

CLDV6212

SUMMATIVE POE FINAL SUBMISSION

ST10445866 - Botshelo Koketso
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Table of Contents

<i>GitHub Link:</i>	1
Web Application Link:	1
A. Create an Azure SQL Login Database.....	2
Screenshots on Azure SQL Database Creation:.....	2
Screenshot on Azure Deployment Process:	8
B. Document the technology choices for my solution.....	14
C. Motivate the Azure Services used for each application functionality.....	16
D. Identify alternative Azure Technologies	18
Bibliography.....	20

GitHub Link:

<https://github.com/SekwenaBotshelo/CLDV6212-POE-Final-Submission-ST10445866.git>

PLEASE NOTE THAT ALL PROJECT FILES WILL BE SUBMITTED ON ARC AS THEY ARE TOO LARGE TO BE COMMITED ON GIT BUT (I.E., ABCRETAILER-ST10445866-POE, AND ABCRETAILER-FUNCTIONS), ANY AND ALL FILES TTO BE COMMITED ON GITHUB ARE THE FOLLOWING: AZURE SQL FOLDER AND THE WORD DOCUMENT.

Web Application Link:

abcretailers-st10445866-a8hsdqdk2gbg0c4.southafricanorth-01.azurewebsites.net

A. Create an Azure SQL Login Database

Screenshots on Azure SQL Database Creation:

The screenshot shows the Microsoft Azure portal interface for a deployment titled "Microsoft.SQLDatabase.newDatabaseNewServer_b965d27969804fcbabef3". The "Overview" tab is selected. A prominent message at the top states "Deployment is in progress". Below this, deployment details are listed: Deployment name: Microsoft.SQLDatabase.newDatabaseNewServer_b965d27969804fcbabef3, Start time: 08/11/2025, 06:02:56, Correlation ID: f618d63b-d0c8-4589-8291-9fd0104fe848, Subscription: ADvTECH-Tertiary Varsity College, Resource group: AZ-JHB-RSG-IIEMSA-ST10445866-TER. A table titled "Deployment details" shows one resource: st10445866-abcretail-sql-server, Type: Microsoft.Sql/servers, Status: Accepted, Operation details: Operation details. The right sidebar contains links for Microsoft Defender for Cloud, Free Microsoft tutorials, and Work with an expert.

This screenshot is nearly identical to the one above, showing the same deployment status and details for the "Microsoft.SQLDatabase.newDatabaseNewServer_b965d27969804fcbabef3" deployment. The deployment is still in progress, with the same start time, correlation ID, subscription, and resource group information. The "Deployment details" table shows the same resource entry. The right sidebar also includes the same links for Microsoft Defender for Cloud, Free Microsoft tutorials, and Work with an expert.

The screenshot shows the Microsoft Azure portal interface for a deployment titled "Microsoft.SQLDatabase.newDatabaseNewServer_b965d27969804fcbabef3". The "Overview" tab is selected. A prominent message at the top states "Deployment is in progress". Below this, deployment details are listed:

Resource	Type	Status	Operation details
st10445866-abcretail-sql-server/Default	Microsoft.Sql/servers/connectio...	OK	Operation details
st10445866-abcretail-sql-server	Microsoft.Sql/servers	Created	Operation details

The status bar at the bottom left indicates: "Add or remove favorites by pressing Cmd+Shift+F".

This screenshot shows the same deployment overview as the first one, but with a specific database name added to the resource list. The deployment status remains "Deployment is in progress". The deployment details table now includes the new database:

Resource	Type	Status	Operation details
st10445866-abcretail-sql-server/ST10445866-ABCRetailDB	Microsoft.Sql/servers/databases	Accepted	Operation details
st10445866-abcretail-sql-server/Default	Microsoft.Sql/servers/connectio...	OK	Operation details
st10445866-abcretail-sql-server	Microsoft.Sql/servers	Created	Operation details

A small inset window in the bottom right corner shows a preview of the Azure portal interface.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes links for Home, Microsoft Azure, portal.azure.com, and Copilot. The main title is "Microsoft.SQLDatabase.newDatabaseNewServer_b965d27969804fcbabef3 | Overview". On the left, a sidebar menu lists "Overview", "Inputs", "Outputs", and "Template". The main content area displays a green checkmark icon indicating "Your deployment is complete". Below this, deployment details are shown, including the deployment name (Microsoft.SQLDatabase.newDatabaseNewServer_b965d27969804fcbabef3), start time (08/11/2025, 06:31:01), correlation ID (f618d63b-d0c8-4589-8291-9fd010fe848), subscription (ADvTECH-Tertiary Varsity College), and resource group (AZ-JHB-RSG-IIEMSA-ST10445866-TER). A table titled "Deployment details" lists three resources: st10445866-abcretail-sql-server/ST10445866-ABCRetailDB (Microsoft.Sql/servers/databases, Created), st10445866-abcretail-sql-server/Default (Microsoft.Sql/servers/connectio, OK), and st10445866-abcretail-sql-server (Microsoft.Sql/servers, Created). To the right, there are promotional sections for "Cost management", "Microsoft Defender for Cloud", "Free Microsoft tutorials", and "Work with an expert". At the bottom left, a note says "Add or remove favorites by pressing Cmd+Shift+F".

