NeXt-LAB
Complex Network

开源

Kubernetes

报告日期：2021/04/25 报告人：郑智杰

NeXt-LAB
Complex Network

PART 1

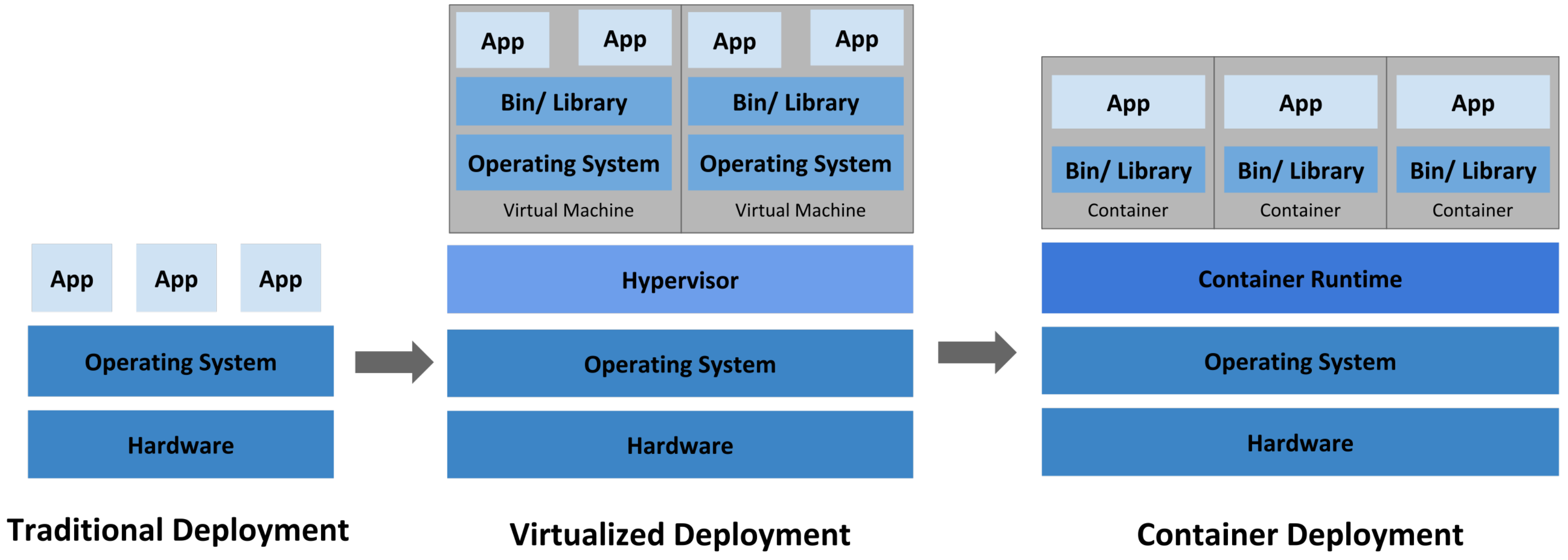
Kubernetes的起源

Kubernetes的起源

Kubernetes

Kubernetes的起源

应用服务部署方式变革

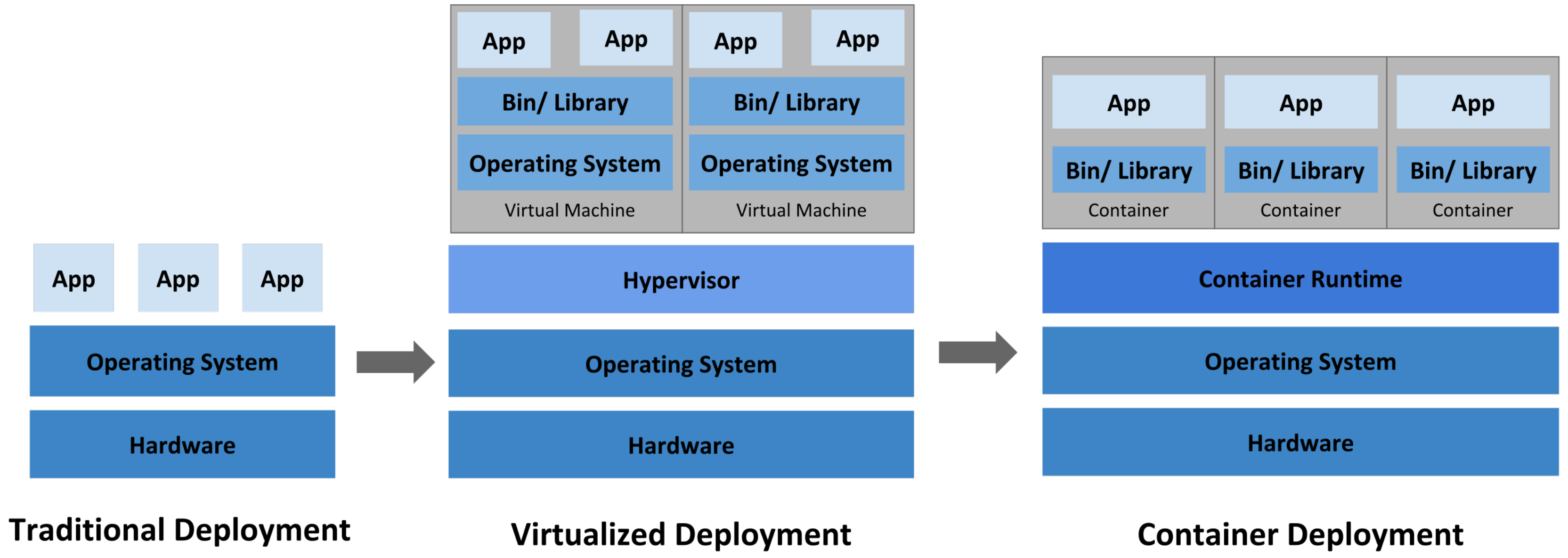


传统部署时代

早期，各个组织机构在物理服务器上运行应用程序。无法为物理服务器中的应用程序定义资源边界，这会导致资源分配问题。

Kubernetes的起源

应用服务部署方式变革

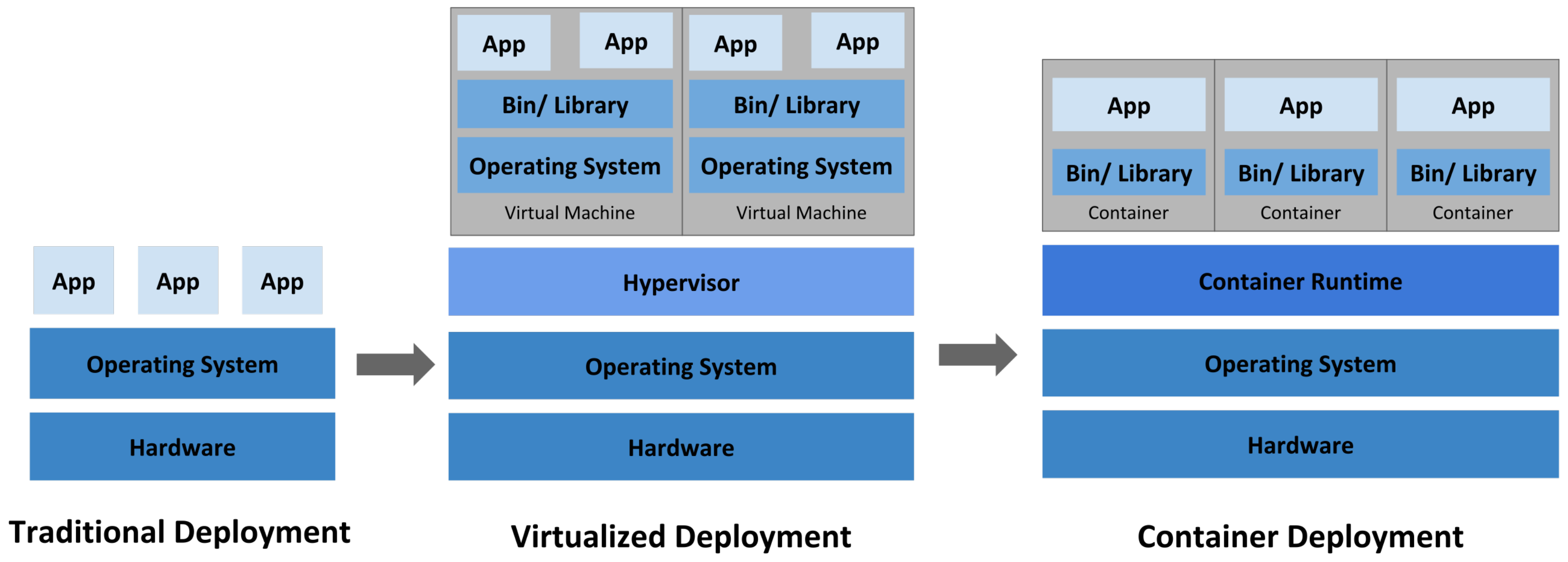


虚拟化部署时代

虚拟化技术允许你在单个物理服务器的 CPU 上运行多个虚拟机（VM）。

Kubernetes的起源

应用服务部署方式变革



容器部署时代

容器类似于 VM，但是它们具有被放宽的隔离属性，可以在应用程序之间共享操作系统（OS）。

Kubernetes的起源

应用服务部署方式变革

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容器部署时代

- 敏捷应用程序的创建和部署：与使用 VM 镜像相比，提高了容器镜像创建的简便性和效率。
- 持续开发、集成和部署：通过快速简单的回滚（由于镜像不可变性），支持可靠且频繁的 容器镜像构建和部署。
- 关注开发与运维的分离：在构建/发布时而不是在部署时创建应用程序容器镜像， 从而将应用程序与基础架构分离。
- 可观察性不仅可以显示操作系统级别的信息和指标，还可以显示应用程序的运行状况和其他指标信号。
- 跨开发、测试和生产的环境一致性：在便携式计算机上与在云中相同地运行。

Kubernetes的起源

应用服务部署方式变革

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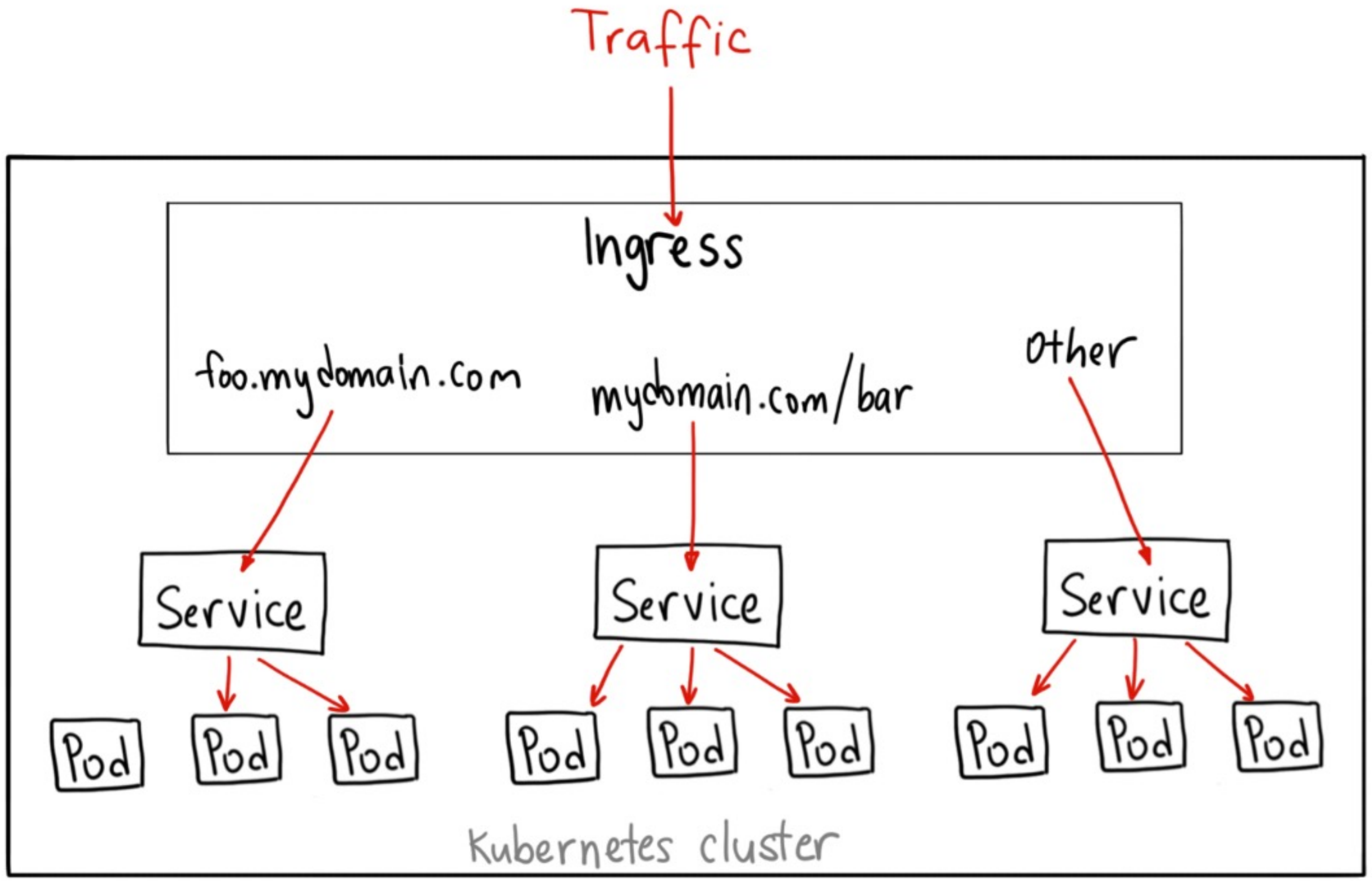
容器部署时代

- 跨云和操作系统发行版本的可移植性：可在 Ubuntu、RHEL、CoreOS、本地、 Google Kubernetes Engine 和其他任何地方运行。
- 以应用程序为中心的管理：提高抽象级别，从在虚拟硬件上运行 OS 到使用逻辑资源在 OS 上运行应用程序。
- 松散耦合、分布式、弹性、解放的微服务：应用程序被分解成较小的独立部分， 并且可以动态部署和管理 - 而不是在一台大型单机上整体运行。
- 资源隔离：可预测的应用程序性能。
- 资源利用：高效率和高密度。

Kubernetes的起源

Kubernetes可以做什么？

服务发现和负载均衡



浅谈Kubernetes Service负载均衡实现机制 | xigang's home

为什么需要Kubernetes？

Kubernetes可以做什么？

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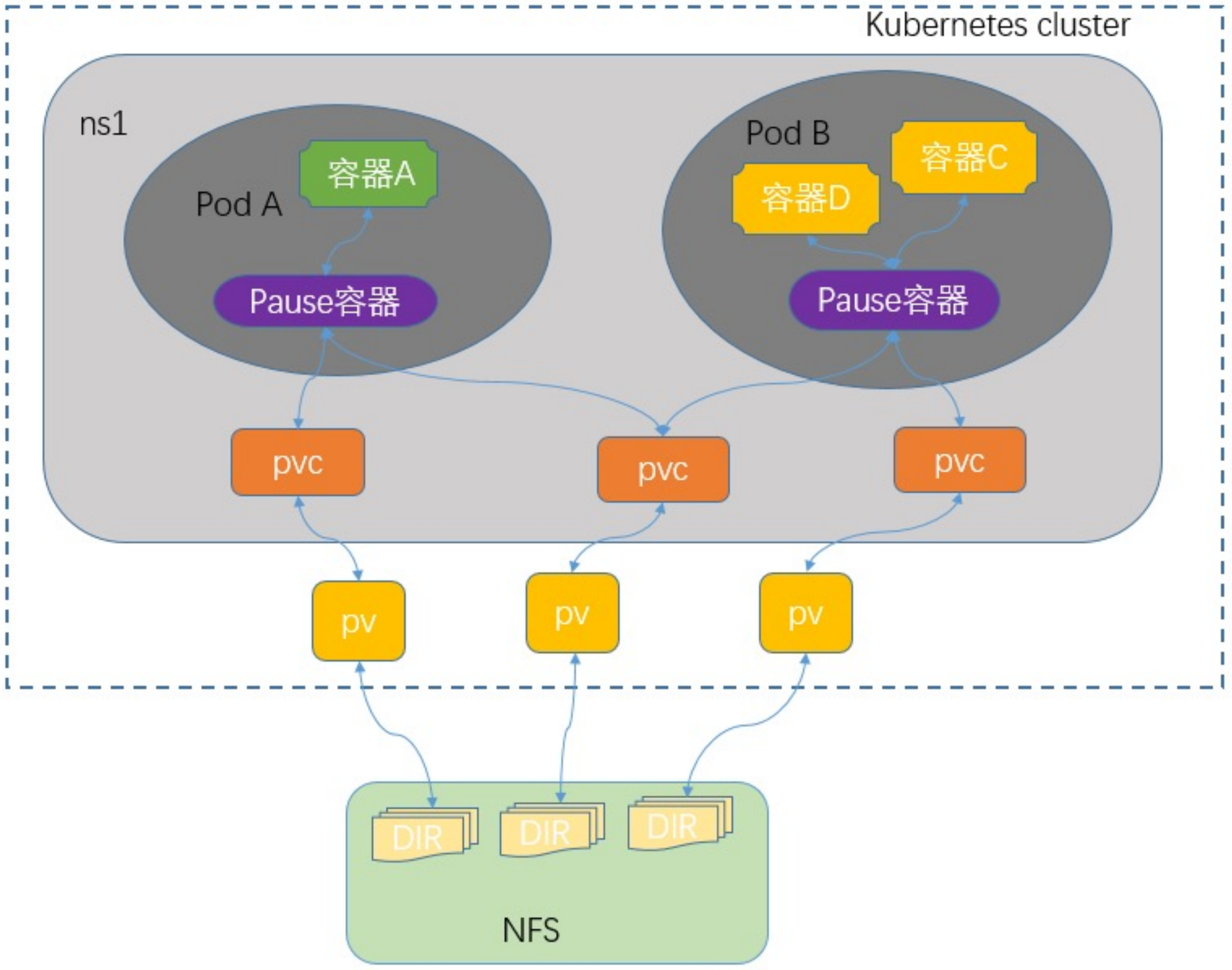
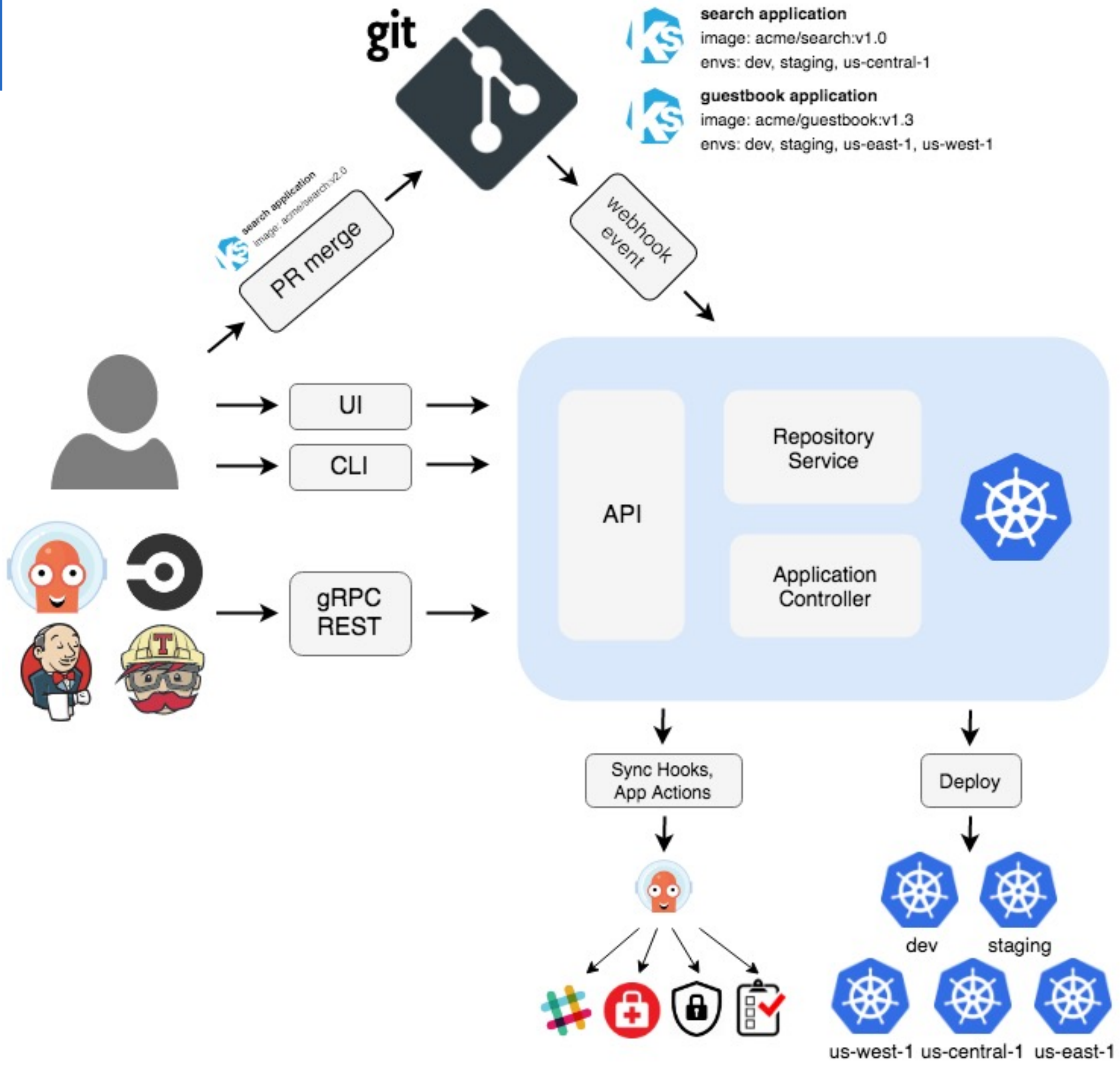
存储编排



