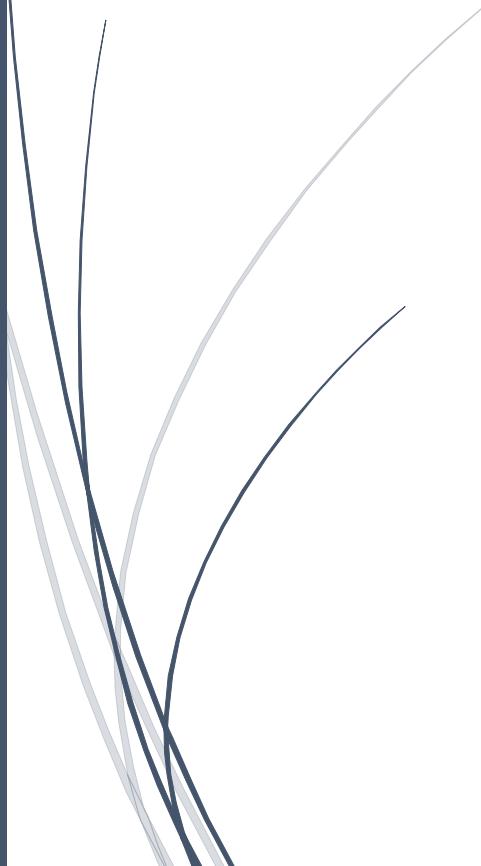


10/6/2025

ST10447759_CLDV 6212_Part2

Lecturer: Kim Youn-Soo



Jeron Joseph Okkers
ST10447759

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Links to sources

URL TO GITHUB: https://github.com/VCCT-CLDV6212-2025-G2/ST10447759_CLDV6212_Part2.git

URL TO Azure website: <https://st10447759.azurewebsites.net/>

URL TO Azure function website: <https://st10447759-func.azurewebsites.net/>

A Creating and deploying function app

The screenshot shows the Microsoft Azure portal interface for creating a new function app. The top navigation bar includes links for Home, Create a resource, and Create Function App. The main title is "Create Function App (App Service)".
Subscription: ADvTECH-Tertiary Varsity College
Resource Group: AZ-JHB-RSG-VCWCCN-ST10447759-TER
Instance Details:

- Function App name:** st10447759-func.azurewebsites.net
- Default Hostname:** Try a secure unique default hostname (preview). [More about this update](#)
- Deployment:** Code (selected) / Container Image
- Operating System:** Windows (selected) / Linux
- Runtime stack:** .NET
- Version:** 8 (LTS), isolated worker model
- Region:** East US

Review + create | **< Previous** | **Next : Storage >**

The second screenshot shows the continuation of the wizard on the "Storage" tab.
Storage: azureretailhubstorage (v2)
Note: Your storage account has no network access restrictions. If you'd like to configure network security, either opt for a new storage account or select an existing storage account with network security.
Blob service diagnostic settings:

- Configure later (Recommended for custom controls)**: Select this option for control over log destinations, retention policies, and specific logs and metrics.
- Configure now (Recommended for basic controls)**: Select to configure Azure Log Analytics with storage, write logs, and transaction metrics for the blob service. You can still modify these settings later.

Review + create | **< Previous** | **Next : Networking >**

Microsoft.Web-FunctionApp-Portal-90c20765-8855 | Overview

Your deployment is complete

Deployment name : Microsoft.Web-FunctionApp-Portal-90c20765-8855 Start time : 10/6/2025, 7:03:02 PM
Subscription : ADvTECH-Tertiary Varsity College Correlation ID : c898f84d-58ea-478e-b34f-3de05b1166c8
Resource group : AZ-JHB-RSG-VCWCCN-ST10447759-TER

Deployment details

Next steps

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 >](#)

Work with an expert
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.
[Find an Azure expert >](#)

st10447759-func

Enable Application Insights for monitoring and profiling for your app.

Essentials

Resource group (move) : AZ-JHB-RSG-VCWCCN-ST10447759-TER	Default domain : st10447759-func.azurewebsites.net
Status : Running	Health Check : Not Configured
Location (move) : East US	Operating System : Windows
Subscription (move) : ADvTECH-Tertiary Varsity College	App Service Plan : ASP-AZJHBRSGVCWCNST10447759TER-b8ec (B1:1)
Subscription ID : e31273bf-0dae-4395-a8b5-33f801de7c65	Runtime version : 4.104.3.200.25453

Functions Metrics Properties Notifications (1)

