Kubernetes

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安装

[root@centos-master ~]# systemctl disable firewalld iptables-services

[root@centos-master ~]# systemctl stop iptables-services firewalld

[root@centos-minion ~]# systemctl disable firewalld iptables-services

[root@centos-minion ~]# systemctl stop iptables-services firewalld

[root@centos-master ~]# yum -y install kubernetes etcd

[root@centos-minion ~]# yum -y install kubernetes etcd

Master/Minion:

vim /etc/kubernetes/config

```
# logging to stderr means we get it in the systemd journal
KUBE_LOGTOSTDERR="--logtostderr=true"

# journal message level, 0 is debug
KUBE_LOG_LEVEL="--v=0"

# Should this cluster be allowed to run privileged docker containers
KUBE_ALLOW_PRIV="--allow_privileged=false"

KUBE_MASTER="--master=http://centos-master:8080"
KUBE_ETCD_SERVERS="--etcd_servers=http://centos-master:4001"

# How the controller-manager, scheduler, and proxy find the apiserver
# KUBE_MASTER="--master=http://127.0.0.1:8080"
```

Master

[root@centos-master ~]# vim /etc/kubernetes/apiserver

```
# The port on the local server to listen on.
# KUBE_API_PORT="--port=8080"

# Port minions listen on
# KUBELET_PORT="--kubelet_port=10250"

# Comma separated list of nodes in the etcd cluster
# KUBE_ETCD_SERVERS="--etcd_servers=http://127.0.0.1:2379"

# Address range to use for services
KUBE_SERVICE_ADDRESSES="--service-cluster-ip-range=10.254.0.0/16"

# default admission control policies
KUBE_ADMISSION_CONTROL="--admission_control=NamespaceLifecycle,NamespaceE
ount,ResourceQuota"

# Add your own!
# KUBE_API_ARGS=""
KUBE_API_ADDRESS="--address=0.0.0.0"
KUBE_API_PORT="--port=8080"
```

[root@centos-master ~]# for SERVICES in etcd kube-apiserver kube-controller-manager
kube-scheduler
do
systemctl restart $SERVICES
systemctl enable $SERVICES
systemctl status $SERVICES
done

[root@centos-master ~]# systemctl status etcd
[root@centos-master ~]# systemctl status kube-apiserver.service
[root@centos-master ~]# systemctl status kube-controller-manager.service
[root@centos-master ~]# systemctl status kube-scheduler.service

```
[root@centos-master ~]# ps aux |grep kube
kube        789  0.2  0.4  17308  8544 ?        Ssl  06:29   0:00 /usr/bin/kube-scheduler
r=http://centos-master:8080
kube        790  0.7  0.5  28036 11260 ?        Ssl  06:29   0:00 /usr/bin/kube-controller
0 --master=http://centos-master:8080
kube       1207  3.5  0.7  34736 14420 ?        Ssl  06:30   0:00 /usr/bin/kube-apiserver
servers=http://centos-master:4001 --address=0.0.0.0 --port=8080 --allow_privileged=false
4.0.0/16 --admission_control=NamespaceLifecycle,NamespaceExists,LimitRanger,SecurityConte
ota
```

Node:

[root@centos-minion ~]# vim /etc/kubernetes/kubelet

```
# The address for the info server to serve on (set to 0.0.0.0 or "" for a
KUBELET_ADDRESS="--address=0.0.0.0"

# The port for the info server to serve on
KUBELET_PORT="--port=10250"

# You may leave this blank to use the actual hostname
KUBELET_HOSTNAME="--hostname_override=centos-minion"

# location of the api-server
KUBELET_API_SERVER="--api_servers=http://centos-master:8080"

# Add your own!
KUBELET_ARGS=""
~
```

[root@centos-minion ~]# systemctl enable kube-proxy kubelet docker

[root@centos-minion ~]# systemctl restart kube-proxy kubelet docker

```
[root@centos-minion ~]# ps aux |grep kube
root      10560  0.2  0.4 193408  9260 ?        Ssl  06:37   0:00 /usr/bin/kube-proxy --
tp://centos-master:8080
root      10757 13.8  0.5 272680 12216 ?        Ssl  06:37   0:00 /usr/bin/kubelet --log
http://centos-master:8080 --address=0.0.0.0 --port=10250 --hostname_override=centos-min
root      10792  0.0  0.0 112640   960 pts/1    R+   06:37   0:00 grep --color=auto kube
[root@centos-minion ~]#
[root@centos-minion ~]# ps aux |grep docker
root      10624  1.3  0.7 429312 15624 ?        Ssl  06:37   0:00 /usr/bin/docker daemon
```

Master:

```
[root@centos-master ~]# kubectl get node
NAME              LABELS                                     STATUS
centos-minion    kubernetes.io/hostname=centos-minion     Ready
[root@centos-master ~]#
[root@centos-master ~]# kubectl cluster-info
Kubernetes master is running at http://localhost:8080
[root@centos-master ~]#
```

