Kubernetes核心实战

1、资源创建方式

- 命令行
- YAML

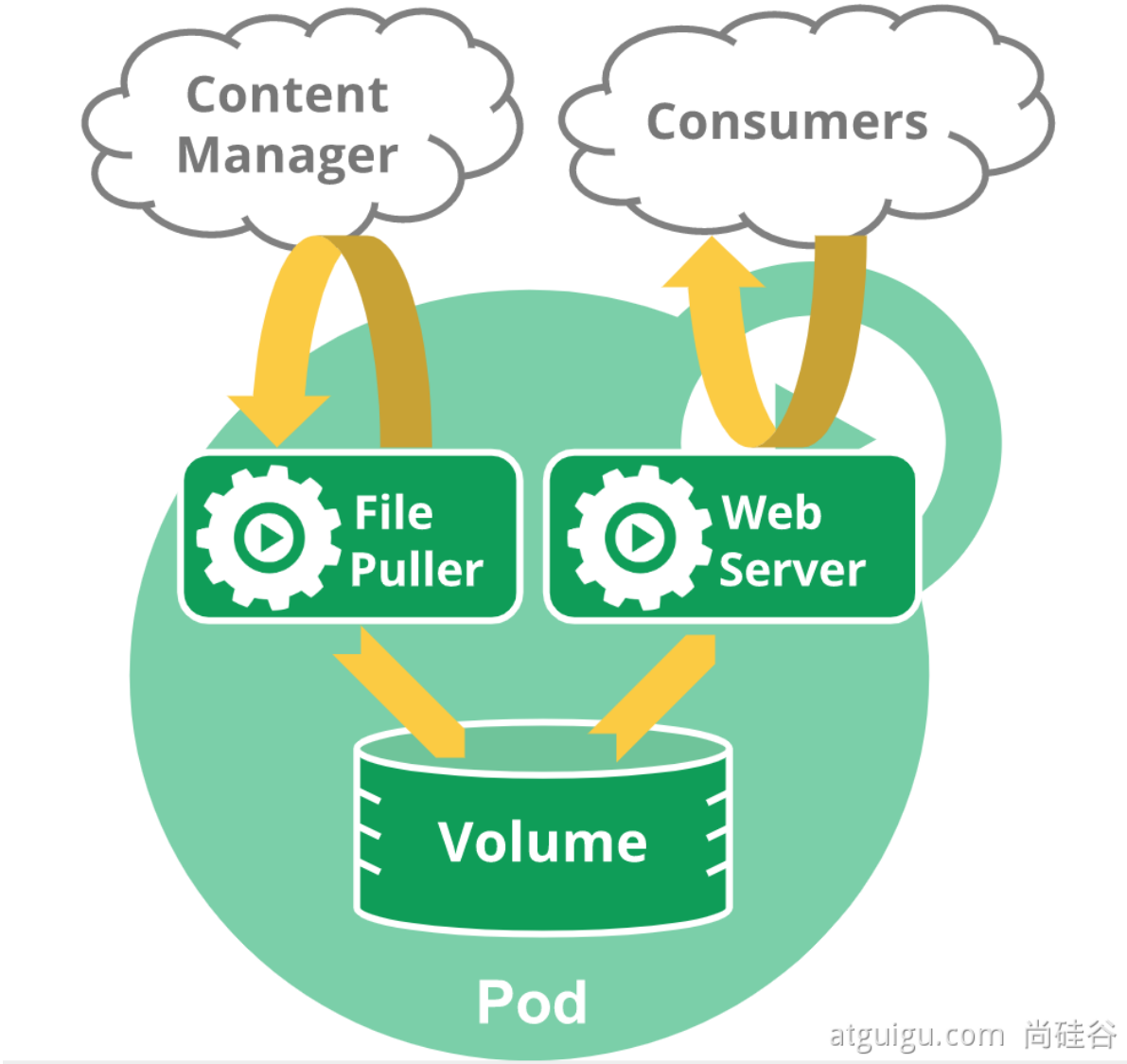
2、Namespace

名称空间用来隔离资源

```
kubectl create ns hello
kubectl delete ns hello
apiVersion: v1
kind: Namespace
metadata:
  name: hello
```

3、Pod

运行中的一组容器，Pod是kubernetes中应用的最小单位.