为什么需要Kubernetes？

Kubernetes可以做什么？

自动部署和回滚



为什么需要Kubernetes？

Kubernetes可以做什么？

自动完成装箱计算

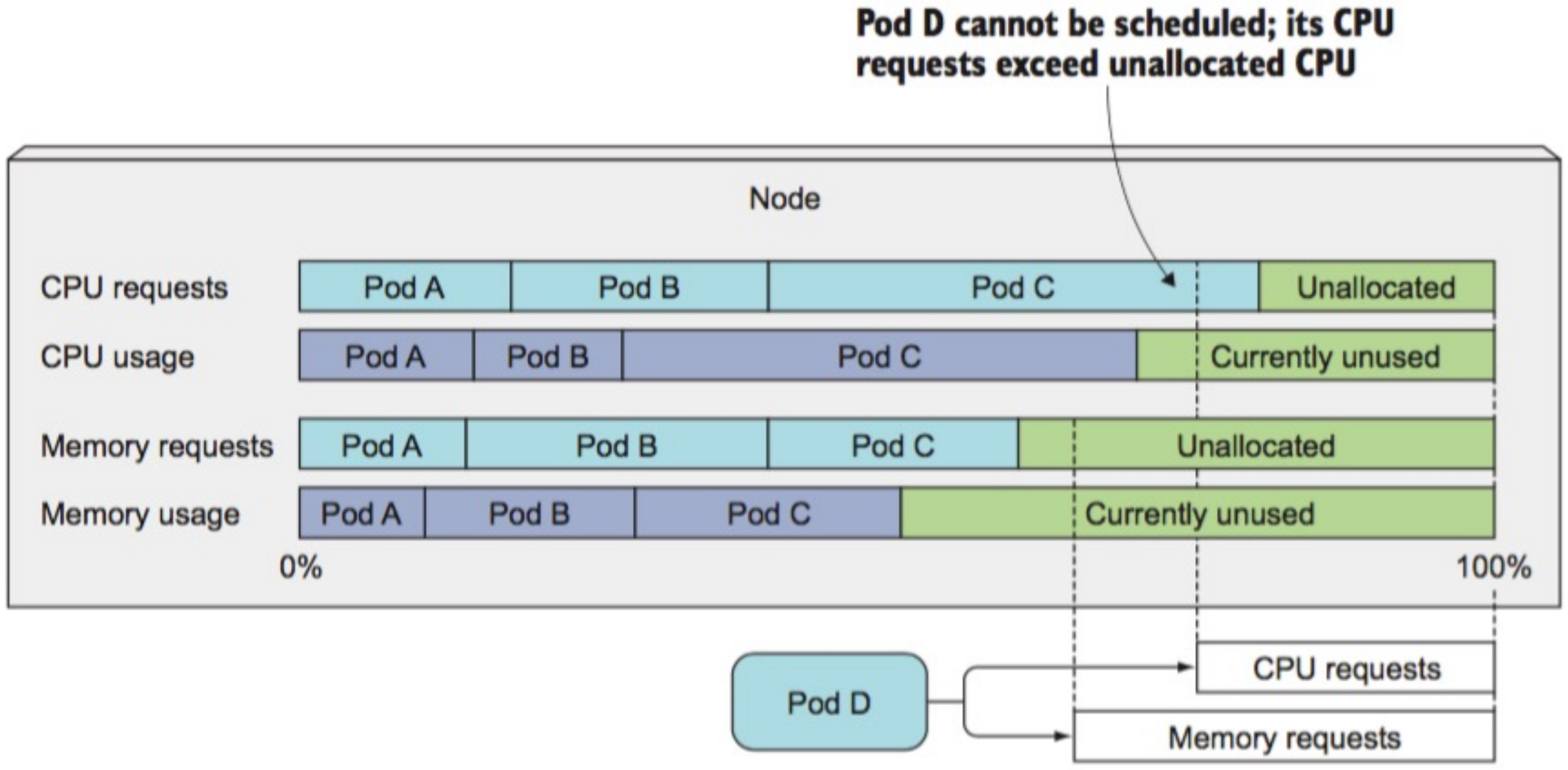


Figure 14.1 The Scheduler only cares about requests, not actual usage.

为什么需要Kubernetes？

Kubernetes可以做什么？

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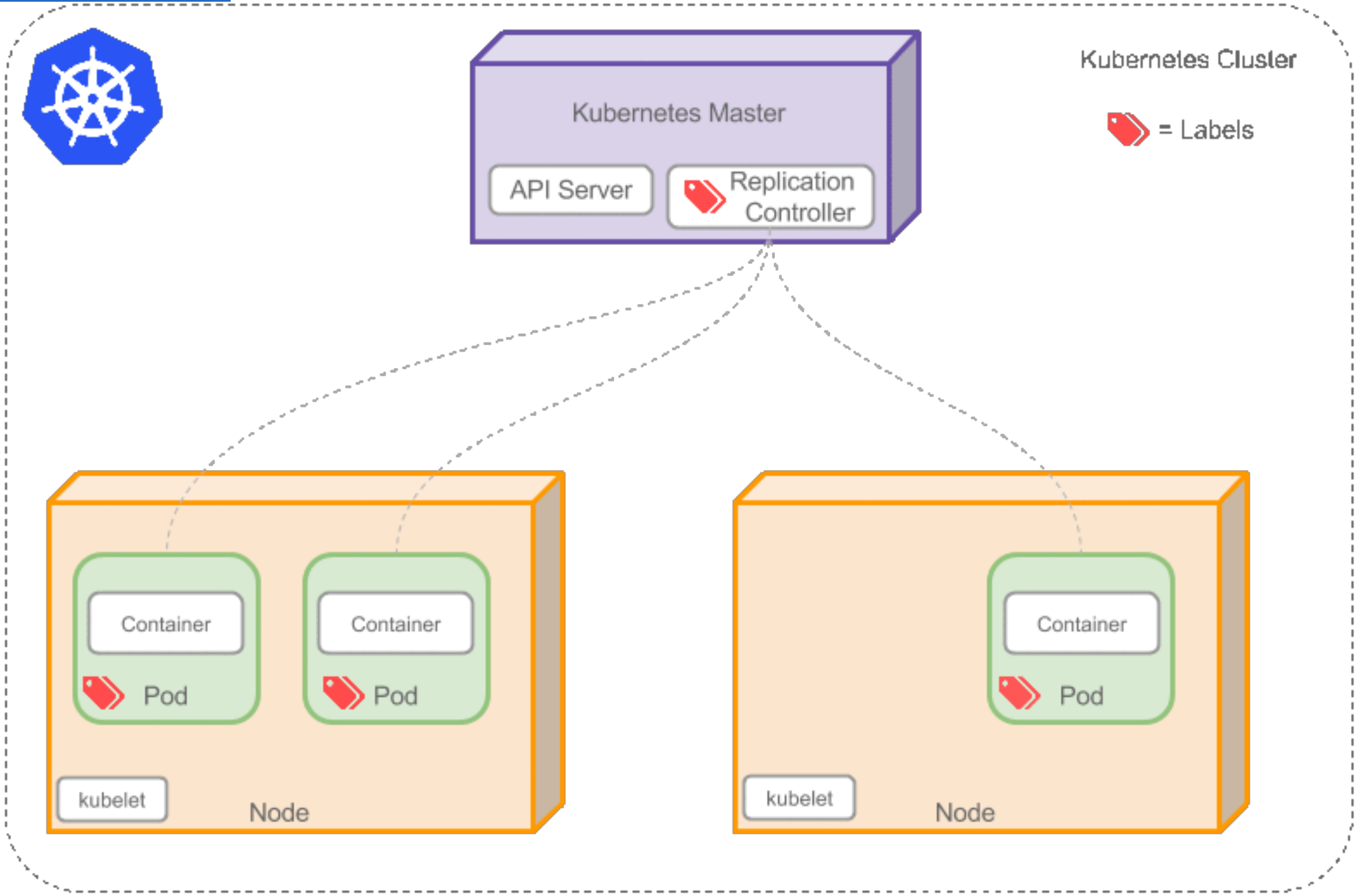
自我修复



为什么需要Kubernetes？

Kubernetes可以做什么？

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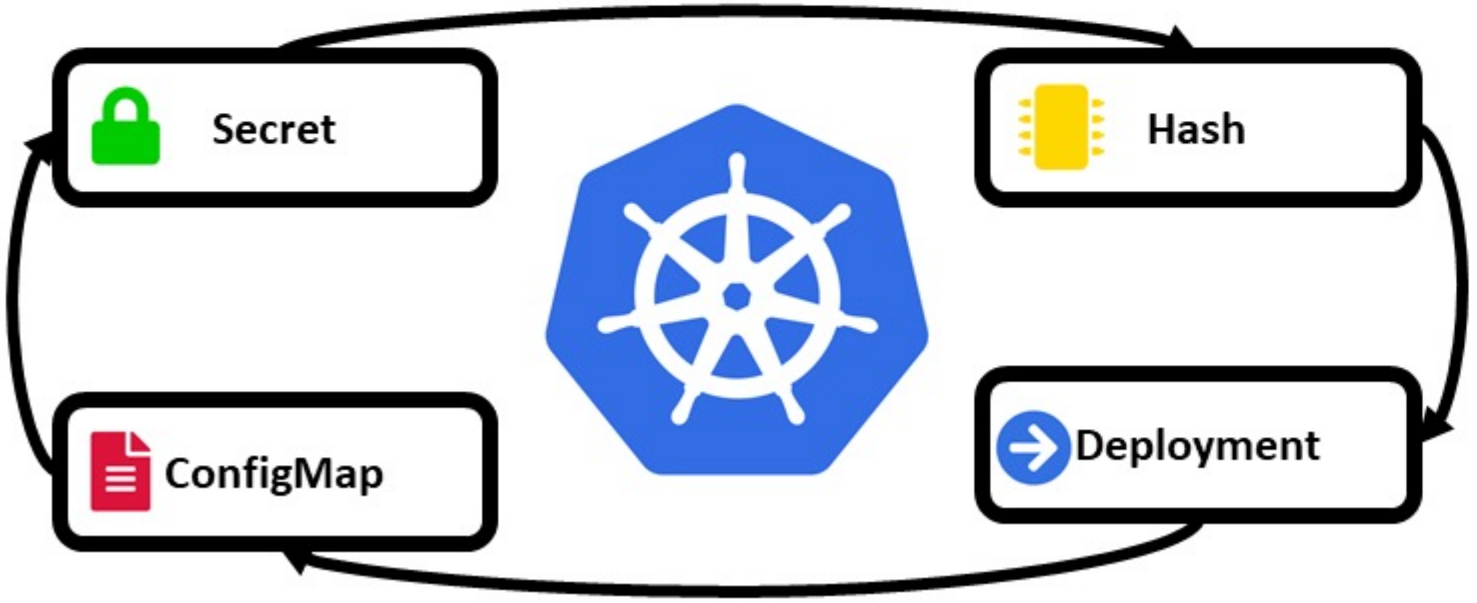
密钥与配置管理



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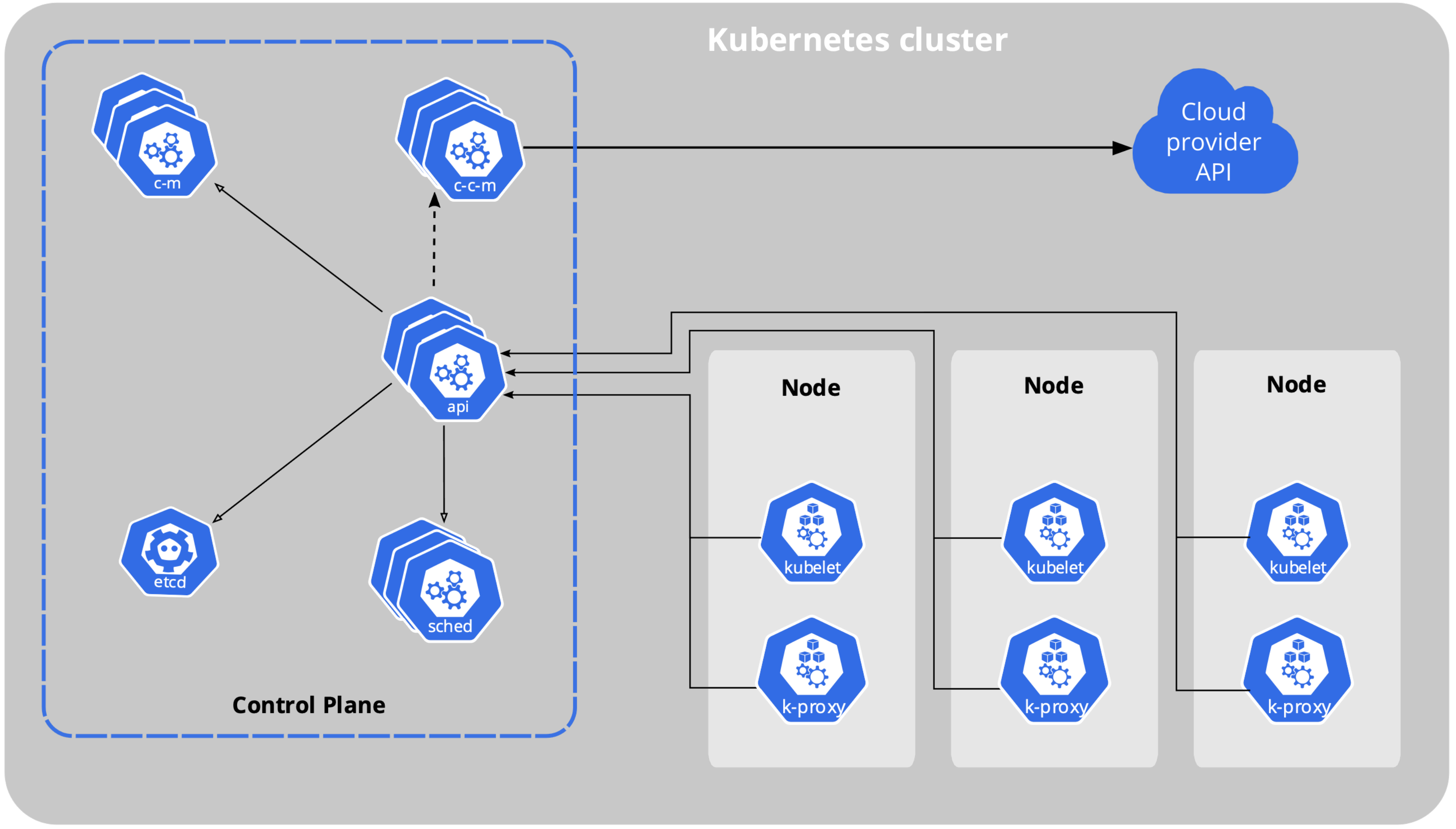
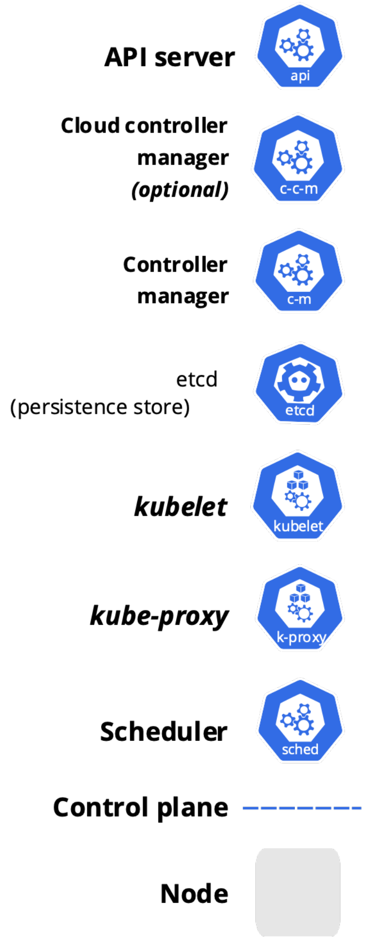
PART 2

