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OpenShift 模板其实是红帽给 OpenShift 弄的一个 Kubernetes 扩展。简单来说，模板就像是一个配置蓝图，里面描述了一堆 Kubernetes 资源该怎么搭。而且这个模板还能设置参数，就像给它留了填空题一样。当你填好这些参数，就能根据模板生成一整套相关的 Kubernetes 资源啦。

默认情况下，Cluster Samples Operator 会往 `openshift 命名空间` 里塞一些模板和镜像流，不过你要是有自己独特的想法，完全可以自己动手创建模板，打造属于自己的资源组合，超有意思！

管理集群中的模板

Cluster Samples Operator 提供的模板位于 `openshift` 命名空间中

```
[student@workstation ~]$ oc get templates -n openshift
NAME                           DESCRIPTION
cakephp-mysql-example          An example CakePHP application with a MySQL database. For mo
cakephp-mysql-persistent       An example CakePHP application with a MySQL database. For mo
dancer-mysql-example           An example Dancer application with a MySQL database. For mor
dancer-mysql-persistent        An example Dancer application with a MySQL database. For mor
django-psql-example            An example Django application with a PostgreSQL database. Fo
django-psql-persistent         An example Django application with a PostgreSQL database. Fo
httpd-example                  An example Apache HTTP Server (httpd) application that serve
mysql-ephemeral                MySQL database service, without persistent storage. For more
mysql-persistent               MySQL database service, with persistent storage. For more in
nodejs-postgresql-example      An example Node.js application with a PostgreSQL database. F
nodejs-postgresql-persistent   An example Node.js application with a PostgreSQL database. F
postgresql-ephemeral           PostgreSQL database service, without persistent storage. For
postgresql-persistent          PostgreSQL database service, with persistent storage. For mo
```

查看模板完整的yaml清单以及参数

```
[student@workstation ~]$ oc get templates -n openshift httpd-example -o yaml
apiVersion: template.openshift.io/v1
kind: Template
labels:
  app: httpd-example
  template: httpd-example
message: |-
  The following service(s) have been created in your project: ${NAME}.

  For more information about using this template, including OpenShift considerations, see h
metadata:
  annotations:
    description: An example Apache HTTP Server (httpd) application that serves static
      content. For more information about using this template, including OpenShift
      considerations, see https://github.com/sclorg/httpd-ex/blob/master/README.md.
    iconClass: icon-apache
    openshift.io/display-name: Apache HTTP Server
    openshift.io/documentation-url: https://github.com/sclorg/httpd-ex
    openshift.io/long-description: This template defines resources needed to develop
      a static application served by Apache HTTP Server (httpd), including a build
      configuration and application deployment configuration.
    openshift.io/provider-display-name: Red Hat, Inc.
    openshift.io/support-url: https://access.redhat.com
    samples.operator.openshift.io/version: 4.12.0
    tags: quickstart,httpd
    template.openshift.io/bindable: "false"
  creationTimestamp: "2023-11-13T17:44:58Z"
  labels:
    samples.operator.openshift.io/managed: "true"
  name: httpd-example
  namespace: openshift
  resourceVersion: "328084"
  uid: 640c1f62-6a3c-44c3-b5d4-3b08705c483e
objects:
- apiVersion: v1
  kind: Service
  metadata:
    annotations:
      description: Exposes and load balances the application pods
    name: ${NAME}
  spec:
    ports:
    - name: web
      port: 8080
```

```
      targetPort: 8080
    selector:
      name: ${NAME}
- apiVersion: route.openshift.io/v1
  kind: Route
  metadata:
    name: ${NAME}
  spec:
    host: ${APPLICATION_DOMAIN}
    to:
      kind: Service
      name: ${NAME}
```