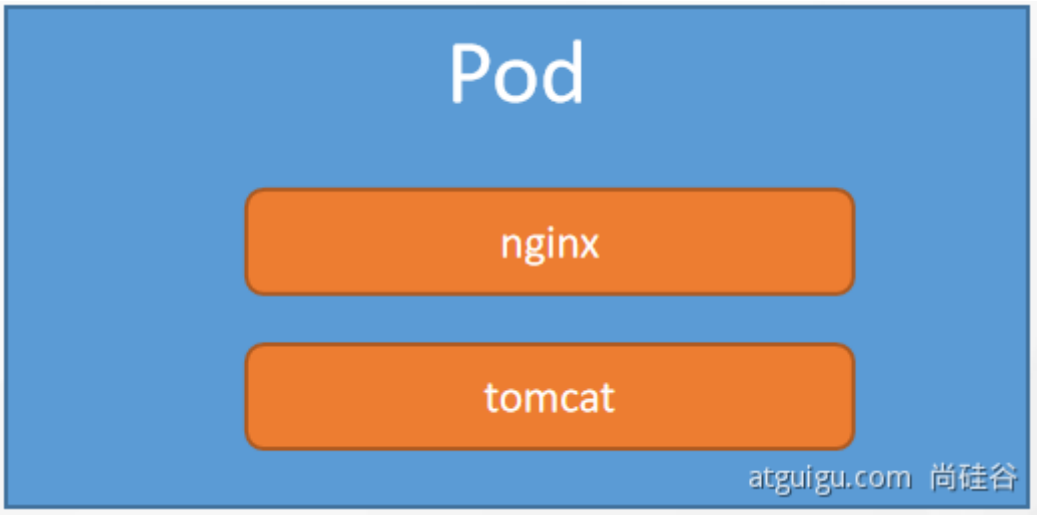

```
kubectl run mynginx --image=nginx

# 查看default名称空间的Pod
kubectl get pod
# 描述
kubectl describe pod 你自己的Pod名字
# 删除
kubectl delete pod Pod名字
# 查看Pod的运行日志
kubectl logs Pod名字

# 每个Pod - k8s都会分配一个ip
kubectl get pod -owide
# 使用Pod的ip+pod里面运行容器的端口
curl 192.168.169.136

# 集群中的任意一个机器以及任意的应用都能通过Pod分配的ip来访问这个Pod
apiVersion: v1
kind: Pod
metadata:
  labels:
    run: mynginx
  name: mynginx
#  namespace: default
spec:
```

```
  containers:
  - image: nginx
    name: mynginx
apiVersion: v1
kind: Pod
metadata:
  labels:
    run: myapp
  name: myapp
spec:
  containers:
  - image: nginx
    name: nginx
  - image: tomcat:8.5.68
    name: tomcat
```



此时的应用还不能外部访问

4、Deployment

控制Pod，使Pod拥有多副本，自愈，扩缩容等能力

```
# 清除所有Pod，比较下面两个命令有何不同效果？
kubectl run mynginx --image=nginx

kubectl create deployment mytomcat --image=tomcat:8.5.68
# 自愈能力
```

1、多副本

```
kubectl create deployment my-dep --image=nginx --replicas=3
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: my-dep
  name: my-dep
```

```
spec:
  replicas: 3
  selector:
    matchLabels:
      app: my-dep
  template:
    metadata:
      labels:
        app: my-dep
    spec:
      containers:
      - image: nginx
        name: nginx
```

2、扩缩容

```
kubectl scale --replicas=5 deployment/my-dep
kubectl edit deployment my-dep

#修改 replicas
```

3、自愈&故障转移

- 停机
- 删除Pod
- 容器崩溃
- ....

4、滚动更新

```
kubectl set image deployment/my-dep nginx=nginx:1.16.1 --record
kubectl rollout status deployment/my-dep
```

```
# 修改 kubectl edit deployment/my-dep
```

5、版本回退

```
#历史记录
kubectl rollout history deployment/my-dep


#查看某个历史详情
kubectl rollout history deployment/my-dep --revision=2

#回滚(回到上次)
kubectl rollout undo deployment/my-dep

#回滚(回到指定版本)
kubectl rollout undo deployment/my-dep --to-revision=2
```

更多:

