

# AZ-104 Case Study 0

Contoso Coffee



# Contoso Coffee

- Contoso Coffee is a coffee house that is opening soon
- London and New York
- Cloud hosted solution for their website and data storage
- Costs must be kept to a minimum

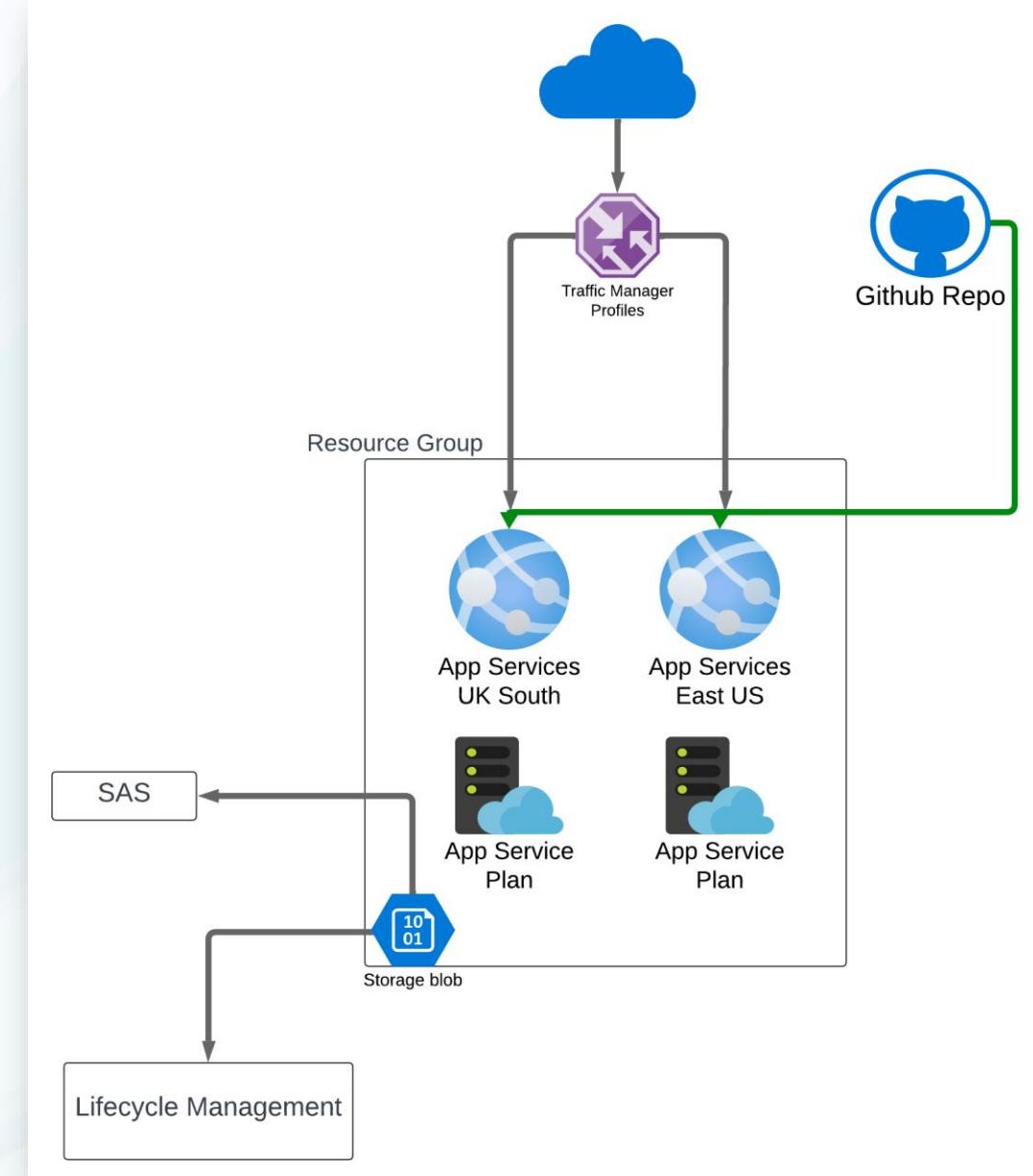


# Specifications

- **User Accounts and Role Assignments**
- **Users and Roles:**
  - **Bob** (**Owner** role on a Subscription level)
  - **Dave** (**Contributor** role to manage the website and its resources)
  - **Mark** (**Reader** role to have read-only access to resources)
- **Website Hosting and Deployment**
  - Two **App Services** (**UK South** and **East US** region)
  - Pull GitHub Hosted Site via **Deployment Center**
- **Azure Traffic Manager**
  - Use **Azure Traffic Manager** to route based on geographic location.
- **Data Storage Solution**
  - Store a large amount of image information (shared with staff members and clients)
  - Secure access control, Lifecycle Management
  - Raspberry pie (display pictures) -- SAS key

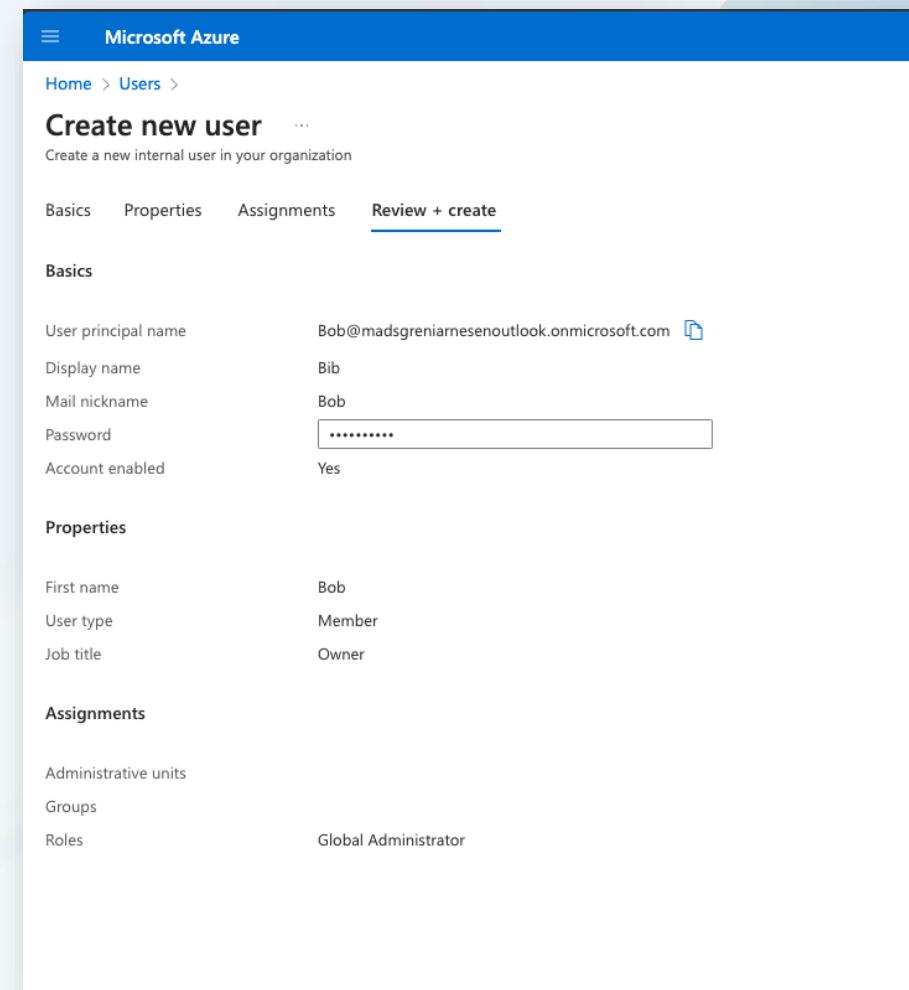
# Topology

- **Regions:** East US, UK South
- **Web Hosting:** 2 App Service Plans
- **Load Balancer:** Traffic distribution
- **Storage:** Azure Blob Storage
  - Secure access control
  - Lifecycle Management



# User accounts - Bob

- Bob – Owner of Contoso Coffee – Tracking and billing
- Global Administrator rights for the Entra tenant.



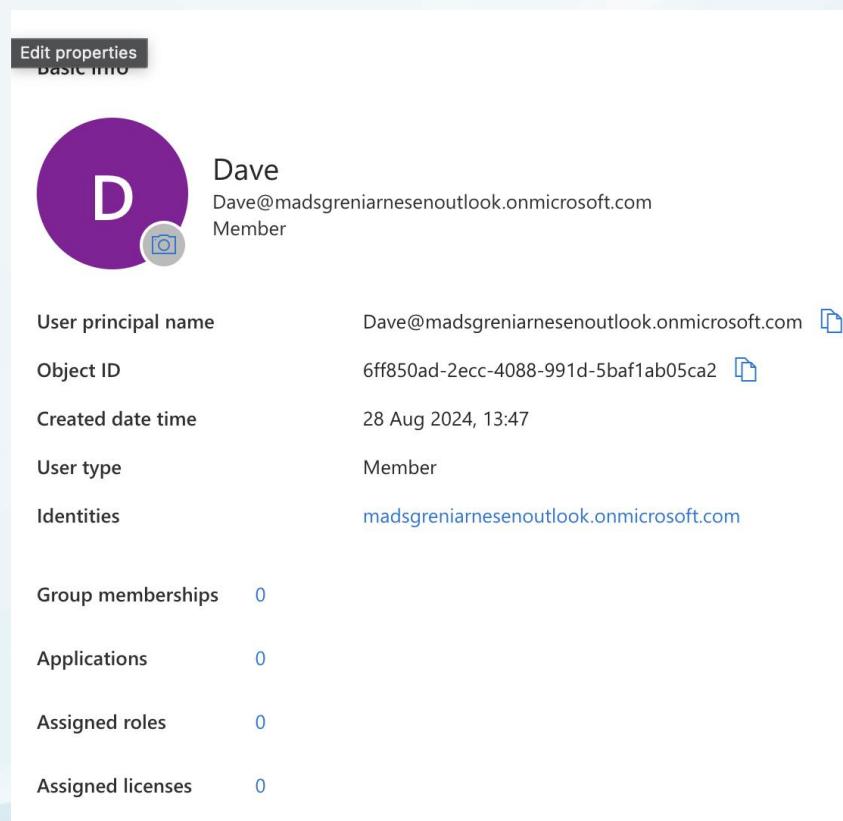
# User accounts Bob – Subscription level

- Owner on the subscription level of Contoso Coffee.
- Inherited access to the resources under the Subscription, such as the resource group of ContosoCoffeeRG

