

Cloud Development B

Summative POE

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SQL Login Database

The screenshot shows the Microsoft Azure portal interface for creating a new SQL Database. At the top, there's a navigation bar with various tabs like 'CLDV', 'Azure', 'SQL', 'VCCT', etc. Below it, the main header says 'Microsoft Azure' and 'Search resources, services, and docs (G+)'. On the right, there's a user profile and some icons.

The main content area is titled 'SQL Database' with a sub-section 'Microsoft | Azure Service'. It shows a rating of '★ 4.4 (2523 ratings)' and a note 'Azure benefit eligible'. There are dropdown menus for 'Subscription' (set to 'ADvTECH-Tertiary Varsity College') and 'Plan' (set to 'SQL Database'). A prominent blue 'Create' button is at the bottom right of this section.

Below this, there are tabs for 'Overview', 'Plans', 'Usage Information + Support', and 'Ratings + Reviews'. The 'Overview' tab is selected. A brief description of the service follows, along with a note about using a template to create a database. A 'Give feedback' button is located on the right side of this section.

Figure 1_Creating SQL database

This screenshot shows the 'Create SQL Database' wizard in the Microsoft Azure portal. The top navigation bar and user profile are identical to the previous screenshot.

The main title is 'Create SQL Database' with a 'Microsoft' link below it. Below the title, there are tabs for 'Basics', 'Networking', 'Security', 'Additional settings', 'Tags', and 'Review + create'. The 'Basics' tab is selected.

A message on the left says: 'Create a SQL database with your preferred configurations. Complete the Basics tab then go to Review + Create to provision with smart defaults, or visit each tab to customize.' It includes a link to 'Learn more'.

On the right, there's a large box containing a 'SQL' logo icon. Below it is a 'Cost summary' table:

Basic (Basic)	1.28
Cost per DTU (in USD)	1.28
DTUs selected	x 5
ESTIMATED COST / MONTH	6.42 USD

At the bottom, there are two buttons: 'Review + create' and 'Next : Networking >'. The 'Review + create' button is highlighted in blue.

The screenshot shows two sequential steps in the Microsoft Azure portal for creating a SQL database.

Create SQL Database Step:

- Project details:** Subscription: AdvTECH-Tertiary Varsity College, Resource group: AZ-JHB-RSG-VCWCCN-ST10445517-TER (selected).
- Database details:** Database name: abcRetailLogin, Server: (new) abc-loginserver (UK South).
- Buttons:** Review + create, Next : Networking >.

Create SQL Database Server Step:

- Server details:** Server name: abc-loginserver.database.windows.net, Location: (UK) UK South.
- Authentication:** A note states: "Azure Active Directory (Azure AD) is now Microsoft Entra ID. Learn more".
- Buttons:** OK, Feedback.

Figure 2_Creating SQL Server

The screenshot shows two sequential steps in the Microsoft Azure portal for creating a database.

Create SQL Database Step:

- Question: "Want to use SQL elastic pool? Yes No"
- Selection: "Workload environment Development Production"
- Info: "Default settings provided for Development workloads. Configurations can be modified as needed."
- Compute + storage: "Basic" (selected), "2 GB storage", "Configure database"
- Backup storage redundancy: "Choose how your PITR and LTR backups are replicated. Geo restore or ability to recover from regional outage is only"
- Buttons: "Review + create" (disabled) and "Next : Networking >"

Create SQL Database Server Step:

- Question: "Microsoft Entra user, group, or application as Microsoft Entra admin [Learn more](#), or select both SQL and Microsoft Entra authentication." Options: "Use Microsoft Entra-only authentication" (), "Use both SQL and Microsoft Entra authentication" (), "Use SQL authentication" ()
- Set Microsoft Entra admin: "ST10445517@vccconnect.edu.za" (selected), "Admin Object/App ID: 7fef6061-dab6-4d87-921e-05fcf08568af", "Set admin"
- Server admin login *: "abc123"
- Password *: "*****"
- Confirm password *: "*****"
- Buttons: "OK" (disabled) and "Feedback"

Compute + storage * ⓘ

Basic
2 GB storage
[Configure database](#)

Backup storage redundancy

Choose how your PITR and LTR backups are replicated. Geo restore or ability to recover from regional outage is only available when geo-redundant storage is selected.

Backup storage redundancy ⓘ

- Locally-redundant backup storage
- Zone-redundant backup storage
- Geo-redundant backup storage
- Geo-Zone-redundant backup storage

[Review + create](#) [Next : Networking >](#)

Cost summary	
Basic (Basic)	1.28
Cost per DTU (in USD)	
DTUs selected	x 5
ESTIMATED COST / MONTH	6.42 USD

Basics Networking Security Additional settings Tags Review + create

Configure network access and connectivity for your server. The configuration selected below will apply to the selected server 'abc-loginserver' and all databases it manages. [Learn more ⓘ](#)

Network connectivity

Choose an option for configuring connectivity to your server via public endpoint or private endpoint. Choosing no access creates with defaults and you can configure connection method after server creation. [Learn more ⓘ](#)

Connectivity method * ⓘ

- No access
- Public endpoint
- Private endpoint

Firewall rules

Setting 'Allow Azure services and resources to access this server' to Yes allows communications from all resources inside the Azure boundary, that may or may not be part of your subscription. [Learn more ⓘ](#)

Setting 'Add current client IP address' to Yes will add an entry for your client IP address to the server firewall.