除了Deployment，k8s还有 `StatefulSet` 、 `DaemonSet` 、 `Job` 等 类型资源。我们都称为 `工作负载`。

有状态应用使用 `StatefulSet` 部署，无状态应用使用 `Deployment` 部署

https://kubernetes.io/zh/docs/concepts/workloads/controllers/

5、Service

将一组 Pods 公开为网络服务的抽象方法。

```
#暴露Deploy
kubectl expose deployment my-dep --port=8000 --target-port=80

#使用标签检索Pod
kubectl get pod -l app=my-dep
apiVersion: v1
kind: Service
metadata:
  labels:
    app: my-dep
  name: my-dep
spec:
  selector:
    app: my-dep
  ports:
  - port: 8000
    protocol: TCP
    targetPort: 80
```

1、ClusterIP

```
# 等同于没有--type的
kubectl expose deployment my-dep --port=8000 --target-port=80 --type=ClusterIP
apiVersion: v1
```

```
kind: Service
metadata:
  labels:
    app: my-dep
  name: my-dep
spec:
  ports:
  - port: 8000
    protocol: TCP
    targetPort: 80
  selector:
    app: my-dep
  type: ClusterIP
```

2、NodePort

```
kubectl expose deployment my-dep --port=8000 --target-port=80 --type=NodePort
apiVersion: v1
kind: Service
metadata:
  labels:
    app: my-dep
  name: my-dep
spec:
  ports:
  - port: 8000
    protocol: TCP
    targetPort: 80
  selector:
    app: my-dep
  type: NodePort
```

NodePort范围在 30000-32767 之间

6、Ingress

1、安装

```
wget https://raw.githubusercontent.com/kubernetes/ingress-nginx/controller-
v0.47.0/deploy/static/provider/baremetal/deploy.yaml

#修改镜像
vi deploy.yaml
#将image的值改为如下值：
registry.cn-hangzhou.aliyuncs.com/lfy_k8s_images/ingress-nginx-
controller:v0.46.0

# 检查安装的结果
kubectl get pod,svc -n ingress-nginx

# 最后别忘记把svc暴露的端口要放行
```