Kubernetes 基本命令：

```
[root@centos-master ~]# kubectl
kubectl controls the Kubernetes cluster manager.

Find more information at https://github.com/GoogleCloudPlatform/kubernete

Usage:
  kubectl [flags]
  kubectl [command]

Available Commands:
  get            Display one or many resources
  describe       Show details of a specific resource or group of resource
  create         Create a resource by filename or stdin
  replace        Replace a resource by filename or stdin.
  patch          Update field(s) of a resource by stdin.
  delete         Delete a resource by filename, stdin, resource and name,
  namespace      SUPERCEDED: Set and view the current Kubernetes namespac
  logs           Print the logs for a container in a pod.
  rolling-update Perform a rolling update of the given ReplicationControl
  scale          Set a new size for a Replication Controller.
  exec           Execute a command in a container.
  port-forward   Forward one or more local ports to a pod.
  proxy          Run a proxy to the Kubernetes API server

[root@centos-master ~]# kubectl describe node centos-minion
Name:                     centos-minion
Labels:                   kubernetes.io/hostname=centos-minion
CreationTimestamp:        Thu, 28 Jan 2016 06:50:54 +0800
Conditions:
  Type           Status   LastHeartbeatTime                          LastTrans
essage
  Ready          True     Thu, 28 Jan 2016 07:07:47 +0800            Thu, 28 J
g ready status
Addresses:       192.168.0.102
Capacity:
 pods:           40
 cpu:            1
 memory:         2042524Ki
Version:
 Kernel Version:               3.10.0-229.el7.x86_64
 OS Image:                     CentOS Linux 7 (Core)
 Container Runtime Version:    docker://1.8.2-el7.centos
 Kubelet Version:              v1.0.3.34+b9a88a7d0e357b
 Kube-Proxy Version:           v1.0.3.34+b9a88a7d0e357b
ExternalID:                    centos-minion


[root@centos-master ~]# kubectl get namespace
NAME        LABELS     STATUS
default     <none>     Active
[root@centos-master ~]#
[root@centos-master ~]# kubectl describe namespace default
Name:   default
Labels: <none>
Status: Active

No resource quota.

No resource limits.
```

Node:

```
[root@centos-minion ~]# docker pull nginx
Using default tag: latest
Trying to pull repository docker.io/library/nginx ... latest: Pulling fro
77e39ee82117: Downloading [=>
5eb1402f0414: Download complete
2f4509f0578a: Download complete
cc87edc856de: Download complete
9b35f2e19927: Downloading [=======>
6fbf62f05baf: Download complete
6fbf62f05baf: Pulling fs layer
2b1e900b514d: Download complete
2b1e900b514d: Pulling fs layer

[root@centos-minion ~]# docker images
REPOSITORY              TAG               IMAGE ID          CREATED
docker.io/nginx         latest            2b1e900b514d      26 hours ago
[root@centos-minion ~]#
[root@centos-minion ~]# docker tag 2b1e nginx
[root@centos-minion ~]# docker images
REPOSITORY              TAG               IMAGE ID          CREATED
docker.io/nginx         latest            2b1e900b514d      26 hours ago
nginx                   latest            2b1e900b514d      26 hours ago
```

Master:

[root@centos-master ~]# vim nginx-pod.yaml

```
apiVersion: v1
kind: Pod
metadata:
 name: nginx
spec:
 containers:
   - name: nginx
     image: nginx
     ports:
       - containerPort: 80
~
```

```
[root@centos-master ~]# kubectl create -f nginx-pod.yaml
Error from server: error when creating "nginx-pod.yaml": Pod "nginx" is forbidden: no API
 default/default, retry after the token is automatically created and added to the service

[root@centos-master ~]# kubectl get pods
NAME          READY       STATUS      RESTARTS      AGE
[root@centos-master ~]#
```

[root@centos-master ~]# vim /etc/kubernetes/apiserver

```
espaceLifecycle,NamespaceExists,LimitRanger,SecurityContextDeny,ServiceA

paceLifecycle,NamespaceExists,LimitRanger,SecurityContextDeny,ResourceQu
```

```
[root@centos-master ~]# systemctl restart kube-apiserver
[root@centos-master ~]# kubectl create -f nginx-pod.yaml
pods/nginx
[root@centos-master ~]# kubectl get pods
NAME        READY       STATUS      RESTARTS    AGE
nginx       0/1         Pending     0           6s
[root@centos-master ~]#
[root@centos-master ~]# kubectl get pods
NAME        READY       STATUS      RESTARTS    AGE
nginx       0/1         Pending     0           16s
[root@centos-master ~]# kubectl get pods
NAME        READY       STATUS                                      RESTAR
nginx       0/1         Image: nginx is ready, container is creating   0


[root@centos-master ~]# kubectl describe pod nginx  |grep pause
   Thu, 28 Jan 2016 07:47:11 +0800       Thu, 28 Jan 2016 07:47:11 +0800 1
ailedSync               Error syncing pod, skipping: image pull failed fc
 be because there are no credentials on this request.  details: (unable t
   Thu, 28 Jan 2016 07:47:11 +0800       Thu, 28 Jan 2016 07:47:11 +0800 1
ed container POD      failed  Failed to pull image "gcr.io/google_conta
/google_containers/pause:0.8.0, this may be because there are no credenti
egistry endpoint https://gcr.io/v0/
   Thu, 28 Jan 2016 07:45:01 +0800       Thu, 28 Jan 2016 07:49:21 +0800 2
ed container POD      failed  Failed to pull image "gcr.io/google_conta
/google_containers/pause:0.8.0, this may be because there are no credenti
egistry endpoint https://gcr.io/v0/
   Thu, 28 Jan 2016 07:45:01 +0800       Thu, 28 Jan 2016 07:49:21 +0800 2
c       Error syncing pod, skipping: image pull failed for gcr.io/google_
e are no credentials on this request.  details: (unable to ping registry
   Thu, 28 Jan 2016 07:46:06 +0800       Thu, 28 Jan 2016 07:50:27 +0800 3
c       Error syncing pod, skipping: image pull failed for gcr.io/google
```

