



Kubernetes Dashboard

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前言

- 作为Kubernetes的Web用户界面，用户可以通过Dashboard在Kubernetes集群中部署容器化的应用，对应用进行问题处理和管理，并对集群本身进行管理。
- 通过Dashboard，用户可以查看集群中应用的运行情况，同时也能够创建或修改Kubernetes的资源。
- 通过部署向导，用户能够对部署的应用进行扩缩容、滚动更新、重启Pod，也可以部署新的应用。
- 当然，通过Dashboard也能够查看Kubernetes资源的状态。



目标

- 学完本课程后，您将能够：
 - 描述Dashboard的功能
 - 区分Dashboard不同的认证方式
 - 熟悉Dashboard界面结构
 - 熟练使用Dashboard管理Kubernetes集群
 - 熟练使用Dashboard部署应用



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1. Dashboard介绍

- Dashboard是什么
 - Dashboard认证
 - Dashboard界面结构

2. Dashboard功能

3. Dashboard部署应用



Dashboard是什么

- Dashboard是Kubernetes的用户网页接口，用于界面化管理Kubernetes集群。

The screenshot shows the Kubernetes Dashboard's Overview page. On the left is a sidebar with navigation links: Cluster, Namespaces, Nodes, Persistent Volumes, Roles, Storage Classes, Namespace (set to default), Overview (selected), Workloads, Cron Jobs, Daemon Sets, Deployments, Jobs, Pods, Replica Sets, Replication Controllers, Stateful Sets, and Discovery and Load Balancing.

The main content area has three sections:

- Workloads**: A summary section with three green circular progress bars labeled "100.00%" for Deployments, Pods, and Replica Sets.
- Deployments**: A table listing one deployment named "mydep".

Name	Labels	Pods	Age	Images
mydep	app: mydep	1 / 1	19 hours	nginx
- Pods**: A table listing one pod named "mydep-546b9d45dd-c5hmk".

Name	Node	Status	Restarts	Age
mydep-546b9d45dd-c5hmk	worker01	Running	1	19 hours



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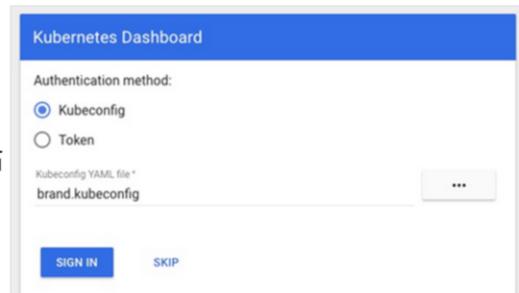
2. Dashboard功能

3. Dashboard部署应用



Dashboard认证 - 配置登录权限

- token方式认证
 - 创建serviceaccount，根据其管理目标，使用rolebinding或者clusterrolebinding绑定至合理role或者clusterrole。
 - 获取到此serviceAccount的secret，查看secret的详细信息，其中就有token，粘贴到web界面的令牌里面。
- kubeconfig方式认证
 - 把serviceaccount的token封装为kubeconfig文件。



- 认证时的账户必须为ServiceAccount，作用是被Dashboard Pod拿来由kubernetes进行认证。



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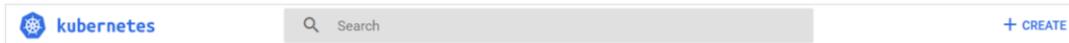
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Dashboard界面结构

- 顶部操作区（用户可以搜索集群中的资源、创建资源）



- 左边导航菜单（查看和管理集群中的各种资源）

- Cluster级别资源
 - Namespace级别资源（默认显示的是default Namespace，可进行切换）

- 中间主体区（在导航菜单中点击了某类资源，中间主体区就会显示该资源的所有实例）

- 搜索栏无法搜索资源对象类型，如“Pod”。



Dashboard界面介绍 - Cluster (1)

- 对于集群和命名空间管理员，Dashboard列出Nodes、Namespaces和持久化卷，并为其提供详细视图。

The screenshot shows the Kubernetes Dashboard interface. On the left, there is a sidebar titled 'Cluster' with the following options: Namespaces (selected), Nodes, Persistent Volumes, Roles, Storage Classes, Namespace (with a dropdown menu showing 'default'), and a search bar. The main area is titled 'Namespaces' and contains a table with the following data:

