



Varsity College - School of IT



Cloud Development 1B (CLDV6212) POE PART 3

Bachelor of Computer Science in Application Development

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AZURE WEB APP LINKS

Please see the following links for submission below:

- Azure Web App URL: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/>
- GitHub Link: <https://github.com/st10251759/cldv6212-poe-part-3>
- YouTube Link: <https://youtu.be/zYT3lK6roUM>

Please see Testing credentials for the different users:

Client User

Email: mick@client.com

Password: Password@123

Admin User

Email: mick@admin.com

Password: Password@123

Commit History

The screenshot shows the GitHub commit history for the master branch of the repository st10251759/cldv6212-poe-part-3. The commits are listed chronologically from November 15, 2024, at the top to November 1, 2024, at the bottom. Each commit includes the author, date, message, and a link to the commit details.

- Nov 15, 2024: Fixed Currency Issue in OrderRequest View (mick123 committed 1 day ago)
- Nov 15, 2024: Deployed Web App, Changed Connection String to Live Azure SQL Database (mick123 committed 1 day ago)
- Nov 14, 2024: Fixed OrderHistory View Logic to Work while users have items in cart (mick123 committed 1 day ago)
- Nov 14, 2024: Fixed an error in Admin Orders Page to allow Admin to process orders while customers still are shopping. (mick123 committed 1 day ago)
- Nov 13, 2024: Uploaded Image Attributes (mick123 committed 1 day ago)
- Nov 13, 2024: Added motion background in banner control of Homepage making it look more professional (mick123 committed 1 day ago)
- Nov 13, 2024: Linked Azure Queue Service to Mvc. Messages will be sent to queues in Storage Account When Orders are Placed, Orders are Processed and Images are uploaded. Styled Application Pages and Authorized Admin. (mick123 committed 1 day ago)
- Nov 13, 2024: Fixed an error in Home Controller (mick123 committed 1 day ago)
- Nov 12, 2024: Verbosely Commented on the functionality of my code providing better documentation, Added Code Attribution and Improved quality (mick123 committed 1 day ago)
- Nov 12, 2024: Fixed Copy Error in Login Form (mick123 committed 1 day ago)
- Nov 11, 2024: Added icons to make pages more user friendly, uploaded more contacts and improve mywork page styling (mick123 committed 1 day ago)
- Nov 11, 2024: Improved Shopping Cart Functionality by adding the option to remove items from the cart (mick123 committed 1 day ago)
- Nov 11, 2024: Created Pages for Admin to upload Documents and Delete Documents and allow users to view Documents and Download Documents. (mick123 committed 1 day ago)
- Nov 11, 2024: Authorized Admin Users to only Register new users, Styled Register and Login Pages to match Consistent Theme (mick123 committed 1 day ago)
- Nov 11, 2024: Added OrderRequest View to Admin Panel (mick123 committed 1 day ago)
- Nov 11, 2024: Improved Styling of Cart and added Customized Nav Bar for Users based on their role, either client or Admin (mick123 committed 1 day ago)
- Nov 11, 2024: Added OrderHistory Page for Customers to view and track Orders Placed, Added an Admin Page for Admin to Process Orders (mick123 committed 1 day ago)
- Nov 11, 2024: Added a Shopping Cart and MyWork Page to allow customers to buy products (mick123 committed 1 day ago)
- Nov 1, 2024: Comments on Nov 15, 2024 (mick123 commented 1 day ago)

THEORY

A. MOTIVATION FOR CREATING A REPLICA OF DATABASE

For ABC Retail's F1 clothing e-commerce platform, creating a replica of the database in a different Azure region is a crucial step toward ensuring high availability and minimizing downtime, particularly during peak sales events. In a distributed e-commerce environment, where customers may be spread across different geographical locations, ensuring that the application remains accessible and responsive is vital. By replicating the Azure SQL database across regions, ABC Retail can provide a resilient infrastructure that automatically fails over to a secondary region in the event of a regional outage or network disruption. This replication process helps maintain business continuity by ensuring that even if one data centre becomes unavailable, the database replica in the other region can seamlessly take over, minimizing service disruption and downtime for customers. This approach not only ensures a better customer experience but also enhances the company's overall disaster recovery preparedness (Airbyte, 2024).

Additionally, having a database replica in a different region can significantly improve the performance and responsiveness of ABC Retail's F1 MVC app. With customers accessing the platform from different parts of the world, using a geographically distributed database replica ensures that data can be served from a location closer to the end user. This minimizes latency and speeds up data retrieval for frequently accessed customer, product, and order information, resulting in faster load times and a better overall user experience. For example, if a customer in Europe places an order, the data can be retrieved from a replica in Europe rather than from a database hosted in North America, reducing latency and providing a quicker response. This localized access also reduces the burden on the primary database, improving its scalability and performance during high-traffic periods like Black Friday or the holiday season when demand spikes (Airbyte, 2024).

