updated at 2020-02-19

搭建kubernetes环境

环境

- Ubuntu 18.04
- kubernetes v1.13
- docker-ce 18.06

> kubeadm now properly recognizes Docker 18.09.0 and newer, but still treats 18.06 as the default supported version.

选择阿里的仓库进行部署。

安装docker

可参考Docker CE 镜像源站

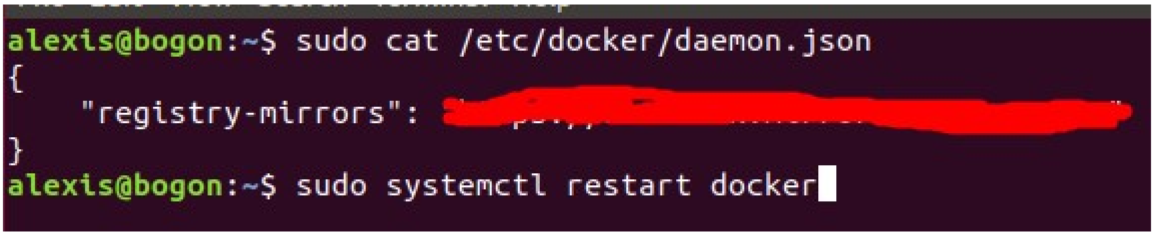
```
# step 1: 安装必要的一些系统工具
sudo apt-get update
sudo apt-get -y install apt-transport-https ca-certificates curl software-properties-common
# step 2: 安装GPG证书
curl -fsSL http://mirrors.aliyun.com/docker-ce/linux/ubuntu/gpg | sudo apt-key add -
# Step 3: 写入软件源信息
sudo add-apt-repository "deb [arch=amd64] http://mirrors.aliyun.com/docker-ce/linux/ubuntu $(lsb_release -cs) stable"
# Step 4: 更新并安装 Docker-CE
sudo apt-get -y update
sudo apt-get -y install docker-ce

# 安装指定版本的Docker-CE:
# Step 1: 查找Docker-CE的版本:
# apt-cache madison docker-ce
#   docker-ce | 17.03.1~ce-0~ubuntu-xenial | http://mirrors.aliyun.com/docker-ce/linux/ubuntu xenial/stable amd64 Packages
#   docker-ce | 17.03.0~ce-0~ubuntu-xenial | http://mirrors.aliyun.com/docker-ce/linux/ubuntu xenial/stable amd64 Packages
# Step 2: 安装指定版本的Docker-CE: (VERSION 例如上面的 17.03.1~ce-0~ubuntu-xenial)
# sudo apt-get -y install docker-ce=[VERSION]
sudo apt-get -y install docker-ce=18.06.1~ce~3-0~ubuntu
```

非root用户使用docker

```
sudo groupadd docker
sudo gpasswd -a ${USER} docker
sudo systemctl restart docker
#之后需要注销当前用户再登录
```

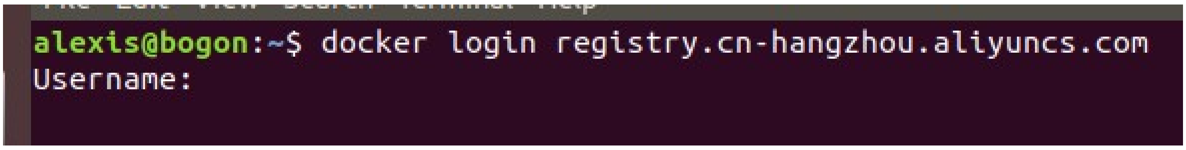
使用阿里云镜像服务作为docker仓库。参考镜像基本操作、官方镜像加速

先配置官方镜像的加速器



```
alexis@bogon:~$ sudo cat /etc/docker/daemon.json
{
    "registry-mirrors": [redacted]
}
alexis@bogon:~$ sudo systemctl restart docker
```

使用非官方镜像



```
alexis@bogon:~$ docker login registry.cn-hangzhou.aliyuncs.com
Username:
```