Screenshot of the Microsoft Azure portal showing the Overview page for the SQL database "ST10445866-ABCretailDB".

Overview

- Resource group (move): AZ-JHB-RSG-IIEMSA-ST10445866-TER
- Status: Online
- Location: South Africa North
- Subscription (move): ADVTECH Tertiary Varsity College
- Subscription ID: e31273bf-0dae-4395-a0b5-33f801de7c65
- Tags (edit): Add tags

Mirror databases in Microsoft Fabric: Easily replicate your existing databases in Fabric, and help your team achieve streamlined ETL and operational analytics goals. [Learn more](#)

Start working with your database

- Configure access**: Configure network access to your SQL server. [Learn more](#)
- Connect to application**: Use connection strings to connect to your SQL database from your applications and favorite tools. [See connection strings](#)
- Start developing**: Work in your database by using tools to add, modify and query data. [Compare tools](#)
- Mirror database in Fabric**: Replicate existing databases in Fabric, and help your team achieve streamlined ETL and operational analytics goals. [Learn more](#)

Screenshot of the Microsoft Azure portal showing the Query editor (preview) page for the SQL database "ST10445866-ABCretailDB".

Query editor (preview)

Query editor (preview) is a tool to run SQL queries against Azure SQL Database in the Azure portal. It is designed for lightweight querying and object exploration in your database. For more information and troubleshooting, [Learn more](#)

Welcome to SQL Database Query Editor

SQL server authentication

Login *: abcretail-st10445866admin
Password *

Microsoft Entra authentication

Logged in as ST10445866@imconnect.edu.za
Continue as ST10445866@imconnect...

The screenshot shows the Microsoft Azure Query editor (preview) interface. The left sidebar lists various database management options like Overview, Activity log, Tags, and Query editor (preview). The main area displays a query editor titled "Query 1" with a single line of code: "1". Below the editor are tabs for "Results" and "Messages", and a search bar.

The screenshot shows the Microsoft Azure Query editor (preview) interface after executing a query. The query "1 SELECT * FROM Users;" has been run, and the results are displayed in a table. The table has columns: Id, Username, PasswordHash, and Role. It contains two rows: one for a customer and one for an admin.

Id	Username	PasswordHash	Role
1	customer01	customerpass123	Customer
2	admin01	adminpass123	Admin

The screenshot shows a Microsoft Azure portal window with the URL portal.azure.com in the address bar. The title bar reads "ST10445866-ABCretailDB (st10445866-abcretail-sql-server/ST10445866-ABCretailDB) | Query editor (preview)". The left sidebar is collapsed, showing a list of services and features. The main area is titled "Query 1" and contains a code editor with the following SQL query:

```
1 SELECT *
2 FROM Cart;
```

Below the code editor, there are two tabs: "Results" and "Messages". The "Messages" tab is selected, displaying the message "Query succeeded: Affected rows: 0".

(Kamil Mrzygłód, 2022) (Kamil Mrzygłód, 2021)

Screenshot on Azure Deployment Process:

The screenshot shows the Microsoft Azure portal interface. The main title bar reads "Microsoft.Web-WebApp-Portal-00804ec5-9a0d | Overview". The left sidebar has sections for Overview, Inputs, Outputs, and Template. The main content area displays a green checkmark icon indicating "Your deployment is complete". It shows deployment details for three resources: "abcretailers-st10445866/ftp", "abcretailers-st10445866/scm", and "abcretailers-st10445866", all listed as Microsoft.Web/sites/basicPublishingCred... with status OK. To the right, there are promotional cards for Cost Management, Microsoft Defender for Cloud, Free Microsoft tutorials, and Work with an expert.

Deployment details

Resource	Type	Status	Operation details
abcretailers-st10445866/ftp	Microsoft.Web/sites/basicPublishingCred...	OK	Operation details
abcretailers-st10445866/scm	Microsoft.Web/sites/basicPublishingCred...	OK	Operation details
abcretailers-st10445866	Microsoft.Web/sites	OK	Operation 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](#)

Add or remove favorites by pressing Cmd+Shift+F

The screenshot shows the Microsoft Azure App Service quickstart page. The title bar reads "abcretailers-st10445866-a8hsdqke2gbg0c4.southafricanorth-01.azurewebsites.net". The main message is "Your web app is running and waiting for your content". It includes a note: "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." To the right is a 3D rendering of a computer monitor displaying a globe icon. Below the message, there's a section for "Supporting Node.js, Java, .NET and more". It includes links for "Haven't deployed yet?", "Starting a new web site?", and "Quickstart". A "Deployment center" button is also present.

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.