Name	Labels	Status	Age
default	-	Active	a day
kube-node-lease	-	Active	a day
kube-public	-	Active	a day
kube-system	-	Active	a day



Dashboard界面介绍 - Cluster (2)

The screenshot shows the Kubernetes Dashboard's Nodes list view. On the left, there's a sidebar with navigation links like Cluster, Namespaces, Nodes (which is selected), Persistent Volumes, Roles, Storage Classes, Namespace (set to default), Overview, Workloads, Cron Jobs, Daemon Sets, Deployments, Jobs, Pods, Replica Sets, and Replication Controllers. The main area is titled "Nodes" and lists three nodes:

Name	Labels	Ready	CPU requests (cores)	CPU limits (cores)	Memory requests (bytes)	Memory limits (bytes)	Age
worker02	beta.kubernetes. kubernetes.io/ar...	True	0.1 (5.00%)	0.1 (5.00%)	50 Mi (1.33%)	50 Mi (1.33%)	a day
worker01	beta.kubernetes. kubernetes.io/ar...	True	0.1 (5.00%)	0.1 (5.00%)	50 Mi (1.33%)	50 Mi (1.33%)	a day
master	beta.kubernetes. kubernetes.io/ar...	True	0.85 (42.50%)	0.1 (5.00%)	190 Mi (5.06%)	390 Mi (10.40%)	a day

At the bottom of the table, there's a "show all" link.

- Node列表视图包含所有Node的CPU和内存使用指标。详情视图显示Node的指标、规格、状态、分配的资源、事件和Node上运行的Pod。



Dashboard界面介绍 - Cluster (3)

The screenshot shows the Kubernetes Dashboard interface. On the left, there is a sidebar with the following navigation items:

- Cluster
- Namespaces
- Nodes
- Persistent Volumes
- Roles** (highlighted)
- Storage Classes

Below the sidebar, there is a dropdown menu for the Namespace, currently set to "default". Under "Overview", there are links for Workloads, Cron Jobs, Daemon Sets, Deployments, Jobs, Pods, and Replica Sets.

The main content area is titled "Roles" and contains a table with the following data:

Name	Role Type	Namespace	Age
kubernetes-dashboard-minimal	Role	kube-system	a day
flannel	Cluster Role	All Namespaces	a day
system:coredns	Cluster Role	All Namespaces	a day
kubeadm:bootstrap-signer-clusterinfo	Role	kube-public	a day
kube-proxy	Role	kube-system	a day
kubeadm:kubelet-config-1.15	Role	kube-system	a day
kubeadm:nodes-kubeadm-config	Role	kube-system	a day
system:leader-locking-kube-controller-metrics	Role	kube-system	a day
extension-apiserver-authentication-reader	Role	kube-system	a day
system:controller:bootstrap-signer	Role	kube-system	a day

At the bottom right of the table, there is a pagination indicator: "1 - 10 of 67" followed by navigation icons for first, previous, next, and last pages.



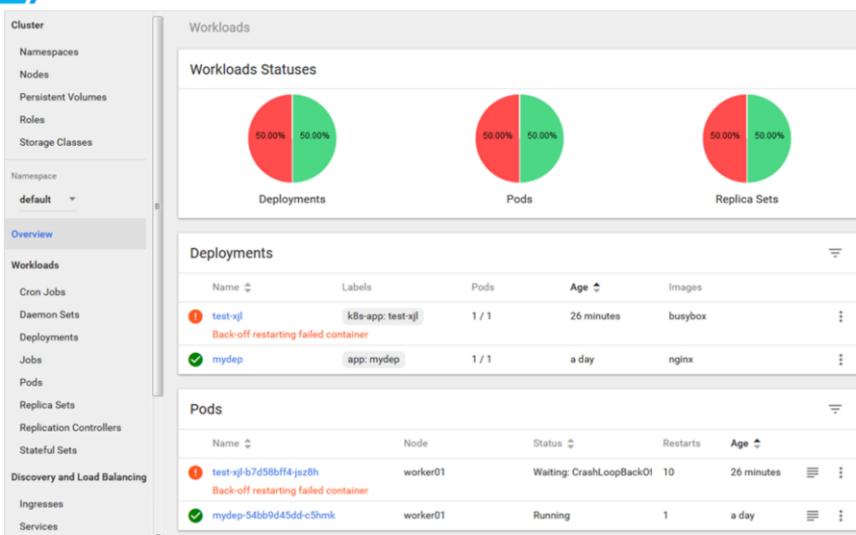
Dashboard界面介绍 - Namespace

- 选中不同Namespace，可以看到该Namespace下所有的资源情况。

The screenshot shows the left sidebar of the Kubernetes Dashboard with the 'Cluster' tab selected. Under the 'Cluster' tab, the 'Namespaces' option is highlighted. A blue arrow points from the 'Namespaces' option to a dropdown menu on the right. The dropdown menu has a header 'Select namespace...' and contains three items: 'All namespaces', 'NAMESPACES', and 'default'. Below 'NAMESPACES' is a list item 'kube-node-lease'.