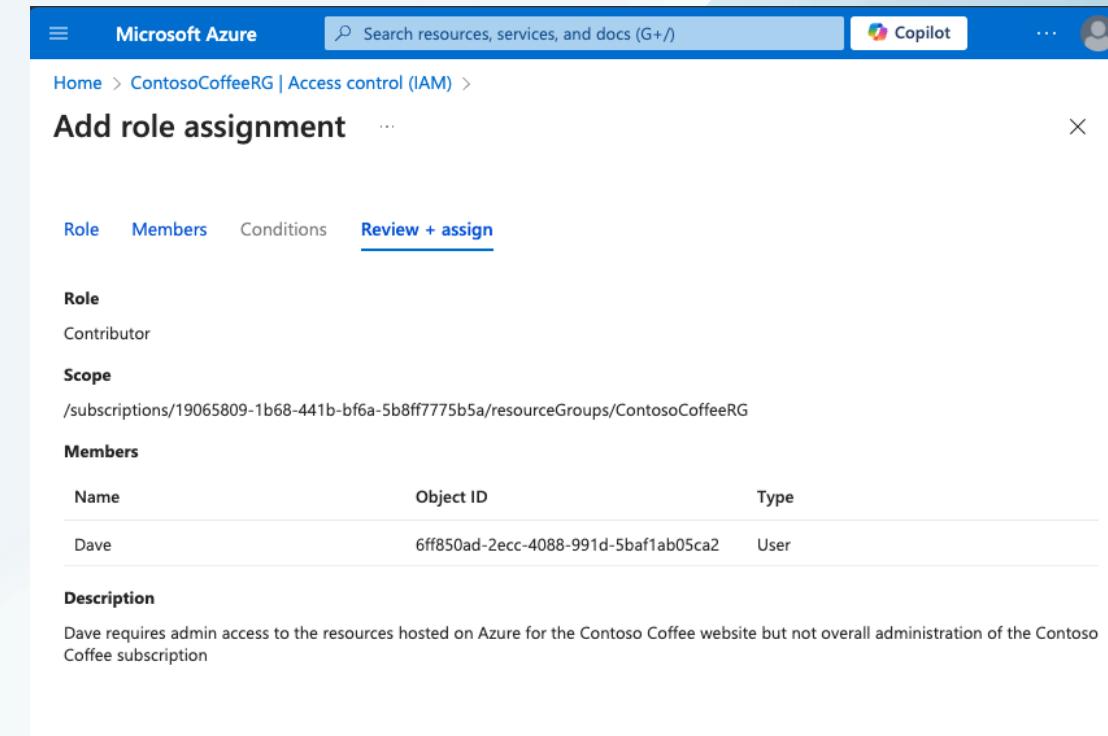
The screenshot shows the Microsoft Azure portal interface for managing role assignments. The top navigation bar includes 'Microsoft Azure', a search bar, and a 'Copilot' button. The current page is 'Add role assignment' for the 'Owner' role on the specified scope. The 'Review + assign' tab is active. The 'Members' section lists a single user named 'Bob' with the object ID '5405940a-7c6c-426d-863a-b3467aa55c7e' and 'User' type. Other tabs like 'Role', 'Conditions', and 'Review + assign' are visible. The URL in the address bar is 'Home > ContosoCoffeeRG | Access control (IAM) > Azure Pass - ContosoCoffee | Access control (IAM) > Add role assignment'.

# User accounts - Dave

- Dave requires admin access to the resources hosted on Azure for the Contoso Coffee website but not overall administration of the Contoso Coffee subscription



The screenshot shows the 'Edit properties' view for a user named Dave. The profile picture is a purple circle with a white letter 'D'. The basic info section shows the name 'Dave' and email 'Dave@madsgreniarnesenoutlook.onmicrosoft.com'. Below this, under 'User principal name' and 'Object ID', the values 'Dave@madsgreniarnesenoutlook.onmicrosoft.com' and '6ff850ad-2ecc-4088-991d-5baf1ab05ca2' are listed. The 'Created date time' is '28 Aug 2024, 13:47'. The 'User type' is 'Member'. Under 'Identities', the value 'madsgreniarnesenoutlook.onmicrosoft.com' is shown. At the bottom, there are sections for 'Group memberships' (0), 'Applications' (0), 'Assigned roles' (0), and 'Assigned licenses' (0).



The screenshot shows the 'Add role assignment' page in Microsoft Azure. The top navigation bar includes 'Microsoft Azure', 'Search resources, services, and docs (G+)', 'Copilot', and a user icon. The breadcrumb path is 'Home > ContosoCoffeeRG | Access control (IAM) > Add role assignment'. The main content area has tabs for 'Role', 'Members', 'Conditions', and 'Review + assign', with 'Review + assign' being the active tab. Under 'Role', 'Contributor' is selected. Under 'Scope', the value is '/subscriptions/19065809-1b68-441b-bf6a-5b8ff7775b5a/resourceGroups/ContosoCoffeeRG'. Under 'Members', there is one entry: 'Name' 'Dave', 'Object ID' '6ff850ad-2ecc-4088-991d-5baf1ab05ca2', and 'Type' 'User'. A 'Description' field contains the note: 'Dave requires admin access to the resources hosted on Azure for the Contoso Coffee website but not overall administration of the Contoso Coffee subscription'.

Contributor access on the specific ContosoCoffeeRG

# User accounts - Mark

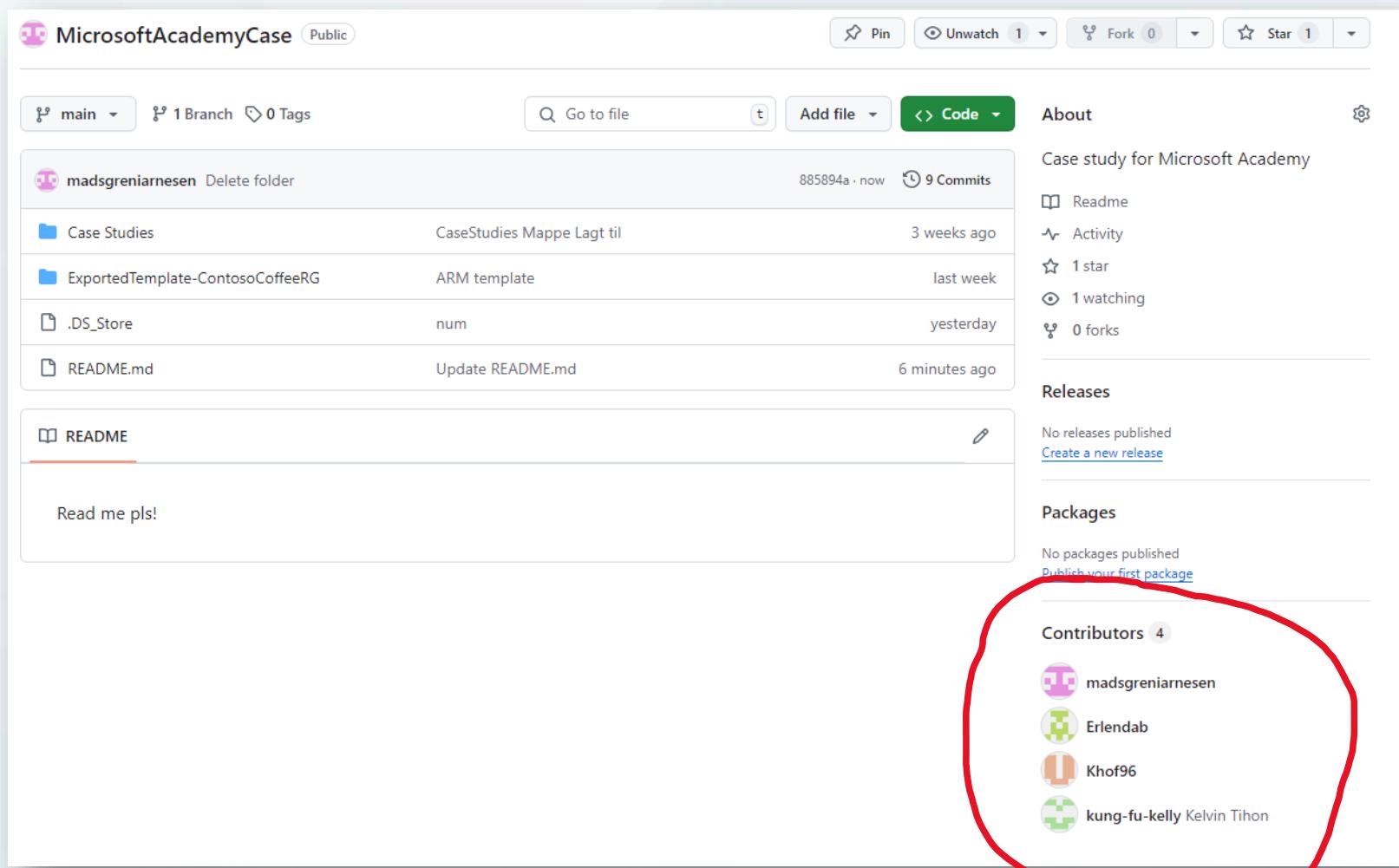
- Mark will require read-only access to the Contoso Coffee resources.

The screenshot shows the 'Basic info' section of a user profile. The user is named 'Mark' with the email 'Mark@madsgreniarenesenoutlook.onmicrosoft.com'. The user type is listed as 'Member'. Below this, there are sections for 'User principal name', 'Object ID', 'Created date time', 'User type', and 'Identities'. Further down, there are sections for 'Group memberships', 'Applications', 'Assigned roles', and 'Assigned licenses', all of which show a count of 0. At the bottom, there's a 'My Feed' section with 'Account status' (Enabled) and 'B2B invitation' options.

For this reason he's assigned as reader for the specific resource group - ContosoCoffeeRG

The screenshot shows the 'Add role assignment' screen in the Microsoft Azure portal. The 'Review + assign' tab is selected. Under 'Role', 'Reader' is chosen. Under 'Scope', the path '/subscriptions/19065809-1b68-441b-bf6a-5b8ff7775b5a/resourceGroups/ContosoCoffeeRG' is specified. In the 'Members' section, there is one entry: 'Mark' (Object ID: a919cbcc-eefb-4f22-952b-ce1c6f94cd8b, Type: User). A description at the bottom states: 'Mark will require read-only access to the Contoso Coffee resources.'

# GitHub Repo

A screenshot of a GitHub repository page for "MicrosoftAcademyCase". The repository is public and has 1 branch and 0 tags. The main branch has 9 commits. The latest commit was made by "madsgreniarnesen" 3 weeks ago, updating a README file. Other commits include creating a folder for Case Studies and an ARM template. The repository has 1 star, 1 watcher, and 0 forks. A red circle highlights the "Contributors" section, which lists four contributors: madsgreniarnesen, Erlendab, Khof96, and kung-fu-kelly Kelvin Tihon.