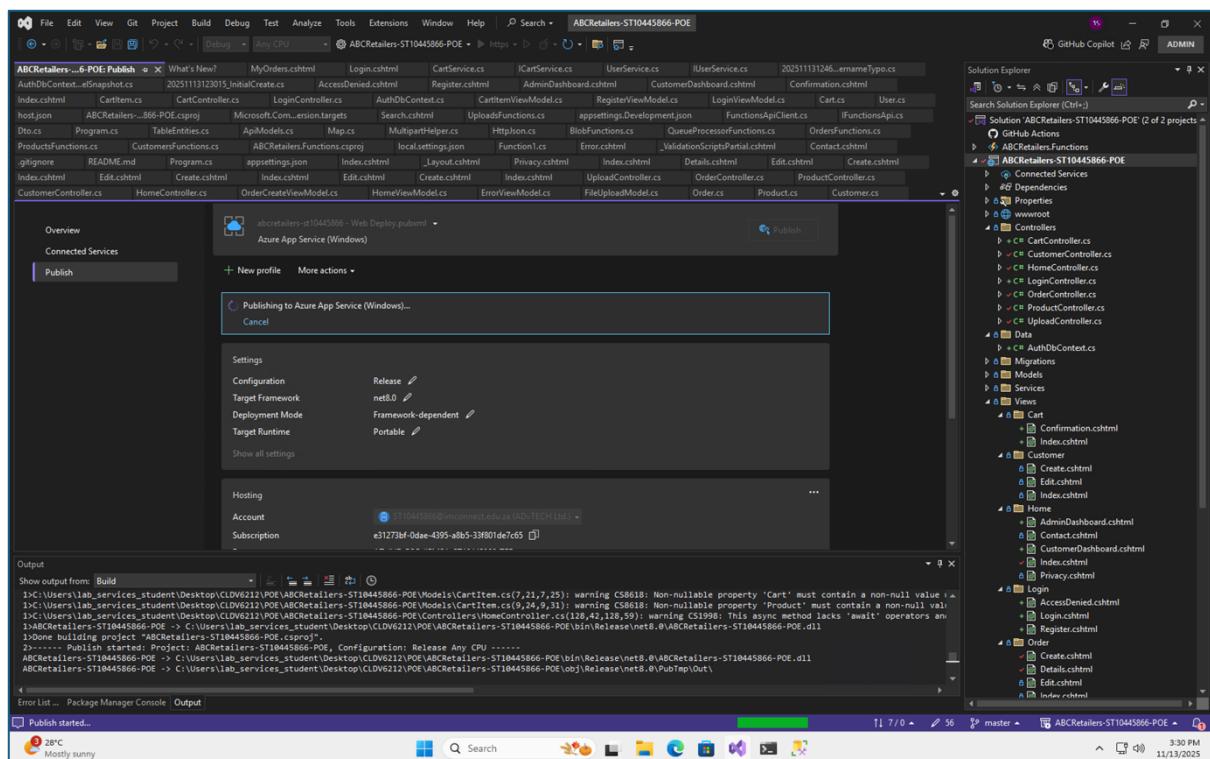
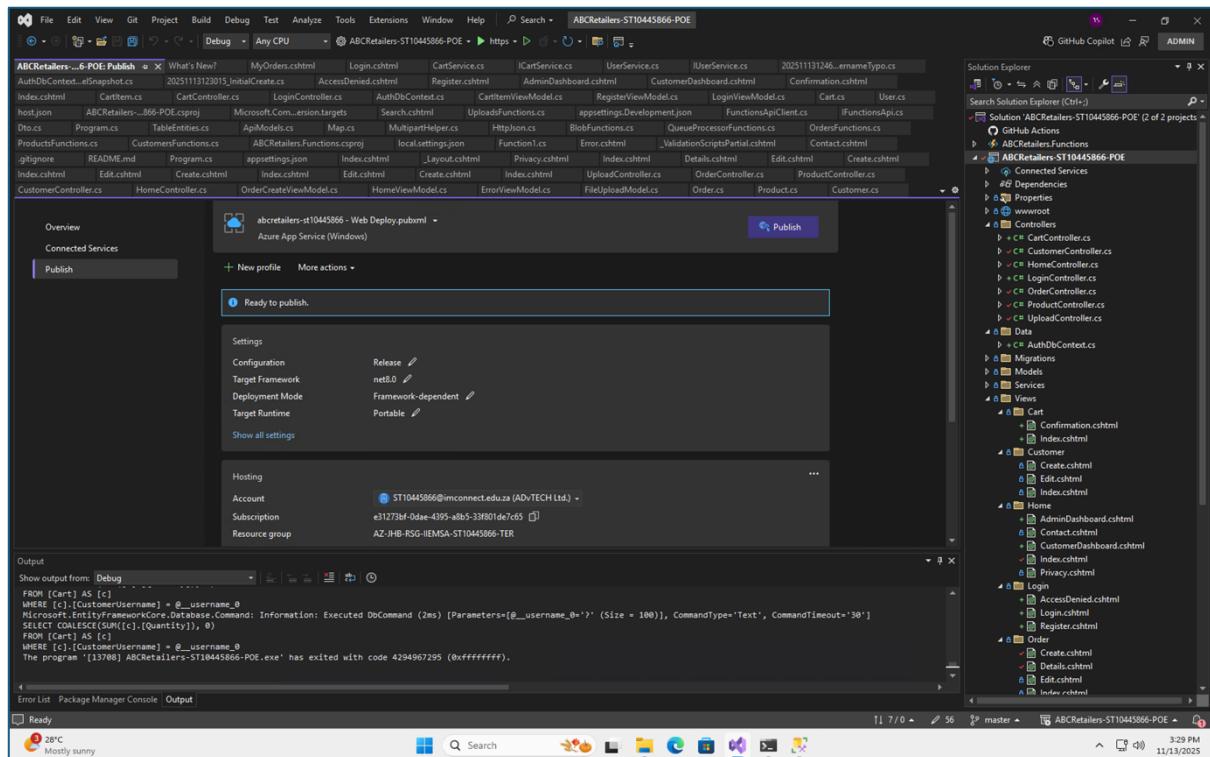
</> Supporting Node.js, Java, .NET and more

