

# Kubernetes 包管理工具 Helm

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# “Kubernetes”系列公开课

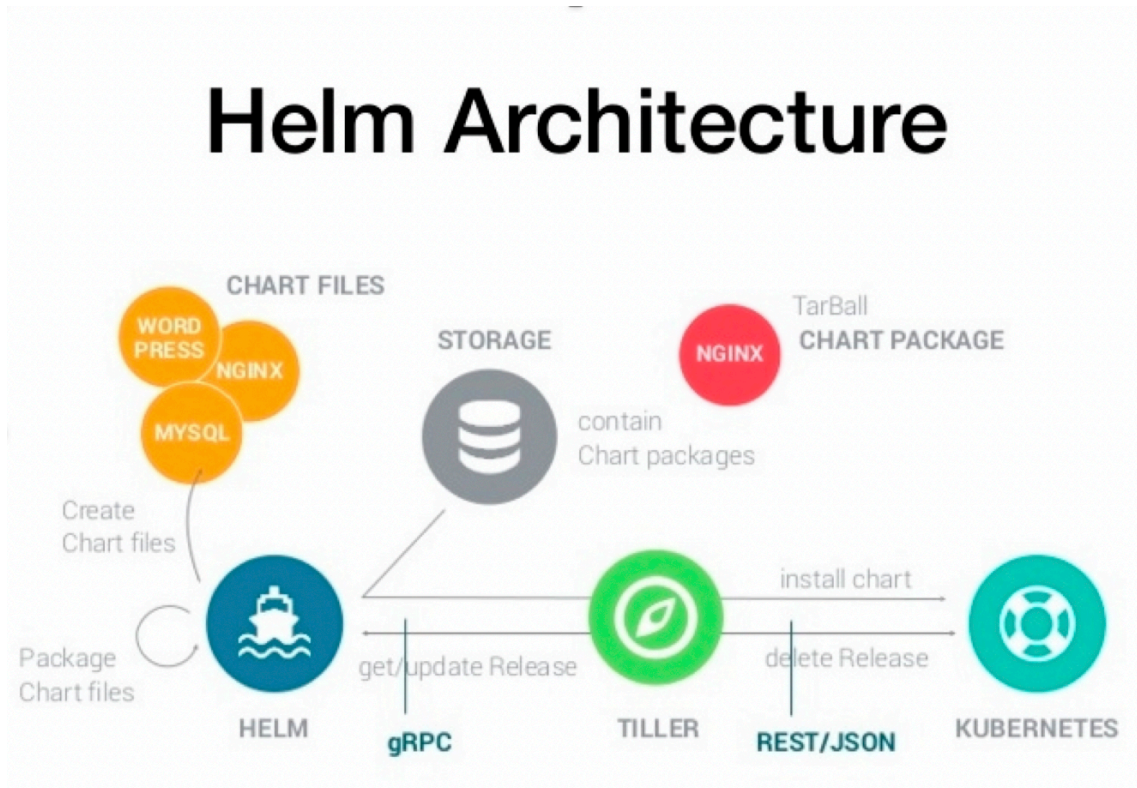
## • 每周四晚8点档

1. Kubernetes 初探
2. 上手 Kubernetes
3. Kubernetes 的资源调度
4. Kubernetes 的运行时
5. Kubernetes 的网络管理
6. Kubernetes 的存储管理
7. Kubernetes 的日志与监控
- 8. Kubernetes 的应用部署**
9. 扩展 Kubernetes 生态
10. Kubernetes 的企业实践

课程Wiki: <http://ibm.biz/opentech-ma>

# Helm 架构

- ❑ Helm
  - Helm CLI 部署Tiller server
  - 管理Chart repository
  - 管理Chart package
- ❑ Tiller
  - 管理 Release
- ❑ Chart package/repository