查询模板属性

```
[student@workstation ~]$ oc describe template httpd-example -n openshift
Name:           httpd-example
Namespace:      openshift
Created:        13 months ago
Labels:         samples.operator.openshift.io/managed=true
Description:    An example Apache HTTP Server (httpd) application that serves static conter
Annotations:    iconClass=icon-apache
                openshift.io/display-name=Apache HTTP Server
                openshift.io/documentation-url=https://github.com/sclorg/httpd-ex
                openshift.io/long-description=This template defines resources needed to dev
                openshift.io/provider-display-name=Red Hat, Inc.
                openshift.io/support-url=https://access.redhat.com
                samples.operator.openshift.io/version=4.12.0
                tags=quickstart,httpd
                template.openshift.io/bindable=false

Parameters:
    Name:               NAME
    Display Name:       Name
    Description:        The name assigned to all of the frontend objects defined in this te
    Required:           true
    Value:              httpd-example

    Name:               NAMESPACE
    Display Name:       Namespace
    Description:        The OpenShift Namespace where the ImageStream resides.
    Required:           true
    Value:              openshift

    Name:               HTTPD_VERSION
    Display Name:       HTTPD Version
    Description:        Version of HTTPD image to be used (2.4-el8 by default).
    Required:           true
    Value:              2.4-el8

    Name:               MEMORY_LIMIT
    Display Name:       Memory Limit
    Description:        Maximum amount of memory the container can use.
    Required:           true
    Value:              512Mi

    Name:               SOURCE_REPOSITORY_URL
    Display Name:       Git Repository URL
    Description:        The URL of the repository with your application source code.
```

```
    Required:           true
    Value:              https://github.com/sclorg/httpd-ex.git

    Name:               SOURCE_REPOSITORY_REF
    Display Name:       Git Reference
    Description:        Set this to a branch name, tag or other ref of your repository if y
    Required:           false
    Value:              <none>

    Name:               CONTEXT_DIR
    Display Name:       Context Directory
    Description:        Set this to the relative path to your project if it is not in the r
    Required:           false
    Value:              <none>

    Name:               APPLICATION_DOMAIN
    Display Name:       Application Hostname
    Description:        The exposed hostname that will route to the httpd service, if left
    Required:           false
    Value:              <none>

    Name:               GITHUB_WEBHOOK_SECRET
    Display Name:       GitHub Webhook Secret
    Description:        Github trigger secret.  A difficult to guess string encoded as part
    Required:           false
    Generated:          expression
    From:               [a-zA-Z0-9]{40}

    Name:               GENERIC_WEBHOOK_SECRET
    Display Name:       Generic Webhook Secret
    Description:        A secret string used to configure the Generic webhook.
    Required:           false
    Generated:          expression
    From:               [a-zA-Z0-9]{40}


Object Labels:  app=httpd-example,template=httpd-example

Message:        The following service(s) have been created in your project: ${NAME}.

                For more information about using this template, including OpenShift conside

Objects:
    Service                             ${NAME}
    Route.route.openshift.io            ${NAME}
    ImageStream.image.openshift.io      ${NAME}
```

```
    BuildConfig.build.openshift.io      ${NAME}
    DeploymentConfig.apps.openshift.io  ${NAME}
```

上面的内容太多了，可以用下面的方法，仅列出模板使用的参数即可

```
[student@workstation ~]$ oc process --parameters httpd-example -n openshift
NAME                     DESCRIPTION
NAME                     The name assigned to all of the frontend objects defined in this t
NAMESPACE                The OpenShift Namespace where the ImageStream resides.
HTTPD_VERSION            Version of HTTPD image to be used (2.4-el8 by default).
MEMORY_LIMIT             Maximum amount of memory the container can use.
SOURCE_REPOSITORY_URL    The URL of the repository with your application source code.
SOURCE_REPOSITORY_REF    Set this to a branch name, tag or other ref of your repository if
CONTEXT_DIR              Set this to the relative path to your project if it is not in the
APPLICATION_DOMAIN       The exposed hostname that will route to the httpd service, if left
GITHUB_WEBHOOK_SECRET    Github trigger secret.  A difficult to guess string encoded as par
GENERIC_WEBHOOK_SECRET   A secret string used to configure the Generic webhook.
```