Kubernetes的组件

Kubernetes的组件

组件

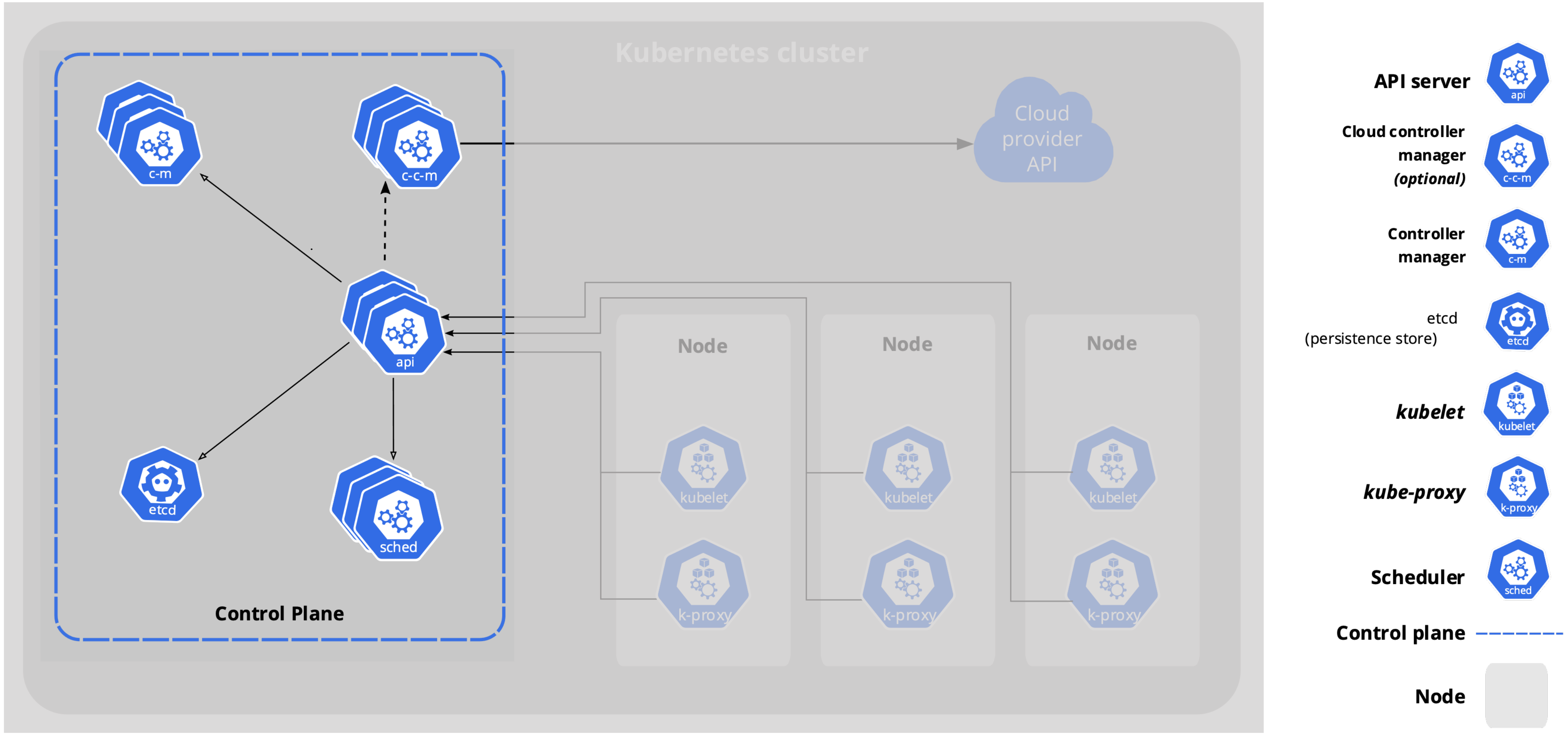




Kubernetes的组件

控制平面组件

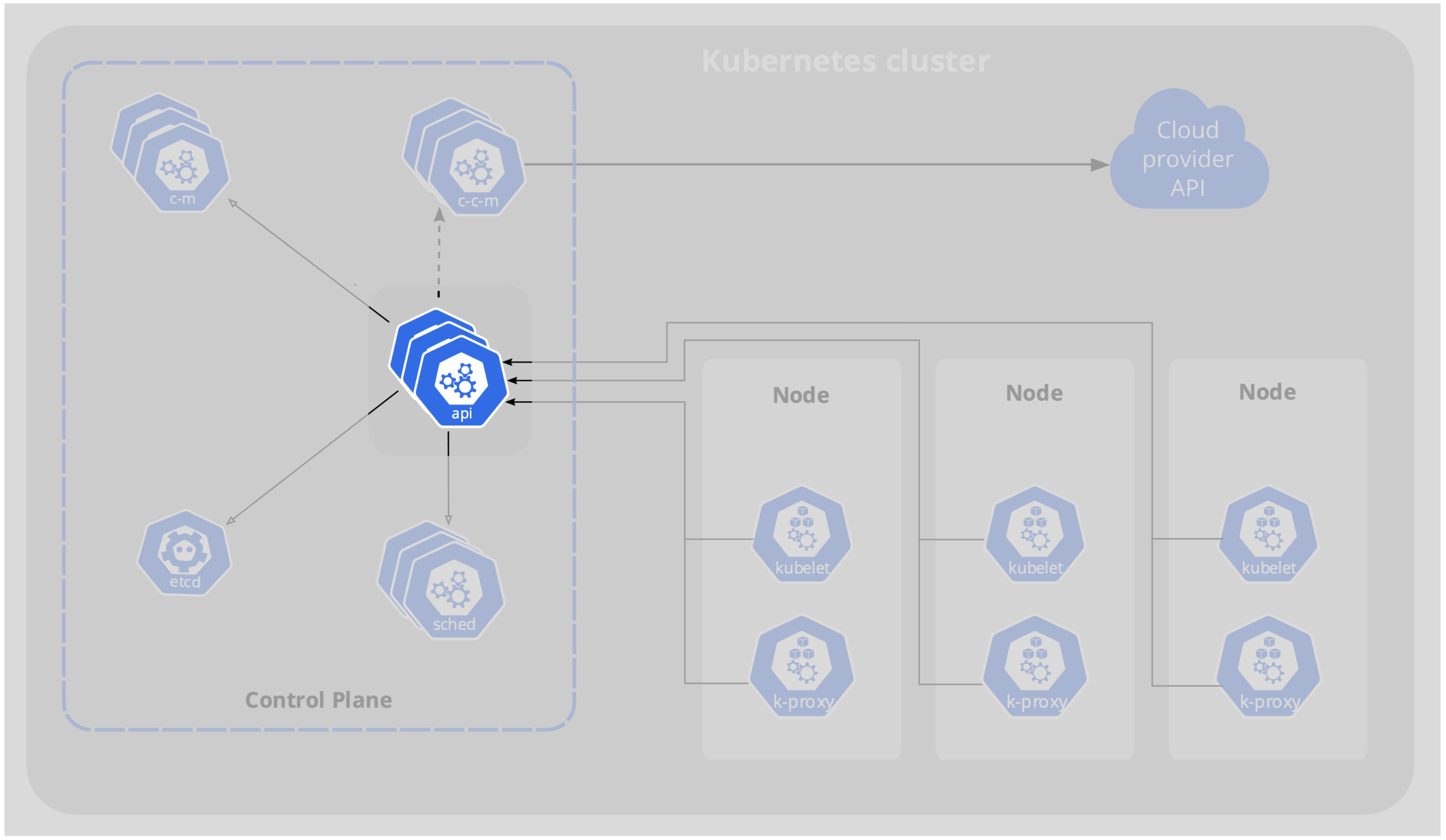
控制平面组件

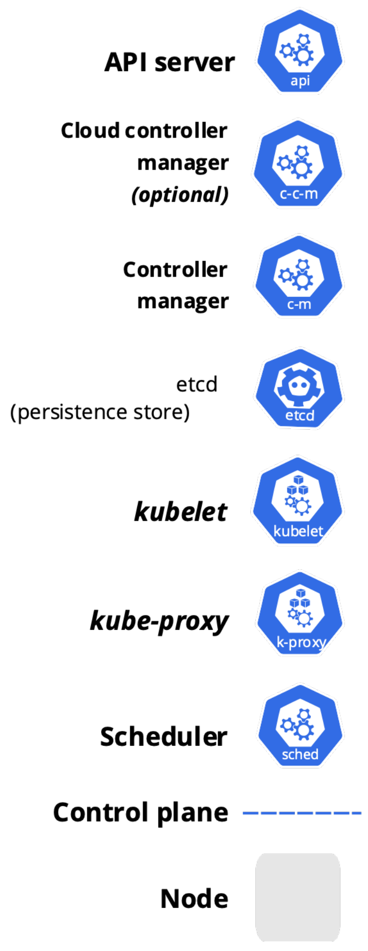


Kubernetes的组件

控制平面组件

kube-apiserver

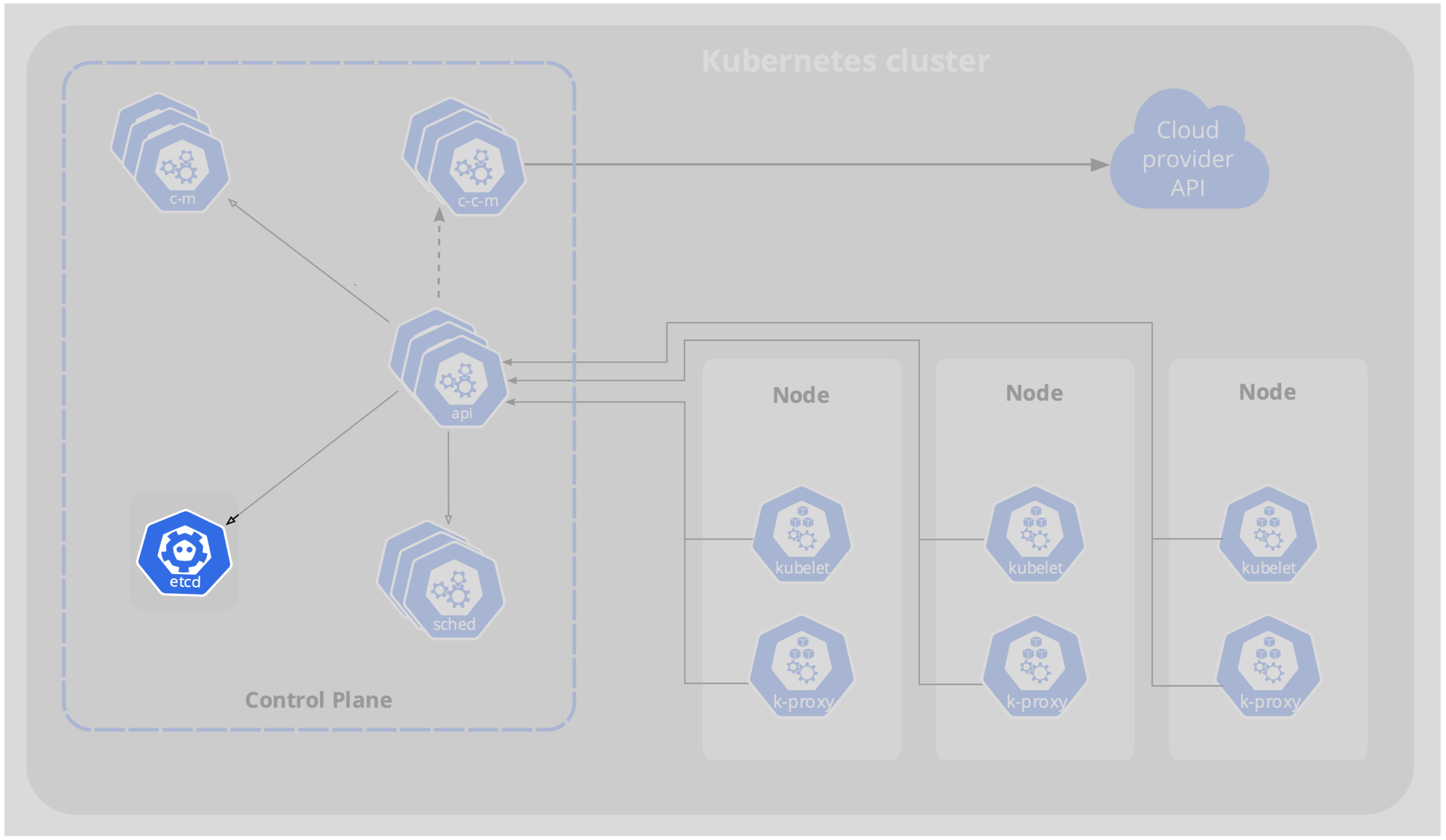


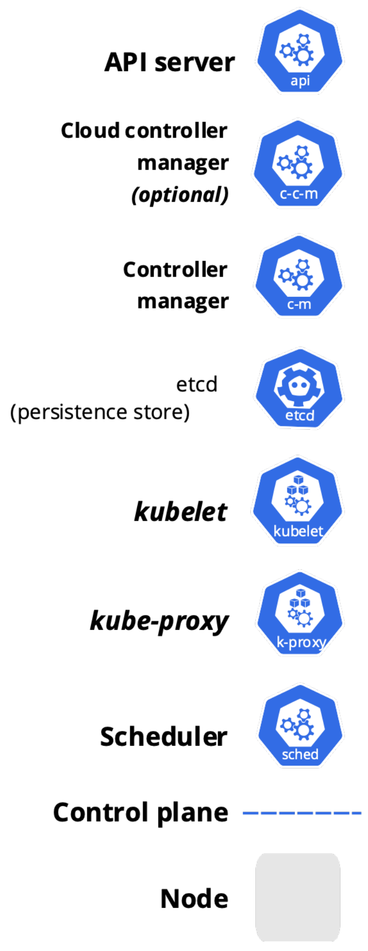


Kubernetes的组件

控制平面组件

etcd

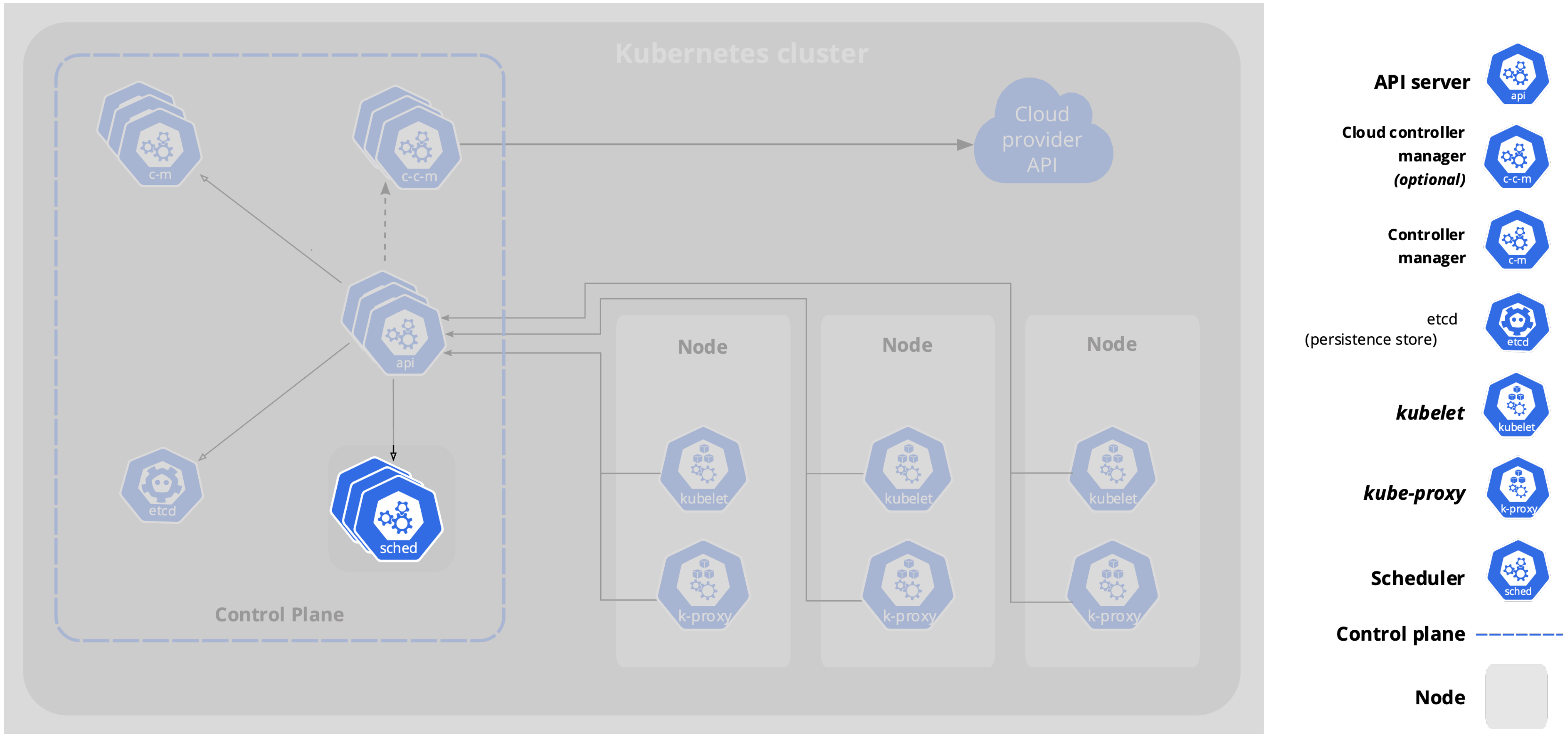




Kubernetes的组件

控制平面组件

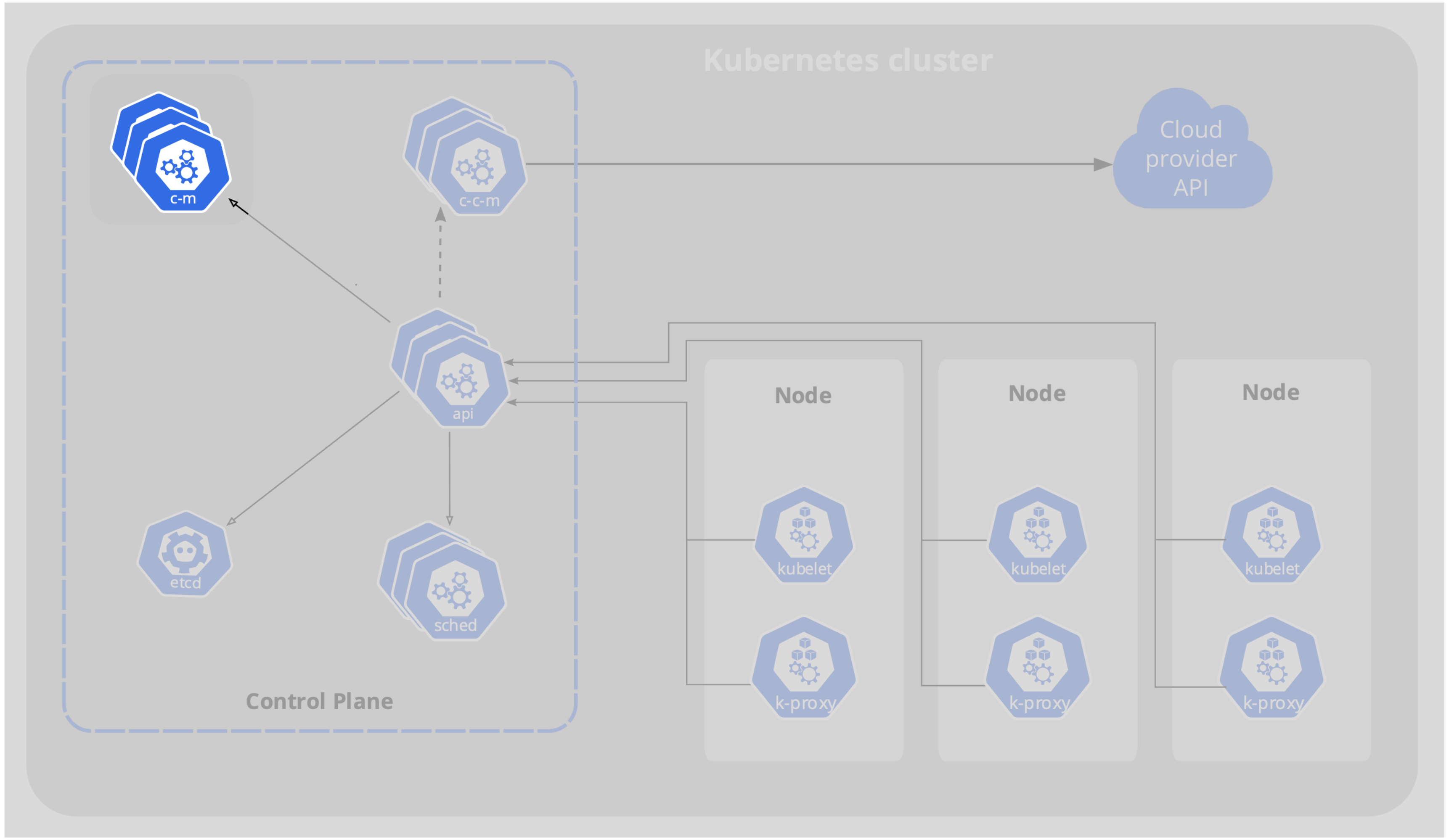
kube-scheduler

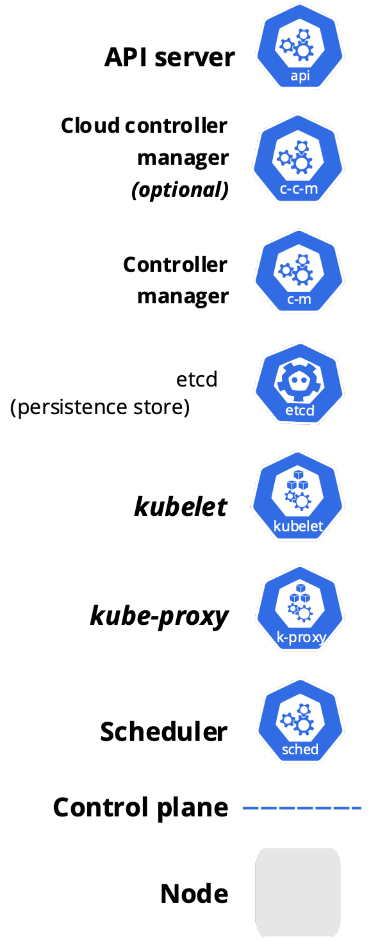