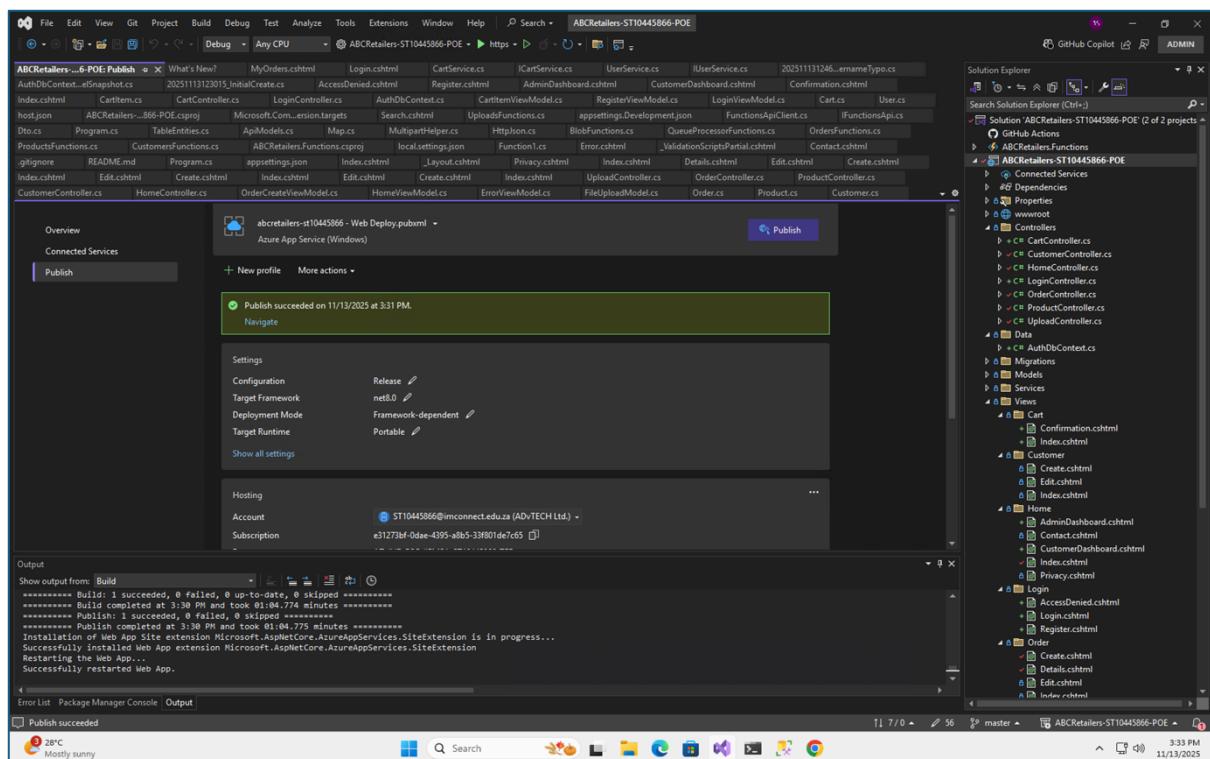
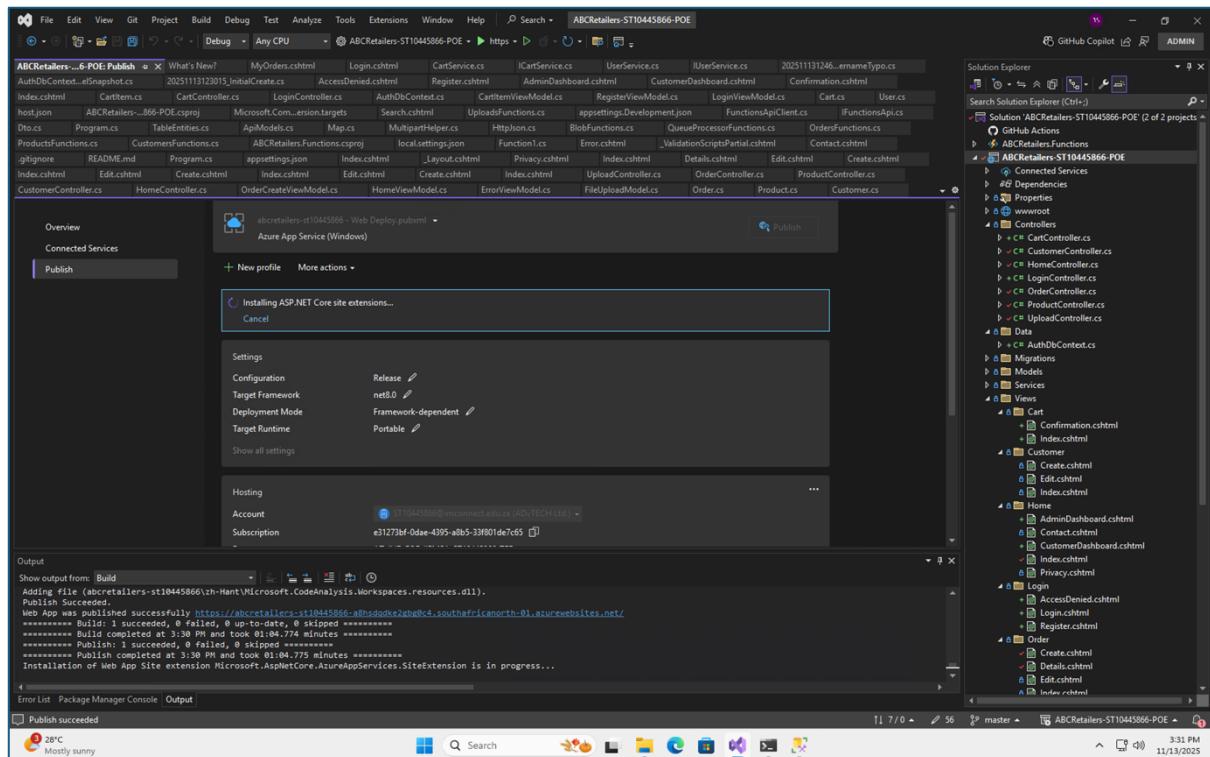
Haven't deployed yet?
Use the deployment center to publish code or set up continuous deployment.