Finally, the replication of the database provides valuable support for analytical workloads and reporting. With a dedicated replica, ABC Retail can run heavy read-intensive operations such as generating sales reports, analyzing customer behavior, and forecasting inventory demands without affecting the performance of the production system. By using Azure SQL replication for offloading these tasks, ABC Retail ensures that the transactional database remains optimized for order processing and real-time transactions, while the replica handles the analytics workload. This division of responsibilities enhances scalability, as the reporting and data processing tasks are offloaded to the replica, preventing them from overloading the production database. In summary, creating a replica of the database in a different region enhances availability, reduces latency, and optimizes resource usage, making it a strategic choice for improving the reliability and performance of ABC Retail's F1 MVC app (Airbyte, 2024). Please see Page 33 for screenshots of implementation

B. TECHNOLOGY CHOICES FOR MY SOLUTION

This is a comprehensive report on the Azure technologies used in the ABC Retailers F1 e-commerce application. This table includes details on each component, the technology choice and its purpose, the hosting model, and an explanation of how each service supports the application.:

| Component | Technology Choice | Hosting Model | Services Explanation |
|---------------------|---|------------------------------|--|
| Azure Table Storage | Data storage for non-relational structured data, initially used to store customer profiles, product details, and orders. | Platform as a Service (PaaS) | Enabled quick access to non-relational, structured data, such as, customer, order and product information. Provided a schema-less database structure suitable for flexible storage requirements, facilitating efficient data retrieval and lightweight storage (Pedamkar, 2020). |
| Azure Blob Storage | Object storage for hosting product images and multimedia content | Platform as a Service (PaaS) | Hosts high-resolution images and videos of F1-themed products, ensuring scalability, durability, and quick retrieval times for media-heavy content, enhancing the visual aspect of the e-commerce experience (Pedamkar, 2020). |
| Azure Queue Storage | Messaging system for managing asynchronous order processing and inventory update messages. | Platform as a Service (PaaS) | Manages order messages to decouple order placement from processing, allowing tasks to be queued and handled asynchronously, improving app responsiveness and reliability in handling orders without delays or bottlenecks (Pedamkar, 2020). |
| Azure File Storage | File storage system for storing PDF contracts and log files in a shared file system. | Platform as a Service (PaaS) | Stores contracts and logs in a shared file system, accessible across different application instances, supporting secure and centralized storage for important documents that can be accessed as needed by various users or admins (Pedamkar, 2020). |
| Azure App Service | Web hosting platform to run the MVC e-commerce application with scaling capabilities | Platform as a Service (PaaS) | Hosts the ABC Retailers F1 web application, managing server resources, scaling, and load balancing automatically to provide a smooth, reliable user experience while minimizing server management overhead (Pedamkar, 2020). |
| Azure Functions | Compute for serverless, event-driven tasks such as order confirmations, inventory updates, and notifications | Function as a Service (FaaS) | Executes serverless tasks like writing data to storage, updating order status, or sending notifications, triggered by specific events to optimize performance and minimize costs by only using compute resources when needed (Pedamkar, 2020). |
| Azure Event Grid | Event routing service for event-driven communication between components | Platform as a Service (PaaS) | Enables real-time event communication between application services, supporting reactive features such as real-time notifications for order updates and alerts, |

| | | | |
|---------------------------|--|--|---|
| | | | ensuring responsive user interactions within the application (Pedamkar, 2020). |
| Azure SQL Database | Relational database for storing structured data, including customer, product, order and document information (added in Part 3) | Database as a Service (DBaaS) / Platform as a Service (PaaS) | Replaced Table Storage to manage relational data efficiently with SQL capabilities, supporting complex queries, data consistency, and relationships between entities, facilitating accurate data management and advanced reporting for orders and customers (Pedamkar, 2020). |
| Azure Event Hubs | Event streaming platform to process high volumes of customer interaction data | Platform as a Service (PaaS) | Ingests and processes large streams of real-time customer activity, providing data for analysis and enabling responsive actions based on customer behavior, helping to tailor user experiences and identify trends in real-time (Pedamkar, 2020). |

C. MOTIVATION FOR AZURE SERVICES

ABC Retail E-commerce Application: Motivation for Azure Services

Introduction

This document outlines the application requirements for ABC Retail's e-commerce platform and the Azure services selected to meet these needs. Each service has been chosen to support the growing demands of ABC Retail by providing functionality, scalability, and a reliable user experience essential for the online retail environment. The motivations for each Azure service are explained, highlighting how they meet the specific needs of ABC Retail's e-commerce operations.

Requirement 1: Efficient Storage of Customer Profiles and Product Information

Service Used: Azure Table Storage

In the context of ABC Retail's e-commerce platform, having a robust and scalable storage solution for customer profiles and product information is essential. **Azure Table Storage** was selected for this purpose, as it efficiently handles large volumes of non-relational data, making it ideal for storing structured information like customer details, product descriptions, and catalog information. For an online retail business like ABC Retail, the speed and reliability of Azure Table Storage directly impact customer experience by enabling quick access to user profiles and product listings. This service supports the application's need to display product catalogs instantly and retrieve customer preferences, browsing history, or saved items, which are vital for delivering a personalized shopping experience. As the user base and catalog grow, Azure Table Storage's scalability ensures it can accommodate increasing data volumes without affecting application performance, making it possible to serve customers smoothly, even during high-traffic events such as seasonal sales (Turbo360, n.d.).

The suitability of Azure Table Storage for ABC Retail's e-commerce application lies in its high availability and quick query capabilities, allowing the platform to handle multiple customer requests simultaneously. This helps maintain the seamless browsing experience that is crucial in a competitive online retail environment. Additionally, Azure Table Storage's low latency ensures rapid data retrieval, enabling features like "Recently Viewed" items and "Recommended for You" sections to load quickly. This not only enriches customer interactions but also enhances overall user satisfaction. Since Azure Table Storage is cost-effective, ABC Retail can leverage this service to manage extensive non-relational data affordably, balancing both performance and operational efficiency. Azure Table Storage's high availability and scalability make it well-suited to handle the storage and quick retrieval of these frequently accessed data points, providing customers with a seamless browsing and ordering experience (Turbo360, n.d.).