[Review + create](#) [< Previous](#) [Next : Security >](#)

The screenshot displays two Microsoft Azure portal pages. The top page shows the 'Create SQL Database' wizard, step 2 of 3, titled 'Firewall rules'. It includes options for allowing Azure services (Yes) and adding current client IP address (Yes). The bottom page shows the deployment details for 'Microsoft.SQLDatabase.newDatabaseNewServer_26d599af456c4edba2907'. The deployment status is 'Deployment succeeded' with a green checkmark icon. Deployment details include the name, start time (11/13/2025, 12:27:26 PM), subscription (AdvTECH-Tertiary Varsity Coll...), correlation ID (f512f800-ff54-4330-80c0-4d1a...), and resource group (AZ-JHB-RSG-VCWCCN-ST10445517-TER). The deployment was successful.

Figure 3_Successful Server and Database Deployment

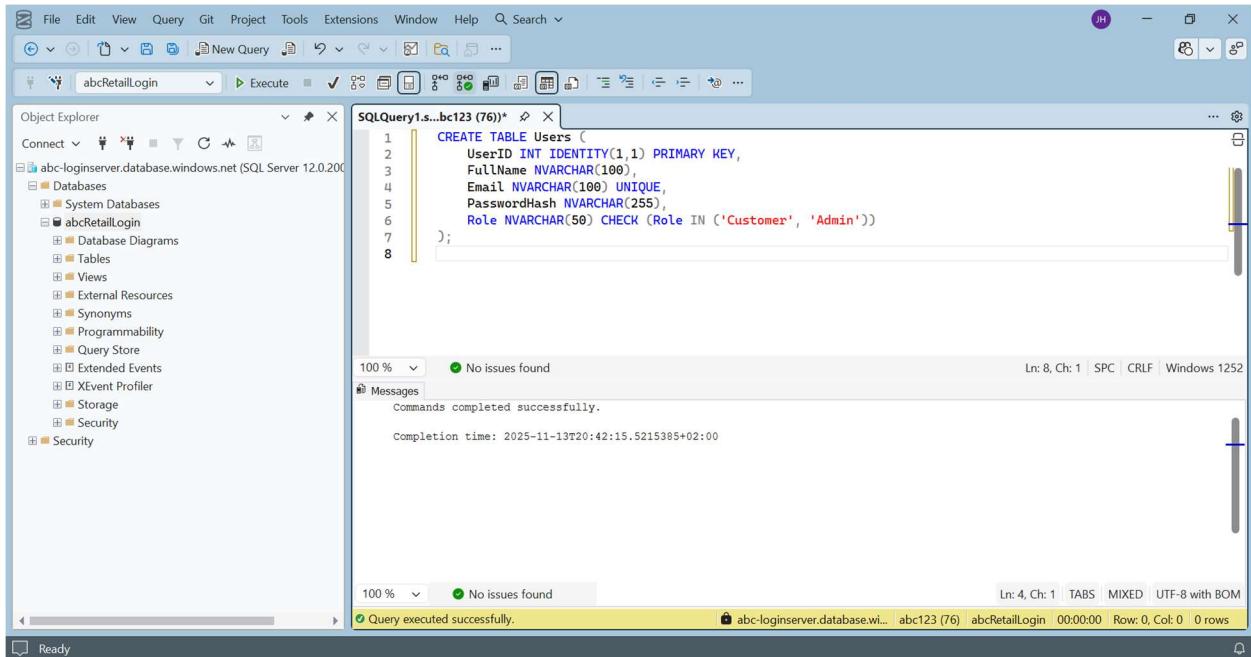


Figure 4_Logging into SSMS and creating SqlCustomer Table

```

PM> Add-Migration InitialSqlDbSetup
Build started...
Build succeeded.
To undo this action, use Remove-Migration.
PM> Update-Database
Build started...
Build succeeded.
Microsoft.EntityFrameworkCore.Database.Command[20101]
    Executed DbCommand (277ms) [Parameters=[], CommandType='Text', CommandTimeout='30']
        SELECT 1
Microsoft.EntityFrameworkCore.Migrations[20411]
    Acquiring an exclusive lock for migration application. See https://aka.ms/efcore-docs-migrations-lock for more information if this takes too long.
    Acquiring an exclusive lock for migration application. See https://aka.ms/efcore-docs-migrations-lock for more information if this takes too long.
Microsoft.EntityFrameworkCore.Database.Command[20101]
    Executed DbCommand (280ms) [Parameters=[], CommandType='Text', CommandTimeout='30']
    DECLARE @result int;
    EXEC @result = sp_getapplock @Resource = '_EFMigrationsLock', @LockOwner = 'Session', @LockMode = 'Exclusive';
    SELECT @result
Microsoft.EntityFrameworkCore.Database.Command[20101]
    Executed DbCommand (302ms) [Parameters=[], CommandType='Text', CommandTimeout='30']
    IF OBJECT_ID('[_EFMigrationsHistory]') IS NULL
    BEGIN
        CREATE TABLE [_EFMigrationsHistory] (
            [MigrationId] nvarchar(150) NOT NULL,
            [ProductVersion] nvarchar(32) NOT NULL,
            CONSTRAINT [PK__EFMigrationsHistory] PRIMARY KEY ([MigrationId])
        );
    END;
Microsoft.EntityFrameworkCore.Database.Command[20101]
    Executed DbCommand (411ms) [Parameters=[], CommandType='Text', CommandTimeout='30']
    SELECT 1
Microsoft.EntityFrameworkCore.Database.Command[20101]

```

Figure 5_Successful DB Migration in the MVC project

The screenshot shows the SSMS interface with the following details:

- Object Explorer:** Shows the database structure for `abc-loginserver.database.windows.net` (SQL Server 12.0). It includes the `abcRetailLogin` database and its tables, such as `SqlCustomers`.
- SQL Query Editor:** Contains the following SQL code:


```
1 INSERT INTO SqlCustomers (CustomerName, CustomerEmail, PasswordHash, Role)
2 VALUES (
3     'Admin1',
4     'admin@abcretail.com',
5     '$2b$10$dKcI.Y/GNbduvn2k6PoAueJVkaofaBVZonPFJAq5Qxum4A.VWjj72', -- GENERATED HASH STRING FROM CONSOLE
6     'Admin'
7 );
```
- Messages Panel:** Displays the result of the query: `(1 row affected)` and the completion time: `Completion time: 2025-11-14T04:18:38.7706941+02:00`.
- Error List:** Shows 0 errors, 0 warnings, and 0 messages.
- Status Bar:** Shows the session information: `abc-loginserver.database.wi... abc123 (78) abcRetailLogin 00:00:00 Row: 0, Col: 0 0 rows`.