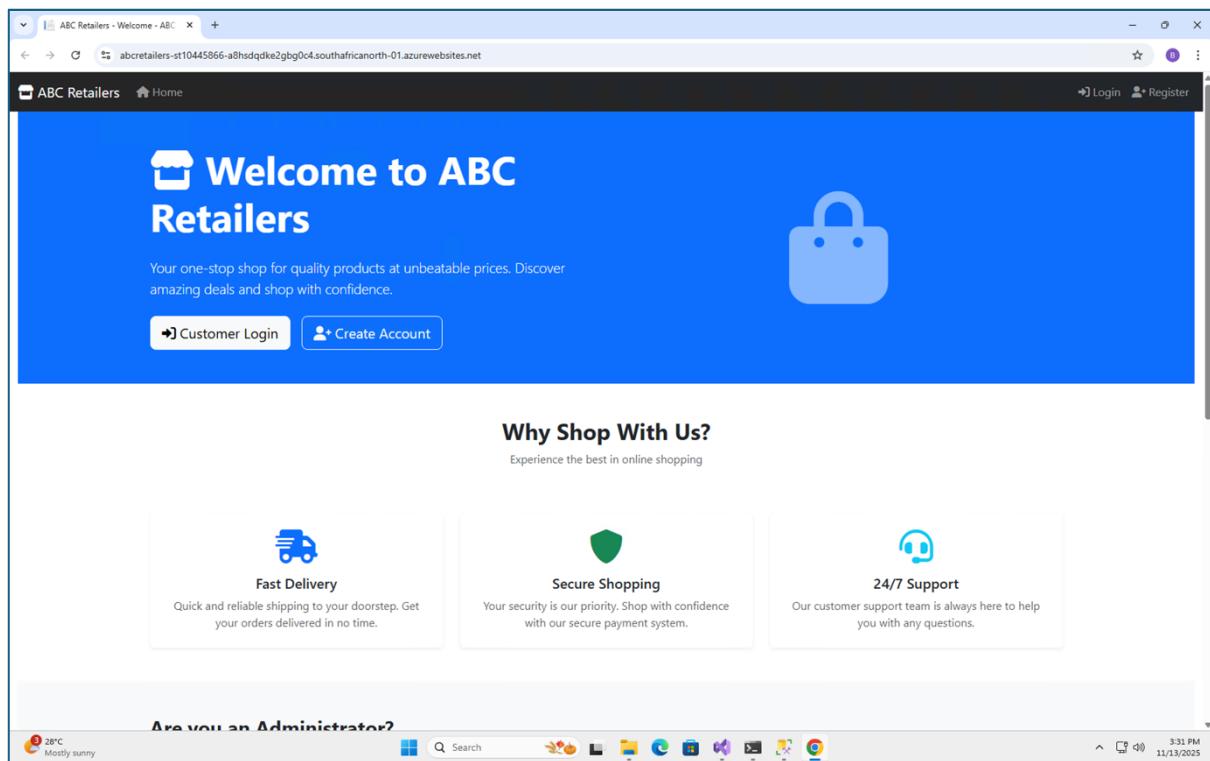
Starting a new web site?
Follow our Quickstart guide to get a web app ready quickly.

