

Detailed documentation

1&2 Fork and clone the codebase

A terminal window titled "demo — -zsh — 80x24" showing the execution of a git clone command. The user is at the prompt "qingliu@allenbook demo %". The command is "git clone https://github.com/QuinnieLiu/sit722-week08.git". The output shows the cloning process: "Cloning into 'sit722-week08'...", "remote: Enumerating objects: 268, done.", "remote: Counting objects: 100% (90/90), done.", "remote: Compressing objects: 100% (26/26), done.", "remote: Total 268 (delta 73), reused 64 (delta 64), pack-reused 178 (from 1)", "Receiving objects: 100% (268/268), 98.13 KiB | 2.04 MiB/s, done.", "Resolving deltas: 100% (128/128), done.", and the prompt returns to "qingliu@allenbook demo %".

```
qingliu@allenbook demo % git clone https://github.com/QuinnieLiu/sit722-week08.git
Cloning into 'sit722-week08'...
remote: Enumerating objects: 268, done.
remote: Counting objects: 100% (90/90), done.
remote: Compressing objects: 100% (26/26), done.
remote: Total 268 (delta 73), reused 64 (delta 64), pack-reused 178 (from 1)
Receiving objects: 100% (268/268), 98.13 KiB | 2.04 MiB/s, done.
Resolving deltas: 100% (128/128), done.
qingliu@allenbook demo %
```

3 Key differences between two workflows

1. CI/CD Separation

- **Current Project:** Clear separation between CI (Continuous Integration) and CD (Continuous Delivery) workflows
- **chapter-8-example-3:** Combined approach - single workflow handles build, publish, and deploy

2. Testing Integration

- **Current Project:** Backend CI includes comprehensive testing with database services before building images
- **chapter-8-example-3:** No testing phase - builds and deploys without validation

3. Deployment Strategy

- **Current Project:** Manual deployment triggers (Continuous Delivery) - human approval required
- **chapter-8-example-3:** Automatic deployment on code changes (Continuous Deployment)

4. Architecture Complexity

- **Current Project:** Multi-service architecture with separate workflows for frontend/backend

- **chapter-8-example-3:** Single microservice deployment

5. Error Handling & Validation

- **Current Project:**
 - Job dependencies ensure tests pass before building
 - LoadBalancer IP validation with timeout handling
 - Proper Azure logout in all scenarios
- **chapter-8-example-3:** Basic deployment without validation steps

6. Path-based Triggering

- **Current Project:** Smart triggering based on changed paths (frontend/** or backend/**)
- **chapter-8-example-3:** Triggers on any change to main branch

7. Multi-job Orchestration

- **Current Project:** Complex multi-job workflows with outputs and dependencies
- **chapter-8-example-3:** Single job execution

4 Create all required Azure resources

1. Set Variables

```
RESOURCE_GROUP="sit722-week08-rg"
LOCATION="australiaeast"
STORAGE_ACCOUNT="sit722week08storage"
ACR_NAME="sit722week08acr"
AKS_CLUSTER="sit722-week08-aks"
SP_NAME="sit722-week08-sp-qingliu"
```

2. Create Resource Group

```
az group create --name $RESOURCE_GROUP --location $LOCATION
```

3. Create Storage Account

```
az storage account create \
--name $STORAGE_ACCOUNT \
--resource-group $RESOURCE_GROUP \
--location $LOCATION \
--sku Standard_LRS
```

4. Create Azure Container Registry (ACR)

```
az acr create \
--resource-group $RESOURCE_GROUP \
--name $ACR_NAME \
--sku Basic \
--location $LOCATION
```

5. Create AKS Cluster

```
az aks create \  
--resource-group $RESOURCE_GROUP \  
--name $AKS_CLUSTER \  
--node-count 2 \  
--node-vm-size Standard_B2s \  
--location $LOCATION \  
--attach-acr $ACR_NAME \  
--generate-ssh-keys
```