Requirement 2: Scalable Storage of Product Images and Media Content

Service Used: Azure Blob Storage

For ABC Retail, visually engaging product presentations are vital for driving sales, as high-quality images, videos, and other media content form a core part of the online shopping experience. **Azure Blob Storage** was chosen to host and serve this rich multimedia content, leveraging its ability to store and manage large amounts of unstructured data like images and videos. By storing media content in Blob Storage, ABC Retail ensures that its e-commerce platform can display high-resolution product images and video demonstrations that are crucial for building customer trust and enhancing engagement. Azure Blob Storage integrates seamlessly with Content Delivery Networks (CDNs), allowing for fast delivery of media content globally, which is particularly useful for an e-commerce platform with a widespread customer base. This CDN integration ensures that product images and videos load swiftly, providing a smooth and visually appealing experience for users regardless of their geographic location (Turbo360, n.d.).

Azure Blob Storage's scalability is an added advantage for ABC Retail, especially as the product catalog grows and new items are frequently added. With this service, ABC Retail can expand its media storage without impacting performance or loading times, making it easy to add images and promotional videos as the business grows. The service also provides secure access and version control, ensuring that outdated media can be quickly replaced with updated content. In an industry where visual representation significantly influences purchasing decisions, Azure Blob Storage's robust and flexible capabilities empower ABC Retail to deliver high-quality media consistently, enhancing the overall shopping experience (Turbo360, n.d.).

Requirement 3: Reliable Order Processing and Inventory Messaging System

Service Used: Azure Queue Storage

For an e-commerce platform like ABC Retail, handling high volumes of order requests while maintaining inventory accuracy is essential for meeting customer expectations and ensuring smooth business operations. **Azure Queue Storage** was implemented as a messaging backbone for managing the asynchronous order processing and inventory update tasks, which allows the application to handle spikes in order volume efficiently without overwhelming the backend system. By queuing each order request, Azure Queue Storage enables the platform to decouple the order intake from inventory processing, ensuring that even during peak times, orders are placed reliably in a first-in, first-out (FIFO) manner. For example, when a customer places an order, the request is queued up in Azure Queue Storage, which temporarily holds the message until the backend processing logic can confirm stock levels, update inventory, and send order confirmations to the user. This setup prevents bottlenecks, as the system can process orders at a steady pace while prioritizing customer service and ensuring that every order is accounted for. Moreover, as customers place orders, messages are sent to Queue Storage to initiate tasks such as inventory checks and order confirmations. This decouples the order processing logic, ensuring that even if one part of

the system is delayed, other processes continue without interruptions. In the case of ABC Retail, which experiences high-volume orders during new clothing launches. Azure Queue Storage ensures that every order is handled efficiently and accurately, preventing backlogs and enhancing order fulfilment reliability (Tutorials Point, 2024).

Azure Queue Storage is particularly well-suited for this scenario because of its high scalability, reliability, and capacity to handle massive amounts of messages, which are crucial in an environment where sudden demand surges are common. Its built-in retry and dead-letter functionality provides an extra layer of resilience by ensuring that failed messages (such as orders that could not be processed due to low stock) are retried or logged for further inspection, rather than being lost. This feature minimizes order failures, contributing to a more reliable customer experience. Additionally, Queue Storage's compatibility with other Azure services—like Azure Functions for background processing and Azure Event Grid for event-driven notifications—means that ABC Retail can build a complete, automated order processing pipeline that operates in real-time, providing instant feedback to customers about the status of their purchases (Tutorials Point, 2024).

Azure Queue Storage is a strategic choice for ABC Retail's application because it allows for efficient scaling as order volume grows, without sacrificing reliability or increasing operational complexity. Queue-based messaging systems like Azure Queue Storage also enhance performance by enabling distributed processing, where multiple backend workers can process queue messages in parallel, balancing the load and ensuring timely responses even during high-traffic periods. Furthermore, the cost-effective pricing model of Azure Queue Storage makes it feasible for ABC Retail to handle extensive messaging needs affordably, allowing the business to maintain robust order processing and inventory management capabilities within a reasonable budget. By using Queue Storage, ABC Retail achieves a resilient, scalable, and cost-efficient solution for handling order processing and inventory updates, delivering a seamless shopping experience that adapts well to fluctuating demand (Tutorials Point, 2024).

Requirement 4: Real-Time Notifications and System Updates

Service Used: Azure Event Grid (Event Bus)

For ABC Retail, providing real-time notifications and system updates is crucial to keeping customers informed about the status of their orders, inventory changes, and promotional events. **Azure Event Grid**, which functions as an event bus, was implemented to support the real-time delivery of events and system updates across various services in the application. Event Grid allows ABC Retail to easily send notifications about key events such as when an order is placed, processed, or shipped, as well as when items are restocked or when new promotional sales are live. For instance, when a customer places an order, an event is triggered to notify the inventory management system to reduce stock levels. Simultaneously, an event is pushed to the notification service to inform the customer that their order is confirmed. Event Grid allows for seamless communication between different services, ensuring that the system is always updated in real-time, without manual intervention. This

ensures that customers receive timely updates, which improves their overall shopping experience by providing transparency into their purchase journey (Microsoft, 2022).