Dashboard界面介绍 - Overview



- 对于处于Succeeded、Running状态的资源对象显示为绿色；对于处于Pending状态的资源对象显示为橙色；对于处于Failed、Unknown状态的资源对象显示为红色。



Dashboard界面介绍 - Workloads (1)

- 显示所选 Namespace 中运行的所有 Workload 类型（如 Deployments、ReplicaSets等）的应用程序，并且每个Workload类型可以分开查看。

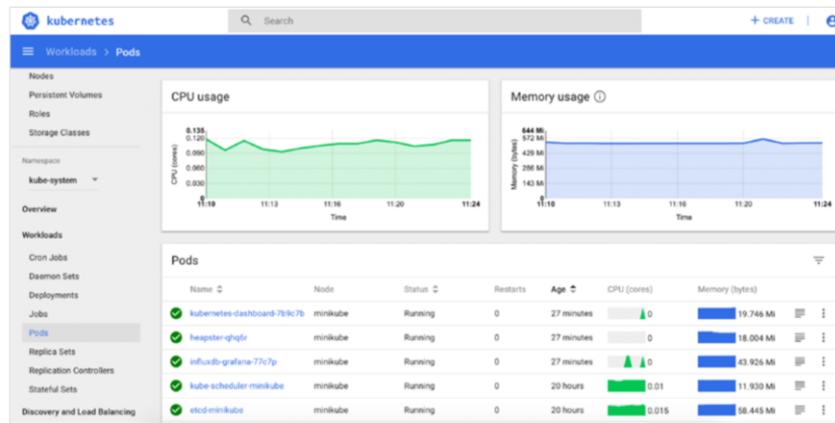
The screenshot shows the Kubernetes Dashboard interface for the 'default' namespace. The left sidebar is collapsed, and the main area displays three tables:

- Deployments**: Shows two entries: 'test-xjl' (status: Back-off restarting failed container) and 'mydep' (status: Running).
- Pods**: Shows two entries: 'test-xjl-b7d58bfff4-jszBh' (status: Waiting: CrashLoopBackOff) and 'mydep-54bb9d45dd-c5henk' (status: Running).
- Replica Sets**: Shows two entries: 'test-xjl-b7d58bfff4' (status: 1 / 1) and 'mydep-54bb9d45dd' (status: 1 / 1).



Dashboard界面介绍 - Workloads (2)

- 列表汇总了Workloads的可操作信息。例如，一个ReplicaSets的数量或一个Pod的当前内存使用率。





Dashboard界面介绍 - Workloads (3)

- Workloads的详细视图显示了对象的状态、规格信息以及各个对象之间的关系。

The screenshot shows the 'Details' tab for a Replica Set named 'mydep' in the 'default' namespace. The 'Replica Sets' tab is selected in the sidebar. The 'Details' section displays the following information:

- Name: mydep-54bb9d45dd
- Namespace: default
- Labels: app: mydep, pod-template-hash: 54bb9d45dd
- Annotations: deployment.kubernetes.io/desired-replicas: 1, deployment.kubernetes.io/max-replicas: 2, deployment.kubernetes.io/revision: 1
- Creation Time: 2019-06-27T06:46 UTC
- Selector: app: mydep, pod-template-hash: 54bb9d45dd
- Images: nginx
- Status: Pods: 1 running

The 'Pods' section lists one pod:

Name	Node	Status	Restarts	Age
mydep-54bb9d45dd-c5hmk	worker01	Running	1	a day



Dashboard界面介绍 - Discovery and Load Balancing

- Service和Ingress都归属于Discovery and Load Balancing列表下，显示用于集群连接的内部端点和外部用户的外部端点。

The screenshot shows the Kubernetes Dashboard interface. On the left, there's a sidebar with a 'default' dropdown and several navigation items: Overview, Workloads (Cron Jobs, Daemon Sets, Deployments, Jobs, Pods, Replica Sets), Replication Controllers (selected), Stateful Sets, Discovery and Load Balancing (selected), Ingresses, and Services. The main area is titled 'Services' and lists a single entry: 'kubernetes'. The table columns are Name, Labels, Cluster IP, Internal endpoints, External endpoints, and Age. The 'kubernetes' entry has a green checkmark in the Name column, 'component: apiser.' in Labels, '10.96.0.1' in Cluster IP, 'kubernetes:443 TCP' and 'kubernetes:0 TCP' in Internal endpoints, and 'a day' in Age.



Dashboard界面介绍 - Config and Storage

The screenshot shows the Kubernetes Dashboard interface. The left sidebar has a blue header "Config and storage" and a "Namespace" dropdown set to "default". The sidebar menu includes: Overview, Workloads (Cron Jobs, Daemon Sets, Deployments, Jobs, Pods, Replica Sets, Replication Controllers, Stateful Sets), Discovery and Load Balancing (Ingresses, Services), and Config and Storage (Config Maps, Persistent Volume Claims, Secrets). The "Secrets" section is selected, displaying a table with one row:

Name	Type	Age
default-token-qqx7b	kubernetes.io/service-account-token	a day



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使用Dashboard能做什么 - 增

- 为Kubernetes集群部署容器化应用。

The screenshot shows the 'Resource creation' interface in the Kubernetes Dashboard. The 'CREATE AN APP' tab is active. The 'App name' field contains 'app'. The 'Container image' field is empty. The 'Number of pods' field contains '1'. The 'Service' dropdown is set to 'None'. Below these fields are two informational paragraphs: one about adding an 'app' label to the Deployment and Service, and another about creating a Deployment to maintain the desired number of pods. At the bottom are 'SHOW ADVANCED OPTIONS', 'DEPLOY', and 'CANCEL' buttons.



使用Dashboard能做什么 - 删

- 对于不使用/有问题的应用进行删除，达到资源合理使用目的。

The screenshot shows the Kubernetes Dashboard's Deployments page. A blue arrow points from the top section down to a confirmation dialog box.

Deployments

Name	Labels	Pods	Age	Images	Actions
test-xjl	k8s-app: test-xjl	0 / 1	-	busybox	Scale
mydep	app: mydep	1 / 1	a day	nginx	Delete

Pods

Delete a Deployment

Are you sure you want to delete Deployment **test-xjl** in namespace **default**?

CANCEL DELETE



使用Dashboard能做什么 - 改 (1)

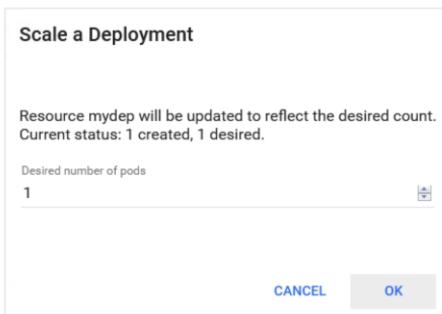
- 修改Kubernetes集群资源 (Deployments、Jobs、DaemonSets等)

The screenshot shows the Kubernetes Dashboard interface. The top navigation bar includes the Kubernetes logo, a search bar, and buttons for '+ CREATE', 'SCALE', 'EDIT', and 'DELETE'. The main title is 'Workloads > Deployments > mydep'. On the left, a sidebar menu lists 'Cluster', 'Namespaces', 'Nodes', 'Persistent Volumes', 'Roles', 'Storage Classes' (which is selected), 'Namespace' (set to 'default'), 'Overview', 'Workloads', and 'Cron Jobs'. The central panel displays the 'Details' for the 'mydep' deployment, listing its configuration: Name: mydep, Namespace: default, Labels: app: mydep, Annotations: deployment.kubernetes.io/revision: 1, Creation Time: 2019-06-27T06:46 UTC, Selector: app: mydep, Strategy: RollingUpdate, Min ready seconds: 0, Revision history limit: 10, Rolling update strategy: Max surge: 25%, Max unavailable: 25%, and Status: 1 updated, 1 total, 1 available, 0 unavailable.