安装kubernetes

可参考https://opsx.alibaba.com/mirror?lang=zh-CN中kubernetes的帮助部分。

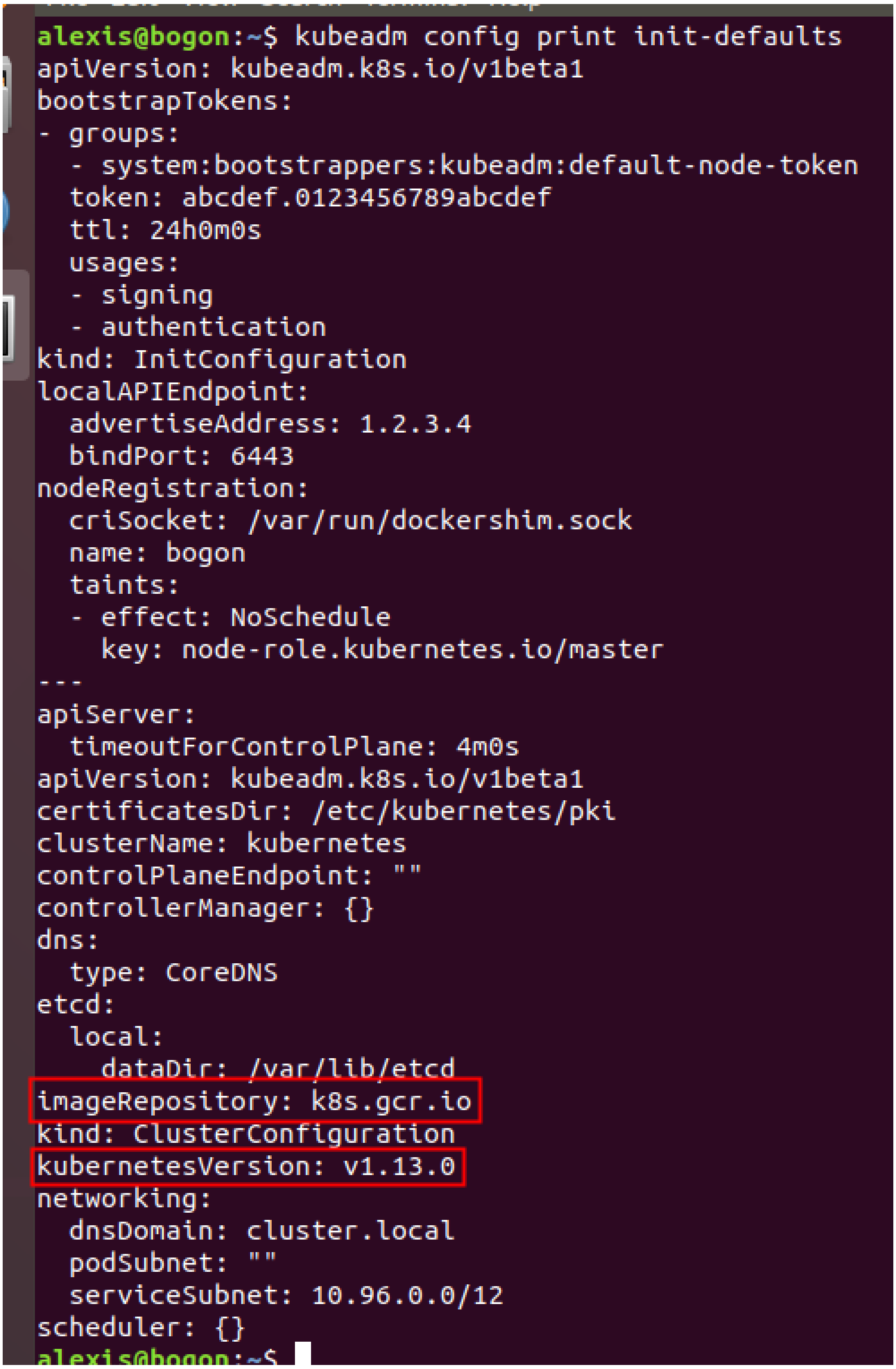
```
apt-get update && apt-get install -y apt-transport-https
curl https://mirrors.aliyun.com/kubernetes/apt/doc/apt-key.gpg | apt-key add -
cat <<EOF >/etc/apt/sources.list.d/kubernetes.list
deb https://mirrors.aliyun.com/kubernetes/apt/ kubernetes-xenial main
EOF
apt-get update
apt-get install -y kubelet kubeadm kubectl
```