6. Create Service Principal with Owner Permission

```
# Get subscription ID  
SUBSCRIPTION_ID=$(az account show --query id -o tsv)  
  
# Get resource group ID  
RESOURCE_GROUP_ID=$(az group show --name $RESOURCE_GROUP --query id -o  
tsv)  
  
# Create service principal with Owner role on the resource group  
az ad sp create-for-rbac \  
--name $SP_NAME \  
--role Owner \  
--scopes $RESOURCE_GROUP_ID \  
--json-auth
```

7. Get ACR Login Server (for GitHub secrets)

```
az acr show --name $ACR_NAME --resource-group $RESOURCE_GROUP --query  
loginServer -o tsv
```

The screenshot shows a VS Code editor with a file explorer on the left and a terminal window on the right. The file explorer shows a project structure for 'SIT722-WEEK08' with files like 'backend_ci.yml', 'backend-cd.yml', 'frontend_ci.yml', 'frontend-cd.yml', 'backend', 'frontend', 'k8s', '.gitignore', 'docker-compose.yml', 'README.md', 'SIT722-8.1P Answer.md', and 'workflow-comparison-ana...'. The terminal window shows the following commands and outputs:

```

qingliu@allenbook sit722-week08 % RESOURCE_GROUP="sit722-week08-rg"
LOCATION="australiaeast"
STORAGE_ACCOUNT="sit722week08storage"
ACR_NAME="sit722week08acr"
AKS_CLUSTER="sit722-week08-aks"
SP_NAME="sit722-week08-sp"

qingliu@allenbook sit722-week08 % az group create --name $RESOURCE_GROUP --location $LOCATION
{
  "id": "/subscriptions/ea298714-a57d-4ad2-ab0f-0f76956020ad/resourceGroups/sit722-week08-rg",
  "location": "australiaeast",
  "managedBy": null,
  "name": "sit722-week08-rg",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}

qingliu@allenbook sit722-week08 % az storage account create \
  --name $STORAGE_ACCOUNT \
  --resource-group $RESOURCE_GROUP \
  --location $LOCATION \
  --sku Standard_LRS
{
  "accessTier": "Hot",
  "accountMigrationInProgress": null,
  "allowBlobPublicAccess": false,
  "allowCrossTenantReplication": false,
  "allowSharedKeyAccess": null,
  "allowedCopyScope": null,
  "azureFilesIdentityBasedAuthentication": null,
  "blobRestoreStatus": null,
  "creationTime": "2025-09-12T08:42:34.367944+00:00",
  "customDomain": null,
  "defaultToOAuthAuthentication": null,
  "dnsEndpointType": null,
  "enableExtendedGroups": null,
  "enableHttpsTrafficOnly": true,
  "enableNfsv3": null,
  "encryption": {
    "encryptionIdentity": null,
    "keySource": "Microsoft.Storage",
    "keyVaultProperties": null,
    "requireInfrastructureEncryption": null,

```

The screenshot continues the terminal window from the previous one, showing the 'az acr create' command and its output:

```

}

qingliu@allenbook sit722-week08 % az acr create \
  --resource-group $RESOURCE_GROUP \
  --name $ACR_NAME \
  --sku Basic \
  --location $LOCATION
{
  "adminUserEnabled": false,
  "anonymousPullEnabled": false,
  "autoGeneratedDomainNameLabelScope": "Unsecure",
  "creationDate": "2025-09-12T08:44:27.050029+00:00",
  "dataEndpointEnabled": false,
  "dataEndpointHostNames": [],
  "encryption": {
    "keyVaultProperties": null,
    "status": "disabled"
  },
  "id": "/subscriptions/ea298714-a57d-4ad2-ab0f-0f76956020ad/resourceGroups/sit722-week08-rg/providers/Microsoft.ContainerR
egistry/registries/sit722week08acr",
  "identity": null,
  "location": "australiaeast",
  "loginServer": "sit722week08acr.azurecr.io",
  "metadataSearch": "Disabled",
  "name": "sit722week08acr",
  "networkRuleBypassOptions": "AzureServices",
  "networkRuleSet": null,
  "policies": {
    "azureAdAuthenticationAsArmPolicy": {
      "status": "enabled"
    },
    "exportPolicy": {
      "status": "enabled"
    },
    "quarantinePolicy": {
      "status": "disabled"
    },
    "retentionPolicy": {
      "days": 7,
      "lastUpdatedTime": "2025-09-12T08:44:34.533143+00:00",
      "status": "disabled"
    },
    "softDeletePolicy": {
      "lastUpdatedTime": "2025-09-12T08:44:34.533189+00:00",
      "retentionDays": 7,

```

The image displays two screenshots of a VS Code editor window, showing terminal output for Azure CLI commands.

