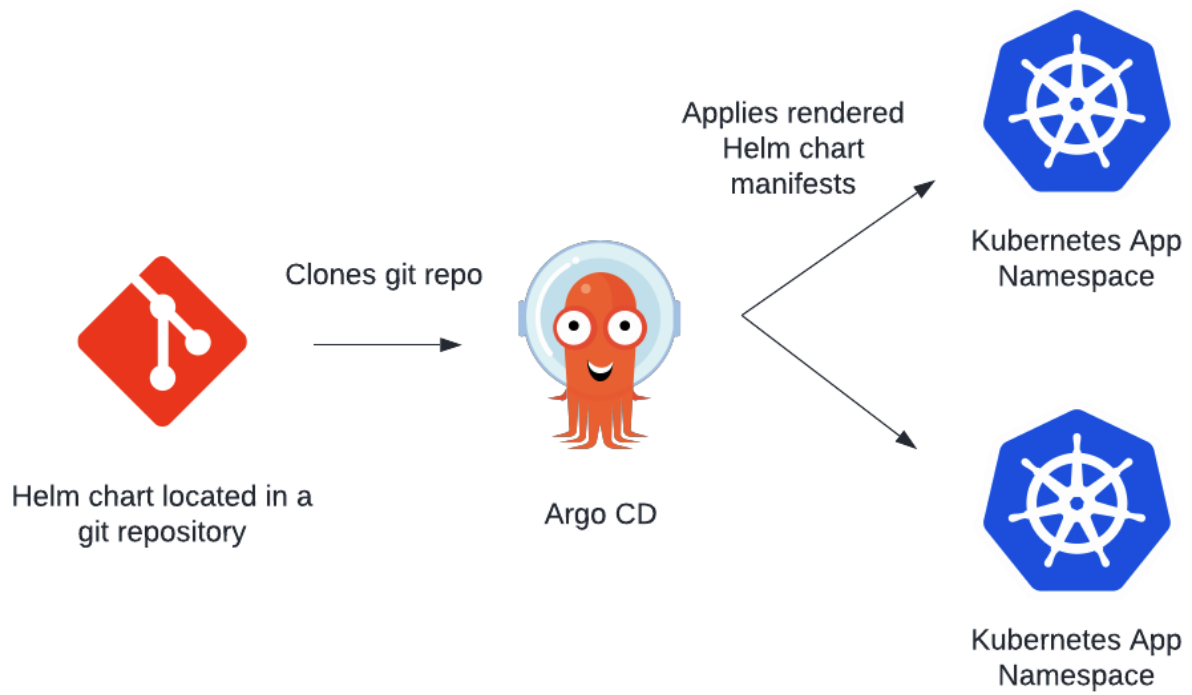
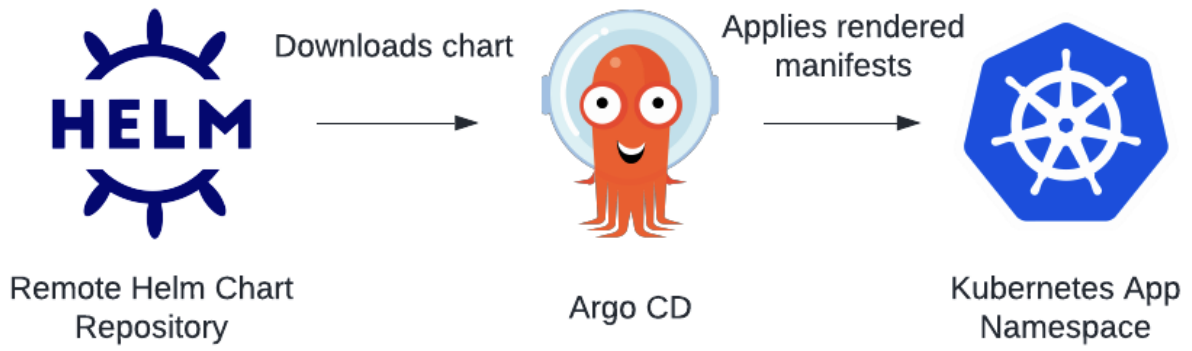
```
Linting chart 'nginx => (version: "1.0.0", path: "helm-charts/charts/nginx")'
Checking chart 'nginx => (version: "1.0.0", path: "helm-charts/charts/nginx")' for a version bump...
Old chart version: 1.0.0
New chart version: 1.0.0

-----
* nginx => (version: "1.0.0", path: "helm-charts/charts/nginx") > Chart version not ok. Needs a version bump!
-----

Error: Error linting and installing charts: Error processing charts
Error linting and installing charts: Error processing charts
```