**MicrosoftAcademyCase** Public

main 1 Branch 0 Tags

Go to file Add file Code

**About**

Case study for Microsoft Academy

Readme Activity 1 star 1 watching 0 forks

**Releases**

No releases published [Create a new release](#)

**Packages**

No packages published [Publish your first package](#)

**Contributors** 4

- madsgreniarnesen
- Erlendab
- Khof96
- kung-fu-kelly Kelvin Tihon

# Kanban Board (GitHub)

Filter by keyword or by field

To do 2 / 5 Estimate: 0

This item hasn't been started

Draft

5. Infrastructure as Code 5.1 Deploy Template for Deployment:

Draft

5.2 Version Control with GitHub: Create a GitHub repository for the ARM template and website code. Ensure the repository is structured to allow easy forking and collaboration.

In progress 6 Estimate: 0

This is ready to be picked up

Draft

PRESENTATION: Create a presentation while webapp is being deployed

Draft

6. Visual Diagrams 6.1 Create Architectural Diagrams: Design visual diagrams of the final solution using Azure icons. Include diagrams for the web hosting setup, storage architecture, and load balancing configuration. (drawio og diagrams.net)

Draft

3. Load Balancing and Geo-redundant Access 3.1 Configure Load Balancing:

MicrosoftAcademyCase #9

Illustrate topology

MicrosoftAcademyCase #11

4. Data Storage Solution 4.1 Set Up Azure Storage Account: Create an Azure Storage account for storing image data. Configure lifecycle management policies to archive older data to cheaper storage automatically.

MicrosoftAcademyCase #10

4.2 Implement SAS Key for Image Access: Generate SAS (Shared Access Signature) keys for secure access to the stored images. Plan for future integration with a Raspberry Pi-hosted web page for image display.

In review 3 / 5 Estimate: 0

This item is in review

MicrosoftAcademyCase #2

User Bob: Needs full administrative access because he will manage and track billing for the Contoso Coffee website. The Owner role provides complete access to all resources, including the ability to delegate access to others.

MicrosoftAcademyCase #4

User Mark: Requires read-only access to the resources. The Reader role allows him to view all resources but not make any changes.

MicrosoftAcademyCase #3

User Dave: Needs admin access to resources but should not have control over the entire subscription or billing. The Contributor role allows him to manage resources but not to grant access to others.

Done 5 Estimate: 0

This has been completed

MicrosoftAcademyCase #5

Create New Tenant

MicrosoftAcademyCase #6

Fork CoffeeShopTemplate GitHub and invite group members as collaborators.

MicrosoftAcademyCase #1

Add User for collaboration and assign permissions and access

MicrosoftAcademyCase #7

Create a shared PowerPoint

MicrosoftAcademyCase #8

2. Website Hosting: 2.1 Deploy Contoso Coffee Website via GitHub:



# App Service Plan

### Create App Service Plan

**Basics** Tags Review + create

App Service plans give you the flexibility to allocate specific apps to a given set of resources and further optimize your Azure resource utilization. This way, if you want to save money on your testing environment you can share a plan across multiple apps. [Learn more](#)

**Project Details**  
Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

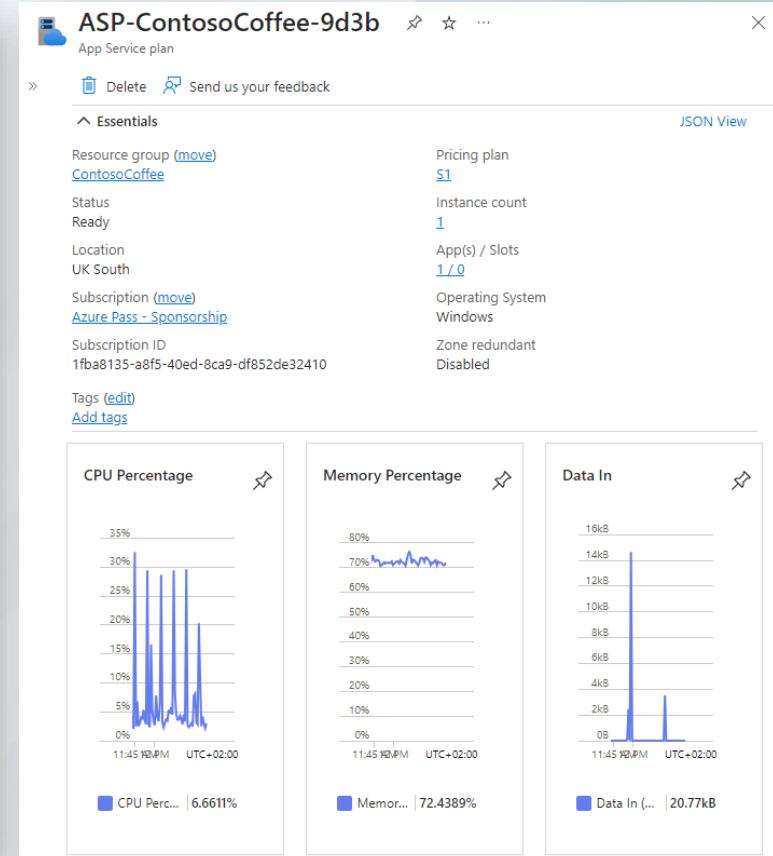
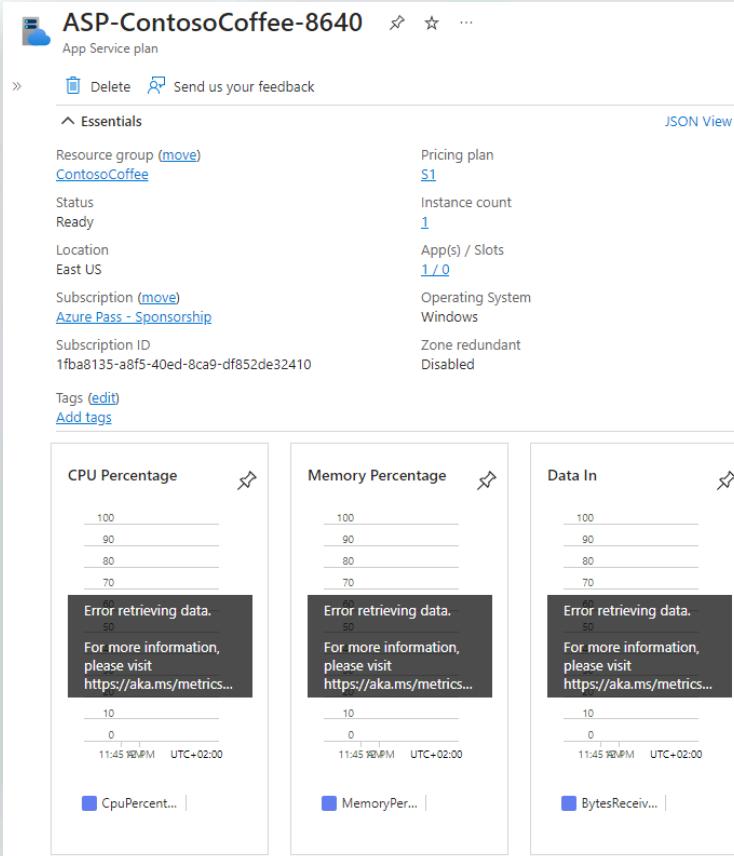
Subscription \*  Azure Pass - ContosoCoffee  Create new  
Resource Group \*  ContosoCoffeeRG  Create new

**App Service Plan details**  
Name \* PlanEastUs  
Operating System \*  Linux  Windows  
Region \* East US

**Pricing Tier**  
App Service plan pricing tier determines the location, features, cost and compute resources associated with your app.  
[Learn more](#)  
Pricing plan  Free F1 (Shared infrastructure)  Explore pricing plans

**Zone redundancy**  
An App Service plan can be deployed as a zone redundant service in the regions that support it. This is a deployment time only decision. You can't make an App Service plan zone redundant after it has been deployed. [Learn more](#)

Zone redundancy  Enabled: Your App Service plan and the apps in it will be zone redundant. The minimum App Service plan instance count will be three.  Disabled: Your App Service Plan and the apps in it will not be zone redundant. The minimum App Service plan instance count will be one.



# Web App

Create Web App ...

Basics Deployment Networking Monitor + secure Tags Review + create

App Service Web Apps lets you quickly build, deploy, and scale enterprise-grade web, mobile, and API apps running on any platform. Meet rigorous performance, scalability, security and compliance requirements while using a fully managed platform to perform infrastructure maintenance. [Learn more](#)

**Project Details**  
Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \*  Azure Pass - ContosoCoffee  ContosoCoffeeRG [Create new](#)

Resource Group \*  ContosoCoffeeRG [Create new](#)

**Instance Details**  
Name \*  .azurewebsites.net

Try a unique default hostname (preview). [More about this update](#)

Publish \*  Code  Container  Static Web App

Runtime stack \*

Operating System \*  Linux  Windows

Region \*   
Not finding your App Service Plan? Try a different region or select your App Service Environment.

**Pricing plans**  
App Service plan pricing tier determines the location, features, cost and compute resources associated with your app. [Learn more](#)

Windows Plan (East US) \*  PlanEastUS (F1) [Create new](#)

Pricing plan

**Zone redundancy**  
An App Service plan can be deployed as a zone redundant service in the regions that support it. This is a deployment time only decision. You can't make an App Service plan zone redundant after it has been deployed. [Learn more](#)

Zone redundancy  Enabled: Your App Service plan and the apps in it will be zone redundant. The minimum App Service plan instance count will be three.  Disabled: Your App Service Plan and the apps in it will not be zone redundant. The minimum App Service plan instance count will be one.

← → ⌛ [webappcoffeeshopaeastus.azurewebsites.net](#) ⚙ ☆

 Microsoft Azure

Your web app is running and waiting for your content

Your web app is live, but we don't have your content yet. If you've already deployed, it could take up to 5 minutes for your content to show up, so come back soon.



 Supporting Node.js, Java, .NET and more

Haven't deployed yet? Use the deployment center to publish code or set up continuous deployment.

Starting a new web site? Follow our Quickstart guide to get a web app ready quickly.

[Quickstart](#) [Deployment center](#)

<input type="checkbox"/>  ContosoEastUS	App Service	East US	...
<input type="checkbox"/>  contosouksouth	App Service	UK South	...