- kubelet运行在Cluster所有节点上，负责启动Pod和容器。
- kubeadm用于初始化Cluster。
- kubectl是Kubernetes命令行工具。通过kubectl可以部署和管理应用，查看各种资源，创建、删除和更新各种组件。

添加kubeadm、kubectl的命令行补齐（需要先安装bash-completion）

```
echo "source <(kubeadm completion bash)" >> ~/.bashrc
echo "source <(kubectl completion bash)" >> ~/.bashrc
```

使用`kubeadm config print init-defaults`查看Master节点初始化的配置

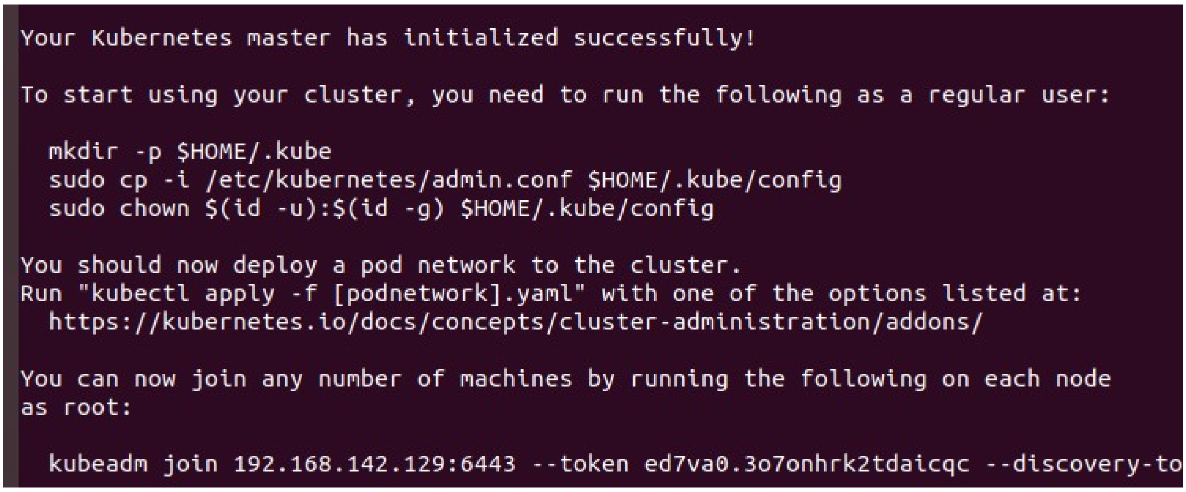


```
alexis@bogon:~$ kubeadm config print init-defaults
apiVersion: kubeadm.k8s.io/v1beta1
bootstrapTokens:
- groups:
  - system:bootstrappers:kubeadm:default-node-token
  token: abcdef.0123456789abcdef
  ttl: 24h0m0s
  usages:
  - signing
  - authentication
kind: InitConfiguration
localAPIEndpoint:
  advertiseAddress: 1.2.3.4
  bindPort: 6443
nodeRegistration:
  criSocket: /var/run/dockershim.sock
  name: bogon
  taints:
  - effect: NoSchedule
    key: node-role.kubernetes.io/master
---
apiServer:
  timeoutForControlPlane: 4m0s
apiVersion: kubeadm.k8s.io/v1beta1
certificatesDir: /etc/kubernetes/pki
clusterName: kubernetes
controlPlaneEndpoint: ""
controllerManager: {}
dns:
  type: CoreDNS
etcd:
  local:
    dataDir: /var/lib/etcd
imageRepository: k8s.gcr.io
kind: ClusterConfiguration
kubernetesVersion: v1.13.0
networking:
  dnsDomain: cluster.local
  podSubnet: ""
  serviceSubnet: 10.96.0.0/12
scheduler: {}
alexis@bogon:~$
```