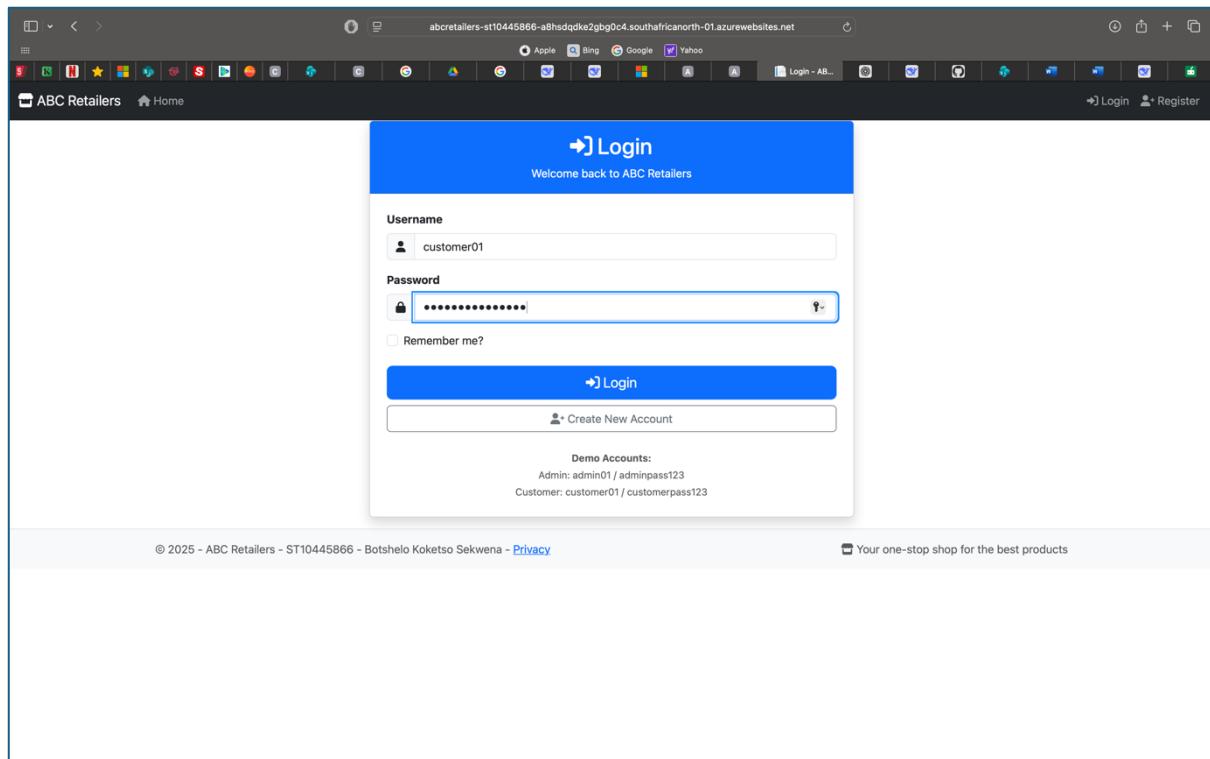
[Quickstart](#)

[Deployment center](#)