# Deployment (GitHub)

The screenshot shows a GitHub repository page for 'CoffeeShopTemplate'. The repository has been forked from 'kramit/CoffeeShopTemplate'. The main branch has 9 commits. The repository contains files like .github/workflows, css, img, social, .gitattributes, Index.html, README.md, contact.us.html, locate.html, and order.online.html. A 'README' file is present. The repository is described as a 'Case study 0 for Microsoft Academy'. It has 0 stars, 0 forks, and 0 watching. There are no releases or packages published.

The screenshot shows the 'WebAppCoffeeshopUKSouth | Deployment Center' settings page. The 'Source' is set to 'External Git' (selected). The 'Repository' is set to 'https://github.com/madsgreniarne...'. The 'Branch' is set to 'main'. The 'Repository Type' is set to 'Public'. A note at the top states: 'You're now in the production slot, which is not recommended for setting up CI/CD.' A red circle highlights the 'On' button for 'SCM Basic Auth Publish...', while the 'Off' button is crossed out with a red X.

# EastUS

contosoeastus.azurewebsites.net

Darth Roast Home Order online Locate us

**DARTH ROAST**  
COFFEE AND TEA



"I have been waiting 1 week, 3 days and 5 hours for you to bring me my coffee. I condemn you to death!" —Rel Rogock[src] Coffee is a non-alcoholic beverage that was most often served extremely hot sometimes cold and made from a specific type of bean. Emperor Palpatine owned farms on various planets that provided the beans to produce high quality coffee and vine-coffee, solely for the use of his court. Coffee could be prepared and dispensed from a coffee machine, and was usually served in a coffee cup.

Ref: StarWars Fandom



# UKSouth

contosouksouth.azurewebsites.net

Darth Roast Home Order online Locate us

**DARTH ROAST**  
COFFEE AND TEA



"I have been waiting 1 week, 3 days and 5 hours for you to bring me my coffee. I condemn you to death!" —Rel Rogock[src] Coffee is a non-alcoholic beverage that was most often served extremely hot sometimes cold and made from a specific type of bean. Emperor Palpatine owned farms on various planets that provided the beans to produce high quality coffee and vine-coffee, solely for the use of his court. Coffee could be prepared and dispensed from a coffee machine, and was usually served in a coffee cup.

Ref: StarWars Fandom



# Traffic Manager Profile/setup

- Contoso Coffee will operate in London and New York.
- Traffic Manager
  - DNS
  - Performance <> Geography
  - HTTPS – Advisable

The image displays two side-by-side screenshots of the Microsoft Azure portal interface, illustrating the setup of a Traffic Manager profile for Contoso Coffee.

**Left Screenshot: ContosoCoffeTM | Configuration**

This screenshot shows the configuration page for an existing Traffic Manager profile named "ContosoCoffeTM". The left sidebar lists various settings like Overview, Activity log, and Configuration (which is selected). The main pane shows configuration details:

- Routing method:** Performance
- DNS time to live (TTL):** 60 seconds
- Endpoint monitor settings:** Protocol is set to HTTP, with options for HTTP, HTTPS, and TCP.
- Custom Headers:** Configure in this blade.
- Probing interval:** 30 seconds
- Tolerated number of failed probes:** 3
- Probe timeout:** 10 seconds

**Right Screenshot: Create Traffic Manager profile**

This screenshot shows the "Create Traffic Manager profile" blade. The fields filled in are:

- Name:** ContosoCoffeTM
- Routing method:** Performance
- Subscription:** Azure Pass - ContosoCoffee
- Resource group:** ContosoCoffeeRG
- Resource group location:** Norway East

# Traffic Manager Endpoints

- Enable health checks
  - Reliability

 **Add endpoint**  
ContosoCoffeTM

Type \* ⓘ

Name \*

Enable Endpoint

Target resource type

Target resource \*

Custom Header settings ⓘ

**⚠** Do NOT input sensitive customer data in this field (i.e. APIKeys, Secrets, and Auth tokens etc.).

Health Checks ⓘ  
 **Enable**  
Health check will determine if traffic can be served to the endpoint.  
 **Always serve traffic**  
No health check will run. Traffic will be always served to the endpoint.

 **Add endpoint**  
ContosoCoffeTM

Type \* ⓘ

Name \*

Enable Endpoint

Target resource type

Target resource \*

Custom Header settings ⓘ

**⚠** Do NOT input sensitive customer data in this field (i.e. APIKeys, Secrets, and Auth tokens etc.).

Health Checks ⓘ  
 **Enable**  
Health check will determine if traffic can be served to the endpoint.  
 **Always serve traffic**  
No health check will run. Traffic will be always served to the endpoint.

# Traffic manager – Certificates

- After endpoints
- Certificates provisioned directly in the web apps

Add App Service Managed Certificate ×

Custom domain \* ⓘ  
contosocoffetm.trafficmanager.net ▼

Certificate friendly name \* ⓘ  
contosocoffetm.trafficmanager.net-WebAppCoffeeshopEastUS ✓

Add App Service Managed Certificate ×

Custom domain \* ⓘ  
contosocoffetm.trafficmanager.net ▼

Certificate friendly name \* ⓘ  
contosocoffetm.trafficmanager.net-WebAppCoffeeshopUKSouth ✓

# Traffic Manager – Binding certificates

- Bind the certificate to the custom domain
- Secure connection for clients

The image displays two side-by-side screenshots of the Azure portal interface, specifically the 'Custom domains' section for two different web applications: 'WebAppCoffeeshopEastUS' and 'WebAppCoffeeshopUKSouth'. Both screenshots show the 'Update TLS/SSL binding' dialog open.

**Left Screenshot (WebAppCoffeeshopEastUS):**

- Domain:** contosocoffetm.trafficmanager.net
- Certificate:** contosocoffetm.trafficmanager.net-WebAp... (selected)
- TLS/SSL type:** SNI SSL (selected)
- Custom domains:** contosocoffetm.trafficmanager.net (selected)

**Right Screenshot (WebAppCoffeeshopUKSouth):**

- Domain:** contosocoffetm.trafficmanager.net
- Certificate:** contosocoffetm.trafficmanager.net-WebAp... (selected)
- TLS/SSL type:** SNI SSL (selected)
- Custom domains:** contosocoffetm.trafficmanager.net (selected)

# Storage Account

Microsoft Azure Search resources, services, and docs (G+/) Copilot Home Resource groups ContosoCoffee contosocoffeestore Storage account Upload Open in Explorer Delete Move Refresh Open in mobile CLI / PS Feedback JSON View

admin@kelvthmsuout...  
DEFAULT DIRECTORY (KELVTH...)

**Overview**

Resource group ([move](#)) : [ContosoCoffee](#) Performance : Standard  
Location : eastus Replication : Locally-redundant storage (LRS)  
Subscription ([move](#)) : [Azure Pass - Sponsorship](#) Account kind : StorageV2 (general purpose v2)  
Subscription ID : 1fba8135-a8f5-40ed-8ca9-df852de32410 Provisioning state : Succeeded  
Disk state : Available Created : 11.9.2024, 10:04:07  
[Tags \(edit\)](#) : Add tags

**Properties** Monitoring Capabilities (7) Recommendations (0) Tutorials Tools + SDKs

**Blob service**

Hierarchical namespace	Disabled
Default access tier	Hot
Blob anonymous access	Disabled
Blob soft delete	Enabled (7 days)
Container soft delete	Enabled (7 days)
Versioning	Disabled
Change feed	Disabled
NFS v3	Disabled
Allow cross-tenant replication	Disabled
Storage tasks assignments	None

**Security**

Require secure transfer for REST API operations	Enabled
Storage account key access	Enabled
Minimum TLS version	Version 1.2
Infrastructure encryption	Disabled

**Networking**

Allow access from	All networks
Private endpoint connections	0
Network routing	Microsoft network routing
Access for trusted Microsoft services	Yes
Endpoint type	Standard

**File service**

Large file share	Enabled
Identity-based access	Not configured
Default share-level permissions	Disabled
Soft delete	Enabled (7 days)

**Activity log**

**Tags**

**Diagnose and solve problems**

**Access Control (IAM)**

**Data migration**

**Events**

**Storage browser**

**Storage Mover**

**Data storage**

**Security + networking**

**Data management**

**Settings**

**Monitoring**

**Monitoring (classic)**

**Automation**

**Tasks (preview)**

**Export template**

**Help**

**Resource health**

**Connectivity check**

**Support + Troubleshooting**

# Storage Account – Lifecycle Management

Microsoft Azure

Search resources, services, and docs (G/)

Home > Resource groups > ContosoCoffee > contosocoffeestore | Lifecycle management >

## Update a rule

Details Base blobs ...

Lifecycle management uses your rules to automatically move blobs to cooler tiers or to delete them. If you create multiple rules, the associated actions must be implemented in tier order (from hot to cool storage, then archive, then deletion).

If Base blobs haven't been modified in 30 days

Then Move to cool storage

If Base blobs haven't been modified in 90 days

Then Move to archive storage

+ Add conditions

Update Previous Next

The screenshot shows the Microsoft Azure portal interface for managing lifecycle rules in a storage account. On the left, a sidebar lists various service categories like Home, Dashboard, All services, and Resource groups. The main area is titled 'Update a rule' under 'Lifecycle management'. It displays two rules defined by 'If' and 'Then' clauses. Rule 1 triggers when blobs haven't been modified in 30 days, moving them to 'cool storage'. Rule 2 triggers when blobs haven't been modified in 90 days, moving them to 'archive storage'. A link to 'Add conditions' is available to expand the rule logic. At the bottom, there are 'Update', 'Previous', and 'Next' buttons.

# Media Container & SAS Key

Microsoft Azure

Home > Resource groups > ContosoCoffee > contosocoffeestore | Containers > photos

**photos** Container

Search resources, services, and docs (G+)

**Overview**

Authentication method: Access key (Switch to Microsoft Entra user account)  
Location: photos

Upload Change access level Refresh Delete

Search blobs by prefix (case-sensitive)

Diagnose and solve problems  
Access Control (IAM)  
Settings  
Shared access tokens  
Access policy  
Properties  
Metadata

Name Modified

No results

Create a resource Home Dashboard All services FAVORITES All resources Resource groups App Services Function App SQL databases Azure Cosmos DB Virtual machines Load balancers Storage accounts Virtual networks Microsoft Entra ID Monitor Advisor Microsoft Defender for Cloud Cost Management + Billing Help + support

Microsoft Azure

Home > Resource groups > ContosoCoffee > contosocoffeestore | Containers > photos

**photos** Container

Search resources, services, and docs (G+)

**Shared access tokens**

A shared access signature (SAS) is a URI that grants restricted access to an Azure Storage container. Use it when you want storage account key. [Learn more about creating an account SAS](#)

**Settings**

Signing method  
 Account key  User delegation key

Signing key  
Key 1

Stored access policy  
None

Permissions \*  
Read

Start and expiry date/time  
Start: 09/11/2024 12:30:29 PM (UTC+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna

Expiry: 02/01/2025 8:30:29 PM (UTC+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna

Allowed IP addresses  
for example, 168.1.5.65 or 168.1.5.65-168...