Top Screenshot: The terminal shows the output of the command `az aks create`. The output indicates that AAD role propagation is done (100.0000%) and lists the configuration for the AKS cluster, including node count, VM size, location, and various system settings.

Bottom Screenshot: The terminal shows the output of the command `az ad sp create-for-rbac`. The output indicates that the role assignment is successful and displays the details of the service principal created, including its name, role, and the subscription it belongs to.

5 Run Backend CI and CD

PTESIT722-8.1P Answer.md

Backend CI - Test, Build and Push Images to ACR

chapter-8-example-3

Azure Command-Line

Create Your Azure Fre

sit722-week08-aks

github.com/QuinnieLiu/sit722-week08/actions/workflows/backend_ci.yml

Finish update

QuinnieLiu / sit722-week08

Type to search

CodePull requestsActionsProjectsWikiSecurityInsightsSettings

Actions

New workflow

All workflows

Backend CI - Test, Build and Push I...

CD - Deploy Backend Services to AKS

CD - Deploy Frontend to AKS

Frontend CI - Build & Push Image

Management

Caches

Deployments

Attestations

Runners

Usage metrics

Performance metrics

Backend CI - Test, Build and Push Images to ACR

backend_ci.yml

Filter workflow runs

2 workflow runs

EventStatusBranchActor

This workflow has a workflow_dispatch event trigger.

Run workflow

Backend CI - Test, Build and Push Images to ACR

Backend CI - Test, Build and Push Images to ACR #2: Manually run by QuinnieLiu

main

7 minutes ago

2m 23s

Backend CI - Test, Build and Push Images to ACR

Backend CI - Test, Build and Push Images to ACR #1: Manually run by QuinnieLiu

main

23 minutes ago

2m 23s

PTESIT722-8.1P Answer.md

CD - Deploy Backend

chapter-8-example-3

Azure Command-Line

Create Your Azure Fre

sit722-week08-aks

github.com/QuinnieLiu/sit722-week08/actions/workflows/backend-cd.yml

Finish update

QuinnieLiu / sit722-week08

Type to search

CodePull requestsActionsProjectsWikiSecurityInsightsSettings

Actions

New workflow

All workflows

Backend CI - Test, Build and Push Ima...

CD - Deploy Backend Services to AKS

CD - Deploy Frontend to AKS

Frontend CI - Build & Push Image

Management

Caches

Deployments

Attestations

Runners

Usage metrics

Performance metrics

CD - Deploy Backend Services to AKS

backend-cd.yml

Filter workflow runs

2 workflow runs

EventStatusBranchActor

This workflow has a workflow_dispatch event trigger.

Run workflow

CD - Deploy Backend Services to AKS

CD - Deploy Backend Services to AKS #2: Manually run by QuinnieLiu

main

5 minutes ago

5m 1s

CD - Deploy Backend Services to AKS

CD - Deploy Backend Services to AKS #1: Manually run by QuinnieLiu

main

22 minutes ago

5m 43s

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CD - Deploy Backend

chapter-8-example-3

Azure Command-Line

Create Your Azure Fre

sit722-week08-aks

+

portal.azure.com/?ocid=AIDcmxbrqs76_SEM__k_CjwKCAjwiY_GBhBEEiWAFaghvJUU-p3vVdKK4vT4I2JRyb4JuZbpvGABJYgkMSORn9Mbm8qR...

Finish update

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

odl_user_1796941@clou...
DEAKIN UNIVERSITY (CLOUDLAB...