Azure Event Grid is particularly well-suited for this use case because it is a fully managed, scalable event routing service that enables event-driven architectures to function effectively. With its ability to route events from multiple sources (like Azure Storage, Azure Functions, or custom applications) to various destinations (such as notification services, logging systems, or customer-facing services), it provides the necessary flexibility and scalability for ABC Retail to handle varying levels of traffic, especially during high-demand periods like product launches or flash sales. For example, during a major product drop, Event Grid can handle large volumes of events in real-time, ensuring that all customers who are subscribed to the event receive immediate notifications about availability and promotions. Furthermore, Event Grid offers low-latency event delivery and built-in retries, ensuring that no customer misses an important notification even during system outages or failures. The service's ease of integration with other Azure services (like Azure Functions or Azure Logic Apps) allows ABC Retail to automate complex workflows for order processing, stock updates, and customer notifications, streamlining operations and ensuring that all parts of the business remain synchronized in real-time (Microsoft, 2022).

Azure Event Grid is an ideal choice for ABC Retail's real-time notification system because it's specifically designed to handle event-based communication at scale. The service is optimized for system-to-system communication, meaning that it's well-suited to trigger background processes, such as updating inventory systems, sending confirmation emails, or updating dashboards in real-time. It offers a reliable and cost-effective solution for managing these critical events without introducing excessive complexity. Event Grid also supports a wide range of event types and integrates seamlessly with various Azure services, making it easy to extend or customize notifications as the business evolves. While **Azure Notification Hubs** would be an excellent alternative for pushing personalized notifications directly to user devices, **Event Grid** offers greater flexibility for system-wide notifications, especially when real-time event routing between different backend systems is required. Therefore, Event Grid was chosen for its ability to ensure efficient, event-driven communication within the application's backend, keeping both the system and customers up-to-date with minimal delays (Microsoft, 2022).

Requirement 5: Streamlined Order Fulfilment and Task Automation

Service Used: Azure Functions

In the ABC Retail platform, the need for streamlined order fulfilment and task automation is crucial to maintaining operational efficiency and providing a seamless customer experience. **Azure Functions** was implemented to automate various operational processes in response to specific events that occur throughout the order lifecycle. For example, once a customer places an order, Azure Functions is triggered to perform multiple tasks automatically. These include sending a confirmation email to the customer, updating inventory levels in real-time to reflect the new order, and initiating the payment processing procedure. This serverless compute service enables ABC Retail to handle tasks like order confirmation, inventory

management, and payment verification without requiring manual intervention, significantly reducing the time and effort involved in each transaction. Automation helps to accelerate the order fulfilment process, ensuring that customers receive their orders as quickly as possible while maintaining accurate stock levels (Microsoft, 2023).

Azure Functions is particularly well-suited for this use case because it provides a scalable, event-driven architecture that only consumes resources when triggered by specific events. For instance, when a customer places an order, the function is invoked to process the payment, update the inventory, and notify relevant systems. This on-demand resource allocation is highly cost-effective, as ABC Retail only pays for the time the function runs, rather than maintaining a constantly running server. Additionally, Azure Functions is easily integrated with other Azure services, such as Azure Event Grid or Azure Storage, which allows for a highly automated, flexible system. During peak demand periods, such as holiday sales or product launches, Azure Functions automatically scales to handle the increased volume of orders, ensuring that ABC Retail's systems remain responsive without requiring manual intervention. This dynamic scaling ensures that ABC Retail can handle fluctuating workloads efficiently, maintaining fast and reliable order processing even during high-demand periods (Microsoft, 2023).

The choice of **Azure Functions** for this requirement was driven by its ability to execute tasks in a highly efficient, event-driven manner, which is ideal for automating processes within an e-commerce platform. Unlike traditional server-based solutions that require constant resource allocation, Azure Functions only runs when needed, allowing ABC Retail to manage costs effectively. The service's serverless nature reduces infrastructure management overhead, enabling the development team to focus more on business logic and application development rather than worrying about scaling and server maintenance.

Additionally, Azure Functions' seamless integration with other Azure services, such as Azure Event Grid for event-driven architecture, and Azure Storage for data persistence, makes it an ideal fit for the ABC Retail platform, where various operational tasks need to be automated and scaled efficiently to support the growing customer base. This ensures smooth, cost-effective, and scalable order fulfilment, making Azure Functions the optimal solution for automating key tasks in the order processing pipeline.

Requirement 6: Centralized, Consistent Data Storage for Orders and Customer Information

Service Used: Azure SQL Database

For ABC Retail's e-commerce platform, maintaining centralized and consistent data storage for customer orders, payment details, and shopping cart information is critical for ensuring smooth operations and reliable order processing. **Azure SQL Database** was chosen as the primary storage solution for transactional data due to its capabilities in handling complex relationships and structured data in a relational database format. Orders, payment records, and customer profiles are interrelated, and SQL Database is ideal for managing these relationships with its robust support for SQL queries and data integrity. For example, when a customer places an order, Azure SQL Database stores details about the customer, their purchased products, payment status, and shipping information, all while ensuring that data is

consistent across different tables. Azure SQL Database's ACID (Atomicity, Consistency, Isolation, Durability) compliance guarantees reliable transaction processing, even under high-load conditions, ensuring that order data is accurately recorded, and transactions are completed without errors. This centralized database architecture allows for real-time querying, making it easy for the retail platform to access and update order and customer data promptly during checkout, inventory updates, and customer support interactions (Microsoft, 2022).