Allowed protocols  
 HTTPS only  HTTPS and HTTP

**Generate SAS token and URL**

Blob SAS token  
sp=r&st=2024-09-11T10:30:29Z&se=2025-02-01T19:30:29Z&spr=https&sv=2022-11-02&sr=c&sig=YWS6TlqFzy3rjFxk

Blob SAS URL  
<https://contosocoffeestore.blob.core.windows.net/photos?sp=r&st=2024-09-11T10:30:29Z&se=2025-02-01T19:30:29Z&spr=https&sv=2022-11-02&sr=c&sig=YWS6TlqFzy3rjFxk>

Microsoft Azure

Home Dashboard All services FAVORITES All resources Resource groups App Services Function App SQL databases Azure Cosmos DB Virtual machines Load balancers Storage accounts Virtual networks Microsoft Entra ID Monitor Advisor Microsoft Defender for Cloud Cost Management + Billing Help + support

# Arm template

- **Relaunch:** Redeploy infrastructure
- **Backup:** Save configuration
- **Automate:** Simplify deployments

Screenshot of the Azure portal showing the "ContosoCoffeeRG | Export template" page. A red arrow points from the "Download" button in the top navigation bar to the ARM template code editor on the right.

The "Download" button is highlighted with a red box.

The ARM template code is displayed in the editor:

```
$schema: "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
contentVersion: "1.0.0.0",
parameters: {
  "serverfarms_PlanEastUS_name": {
    "defaultValue": "PlanEastUS",
    "type": "String"
  },
  "serverfarms_PlanUKSouth_name": {
    "defaultValue": "PlanUKSouth",
    "type": "String"
  },
  "sites_WebAppCoffeeshopEastUS_name": {
    "defaultValue": "WebAppCoffeeshopEastUS",
    "type": "String"
  },
  "sites_WebAppCoffeeshopUKSouth_name": {
    "defaultValue": "WebAppCoffeeshopUKSouth",
    "type": "String"
  },
  "components_WebAppCoffeeshopEastUS_name": {
    "defaultValue": "WebAppCoffeeshopEastUS",
    "type": "String"
  }
},
resources: [
  {
    "name": "actionGroups_Applic",
    "type": "microsoft.insights/actionGroups",
    "dependsOn": [],
    "properties": {}
  },
  {
    "name": "components_WebAp",
    "type": "microsoft.insights/components",
    "dependsOn": [],
    "properties": {}
  },
  {
    "name": "components_WebAp",
    "type": "microsoft.insights/components",
    "dependsOn": [],
    "properties": {}
  },
  {
    "name": "userAssignedIdentitie",
    "type": "Microsoft.ManagedIdentity/userA",
    "dependsOn": [],
    "properties": {}
  },
  {
    "name": "storageAccounts_sto",
    "type": "Microsoft.Storage/storageAccou",
    "dependsOn": [],
    "properties": {}
  },
  {
    "name": "serverfarms_PlanEast",
    "type": "Microsoft.Web/serverfarms",
    "dependsOn": [],
    "properties": {}
  },
  {
    "name": "serverfarms_PlanUKS",
    "type": "Microsoft.Web/serverfarms",
    "dependsOn": [],
    "properties": {}
  }
]
```

# Final Overview

- **Achieved the requirements from the client:**
- User accounts created and roles assigned
- Website Hosted and deployed
- Load balancing
- Data Storage Solution



# AZ-104 Case Study 1

AcmeInc Manufaturing



# Acme Inc

- Acme Inc is a small manufacturing company
- Tartan paint and Left handed screwdrivers
- Proprietary/Old software (IIS and FTP)
- Move everything, but change nothing

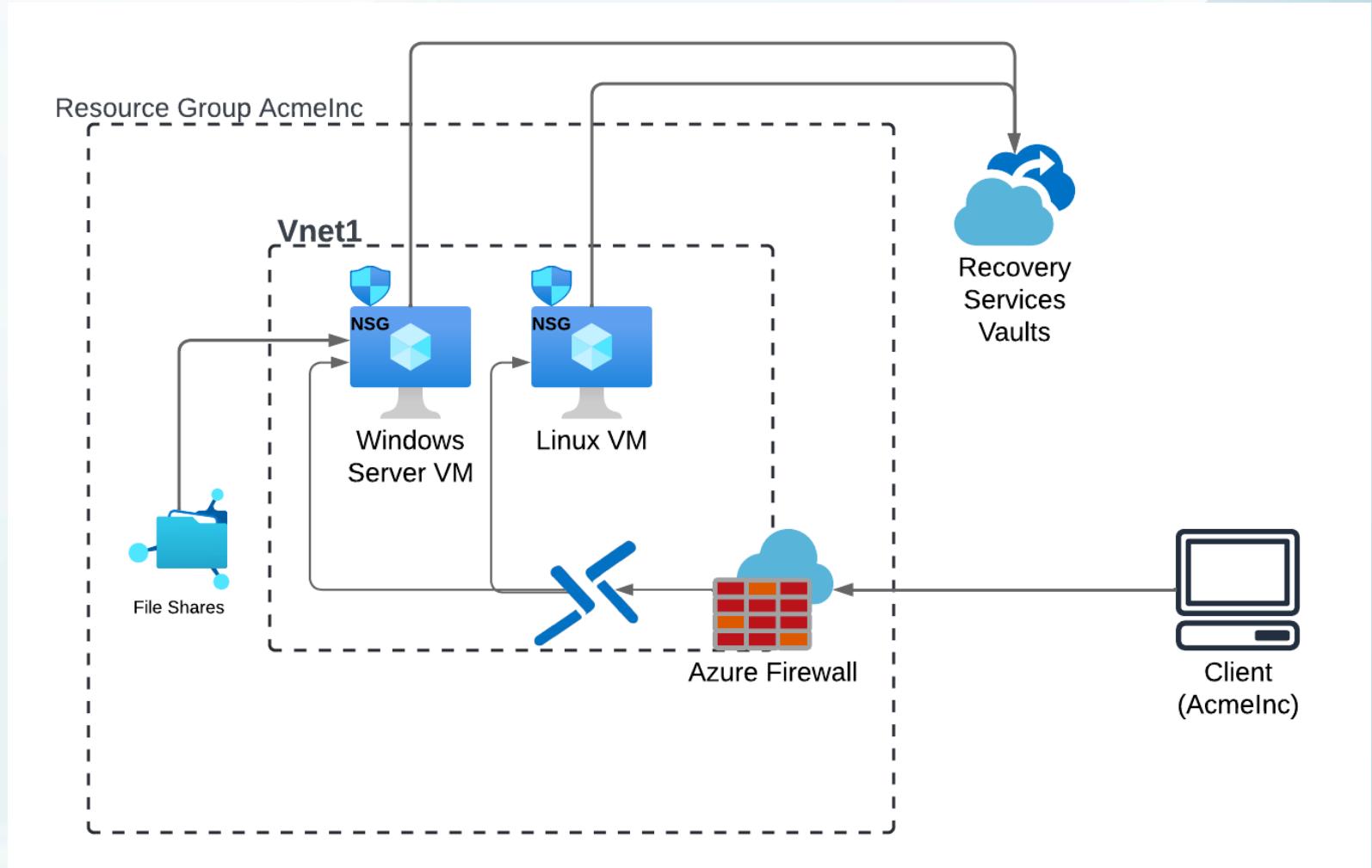


# Specifications

- Two Azure **VMs** (Windows Server with IIS and Ubuntu Linux with FTP).
- Configured **firewalls (NSGs)** restricting external access to ports 80/21/443.
- Jump-box or **Azure Bastion** configured for remote management.
- **Backup** solution enabled for both VMs (**Restore** the full machines in case of failure)
- **Storage account** mapped as a drive on Windows VM.

# Topology

- Two VM's
- Azure firewall
- Azure Bastion
- Backup
- Storage



 AcmeInc  
Resource group Search[Create](#) [Manage view](#) [Delete resource group](#) [Refresh](#) [Export to CSV](#) [Open query](#) [Assign](#)[Overview](#)

- [Activity log](#)
- [Access control \(IAM\)](#)
- [Tags](#)
- [Resource visualizer](#)
- [Events](#)
- [Settings](#)
  - [Deployments](#)
  - [Security](#)
  - [Deployment stacks](#)
  - [Policies](#)
  - [Properties](#)
  - [Locks](#)
- [Monitoring](#)
  - [Insights \(preview\)](#)
  - [Alerts](#)
  - [Metrics](#)
  - [Diagnostic settings](#)
  - [Logs](#)
  - [Advisor recommendations](#)
  - [Workbooks](#)
- [Automation](#)
  - [Export template](#)
- [Help](#)
  - [Support + Troubleshooting](#)

[Essentials](#)Subscription ([move](#))  
[Azure Pass - Sponsorship](#)Deployments  
[6 Succeeded](#)Subscription ID  
1fba8135-a8f5-40ed-8ca9-df852de32410Location  
East USTags ([edit](#))  
[Add tags](#)[Resources](#) [Recommendations \(1\)](#) Filter for any field...[Type equals all](#) [X](#)[Location equals all](#) [X](#)[Add filter](#)Showing 1 to 16 of 16 records.  Show hidden types[No grouping](#)

<input type="checkbox"/> Name ↑↓	Type ↑↓	Location ↑↓
<a href="#">acmebackup</a>	Recovery Services vault	UK South
<a href="#">ftpserver</a>	Virtual machine	UK South
<a href="#">ftpserver-ip</a>	Public IP address	UK South
<a href="#">ftpserver-nsg</a>	Network security group	UK South
<a href="#">ftpserver940</a>	Network Interface	UK South
<a href="#">ftpserver_OsDisk_1_b5308ec692e74378811662f8ee09f0d1</a>	Disk	UK South
<a href="#">vnet1</a>	Virtual network	UK South
<a href="#">vnet1-Bastion</a>	Bastion	UK South
<a href="#">vnet1-bastion</a>	Public IP address	UK South
<a href="#">vnet1-Firewall</a>	Firewall	UK South
<a href="#">vnet1-firewall</a>	Public IP address	UK South
<a href="#">webserver</a>	Virtual machine	UK South
<a href="#">webserver-ip</a>	Public IP address	UK South

[< Previous](#) Page [1](#) of 1 [Next >](#)