Create functions in your preferred environment

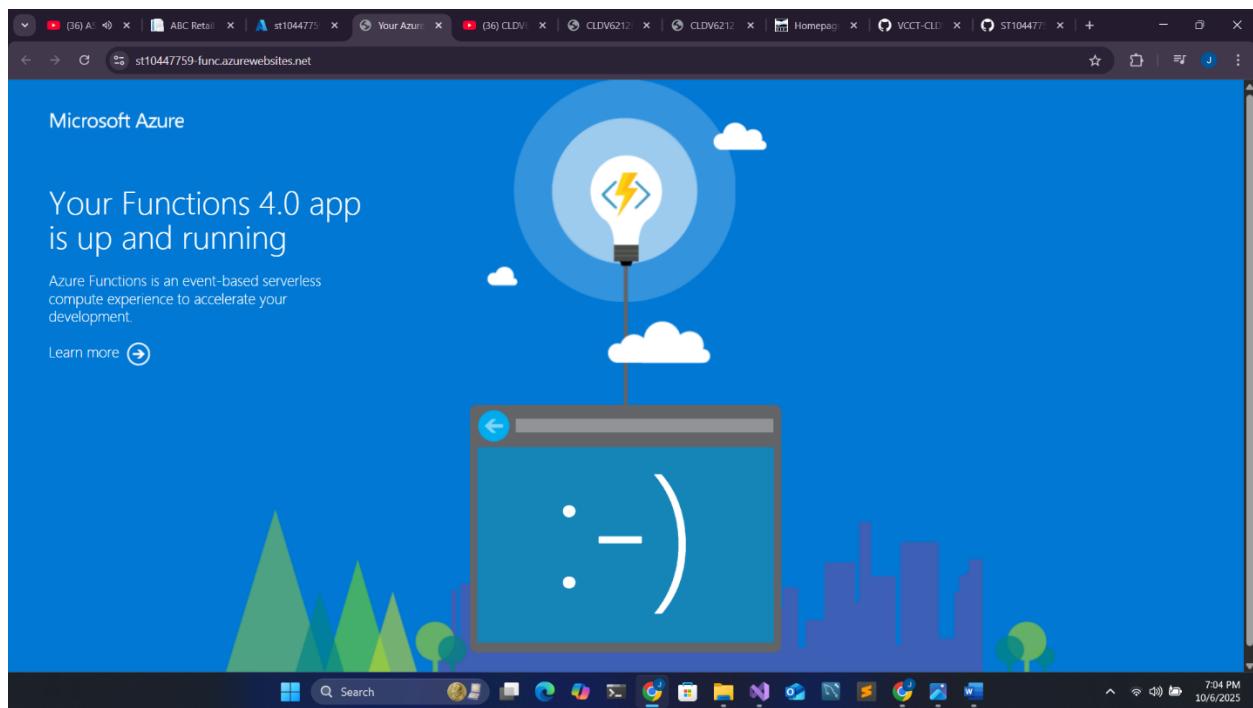
Create with Visual Studio **VS Code Desktop** **Other editors or CLI**

Best optimized for:
• Local development within Visual Studio
• Using a full .NET IDE

Best optimized for:
• Local development within VS Code
• Custom development tool requirements

Best optimized for:
• Using preferred editor for development
• Visual Studio, IntelliJ, command line

[Create with Visual Studio](#) [Create with VS Code Desktop](#) [Set up your editor](#)



Publishing the function

The screenshot shows the Visual Studio interface with the 'AzureRetailHub' project open. In the center, a modal window titled 'Publishing to Azure Function App...' is displayed, indicating the progress of the publish operation. The output window below shows the command line logs for the build and publish process, confirming success. To the right, the Solution Explorer shows the project structure, including files like 'ProductsController.cs', 'appsettings.json', and various .cshtml files for 'Orders' and 'Products'. Below the IDE, a Microsoft Edge browser window is open to the Azure portal, specifically the 'Functions' blade for the 'st10447759-func' app. This blade lists seven functions: 'ContractUpload', 'CustomerDelete', 'CustomerUpser', 'OrdersEnqueue', 'OrdersQueueProcessor', 'ProductImageUpload', and 'ProductUpser', all of which are enabled and show 'Invocations and more' under the 'Monitor' column.

Shows all added functions

Name	Value	Deployment slot setting	Source	Delete
AzureWebJobsStorage	DefaultEndpointsProtocol=https;AccountName=azureretail		App Service	
FUNCTIONS_EXTENSION_VERSION	Show value		App Service	
FUNCTIONS_WORKER_RUNTIME	Show value		App Service	
StorageOptions:BlobContainer	Show value		App Service	
StorageOptions:ConnectionString	Show value		App Service	
StorageOptions:CustomersTable	Show value		App Service	
StorageOptions:fileShareName	Show value		App Service	
StorageOptions:OrdersTable	Show value		App Service	
StorageOptions:ProductsTable	Show value		App Service	

Storage Accounts

Price
R 700.00
Price in South African rand.

Image
Choose File scoter.png
PNG, JPG or JPEG. Max a few MB.



Create Product Back to list

Tip: Choose the image first to confirm it looks right before submitting.