Kubernetes的组件

控制平面组件

kube-controller-manager

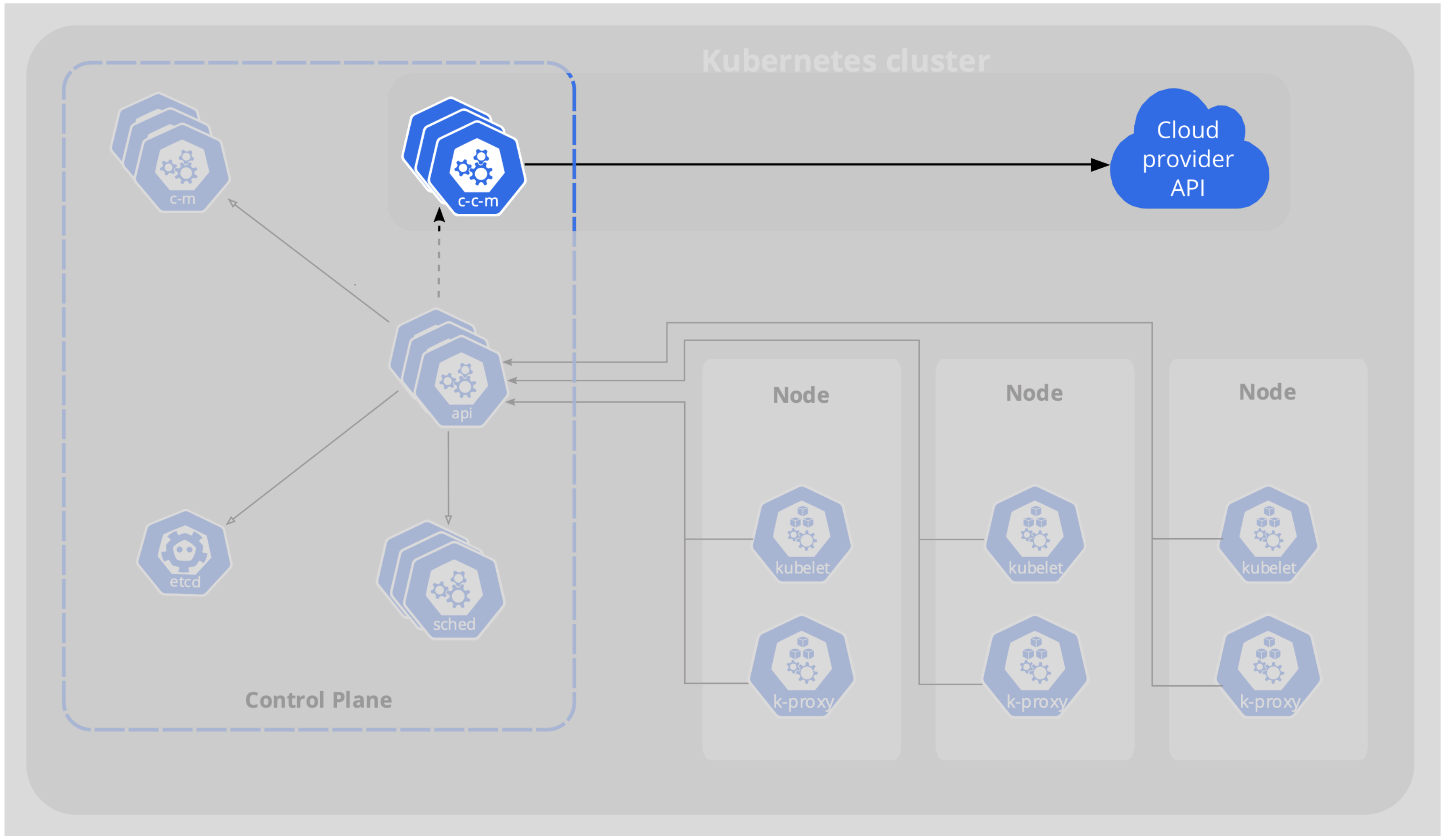


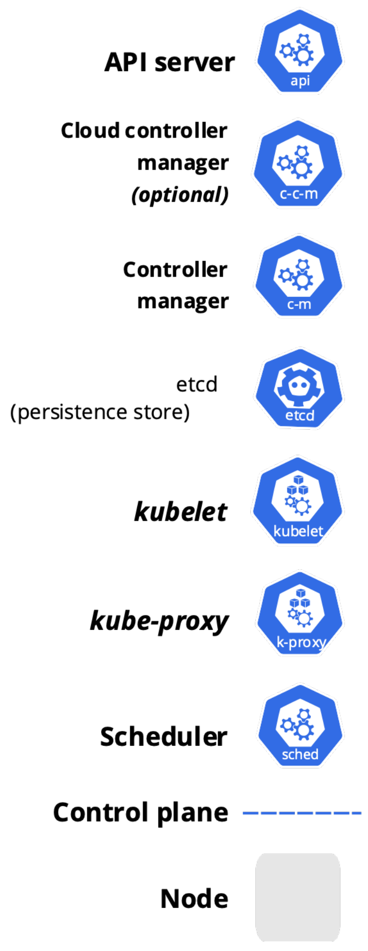


Kubernetes的组件

控制平面组件

cloud-controller-manager

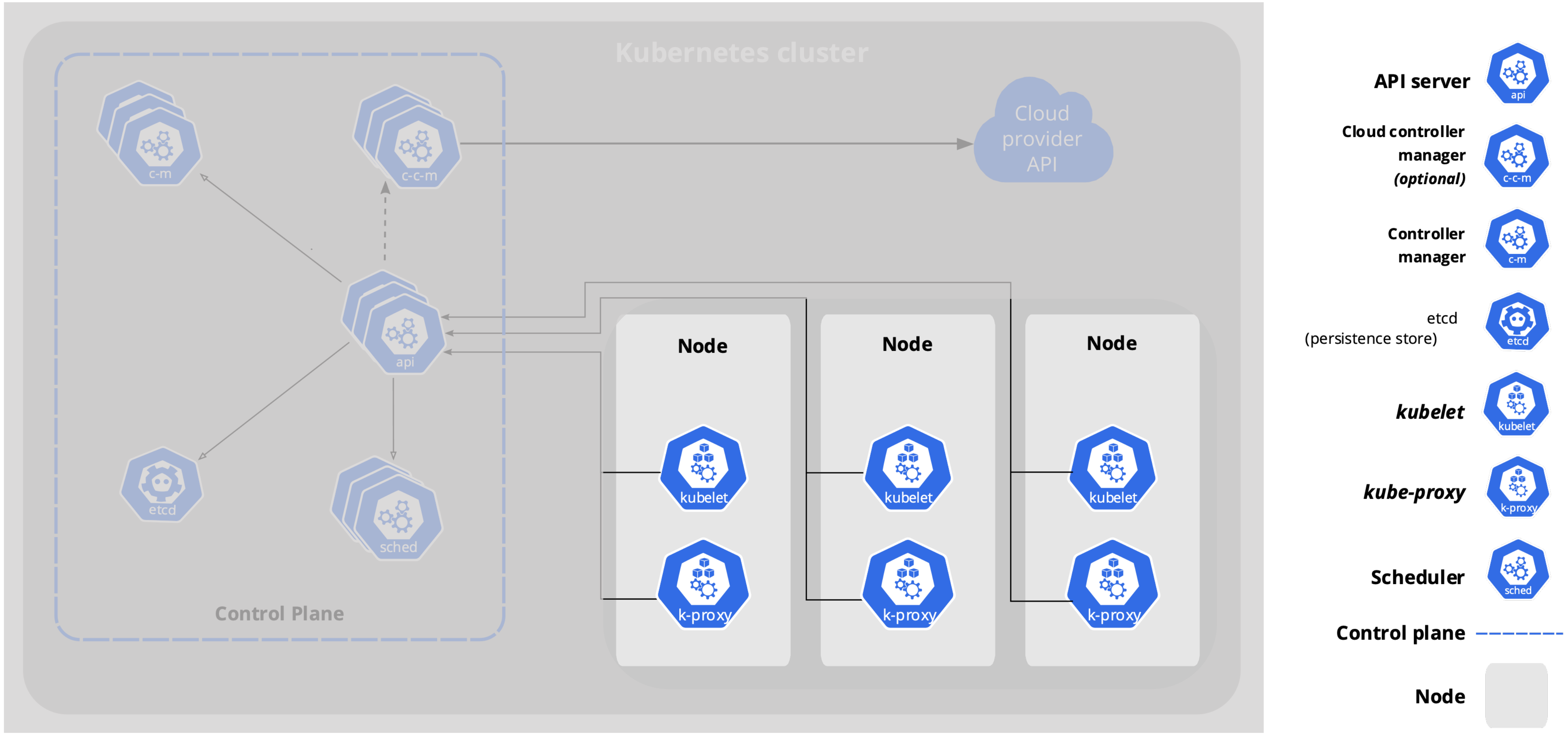




Kubernetes的组件

Node组件

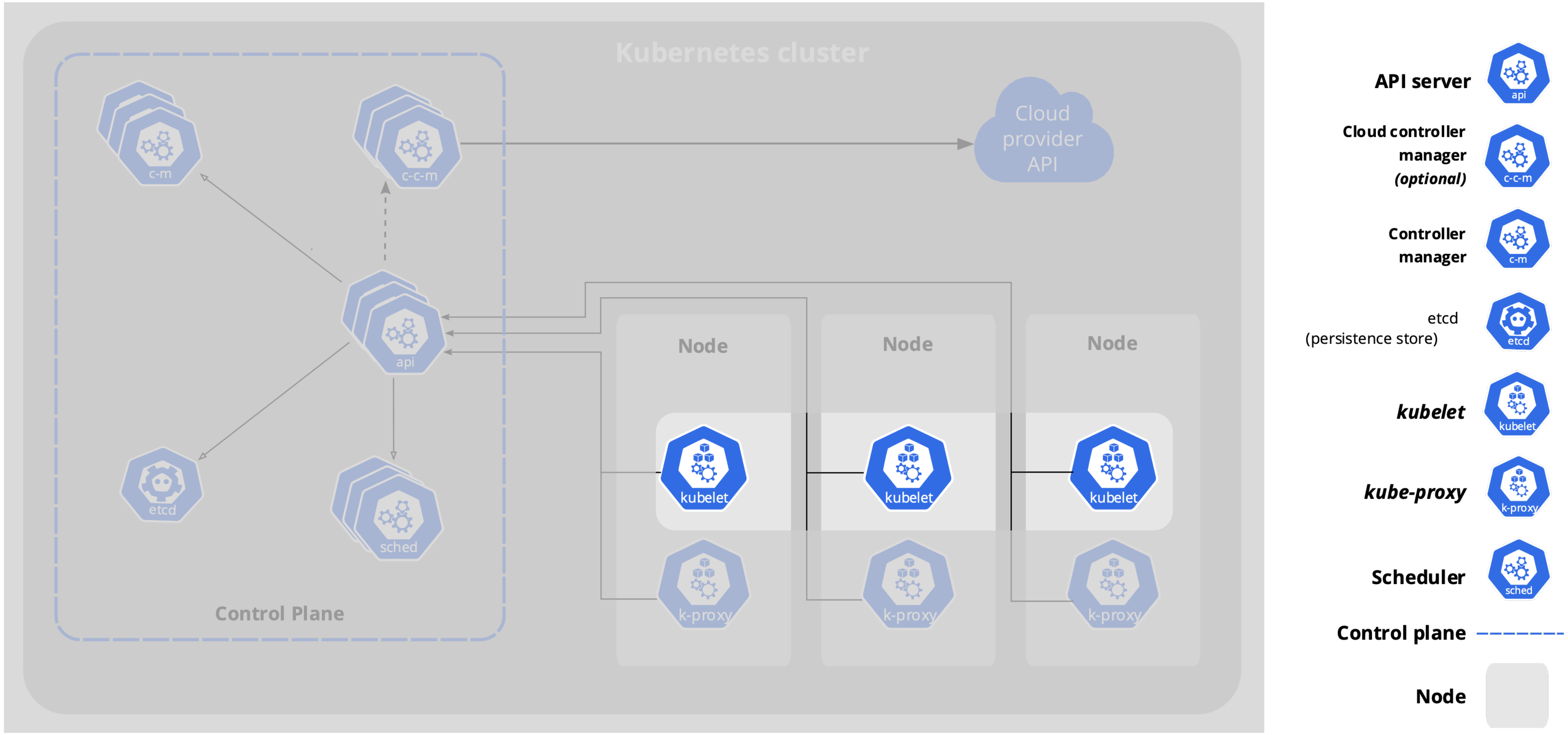
Node组件



Kubernetes的组件

Node组件

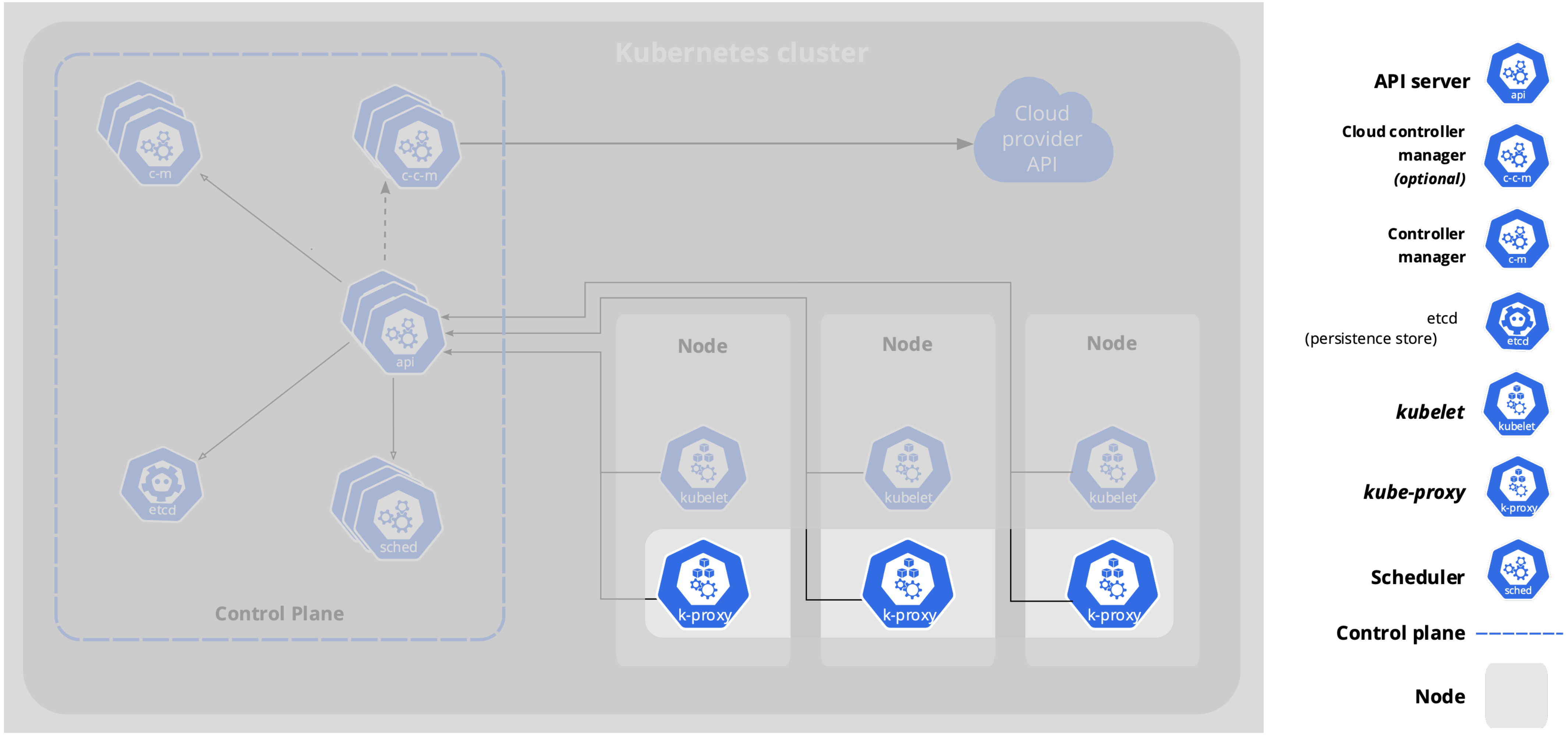
kubelet



Kubernetes的组件

Node组件

kube-proxy



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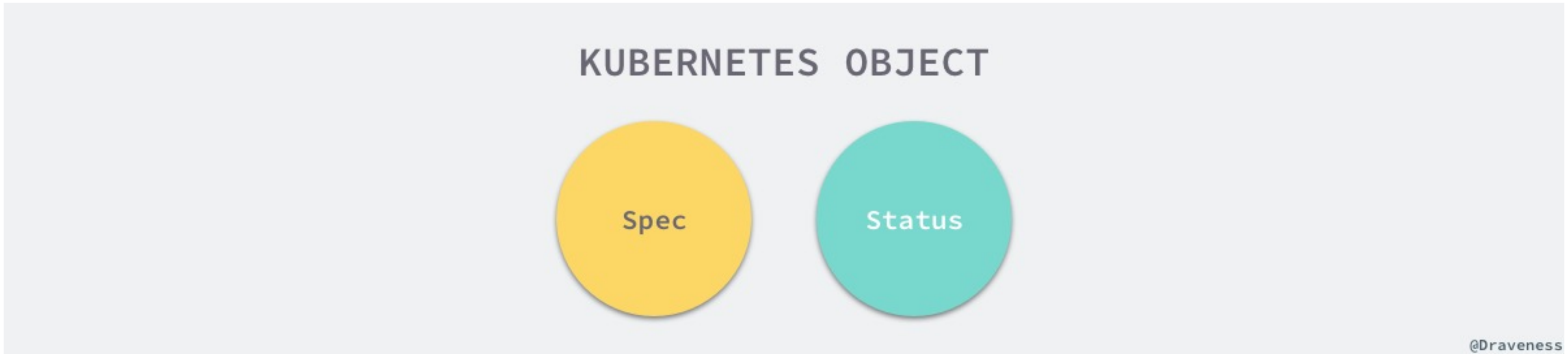
PART 3