# 安装Helm

Helm 最新release v2.7.2

- <https://github.com/kubernetes/helm/releases/tag/v2.7.2>

## 初始化Helm

- 部署Tiller
- 初始化本地 cache
- 舒适化本地 Chart repository

```
# helm init
Creating /root/.helm
Creating /root/.helm/repository
Creating /root/.helm/repository/cache
Creating /root/.helm/repository/local
Creating /root/.helm/plugins
Creating /root/.helm/starters
Creating /root/.helm/cache/archive
Creating /root/.helm/repository/repositories.yaml
$HELM_HOME has been configured at /root/.helm.
Happy Helming!
```

# 添加 chart repository

## 添加新的repository

- `helm repo add incubator https://kubernetes-charts-incubator.storage.googleapis.com/`

```
# helm repo list
NAME      URL
stable    https://kubernetes-charts.storage.googleapis.com
local     http://127.0.0.1:8879/charts
incubator https://kubernetes-charts-incubator.storage.googleapis.com/
```

## 更多repository 操作

- 删除
- 更新
- 为本地repository生成index.yaml

# 安装 Helm chart

## 查找 Helm chart

```
# helm search mariadb
NAME          VERSION   DESCRIPTION
stable/mariadb 2.1.1     Fast, reliable, scalable, and easy to use open-...
```

## 查看 Helm chart 信息

```
# helm inspect stable/mariadb
```

## 安装 Helm chart。

```
# helm install --name=mymariadb --namespace=demo --set persistence.enabled=false stable/mariadb
```

```
# helm list
NAME          REVISION   UPDATED              STATUS   CHART          NAMESPACE
mymariadb     1          Tue Dec 5 02:52:33 2017    DEPLOYED mariadb-2.1.1   demo
```

```
# helm get mymariadb
```

# Helm Chart

## ❑ Chart描述

- 名称版本信息
- 应用简介
- 其他

## ❑ REAME.md

- 如何安装配置以及验证应用

## ❑ values.yaml

- 应用的配置参数

## ❑ Templates

- 创建应用需要的Kubernetes resources

## ❑ charts 目录 和 requirements.yaml

- 定义应用依赖

```
mariadb
|-- Chart.yaml
|-- README.md
|-- templates
|   |-- configmap.yaml
|   |-- deployment.yaml
|   |-- _helpers.tpl
|   |-- NOTES.txt
|   |-- pvc.yaml
|   |-- secrets.yaml
|   |-- svc.yaml
|   |-- test-runner.yaml
|   `-- tests.yaml
`-- values.yaml
```

# Helm Chart

## 创建sample Helm chart

```
# helm create mychart
```

### 创建应用

- ☐ 修改 Chart.yaml
- ☐ 根据应用编写相应的Kubernetes resources
- ☐ 编写测试yaml
- ☐ 修改 values.yaml
- ☐ 修改NOTES.txt
- ☐ 创建README.md

### 检查chart 语法

```
# helm lint mychart
==> Linting mychart/
[INFO] Chart.yaml: icon is recommended
1 chart(s) linted, no failures
```

```
mychart/
|-- charts
|-- Chart.yaml
|-- templates
|   |-- deployment.yaml
|   |-- _helpers.tpl
|   |-- ingress.yaml
|   |-- NOTES.txt
|   `-- service.yaml
`-- values.yaml
```



# Helm Chart

## 测试 Helm chart

```
# helm install --namespace=demo --name=mychart mychart/  
NAME: mychart  
NAMESPACE: demo  
STATUS: DEPLOYED
```

## 打包 Helm chart 信息

```
# helm package mychart/  
Successfully packaged chart and saved it to: /root/demo/mychart-0.1.0.tgz  
  
# ls -l mychart-0.1.0.tgz  
-rw-r--r--. 1 root root 2407 Dec  5 07:38 mychart-0.1.0.tgz
```

## 上传新的chart包并更新chart 仓库index.yaml

```
# helm repo index --url http://myrepo:9090 .  
  
# ls -l index.yaml  
-rwxr-xr-x. 1 root root 362 Dec  5 07:41 index.yaml
```

# Helm Release

## Tiller如何存储 release

```
# kubectl get configmap --namespace=kube-system |grep mariadb
mymariadb.v1          1      3h
mymariadb.v2          1      2h
mymariadb.v3          1      10m
```