如果下载不到，用以下文件

```yaml
apiVersion: v1
kind: Namespace
metadata:
  name: ingress-nginx
  labels:
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx

---
# Source: ingress-nginx/templates/controller-serviceaccount.yaml
apiVersion: v1
kind: ServiceAccount
metadata:
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: controller
  name: ingress-nginx
  namespace: ingress-nginx
automountServiceAccountToken: true
---
# Source: ingress-nginx/templates/controller-configmap.yaml
apiVersion: v1
kind: ConfigMap
metadata:
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: controller
  name: ingress-nginx-controller
  namespace: ingress-nginx
data:
---
# Source: ingress-nginx/templates/clusterrole.yaml
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRole
metadata:
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
  name: ingress-nginx
rules:
  - apiGroups:
      - ''
    resources:
      - configmaps
```

```
      - endpoints
      - nodes
      - pods
      - secrets
    verbs:
      - list
      - watch
  - apiGroups:
      - ''
    resources:
      - nodes
    verbs:
      - get
  - apiGroups:
      - ''
    resources:
      - services
    verbs:
      - get
      - list
      - watch
  - apiGroups:
      - extensions
      - networking.k8s.io   # k8s 1.14+
    resources:
      - ingresses
    verbs:
      - get
      - list
      - watch
  - apiGroups:
      - ''
    resources:
      - events
    verbs:
      - create
      - patch
  - apiGroups:
      - extensions
      - networking.k8s.io   # k8s 1.14+
    resources:
      - ingresses/status
    verbs:
      - update
  - apiGroups:
      - networking.k8s.io   # k8s 1.14+
    resources:
      - ingressclasses
    verbs:
      - get
      - list
      - watch
---
# Source: ingress-nginx/templates/clusterrolebinding.yaml
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRoleBinding
metadata:
  labels:
```

```
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
  name: ingress-nginx
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: ClusterRole
  name: ingress-nginx
subjects:
  - kind: ServiceAccount
    name: ingress-nginx
    namespace: ingress-nginx
---
# Source: ingress-nginx/templates/controller-role.yaml
apiVersion: rbac.authorization.k8s.io/v1
kind: Role
metadata:
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: controller
  name: ingress-nginx
  namespace: ingress-nginx
rules:
  - apiGroups:
      - ''
    resources:
      - namespaces
    verbs:
      - get
  - apiGroups:
      - ''
    resources:
      - configmaps
      - pods
      - secrets
      - endpoints
    verbs:
      - get
      - list
      - watch
  - apiGroups:
      - ''
    resources:
      - services
    verbs:
      - get
      - list
      - watch
  - apiGroups:
      - extensions
      - networking.k8s.io   # k8s 1.14+
    resources:
```

```
      - ingresses
    verbs:
      - get
      - list
      - watch
  - apiGroups:
      - extensions
      - networking.k8s.io   # k8s 1.14+
    resources:
      - ingresses/status
    verbs:
      - update
  - apiGroups:
      - networking.k8s.io   # k8s 1.14+
    resources:
      - ingressclasses
    verbs:
      - get
      - list
      - watch
  - apiGroups:
      - ''
    resources:
      - configmaps
    resourceNames:
      - ingress-controller-leader-nginx
    verbs:
      - get
      - update
  - apiGroups:
      - ''
    resources:
      - configmaps
    verbs:
      - create
  - apiGroups:
      - ''
    resources:
      - events
    verbs:
      - create
      - patch
---
# Source: ingress-nginx/templates/controller-rolebinding.yaml
apiVersion: rbac.authorization.k8s.io/v1
kind: RoleBinding
metadata:
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: controller
  name: ingress-nginx
  namespace: ingress-nginx
roleRef:
  apiGroup: rbac.authorization.k8s.io
```

```yaml
  kind: Role
  name: ingress-nginx
subjects:
  - kind: ServiceAccount
    name: ingress-nginx
    namespace: ingress-nginx
---
# Source: ingress-nginx/templates/controller-service-webhook.yaml
apiVersion: v1
kind: Service
metadata:
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: controller
  name: ingress-nginx-controller-admission
  namespace: ingress-nginx
spec:
  type: ClusterIP
  ports:
    - name: https-webhook
      port: 443
      targetPort: webhook
  selector:
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/component: controller
---
# Source: ingress-nginx/templates/controller-service.yaml
apiVersion: v1
kind: Service
metadata:
  annotations:
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: controller
  name: ingress-nginx-controller
  namespace: ingress-nginx
spec:
  type: NodePort
  ports:
    - name: http
      port: 80
      protocol: TCP
      targetPort: http
    - name: https
      port: 443
      protocol: TCP
      targetPort: https
  selector:
    app.kubernetes.io/name: ingress-nginx
```

```
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/component: controller
---
# Source: ingress-nginx/templates/controller-deployment.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: controller
  name: ingress-nginx-controller
  namespace: ingress-nginx
spec:
  selector:
    matchLabels:
      app.kubernetes.io/name: ingress-nginx
      app.kubernetes.io/instance: ingress-nginx
      app.kubernetes.io/component: controller
  revisionHistoryLimit: 10
  minReadySeconds: 0
  template:
    metadata:
      labels:
        app.kubernetes.io/name: ingress-nginx
        app.kubernetes.io/instance: ingress-nginx
        app.kubernetes.io/component: controller
    spec:
      dnsPolicy: ClusterFirst
      containers:
        - name: controller
          image: registry.cn-hangzhou.aliyuncs.com/lfy_k8s_images/ingress-nginx-
controller:v0.46.0
          imagePullPolicy: IfNotPresent
          lifecycle:
            preStop:
              exec:
                command:
                  - /wait-shutdown
          args:
            - /nginx-ingress-controller
            - --election-id=ingress-controller-leader
            - --ingress-class=nginx
            - --configmap=$(POD_NAMESPACE)/ingress-nginx-controller
            - --validating-webhook=:8443
            - --validating-webhook-certificate=/usr/local/certificates/cert
            - --validating-webhook-key=/usr/local/certificates/key
          securityContext:
            capabilities:
              drop:
                - ALL
              add:
                - NET_BIND_SERVICE
            runAsUser: 101
            allowPrivilegeEscalation: true
```

```
          env:
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: POD_NAMESPACE
              valueFrom:
                fieldRef:
                  fieldPath: metadata.namespace
            - name: LD_PRELOAD
              value: /usr/local/lib/libmimalloc.so
          livenessProbe:
            failureThreshold: 5
            httpGet:
              path: /healthz
              port: 10254
              scheme: HTTP
            initialDelaySeconds: 10
            periodSeconds: 10
            successThreshold: 1
            timeoutSeconds: 1
          readinessProbe:
            failureThreshold: 3
            httpGet:
              path: /healthz
              port: 10254
              scheme: HTTP
            initialDelaySeconds: 10
            periodSeconds: 10
            successThreshold: 1
            timeoutSeconds: 1
          ports:
            - name: http
              containerPort: 80
              protocol: TCP
            - name: https
              containerPort: 443
              protocol: TCP