Kubernetes对象

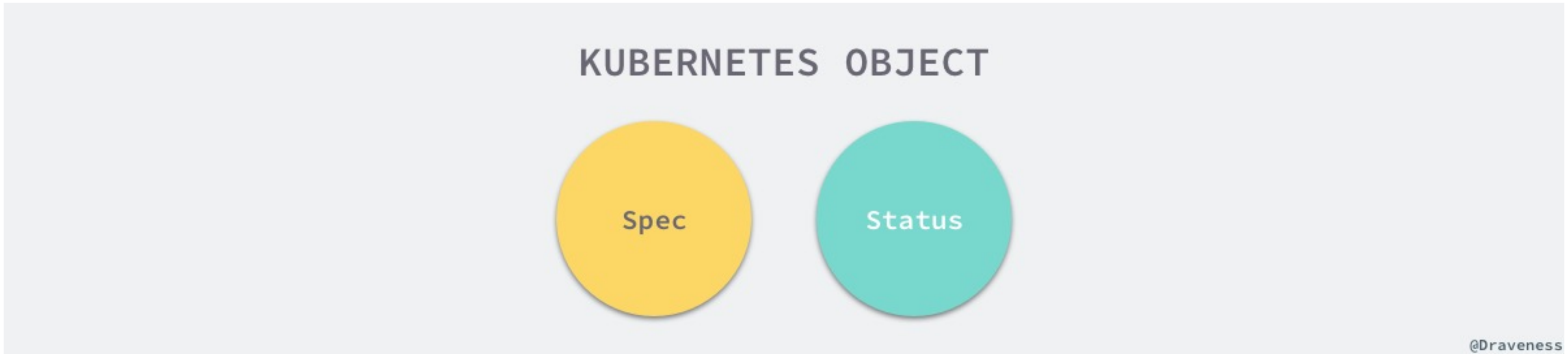
Kubernetes对象

理解Kubernetes对象



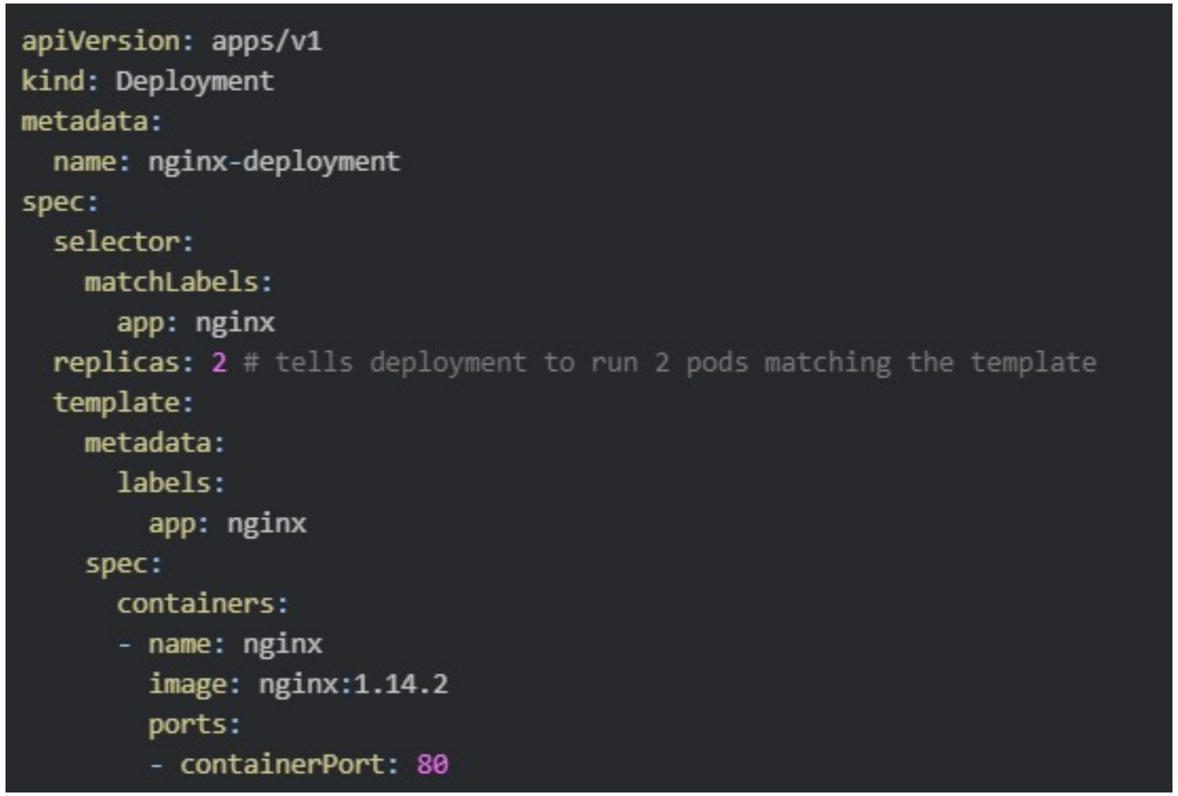
Kubernetes对象

对象规约（Spec）与状态（Status）



Kubernetes对象

描述 Kubernetes 对象

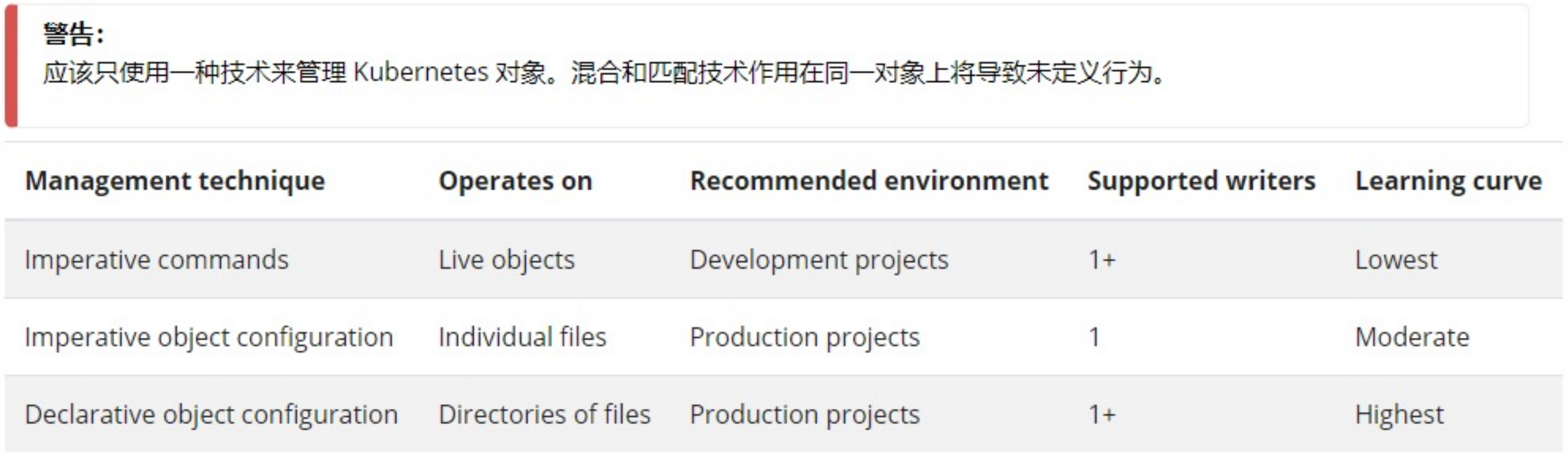


```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  selector:
    matchLabels:
      app: nginx
  replicas: 2 # tells deployment to run 2 pods matching the template
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.14.2
        ports:
        - containerPort: 80
```

Kubernetes对象

Kubernetes 对象管理

Kubernetes 对象管理



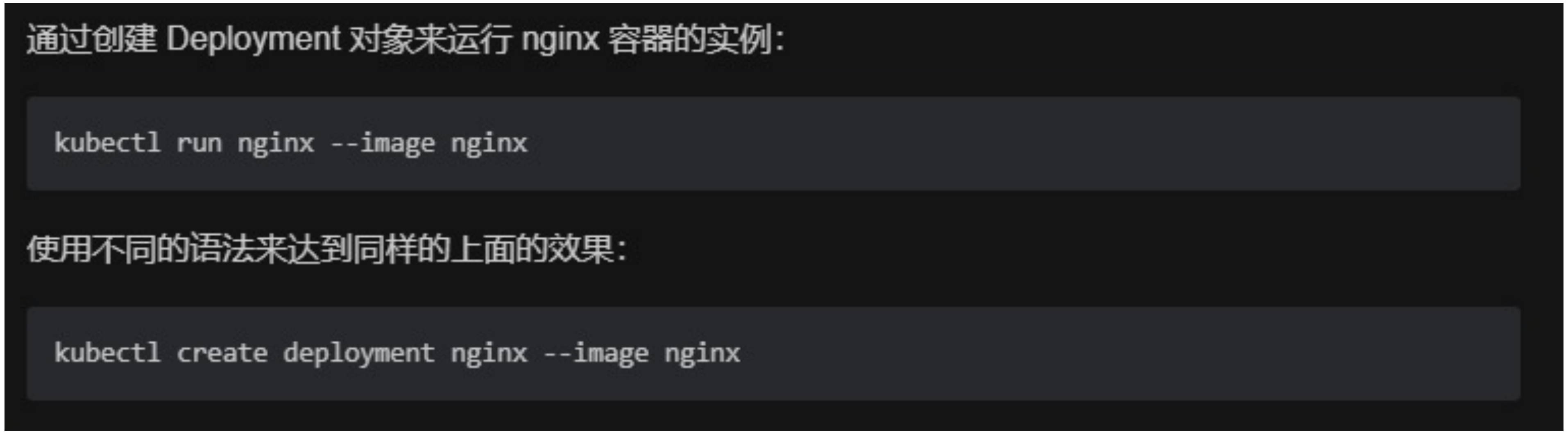
警告：
应该只使用一种技术来管理 Kubernetes 对象。混合和匹配技术作用在同一对象上将导致未定义行为。

Management technique	Operates on	Recommended environment	Supported writers	Learning curve
Imperative commands	Live objects	Development projects	1+	Lowest
Imperative object configuration	Individual files	Production projects	1	Moderate
Declarative object configuration	Directories of files	Production projects	1+	Highest

Kubernetes对象

Kubernetes 对象管理

命令式命令



通过创建 Deployment 对象来运行 nginx 容器的实例:

```
kubectl run nginx --image nginx
```

使用不同的语法来达到同样的上面的效果:

```
kubectl create deployment nginx --image nginx
```

Kubernetes对象

Kubernetes 对象管理

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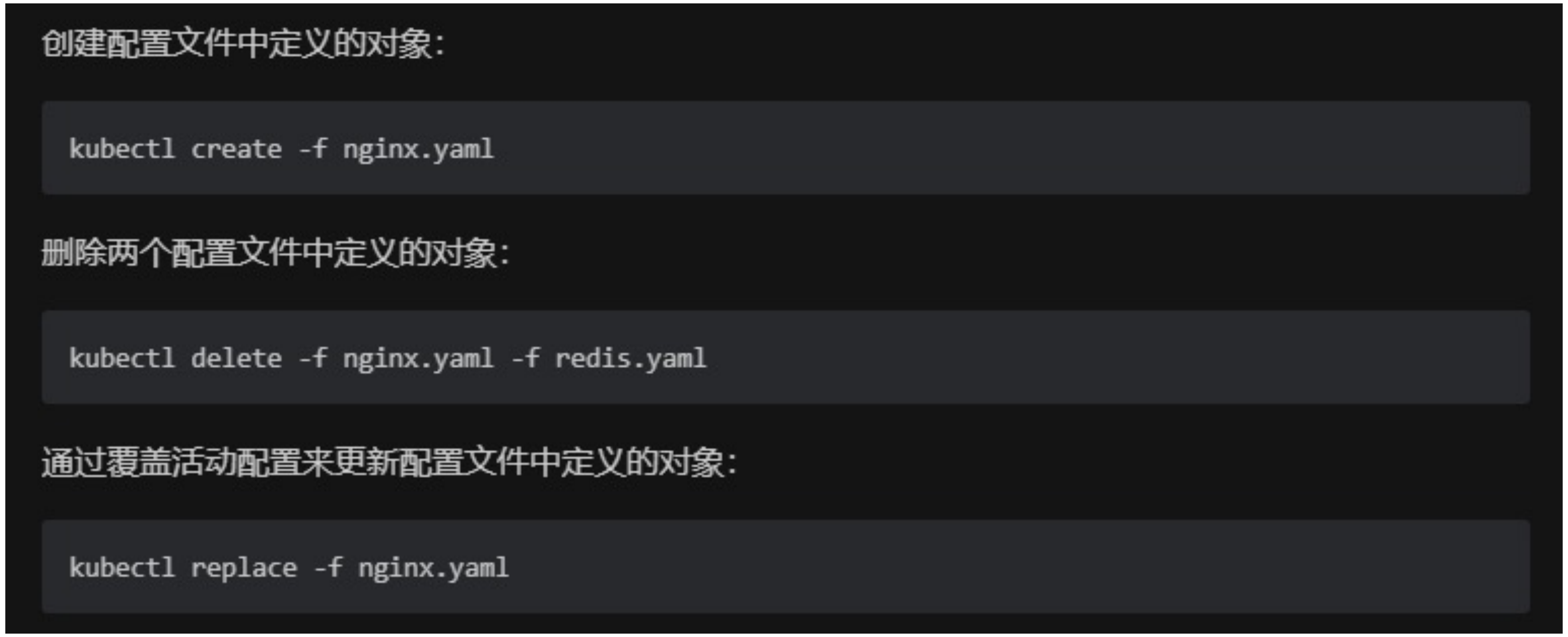
命令式对象配置



创建配置文件中定义的对象：

```
kubectl create -f nginx.yaml
```

删除两个配置文件中定义的对象：

```
kubectl delete -f nginx.yaml -f redis.yaml
```

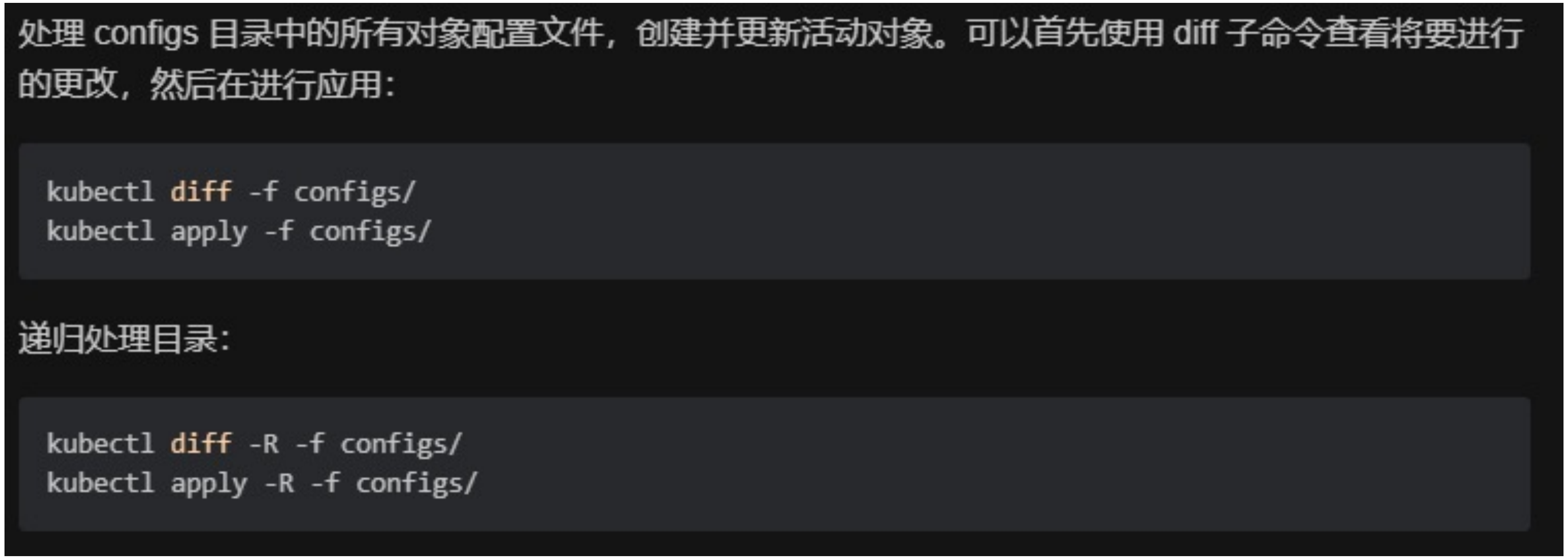
通过覆盖活动配置来更新配置文件中定义的对象：

```
kubectl replace -f nginx.yaml
```

Kubernetes对象

Kubernetes 对象管理

声明式对象配置



处理 configs 目录中的所有对象配置文件，创建并更新活动对象。可以首先使用 diff 子命令查看将要进行的更改，然后在进行应用：

```
kubectl diff -f configs/
kubectl apply -f configs/
```

递归处理目录：

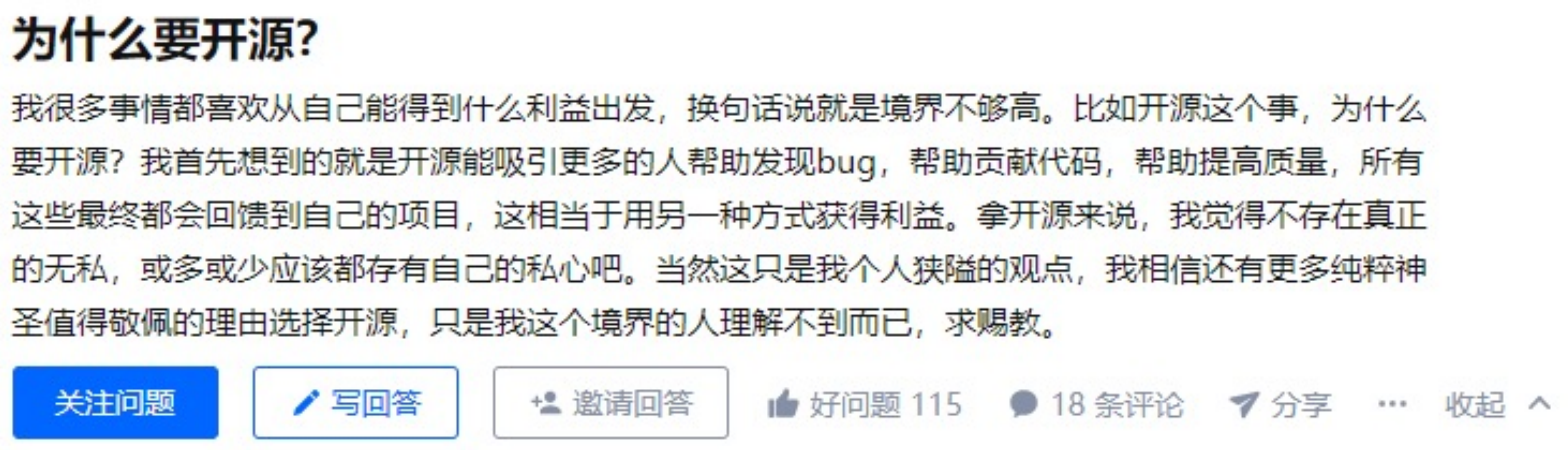
```
kubectl diff -R -f configs/
kubectl apply -R -f configs/
```

PART 3

开源&Kubernetes

开源&Kubernetes

为什么要开源？



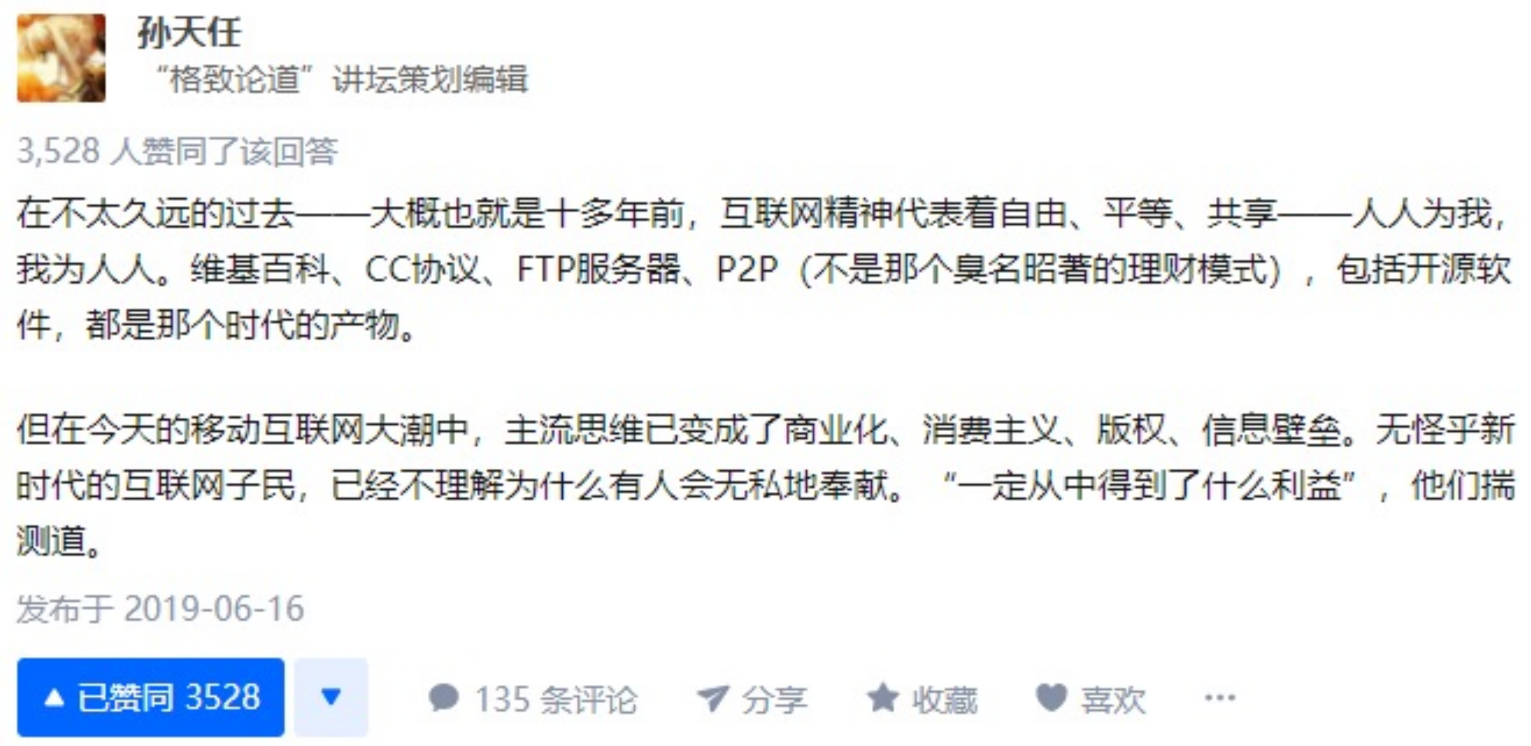
为什么要开源?