Creating a product to show functioning

The screenshot shows the Microsoft Azure Storage Container browser interface. The left sidebar shows the navigation path: Home > azureretailhubstorage | Containers > productimages. The main area displays a list of blobs in the 'productimages' container. The table includes columns for Name, Last modified, Access tier, Blob type, Size, and Lease state. The blobs listed are:

Name	Last modified	Access tier	Blob type	Size	Lease state
03412a95-796a-4cd1-a614-2de9e6af937_Horse.jpg	10/6/2025, 6:09:34 PM	Hot (Inferred)	Block blob	40.02 KB	Available
7f93428d-b58c-4d5a-a855-3cb8b224adc1.jpg	10/6/2025, 3:23:55 PM	Hot (Inferred)	Block blob	40.02 KB	Available
d5301875-ae29-41ea-8c56-037a464cb01a_Mansion.jpg	10/6/2025, 5:46:21 PM	Hot (Inferred)	Block blob	13.35 KB	Available
dfa38d85-8798-4819-be5d-b68f94cab31e_scotter.png	10/6/2025, 7:17:46 PM	Hot (Inferred)	Block blob	24.16 KB	Available
seed-0-9b545617-9656-4fd5-bc7e-26c2241d339e.jpg	10/6/2025, 3:17:00 PM	Hot (Inferred)	Block blob	93.23 KB	Available
seed-2-dafeb457-e218-4e8c-b964-6f2ca6a52821.jpg	10/6/2025, 3:17:03 PM	Hot (Inferred)	Block blob	46.48 KB	Available
seed-3-4af2415e-6e0a-468f-be36-b485905c40a9.jpg	10/6/2025, 3:17:05 PM	Hot (Inferred)	Block blob	89.87 KB	Available
seed-4-8e320247-8979-4f52-8594-ad7cabf531c8.jpg	10/6/2025, 3:17:06 PM	Hot (Inferred)	Block blob	27.48 KB	Available

The taskbar at the bottom shows various pinned applications like Microsoft Edge, File Explorer, and Visual Studio Code.

Shows added product image to blobcontainer

The screenshot shows the Microsoft Azure Storage browser interface for the 'azureretailhubstorage' storage account. The left sidebar shows the navigation path: Home > azureretailhubstorage > Storage browser. The main area displays a list of tables in the account. The table includes columns for PartitionKey, RowKey, Timestamp, Name, Description, and Price. The tables listed are:

PartitionKey	RowKey	Timestamp	Name	Description	Price
PRODUCT	133ae95e-2d0c-4687-835...	2025-10-06T13:17:05.520Z	Cashmere Scarf	Luxurious scarf	49.99
PRODUCT	1a3aea25-12be-4f87-94c5...	2025-10-06T13:17:04.078Z	Classic Trench Coat	Timeless outerwear	149.9
PRODUCT	a82c879a-3441-4672-92fa...	2025-10-06T11:17:47.555Z	scotter	cool two wheel scotter	700.0
PRODUCT	c1ad256e-00e-4114-b19b...	2025-10-06T13:17:01.098Z	Cozy Knit Sweater	Soft warm sweater	79.99
PRODUCT	de456d16-d098-430f-be3...	2025-10-06T15:46:22.437Z	Mansion	A massive house	1000!
PRODUCT	f290fb33-4d91-43d9-94f7...	2025-10-06T16:09:35.435Z	Horse	A mustang	1000!

The taskbar at the bottom shows various pinned applications like Microsoft Edge, File Explorer, and Visual Studio Code.

Shows added product to product table

Create Customer

Add a new customer to Azure Retail Hub.

FullName
John Dow

Email
John

Phone
+27789538132

Create **Back to list**

Tip: Ensure the email and phone are valid — client-side validation will highlight any issues.

Creating a testing customer

azureretailhubstorage | Storage browser

Storage account

Overview Activity log Tags Diagnose and solve problems Access Control (IAM) Data migration Events Storage browser Storage Mover Partner solutions Resource visualizer Data storage Containers File shares Queues Tables AzureFunctionsDiagno... Products customers orders

Tables > customers

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

Add filter Advanced filters

PartitionKey	RowKey	Timestamp	Email	FullName	Phone
CUSTOMER	628281d5-7302-48fe-a6b...	2025-10-06T17:23:14.2520...	John	John Dow	+277
CUSTOMER	6b8c1078-5abf-4eb1-8a21...	2025-10-06T16:10:12.7018...	okkersjeron@gmail.com	Jeron Okkers	0789!
CUSTOMER	84ec5204-d84d-4395-bc0...	2025-10-06T15:46:45.2823...	okkersjw@gmail.com	Joseph Okkers	0744!
CUSTOMER	cbd4c419-eb7a-4c64-96df...	2025-10-06T15:40:16.3170...	Chardene@gmail.com	Chardene	0789!