Figure 6_Inserting seed data into SqlCustomer Data. NB: Please user the above admin logins to login to admin

The screenshot shows the SSMS interface with the following details:

- Object Explorer:** Shows the database structure for `abc-loginserver.database.windows.net` (SQL Server 12.0). It includes the `abcRetailLogin` database and its tables, such as `SqlCustomers`.
- SQL Query Editor:** Contains the following SQL code:


```
1 INSERT INTO SqlCustomers (CustomerName, CustomerEmail, PasswordHash, Role)
2 VALUES (
3     'Jade',
4     'jade@hotmail.com',
5     '$2b$10$8URW6ICThTxsz8M1LpSBF.uvrUevzNzwIBt85bLk1hpqrdsImp56y', -- GENERATED HASH STRING FROM CONSOLE
6     'Customer'
7 );
```
- Messages Panel:** Displays the result of the query: `(1 row affected)` and the completion time: `Completion time: 2025-11-14T04:21:31.4428190+02:00`.
- Error List:** Shows 0 errors, 0 warnings, and 0 messages.
- Status Bar:** Shows the session information: `abc-loginserver.database.wi... abc123 (77) abcRetailLogin 00:00:00 Row: 0, Col: 0 0 rows`.

Figure 7_Inserting seed data for shopping customer

The screenshot shows the SSMS interface with the following details:

- Object Explorer:** Shows the database structure for "abc-loginserver.database.windows.net (SQL Server 12.0)". It includes:
 - Databases: System Databases, abcRetailLogin (selected), Database Diagrams
 - Tables: System Tables, External Tables, Graph Tables, dbo.SqlCustomers (selected), dbo_EFMigrationsHistory
 - Columns, Keys, Constraints, Triggers, Indexes, Statistics, Dropped Ledger Tables, Views, External Resources.
- SQL Query Editor:** Contains the query: `SELECT * FROM SqlCustomers;`
- Results Grid:** Displays the data from the query:

CustomerID	CustomerName	CustomerEmail	PasswordHash	Role
1	Admin1	admin@abcretail.com	\$2b\$10\$dKoI.YjGNbdvvn2k6PeAueJVkofaBVZonPFJAq5Qxu...	Admin
2	Jade	jade@hotmail.com	\$2b\$10\$URW6ICThTxsz8M1LpSBF uwUevzNzwbT85bfChpqr...	Customer
3	hannah	h@gmail.com	\$2b\$10\$SgtxXNSD5QcZKtq5YOBeN28SEFh8coebWHb09...	Customer
4	gabby Smith	gsmith@gmail.com	\$2b\$10\$IR frmpEcMaqC0JTVu2EeCfnPDZLU9k30GNeDEUvh...	Customer
- Messages:** No issues found.
- Error List:** 0 Errors, 0 Warnings, 0 of 2 Messages.
- Status Bar:** Lr: 1, Ch: 28 | TABS | CRLF | Windows 1252 | Query executed successfully.