Home > sit722-week08-aks

sit722-week08-aks | Workloads

☆

...

Kubernetes service

Search

◊

◀

+ Create

↗ Scale

🗑 Delete

🔄 Refresh

🏷 Show labels

🗨 Give feedback

Overview

Activity log

Access control (IAM)

Tags

Monitor

Diagnose and solve problems

Microsoft Defender for Cloud

Cost analysis

Resource visualizer

▼ Kubernetes resources

Namespaces

Workloads

Services and ingresses

Storage

Configuration

Custom resources

Events

Run command

> Settings

Add or remove favorites by pressing Cmd+Shift+F

Deployments

Pods

Replica sets

Stateful sets

Daemon sets

Jobs

Cron jobs

Filter by namespace

All namespaces

Deployment name: All

Add label filter

<input type="checkbox"/>	Name	Namespace	Ready	Age ↓	CPU	Memory
<input type="checkbox"/>	coredns	kube-system	✓ 2/2	45 minutes	Enable metrics	
<input type="checkbox"/>	coredns-autoscaler	kube-system	✓ 1/1	45 minutes	%	%
<input type="checkbox"/>	connectivity-agent	kube-system	✓ 2/2	45 minutes	%	%
<input type="checkbox"/>	connectivity-agent-autoscaler	kube-system	✓ 1/1	45 minutes	%	%
<input type="checkbox"/>	metrics-server	kube-system	✓ 2/2	45 minutes	%	%
<input type="checkbox"/>	product-db-deployment-w08e1	default	✓ 1/1	18 minutes	%	%
<input type="checkbox"/>	order-db-deployment-w08e1	default	✓ 1/1	18 minutes	%	%
<input type="checkbox"/>	product-service-w08e1	default	✓ 1/1	18 minutes	%	%
<input type="checkbox"/>	order-service-w08e1	default	✓ 1/1	18 minutes	%	%

6 Update IP address of each service in frontend via Actions

PTESIT722-8.1P Answer.md

Frontend CI - Build & Push Image

Frontend CI - Build & Push Image

chapter-8-exam

Azure Command

Create Your Azure

SIT722-week08

github.com/QuinnieLiu/sit722-week08/actions/workflows/frontend_ci.yml

Finish update

QuinnieLiu / sit722-week08

Type to search

Code Pull requests Actions Projects Wiki Security Insights Settings

Actions

New workflow

All workflows

Backend CI - Test, Build and Push Image

CD - Deploy Backend Services to AKS

CD - Deploy Frontend to AKS

Frontend CI - Build & Push Image

Management

Caches

Deployments

Attestations

Runners

Usage metrics

Performance metrics

Frontend CI - Build & Push Image

frontend_ci.yml

Filter workflow runs

2 workflow runs

Event Status Branch Actor

This workflow has a workflow_dispatch event trigger.

Run workflow

Revert "Update frontend with backend service IP address..."

Frontend CI - Build & Push Image #2: Commit de7c821 pushed by QuinnieLiu

main

3 minutes ago

52s

Update frontend with backend service IP addresses

Frontend CI - Build & Push Image #1: Commit fce4ad pushed by QuinnieLiu

main

6 minutes ago

1m 9s

PTESIT722-8.1P Answer.md

CD - Deploy Frontend to AKS

Frontend CI - Build & Push Image

chapter-8-exam

Azure Command

Create Your Azure

SIT722-week08

github.com/QuinnieLiu/sit722-week08/actions/workflows/frontend-cd.yml

Finish update

QuinnieLiu / sit722-week08

Type to search

Code Pull requests Actions Projects Wiki Security Insights Settings

Actions

New workflow

All workflows

Backend CI - Test, Build and Push Image

CD - Deploy Backend Services to AKS

CD - Deploy Frontend to AKS

Frontend CI - Build & Push Image

Management

Caches

Deployments

Attestations

Runners

Usage metrics

Performance metrics

CD - Deploy Frontend to AKS

frontend-cd.yml

Filter workflow runs

1 workflow run

Event Status Branch Actor

This workflow has a workflow_dispatch event trigger.

