Tutorial: Prepare an application for Azure Kubernetes Service (AKS)

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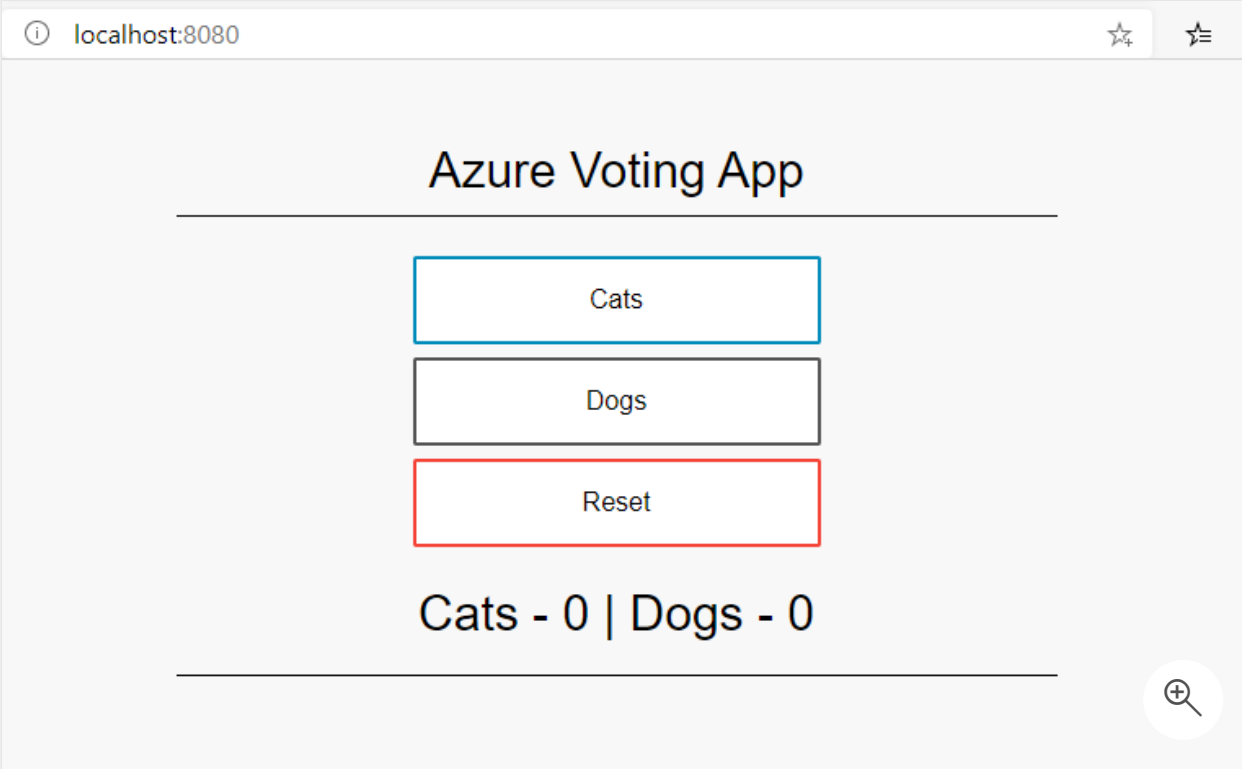
In this tutorial, part one of seven, a multi-container application is prepared for use in Kubernetes. Existing development tools such as Docker Compose are used to locally build and test an application. You learn how to:

- ✓ Clone a sample application source from GitHub
- ✓ Create a container image from the sample application source
- ✓ Test the multi-container application in a local Docker environment

Once completed, the following application runs in your local development environment:



In later tutorials, the container image is uploaded to an Azure Container Registry, and then deployed into an AKS cluster.

Before you begin

This tutorial assumes a basic understanding of core Docker concepts such as containers, container images, and `docker` commands. For a primer on container basics, see Get started with Docker .

To complete this tutorial, you need a local Docker development environment running Linux containers. Docker provides packages that configure Docker on a Mac , Windows , or Linux system.

> **Note**
>
> Azure Cloud Shell does not include the Docker components required to complete every step in these tutorials. Therefore, we recommend using a full Docker development environment.