Figure 8_ Viewing all data in the SqlCustomer Table

Deployment

Functions

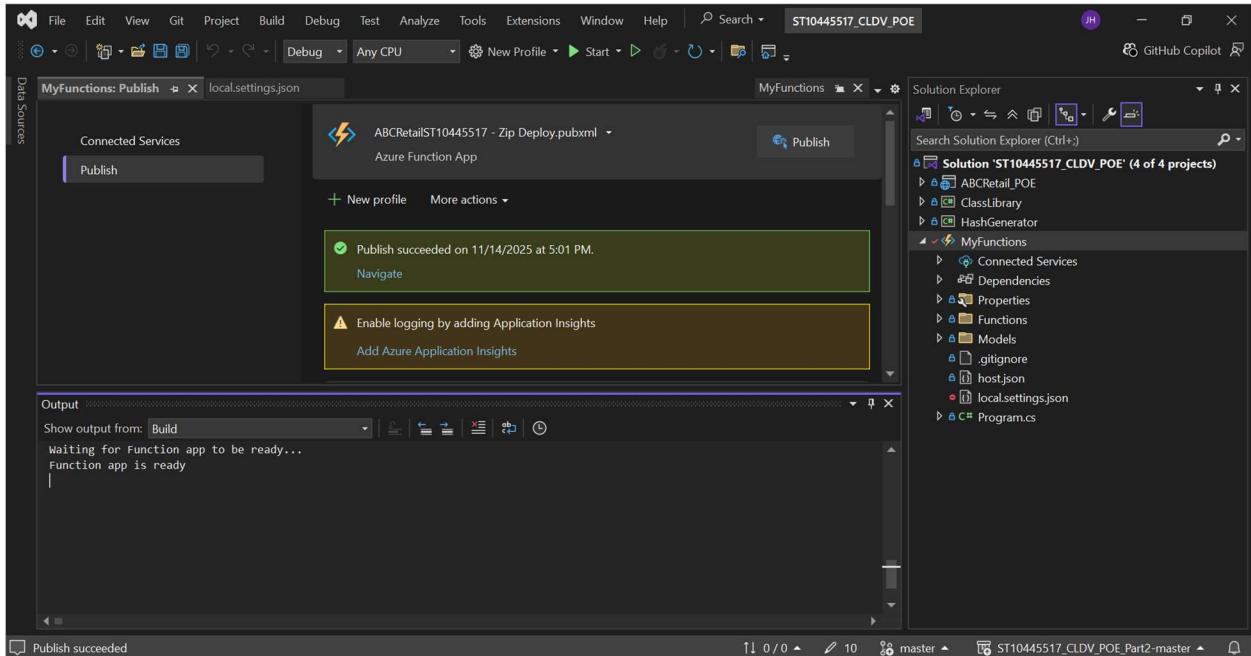


Figure 9_Successful Functions Deployment

```
C:\Program Files\dotnet\dotnet C:\Users\Admin\Desktop\ST10445517_CLDV_POE_Part2-master\MyFunctions\bin\Debug\net8.0.

'local.settings.json' found in root directory (C:\Users\Admin\Desktop\ST10445517_CLDV_POE_Part2-master\MyFunctions\bin\Debug\net8.0).
Resolving worker runtime to 'dotnet-isolated'.

Azure Functions Core Tools
Core Tools Version:    4.4.1+e4b8a4bdc8fd3b73143908be867f029865b74647 (64-bit)
Function Runtime Version: 4.1043.200.25453

[2025-11-14T15:02:22.683Z] Found C:\Users\Admin\Desktop\ST10445517_CLDV_POE_Part2-master\MyFunctions\MyFunctions.csproj.
  Using for user secrets file configuration.
[2025-11-14T15:02:28.195Z] Azure Functions .NET Worker (PID: 31080) initialized in debug mode. Waiting for debugger to attach...
[2025-11-14T15:02:28.329Z] Worker process started and initialized.

Functions:

  AddImageBlob: [POST] http://localhost:7067/api/upload-image
  HandleNewCustomer: [POST] http://localhost:7067/api/customers
  SendOrderMessage: [POST] http://localhost:7067/api/orders/queue
  ProcessOrderQueueItem: queueTrigger

For detailed output, run func with --verbose flag.
[2025-11-14T15:02:34.869Z] Host lock lease acquired by instance ID '000000000000000000000000E7EDD99E'.
```

Figure 10_Local running test successful]

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes tabs for 'Homepage - Cloud', 'azure portal - Search', 'ABCRetailST10445517', '100 total ACU, 1.75', 'POE_CLDV_INSTRU...', 'Order Management', and a '+' button. The main title is 'ABCRetailST10445517' under 'Function App'. The left sidebar has sections like 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Microsoft Defender for Cloud', 'Events (preview)', 'Log stream', 'Resource visualizer', 'Functions', 'Deployment', 'Settings', and 'Performance'. The 'Functions' tab is selected, showing a table with four rows:

Name	Trigger	Status	Monitor
AddImageBlob	HTTP	Enabled	Invocations and more
HandleNewCustomer	HTTP	Enabled	Invocations and more
ProcessOrderQueueItem	Queue	Enabled	Invocations and more
SendOrderMessage	HTTP	Enabled	Invocations and more

The screenshot shows the Microsoft Azure portal interface for managing a function app named 'AddImageBlob'. The 'Code + Test' tab is selected. The 'functions.metadata' file is displayed, showing the configuration for two functions:

```
1  [
2  |  {
3  |  |  "name": "HandleNewCustomer",
4  |  |  "scriptFile": "MyFunctions.dll",
5  |  |  "entryPoint": "ABCRetail_POE.Functions.CreateCustomerFunction.Run",
6  |  |  "language": "dotnet-isolated",
7  |  }
8  ]
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
```

The 'Logs' section is collapsed. At the bottom, there is a message: 'Configure Application Insights to capture invocation logs'.

The second screenshot shows the same interface after changes have been made to the 'ProcessOrderQueueItem' function. The 'properties' object now includes a 'IsCodeless' key set to 'false'.

```
1  [
2  |  {
3  |  |  "name": "HandleNewCustomer",
4  |  |  "scriptFile": "MyFunctions.dll",
5  |  |  "entryPoint": "ABCRetail_POE.Functions.CreateCustomerFunction.Run",
6  |  |  "language": "dotnet-isolated",
7  |  |  "properties": {
8  |  |  |  "IsCodeless": false
9  |  |  }
10 }
11 ]
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
```

The screenshot shows two separate views in the Microsoft Azure portal.

Top View (Function App):

- URL:** https://portal.azure.com/#view/WebsitesExtension/FunctionTabMenuBlade/~/codeTest/resourceId%2Fsubscriptions%2Fe31273bf-0dae-4395-a8b5-33f801de7c65/resourceGroup/abc1retailstorage/functions/functions.metadata
- Title:** AddImageBlob | Code + Test
- Code + Test Tab:** Active
- Code Editor:**

```

75     "name": "OrderMessage",
76     "direction": "Out",
77     "type": "queue",
78     "dataType": "String",
79     "queueName": "order-queue",
80     "connection": "AzureWebJobsStorage",
81     "properties": {}
82   ],
83 },
84 {
85   "name": "AddImageBlob",
86   "scriptFile": "MyFunctions.dll",
87 }
```
- Buttons:** Save, Discard, Refresh, Test/Run, Get function URL, Disable, Delete, Upload, Resource JSON, Send us your feedback
- Message:** Editing .NET isolated Function Apps is not supported in the Azure portal. Use your local development environment to edit this Function App.