Run workflow

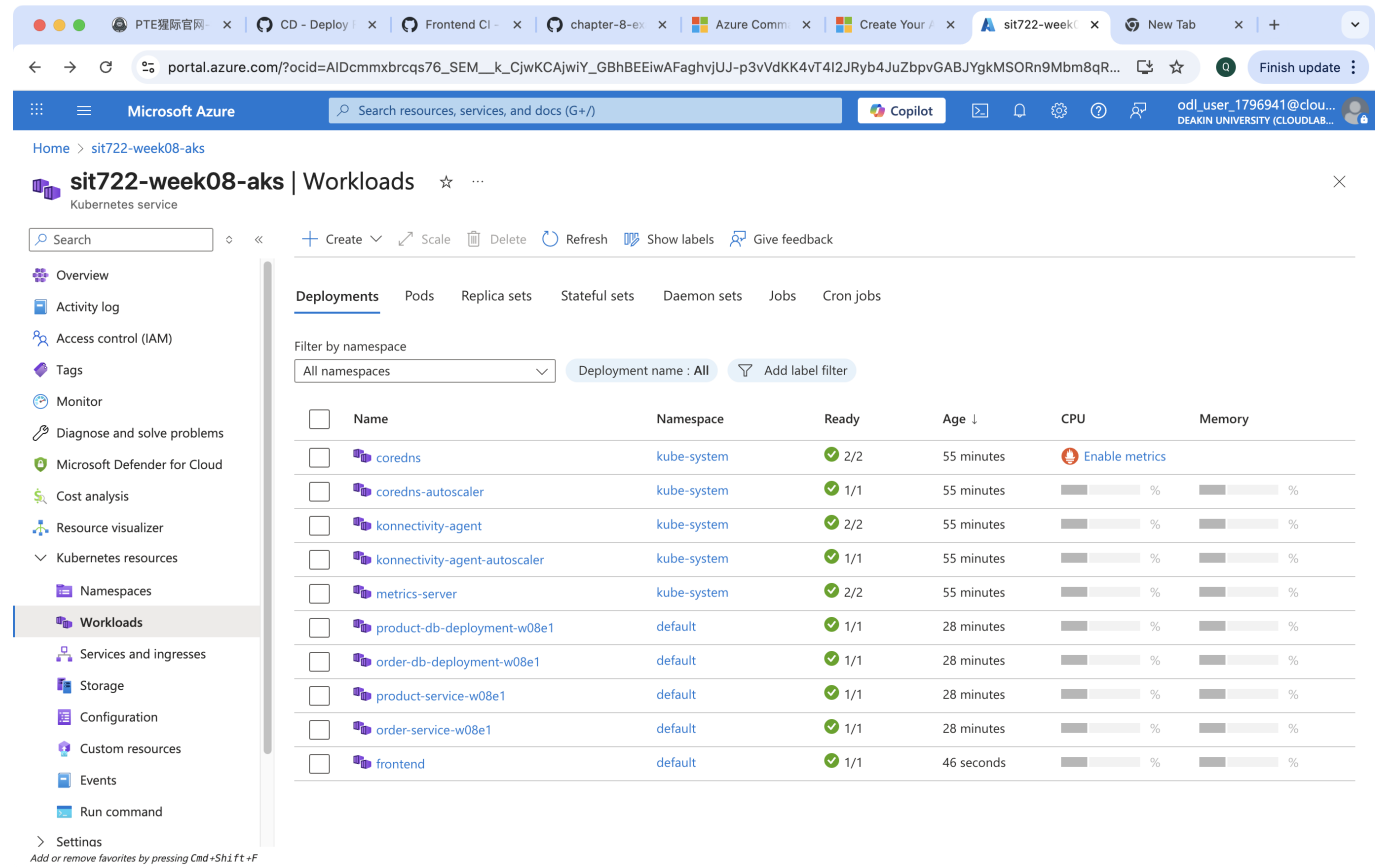
CD - Deploy Frontend to AKS

CD - Deploy Frontend to AKS #1: Manually run by QuinnieLiu