Shows created functions customer in table

Create New Order

Customer Information

Customer Name
John Dow

Product Selection

Product	Quantity	Price	Total
scoter	12	R 700.00	R 8400.00

Order Summary

Subtotal	R 8400.00
-----------------	-----------

Submit Order

New order placed

azureretailhubstorage | Storage browser

Queues > orderqueue-poison

Showing all 2 items

Message text	Id	Insertion time	Expiration time	Dequeue count
{"Action": "CreateOrUpdate", "OrderId": "5ef364a2..."}	ba121b71-5726-4bd6-965...	10/6/2025, 5:32:08 PM	10/13/2025, 5:32:08 PM	0
{"Action": "CreateOrUpdate", "OrderId": "a6d247f2..."}	49f02f05-e3bc-4696-a216...	10/6/2025, 5:32:58 PM	10/13/2025, 5:32:58 PM	0

Order queue

Order table updated

```

1  [
2   {
3     "name": "CustomerUpsert",
4     "scriptFile": "AzureRetailHub.Functions.dll",
5     "entryPoint": "Azure-RetailHub.Functions.CustomersFunctions.UpsertAsync",
6     "language": "dotnet-isolated",
7     "properties": {
8       "isCodeless": false
9     },
10    "bindings": [
11      {
12        "name": "req",
13        "direction": "In",
14        "type": "queue"
15      }
16    ]
17  }
18]

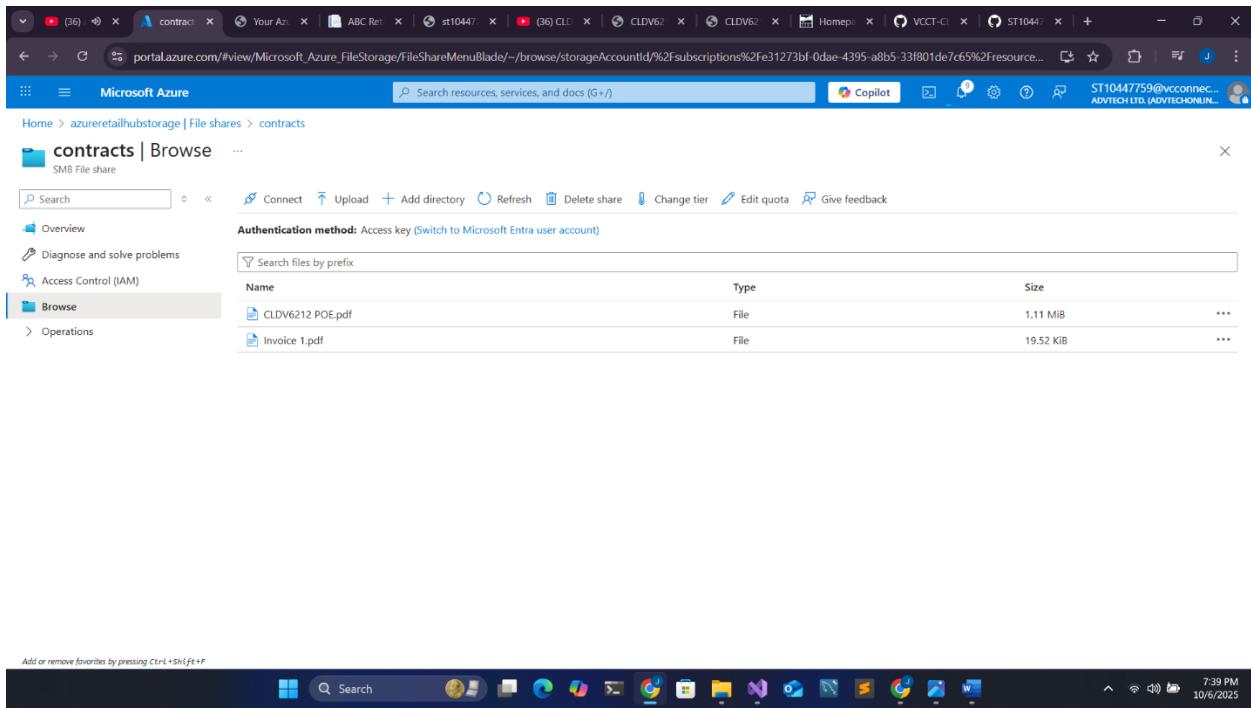
```

The 'Test/Run' tab shows the output of a test run:

- HTTP response code: 202 Accepted
- HTTP response content: (empty)

Shows 202 showing OrderQueueProcessor works

Contracts show in fileshare



The screenshot shows the Microsoft Azure File Share interface. The browser tab is titled "contracts | Browse". The left sidebar has options: Overview, Diagnose and solve problems, Access Control (IAM), **Browse** (which is selected), and Operations. The main area shows a table of files:

Name	Type	Size	...
CLDV6212 POE.pdf	File	1.11 MiB	...
Invoice 1.pdf	File	19.52 KIB	...

Below the table, there's a note: "Add or remove favorites by pressing Ctrl+Shift+F". The taskbar at the bottom shows various pinned icons.

Updated search functionality on products page

The screenshot displays two instances of the ABC Retail web application interface, illustrating the search functionality on the products page.