使用Dashboard能做什么 - 改 (2)

- 扩容或者缩容Pod数量



- 编辑应用的yaml文件

```
1  {
2   "kind": "Deployment",
3   "apiVersion": "extensions/v1beta1",
4   "metadata": {
5     "name": "mydep",
6     "namespace": "default",
7     "selfLink": "/apis/extensions/v1beta1/namespaces/default/deployments/mydep",
8     "uid": "44e4305f-e0ce-4abc-bb63-5ffea1fc0000",
9     "resourceVersion": "15973",
10    "generation": 1,
11    "creationTimestamp": "2019-06-27T06:46:03Z",
12    "labels": {
13      "app": "mydep"
14    },
15    "annotations": {
16      "deployment.kubernetes.io/revision": "1"
17    }
}
```



使用Dashboard能做什么 - 查 (1)

- 查看Kubernetes集群中容器化应用的信息。

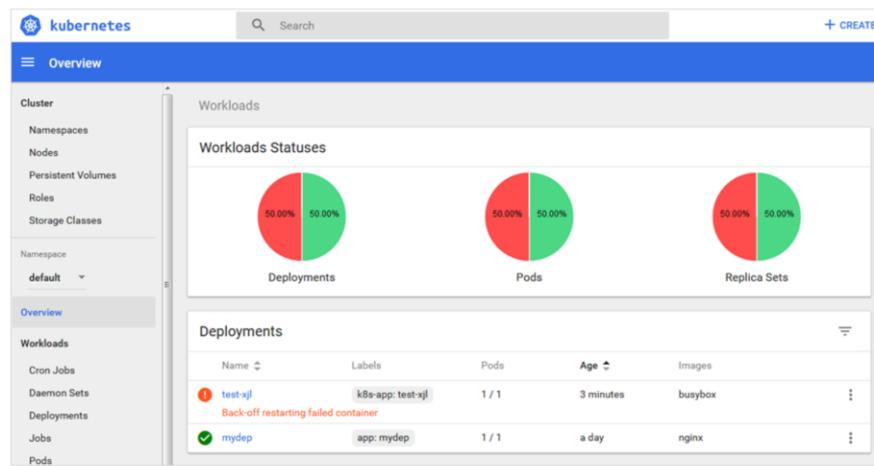
The screenshot shows the Kubernetes Dashboard interface. The left sidebar is collapsed. The main area shows the 'Workloads > Deployments > mydep' view. The 'Details' section displays deployment metadata: Name: mydep, Namespace: default, Labels: app: mydep, Annotations: deployment.kubernetes.io/revision: 1, Creation Time: 2019-06-27T06:46 UTC, Selector: app: mydep, Strategy: RollingUpdate, Min ready seconds: 0, Revision history limit: 10, Rolling update strategy: Max surge: 25%, Max unavailable: 25%, Status: 1 updated, 1 total, 1 available, 0 unavailable. Below this is a 'New Replica Set' table:

Name	Labels	Pods	Age	Images
mydep-54bbb9d45dd	app: mydep pod-template-hash: 54b...	1 / 1	19 hours	nginx



使用Dashboard能做什么 - 查 (2)

- 查看Kubernetes集群的资源状态。





使用Dashboard能做什么 - 查 (3)

- 通过Kubernetes集群容器化应用的日志进行故障排查。

The screenshot shows two panels of the Kubernetes Dashboard. The left panel is the 'Pods' details view for a pod named 'mydep-54bb9d45dd-c5hmk'. It displays basic information like name, namespace, creation time, and status. The right panel is the 'Logs' view for the same pod. It shows the log output from the 'nginx' container, which currently displays the message: 'The selected container has not logged any messages yet.'

- 窗口的右上角可以进行调整日志输出窗口的格式，已经下载日志到本地。



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3. **Dashboard部署应用**



使用Dashboard部署一个应用

The screenshot shows the Kubernetes Dashboard's 'Overview' page. At the top right, there is a red-bordered 'CREATE' button. Below it, there are three tabs: 'CREATE FROM TEXT INPUT', 'CREATE FROM FILE', and 'CREATE AN APP'. The 'CREATE AN APP' tab is currently selected. The form fields include 'App name *' (with a character limit of 0/24), 'Container image *' (with a placeholder 'Enter the URL of a public image on any registry, or a private image hosted on Docker Hub or Google Container Registry.'), 'Number of pods *' (set to 1), 'Service *' (set to 'None'), and 'SHOW ADVANCED OPTIONS'. At the bottom are 'DEPLOY' and 'CANCEL' buttons.