Node:

[root@centos-minion ~]# vim /etc/sysconfig/docker

INSECURE_REGISTRY='--insecure-registry gcr.io'

```
[root@centos-minion ~]# docker pull docker.io/kubernetes/pause
Using default tag: latest
Trying to pull repository docker.io/kubernetes/pause ... latest: Pulling
511136ea3c5a: Pull complete
e244e638e26e: Pull complete
6c4579af347b: Already exists
Digest: sha256:2088df8eb02f10aae012e6d4bc212cabb0ada93cb05f09e504af0c9811
Status: Downloaded newer image for docker.io/kubernetes/pause:latest

[root@centos-minion ~]# docker images
REPOSITORY                  TAG         IMAGE ID        CREA
docker.io/nginx             latest      2b1e900b514d    26 h
nginx                       latest      2b1e900b514d    26 h
docker.io/kubernetes/pause  latest      6c4579af347b    18 m
[root@centos-minion ~]# docker tag 6c4 pause
[root@centos-minion ~]# docker images
REPOSITORY                  TAG         IMAGE ID        CREA
nginx                       latest      2b1e900b514d    26 h
docker.io/nginx             latest      2b1e900b514d    26 h
docker.io/kubernetes/pause  latest      6c4579af347b    18 m
pause                       latest      6c4579af347b    18 m
```

```
[root@centos-minion ~]# docker tag docker.io/kubernetes/pause gcr.io/google_containers/pause:0.8.0
[root@centos-minion ~]# docker images
REPOSITORY                              TAG         IMAGE ID        CREATED         VIRTU
docker.io/nginx                         latest      2b1e900b514d    27 hours ago    134.4
nginx                                   latest      2b1e900b514d    27 hours ago    134.4
pause                                   latest      6c4579af347b    18 months ago   239.8
gcr.io/google_containers/pause          0.8.0       6c4579af347b    18 months ago   239.8
docker.io/kubernetes/pause              latest      6c4579af347b    18 months ago   239.8
```

Master:

```
[root@centos-master ~]# kubectl describe pod nginx
Name:                           nginx
Namespace:                      default
Image(s):                       nginx
Node:                           centos-minion/192.168.0.102
Labels:                         <none>
Status:                         Pending
Reason:
Message:
IP:
Replication Controllers:        <none>
Containers:
  nginx:
    Image:                      nginx
    State:                      Waiting
      Reason:                   Image: nginx is ready, container is creating
    Ready:                      False
    Restart Count:              0
Conditions:
  Type            Status
  Ready           False


Events:
  FirstSeen                             LastSeen                        C
essage
  Thu, 28 Jan 2016 08:13:54 +0800       Thu, 28 Jan 2016 08:13:54 +0800 1
eduling Binding rejected: binding "nginx" cannot be updated: pod nginx is
  Thu, 28 Jan 2016 08:13:54 +0800       Thu, 28 Jan 2016 08:13:54 +0800 1
uccessfully assigned nginx to centos-minion
```

```
[root@centos-master ~]# kubectl get pods
NAME        READY       STATUS      RESTARTS    AGE
nginx       1/1         Running     0           1m
[root@centos-master ~]# kubectl get pods
NAME        READY       STATUS      RESTARTS    AGE
nginx       1/1         Running     0           1m
[root@centos-master ~]# kubectl get pods
NAME        READY       STATUS      RESTARTS    AGE
nginx       1/1         Running     0           1m
[root@centos-master ~]# kubectl get pods
NAME        READY       STATUS      RESTARTS    AGE
nginx       1/1         Running     0           1m
[root@centos-master ~]#
[root@centos-master ~]# kubectl get pods
NAME        READY       STATUS      RESTARTS    AGE
nginx       1/1         Running     0           1m
[root@centos-master ~]#
[root@centos-master ~]# kubectl describe pod nginx
Name:                       nginx
Namespace:                  default
Image(s):                   nginx
Node:                       centos-minion/192.168.0.102
Labels:                     <none>
Status:                     Running
Reason:
```