这里需要事先==关闭swap分区==。更改kubernetes docker镜像仓库，同时需要事先选择Pod网络插件，根据官方文档配置`--pod-network-cidr`参数，这里选择Flannel插件。

```
sudo kubeadm init --image-repository 'registry.aliyuncs.com/google_containers' --kubernetes-version v1.13.0 --pod-network-cidr=10.244.0.0/16
```

成功的话会有这种提示



```
Your Kubernetes master has initialized successfully!

To start using your cluster, you need to run the following as a regular user:

  mkdir -p $HOME/.kube
  sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
  sudo chown $(id -u):$(id -g) $HOME/.kube/config

You should now deploy a pod network to the cluster.
Run "kubectl apply -f [podnetwork].yaml" with one of the options listed at:
  https://kubernetes.io/docs/concepts/cluster-administration/addons/

You can now join any number of machines by running the following on each node
as root:

  kubeadm join 192.168.142.129:6443 --token ed7va0.3o7onhrk2tdaicqc --discovery-to
```

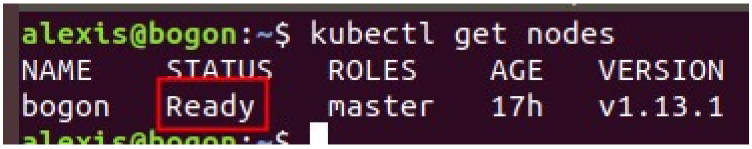
按提示继续操作

```
mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
```

Pod网络插件

```
sudo kubectl apply -f
https://raw.githubusercontent.com/coreos/flannel/master/Documentation/kube-
flannel.yml
```

一切正常的话Master节点会是Ready状态。



```
alexis@bogon:~$ kubectl get nodes
NAME     STATUS   ROLES    AGE   VERSION
bogon    Ready    master   17h   v1.13.1
alexis@bogon:~$
```

Master节点默认不参与Pod的调度，如果希望部署单节点的Kubernetes，可以跑下面这个命令

```
#恢复原来的状态，执行kubectl taint node <node name> node-
role.kubernetes.io/master="":NoSchedule
kubectl taint nodes --all node-role.kubernetes.io/master-
```

添加kubernetes node节点（待续）

更新

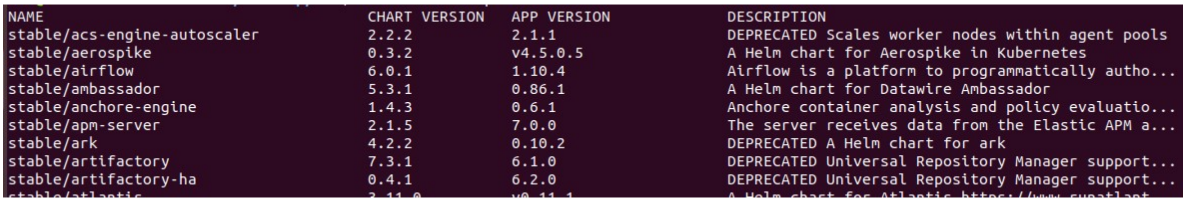
```
sudo kubeadm upgrade plan
sudo kubeadm upgrade apply xxx
```

部署Helm包管理器

参考Installing Helm，这里使用官方脚本安装。Helm的stable仓库可以更换为阿里云的仓库，参考Helm使用

```
# 安装
curl https://raw.githubusercontent.com/helm/helm/master/scripts/get-helm-3 | bash

#添加命令行补齐
echo "source <(helm completion bash)" >> ~/.bashrc

# 添加仓库
helm repo add stable https://kubernetes-charts.storage.googleapis.com/
helm repo add incubator https://aliacs-app-catalog.oss-cn-hangzhou.aliyuncs.com/charts-incubator/
helm repo update
```