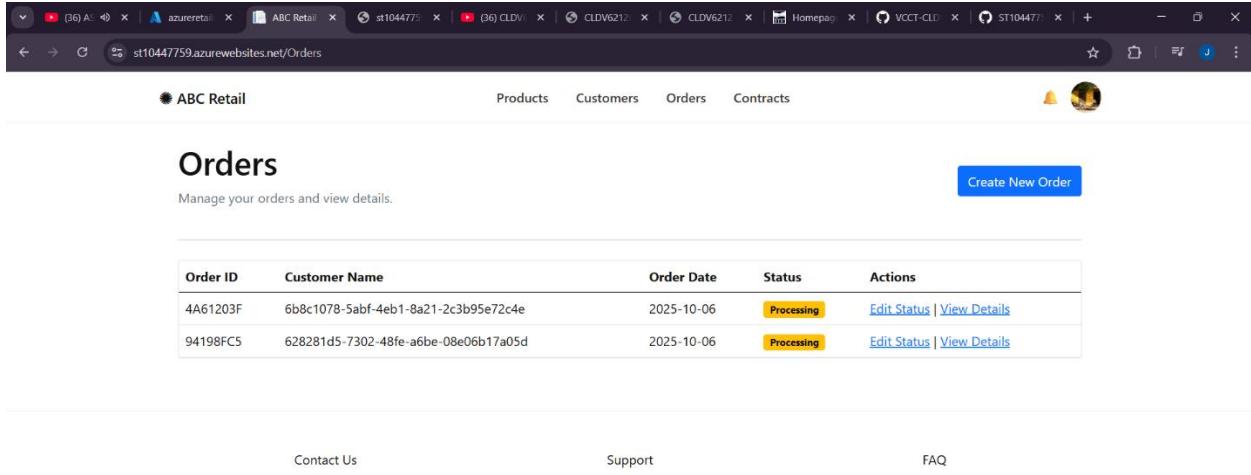
Top Screenshot (Search term: q=)

- Header:** ABC Retail, Products, Customers, Orders, Contracts, Create New.
- Search Bar:** Search products... (with placeholder "Search products...") and a blue Search button.
- Product Listings:** Three product items are shown in cards:
 - Cashmere Scarf:** R49,99. Luxurious scarf. Image shows two cars.
 - Classic Trench Coat:** R149,99. Timeless outerwear. Image shows a beach scene.
 - scotter:** R700,00. cool two wheel scotter. Image shows a kick scooter.
- Bottom:** A Windows taskbar with various pinned icons and the date/time: 9:07 PM 10/6/2025.

Bottom Screenshot (Search term: q=hors)

- Header:** ABC Retail, Products, Customers, Orders, Contracts, Create New.
- Search Bar:** Search (with placeholder "Search") and a blue Search button.
- Product Listing:** One product item is shown in a card:
 - Horse:** R10 000,00. A mustang. Image shows a black horse in a field.
- Bottom:** A Windows taskbar with various pinned icons and the date/time: 9:07 PM 10/6/2025.

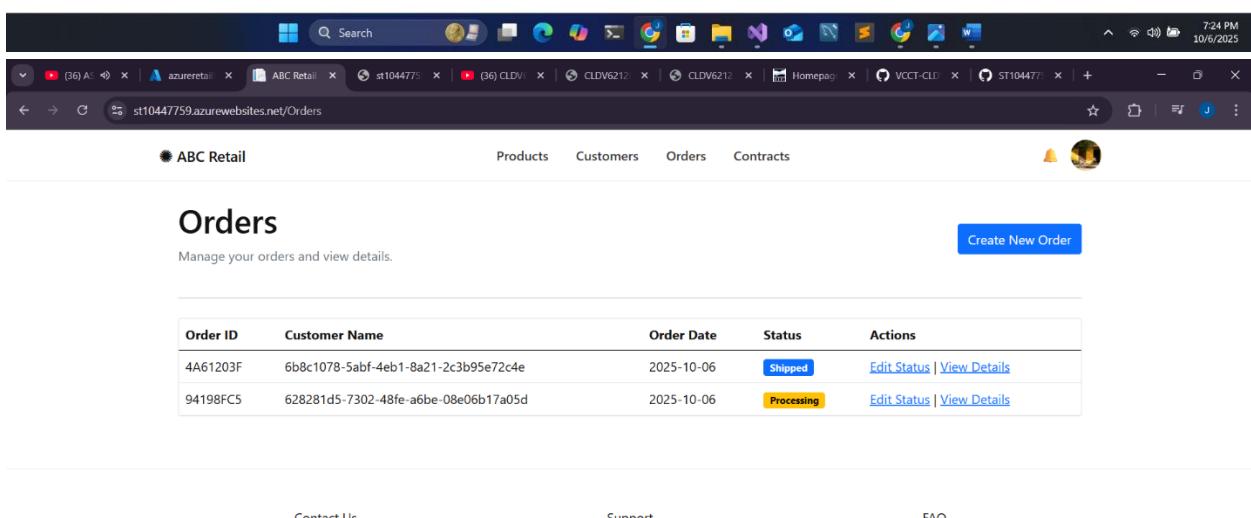
Order status updates



The screenshot shows the ABC Retail Orders page. At the top, there is a navigation bar with links for Products, Customers, Orders, and Contracts. A user profile icon is also present. Below the navigation bar, the page title is "Orders" and a sub-instruction "Manage your orders and view details." To the right of the title is a blue "Create New Order" button. The main content area displays a table of orders:

Order ID	Customer Name	Order Date	Status	Actions
4A61203F	6b8c1078-5abf-4eb1-8a21-2c3b95e72c4e	2025-10-06	Processing	Edit Status View Details
94198FC5	628281d5-7302-48fe-a6be-08e06b17a05d	2025-10-06	Processing	Edit Status View Details

At the bottom of the page, there are links for Contact Us, Support, and FAQ. A copyright notice "2025 © ABC Retail. All rights reserved." is also present.