Node:

```
[root@centos-minion ~]# docker ps
CONTAINER ID        IMAGE                               COMMAND
    PORTS               NAMES
c4603329ec70        nginx                               "nginx -g 'dae
                    k8s_nginx.d7d3eb2f_nginx_default_6dc8661a-c555-11e
955623a608bf        gcr.io/google_containers/pause:0.8.0    "/pause"
                    k8s_POD.ef28e851_nginx_default_6dc8661a-c555-11e5-

[root@centos-minion ~]# ping 172.17.0.2
PING 172.17.0.2 (172.17.0.2) 56(84) bytes of data.
64 bytes from 172.17.0.2: icmp_seq=1 ttl=64 time=0.115 ms
64 bytes from 172.17.0.2: icmp_seq=2 ttl=64 time=0.099 ms
^C
--- 172.17.0.2 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 999ms
rtt min/avg/max/mdev = 0.099/0.107/0.115/0.008 ms
[root@centos-minion ~]#
[root@centos-minion ~]# curl 172.17.0.2
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
    body {
        width: 35em;
        margin: 0 auto;
        font-family: Tahoma, Verdana, Arial, sans-serif;
    }
</style>
```

Master:

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx2
spec:
  containers:
    - name: nginx2
      image: nginx
      ports:
        - containerPort: 80