Azure SQL Database is highly suited to the requirements of ABC Retail due to its ability to scale based on demand while maintaining a high level of data integrity and availability. For example, during high-traffic events such as flash sales or product launches, the service can automatically scale to handle increased transactional load, ensuring that data remains consistent and accessible to the application without performance degradation. The platform's backup and replication feature further enhance reliability by offering automated backups and geographic data replication, ensuring that customer data remains secure and recoverable in case of unforeseen events, such as system failures or outages. This is particularly crucial for ABC Retail as it operates in a competitive retail environment where data availability is key to providing a seamless customer experience. Moreover, Azure SQL Database integrates well with other Azure services, such as Azure Functions and Azure Logic Apps, which can trigger workflows and processes based on changes to the database, enabling further automation and enhancing operational efficiency. In conclusion, Azure SQL Database provides the robust, scalable, and reliable data storage required to manage transactional information in a retail setting, making it the ideal choice for ABC Retail's centralized data storage needs (Microsoft, 2022).

Requirement 7: Scalable and responsive web-based order system

Service Used: Azure Web App Service

For ABC Retail's F1 clothing e-commerce application, a scalable and responsive web-based order system is essential to handle fluctuating customer demands, particularly during high-traffic events like holiday sales or promotional campaigns. Azure Web App is well-suited for this requirement, providing a fully managed platform that can dynamically scale to accommodate varying traffic loads. This automatic scaling feature is critical during peak shopping times, allowing ABC Retail to maintain high performance and avoid service interruptions without requiring manual intervention. The platform's built-in load balancing also helps distribute incoming requests across multiple instances, ensuring smooth user experiences and preventing slowdowns. This is particularly valuable for an order system where latency or downtime could lead to cart abandonment and lost sales. Azure Web App's seamless scaling capabilities allow ABC Retail to optimize operational efficiency and serve thousands of customers simultaneously, delivering a reliable and responsive service under all load conditions (Microsoft, 2022).

Azure Web App also offers integrated monitoring, patch management, and security updates, making it an excellent choice for maintaining a secure and stable order system. The platform automatically applies necessary updates, reducing security risks and downtime associated

with manual patching. Through Azure's Application Insights and diagnostics, ABC Retail can monitor real-time performance metrics and quickly identify and resolve any issues that could impact the customer experience. This proactive management enables the application to stay responsive and maintain high availability, even under unforeseen traffic spikes. By utilizing Azure Web App, ABC Retail benefits from a robust, scalable infrastructure that supports consistent, high-quality service, ensuring customers experience smooth order processing and checkout, regardless of traffic fluctuations. This choice directly supports the company's goal of providing an efficient, responsive, and scalable order management system, keeping pace with the growing demands of its online customers (Microsoft, 2022).

Conclusion

In conclusion, the Azure services integrated into ABC Retail's F1 e-commerce platform have been meticulously selected to meet the diverse operational needs of the business. From **Azure SQL Database** ensuring centralized and consistent data storage to **Azure Functions** automating key tasks, and Azure Event Grid enabling real-time messaging, each service plays a crucial role in delivering a seamless, high-performance experience. These services support the platform's scalability and resilience, which are vital during high-demand periods like product launches and sales events. By leveraging Azure's cloud infrastructure, ABC Retail can ensure fast, reliable, and efficient operations, which ultimately enhances both backend processes and customer-facing interactions, fostering improved satisfaction and engagement with every transaction.

D. ALTERNATIVE AZURE TECHNOLOGIES

Alternative Azure Technologies for ABC Retail E-commerce Application

Introduction

To drive the continued success and scalability of ABC Retail's F1 e-commerce platform, a thoughtful selection of Azure services was made to address key business needs, including efficient data storage, streamlined messaging, reliable notifications, and automated processes. These services were chosen based on their ability to support high availability, performance, and ease of integration. However, Azure's vast ecosystem offers a variety of alternative services that could potentially better suit the evolving demands of ABC Retail, depending on factors such as traffic volume, user engagement, and system complexity. Exploring these alternatives provides an opportunity to optimize the platform further by leveraging advanced features, improving operational efficiency, and ensuring greater flexibility in how business-critical data is handled. This report delves into four specific application requirements of the platform and evaluates viable alternative Azure services that could meet or exceed the needs of ABC Retail, while offering new capabilities to enhance the user experience and business operations.

Requirement 1: Efficient Storage of Customer Profiles and Product Information

Current Service: Azure Table Storage

Alternative Service: Azure Cosmos DB

For ABC Retail's F1 clothing e-commerce platform, efficiently storing customer profiles and product information is a key requirement, as this data forms the backbone of the retail experience. While Azure Table Storage offers a reliable NoSQL solution, it may not fully meet the dynamic and complex needs of a growing retail business. Azure Cosmos DB presents a compelling alternative by offering a highly scalable and flexible database solution that can handle the increasing data complexity associated with the expansion of ABC Retail's customer base and product catalog. Cosmos DB supports multiple data models, such as document, key-value, graph, and column-family, making it an ideal choice for handling diverse data types, including personalized customer profiles, purchase history, product reviews, and advanced inventory data. This versatility enables ABC Retail to customize the database schema to better align with evolving business needs, such as incorporating advanced features like personalized recommendations or targeted marketing efforts (Rolyon, 2024).