# Virtual Network

- Default
- Bastion
- Firewall

Home > Resource groups > AcmeInc >

### vnet1

Virtual network

Search

Move Delete Refresh Give feedback

Overview

- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Settings
  - Address space
  - Connected devices
  - Subnets
  - Bastion
  - DDoS protection
  - Firewall
  - Microsoft Defender for Cloud
  - Network manager
  - DNS servers
  - Peerings
  - Service endpoints
  - Private endpoints
  - Properties

Essentials

Resource group ( <a href="#">move</a> )	: AcmeInc	Address space	: 10.0.0.0/16
Location ( <a href="#">move</a> )	: UK South	DNS servers	: Azure provided DNS service
Subscription ( <a href="#">move</a> )	: Azure Pass - Sponsorship	Flow timeout	: Configure
Subscription ID	: 1fba8135-a8f5-40ed-8ca9-df852de32410	BGP community string	: Configure
		Virtual network ID	: 3de98921-4aec-4319-b938-0c02901dd256

Tags ([edit](#)) : Add tags

Topology Properties Capabilities (5) Recommendations Tutorials

**DDoS protection**  
Configure additional protection from distributed denial of service attacks.  
Not configured

**Azure Firewall**  
Protect your network with a stateful L3-L7 firewall.  
VNET1-FIREWALL

**Peerings**  
Seamlessly connect two or more virtual networks.  
Not configured

**Microsoft Defender for Cloud**  
Strengthen the security posture of your environment.

JSON View

Home > Resource groups > AcmeInc > vnet1

### vnet1 | Subnets

Virtual network

Search

+ Subnet + Gateway subnet Refresh Manage users Delete

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Address space

Connected devices

Subnets

Search subnets

Name ↑↓	IPv4 ↑↓	IPv6 ↑↓	Available IPs ↑↓	Delegated to ↑↓	Security group ↑↓	Route table ↑↓	...
default	10.0.0.0/24	-	249	-	-	-	...
AzureFirewallSubnet	10.0.1.64/26	-	56	-	-	-	...
AzureBastionSubnet	10.0.1.0/26	-	57	-	-	-	...

# Configuring the Windows VM

The screenshot shows the Azure portal interface for managing a virtual machine. The top navigation bar includes options like Connect, Start, Restart, Stop, Hibernate, Capture, Delete, Refresh, Open in mobile, Feedback, and CLI / PS. A message bar at the top indicates an advisor for enabling Trusted Launch. The main content area displays the VM details under the 'Essentials' tab, including resource group (AcmeInc), status (Running), location (UK South), subscription (Azure Pass - Sponsorship), and subscription ID (1fba8135-a8f5-40ed-8ca9-df852de32410). The operating system is Windows Server 2022 Datacenter Azure Edition, with a public IP address of 172.167.79.81. The VM was created on 9/11/2024 at 8:17 AM UTC. Below this, there's a 'Tags (edit)' section with a link to 'Add tags'. The 'Properties' tab is selected, showing detailed configuration settings for the virtual machine, networking, size, and source image details.

**Essentials**

Resource group ([move](#)) : [AcmeInc](#)

Status : Running

Location : UK South

Subscription ([move](#)) : [Azure Pass - Sponsorship](#)

Subscription ID : 1fba8135-a8f5-40ed-8ca9-df852de32410

Operating system : Windows (Windows Server 2022 Datacenter Azure Edition)

Size : Standard D2s v3 (2 vcpus, 8 GiB memory)

Public IP address : [172.167.79.81](#)

Virtual network/subnet : [vnet1/default](#)

DNS name : [Not configured](#)

Health state : -

Time created : 9/11/2024, 8:17 AM UTC

Tags ([edit](#)) : [Add tags](#)

**Properties**   [Monitoring](#)   [Capabilities \(8\)](#)   [Recommendations \(1\)](#)   [Tutorials](#)

**Virtual machine**

Computer name	webserver
Operating system	Windows (Windows Server 2022 Datacenter Azure Edition)
VM generation	V2
VM architecture	x64
Agent status	Ready
Agent version	2.7.41491.1139
Hibernation	Disabled
Host group	-
Host	-
Proximity placement group	-
Colocation status	N/A
Capacity reservation group	-
Disk controller type	SCSI

**Azure Spot**

Azure Spot	-
Azure Spot eviction policy	-

**Networking**

Public IP address	<a href="#">172.167.79.81</a> ( Network interface <a href="#">webserver411</a> )
Public IP address (IPv6)	-
Private IP address	10.0.0.4
Private IP address (IPv6)	-
Virtual network/subnet	<a href="#">vnet1/default</a>
DNS name	<a href="#">Configure</a>

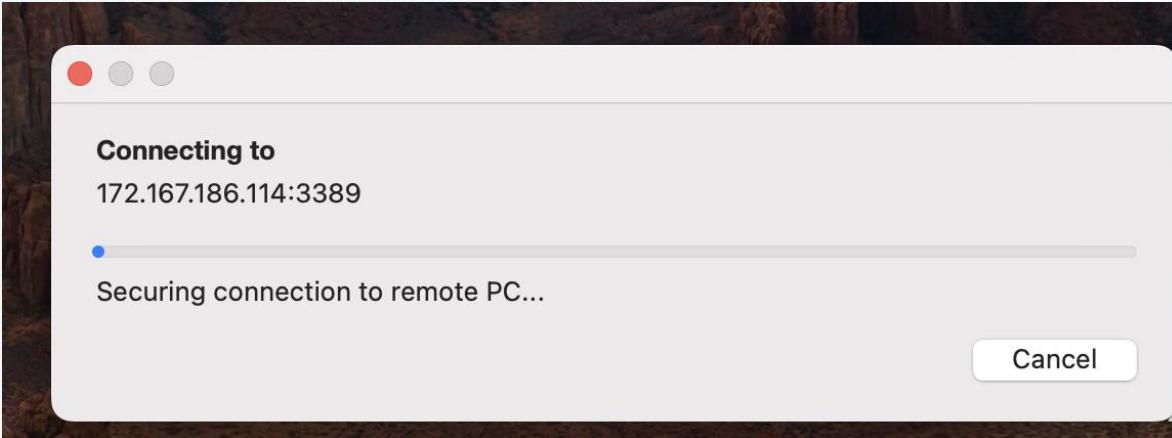
**Size**

Size	Standard D2s v3
vCPUs	2
RAM	8 GiB

**Source image details**

Source image publisher	MicrosoftWindowsServer
Source image offer	WindowsServer
Source image plan	2022-datacenter-azure-edition

# Internet Information Services



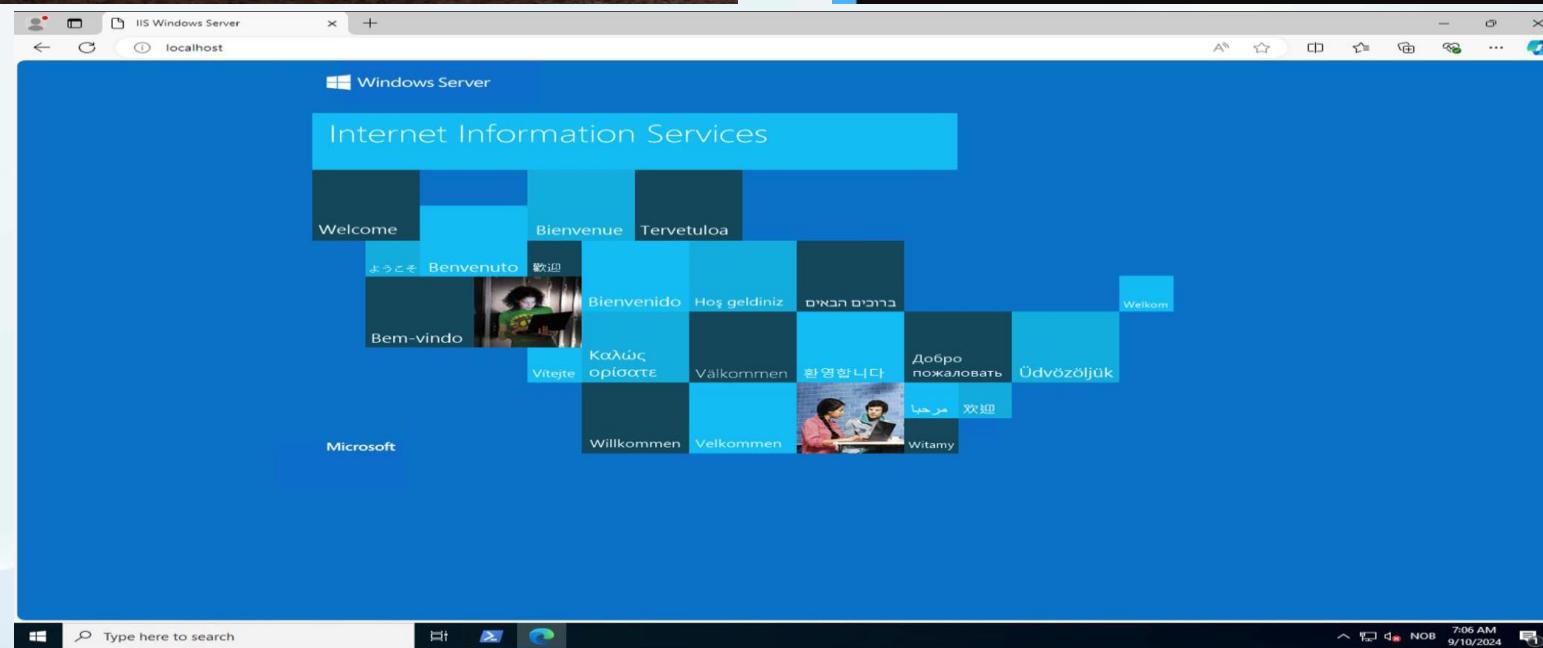
```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\adminuser> Install-WindowsFeature -name Web-Server -IncludeManagementTools
>>

Success Restart Needed Exit Code Feature Result
----- ----- ----- -----
True No Success {Common HTTP Features, Default Document, D...

PS C:\Users\adminuser>
```



```
*New Text Document - Notepad
File Edit Format View Help
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Tartan Paint Patterns - Acme Inc</title>
    <style>
        body {
            font-family: 'Arial', sans-serif;
            background-color: #f0f0f0;
            color: #333;
            margin: 0;
            padding: 0;
            display: flex;
            justify-content: center;
            align-items: center;
            min-height: 100vh;
        }
        .container {
            background-color: #fff;
            box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);
            border-radius: 10px;
            max-width: 600px;
            padding: 20px;
            text-align: center;
        }
        h1 {
            font-size: 2em;
            color: #004085;
        }
        p {
            font-size: 1.2em;
            color: #555;
        }
        .btn {
            background-color: #004085;
            color: white;
            padding: 10px 20px;
            text-decoration: none;
            border-radius: 5px;
            font-size: 1em;
            transition: background-color 0.3s;
        }
        .btn:hover {
            background-color: #0056b3;
        }
        img {
            width: 100%;
            height: auto;
            border-radius: 10px;
            margin: 20px 0;
        }
    </style>
</head>
<body>
    <div class="container">
        <h1>Welcome to Acme Inc's Tartan Paint Patterns</h1>
        <p>Explore the latest tartan paint patterns designed for left-handed screwdrivers!</p>
        
        <a href="more-designs.html" class="btn">Browse More Designs</a>
    </div>
</body>
</html>
```

```
*New Text Document - Notepad
File Edit Format View Help
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>More Tartan Paint Patterns - Acme Inc</title>
    <style>
        body {
            font-family: 'Arial', sans-serif;
            background-color: #f0f0f0;
            color: #333;
            margin: 0;
            padding: 0;
            display: flex;
            justify-content: center;
            align-items: center;
            min-height: 100vh;
        }
        .container {
            background-color: #fff;
            box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);
            border-radius: 10px;
            max-width: 700px;
            padding: 20px;
            text-align: center;
        }
        h1 {
            font-size: 2em;
            color: #004085;
        }
        p {
            font-size: 1.2em;
            color: #555;
        }
        .pattern-grid {
            display: grid;
            grid-template-columns: repeat(auto-fit, minmax(150px, 1fr));
            gap: 20px;
            margin: 20px 0;
        }
        .pattern-grid img {
            width: 100%;
            border-radius: 10px;
            box-shadow: 0 2px 5px rgba(0, 0, 0, 0.1);
        }
        .btn-back {
            background-color: #004085;
            color: white;
            padding: 10px 20px;
            text-decoration: none;
            border-radius: 5px;
            font-size: 1em;
            transition: background-color 0.3s;
        }
        .btn-back:hover {
            background-color: #0056b3;
        }
    </style>
</head>
<body>
    <div class="container">
        <h1>Explore More Tartan Paint Patterns</h1>
        <p>Here are more exciting designs crafted by Acme Inc for left-handed screwdrivers!</p>
        <div class="pattern-grid">
            
            
            
            
        </div>
        <a href="index.html" class="btn-back">Go Back</a>
    </div>
</body>
</html>
```