          hostport: 80
~
```
```
[root@centos-master ~]# kubectl create -f nginx2-pod.yaml
```

Node:
```
[root@centos-minion ~]# docker ps
CONTAINER ID        IMAGE                                  COMMAND
    PORTS                 NAMES
15048d36a9b4        nginx                                  "nginx -g 'dae
            k8s_nginx2.3e1eb99_nginx2_default_a332ee03-c556-1
7a8aa93def9b        gcr.io/google_containers/pause:0.8.0   "/pause"
    0.0.0.0:80->80/tcp    k8s_POD.98d1e889_nginx2_default_a332ee03-c556-11e
c4603329ec70        nginx                                  "nginx -g 'dae
            k8s_nginx.d7d3eb2f_nginx_default_6dc8661a-c555-11
955623a608bf        gcr.io/google_containers/pause:0.8.0   "/pause"
            k8s_POD.ef28e851_nginx_default_6dc8661a-c555-11e5
```
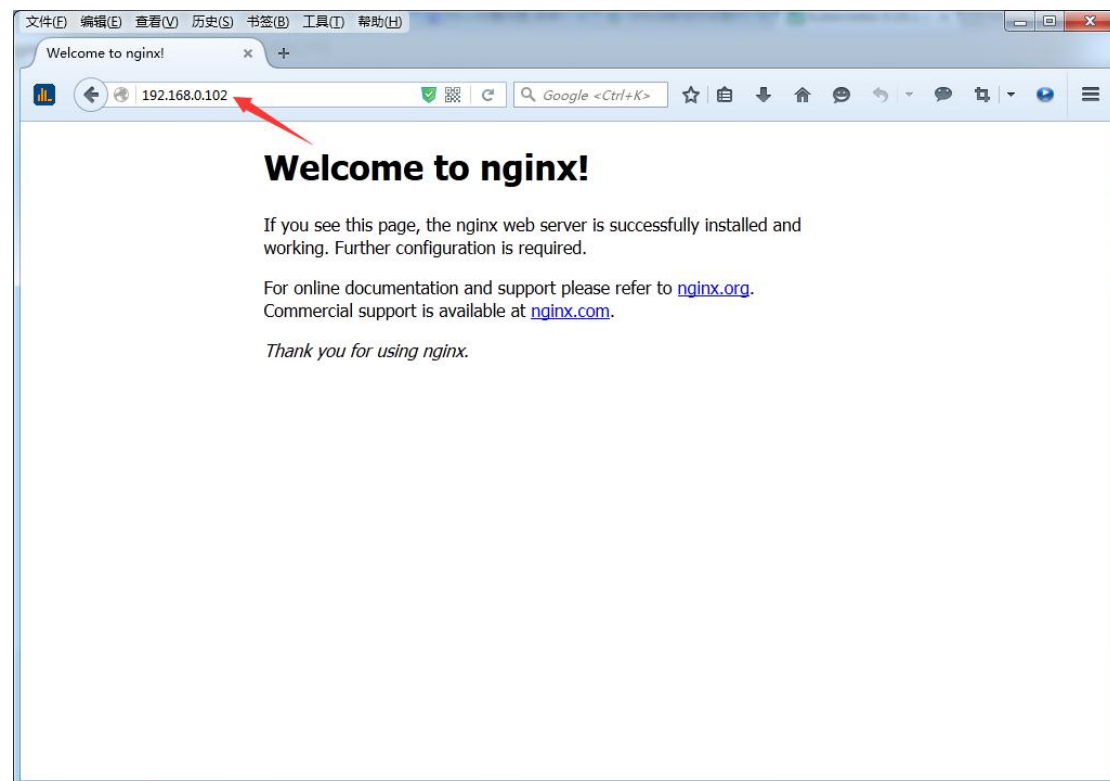

Kubernetes分布式集群架构

服务注册：
每个服务分配一个不变的 IP + 端口

服务注册：
每个服务分配一个不变的 IP + 端口
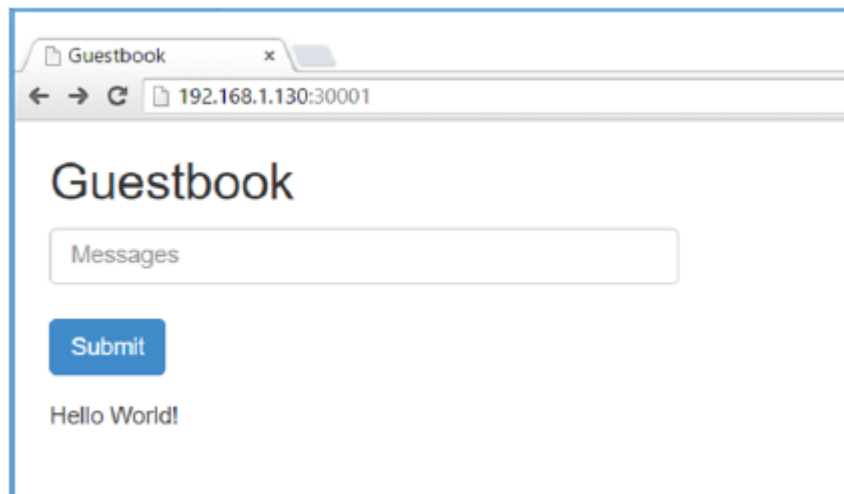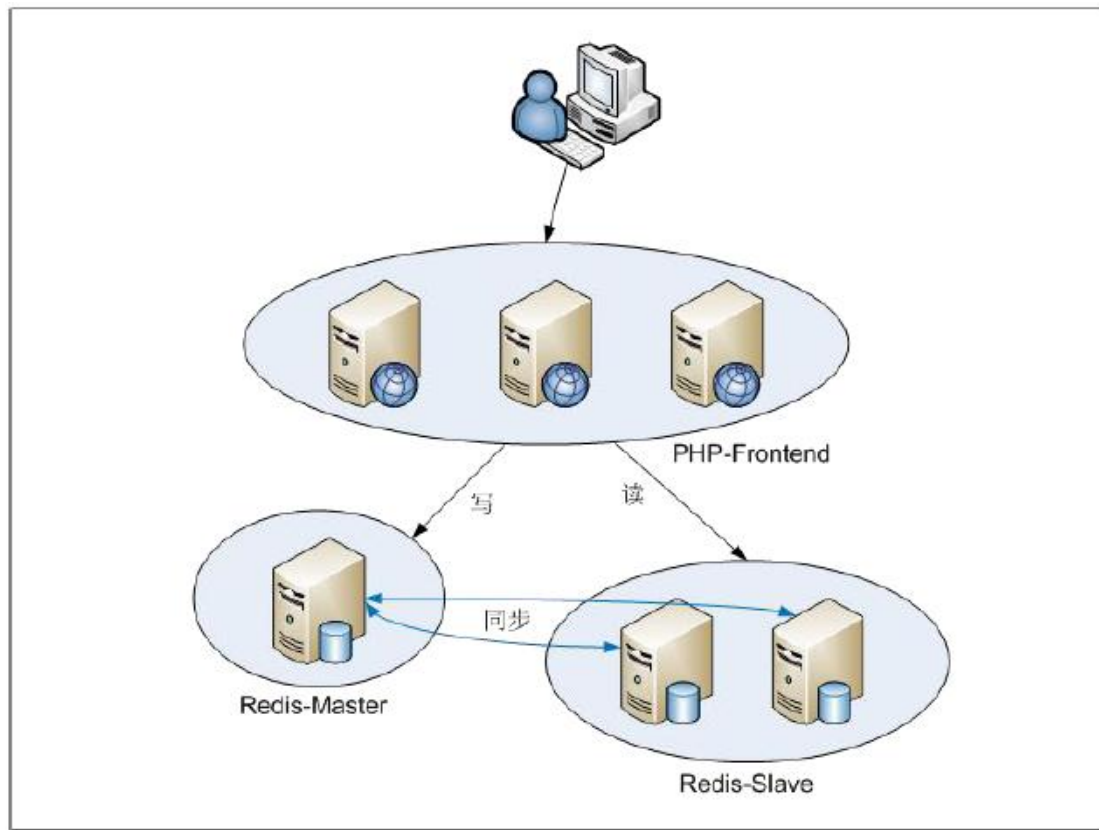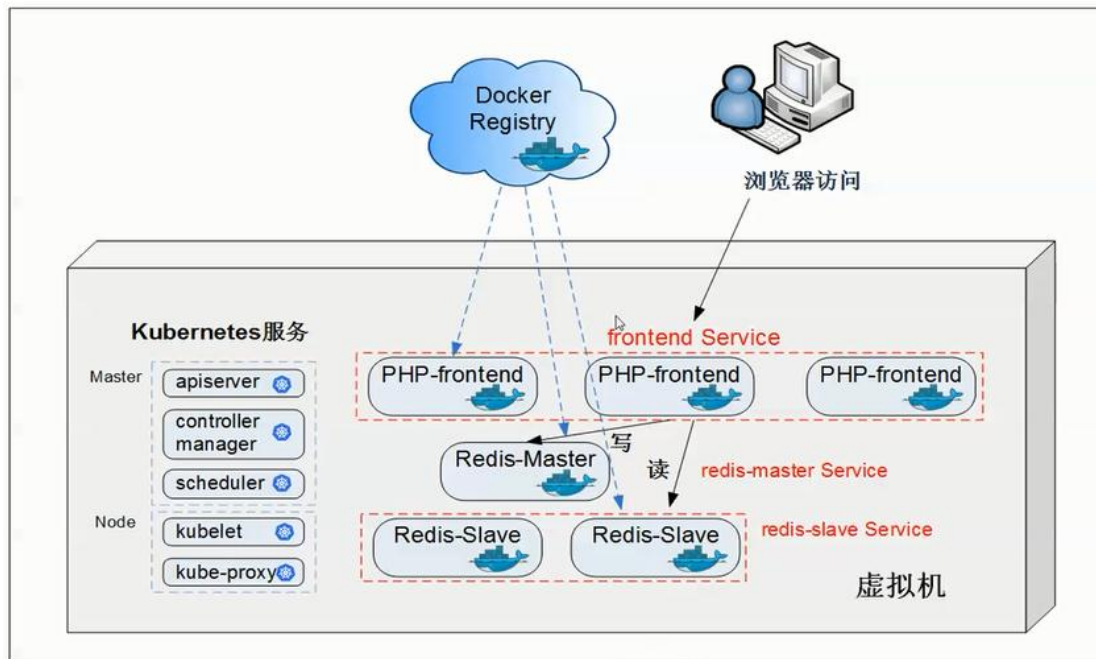
kubeguide/redis-master
public

1
STARS
865
PULLS

DETAILS

kubeguide/guestbook-php-frontend
public

1
STARS
787
PULLS

DETAILS

kubeguide/guestbook-redis-slave
public