Furthermore, Azure Cosmos DB's globally distributed nature makes it particularly suited for high-demand scenarios, such as large seasonal sales or flash promotions, which are common in the retail industry. By replicating data across multiple regions, Cosmos DB ensures that customers from different parts of the world experience low-latency access, even during peak traffic periods. This ensures that users can browse product information, view inventory, and make purchases without delays, significantly improving the customer experience. In addition, Cosmos DB's ability to automatically scale resources based on usage patterns

ensures that ABC Retail can efficiently handle fluctuations in web traffic without experiencing performance degradation. This automatic scaling, coupled with the option to choose between multiple consistency levels, provides ABC Retail with both flexibility and performance optimization, which Azure Table Storage lacks. Overall, Azure Cosmos DB would provide ABC Retail with a more scalable, flexible, and resilient solution for storing and managing customer and product information, aligning with the platform's long-term growth and global reach (Rolyon, 2024).

Requirement 2: Scalable Storage of Product Images and Media Content

Current Service: Azure Blob Storage

Alternative Service: Azure Data Lake Storage

For ABC Retail's F1 clothing e-commerce platform, scalability and cost-effectiveness in storing product images and media content are crucial for both performance and analytics. Azure Blob Storage is commonly used for such tasks, offering a simple, highly available solution for storing large amounts of unstructured data, including images, videos, and documents. However, if ABC Retail seeks to expand their capabilities beyond basic storage, particularly to leverage customer interaction analytics, Azure Data Lake Storage Gen2 may present a better solution. Azure Data Lake Storage Gen2 is built on top of Blob Storage and adds advanced capabilities designed for big data analytics. The primary benefit of Data Lake Storage over Blob Storage is its ability to store and process large datasets in a more structured manner. Data Lake's hierarchical namespace allows ABC Retail to organize product images more efficiently, especially as the product catalog grows, by grouping media files based on categories or other attributes such as seasons or collections (Rolyon, 2024).

One of the key advantages of using Azure Data Lake Storage for ABC Retail is its seamless integration with big data analytics tools like Azure Synapse Analytics, Apache Hadoop, and Spark. These tools can help ABC Retail analyze customer interactions with product images, enabling personalized recommendations, targeted marketing, and a better understanding of customer behavior. For instance, ABC Retail can track which types of products (e.g., specific F1 clothing styles or sizes) generate the most interest by analyzing interactions with their images and media content. This data can then be used to improve the customer shopping experience by tailoring product displays, promotions, and stock recommendations based on customer preferences. Additionally, Data Lake's superior security features, such as access control lists and encryption, provide ABC Retail with greater control over their data, which is critical for protecting customer information and maintaining regulatory compliance (Rolyon, 2024).

In contrast, Azure Blob Storage, while effective for storing static content such as images, does not provide the same advanced capabilities for organizing and analyzing large-scale data. Blob Storage is a flat storage model that lacks the hierarchical file structure needed for efficient data processing and interaction with analytics platforms. It is optimized for simple storage use cases, such as serving images through content delivery networks (CDNs) to users, but it lacks built-in tools for organizing or analyzing that data. For ABC Retail, as their business grows and they seek deeper insights into customer behavior and interactions with

their media, Azure Data Lake Storage Gen2 becomes a more viable solution. It not only supports the storage of large volumes of unstructured data but also integrates with the advanced analytics and machine learning frameworks that can help ABC Retail drive more personalized customer experiences, enhance their marketing strategies, and ultimately improve sales and customer satisfaction (Rolyon, 2024).

Requirement 3: Reliable Order Processing and Inventory Messaging System

Current Service: Azure Queue Storage

Alternative Service: Azure Service Bus

For ABC Retail's F1 clothing e-commerce platform, reliable order processing and inventory messaging are essential components that ensure smooth operations and an excellent customer experience. While Azure Queue Storage currently serves as the messaging system, Azure Service Bus presents a more suitable alternative due to its advanced messaging features. Azure Queue Storage is effective for simple queuing scenarios, but for a complex e-commerce platform like ABC Retail, which involves multiple departments handling different aspects of order fulfilment, inventory management, and customer support, Azure Service Bus offers far more flexibility and reliability. The key advantage of Azure Service Bus is its support for topics and subscriptions, which allow multiple consumers to process messages based on specific categories. For example, the order fulfilment department can listen to a specific topic related to new orders, while the inventory management team can focus on messages related to stock levels, ensuring that each team only processes the most relevant information. This approach reduces the load on each department, streamlines workflows, and enhances system efficiency (Spelluru, 2023).

Another critical advantage of Azure Service Bus is its support for FIFO (First-In, First-Out) message delivery, which ensures that messages are processed in the exact order they are received. This feature is crucial for order processing, where the sequence of operations—such as payment verification, inventory update, and shipping—must occur in a precise order to avoid errors and maintain accuracy. During high-traffic periods, such as seasonal sales or limited-edition clothing releases, ensuring that order-related messages are processed in the correct sequence helps prevent issues like double-charging customers or overselling products. Furthermore, Azure Service Bus supports transactional messaging, which guarantees that multiple related messages are handled atomically, meaning either all operations are completed successfully, or none are. This capability significantly improves the reliability of the order processing and inventory management system, ensuring that data consistency is maintained across all involved systems, and preventing partial or inconsistent updates to the database (Spelluru, 2023).

Lastly, Azure Service Bus provides greater scalability and fault tolerance, making it a perfect fit for the unpredictable demand and traffic spikes that ABC Retail may experience, especially during new product launches or flash sales. With automatic message retries and dead-letter queues, Azure Service Bus ensures that messages that fail to be processed can be properly handled without disrupting the flow of the overall system. These advanced features provide a more robust solution for ABC Retail's messaging needs, making it an ideal

alternative to Azure Queue Storage for handling complex, high-volume messaging scenarios. The ability to integrate with other Azure services like Logic Apps and Azure Functions further extends the capabilities of Azure Service Bus, allowing for sophisticated workflows that automatically trigger actions based on message content. This advanced messaging infrastructure can significantly enhance the reliability, scalability, and performance of ABC Retail's order processing and inventory management system (Spelluru, 2023).