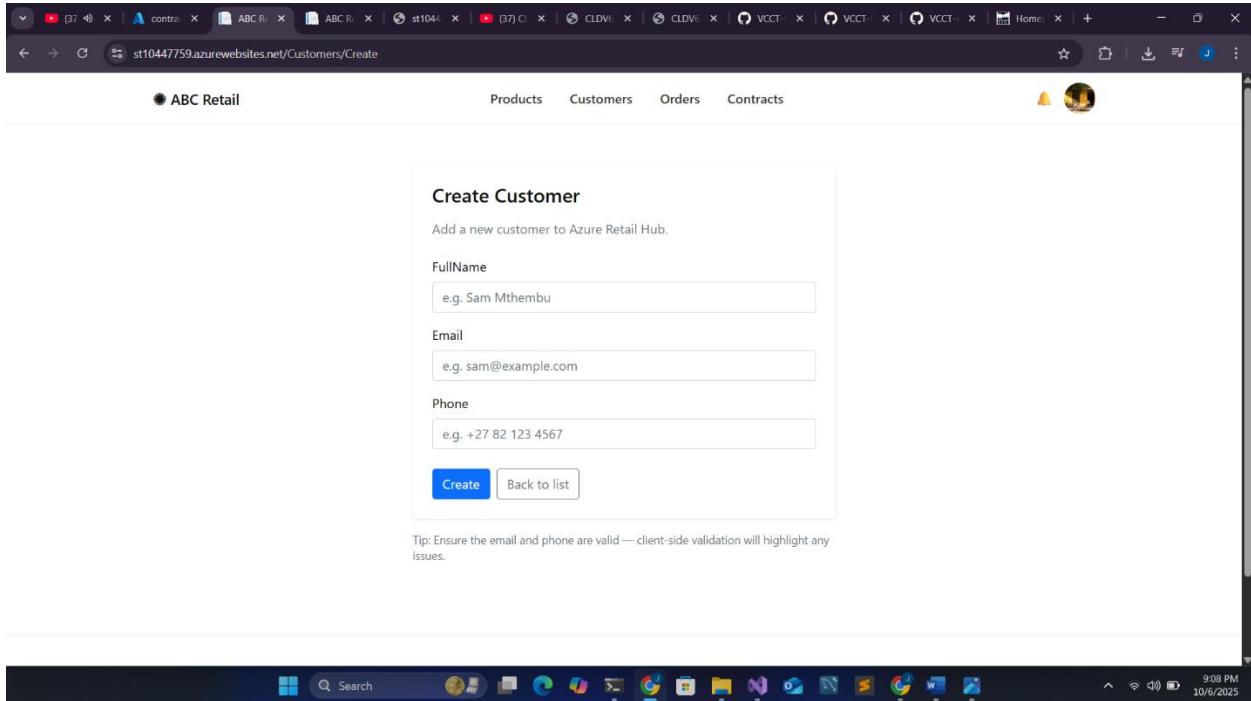


This screenshot shows the same ABC Retail Orders page as the previous one, but the status of the first order has been updated. The table now looks like this:

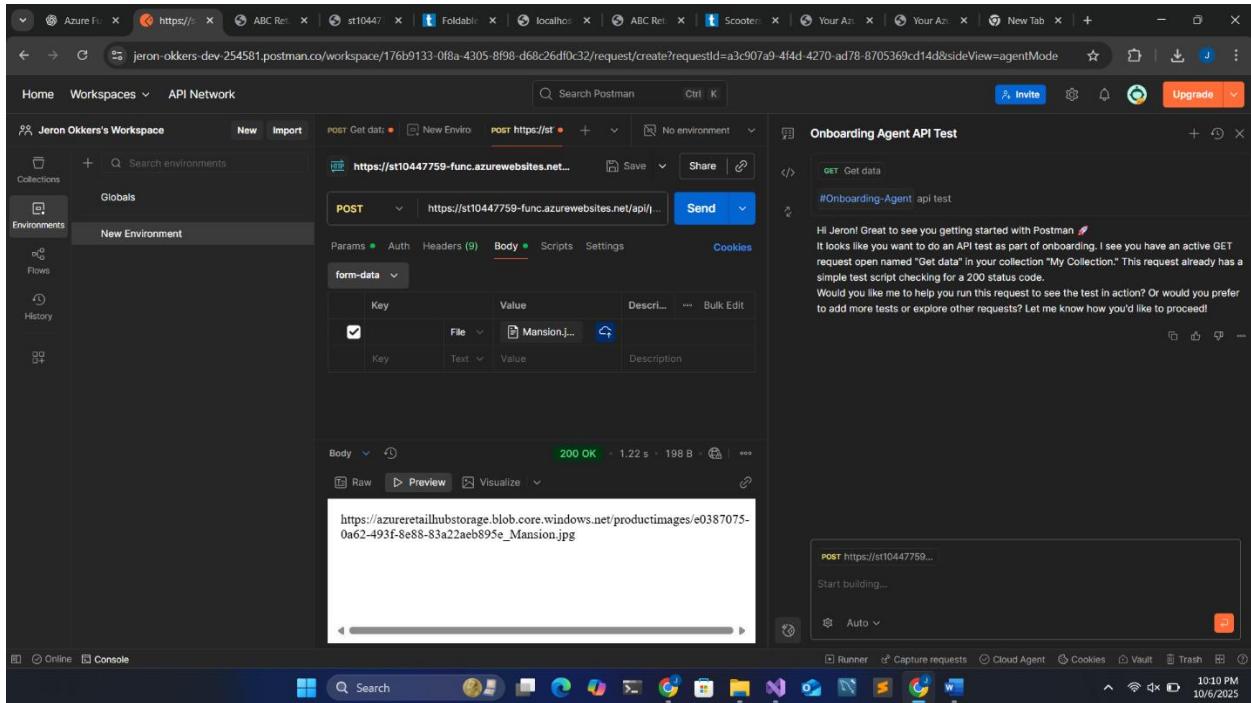
Order ID	Customer Name	Order Date	Status	Actions
4A61203F	6b8c1078-5abf-4eb1-8a21-2c3b95e72c4e	2025-10-06	Shipped	Edit Status View Details
94198FC5	628281d5-7302-48fe-a6be-08e06b17a05d	2025-10-06	Processing	Edit Status View Details



Updated styling on customer create and product create page



Postman checks for functioning



Product upsert (Table)

The screenshot shows the Postman application interface. On the left, the sidebar includes 'Home', 'Workspaces' (selected), 'API Network', 'Collections', 'Environments' (selected), 'Flows', and 'History'. The main workspace displays a POST request to 'https://st10447759-func.azurewebsites.net/api/products'. The 'Body' tab is selected, showing the following JSON payload:

```
1 {
2   "rowKey": "P-1001",
3   "name": "Surface Arc Mouse",
4   "description": "Ergonomic Bluetooth mouse",
5   "price": 899.99,
6   "imageUrl": "https://<your-storage>.blob.core.windows.net/productimages/sample.jpg"
7 }
8 }
```

The response status is '200 OK' with a duration of '673 ms' and a size of '101 B'. A note in the response body says 'Product upserted.' To the right, there is a test section titled '#Onboarding-Agent api test' with a message from 'Jeroni' welcoming the user to Postman.

Post url :https://st10447759-func.azurewebsites.net/api/products?code=d0XHqcNqGYwFU9EFuLGeoC9XLxW4vql_rNa6kR8lWWfFAzFufzCyhg== and raw json

```
{
  "rowKey": "P-1001",
  "name": "Surface Arc Mouse",
  "description": "Ergonomic Bluetooth mouse",
  "price": 899.99,
  "imageUrl": "https://<your-storage>.blob.core.windows.net/productimages/sample.jpg"
}
```

Customer upsert (Table)

The screenshot shows the Postman interface with a successful API call. The request URL is `https://st10447759-func.azurewebsites.net/api/...`. The response status is `200 OK` with a response time of `1.03 s` and a size of `102 B`. The response body contains the message `Customer upserted.`

Order enqueue (Queue)

The screenshot shows the Postman interface with a successful API call. The request URL is `https://st10447759-func.azurewebsites.net/api/...`. The response status is `202 Accepted` with a response time of `737 ms` and a size of `105 B`. The response body contains the message `Order enqueued.`

Contract upload (Azure Files)

The screenshot shows the Postman application interface. On the left, the sidebar displays 'Jeron Okkers's Workspace' with sections for Collections, Environments, Flows, and History. The main workspace shows a collection named 'My Collection' with a single request titled 'Get data'. The request method is 'POST' and the URL is 'https://st10447759-func.azurewebsites.net/api/...'. The 'Body' tab is selected, showing a 'form-data' section with a single entry: 'file' (File type) with the value 'Updated_Labour_Document.pdf'. Below the body, the response status is '200 OK' with a response time of '1.27 s' and a size of '253 B'. The response body is displayed as JSON:

```
1 {
2   "files": [
3     "7e896824-7836-4405-bdb4-b26edh48d565_Updated_Labour_Document.pdf"
4   ]
5 }
```

To the right of the main workspace, there is a sidebar titled 'Onboarding Agent API Test' containing a message from 'Jerome' and a 'GET Get data' request card.