## release对应的Kubernetes resources

NAME	READY	STATUS	RESTARTS	AGE
po/mymariadb-mariadb-7f5576745f-qpdmw	1/1	Running	0	14m

NAME	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
svc/mymariadb-mariadb	10.0.0.163	<none>	3306/TCP	3h

NAME	DESIRED	CURRENT	UP-TO-DATE	AVAILABLE	AGE
deploy/mymariadb-mariadb	1	1	1	1	3h

NAME	DESIRED	CURRENT	READY	AGE
rs/mymariadb-mariadb-746df79597	0	0	0	2h
rs/mymariadb-mariadb-7f5576745f	1	1	1	3h

# Helm Release

## Upgrade release

```
# helm upgrade mymariadb stable/mariadb --namespace=demo --version=0.5.2
Release "mymariadb" has been upgraded. Happy
...
```

## Deployment/StatefulSet/DaemonSet upgrade

```
# kubectl rollout history deployment/mymariadb-mariadb --namespace=demo
deployments "mymariadb-mariadb"
REVISION  CHANGE-CAUSE
1          <none>
2          <none>

# kubectl --namespace=demo get rs
NAME                                DESIRED  CURRENT  READY  AGE
mymariadb-mariadb-746df79597        0        0        0      1h
mymariadb-mariadb-7f5576745f        1        1        1      3h
```

# Helm Release

[查看 release history](#)

```
# helm history mymariadb
```

REVISION	UPDATED	STATUS	CHART	DESCRIPTION
1	Tue Dec 5 02:52:33 2017	SUPERSEDED	mariadb-2.1.1	Install complete
2	Tue Dec 5 04:28:47 2017	DEPLOYED	mariadb-0.5.2	Upgrade complete

[Rollback release](#)

```
# helm rollback --force --recreate-pods mymariadb 1
Rollback was a success! Happy Helming!

# kubectl rollout history deployment/mymariadb-mariadb --namespace=demo
deployments "mymariadb-mariadb"
REVISION  CHANGE-CAUSE
2         <none>
3         <none>
```

# Helm Repository

## index.yaml

- ❑ Chart.yaml 对于chart的描述信息。
- ❑ 可以下载Chart package 的 URL
- ❑ helm repo index 帮助生成 repository的index.yaml

















## Chart package list

- ❑ Chart tgz package需要放到目标 http server上。
- ❑ Helm lint 和 helm package 命令帮助检查chart 语法和打包。





























```
artifactory:
- created: 2017-07-06T01:33:50.952906435Z
  description: Universal Repository Manager supporting all major packaging formats,
    build tools and CI servers.
  digest: 249e27501dbfe1bd93d4039b04440f0ff19c707ba720540f391b5aefa3571455
  home: https://www.jfrog.com/artifactory/
  icon: https://raw.githubusercontent.com/JFrogDev/artifactory-dcos/master/images/jfrog_med.png
  keywords:
  - artifactory
  - jfrog
  maintainers:
  - email: jainishs@jfrog.com
    name: Jainish shah
  name: artifactory
  sources:
  - https://bintray.com/jfrog/product/JFrog-Artifactory-Pro/view
  - https://github.com/JFrogDev
  urls:
  - https://kubernetes-charts-incubator.storage.googleapis.com/artifactory-5.2.0.tgz
  version: 5.2.0
```

```
# helm serve --address 0.0.0.0:8879 --repo-path ./charts
```

# Helm UI - Monocular

 artifactory v5.2.0   incubator	 aws-cluster-autoscaler v0.2.1   stable	 cassandra v0.1.0   incubator	 chaoskube v0.5.0   stable
 chronograf v0.2.1   stable	 cockroachdb v0.2.4   stable	 concourse v0.1.3   stable	 consul v0.3.0   stable
 coredns v0.2.0   stable	 datadog v0.5.0   stable	 dokuwiki v0.1.5   stable	 drupal v0.7.0   stable
 elasticsearch v0.1.4   incubator	 etcd v0.2.0   incubator	 etcd-operator v0.2.1   stable	 factorio v0.2.0   stable