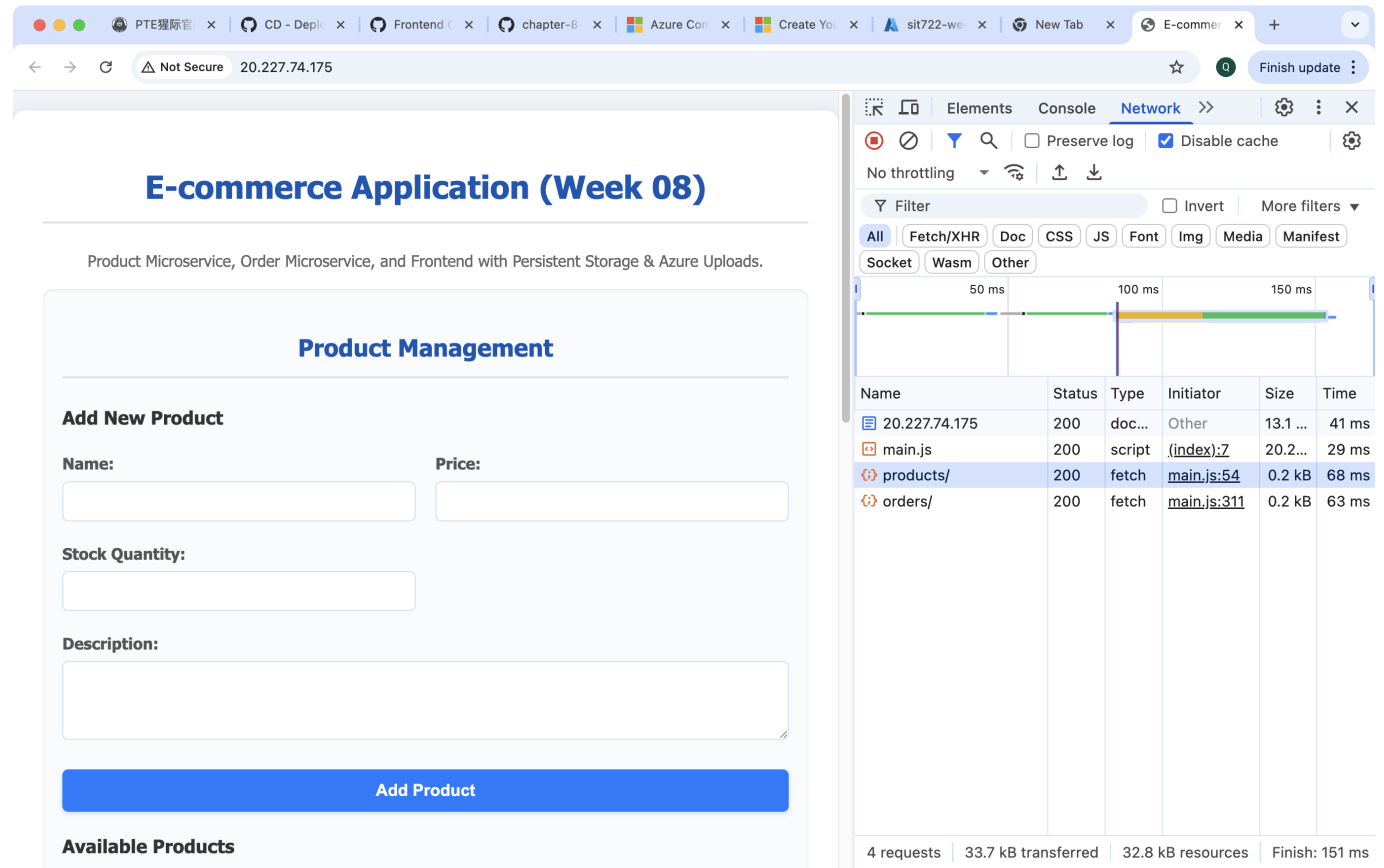
main

1 minute ago

52s



7 Run and test completely



8 Delete all resources

All Azure resources created for this task has been cleaned up.