B: Using services for improving customer experience

1) Azure Event Hubs

Description (what it is):

Azure Event Hubs is a big-throughput, real-time data ingestion service for collecting telemetry and event streams from web/apps, devices, and services. It's optimized for millions of events per second, partitioned for scale, and retains events for downstream consumers (analytics, processing) (azure.microsoft.com, 2025).

Mechanism (how it works):

- Your app sends events (e.g., "ProductViewed", "AddToCart", "CheckoutStarted") to an Event Hub (dev4side.com, 2024).
- Events are appended to partitions and retained for a configurable window (dev4side.com, 2024).
- Consumers (Stream Analytics, Functions, Kafka clients, Spark) read from the stream checkpointing their offsets (dev4side.com, 2024).
- This decouples producers (your web app) from consumers (analytics, personalization, fraud detection) (dev4side.com, 2024).

How it improves customer experience in ABC Retail:

- **Personalized recommendations in near-real-time:** As customers browse, view events flow into Event Hubs → a small streaming job updates a "trending/recommended" cache → the site shows fresher, tailored products (Popat, 2024).
- **Smoother peak traffic:** Spikes (Black Friday) don't bottleneck the app—events buffer in Event Hubs so front-end stays fast, while downstream processors scale out (Popat, 2024).
- **Live dashboards:** Ops can see "items in cart," "abandon rates," and "conversion by category" instantly; teams can react quickly (e.g., promote low-stock alternatives), which feels responsive to customers (Popat, 2024).

2) Event Bus (Azure Service Bus – Topics/Queues)

Description (what it is):

Azure Service Bus is a reliable enterprise message broker. The **Queue** pattern sends a

message to one consumer; the **Topic/Subscriptions** pattern (often called an “event bus”) fan-outs a message to many subscribers, each with its own filtered subscription (Ali Khan, 2023).

Mechanism (how it works):

- Your app (or an Order Function) publishes a message like OrderPlaced to a **Topic** (Das, 2024).
- Multiple subscribers receive their own copy (e.g., “SendEmail”, “AllocateStock”, “StartDelivery”, “CRM/Loyalty”) (Das, 2024).
- Dead-lettering, sessions, duplicate detection, and scheduled delivery provide robust, ordered workflows (Das, 2024).

How it improves customer experience in ABC Retail:

- **Faster confirmations & updates:** An OrderPlaced event immediately triggers confirmation emails/SMS and shows timely status updates in the customer portal.
- **Reliable fulfillment:** Inventory allocation and shipping labels run asynchronously but reliably—fewer failures/retries visible to the customer.
- **Targeted after-sales journeys:** A “loyalty/CRM” subscription can award points and send personalized thank-you coupons without slowing checkout.

Event Hubs vs Event Bus (when to use which):

- **Event Hubs** → massive, append-only telemetry/behavior streams for analytics and near-real-time personalization (Das, 2024).
- **Service Bus (Event Bus/Topics)** → business events/commands that must be delivered reliably to specific handlers with ordering, retries, and workflows (Das, 2024).

How they fit in AzureRetailHub:

- Keep your current **Queue-triggered Orders** flow for core order processing (it’s already aligned with Service Bus/Queue patterns).
- Add **Event Hubs** for high-volume clickstream/behavior → feed recommendations and live KPIs.
- If you later split functions/microservices, promote the single order queue into **Service Bus Topic** “orders” with independent subscribers (emails, stock, shipping, CRM), improving agility without coupling.

Bibliography

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- Popat, M., 2024. *Unlocking Real-Time Data Streaming with Azure Event Hubs: Your Guide to Seamless Data Ingestion* | by Mihir Popat | Medium. [online] Available at: <<https://mihirpopat.medium.com/unlocking-real-time-data-streaming-with-azure-event-hubs-your-guide-to-seamless-data-ingestion-e8c128bf4413>> [Accessed 6 October 2025].

AI Usage and Disclaimer

Section(s) of Assessment	AI Tool Used	Purpose / Intention	Date(s) of Use	Evidence (Link or Screenshot)
Part 2 – Orders queue bugfix	ChatGPT (OpenAI GPT-5 Thinking)	Diagnosed Base64 dequeue error; aligned OrdersEnqueue (raw JSON) with OrdersQueueProcessor (no extra Base64 decode).	2025-10-06	https://chatgpt.com/s/t_68e419b5b3c081918227377e1b2181c4
Part 2 – Product image upload	ChatGPT (OpenAI GPT-5 Thinking)	Fixed “Content would exceed Content-Length” by adding length-aware stream handling; added guardrails and clearer errors.	2025-10-06	
Part 2 – UI polish (Razor views)	ChatGPT (OpenAI GPT-5 Thinking)	Upgraded “Create Customer” and “Create Product” pages with Bootstrap cards,	2025-10-06	

		validation, and layout.		
Part 2 – README (submission)	ChatGPT (OpenAI GPT-5 Thinking)	Drafted and formatted Part 2 README (features, services used, deployment notes), then refined language.	2025-10-06	https://chatgpt.com/s/t_68e41a6e0d008191a650a829b662a3ec