Requirement 4: Real-Time Notifications and System Updates

Current Service: Azure Event Bus (Event Grid)

Alternative Service: Azure Notification Hubs

For ABC Retail's F1 clothing e-commerce platform, real-time notifications and system updates are crucial to keeping customers informed and engaged. While Azure Event Grid is a powerful tool for event-driven architectures and system-to-system communication, it is not optimized for user-specific notifications. Azure Event Grid is designed for routing events across different parts of an application, such as triggering workflows when a new product is added, or an order is placed. However, when the primary goal is to deliver real-time notifications directly to users' devices, especially across a variety of platforms, Azure Notification Hubs is the more appropriate alternative. Azure Notification Hubs specializes in sending push notifications to mobile devices and web applications, which allows for more personalized and immediate user engagement. Whether it's sending alerts for order updates, new product launches, or promotional events, Notification Hubs is built specifically to handle high volumes of notifications and scale to millions of users, ensuring that every customer is instantly updated with relevant information (Rolyon, 2024).

Azure Notification Hubs provides a high level of customization, enabling ABC Retail to send tailored messages to specific user groups. For example, customers who have shown interest in a particular category, such as new releases in F1-themed apparel, could receive targeted notifications when new merchandise is available. Additionally, the platform can be used to send alerts for restocked items or special promotions, increasing customer engagement and driving sales. Notification Hubs supports multiple platforms, including iOS, Android, and Windows, making it versatile for reaching a broad range of users regardless of their device preferences. By using Notification Hubs, ABC Retail can significantly enhance customer interaction, ensuring that updates such as flash sales or limited-time offers are communicated in real-time. This capability is particularly valuable during high-demand events, such as exclusive merchandise drops, where speed and accuracy in delivering notifications are key to driving customer action (Rolyon, 2024).

Moreover, Azure Notification Hubs integrates seamlessly with other Azure services, such as Azure Functions and Azure Logic Apps, to automate notification workflows based on certain triggers. For instance, when an order is confirmed, a push notification can automatically be sent to the customer's mobile device. This ensures that ABC Retail's communication remains timely and efficient without manual intervention. Additionally, Notification Hubs provides detailed analytics, allowing ABC Retail to monitor the success of their notification campaigns, track delivery rates, and optimize message content based on customer behavior.

The service's scalability is another major advantage, allowing ABC Retail to grow its user base while continuing to deliver notifications to millions of devices with minimal impact on performance. By leveraging Notification Hubs, ABC Retail can improve user satisfaction and retention through timely, relevant, and personalized updates, which are essential for building long-term customer loyalty and engagement in a competitive retail environment (Rolyon, 2024).

Requirement 5: Scalable and responsive web-based order system

Current Service: Azure Web App

Alternative Service: Azure Kubernetes Service (AKS)

A scalable and responsive web-based order system is essential for ABC Retail's F1 clothing e-commerce platform, particularly during high-demand periods like holiday shopping or product launches. Azure Kubernetes Service (AKS) provides a highly viable alternative to Azure Web App for this requirement, especially if ABC Retail decides to adopt a microservices architecture. By using AKS, ABC Retail can deploy its order system components — such as user accounts, product catalog, inventory, and order management — as separate, containerized services, each capable of scaling independently. This structure ensures that during peak times, specific services like checkout or catalog browsing can scale autonomously to meet demand without affecting other parts of the application. Additionally, AKS offers load balancing across these services and supports dynamic resource allocation, ensuring optimal application performance even when traffic spikes unpredictably (Rolyon, 2024).

Using AKS also gives ABC Retail more control over resources and deployment than Azure Web App, which is ideal for a company aiming to create a fine-tuned, customizable infrastructure. Azure Web App is excellent for monolithic applications but can encounter constraints in scaling complex, microservices-based systems. AKS, on the other hand, enables container orchestration through Kubernetes, allowing ABC Retail to define resource limits, perform rolling updates, and minimize downtime with zero-downtime deployments. This approach is particularly beneficial for applications where availability and response times directly impact customer satisfaction. Furthermore, AKS can distribute workloads across multiple regions, reducing latency for users in different geographic areas, thus enhancing user experience globally and ensuring high availability for ABC's F1 clothing line (Rolyon, 2024).

Another key benefit of AKS is its seamless integration with Continuous Integration and Continuous Deployment (CI/CD) pipelines. This integration simplifies the testing and deployment processes, enabling ABC Retail to automate updates and roll out new features with minimal disruption. AKS also supports robust monitoring and diagnostic tools, allowing ABC Retail to track application performance in real-time, making it easier to proactively address issues before they impact users. By adopting AKS, ABC Retail can create a highly adaptable and responsive order system, well-suited for handling dynamic traffic patterns, maintaining service reliability, and supporting rapid development cycles — all essential for a competitive online retail environment (Rolyon, 2024).