Get application code

The sample application used in this tutorial is a basic voting app consisting of a front-end web component and a back-end Redis instance. The web component is packaged

into a custom container image. The Redis instance uses an unmodified image from Docker Hub.

Use git to clone the sample application to your development environment:

Console Copy

```
git clone https://github.com/Azure-Samples/azure-voting-app-redis.git
```

Change into the cloned directory.

Console Copy

```
cd azure-voting-app-redis
```

Inside the directory is the application source code, a pre-created Docker compose file, and a Kubernetes manifest file. These files are used throughout the tutorial set. The contents and structure of the directory are as follows:

Output Copy

```
azure-voting-app-redis
│   azure-vote-all-in-one-redis.yaml
│   docker-compose.yaml
│   LICENSE
│   README.md
│
├───azure-vote
│   │   app_init.supervisord.conf
│   │   Dockerfile
│   │   Dockerfile-for-app-service
│   │   sshd_config
│   │
│   └───azure-vote
│       │   config_file.cfg
│       │   main.py
│       │
│       ├───static
│       │       default.css
│       │
│       └───templates
│               index.html
│
└───jenkins-tutorial
        config-jenkins.sh
        deploy-jenkins-vm.sh
```

Create container images

Docker Compose can be used to automate building container images and the deployment of multi-container applications.

Use the sample `docker-compose.yaml` file to create the container image, download the Redis image, and start the application:

Console Copy

```
docker-compose up -d
```

When completed, use the docker images command to see the created images. Three images have been downloaded or created. The *azure-vote-front* image contains the front-end application and uses the *nginx-flask* image as a base. The *redis* image is used to start a Redis instance.

Copy

```
$ docker images

REPOSITORY                                    TAG                 IMAGE ID
CREATED             SIZE
mcr.microsoft.com/azuredocs/azure-vote-front   v1
84b41c268ad9        9 seconds ago       944MB
mcr.microsoft.com/oss/bitnami/redis           6.0.8
3a54a920bb6c        2 days ago          103MB
tiangolo/uwsgi-nginx-flask                    python3.6
a16ce562e863        6 weeks ago         944MB
```

Run the docker ps command to see the running containers:

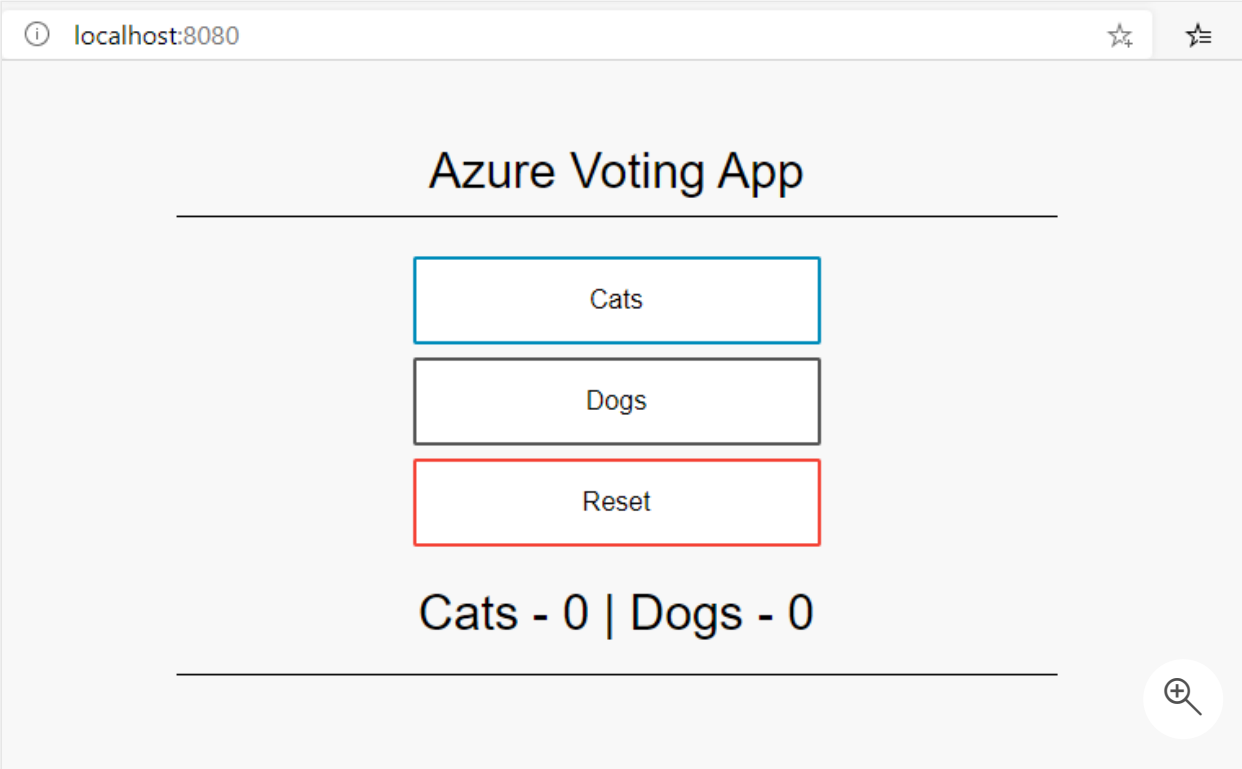
Copy

```
$ docker ps

CONTAINER ID        IMAGE
COMMAND                  CREATED             STATUS              PORTS
NAMES
d10e5244f237        mcr.microsoft.com/azuredocs/azure-vote-front:v1
"/entrypoint.sh /sta…"   3 minutes ago       Up 3 minutes        443/tcp,
0.0.0.0:8080->80/tcp   azure-vote-front
21574cb38c1f        mcr.microsoft.com/oss/bitnami/redis:6.0.8
"/opt/bitnami/script…"   3 minutes ago       Up 3 minutes
0.0.0.0:6379->6379/tcp          azure-vote-back
```