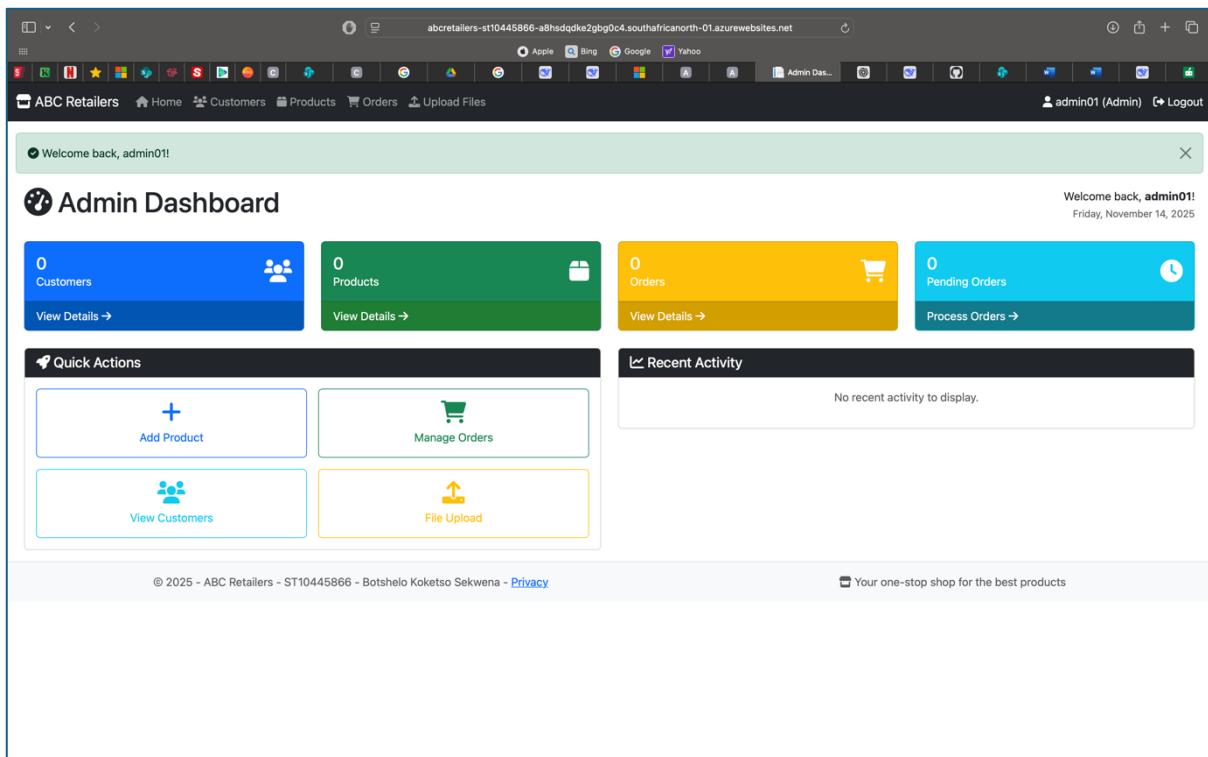
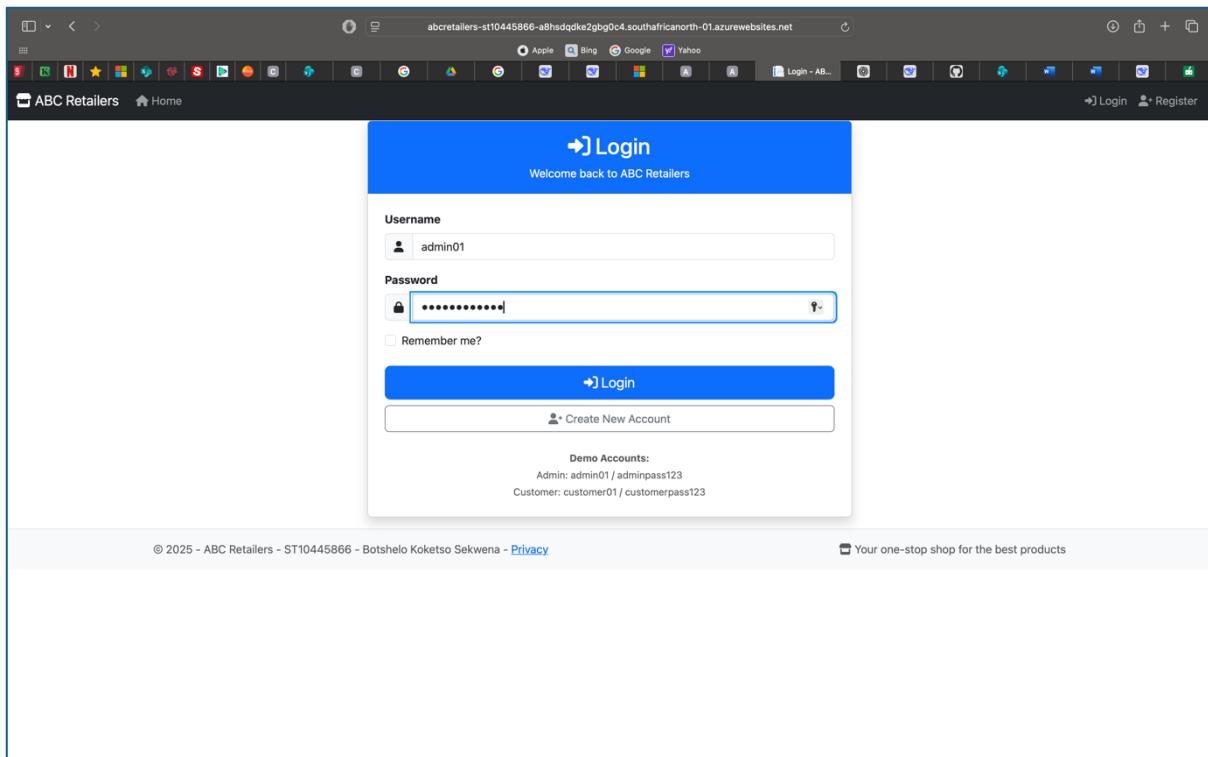








The screenshot shows a web browser window with the same URL as the previous screenshot. The title bar now says "ABC Retailers". The top navigation bar includes links for "Home", "Shop", "My Cart", "My Orders", "Customer...", and "Logout". The user is identified as "customer01 (Customer)". The main area is titled "My Dashboard". It features three cards: "Items in Cart" (0), "My Orders" (0), and "Pending Orders" (0). Below these are sections for "Quick Shopping" (with "Browse Products" and "View My Cart" buttons) and "Account Summary" (showing "customer01" profile, "Member Since: Nov 2025", "Total Orders: 0", and "Cart Items: 0"). The footer is identical to the previous screenshot.



(Kamil Mrzygłód, 2022) (Kamil Mrzygłód, 2022) (Kamil Mrzygłód, 2022)

B. Document the technology choices for my solution

Component	Technology Choice	Hosting Model	Description
Azure SQL Database	Data Storage (Relational)	PaaS (Platform as a Service)	Primary database with full SQL capabilities for user authentication, shopping cart information, and application metadata
Azure Functions	Serverless Compute	PaaS (Platform as a Service)	Backend API services that manage file uploads, orders, customers, and product CRUD operations
Azure Table Storage	Data Storage (NoSQL)	PaaS (Platform as a Service)	Product catalogue, customer, and order data are stored in NoSQL using the Functions API
Azure Blob Storage	File Storage	PaaS (Platform as a Service)	Storage service via Functions API integration for product photos and proof of payment documents
ASP.NET Core MVC Application	Web Application Framework	IaaS/PaaS (Infrastructure/Platform as a Service)	The e-commerce platform's primary web application uses controller-based design.
Azure App Service	Web Hosting	PaaS (Platform as a Service)	The ASP.NET Core application's implied hosting platform with automated scalability and administration