```
[root@centos-minion ~]# docker search kubeguide/redis-master
INDEX       NAME                              DESCRIPTION
docker.io   docker.io/kubeguide/redis-master   redis-master with "Hello World!
[root@centos-minion ~]# docker pull kubeguide/redis-master
Using default tag: latest
Trying to pull repository docker.io/kubeguide/redis-master ...
```

```
[root@centos-minion ~]# docker pull kubeguide/guestbook-php-frontend^C
[root@centos-minion ~]# docker pull kubeguide/guestbook-redis-slave^C
[root@centos-minion ~]# docker images
REPOSITORY                                    TAG           IMAGE ID
docker.io/nginx                               latest        2b1e900b
nginx                                         latest        2b1e900b
docker.io/kubeguide/guestbook-php-frontend    latest        38658844
docker.io/kubeguide/redis-master              latest        423e126c
docker.io/kubeguide/guestbook-redis-slave     latest        5429ea4e
gcr.io/google_containers/pause                0.8.0         6c4579af
docker.io/kubernetes/pause                    latest        6c4579af
pause                                         latest        6c4579af
```

创建 redis-master Pod 和服务

```
apiVersion: v1
kind: ReplicationController
metadata:
  name: redis-master
  labels:
    name: redis-master
spec:
  replicas: 1
  selector:
    name: redis-master
  template:
    metadata:
      labels:
        name: redis-master
    spec:
      containers:
      - name: master
        image: kubeguide/redis-master
        ports:
        - containerPort: 6379
~
~
"redis-master-controller.yaml" 20L, 370C

[root@centos-master ~]# kubectl create -f redis-master-controller.yaml
replicationcontrollers/redis-master
[root@centos-master ~]# kubectl get pods
NAME                 READY     STATUS     RESTARTS    AGE
nginx                1/1       Running    0           1h
nginx2               1/1       Running    0           1h
redis-master-scv65   1/1       Running    0           13s
```

```
apiVersion: v1
kind: Service
metadata:
  name: redis-master
  labels:
    name: redis-master
spec:
  ports:
  - port: 6379
    targetPort: 6379
    selector:
    name: redis-master
~
~
~
~
~
~
~
~
~
~
~
"redis-master-service.yaml" 12L, 181C
```

```
[root@centos-master ~]# kubectl create -f redis-master-service.yaml
services/redis-master
[root@centos-master ~]# kubectl get pods
NAME                 READY   STATUS    RESTARTS    AGE
nginx                1/1     Running   0           1h
nginx2               1/1     Running   0           1h
redis-master-scv65   1/1     Running   0           4m
[root@centos-master ~]#
[root@centos-master ~]# kubectl get service
NAME           LABELS                                        SELECTOR           IP(S)          PORT(S)
kubernetes     component=apiserver,provider=kubernetes       <none>             10.254.0.1     443/TCP
redis-master   name=redis-master                             name=redis-master  10.254.75.126  6379/TCP
```

创建 redis-slave Pod 和服务

```
apiVersion: v1
kind: ReplicationController
metadata:
  name: redis-slave
  labels:
    name: redis-slave
spec:
  replicas: 2
  selector:
    name: redis-slave
  template:
    metadata:
      labels:
        name: redis-slave
    spec:
      containers:
      - name: slave
        image: kubeguide/guestbook-redis-slave
        env:
        - name: GET_HOSTS_FROM
          value: env
        ports:
        - containerPort: 6379
"redis-slave-controller.yaml" 23L, 439C
```