            - name: webhook
              containerPort: 8443
              protocol: TCP
          volumeMounts:
            - name: webhook-cert
              mountPath: /usr/local/certificates/
              readOnly: true
          resources:
            requests:
              cpu: 100m
              memory: 90Mi
      nodeSelector:
        kubernetes.io/os: linux
      serviceAccountName: ingress-nginx
      terminationGracePeriodSeconds: 300
      volumes:
        - name: webhook-cert
          secret:
            secretName: ingress-nginx-admission
---
```

```yaml
# Source: ingress-nginx/templates/admission-webhooks/validating-webhook.yaml
# before changing this value, check the required kubernetes version
# https://kubernetes.io/docs/reference/access-authn-authz/extensible-admission-controllers/#prerequisites
apiVersion: admissionregistration.k8s.io/v1
kind: ValidatingWebhookConfiguration
metadata:
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: admission-webhook
  name: ingress-nginx-admission
webhooks:
  - name: validate.nginx.ingress.kubernetes.io
    matchPolicy: Equivalent
    rules:
      - apiGroups:
          - networking.k8s.io
        apiVersions:
          - v1beta1
        operations:
          - CREATE
          - UPDATE
        resources:
          - ingresses
    failurePolicy: Fail
    sideEffects: None
    admissionReviewVersions:
      - v1
      - v1beta1
    clientConfig:
      service:
        namespace: ingress-nginx
        name: ingress-nginx-controller-admission
        path: /networking/v1beta1/ingresses
---
# Source: ingress-nginx/templates/admission-webhooks/job-patch/serviceaccount.yaml
apiVersion: v1
kind: ServiceAccount
metadata:
  name: ingress-nginx-admission
  annotations:
    helm.sh/hook: pre-install,pre-upgrade,post-install,post-upgrade
    helm.sh/hook-delete-policy: before-hook-creation,hook-succeeded
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: admission-webhook
  namespace: ingress-nginx
---
# Source: ingress-nginx/templates/admission-webhooks/job-patch/clusterrole.yaml
```

```yaml
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRole
metadata:
  name: ingress-nginx-admission
  annotations:
    helm.sh/hook: pre-install,pre-upgrade,post-install,post-upgrade
    helm.sh/hook-delete-policy: before-hook-creation,hook-succeeded
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: admission-webhook
rules:
  - apiGroups:
      - admissionregistration.k8s.io
    resources:
      - validatingwebhookconfigurations
    verbs:
      - get
      - update
---
# Source: ingress-nginx/templates/admission-webhooks/job-
patch/clusterrolebinding.yaml
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRoleBinding
metadata:
  name: ingress-nginx-admission
  annotations:
    helm.sh/hook: pre-install,pre-upgrade,post-install,post-upgrade
    helm.sh/hook-delete-policy: before-hook-creation,hook-succeeded
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: admission-webhook
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: ClusterRole
  name: ingress-nginx-admission
subjects:
  - kind: ServiceAccount
    name: ingress-nginx-admission
    namespace: ingress-nginx
---
# Source: ingress-nginx/templates/admission-webhooks/job-patch/role.yaml
apiVersion: rbac.authorization.k8s.io/v1
kind: Role
metadata:
  name: ingress-nginx-admission
  annotations:
    helm.sh/hook: pre-install,pre-upgrade,post-install,post-upgrade
    helm.sh/hook-delete-policy: before-hook-creation,hook-succeeded
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
```

```
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: admission-webhook
  namespace: ingress-nginx
rules:
  - apiGroups:
      - ''
    resources:
      - secrets
    verbs:
      - get
      - create
---
# Source: ingress-nginx/templates/admission-webhooks/job-patch/rolebinding.yaml
apiVersion: rbac.authorization.k8s.io/v1
kind: RoleBinding
metadata:
  name: ingress-nginx-admission
  annotations:
    helm.sh/hook: pre-install,pre-upgrade,post-install,post-upgrade
    helm.sh/hook-delete-policy: before-hook-creation,hook-succeeded
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: admission-webhook
  namespace: ingress-nginx
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: Role
  name: ingress-nginx-admission
subjects:
  - kind: ServiceAccount
    name: ingress-nginx-admission
    namespace: ingress-nginx
---
# Source: ingress-nginx/templates/admission-webhooks/job-patch/job-
createSecret.yaml
apiVersion: batch/v1
kind: Job
metadata:
  name: ingress-nginx-admission-create
  annotations:
    helm.sh/hook: pre-install,pre-upgrade
    helm.sh/hook-delete-policy: before-hook-creation,hook-succeeded
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: admission-webhook
  namespace: ingress-nginx
spec:
```

```
  template:
    metadata:
      name: ingress-nginx-admission-create
      labels:
        helm.sh/chart: ingress-nginx-3.33.0
        app.kubernetes.io/name: ingress-nginx
        app.kubernetes.io/instance: ingress-nginx
        app.kubernetes.io/version: 0.47.0
        app.kubernetes.io/managed-by: Helm
        app.kubernetes.io/component: admission-webhook
    spec:
      containers:
        - name: create
          image: docker.io/jettech/kube-webhook-certgen:v1.5.1
          imagePullPolicy: IfNotPresent
          args:
            - create
            - --host=ingress-nginx-controller-admission,ingress-nginx-
controller-admission.$(POD_NAMESPACE).svc
            - --namespace=$(POD_NAMESPACE)
            - --secret-name=ingress-nginx-admission
          env:
            - name: POD_NAMESPACE
              valueFrom:
                fieldRef:
                  fieldPath: metadata.namespace
      restartPolicy: OnFailure
      serviceAccountName: ingress-nginx-admission
      securityContext:
        runAsNonRoot: true
        runAsUser: 2000
---
# Source: ingress-nginx/templates/admission-webhooks/job-patch/job-
patchWebhook.yaml
apiVersion: batch/v1
kind: Job
metadata:
  name: ingress-nginx-admission-patch
  annotations:
    helm.sh/hook: post-install,post-upgrade
    helm.sh/hook-delete-policy: before-hook-creation,hook-succeeded
  labels:
    helm.sh/chart: ingress-nginx-3.33.0
    app.kubernetes.io/name: ingress-nginx
    app.kubernetes.io/instance: ingress-nginx
    app.kubernetes.io/version: 0.47.0
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/component: admission-webhook
  namespace: ingress-nginx
spec:
  template:
    metadata:
      name: ingress-nginx-admission-patch
      labels:
        helm.sh/chart: ingress-nginx-3.33.0
        app.kubernetes.io/name: ingress-nginx
        app.kubernetes.io/instance: ingress-nginx
        app.kubernetes.io/version: 0.47.0
```

```
        app.kubernetes.io/managed-by: Helm
        app.kubernetes.io/component: admission-webhook
    spec:
      containers:
        - name: patch
          image: docker.io/jettech/kube-webhook-certgen:v1.5.1
          imagePullPolicy: IfNotPresent
          args:
            - patch
            - --webhook-name=ingress-nginx-admission
            - --namespace=$(POD_NAMESPACE)
            - --patch-mutating=false
            - --secret-name=ingress-nginx-admission
            - --patch-failure-policy=Fail
          env:
            - name: POD_NAMESPACE
              valueFrom:
                fieldRef:
                  fieldPath: metadata.namespace
      restartPolicy: OnFailure
      serviceAccountName: ingress-nginx-admission
      securityContext:
        runAsNonRoot: true
        runAsUser: 2000
```