`helm search repo`就可以看到所有的chart（相当于软件包）



```
NAME                                    CHART VERSION   APP VERSION             DESCRIPTION
stable/acs-engine-autoscaler            2.2.2           2.1.1                   DEPRECATED Scales worker nodes within agent pools
stable/aerospike                        0.3.2           v4.5.0.5                A Helm chart for Aerospike in Kubernetes
stable/airflow                          6.0.1           1.10.4                  Airflow is a platform to programmatically autho...
stable/ambassador                       5.3.1           0.86.1                  A Helm chart for Datawire Ambassador
stable/anchore-engine                   1.4.3           0.6.1                   Anchore container analysis and policy evaluatio...
stable/apm-server                       2.1.5           7.0.0                   The server receives data from the Elastic APM a...
stable/ark                              4.2.2           0.10.2                  DEPRECATED A Helm chart for ark
stable/artifactory                      7.3.1           6.1.0                   DEPRECATED Universal Repository Manager support...
stable/artifactory-ha                   0.4.1           6.2.0                   DEPRECATED Universal Repository Manager support...
stable/atlantic                         3.11.0          v0.11.1                 A Helm chart for Atlantis https://www.runatlant...
```

（可选）Draft & vscode

参考Quickstart Guide

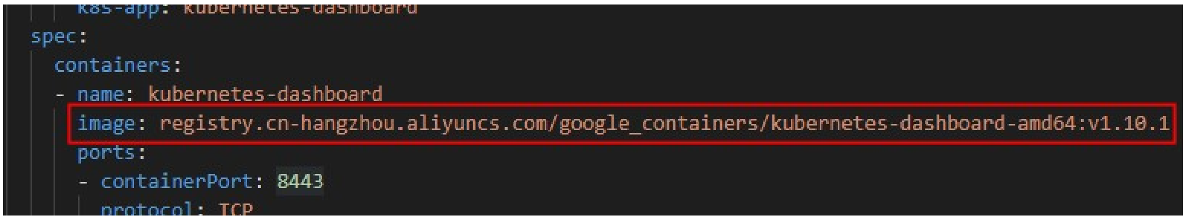
```
tar -xzvf draft-v0.14.1-linux-amd64.tar.gz
mv linux-amd64/draft /usr/local/bin/draft
draft init
```

vscode安装插件Docker、Kubernetes

（可选）部署kubernetes dashboard（待续）

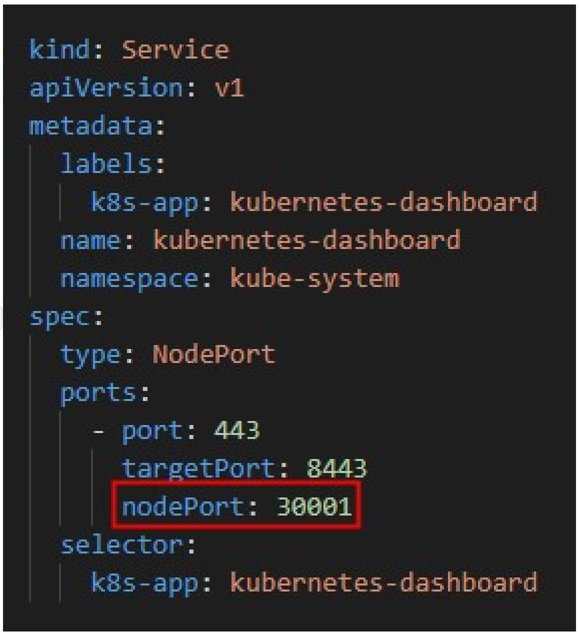
可参考以下url进行部署，不同的地方是这里的`image`改成阿里上搜索到的镜像

- https://www.cnblogs.com/fengzhihai/p/9851470.html
- https://github.com/kubernetes/dashboard