使用模板

`oc new-app` 命令具有 `--template` 选项，可以直接从 `openshift` 项目部署模板资源。

```
[student@workstation ~]$ oc new-app --template=httpd-example -p NAME=lixiaohui
--> Deploying template "default/httpd-example" to project default

     Apache HTTP Server
     ---------
     An example Apache HTTP Server (httpd) application that serves static content. For more

     The following service(s) have been created in your project: lixiaohui.

     For more information about using this template, including OpenShift considerations, se

     * With parameters:
        * Name=lixiaohui
        * Namespace=openshift
        * HTTPD Version=2.4-el8
        * Memory Limit=512Mi
        * Git Repository URL=https://github.com/sclorg/httpd-ex.git
        * Git Reference=
        * Context Directory=
        * Application Hostname=
        * GitHub Webhook Secret=D5iaWBYs7neNmNirw8YuEB7SIXgfPre6HstjXpK5 # generated
        * Generic Webhook Secret=TvoiO2eYrST2tLxnhjsK0F4kBmJKeuGXF44sxoCC # generated

--> Creating resources ...
    service "lixiaohui" created
    route.route.openshift.io "lixiaohui" created
    imagestream.image.openshift.io "lixiaohui" created
    buildconfig.build.openshift.io "lixiaohui" created
    deploymentconfig.apps.openshift.io "lixiaohui" created
--> Success
    Access your application via route 'lixiaohui-default.apps.ocp4.example.com'
    Build scheduled, use 'oc logs -f buildconfig/lixiaohui' to track its progress.
    Run 'oc status' to view your app.
```

查看部署的过程

```
[student@workstation ~]$ oc status --suggest
In project default on server https://api.ocp4.example.com:6443

svc/openshift - kubernetes.default.svc.cluster.local
svc/kubernetes - 172.30.0.1:443 -> 6443

http://lixiaohui-default.apps.ocp4.example.com (svc/lixiaohui)
  dc/lixiaohui deploys istag/lixiaohui:latest <-
    bc/lixiaohui source builds https://github.com/sclorg/httpd-ex.git on openshift/httpd:2.
    deployment #1 deployed about a minute ago - 1 pod

deployment/lixiaohui-deployment deploys nginx
  deployment #1 running for 3 hours - 0/3 pods

deployment/d deploys mysql
  deployment #3 running for 3 hours - 0/1 pods
  deployment #2 deployed 3 hours ago - 0/1 pods
  deployment #1 deployed 3 hours ago
```

不过需要注意，new-app不能用于更新应用

生成确切的资源清单文件

用模板和参数，可以生成最终的资源清单文件，用于版本控制

```
[student@workstation ~]$ oc process httpd-example -n openshift -p NAME=lxh-name -o yaml > m
[student@workstation ~]$ cat myyaml.yaml
apiVersion: v1
items:
- apiVersion: v1
  kind: Service
  metadata:
    annotations:
      description: Exposes and load balances the application pods
    labels:
      app: httpd-example
      template: httpd-example
    name: lxh-name
  spec:
    ports:
    - name: web
      port: 8080
      targetPort: 8080
    selector:
      name: lxh-name
- apiVersion: route.openshift.io/v1
  kind: Route
  metadata:
    labels:
      app: httpd-example
      template: httpd-example
    name: lxh-name
  spec:
```

使用-p选项将多个参数放在命令行的话，参数不方便保存，所以参数也可以放在文件中

生成参数文件

```
cat > myargs.file <<-EOF
NAME=lixiaohui
EOF
```

```
[student@workstation ~]$ oc process httpd-example -n openshift --param-file=myargs.file > m
```

或者直接创建出线上资源

```
[student@workstation ~]$ oc process httpd-example -n openshift --param-file=myargs.file | c
```

删除模板

删除之前，我导出了一份用于备份

```
[student@workstation ~]$ oc get templates -n openshift httpd-example -o yaml > my-template.
[student@workstation ~]$
[student@workstation ~]$ oc delete template -n openshift httpd-example
template.template.openshift.io "httpd-example" deleted
```

创建新模板

用刚才的备份来生成新的模板，我创建到我自己的namespace中

```
[student@workstation ~]$ sed -i 's|namespace: openshift|namespace: lxh|g' my-template.yml

[student@workstation ~]$ oc create -f my-template.yml
template.template.openshift.io/httpd-example created
```

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