# Helm UI – Kubernetes Dashboard

 <b>artifactory</b> <p>JFrog provides open source communities with solutions to automate software package management. Artifactory, JFrog's open source project, was released to speed up development cycles using binary... <a href="#">More...</a></p>	 <b>cassandra</b> <p>No description</p>	 <b>cd-pipeline</b> <p>Provides the core Continuous Delivery platform using Gogs, Jenkins, More...</p>	 <b>chaos-monkey</b> <p>Randomly kills pods to help check your environment can withstand failures</p>
 <b>chat-irc</b> <p>Provides Chat using Hubot as the bot framework and IRC as the chat service</p>	 <b>chat-letschat</b> <p>Provides Chat using Hubot as the bot framework and Let's... More...</p>	 <b>chat-slack</b> <p>Provides Chat using Hubot as the bot framework and Slack as the chat service</p>	 <b>content-repository</b> <p>Nexus is a maven repository manager</p>
 <b>example-message-consumer</b> <p>No description</p>	 <b>example-message-producer</b> <p>No description</p>	 <b>fabric8-docker-registry</b> <p>Private Docker Registry</p>	 <b>fabric8-forge</b> <p>Fabric8 :: Forge</p>
 <b>gerrit</b> <p>Gerrit is a web based code review system, facilitating online code reviews for projects using the Git version control system.</p>	 <b>git-collector</b> <p>Git Collector will watch all apps in the current project and for all git based projects it will watch and capture all the git commit events into Elasticsearch for reporting.</p>	 <b>gitlab</b> <p>Gitlab is a self-hosted Git service</p>	 <b>gogs</b> <p>Gogs is a self-hosted Git service written in Go.</p>
 <b>hystrix-dashboard</b> <p>Dashboard for visualization of Hystrix streams</p>	 <b>ingress-nginx</b> <p>No description</p>	 <b>jenkins</b> <p>Jenkins CI is a leading open-source continuous integration server. Built with Java, it provides 985 plugins to support building and testing virtually any project.</p>	 <b>kafka</b> <p>No description</p>
 <b>kiwiirc</b> <p>Kiwi IRC is a web IRC client that can not only be used to interact with fabric8 but also receive notifications about CI and CD pipelines. It also enables collaboration for the cross functional which... <a href="#">More...</a></p>	 <b>kubeflex</b> <p>Contains the Hystrix dashboard along with a Turbine server for viewing consolidated circuit breaker metrics</p>	 <b>letschat</b> <p>No description</p>	 <b>logging</b> <p>Provides centralised Logging using Elasticsearch as the back end and More...</p>
 <b>manageiq</b>	 <b>management</b>	 <b>maven-shell</b>	 <b>message-broker</b>

# Helm UI – IBM Cloud Private



IBM Cloud Private

## Catalog

Search items

Filter

### Helm charts

Deploy your applications and install software packages



#### ibm-cloudant-dev

Cloudant for Linux.

ibm-charts



#### ibm-datapower-dev

IBM DataPower Gateway

ibm-charts



#### ibm-db2oltp-dev

IBM Db2 Developer-C Edition 11.1.2.2

ibm-charts



#### ibm-db2warehouse-dev

Db2 Warehouse Developer-C for Non-Production v2.0.0

ibm-charts



#### ibm-dsm-dev

IBM Data Server Manager Developer-C Edition.  
Note that there can only be one DSM deployed per

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#### ibm-dsx-dev

IBM Data Science Experience (DSX) Developer Edition brings together best of breed open source

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#### ibm-icplogging

Log storage and search management solution

ibm-charts



#### ibm-icplogging-kibana

Installs Kibana, a web UI to query and visualize data in existing Elasticsearch clusters

ibm-charts



#### ibm-icpmonitoring

IBM monitoring service in private cloud

ibm-charts



# Helm RESTful API

## Rudder

**Helm repository以及Tiller的RESTful API.**

<https://github.com/AcalephStorage/rudder>

## Monocular API

**Golang Http RESTful API server。**

<https://github.com/kubernetes-helm/monocular/tree/v0.6.1/src/api>

# Thank You