Chapter 10: Automating Helm with CD and GitOps



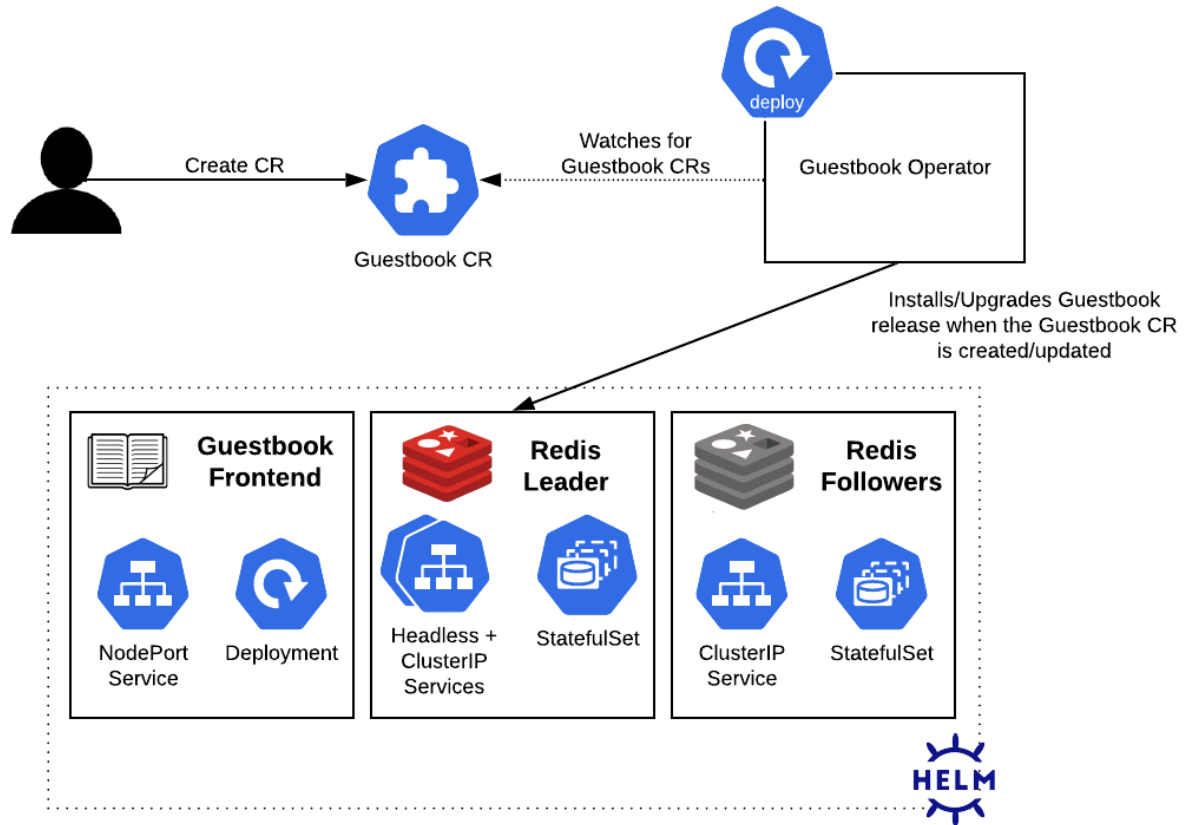


Chapter 11: Using Helm with the Operator Framework

| File/folder | Definition |
|--------------|---|
| Dockerfile | Used to build the operator image |
| Makefile | Provides a convenient set of targets for building the operator image and deploying it to Kubernetes |
| PROJECT | Provides <code>operator-sdk</code> metadata |
| config/ | Contains Kubernetes resource manifests for CRDs, CRs, and the operator instance |
| helm-charts/ | Contains the Helm charts that the operator is in charge of installing |
| watches.yaml | Defines the CRs that the operator is in charge of monitoring |