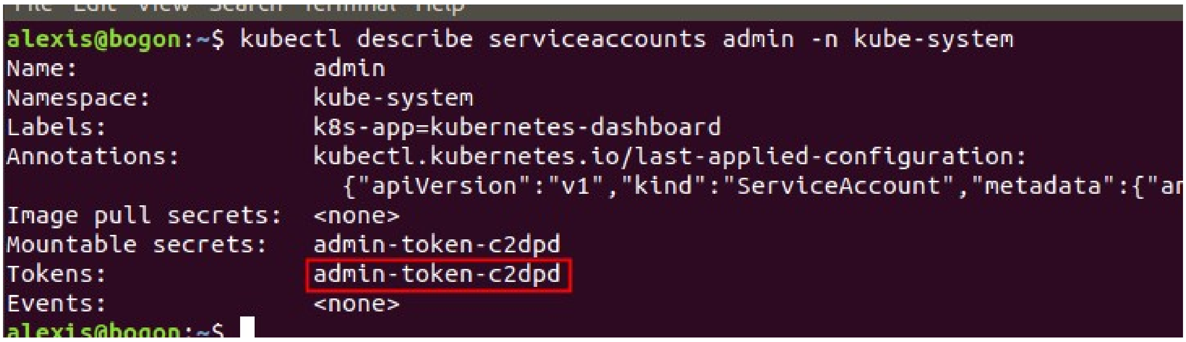


```
    k8s-app: kubernetes-dashboard
spec:
  containers:
  - name: kubernetes-dashboard
    image: registry.cn-hangzhou.aliyuncs.com/google_containers/kubernetes-dashboard-amd64:v1.10.1
    ports:
    - containerPort: 8443
      protocol: TCP
```

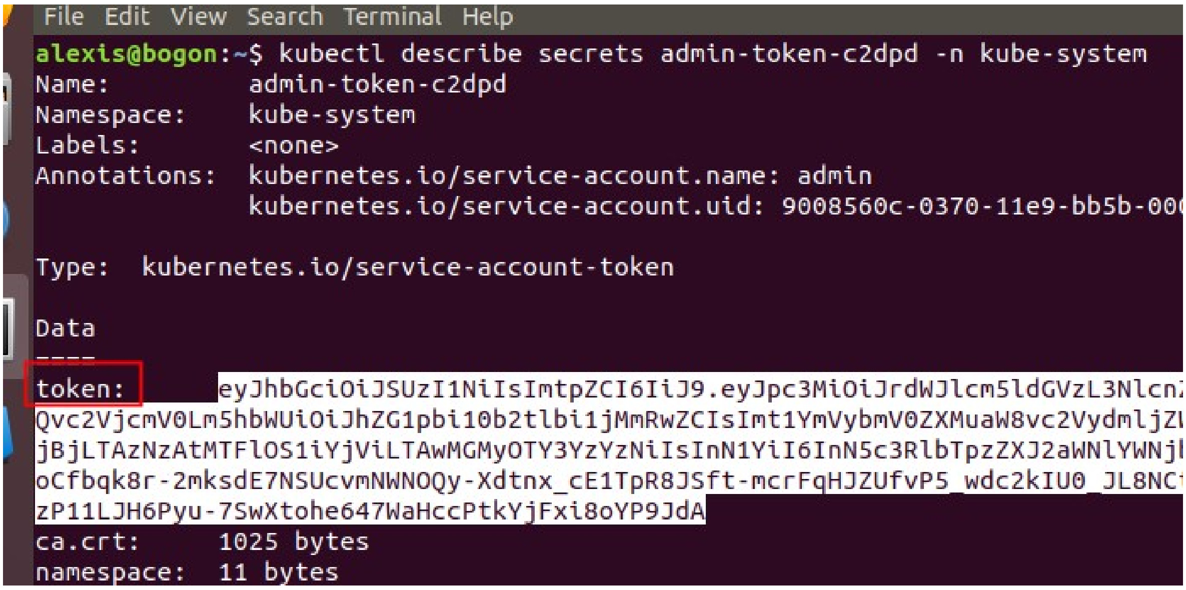
此外也可以修改`nodePort`



```yaml
kind: Service
apiVersion: v1
metadata:
  labels:
    k8s-app: kubernetes-dashboard
  name: kubernetes-dashboard
  namespace: kube-system
spec:
  type: NodePort
  ports:
    - port: 443
      targetPort: 8443
      nodePort: 30001
  selector:
    k8s-app: kubernetes-dashboard
```