2、使用

官网地址：https://kubernetes.github.io/ingress-nginx/

就是nginx做的

https://139.198.163.211:32401/

http://139.198.163.211:31405/

测试环境

应用如下yaml，准备好测试环境

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: hello-server
spec:
  replicas: 2
  selector:
    matchLabels:
      app: hello-server
  template:
    metadata:
      labels:
        app: hello-server
```

```yaml
    spec:
      containers:
      - name: hello-server
        image: registry.cn-hangzhou.aliyuncs.com/lfy_k8s_images/hello-server
        ports:
        - containerPort: 9000
---
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: nginx-demo
  name: nginx-demo
spec:
  replicas: 2
  selector:
    matchLabels:
      app: nginx-demo
  template:
    metadata:
      labels:
        app: nginx-demo
    spec:
      containers:
      - image: nginx
        name: nginx
---
apiVersion: v1
kind: Service
metadata:
  labels:
    app: nginx-demo
  name: nginx-demo
spec:
  selector:
    app: nginx-demo
  ports:
  - port: 8000
    protocol: TCP
    targetPort: 80
---
apiVersion: v1
kind: Service
metadata:
  labels:
    app: hello-server
  name: hello-server
spec:
  selector:
    app: hello-server
  ports:
  - port: 8000
    protocol: TCP
    targetPort: 9000
```

1、域名访问