| Folder | Definition |
|--------------------|--|
| config/crd/ | Contains the CRDs for extending the Kubernetes API. For our Guestbook operator, there is only one CRD. |
| config/default/ | Contains a parent <code>kustomization.yaml</code> file for applying CRD, RBAC, and operator (also referred to as <i>manager</i>) resources. |
| config/manager/ | Contains a deployment resource for creating the operator (or manager) instance. |
| config/manifests/ | A superset of the <code>config/default/</code> folder. Here, <code>config/manifests</code> applies CRD, RBAC, and operator resources, but it also applies an example Guestbook CR and a <i>scorecard</i> , which is used for testing the operator. |
| config/prometheus/ | Contains a Prometheus <code>ServiceMonitor</code> resource for tracking metrics. This is disabled by default but can be enabled in the <code>kustomization.yaml</code> file located under <code>config/default/</code> . |
| config/rbac/ | Contains Role, RoleBinding, and ServiceAccount resources. These grant the operator permission to manage Guestbook resources. They also create Guestbook editor and viewer roles for users throughout the Kubernetes cluster. |

| | |
|-------------------|--|
| config/samples/ | Contains an example Guestbook manifest. |
| config/scorecard/ | Contains manifests for testing the operator. They are unused by default. |



| | | | | |
|---------------------------|--------------------------------------|-----------------|-------------------------|----------|
| Overview | Repositories 49 | Projects | Packages | Stars 35 |
| Type: All | Search packages... | Visibility: All | Sort by: Most downloads | |
| 2 packages | | | | |
| guestbook | Published on Feb 23 by Austin Dewey | | | ↓ 2 |
| guestbook-operator | Published 4 days ago by Austin Dewey | | | ↓ 0 |

Chapter 12: Helm Security Considerations




Installation and Upgrading

Download Helm v3.8.2. The common platform binaries are here:

- [MacOS amd64 \(checksum / 25bb4a70b0d9538a97abb3aaa57133c0779982a8091742a22026e60d8614f8a0\)](#)
- [MacOS arm64 \(checksum / dfddc0696597c010ed903e486fe112a18535ab0c92e35335aa54af2360077900\)](#)
- [Linux amd64 \(checksum / 6cb9a48f72ab9ddfecab88d264c2f6508ab3cd42d9c09666be16a7bf006bed7b\)](#)
- [Linux arm \(checksum / 3447782673a8dec87f0736d3fcde5c2af6316b0dd19f43b7ffaf873e4f5a486e\)](#)
- [Linux arm64 \(checksum / 238db7f55e887f9c1038b7e43585b84389a05fff5424e70557886cad1635b3ce\)](#)
- [Linux i386 \(checksum / 4d18731d8c71031b38c4b6579636eda6626b25f5a1965fd3e44b7d5f58c702d5\)](#)
- [Linux ppc64le \(checksum / 144fcfface6dc99295c1cfdd39238f188c601b96472e933e17054eddd1acb8fa\)](#)
- [Linux s390x \(checksum / 3dece48def23f1a97568936e1099bc626effc9207786b355ea01b274cd8ab2c0\)](#)
- [Windows amd64 \(checksum / 051959311ed5a3d49596b298b9e9618e2a0ad6a9270c134802f205698348ba5e\)](#)

This release was signed with `672C 657B E06B 4B30 969C 4A57 4614 49C2 5E36 B98E` and can be found at [@mattfarina keybase account](#). Please use the attached signatures for verifying this release using `gpg`.

Assets 29

| |
|---|
|  helm-v3.8.2-darwin-amd64.tar.gz.asc |
|  helm-v3.8.2-darwin-amd64.tar.gz.sha256.asc |
|  helm-v3.8.2-darwin-amd64.tar.gz.sha256sum.asc |
|  helm-v3.8.2-darwin-arm64.tar.gz.asc |
|  helm-v3.8.2-darwin-arm64.tar.gz.sha256.asc |
|  helm-v3.8.2-darwin-arm64.tar.gz.sha256sum.asc |
|  helm-v3.8.2-linux-386.tar.gz.asc |
|  helm-v3.8.2-linux-386.tar.gz.sha256.asc |
|  helm-v3.8.2-linux-386.tar.gz.sha256sum.asc |
|  helm-v3.8.2-linux-amd64.tar.gz.asc |
|  helm-v3.8.2-linux-amd64.tar.gz.sha256.asc |