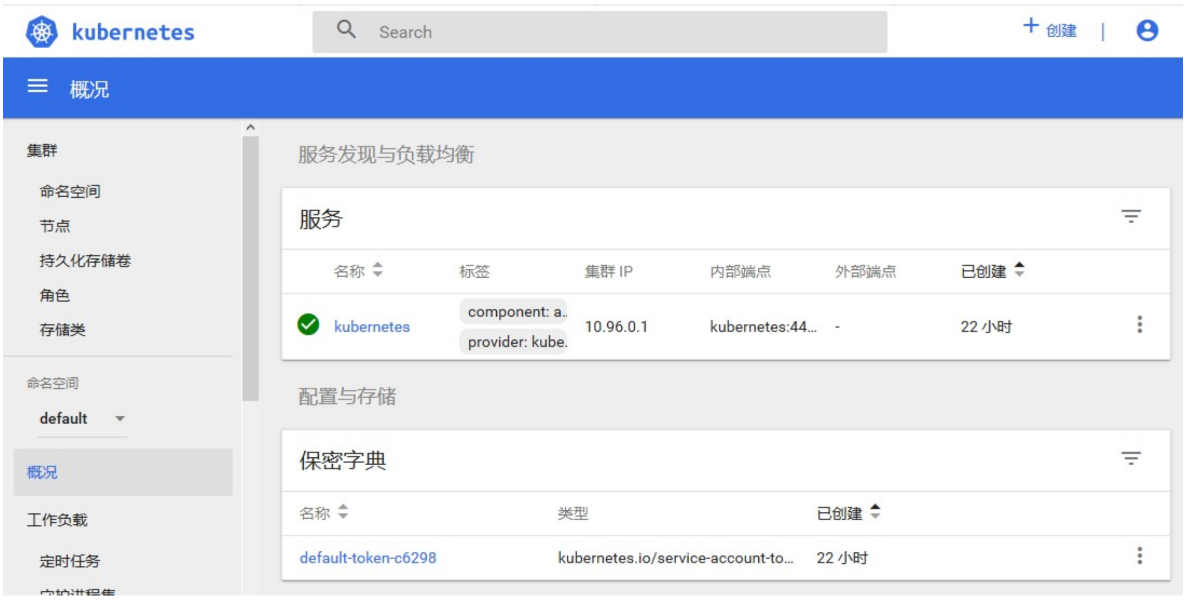


```
alexis@bogon:~$ kubectl describe serviceaccounts admin -n kube-system
Name:                admin
Namespace:           kube-system
Labels:              k8s-app=kubernetes-dashboard
Annotations:         kubectl.kubernetes.io/last-applied-configuration:
                       {"apiVersion":"v1","kind":"ServiceAccount","metadata":{"an
Image pull secrets:  <none>
Mountable secrets:   admin-token-c2dpd
Tokens:              admin-token-c2dpd
Events:              <none>
alexis@bogon:~$
```



```
alexis@bogon:~$ kubectl describe secrets admin-token-c2dpd -n kube-system
Name:         admin-token-c2dpd
Namespace:    kube-system
Labels:       <none>
Annotations:  kubernetes.io/service-account.name: admin
              kubernetes.io/service-account.uid: 9008560c-0370-11e9-bb5b-000

Type:  kubernetes.io/service-account-token

Data
====
token:      eyJhbGciOiJSUzI1NiIsImtpZCI6IiJ9.eyJpc3MiOiJrdWJlcm5ldGVzL3Nlcn
Qvc2VjcmV0Lm5hbWUiOiJhZG1pbi10b2tlbi1jMmRwZCIsImt1YmVybmV0ZXMuaW8vc2VydmljZW
jBjLTAzNzAtMTFlOS1iYjViLTAwMGMyOTY3YzYzNiIsInN1YiI6InN5c3RlbTpzZXJ2aWNlYWNjb
oCfbqk8r-2mksdE7NSUcvmNWNOQy-Xdtnx_cE1TpR8JSft-mcrFqHJZUfvP5_wdc2kIU0_JL8NCt
zP11LJH6Pyu-7SwXtohe647WaHccPtkYjFxi8oYP9JdA
ca.crt:     1025 bytes
namespace:  11 bytes
```

使用token登录后的页面



服务发现与负载均衡

服务

名称	标签	集群 IP	内部端点	外部端点	已创建
kubernetes	component: a.. provider: kube.	10.96.0.1	kubernetes:44...	-	22 小时

配置与存储

保密字典

名称	类型	已创建
default-token-c6298	kubernetes.io/service-account-to...	22 小时

Reference

[Install and Set Up kubectl]

[Creating a single master cluster with kubeadm]