我很多事情都喜欢从自己能得到什么利益出发，换句话说就是境界不够高。比如开源这个事，为什么要开源？我首先想到的就是开源能吸引更多的人帮助发现bug，帮助贡献代码，帮助提高质量，所有这些最终都会回馈到自己的项目，这相当于用另一种方式获得利益。拿开源来说，我觉得不存在真正的无私，或多或少应该都存有自己的私心吧。当然这只是我个人狭隘的观点，我相信还有更多纯粹神圣值得敬佩的理由选择开源，只是我这个境界的人理解不到而已，求赐教。

为什么要开源？ - 知乎 (zhihu.com)

开源&Kubernetes

为什么要开源？



孙天任

“格致论道”讲坛策划编辑

3,528 人赞同了该回答

在不太久远的过去——大概也就是十多年前，互联网精神代表着自由、平等、共享——人人为我，我为人人。维基百科、CC协议、FTP服务器、P2P（不是那个臭名昭著的理财模式），包括开源软件，都是那个时代的产物。

但在今天的移动互联网大潮中，主流思维已变成了商业化、消费主义、版权、信息壁垒。无怪乎新时代的互联网子民，已经不理解为什么有人会无私地奉献。“一定从中得到了什么利益”，他们揣测道。

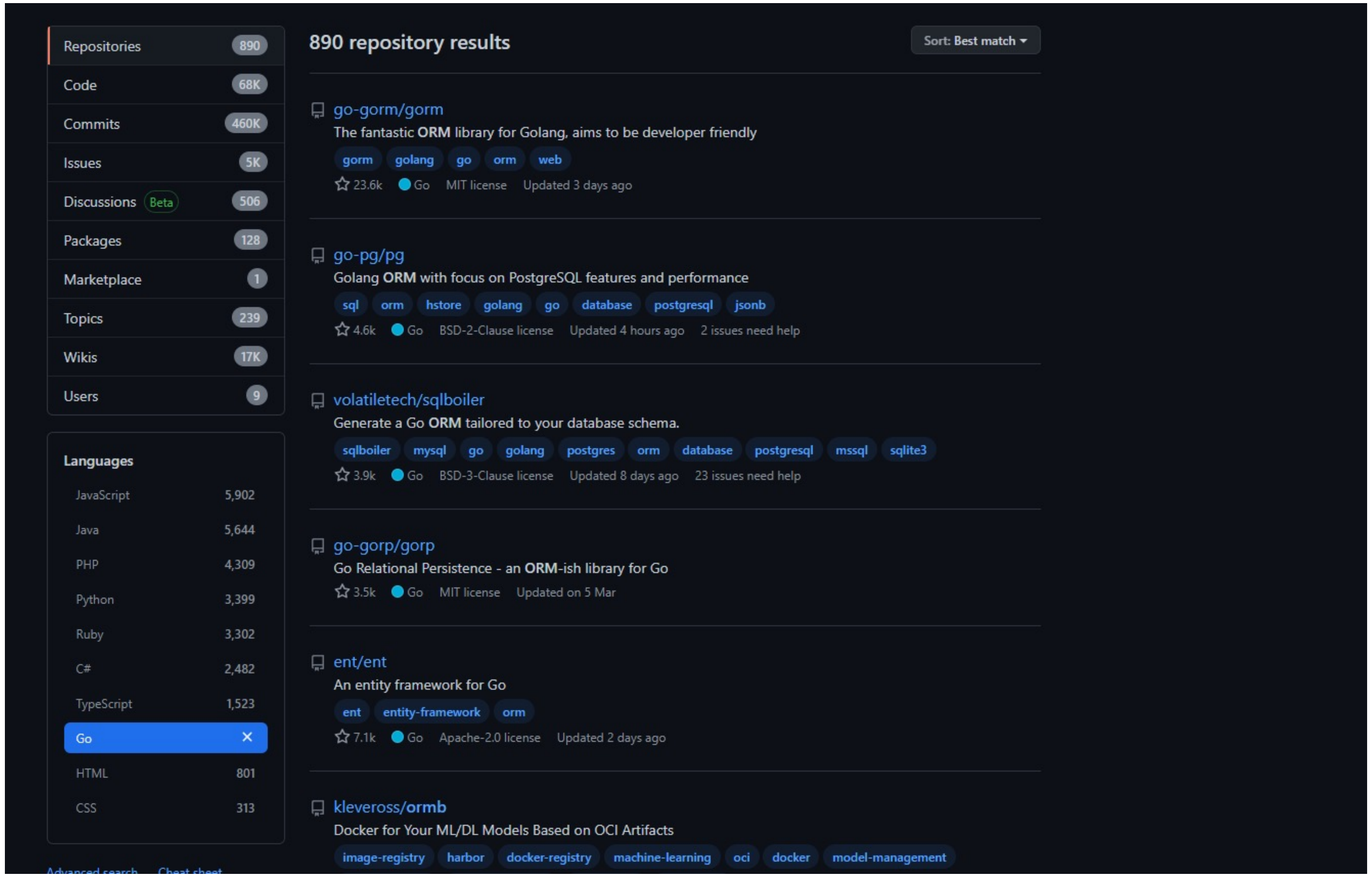
发布于 2019-06-16

[为什么要开源？ - 知乎 (zhihu.com)]

开源&Kubernetes

如何选择开源软件？

Star



Repositories	890
Code	68K
Commits	460K
Issues	5K
Discussions Beta	506
Packages	128
Marketplace	1
Topics	239
Wikis	17K
Users	9

Languages

JavaScript	5,902
Java	5,644
PHP	4,309
Python	3,399
Ruby	3,302
C#	2,482
TypeScript	1,523
Go	×
HTML	801
CSS	313

Advanced search Cheat sheet

890 repository results

Sort: Best match

go-gorm/gorm
The fantastic **ORM** library for Golang, aims to be developer friendly
gorm golang go orm web
☆ 23.6k ● Go MIT license Updated 3 days ago

go-pg/pg
Golang **ORM** with focus on PostgreSQL features and performance
sql orm hstore golang go database postgresql jsonb
☆ 4.6k ● Go BSD-2-Clause license Updated 4 hours ago 2 issues need help

volatiletech/sqlboiler
Generate a Go **ORM** tailored to your database schema.
sqlboiler mysql go golang postgres orm database postgresql mssql sqlite3
☆ 3.9k ● Go BSD-3-Clause license Updated 8 days ago 23 issues need help

go-gorp/gorp
Go Relational Persistence - an **ORM**-ish library for Go
☆ 3.5k ● Go MIT license Updated on 5 Mar

ent/ent
An entity framework for Go
ent entity-framework orm
☆ 7.1k ● Go Apache-2.0 license Updated 2 days ago

kleveross/ormb
Docker for Your ML/DL Models Based on OCI Artifacts
image-registry harbor docker-registry machine-learning oci docker model-management

开源&Kubernetes

如何选择开源软件？

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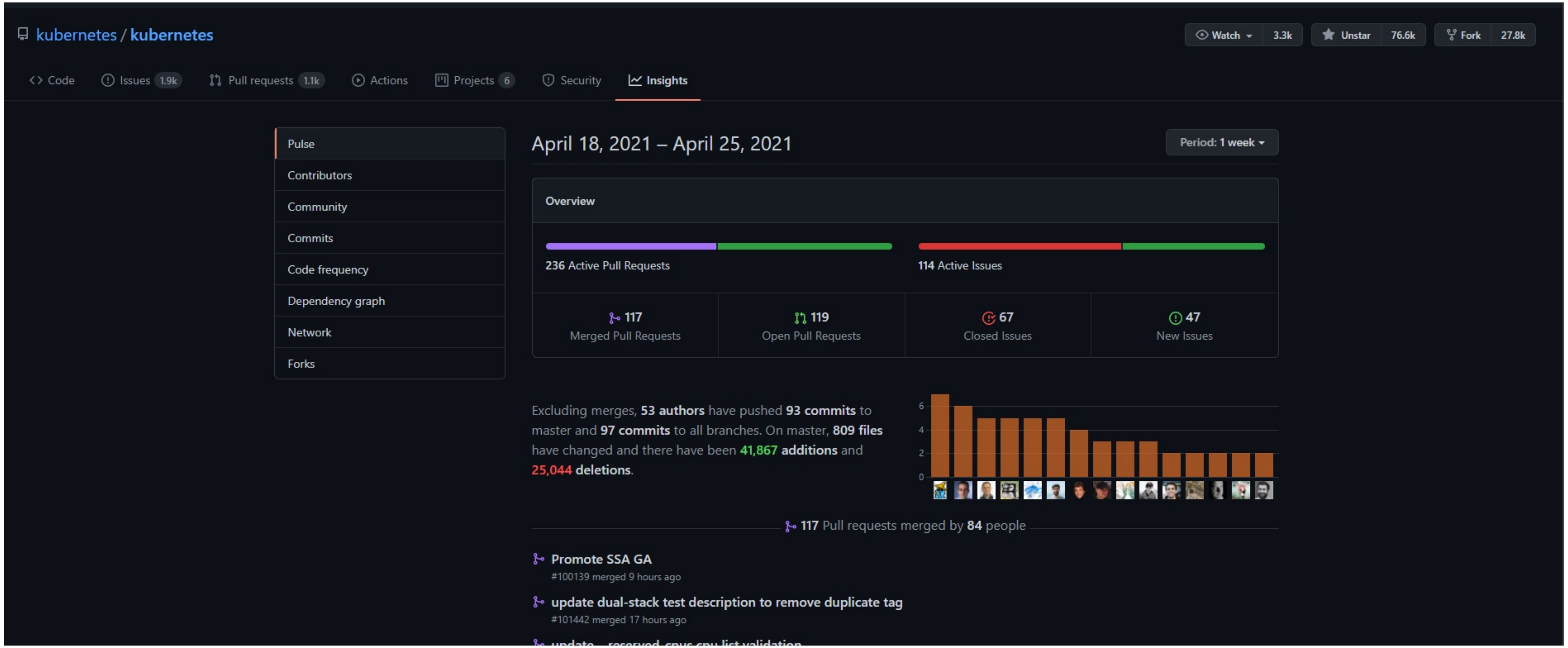
Insights



kubernetes / kubernetes

Watch 3.3k | Unstar 76.6k | Fork 27.8k

Code | Issues 1.9k | Pull requests 1.1k | Actions | Projects 6 | Security | Insights

Pulse
Contributors
Community
Commits
Code frequency
Dependency graph
Network
Forks

April 18, 2021 – April 25, 2021

Period: 1 week

Overview

236 Active Pull Requests

114 Active Issues

117 Merged Pull Requests

119 Open Pull Requests

67 Closed Issues

47 New Issues

Excluding merges, **53 authors** have pushed **93 commits** to master and **97 commits** to all branches. On master, **809 files** have changed and there have been **41,867 additions** and **25,044 deletions**.

117 Pull requests merged by **84** people

Promote SSA GA
#100139 merged 9 hours ago

update dual-stack test description to remove duplicate tag
#101442 merged 17 hours ago

开源&Kubernetes

如何选择开源软件？

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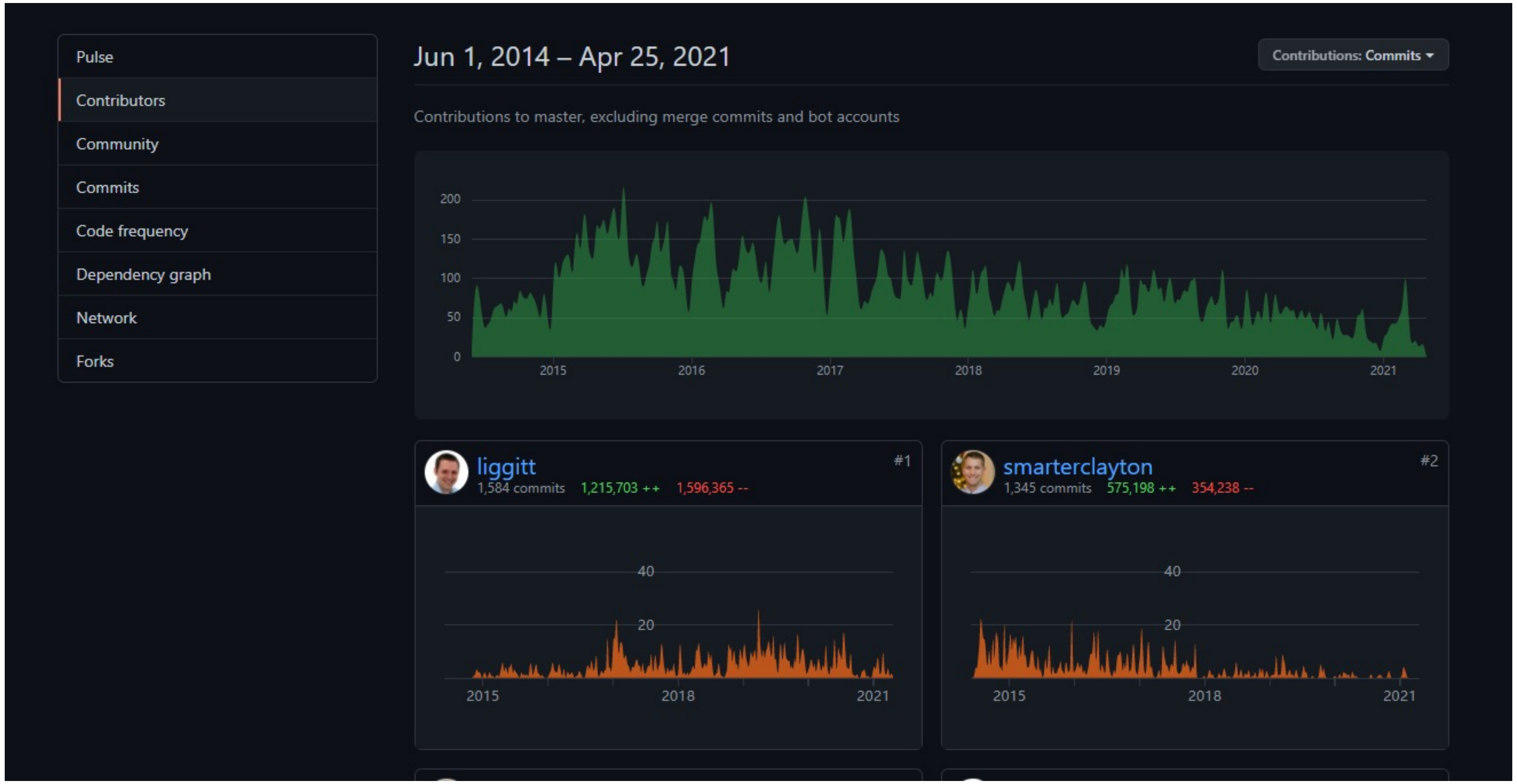
Complex Network

Insights



Jun 1, 2014 – Apr 25, 2021

Contributions to master, excluding merge commits and bot accounts

liggitt
1,584 commits 1,215,703 ++ 1,596,365 --

smarterclayton
1,345 commits 575,198 ++ 354,238 --

开源&Kubernetes

如何选择开源软件？

NeXt-LAB
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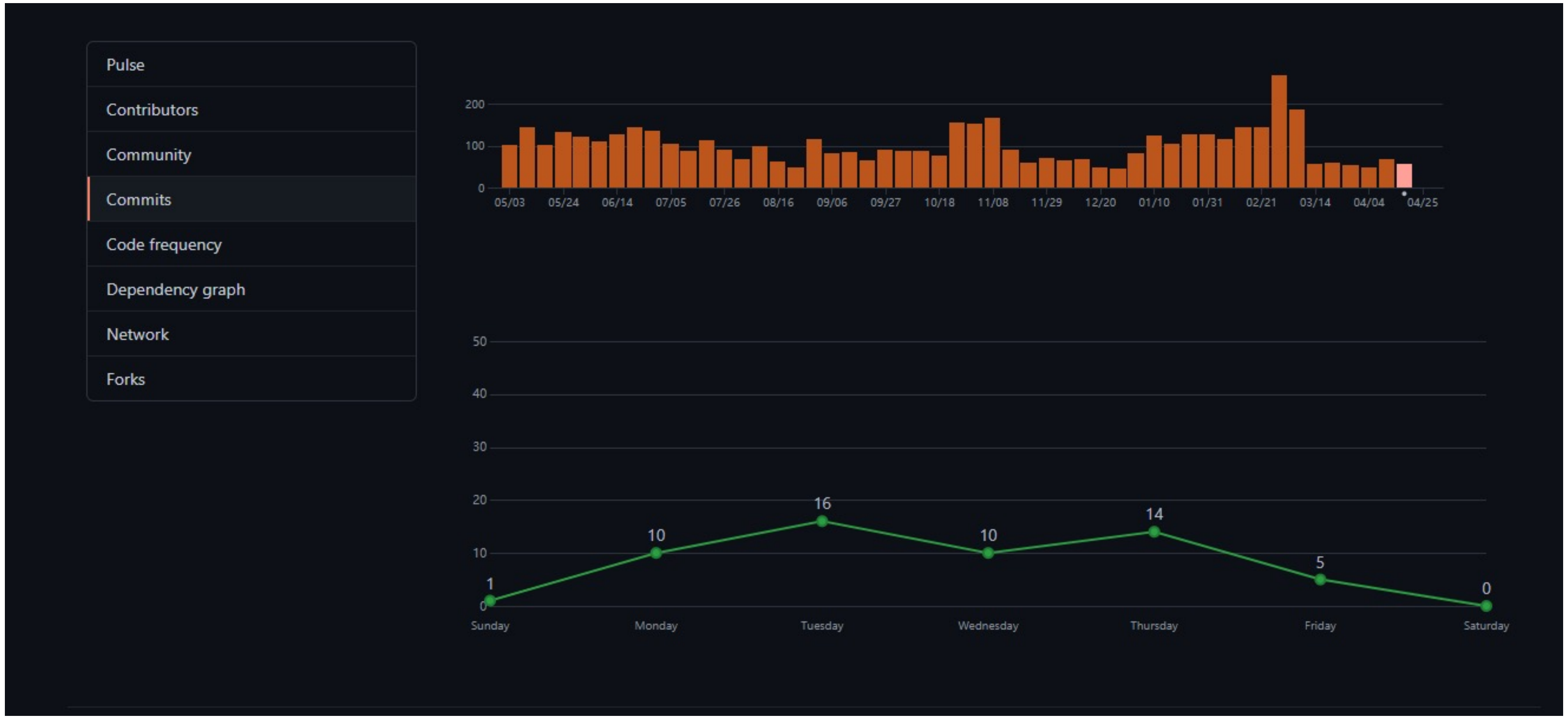
Insights



开源&Kubernetes

如何选择开源软件？

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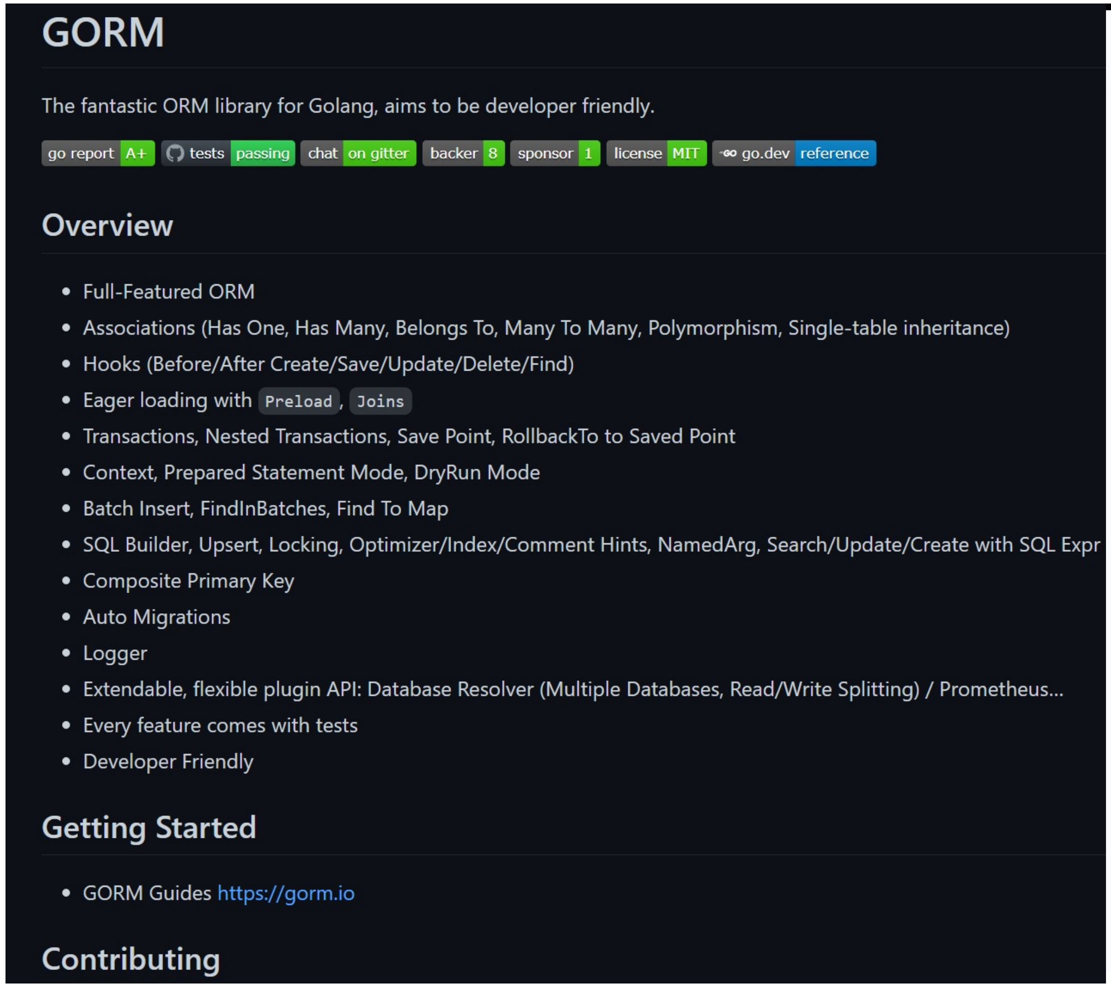
README&DOC



GORM

The fantastic ORM library for Golang, aims to be developer friendly.