Distributed Memory Cache	Session Management	IaaS (Infrastructure as a Service)	Session storage in RAM for temporary data and user authentication status
HTTP Client Services	API Integration	IaaS (Infrastructure as a Service)	Custom HTTP clients to connect to the backend API of Azure Functions

(Kamil Mrzygłód, 2022) (Kamil Mrzygłód, 2022) (Kamil Mrzygłód, 2022)

C. Motivate the Azure Services used for each application functionality

1. Session management and user authentication

- Secure user registration, authentication, and session persistence are necessary.
- Azure Service: Distributed Memory Cache + Azure SQL Database
- Motivation: Azure SQL Database ensures that user credentials are saved safely by offering enterprise-grade security with encryption both in transit and at rest. Complex user-role connections and ACID compliance for user management activities are supported by the relational structure.

2. Persistence of Shopping Carts

- Reliable shopping cart item storage with user association is a need.
- Azure Service: SQL Database in Azure
- Motivation: maintains user and cart item integrity while guaranteeing data consistency for cart operations with foreign key constraints. offers strong backup and recovery capabilities and supports transactional updates during checkout.

3. Management of Product Catalogues

- Scalable product data storage with adaptable schemas is necessary.
- Azure Service: Azure Table Storage through the Functions API
- Motivation: Provides economical storage at large scale, making it perfect for product catalogues with a variety of features. Adding new product attributes is simple and doesn't require database migrations thanks to the schema-less architecture.

4. System for Processing Orders

- High-volume order creation and progress monitoring are necessary.
- Azure Service: Functions API-based Azure Table Storage

- Motivation: It is ideal for order processing workloads since it is optimised for high-velocity data intake. offers configurable status tracking, quick writing, and effective splitting for order data.

5. Document Storage & File Upload

- Requirement: Safekeeping of product photos and documentation proving payment
- Azure Service: Functions API-based Azure Blob Storage
- Motivation: especially made for unstructured data, such as documents and pictures. offers secure access controls, tiered storage choices, and CDN connectivity for the best possible product image delivery.

6. Backend for Serverless APIs

- Requirements: Scalable backend services are necessary for business operations.
- Azure Functions: Azure Service
- Motivation: Makes it possible for microservices architecture to scale automatically in response to demand. The consumption-based pricing strategy effectively manages peak loads while cutting expenses during periods of low usage.

7. Hosting Web Applications

- Requirement: ASP.NET Core MVC application hosting that is dependable
- Azure Service: (implied) Azure App Service
- Motivation: Offers deployment slots, scaling, and automatic patching for managed hosting. For smooth operation, it is integrated with Azure SQL Database and other services.

(Kamil Mrzygłód, 2022) (Kamil Mrzygłód, 2022) (Kamil Mrzygłód, 2022)

D. Identify alternative Azure Technologies

1. A substitute for user authentication

- Azure SQL Database was the original
- Azure Active Directory B2C is an alternative.
- Motivation: AAD B2C offers enterprise-grade security, social identity provider integration, and pre-built authentication flows without requiring custom implementation. improves security compliance for user management while cutting down on development time.

2. A substitute for the shopping cart

- Azure SQL Database was the original
- Azure Cosmos DB with Session Consistency is an alternative.
- Motivation: Cosmos DB's single-digit millisecond latency and worldwide distribution make it ideal for cross-regional shopping cart operations. Users are guaranteed to view their own writes instantly thanks to the session consistency model.

3. A substitute for the product catalogue

- Azure Table Storage was the original
- Alternative: Cosmos DB plus Azure Cognitive Search
- Motivation: While Cosmos DB manages the product data storage, it offers sophisticated search features (fuzzy search, faceted navigation). Perfect for sophisticated product discovery in e-commerce apps.

4. An Alternative to File Storage

- Azure Blob Storage was the original
- Azure File Shares is an alternative.
- Motivation: More appropriate for programs that need shared access among several application instances or conventional file system semantics. supports legacy integration via the SMB protocol.

5. A Serverless Backend Alternative

- Azure Functions was the original
- Azure Container Apps are an alternative.
- Motivation: Preserves serverless scalability features while offering greater control over dependencies and the runtime environment. Better for intricate applications that need particular container setups.

6. A substitute for session management

- Distributed Memory Cache was the original.
- An alternative would be Redis's Azure Cache
- Motivation: enables distributed, permanent session storage that endures application restarts. improves efficiency in load-balanced scenarios by enabling session sharing among several application instances.

7. A substitute for web hosting

- Azure App Service was the original
- Azure Kubernetes Service (AKS) is an alternative.
- Motivation: Gives container orchestration precise control over networking, scaling, and deployment tactics. Better for intricate microservices designs that call for sophisticated DevOps skills.

These options show how various Azure services could meet the same needs with different trade-offs in terms of scalability, cost, complexity, and feature sets, enabling architectural choices based on particular business requirements and technical limitations.

(Kamil Mrzygłód, 2022) (Microsoft, n.d.)

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