Bottom View (Storage Account):

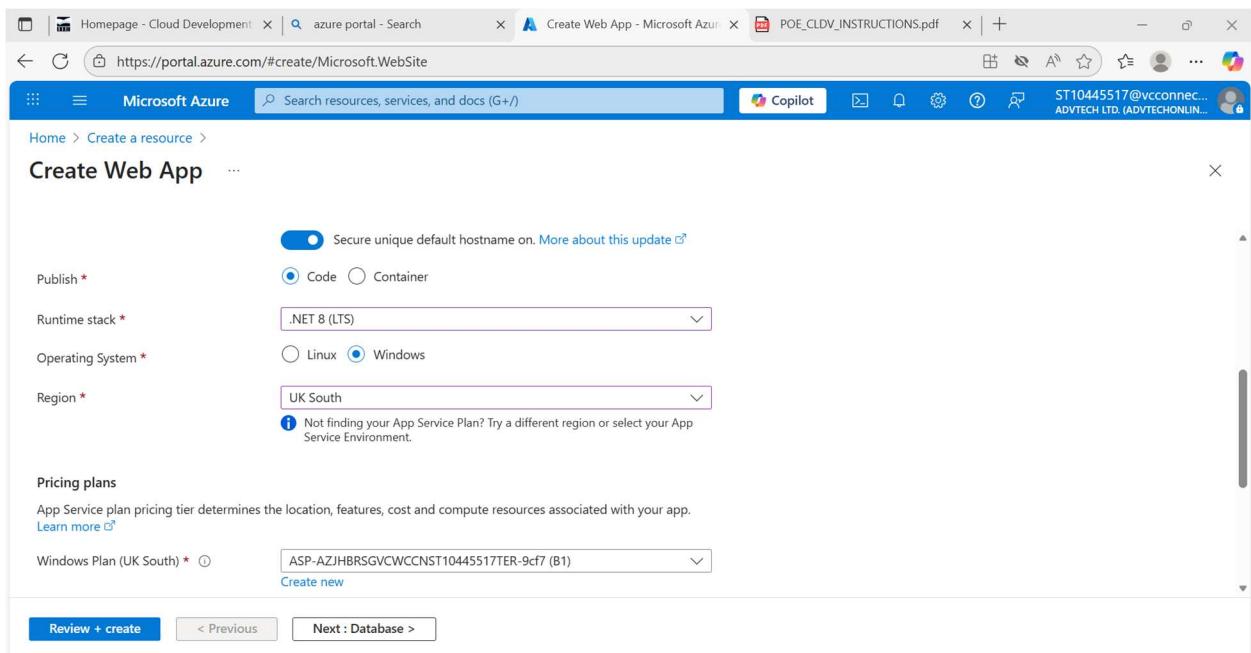
- URL:** https://portal.azure.com/#@advtechonline.onmicrosoft.com/resource/subscriptions/e31273bf-0dae-4395-a8b5-33f801de7c65/resourceGroup/abc1retailstorage/storageAccounts/abc1retailstorage
- Title:** abc1retailstorage | Storage browser
- Storage account:** abc1retailstorage
- Left Sidebar:**
 - Search
 - Data migration
 - Events
 - Storage browser** (selected)
 - Storage Mover
 - Partner solutions
 - Resource visualizer
 - > Data storage
 - > Security + networking
 - > Data management
 - > Settings
 - > Monitoring
 - > Monitoring (classic)
 - > Automation
- Right Content Area:**
 - Queues:** order-queue-poison
 - Authentication method:** Access key (Switch to Microsoft Entra user account)
 - Table:** Showing all 1 items

Message text	Id	Insertion time	Expiration time
{ "OrderId": null, "PartitionKey": "OrderP...", "RowKey": "d0e3af41-b...", "Timestamp": "2025-11-...", "ETag": null, "CustomerID": 0, "ProductID": 0, "Status": "PENDING", "TotalAmount": 0, "Quantity": 1 }	4d33964-5cb4-4ab5-a67...	11/14/2025, 6:09:44 PM	11/21/2025, 6:09:44 PM

Web App

The screenshot shows the Microsoft Azure portal interface for creating a new web app. The top navigation bar includes tabs for 'Homepage - Cloud Development', 'azure portal - Search', 'Create Web App - Microsoft Azure', and 'POE_CLDV_INSTRUCTIONS.pdf'. The main title is 'Create Web App'. Below the title, a sub-header reads: '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.' A 'Learn more' link is present. The 'Project Details' section asks to select a subscription and resource group. The chosen subscription is 'AdvTECH-Tertiary Varsity College' and the resource group is 'AZ-JHB-RSG-VCWCCN-ST10445517-TER'. The 'Instance Details' section allows setting the name of the web app, which is 'st10445517', and specifies the default hostname as '-ashcasfzgfh6fabh.uksouth-01.azurewebsites.net'. A toggle switch is shown as being turned on for 'Secure unique default hostname'. At the bottom, there are buttons for 'Review + create', '< Previous', and 'Next : Database >'.

Figure 11_Configuring Web App Details



Secure unique default hostname on. [More about this update](#)

Code Container

Runtime stack * .NET 8 (LTS)