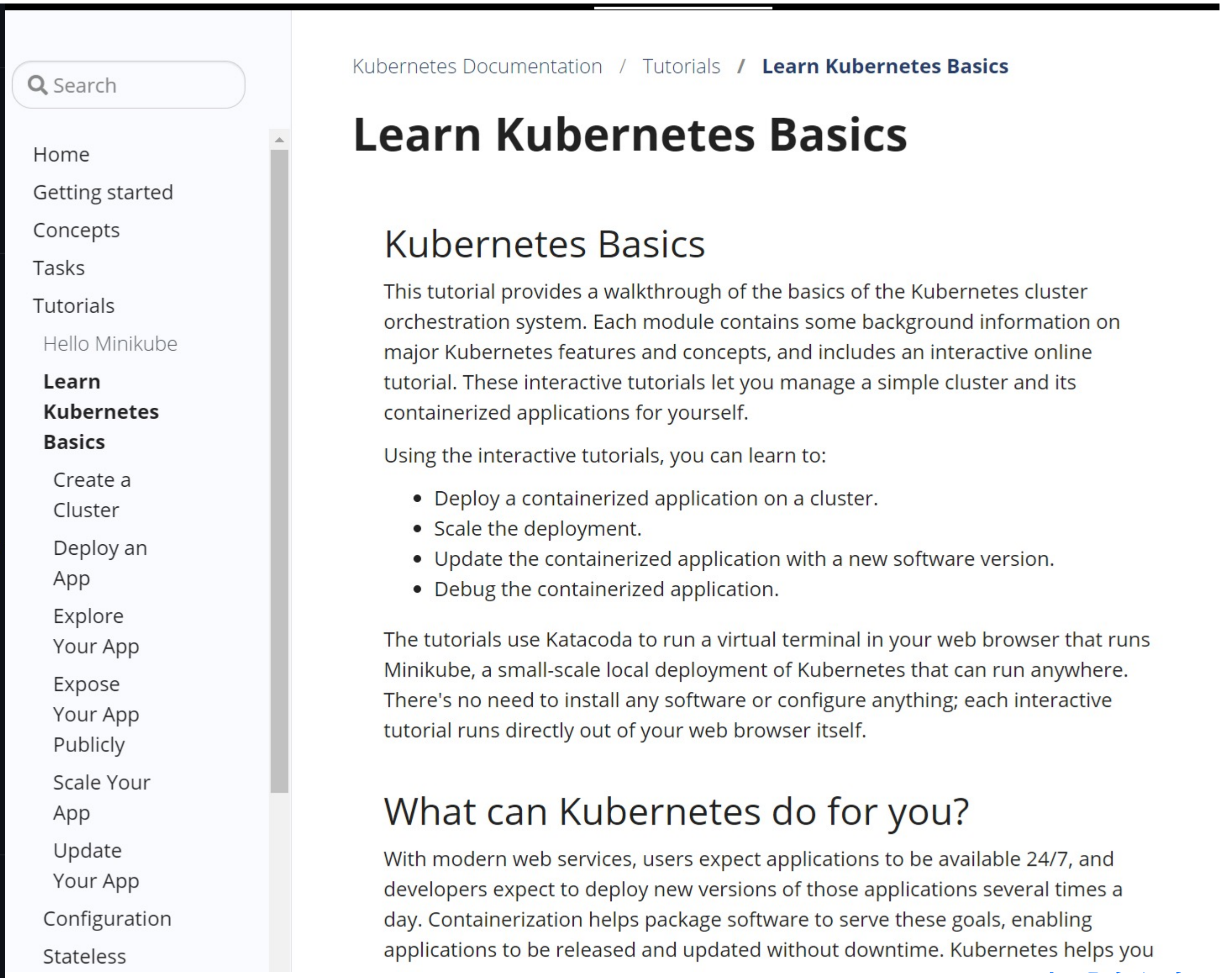
Overview

- Full-Featured ORM
- Associations (Has One, Has Many, Belongs To, Many To Many, Polymorphism, Single-table inheritance)
- Hooks (Before/After Create/Save/Update/Delete/Find)
- Eager loading with `Preload`, `Joins`
- Transactions, Nested Transactions, Save Point, RollbackTo to Saved Point
- Context, Prepared Statement Mode, DryRun Mode
- Batch Insert, FindInBatches, Find To Map
- SQL Builder, Upsert, Locking, Optimizer/Index/Comment Hints, NamedArg, Search/Update/Create with SQL Expr
- Composite Primary Key
- Auto Migrations
- Logger
- Extendable, flexible plugin API: Database Resolver (Multiple Databases, Read/Write Splitting) / Prometheus...
- Every feature comes with tests
- Developer Friendly

Getting Started

- GORM Guides https://gorm.io

Contributing



Kubernetes Documentation / Tutorials / Learn Kubernetes Basics

Learn Kubernetes Basics

Kubernetes Basics

This tutorial provides a walkthrough of the basics of the Kubernetes cluster orchestration system. Each module contains some background information on major Kubernetes features and concepts, and includes an interactive online tutorial. These interactive tutorials let you manage a simple cluster and its containerized applications for yourself.

Using the interactive tutorials, you can learn to:

- Deploy a containerized application on a cluster.
- Scale the deployment.
- Update the containerized application with a new software version.
- Debug the containerized application.

The tutorials use Katacoda to run a virtual terminal in your web browser that runs Minikube, a small-scale local deployment of Kubernetes that can run anywhere. There's no need to install any software or configure anything; each interactive tutorial runs directly out of your web browser itself.

What can Kubernetes do for you?

With modern web services, users expect applications to be available 24/7, and developers expect to deploy new versions of those applications several times a day. Containerization helps package software to serve these goals, enabling applications to be released and updated without downtime. Kubernetes helps you

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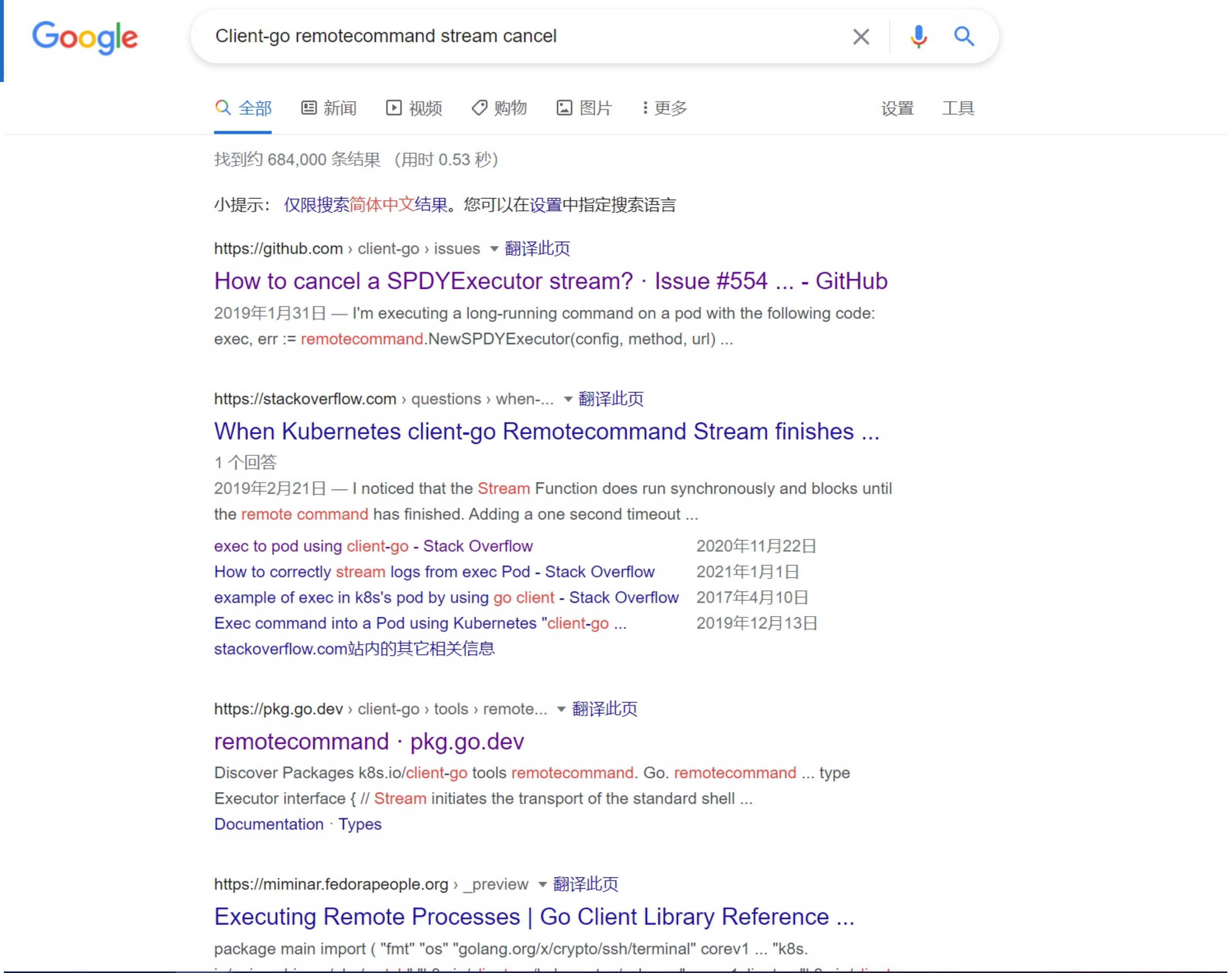

Google

Client-go remotecommand stream cancel

找到约 684,000 条结果 （用时 0.53 秒）

小提示： 仅限搜索简体中文结果。您可以在设置中指定搜索语言

https://github.com › client-go › issues ▾ 翻译此页

How to cancel a SPDYExecutor stream? · Issue #554 ... - GitHub

2019年1月31日 — I'm executing a long-running command on a pod with the following code: exec, err := remotecommand.NewSPDYExecutor(config, method, url) ...

https://stackoverflow.com › questions › when-... ▾ 翻译此页

When Kubernetes client-go Remotecommand Stream finishes ...

1 个回答

2019年2月21日 — I noticed that the Stream Function does run synchronously and blocks until the remote command has finished. Adding a one second timeout ...

exec to pod using client-go - Stack Overflow	2020年11月22日
How to correctly stream logs from exec Pod - Stack Overflow	2021年1月1日
example of exec in k8s's pod by using go client - Stack Overflow	2017年4月10日
Exec command into a Pod using Kubernetes "client-go ...	2019年12月13日

stackoverflow.com站内的其它相关信息

https://pkg.go.dev › client-go › tools › remote... ▾ 翻译此页

remotecommand · pkg.go.dev

Discover Packages k8s.io/client-go tools remotecommand. Go. remotecommand ... type Executor interface { // Stream initiates the transport of the standard shell ...

Documentation · Types

https://miminar.fedorapeople.org › _preview ▾ 翻译此页

Executing Remote Processes | Go Client Library Reference ...

package main import ("fmt" "os" "golang.org/x/crypto/ssh/terminal" corev1 ... "k8s.

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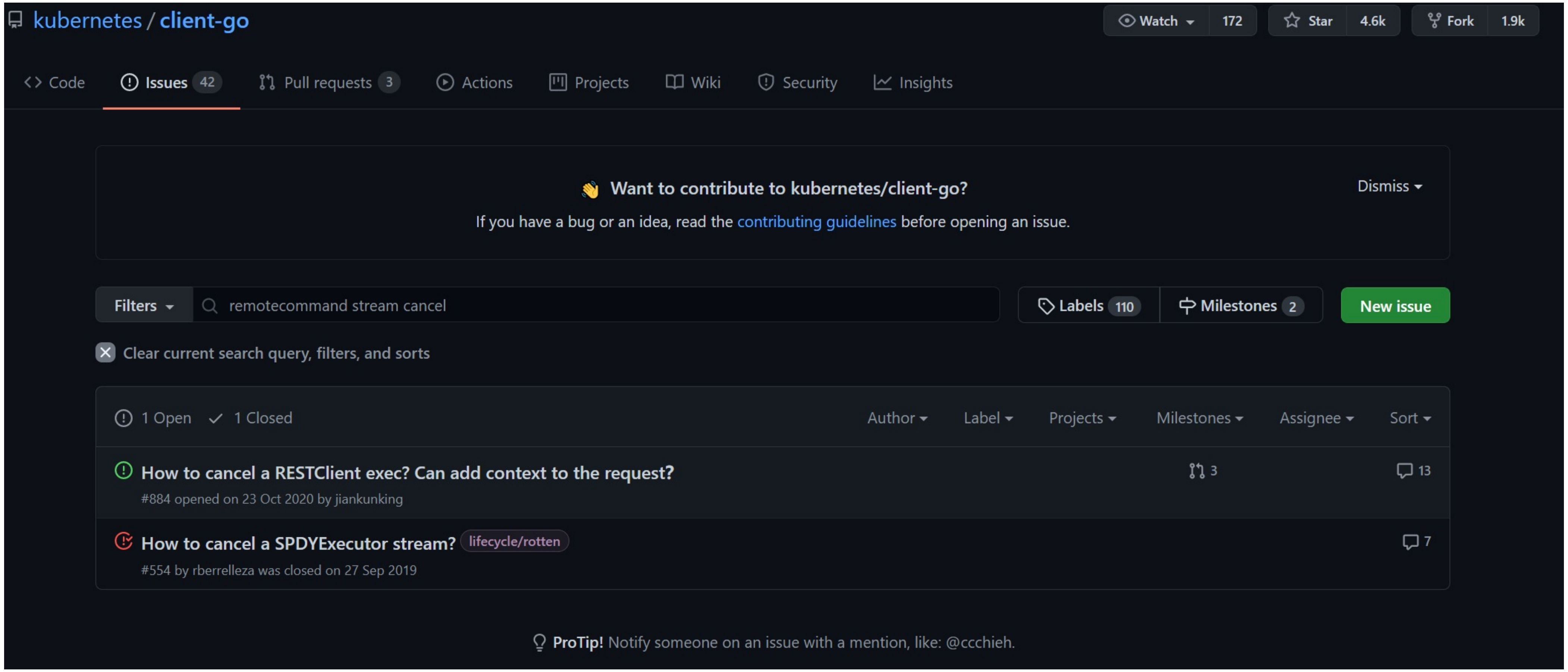
Issue



kubernetes / client-go

Watch 172 · Star 4.6k · Fork 1.9k

Code · Issues 42 · Pull requests 3 · Actions · Projects · Wiki · Security · Insights

Want to contribute to kubernetes/client-go?

If you have a bug or an idea, read the contributing guidelines before opening an issue.

Dismiss

Filters · remotecommand stream cancel · Labels 110 · Milestones 2 · New issue

Clear current search query, filters, and sorts

1 Open ✓ 1 Closed · Author · Label · Projects · Milestones · Assignee · Sort

How to cancel a RESTClient exec? Can add context to the request? 3 13
#884 opened on 23 Oct 2020 by jiankunking

How to cancel a SPDYExecutor stream? lifecycle/rotten 7
#554 by rberrelleza was closed on 27 Sep 2019

ProTip! Notify someone on an issue with a mention, like: @ccchieh.

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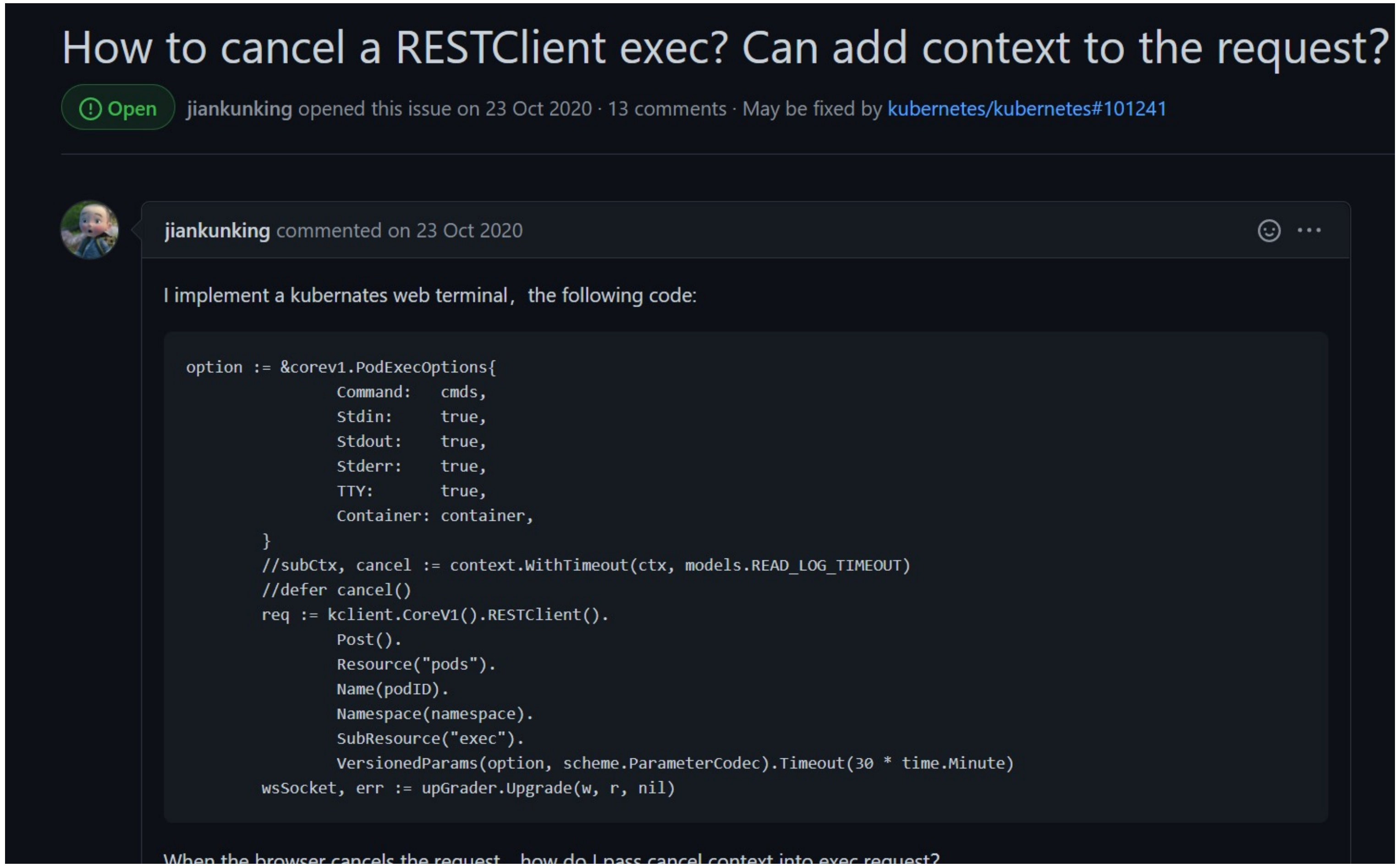
提Issue



How to cancel a RESTClient exec? Can add context to the request?

Open jiankunking opened this issue on 23 Oct 2020 · 13 comments · May be fixed by kubernetes/kubernetes#101241

jiankunking commented on 23 Oct 2020

I implement a kubernates web terminal，the following code:

```
option := &corev1.PodExecOptions{
                Command:   cmds,
                Stdin:     true,
                Stdout:    true,
                Stderr:    true,
                TTY:       true,
                Container: container,
        }
        //subCtx, cancel := context.WithTimeout(ctx, models.READ_LOG_TIMEOUT)
        //defer cancel()
        req := kclient.CoreV1().RESTClient().
                Post().
                Resource("pods").
                Name(podID).
                Namespace(namespace).
                SubResource("exec").
                VersionedParams(option, scheme.ParameterCodec).Timeout(30 * time.Minute)
        wsSocket, err := upGrader.Upgrade(w, r, nil)
```

When the browser cancels the request，how do I pass cancel context into exec request?