使用Dashboard部署一个应用 - 必填项

CREATE FROM TEXT INPUT CREATE FROM FILE **CREATE AN APP**

App name *
Container image *
Number of pods *

1

- App name: 必须在所选的Kubernetes namespace中唯一，且必须以小写字母开头和结尾，只能包含小写字母、数字和“-”。它只限于24个字符，头和尾的空格会被忽略。将会在Replication Controller和服务中添加带有该名称的标签。
- Container image: 在registry上的公有Docker容器镜像或托管在Google Container Registry或Docker Hub上私有镜像的URL，容器镜像规格必须以冒号结尾。
- Number of pods: 应用程序部署的目标数量，该值必须是正整数。



使用Dashboard部署一个应用 - 选项项

Service *
Internal

Port * Target port * Protocol * TCP

Optional, an internal or external Service can be defined to map an incoming Port to a target Port seen by the container. The internal DNS name for this Service will be: `textapp`. [Learn more](#)



None

Internal

External

TCP

UDP

- Services

- 外部Service：对于应用的某些部分（如前端），需要将Service（如集群的公共IP地址）裸露出去。对于外部Service，需要打开一个或多个端口来执行此操作。

- 内部Service：只在集群内部可见的服务。

- 不管哪种Service类型，如果选择创建Service，需要配置容器的监听端口（传入），包括port和Target port。

- 该Service将传入端口映射到容器的目标端口上，而且自动会添加到部署Pod的路由。

- 支持的协议是TCP和UDP。

- Service的内部DNS名称将使用指定的app name。



使用Dashboard部署一个应用 - 高级选项

Description	
<input type="text"/>	

Labels	Value
Key k8s-app	textapp 7 / 253

Namespace *	
default	<input type="button"/>

Image Pull Secret
<input type="button"/>

CPU requirement (cores)	Memory requirement (MiB)
<input type="button"/>	<input type="button"/>

Run command	
<input type="text"/>	

Run command arguments	
<input type="text"/>	

Run as privileged

Environment variables	
Name	Value

- Description: 此处输入的文本将作为Replication Controller的注释添加到应用程序的详细信息中。
- Labels: 应用程序的默认标签包含应用程序名称和版本，可以指定的附加标签（发行版本、环境信息等）到 Replication Controller、Service、Pod里。
- Namespace: 在下拉列表中提供所有可用的Namespace，也可以创建新的Namespace，名称最多包含63个字母数字字符和“-”，创建成功后，默认选中，如果创建失败，则自动选择列表中第一个。
- Image Pull Secret: 如果指定的Docker容器镜像是私有镜像，则某些私有镜像可能需要Pull Secret凭据。
 - Secret的内容必须是base64编码和在.dockercfg文件中指定的。
- CPU requirement (cores) 和Memory requirement (MiB) : 为容器指定最小的资源限制，默认情况下，Pod运行时是没有CPU和内存的限制。
- Run command和Run command arguments: 默认情况下，容器会使用Docker镜像中指定的默认入口点命令运行，可以使用命令选项和参数来重写它。
- Run as privileged: 该设置决定特权容器中的进程是否相当于在主机上运行为root权限的进程，特权容器具备使用操作网络堆栈和访问设备等的能力。
- Environment variables: Kubernetes通过环境变量暴露Service，可以使用环境变量的值编写环境变量或传递参数到命令中，这些变量可以用于在应用中查找Service，这个值可以通过“\$(VAR_NAME)”语法来引用其他变量。



实验任务

- 实验任务
 - 请按照实验手册的2.15章节完成Dashboard相关实验。



思考题

1. Dashboard通过“CREATE AN APP”方式部署应用时，以下哪些参数是必填项？（ ）
 - A. Services
 - B. App name
 - C. Container image
 - D. Number of pods
2. Dashboard可以显示Pods的CPU和内存使用率信息，无需安装配置额外组件。（ ）

- 参考答案：

- BCD。
 - F。



本章总结

- 本章学习了以下内容：
 - Dashboard是什么
 - Dashboard的两种认证方式：token和Kubeconfig
 - Dashboard的界面架构和各个界面内容
 - Dashboard的功能：增删改查
 - 如何使用Dashboard部署应用。

A blue-tinted silhouette of several business people standing in a modern office environment with large windows and a grid pattern. They are engaged in various interactions, such as handshakes and conversations.

谢谢

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