```
[root@centos-master ~]# kubectl create -f redis-slave-controller.yaml
[root@centos-master ~]# kubectl get pods
NAME                READY     STATUS     RESTARTS   AGE
nginx               1/1       Running    0          1h
nginx2              1/1       Running    0          1h
redis-master-scv65  1/1       Running    0          12m
redis-slave-eoak9   1/1       Running    0          45s
redis-slave-u0pcv   1/1       Running    0          55s


apiVersion: v1
kind: Service
metadata:
  name: redis-slave
  labels:
    name: redis-slave
spec:
  ports:
  - port: 6379
    selector:
      name: redis-slave
~
~
~
~
~
~
~
~
~
~
~
~
~
"redis-slave-service.yaml" 11L, 157C
```

```
[root@centos-master ~]# kubectl create -f redis-slave-service.yaml
services/redis-slave
[root@centos-master ~]# kubectl get pods
NAME                READY     STATUS    RESTARTS   AGE
nginx               1/1       Running   0          1h
nginx2              1/1       Running   0          1h
redis-master-scv65  1/1       Running   0          16m
redis-slave-eoak9   1/1       Running   0          5m
redis-slave-u0pcv   1/1       Running   0          5m
[root@centos-master ~]#
[root@centos-master ~]# kubectl get service
NAME          LABELS                                      SELECTOR            IP(S)           PORT(S)
kubernetes    component=apiserver,provider=kubernetes     <none>              10.254.0.1      443/TCP
redis-master  name=redis-master                           name=redis-master   10.254.75.126   6379/TCP
redis-slave   name=redis-slave                            name=redis-slave    10.254.50.124   6379/TCP

[root@centos-minion ~]# docker ps
CONTAINER ID     IMAGE                                        COMMAND
    PORTS                NAMES
e0ba738f62d4     kubeguide/guestbook-redis-slave              "/entrypoint.s
                     k8s_slave.6beb1194_redis-slave-eoak9_default_9f9c
9338dc8102a7     kubeguide/guestbook-redis-slave              "/entrypoint.s
                     k8s_slave.6beb1194_redis-slave-u0pcv_default_99ed
bda609064d1e     gcr.io/google_containers/pause:0.8.0   "/pause"
                     k8s_POD.49eee8c2_redis-slave-eoak9_default_9f9cc0
dfda5cab104c     gcr.io/google_containers/pause:0.8.0   "/pause"
                     k8s_POD.49eee8c2_redis-slave-u0pcv_default_99edef
db2eb6e3b662     kubeguide/redis-master                       "redis-server
                     k8s_master.fedf298_redis-master-scv65_default_049
9e88dad44940     gcr.io/google_containers/pause:0.8.0   "/pause"
                     k8s_POD.49eee8c2_redis-master-scv65_default_0491a
```

          "PublishService": "",
          "Tty": false,
          "OpenStdin": false,
          "StdinOnce": false,
          "Env": [
              "GET_HOSTS_FROM=env",
              "REDIS_MASTER_SERVICE_HOST=10.254.75.126",
              "REDIS_MASTER_PORT_6379_TCP_PROTO=tcp",
              "KUBERNETES_PORT_443_TCP_PROTO=tcp",
              "KUBERNETES_PORT_443_TCP_PORT=443",
              "KUBERNETES_PORT_443_TCP_ADDR=10.254.0.1",
              "REDIS_MASTER_SERVICE_PORT=6379",
              "REDIS_MASTER_PORT=tcp://10.254.75.126:6379",
              "REDIS_MASTER_PORT_6379_TCP=tcp://10.254.75.126:6379",
              "REDIS_MASTER_PORT_6379_TCP_PORT=6379",
              "REDIS_MASTER_PORT_6379_TCP_ADDR=10.254.75.126",

通过变量获得Master的IP

创建 frontend Pod 和服务

```yaml
apiVersion: v1
kind: ReplicationController
metadata:
  name: frontend
  labels:
    name: frontend
spec:
  replicas: 3
  selector:
    name: frontend
  template:
    metadata:
      labels:
        name: frontend
    spec:
      containers:
      - name: frontend
        image: kubeguide/guestbook-php-frontend
        env:
        - name: GET_HOSTS_FROM
          value: env
        ports:
        - containerPort: 80
```
"frontend-controller.yaml" 23L, 428C

```
[root@centos-master ~]# kubectl create -f frontend-controller.yaml
replicationcontrollers/frontend
[root@centos-master ~]# kubectl get pods
NAME                READY     STATUS     RESTARTS     AGE
frontend-ef0j9      0/1       Running    0            8s
frontend-q8bhm      1/1       Running    0            8s
frontend-z4kmn      1/1       Running    0            8s
nginx               1/1       Running    0            1h
nginx2              1/1       Running    0            1h
redis-master-scv65  1/1       Running    0            25m
redis-slave-eoak9   1/1       Running    0            13m
redis-slave-u0pcv   1/1       Running    0            13m
```

```yaml
apiVersion: v1
kind: Service
metadata:
  name: frontend
  labels:
    name: frontend
spec:
  type: NodePort
  ports:
  - port: 80
    nodePort: 30001
  selector:
    name: frontend
```
~
~
~
~
~
~
~
~
~
~
~
"frontend-service.yaml" 13L, 182C


```
[root@centos-master ~]# kubectl create -f frontend-service.yaml
You have exposed your service on an external port on all nodes in your
cluster.  If you want to expose this service to the external internet, you may
need to set up firewall rules for the service port(s) (tcp:30001) to serve traffic.