# Tartan Website

The screenshot shows a web browser window with two tabs open. The left tab displays the homepage of 'Acme Inc's Tartan Paint Patterns', featuring a large tartan plaid image and a 'Browse More Designs' button. The right tab displays a page titled 'Explore More Tartan Paint Patterns' with four smaller tartan preview images and a 'Go Back' button.

**Tartan Paint Patterns - Acme Inc** | C:/inetpub/wwwroot/index.html

**More Tartan Paint Patterns - Acme Inc** | C:/inetpub/wwwroot/more-designs.html

Welcome to Acme Inc's Tartan Paint Patterns

Explore the latest tartan paint patterns designed for left-handed screwdrivers!

Browse More Designs

Explore More Tartan Paint Patterns

Here are more exciting designs crafted by Acme Inc for left-handed screwdrivers!

Go Back

# Linux VM

Subscription \* ⓘ Azure Pass - Sponsorship

Resource group \* ⓘ AcmeInc [Create new](#)

Instance details

Virtual machine name \* ⓘ ftpserver ✖ Virtual machine name must be unique in the current resource group.

Region \* ⓘ (Europe) UK South

Availability options ⓘ No infrastructure redundancy required

Security type ⓘ Standard

Image \* ⓘ Ubuntu Server 24.04 LTS - x64 Gen2 [See all images](#) | [Configure VM generation](#)

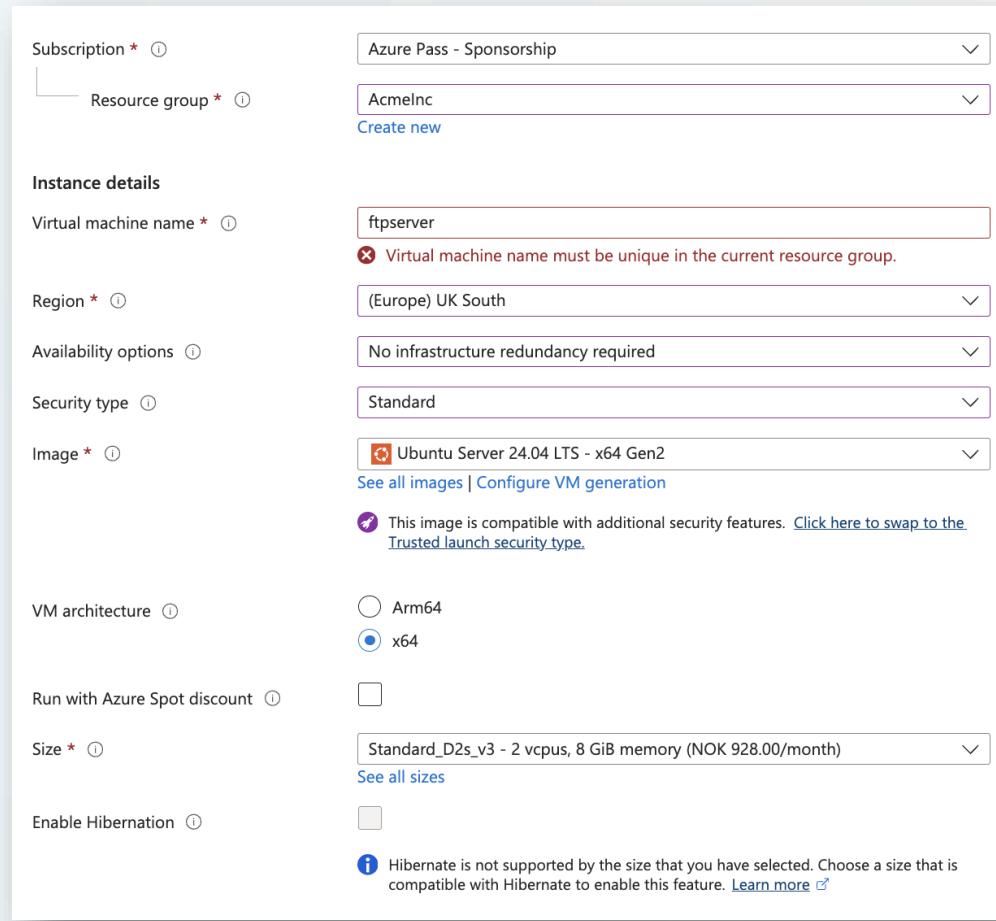
This image is compatible with additional security features. [Click here to swap to the Trusted launch security type.](#)

VM architecture ⓘ  Arm64  x64

Run with Azure Spot discount ⓘ

Size \* ⓘ Standard\_D2s\_v3 - 2 vcpus, 8 GiB memory (NOK 928.00/month) [See all sizes](#)

Enable Hibernation ⓘ   
Hibernate is not supported by the size that you have selected. Choose a size that is compatible with Hibernate to enable this feature. [Learn more](#)



- Ubuntu Server 24.04 LTS
- Redundancy
- SSH public key in future
- SSH through port 22

Administrator account

Authentication type ⓘ  SSH public key  Password

Username \* ⓘ adminuser

Password \* ⓘ ..... Confirm password \* ⓘ .....

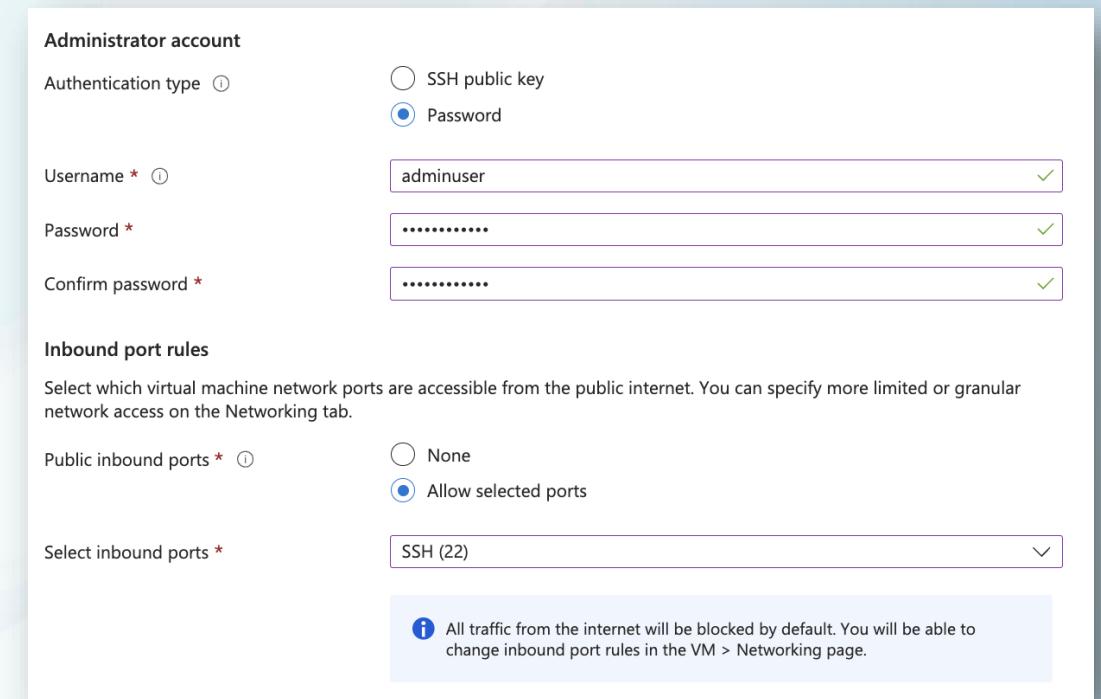
Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports \* ⓘ  None  Allow selected ports

Select inbound ports \* ⓘ SSH (22)

ⓘ All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.



# Linux – Further configuration

- Premium SSD
- NSG
- Vnet

**VM disk encryption**

Azure disk storage encryption automatically encrypts your data stored on Azure managed disks (OS and data disks) at rest by default when persisting it to the cloud.

Encryption at host    
 Encryption at host is not registered for the selected subscription.  
[Learn more about enabling this feature](#)

**OS disk**

OS disk size    
 OS disk type \*    
 Delete with VM    
 Key management    
 Enable Ultra Disk compatibility    
 Ultra disk is supported in Availability Zone(s) 1,2,3 for the selected VM size Standard\_D2s\_v3.