Test application locally

To see the running application, enter `http://localhost:8080` in a local web browser. The sample application loads, as shown in the following example:



Clean up resources

Now that the application's functionality has been validated, the running containers can be stopped and removed. ***Do not delete the container images*** - in the next tutorial, the *azure-vote-front* image is uploaded to an Azure Container Registry instance.

Stop and remove the container instances and resources with the docker-compose down command:

Console | Copy

```
docker-compose down
```

When the local application has been removed, you have a Docker image that contains the Azure Vote application, *azure-vote-front*, for use with the next tutorial.

Next steps

In this tutorial, an application was tested and container images created for the application. You learned how to:

- ✓ Clone a sample application source from GitHub
- ✓ Create a container image from the sample application source
- ✓ Test the multi-container application in a local Docker environment

Advance to the next tutorial to learn how to store container images in Azure Container Registry.

Push images to Azure Container Registry

Recommended content

Kubernetes on Azure tutorial - Deploy an application - Azure Kubernetes Service

In this Azure Kubernetes Service (AKS) tutorial, you deploy a multi-container application to your cluster using a custom image stored in Azure Container Registry.

Kubernetes on Azure tutorial - Create a container registry - Azure Kubernetes Service

In this Azure Kubernetes Service (AKS) tutorial, you create an Azure Container Registry instance and upload a sample application container image.

Kubernetes on Azure tutorial - Update an application - Azure Kubernetes Service

In this Azure Kubernetes Service (AKS) tutorial, you learn how to update an existing application deployment to AKS with a new version of the application code.

Kubernetes on Azure tutorial - Deploy a cluster - Azure Kubernetes Service

In this Azure Kubernetes Service (AKS) tutorial, you create an AKS cluster and use kubectl to connect to the Kubernetes master node.

Kubernetes on Azure tutorial - Upgrade a cluster - Azure Kubernetes Service

In this Azure Kubernetes Service (AKS) tutorial, you learn how to upgrade an existing AKS cluster to the latest available Kubernetes version.

Build, test, and deploy containers to Azure Kubernetes Service using GitHub Actions - Azure Kubernetes Service

Learn how to use GitHub Actions to deploy your container to Kubernetes

Develop on Azure Kubernetes Service (AKS) with Helm - Azure Kubernetes Service

Use Helm with AKS and Azure Container Registry to package and run application containers in a cluster.

Kubernetes on Azure tutorial - Scale Application - Azure Kubernetes Service

In this Azure Kubernetes Service (AKS) tutorial, you learn how to scale nodes and pods in Kubernetes, and implement horizontal pod autoscaling.

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