Operating System * Windows

Region * UK South

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

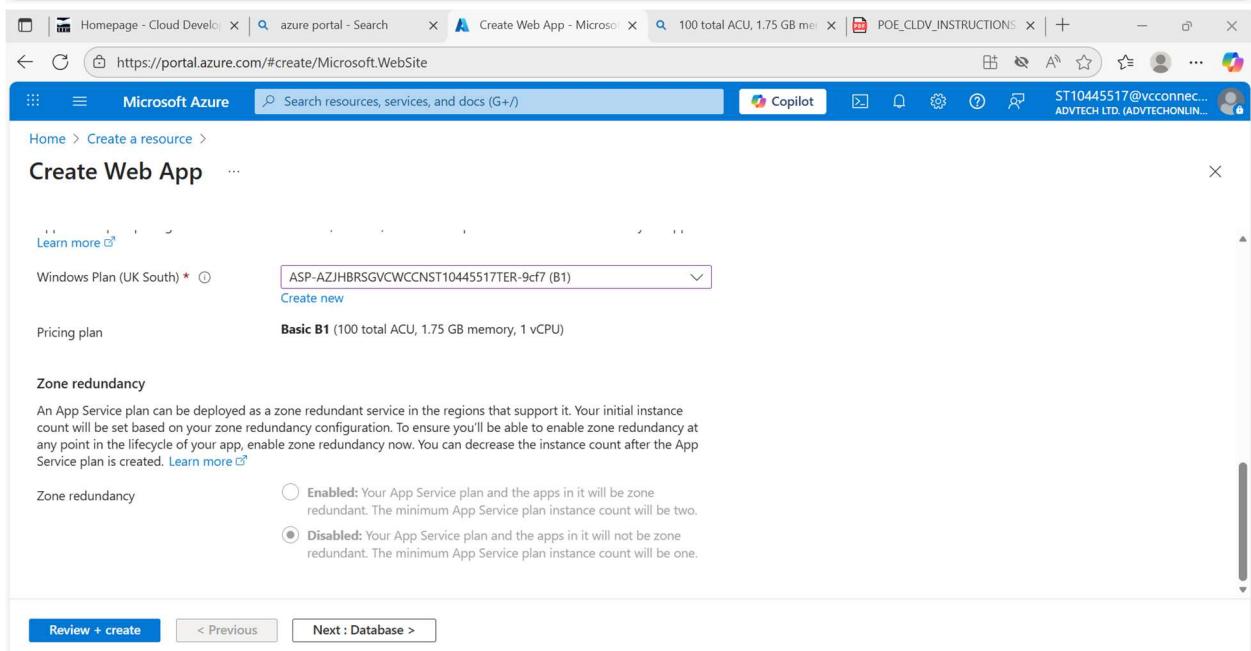
Pricing plans

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

Windows Plan (UK South) * ASP-AZJHBRSGVCWCCNST10445517TER-9cf7 (B1)

Create new

[Review + create](#) [< Previous](#) [Next : Database >](#)



[Learn more](#)

Windows Plan (UK South) * ASP-AZJHBRSGVCWCCNST10445517TER-9cf7 (B1)

Create new

Pricing plan Basic B1 (100 total ACU, 1.75 GB memory, 1 vCPU)

Zone redundancy

An App Service plan can be deployed as a zone redundant service in the regions that support it. Your initial instance count will be set based on your zone redundancy configuration. To ensure you'll be able to enable zone redundancy at any point in the lifecycle of your app, enable zone redundancy now. You can decrease the instance count after the App Service plan is created. [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 two.

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.

[Review + create](#) [< Previous](#) [Next : Database >](#)

The screenshot shows the Microsoft Azure portal interface for creating a web app. The top navigation bar includes links for 'Homepage - Cloud DevOp...', 'azure portal - Search', 'Create Web App - Microsoft', '100 total ACU, 1.75 GB mem...', 'POE_CLDV_INSTRUCTIONS', and a user profile. The main title is 'Create Web App'. Below it, a breadcrumb trail shows 'Home > Create a resource > Create Web App'. The 'Review + create' tab is selected. The 'Summary' section shows the 'Web App by Microsoft' service. A note indicates that basic authentication is disabled. The 'Details' section lists the following configuration:

Subscription	e31273bf-0dae-4395-a8b5-33f801de7c65
Resource Group	AZ-JHB-RSG-VCWCCN-ST10445517-TER
Name	st10445517
Secure unique default hostname	Enabled

At the bottom, there are buttons for 'Create', '< Previous', 'Next >', and 'Download a template for automation'.

This screenshot shows the 'Create Web App' wizard on the next step. The interface is identical to the previous one, with the same header, navigation, and summary section. The 'Details' section now includes additional configuration:

Subscription	e31273bf-0dae-4395-a8b5-33f801de7c65
Resource Group	AZ-JHB-RSG-VCWCCN-ST10445517-TER
Name	st10445517
Secure unique default hostname	Enabled
Publish	Code
Runtime stack	.NET 8 (LTS)

The 'App Service Plan' section is also present, listing:

Name	ASP-AZJHBRSRGVCWCCNST10445517TER-9cf7
Operating System	Windows
Region	UK South
SKU	Basic
Size	Small
ACU	100 total ACU

At the bottom, there are buttons for 'Create', '< Previous', 'Next >', and 'Download a template for automation'.

The screenshot shows two consecutive pages from the Microsoft Azure portal.

Page 1: Create Web App

- Name:** ASP-AZJHBRSGVCWCCNST10445517TER-9cf7
- Operating System:** Windows
- Region:** UK South
- SKU:** Basic
- Size:** Small
- ACU:** 100 total ACU
- Memory:** 1.75 GB memory

Monitor + secure

- Application Insights:** Not enabled

Deployment

- Basic authentication:** Disabled
- Continuous deployment:** Not enabled / Set up after app creation

Buttons at the bottom: **Create**, **< Previous**, **Next >**, **Download a template for automation**.