**Data disks for Ubuntu-VM-FTP**

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
					<input checked="" type="checkbox"/>

[Create and attach a new disk](#) [Attach an existing disk](#)

Basics Disks Networking Management Monitoring Advanced Tags Review + create

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution.  
[Learn more](#)

**Network interface**

When creating a virtual machine, a network interface will be created for you.

Virtual network \*    
 Create new

Subnet \*    
 Manage subnet configuration

Public IP    
 Create new

NIC network security group    
 None  Basic  Advanced

Public inbound ports \*    
 None  Allow selected ports

Select inbound ports \*

**⚠️ This will allow all IP addresses to access your virtual machine.** This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

Delete public IP and NIC when VM is deleted

Enable accelerated networking

# FTP server and connection

- Local authentication with Username and Password
- Docker container with a pre-configured FTP service
- FTP – Public internet
- docker run --restart=always -d -p 20-21:20-21 -p 65500-65515:65500-65515 -v /home/adminuser/ftpdata:/var/ftp:ro metabrainz/docker-anon-ftp

```
PS C:\Users\glasspaper> ftp
ftp> open 4.234.201.185
Connected to 4.234.201.185.
220 Welcome to an awesome public FTP Server
200 Always in UTF8 mode.
User (4.234.201.185:(none)): anonymous
331 Please specify the password.
Password:

230 Login successful.
ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
LeftHandScrewDrivers
```

# Azure FW

The screenshot shows two pages from the Azure portal related to a firewall resource named "vnet1-firewall".

**Top Page (Overview):**

- Resource Group:** Acmelnc
- Location:** UK South
- Subscription:** Azure Pass - Sponsorship
- SKU:** Standard
- Tier:** Regional
- IP address:** 51.142.96.2
- DNS name:** -
- Domain name label scope:** -
- Associated to:** vnet1-Firewall
- Virtual machine:** -
- Routing preference:** Microsoft network

**Bottom Page (Rules (classic)):**

- Rule Collection:** NAT rule collection
- Priority:** 100 (Name: httpnat, Action: Dnat, Rules: > 1 rule)
- Priority:** 200 (Name: ftpserver, Action: Dnat, Rules: > 1 rule)

**Common UI Elements:**

- Search bar at the top.
- Copilot button.
- Refresh button.
- Navigation menu on the left: Home, Resource groups, Acmelnc, vnet1-Firewall, Overview, Activity log, Access control (IAM), Tags, Settings (Configuration, Properties, Locks), Monitoring.

# NAT rules

- Route traffic designated for port 80 to the Window IIS server

Name httpnat

Priority \*

Action Destination Network Address Translation (DNAT).

Rules

name	Protocol	Source type	Source	Destination Addr...	Destination Ports	Translated address	Translated port
httpnat	TCP	IP address	*	51.142.96.2	80	10.0.0.4	80

- Route innbound traffic designated to port 21 to the ftp server.

Name ftpserver

Priority \*

Action Destination Network Address Translation (DNAT).

Rules

name	Protocol	Source type	Source	Destination Addr...	Destination Ports	Translated address	Translated port
ftp	UDP,TCP	IP address	*	51.142.96.2	21	10.0.0.5	21

# Tested Access to Acme Inc's Tartan Pattern Web Page

Microsoft Azure

Home > Resource groups > AcmeInc >

vnet1-firewall Public IP address

Overview

Associate Dissociate Delete Move Refresh Open in mobile Give feedback

Essentials

Resource group (move)	: AcmeInc	SKU	: Standard
Location (move)	: UK South	Tier	: Regional
Subscription (move)	: Azure Pass - Sponsorship	IP address	: 51.142.96.2
Subscription ID	: 1fba8135-a8f5-40ed-8ca9-df852de32410	DNS name	: -
		Domain name label scope	: -
		Associated to	: vnet1-Firewall
		Virtual machine	: -
		Routing preference	: Microsoft network

Activity log

Access control (IAM)

Tags

Settings

Configuration

Properties

Locks

Monitoring

Insights

Tags (edit) : Add tags

Get Started Properties Tutorials

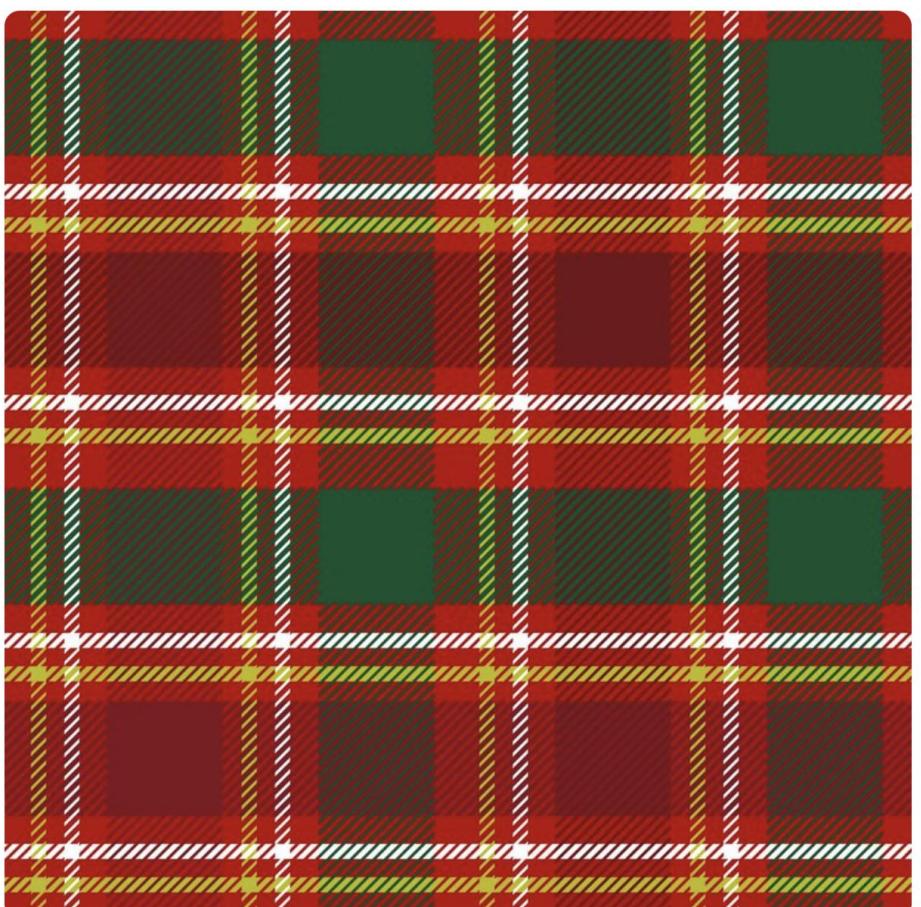
Ikke sikkert — 51.142.96.2

Microsoft Azure

5 Tartan Paint Pa

## Welcome to Acme Inc's Tartan Paint Patterns

Explore the latest tartan paint patterns designed for left-handed screwdrivers!



Browse More Designs

# NSG

Network security group				
<input type="checkbox"/>	ftpserver-nsg	Network security group	UK South	...
<input type="checkbox"/>	webserver-nsg	Network security group	UK South	...

## NSG Inbound Rules

### WebServer-NSG

<input type="checkbox"/>	100	AllowAnyHTTPInbound	80	TCP	Any	Any	Allow
<input type="checkbox"/>	110	AllowAnyHTTPSInbou...	443	TCP	Any	Any	Allow

Allow **Port 80** (HTTP) and **Port 443** (HTTPS) for public website access.

### ftpserver-NSG

<input type="checkbox"/>	100	AllowAnyFTPI inbound	21	TCP	Any	Any	Allow
--------------------------	-----	----------------------	----	-----	-----	-----	-------

Allow **Port 21** (FTP) for the guest FTP server.

# Backup of VM Images

**Microsoft.RecoveryServicesV2-1725958388062 | Overview**

**Configure backup**

AcmeBackupVault

**Deployment is in progress**

Deployment name : Microsoft.RecoveryServicesV2-1725958388062  
Subscription : Azure Pass - ContosoCoffee  
Resource group : AcmeIncManufacturing

**Deployment details**

Resource : AcmeBackupVault

**Give feedback**

Tell us about your experience with deployment

**Policy sub type \***

Enhanced

- ✓ Multiple backups per day
- ✓ Up to 30 days operational tier retention
- ✓ Support for Trusted Launch Azure VM
- ✓ Support for VMs with Ultra Disks and Premium SSD v2

Standard

- ✓ Once-a-day backup
- ✓ Up to 5 days operational tier retention

**Backup policy \***

DefaultPolicy

Create a new policy

**Policy details**

Full backup

**Backup frequency**  
Daily at 6:30 PM UTC

**Instant restore**  
Retain instant recovery snapshot(s) for 2 day(s)

**Retention of daily backup point**  
Retain backup taken every day at 6:30 PM for 30 Day(s)

Consistency type ⓘ

Application or file-system consistent

Name ↑↓	Resource Group ↑↓	Backup Pre-Check	Last Backup Status
Ubuntu-VM-FTP	AcmeIncManufacturing	Passed	⚠ Warning (Initial backup pending)
Windows-VM-IIS	AcmeIncManufacturing	Passed	⚠ Warning (Initial backup pending)

# Storage

To give the windows VM easy access to the cloud storage we:

- Create a storage account
- Create a fileshare
- Map the Windows drive to the fileshare

The screenshot shows the 'Storage accounts' blade in the Azure portal. At the top, there are buttons for '+ Create', 'Restore', 'Manage view', and a refresh icon. Below that is a search bar with 'Filter for any field...' and a dropdown set to 'Subscription equals all'. A message says 'Showing 1 to 2 of 2 records.' A table lists one storage account:

Name
acmelongstorage

The screenshot shows the 'acmefileshare' blade under 'File shares'. It displays the share name 'acmefileshare' with an SMB icon, and a status message 'SMB File share'. At the top, there's a breadcrumb trail: Home > Storage accounts > acmelongstorage | File shares >. Below the share name are buttons for 'Search', 'Connect', and 'Upload'. The URL 'acmefileshare (\acmelongstorage.file.core.windows.net)' is also visible.

The screenshot shows a Windows File Explorer window. The ribbon tabs are 'File', 'Home', 'Share', 'View', 'Manage', and 'Drive Tools'. The 'Manage' tab is selected. The address bar shows the path 'This PC > acmefileshare (\acmelongstorage.file.core.windows.net) (Z:)'. The main pane is empty, indicating no files are currently displayed.

# Final Overview

- **Achieved the requirements from the client:**
  - Azure **VMs** (IIS and FTP).
  - Restricted external access to ports 80/21/443.
  - **Azure Bastion** for remote management.
  - **Backup** solution enabled for both VMs
  - **Storage account** (Mapped FileShare)