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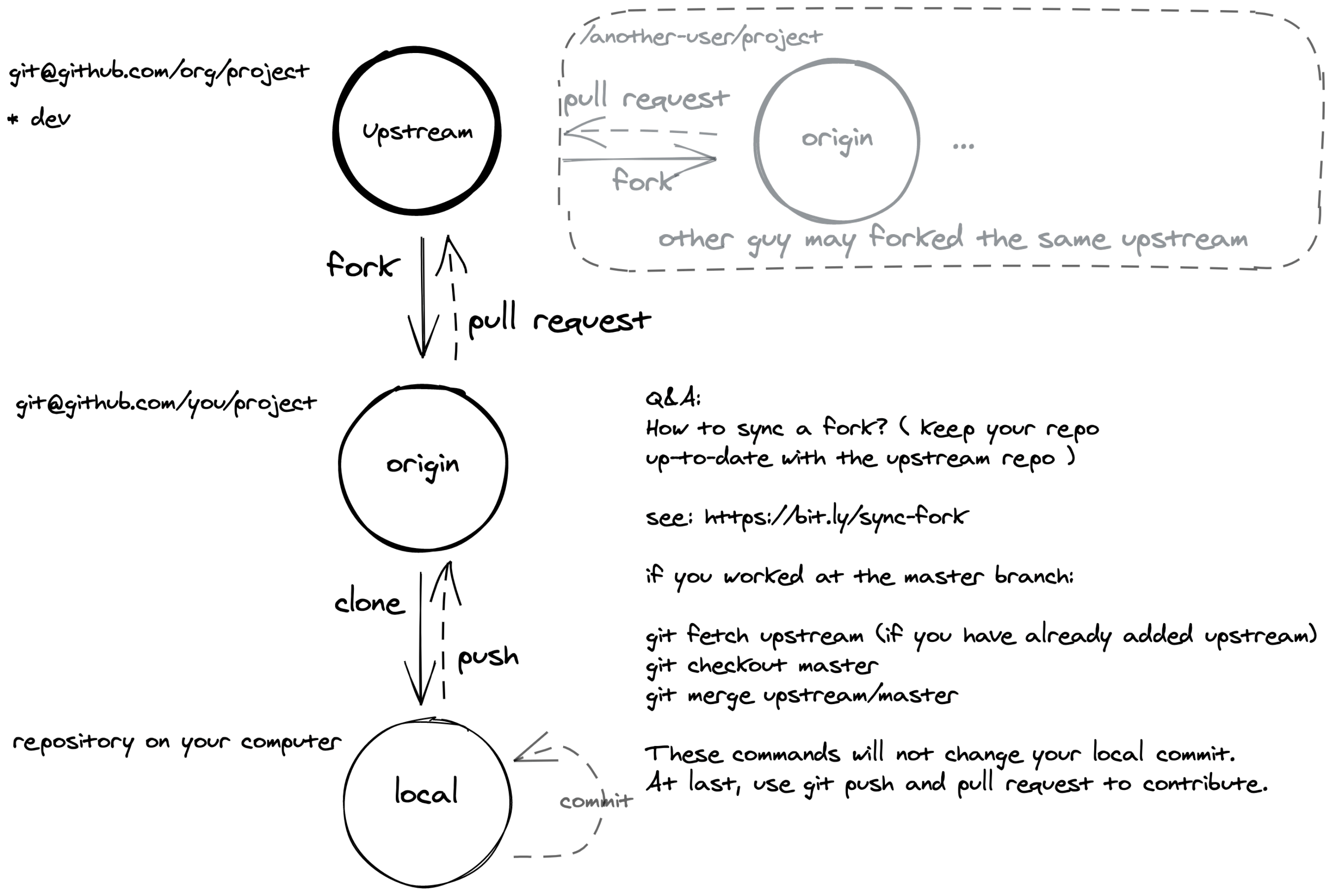
Pull Request

GitHub: Pull Request Workflow


git@github.com/org/project
* dev
Upstream
/another-user/project
pull request
origin
...
fork
other guy may forked the same upstream
fork
pull request
git@github.com/you/project
origin
clone
push
repository on your computer
local
commit

Q&A:
How to sync a fork? (keep your repo up-to-date with the upstream repo)

see: https://bit.ly/sync-fork

if you worked at the master branch:

```
git fetch upstream (if you have already added upstream)
git checkout master
git merge upstream/master
```

These commands will not change your local commit.
At last, use git push and pull request to contribute.

Pull Request (lawrenceli.me)

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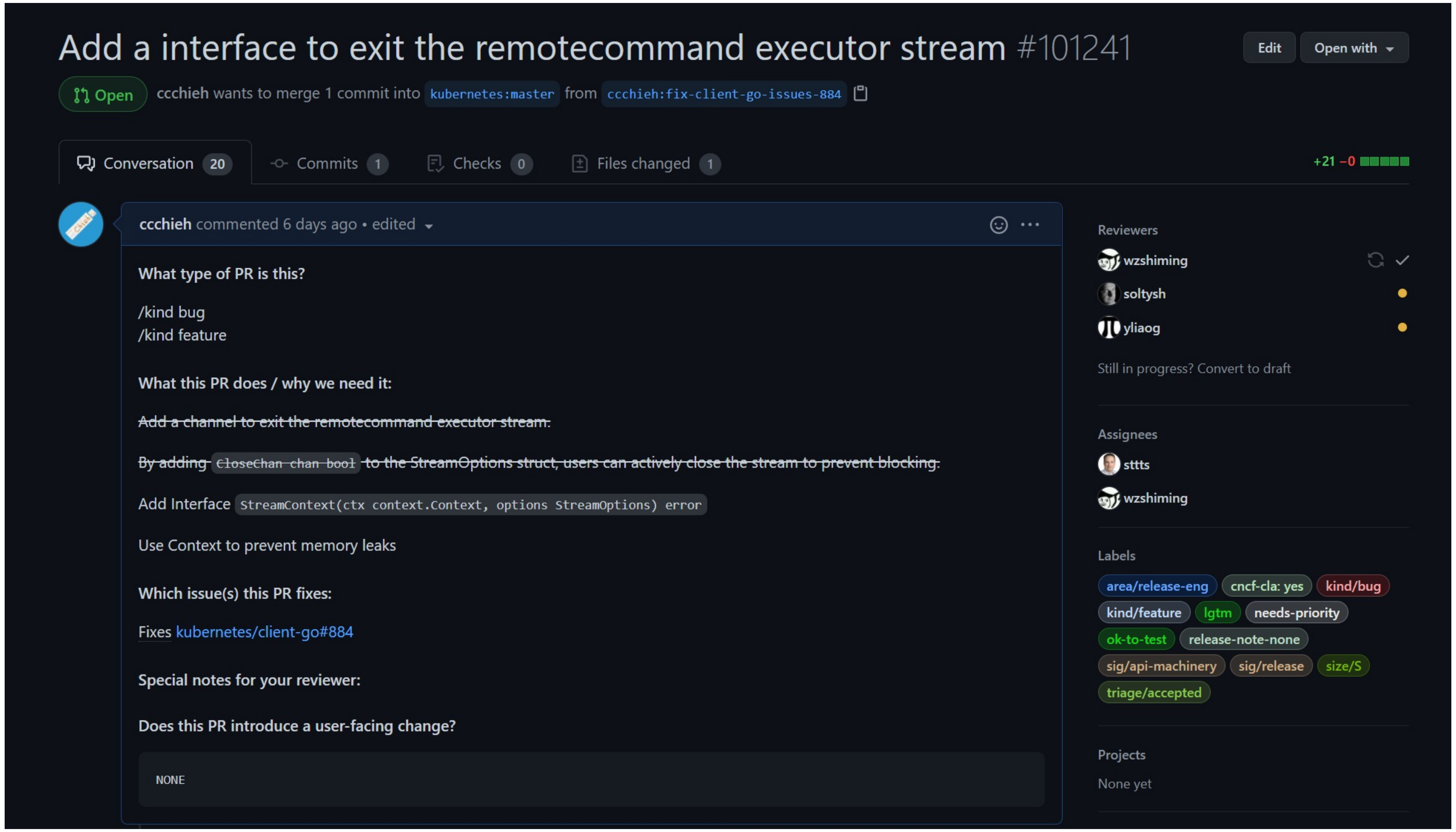
K8s PR



Add a interface to exit the remotecommand executor stream #101241

Edit | Open with

Open | ccchieh wants to merge 1 commit into `kubernetes:master` from `ccchieh:fix-client-go-issues-884`

Conversation 20 | Commits 1 | Checks 0 | Files changed 1 | +21 −0

ccchieh commented 6 days ago • edited

What type of PR is this?

/kind bug
/kind feature

What this PR does / why we need it:

~~Add a channel to exit the remotecommand executor stream.~~

~~By adding `closeChan chan bool` to the StreamOptions struct, users can actively close the stream to prevent blocking.~~

Add Interface `StreamContext(ctx context.Context, options StreamOptions) error`

Use Context to prevent memory leaks

Which issue(s) this PR fixes:

Fixes kubernetes/client-go#884

Special notes for your reviewer:

Does this PR introduce a user-facing change?

```
NONE
```

Reviewers
- wzshiming ✓
- soltysh ●
- yliaog ●

Still in progress? Convert to draft

Assignees
- sttts
- wzshiming

Labels
area/release-eng, cncf-cla: yes, kind/bug, kind/feature, lgtm, needs-priority, ok-to-test, release-note-none, sig/api-machinery, sig/release, size/S, triage/accepted

Projects
None yet

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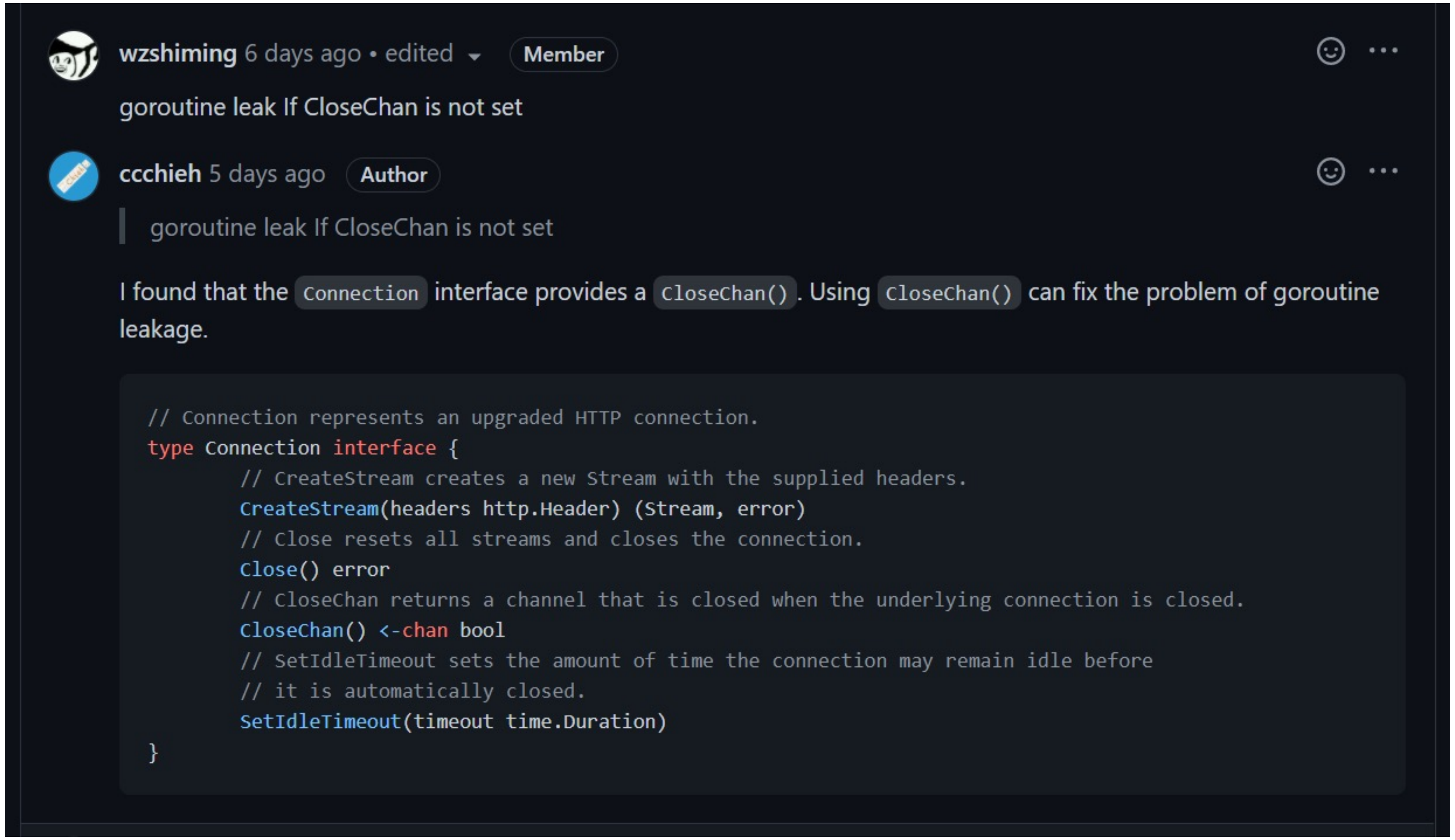
Reviewer



wzshiming 6 days ago • edited Member

goroutine leak If CloseChan is not set

ccchieh 5 days ago Author

> goroutine leak If CloseChan is not set

I found that the `Connection` interface provides a `CloseChan()`. Using `CloseChan()` can fix the problem of goroutine leakage.

```
// Connection represents an upgraded HTTP connection.
type Connection interface {
        // CreateStream creates a new Stream with the supplied headers.
        CreateStream(headers http.Header) (Stream, error)
        // Close resets all streams and closes the connection.
        Close() error
        // CloseChan returns a channel that is closed when the underlying connection is closed.
        CloseChan() <-chan bool
        // SetIdleTimeout sets the amount of time the connection may remain idle before
        // it is automatically closed.
        SetIdleTimeout(timeout time.Duration)
}
```

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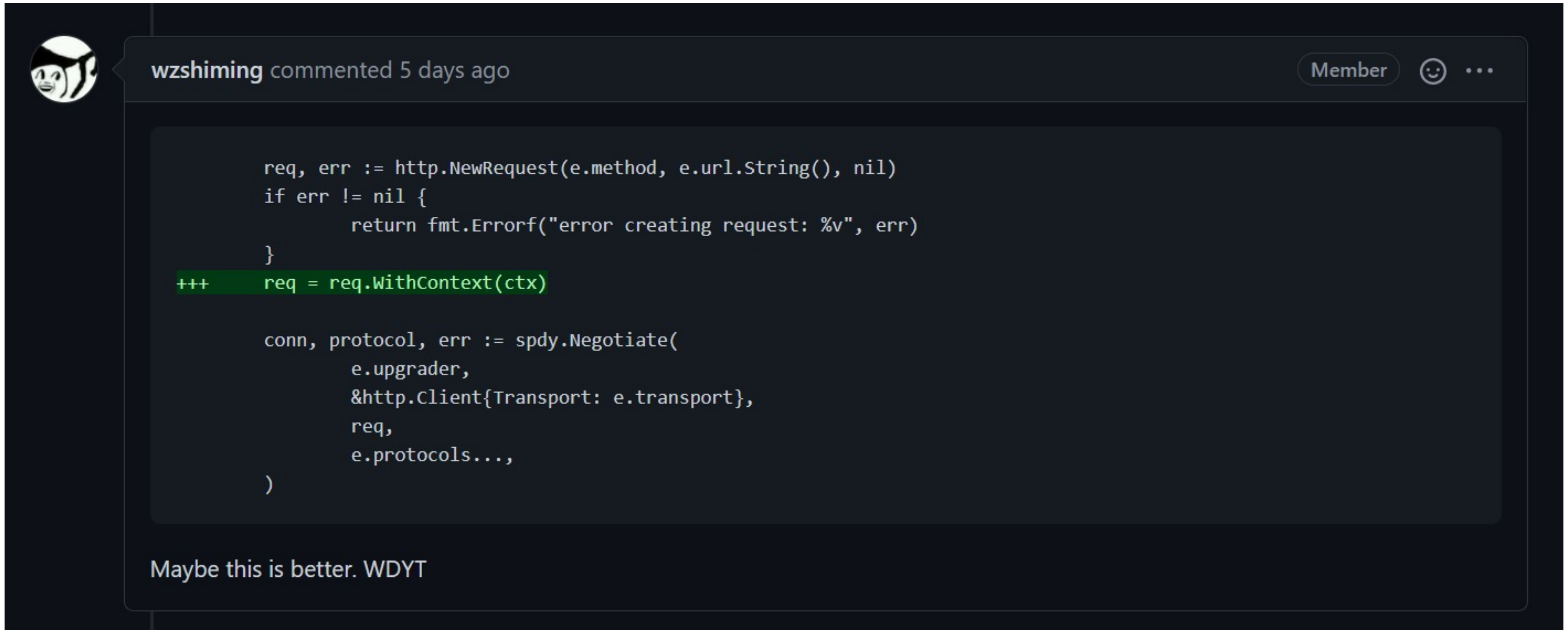
Reviewer



wzshiming commented 5 days ago

Member

```
        req, err := http.NewRequest(e.method, e.url.String(), nil)
        if err != nil {
                return fmt.Errorf("error creating request: %v", err)
        }
+++     req = req.WithContext(ctx)

        conn, protocol, err := spdy.Negotiate(
                e.upgrader,
                &http.Client{Transport: e.transport},
                req,
                e.protocols...,
        )
```

Maybe this is better. WDYT

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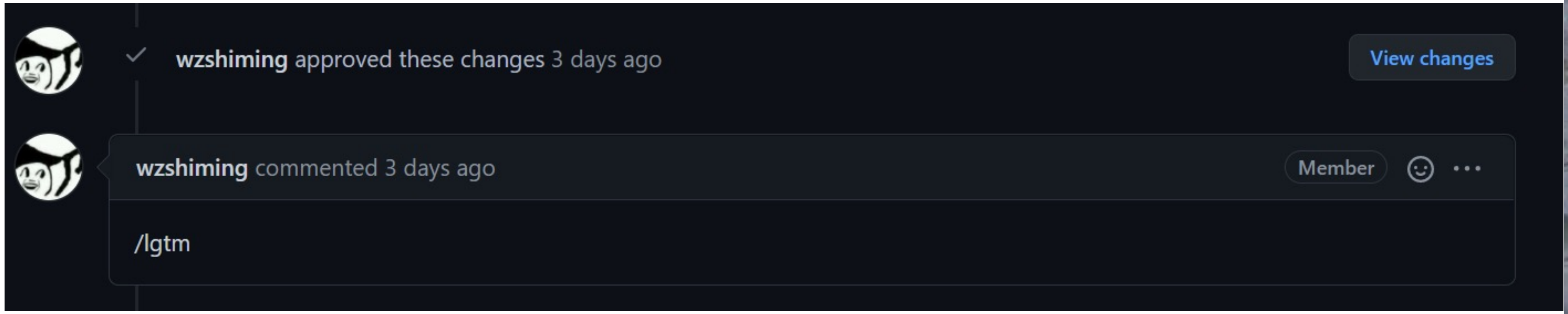
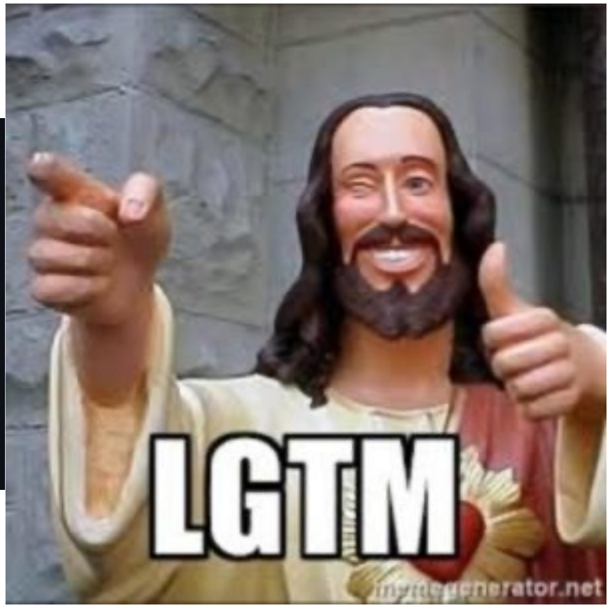
Reviewer


wzshiming approved these changes 3 days ago

wzshiming commented 3 days ago

/lgtm



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