```yaml
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: ingress-host-bar
spec:
  ingressClassName: nginx
  rules:
  - host: "hello.atguigu.com"
    http:
      paths:
      - pathType: Prefix
        path: "/"
        backend:
          service:
            name: hello-server
            port:
              number: 8000
  - host: "demo.atguigu.com"
    http:
      paths:
      - pathType: Prefix
        path: "/nginx"  # 把请求会转给下面的服务，下面的服务一定要能处理这个路径，不能处理就是404
        backend:
          service:
            name: nginx-demo  ## java，比如使用路径重写，去掉前缀nginx
            port:
              number: 8000
```

问题： path: "/nginx" 与 path: "/" 为什么会有不同的效果?

2、路径重写

```yaml
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  annotations:
    nginx.ingress.kubernetes.io/rewrite-target: /$2
  name: ingress-host-bar
spec:
  ingressClassName: nginx
  rules:
  - host: "hello.atguigu.com"
    http:
      paths:
      - pathType: Prefix
        path: "/"
        backend:
          service:
```

```
            name: hello-server
            port:
              number: 8000
  - host: "demo.atguigu.com"
    http:
      paths:
      - pathType: Prefix
        path: "/nginx(/|$)(.*)"  # 把请求会转给下面的服务，下面的服务一定要能处理这个路径，不能处理就是404
        backend:
          service:
            name: nginx-demo  ## java，比如使用路径重写，去掉前缀nginx
            port:
              number: 8000
```

3、流量限制

```
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: ingress-limit-rate
  annotations:
    nginx.ingress.kubernetes.io/limit-rps: "1"
spec:
  ingressClassName: nginx
  rules:
  - host: "haha.atguigu.com"
    http:
      paths:
      - pathType: Exact
        path: "/"
        backend:
          service:
            name: nginx-demo
            port:
              number: 8000
```

7、存储抽象

环境准备

1、所有节点

```
#所有机器安装
yum install -y nfs-utils
```

2、主节点

```
#nfs主节点
echo "/nfs/data/ *(insecure,rw,sync,no_root_squash)" > /etc/exports

mkdir -p /nfs/data
systemctl enable rpcbind --now
systemctl enable nfs-server --now
#配置生效
exportfs -r
```

3、从节点

```
showmount -e 172.31.0.4   #修改为实际IP

#执行以下命令挂载 nfs 服务器上的共享目录到本机路径 /root/nfsmount
mkdir -p /nfs/data

mount -t nfs 172.31.0.4:/nfs/data /nfs/data
# 写入一个测试文件
echo "hello nfs server" > /nfs/data/test.txt
```

4、原生方式数据挂载

```
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: nginx-pv-demo
  name: nginx-pv-demo
spec:
  replicas: 2
  selector:
    matchLabels:
      app: nginx-pv-demo
  template:
    metadata:
      labels:
        app: nginx-pv-demo
    spec:
      containers:
      - image: nginx
        name: nginx
        volumeMounts:
        - name: html
          mountPath: /usr/share/nginx/html
      volumes:
        - name: html
          nfs:
            server: 172.31.0.4   #修改为实际IP
            path: /nfs/data/nginx-pv
```

1、PV&PVC

PV：持久卷（*Persistent Volume*），将应用需要持久化的数据保存到指定位置

PVC：持久卷申明（***Persistent Volume Claim***），申明需要使用的持久卷规格

1、创建pv池

静态供应

```
#nfs主节点
mkdir -p /nfs/data/01
mkdir -p /nfs/data/02
mkdir -p /nfs/data/03
```

创建PV