Page 2: Microsoft.Web-WebApp-Portal-f0a7a6d1-9b39 | Overview

Deployment

Your deployment is complete

- Deployment name:** Microsoft.Web-WebApp-Port...
- Subscription:** ADVTECH-Tertiary Varsity College
- Resource group:** AZ-JHB-RSG-VCWCCN-ST10445...
- Start time:** 11/14/2025, 6:00:52 PM
- Correlation ID:** 32013625-71b9-4569-9f80-2ab80

Deployment details

Next steps

- Manage deployments for your app. Recommended
- Protect your app with authentication. Recommended

Go to resource

Give feedback

Tell us about your experience with deployment

Cost Management

Get notified to stay within your budget and prevent unexpected charges on your bill.
[Set up cost alerts >](#)

Microsoft Defender for Cloud

Secure your apps and infrastructure
[Go to Microsoft Defender for Cloud >](#)

Free Microsoft tutorials

Start learning today

Figure 12_Successful Web App Deployment

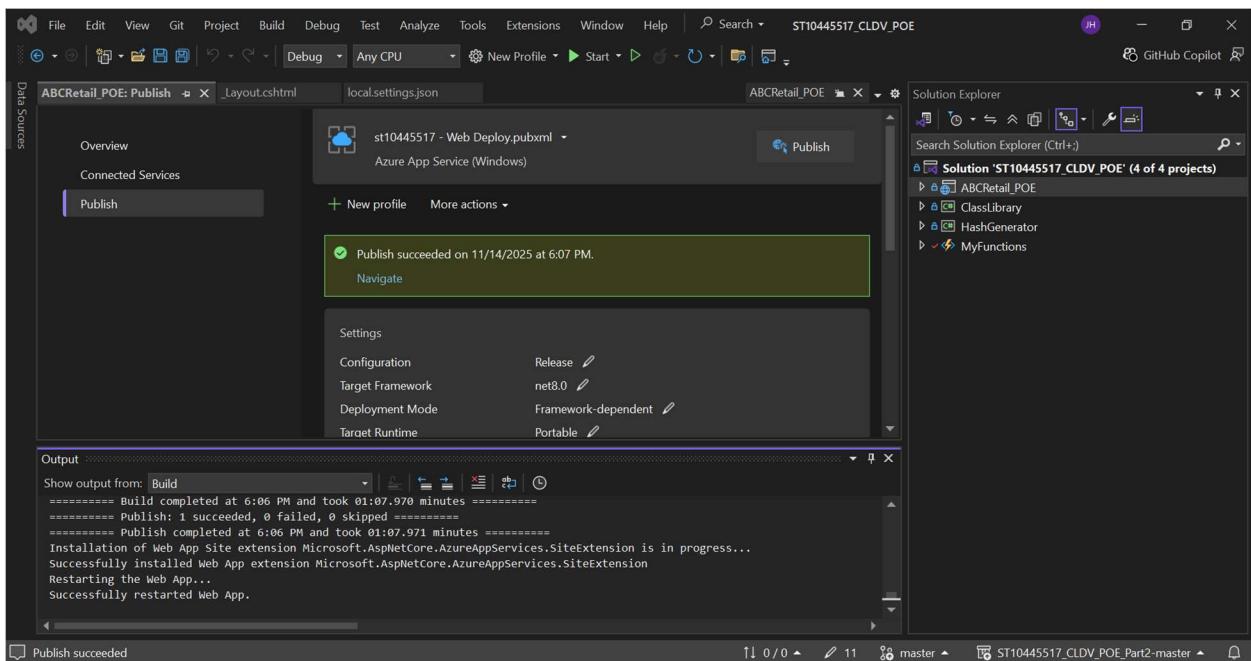


Figure 13_Web App published successfully

Links

YouTube Link: <https://youtu.be/jH2xyhZNY9o>

GitHub Link: https://github.com/VCCT-CLDV6212-2025-G1/ST10445517_CLDV_POE_SUMMATIVE?tab=readme-ov-file

Website Link: <https://st10445517-ashcasfzdgh6fabh.uksouth-01.azurewebsites.net/>

Functions App Link: <https://abcretailst10445517-g6f7bxg0dndxcsc5.uksouth-01.azurewebsites.net>

Azure Service Report Table

Component	Technology Choice	Hosting Model	Description of Service and Service Type
Azure Storage Account (Queue Service)	Asynchronous Communication (Messaging/Queueing)	PaaS (Platform as Service)	The Queue Service is used to store large volumes of messages (in this case order messages) between the web application and the backend processor (Microsoft, 2024). This PaaS service handles the scaling required for messaging and guarantees message persistence and decoupling the system. This prevents the front-end from slowing down during high volume periods.
Azure Storage Account (Blob Service)	Data Storage (File/Binary Storage)	PaaS (Platform as Service)	Blob Storage is the object store used for all unstructured data, which in this application, is mainly used for product images and can be used to backup files (Microsoft, 2025). This service provides tiered storage and high durability. The PaaS offering is a good standard for scalable and global object storage.
Azure Storage Account (Table Service)	Data Storage (NoSQL/Key-Value pairs)	PaaS (Platform as Service)	The NoSQL storage service is used for storing large quantities of structured data such as orders, customers and product inventory, and they do not require complex joins (Microsoft, 2025). Table Storage is created for horizontal scaling and is very economical. The PaaS model offers instant and broad capacity. This makes it good for cost-effective data archival where scaling is more important than transactional integrity.

Azure App Service (for Web App)	Compute(Web Hosting)	PaaS (Platform as Service)	This service provides a fully managed environment for hosting customer interactive web application (Microsoft, 2025). Choosing PaaS eliminates the operational overhead of IaaS. The App Service offers built-in features that are important for the retail application, such as automatic scaling, deployment slots for zero-downtime updates and integrated monitoring.
Azure Functions	Compute (Serverless/Event-Driven)	PaaS (Platform as Service)	Azure Functions executes code snippets for order processing and notifications in response to specific triggers in this case http and queue triggers (Microsoft, 2025). This fully managed PaaS offering eliminates all server management and allows developers to focus on business logic.
Azure SQL Database	Data Storage (Relational/Transactional)	PaaS (Platform as Service)	This is a relational backend used for storing important and transactional data like customer and admin login credentials (Microsoft, 2025). As a PaaS database, it provides important business features including automated backup, network security controls and high-availability.