See http://releases.k8s.io/HEAD/docs/user-guide/services-firewalls.md for more details.
services/frontend
[root@centos-master ~]# kubectl get service
NAME           LABELS                                      SELECTOR             IP(S)           PORT(S)
frontend       name=frontend                               name=frontend        10.254.47.173   80/TCP
kubernetes     component=apiserver,provider=kubernetes     <none>               10.254.0.1      443/TCP
redis-master   name=redis-master                           name=redis-master    10.254.75.126   6379/TCP
redis-slave    name=redis-slave                            name=redis-slave     10.254.50.124   6379/TCP


[root@centos-master ~]# kubectl get replicationcontroller
CONTROLLER     CONTAINER(S)   IMAGE(S)                           SELECTOR             REPLICAS
frontend       frontend       kubeguide/guestbook-php-frontend   name=frontend        3
redis-master   master         kubeguide/redis-master             name=redis-master    1
redis-slave    slave          kubeguide/guestbook-redis-slave    name=redis-slave     2
[root@centos-master ~]#
[root@centos-master ~]# kubectl get rc
CONTROLLER     CONTAINER(S)   IMAGE(S)                           SELECTOR             REPLICAS
frontend       frontend       kubeguide/guestbook-php-frontend   name=frontend        3
redis-master   master         kubeguide/redis-master             name=redis-master    1
redis-slave    slave          kubeguide/guestbook-redis-slave    name=redis-slave     2
```

```
[root@centos-minion ~]# docker ps
CONTAINER ID        IMAGE                                   COMMAND
   PORTS               NAMES
77c344e796e4        kubeguide/guestbook-php-frontend        "apache2-foreg
                    k8s_frontend.ee7712de_frontend-z4kmn_default_7eeb
970782c9cce7        kubeguide/guestbook-php-frontend        "apache2-foreg
                    k8s_frontend.ee7712de_frontend-ef0j9_default_7ef0
342b9467f755        kubeguide/guestbook-php-frontend        "apache2-foreg
                    k8s_frontend.ee7712de_frontend-q8bhm_default_7eec
399bf0a1e15f        gcr.io/google_containers/pause:0.8.0    "/pause"
                    k8s_POD.ef28e851_frontend-ef0j9_default_7ef0b0e1-
b5e41698aa6c        gcr.io/google_containers/pause:0.8.0    "/pause"
                    k8s_POD.ef28e851_frontend-q8bhm_default_7eec44d6-
cd27dabd9a34        gcr.io/google_containers/pause:0.8.0    "/pause"
                    k8s_POD.ef28e851_frontend-z4kmn_default_7eebe53b-
e0ba738f62d4        kubeguide/guestbook-redis-slave         "/entrypoint.s
                    k8s_slave.6beb1194_redis-slave-eoak9_default_9f9c
9338dc8102a7        kubeguide/guestbook-redis-slave         "/entrypoint.s

[root@centos-minion ~]# docker inspect 5667 |grep GET_HOSTS_FROM
            "GET_HOSTS_FROM=env",
[root@centos-minion ~]#
[root@centos-minion ~]# docker inspect 5667 |grep REDIS_MASTER_SERVICE_HOSTS
[root@centos-minion ~]# docker inspect 5667 |grep MASTER
            "REDIS_MASTER_SERVICE_PORT=6379",
            "REDIS_MASTER_PORT=tcp://10.254.75.126:6379",
            "REDIS_MASTER_SERVICE_HOST=10.254.75.126",
            "REDIS_MASTER_PORT_6379_TCP_ADDR=10.254.75.126",
            "REDIS_MASTER_PORT_6379_TCP_PORT=6379",
            "REDIS_MASTER_PORT_6379_TCP=tcp://10.254.75.126:6379",
            "REDIS_MASTER_PORT_6379_TCP_PROTO=tcp",
[root@centos-minion ~]#
[root@centos-minion ~]# docker inspect 5667 |grep SLAVE
            "REDIS_SLAVE_PORT=tcp://10.254.50.124:6379",
            "REDIS_SLAVE_SERVICE_HOST=10.254.50.124",
            "REDIS_SLAVE_PORT_6379_TCP_PROTO=tcp",
            "REDIS_SLAVE_PORT_6379_TCP_PORT=6379",
            "REDIS_SLAVE_PORT_6379_TCP_ADDR=10.254.50.124",
            "REDIS_SLAVE_SERVICE_PORT=6379",
            "REDIS_SLAVE_PORT_6379_TCP=tcp://10.254.50.124:6379",
```