```
apiVersion: v1
kind: PersistentVolume
metadata:
  name: pv01-10m
spec:
  capacity:
    storage: 10M
  accessModes:
    - ReadWriteMany
  storageClassName: nfs
  nfs:
    path: /nfs/data/01
    server: 172.31.0.4   #修改为实际IP
---
apiVersion: v1
kind: PersistentVolume
metadata:
  name: pv02-1gi
spec:
  capacity:
    storage: 1Gi
  accessModes:
    - ReadWriteMany
  storageClassName: nfs
  nfs:
    path: /nfs/data/02
    server: 172.31.0.4  #修改为实际IP
---
apiVersion: v1
kind: PersistentVolume
metadata:
  name: pv03-3gi
spec:
  capacity:
    storage: 3Gi
  accessModes:
    - ReadWriteMany
  storageClassName: nfs
  nfs:
```

```
    path: /nfs/data/03
    server: 172.31.0.4  #修改为实际IP
```

2、PVC创建与绑定

创建PVC

```
kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: nginx-pvc
spec:
  accessModes:
    - ReadWriteMany
  resources:
    requests:
      storage: 200Mi
  storageClassName: nfs
```

创建Pod绑定PVC

```
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: nginx-deploy-pvc
  name: nginx-deploy-pvc
spec:
  replicas: 2
  selector:
    matchLabels:
      app: nginx-deploy-pvc
  template:
    metadata:
      labels:
        app: nginx-deploy-pvc
    spec:
      containers:
      - image: nginx
        name: nginx
        volumeMounts:
        - name: html
          mountPath: /usr/share/nginx/html
      volumes:
        - name: html
          persistentVolumeClaim:
            claimName: nginx-pvc
```

2、ConfigMap

抽取应用配置，并且可以自动更新

1、redis示例

1、把之前的配置文件创建为配置集

```
# 创建配置，redis保存到k8s的etcd;
kubectl create cm redis-conf --from-file=redis.conf
```

```
apiVersion: v1
data:    #data是所有真正的数据，key：默认是文件名    value：配置文件的内容
  redis.conf: |
    appendonly yes
kind: ConfigMap
metadata:
  name: redis-conf
  namespace: default
```

2、创建Pod

```
apiVersion: v1
kind: Pod
metadata:
  name: redis
spec:
  containers:
  - name: redis
    image: redis
    command:
      - redis-server
      - "/redis-master/redis.conf"  #指的是redis容器内部的位置
    ports:
    - containerPort: 6379
    volumeMounts:
    - mountPath: /data
      name: data      #1
    - mountPath: /redis-master
      name: config     #2
  volumes:
    - name: data   #1 volumeMounts标签中的名字
      emptyDir: {}
    - name: config    #2 volumeMounts标签中的名字
      configMap:
        name: redis-conf  #configMap中的名字
        items:
        - key: redis.conf   #configMap中配置的名字
          path: redis.conf  #挂在到上面指定的/redis-master目录下
```

####

3、检查默认配置

```
kubectl exec -it redis -- redis-cli

127.0.0.1:6379> CONFIG GET appendonly
127.0.0.1:6379> CONFIG GET requirepass
```

4、修改ConfigMap

```
apiVersion: v1
kind: ConfigMap
metadata:
  name: example-redis-config
data:
  redis-config: |
    maxmemory 2mb
    maxmemory-policy allkeys-lru
```

5、检查配置是否更新

```
kubectl exec -it redis -- redis-cli

127.0.0.1:6379> CONFIG GET maxmemory
127.0.0.1:6379> CONFIG GET maxmemory-policy
```

检查指定文件内容是否已经更新

修改了CM。Pod里面的配置文件会跟着变

配置值未更改，因为需要重新启动 Pod 才能从关联的 ConfigMap 中获取更新的值。

原因：我们的Pod部署的中间件自己本身没有热更新能力

3、Secret

Secret 对象类型用来保存敏感信息，例如密码、OAuth 令牌和 SSH 密钥。 将这些信息放在 secret 中比放在 Pod 的定义或者 容器镜像 中来说更加安全和灵活。

```
kubectl create secret docker-registry leifengyang-docker \
--docker-username=leifengyang \
--docker-password=Lfy123456 \
--docker-email=534096094@qq.com

##命令格式
kubectl create secret docker-registry regcred \
```

```
  --docker-server=<你的镜像仓库服务器> \
  --docker-username=<你的用户名> \
  --docker-password=<你的密码> \
  --docker-email=<你的邮箱地址>
apiVersion: v1
kind: Pod
metadata:
  name: private-nginx
spec:
  containers:
  - name: private-nginx
    image: leifengyang/guignginx:v1.0
  imagePullSecrets:
  - name: leifengyang-docker    #上面创建的名称
```