Azure Service Utilization Motivation

It was necessary to use an Azure SQL Database as the main requirement was for secure customer login and registration. This managed PaaS guarantees transactional integrity. This is a non-negotiable for handling sensitive user credentials and ensuring that all updates (e.g. passwords) are applied consistently. As it is a relational database, it is perfectly suited for complex security indexing and reliable authentication checks.

I implemented Azure Queue Storage in order to process orders asynchronously. The main motivation was for system decoupling and resilience. The front-end checkout experience for the user is immediate and the back-end processing which in this case is the Functions, can handle the workload in its own time, because the orders are placed into a queue.

The requirement for saving order data after checking out uses Azure Table Storage. In using this service, it was highly motivated for its ability to scale large amounts of data and is very cost effective. As a NoSQL store, Table storage is a lot cheaper and more horizontally scalable than a relational database for storing high volumes of simply structured order records. This is very efficient for quick lookups using partition and row keys.

The compute logic for executing the backend tasks like the serverless execution of order logic (adding an order), is implemented using Azure Functions (Microsoft, 2025). This service provides a serverless environment. You only pay for the execution time required to read messages from the queue and write to table storage. The pay per execution model and automatic scaling align perfectly with event driven requirements. No infrastructure management is required if you make use of this model.

I utilized the Azure App Service as I felt it was the best choice for the mandatory requirement to host a customer-facing web application. As a PaaS platform it provides fully managed hosting, which includes load balancing, patching and continuous deployment capabilities. This allowed me to maximize my time spent on the application features rather than managing, for example, a virtual machine.

The need to store static content, such as product images, is handled by Azure Blob Storage. This is the standard Azure service for unstructured object data. It offers efficient scalability, high durability and cost-effective storage tiers. This ensures that products images are delivered quickly and reliably to the web application.

Alternative Azure Technologies

There are many alternative Azure services that could have been utilized that offer different feature sets and tradeoff

An alternative to Azure Queue Storage for processing orders asynchronously is Azure Service Bus (Microsoft, 2024). Service Bus would be a highly viable alternative due to its high-grade features such as message sessions and more sophisticated dead-letter queues. This would offer more robust error-handling capabilities and ensure that groups of messages are processed in sequences. This process often crucial for complex transactional workflows.

Instead of Azure Table Storage for saving order data you can use Azure Cosmos DB with the NoSQL API as an alternative (Pietschmann, 2024). Cosmos DB is a globally distributed database that would be a good choice as has low-latency performance and native indexing. This offers a greater flexibility and querying power compared to rigid key-value structure of Table Storage. It is higher in cost for applications as it has the mentioned benefits above and includes global performance mandates.

For serverless execution of order logic, an alternative to Azure Functions is Azure Logic Apps. Logic Apps provide a low-code environment for building automated workflows. It should be a very suitable alternative if the processing logic only involved chaining pre-built connectors . This approach could accelerate development time for simple integrations compared to writing custom C# code in Azure Functions.

A good alternative to Azure SQL for the customer login and registration requirement would be an Azure Database for PostgreSQL (Microsoft, 2025). This is a fully managed service that provides the same PaaS operational benefits as Azure SQL but uses an open-source relational engine. This choice would be viable if the rubric explicitly wanted to use open-source technologies or wanted to avoid licensing costs with SQL Server, but still have transactional integrity.

References

- Google Gemini, 2025. *Gemini*. [Online]
Available at: <https://gemini.google.com/app/6728ee6941e5aa43>
[Accessed 4 October 2025].
- Microsoft, 2024. *Storage queues and Service Bus queues - compared and contrasted*.
[Online]
Available at: <https://learn.microsoft.com/en-us/azure/service-bus-messaging/service-bus-azure-and-service-bus-queues-compared-contrasted>
[Accessed 14 November 2025].
- Microsoft, 2024. *Storage queues and Service Bus queues - compared and contrasted*.
[Online]
Available at: <https://learn.microsoft.com/en-us/azure/service-bus-messaging/service-bus-azure-and-service-bus-queues-compared-contrasted>
[Accessed 14 November 2025].
- Microsoft, 2025. *App Service overview*. [Online]
Available at: <https://learn.microsoft.com/en-us/azure/app-service/overview>
[Accessed 14 November 2025].
- Microsoft, 2025. *Azure Functions documentation*. [Online]
Available at: <https://learn.microsoft.com/en-us/azure/azure-functions/>
[Accessed 14 November 2025].
- Microsoft, 2025. *Azure Table storage documentation*. [Online]
Available at: <https://learn.microsoft.com/en-us/azure/storage/tables/>
[Accessed 14 November 2025].
- Microsoft, 2025. *Choose the Automation services in Azure*. [Online]
Available at: <https://learn.microsoft.com/en-us/azure/automation/automation-services>
[Accessed 14 November 2025].
- Microsoft, 2025. *Introduction to Azure Blob Storage*. [Online]
Available at: <https://learn.microsoft.com/en-us/azure/storage/blobs/storage-blobs-introduction>
[Accessed 14 November 2025].
- Microsoft, 2025. *What is Azure Database for PostgreSQL?*. [Online]
Available at: <https://learn.microsoft.com/en-us/azure/postgresql/flexible-server/overview>
[Accessed 14 November 2025].

Microsoft, 2025. *What is Azure SQL Database?*. [Online]
Available at: <https://learn.microsoft.com/en-us/azure/azure-sql/database/sql-database-paas-overview?view=azuresql>
[Accessed 14 November 2025].

OpenAI, 2025. *ChatGPT*. [Online]
Available at: <https://chatgpt.com/overview>
[Accessed 5 September 2025].

Pietschmann, C., 2024. *How to Choose Between Azure Cosmos DB for Table and Azure Table Storage*. [Online]
Available at: <https://build5nines.com/how-to-choose-between-azure-cosmos-db-for-table-and-azure-table-storage/>
[Accessed 14 November 2025].