Requirement 6: Streamlined Order Fulfilment and Task Automation

Current Service: Azure Functions

Alternative Service: Azure API Management (APIM)

For ABC Retail's F1 clothing e-commerce platform, ensuring efficient and reliable order fulfilment is a critical requirement. The original service, Azure Functions, is designed for serverless computing, allowing ABC Retail to run backend operations without needing to manage infrastructure. However, Azure Functions may experience performance issues due to "cold starts," where the system takes time to initialize after being idle, causing delays in order processing. Additionally, serverless architectures can complicate state management, leading to difficulties in tracking the status of tasks, especially for complex order fulfilment workflows that involve multiple services like inventory checks, payment processing, and shipment coordination. These limitations make it difficult for ABC Retail to scale efficiently during peak traffic periods such as Black Friday sales or seasonal promotions, where quick and accurate task automation is essential for meeting customer expectations (Rolyon, 2024).

An effective alternative for ABC Retail is Azure API Management (APIM), which provides a centralized platform to manage, monitor, and scale APIs. This service acts as a gateway between internal systems and third-party services, such as payment gateways, inventory systems, and external shipping providers. Azure API Management simplifies order fulfilment by streamlining communication between these various systems, ensuring smooth order processing. APIM offers robust features like rate limiting, caching, and throttling, which are essential for managing high traffic volumes during peak sales events. By reducing the number of redundant API calls and controlling traffic flow, APIM ensures that ABC Retail's systems remain responsive and perform optimally under heavy loads. This is particularly valuable when processing orders, as the platform can efficiently handle thousands of API requests simultaneously, ensuring customers receive timely responses and updates on their orders (Rolyon, 2024).

Moreover, Azure API Management provides built-in security features like authentication, authorization, and encryption, which protect sensitive customer data and ensure compliance with industry standards. It also offers analytics to track API performance and user behavior, allowing ABC Retail to make data-driven decisions to optimize processes. By using APIM, ABC Retail can manage complex workflows and external integrations with ease, ensuring order fulfillment is streamlined and automated. With the ability to monitor API usage, detect anomalies, and troubleshoot issues more effectively, APIM enables smoother and more reliable service delivery for customers. This solution, with its scalability and ability to manage API calls efficiently, is a much better fit for the needs of ABC Retail compared to Azure Functions, particularly in terms of handling large volumes of traffic and providing consistent, high-performance interactions during peak demand periods (Rolyon, 2024).

Conclusion

Exploring alternative Azure technologies provides ABC Retail's F1 clothing e-commerce application with powerful options to enhance scalability, reliability, and user engagement across key components. By considering Azure Cosmos DB for flexible, scalable product data storage, Azure Data Lake Storage for dynamic multimedia management, Azure Service Bus for reliable and complex order processing, and Azure Notification Hubs for user-centric real-time notifications, ABC Retail can better address its unique requirements. Each alternative service offers distinct advantages that support high availability, enriched user experiences, and efficient operations, aligning well with ABC Retail's growth goals and commitment to delivering exceptional service to its customers. This approach not only enhances the application's functionality but also strengthens its ability to handle high traffic, facilitate smooth user interactions, and maintain responsiveness during peak demand periods, positioning ABC Retail as a leader in the competitive e-commerce space.

E. DATABASE SCHEMA, STYLE & STRUCTURE

Database Schema

This is a screenshot of my Database Schema in SSMS SQL SERVER:

```
SQLQuery1.sql - (localdb)\camDB1 (SQL Server 15.0.4153) - Microsoft SQL Server Management Studio
File Edit View Query Project Tools Window Help
master | Execute | Quick Launch (Ctrl+Q)
Object Explorer
SQLQuery1.sql - (localdb)\chett (52)* - Microsoft SQL Server Management Studio
CREATE DATABASE ABCRetailers_DB;
USE ABCRetailers_DB;

-- Create the Product table
CREATE TABLE [Product] (
    ProductId INT PRIMARY KEY IDENTITY, -- Automatically generates unique IDs
    Name NVARCHAR(255) NOT NULL, -- Product name, cannot be NULL
    ProductDescription NVARCHAR(MAX), -- Product description (optional)
    Price DECIMAL(18, 2) NOT NULL, -- Price of the product
    Category NVARCHAR(100), -- Product category (optional)
    Availability BIT NOT NULL, -- Availability status, 0 or 1
    ImageUrlPath NVARCHAR(500) -- Image URL path for the product (optional)
);

-- Create the Order table
CREATE TABLE [Order] (
    OrderId INT PRIMARY KEY IDENTITY, -- Automatically generates unique Order IDs
    UserId NVARCHAR(450) NOT NULL, -- User ID, assuming it's from Identity ( ApplicationUser's ID )
    OrderDate DATETIME NOT NULL, -- Date and time of the order
    Status NVARCHAR(50), -- Status of the order (optional)
    TotalPrice DECIMAL(18, 2) NOT NULL, -- Total price of the order
    CONSTRAINT FK_Order_User FOREIGN KEY (UserId) REFERENCES AspNetUsers(Id) -- Foreign key referencing AspNetUsers table
);

-- Create the OrderRequest table
CREATE TABLE [OrderRequest] (
    OrderRequestId INT PRIMARY KEY IDENTITY, -- Automatically generates unique OrderRequest IDs
    OrderId INT NOT NULL, -- References the Order table
    ProductId INT NOT NULL, -- References the Product table
    OrderStatus NVARCHAR(50), -- Status of the order request (optional)
    CONSTRAINT FK_OrderRequest_Order FOREIGN KEY (OrderId) REFERENCES [Order](OrderId), -- Foreign key referencing Order table
    CONSTRAINT FK_OrderRequest_Product FOREIGN KEY (ProductId) REFERENCES Product(ProductId) -- Foreign key referencing Product table
);
```

Style

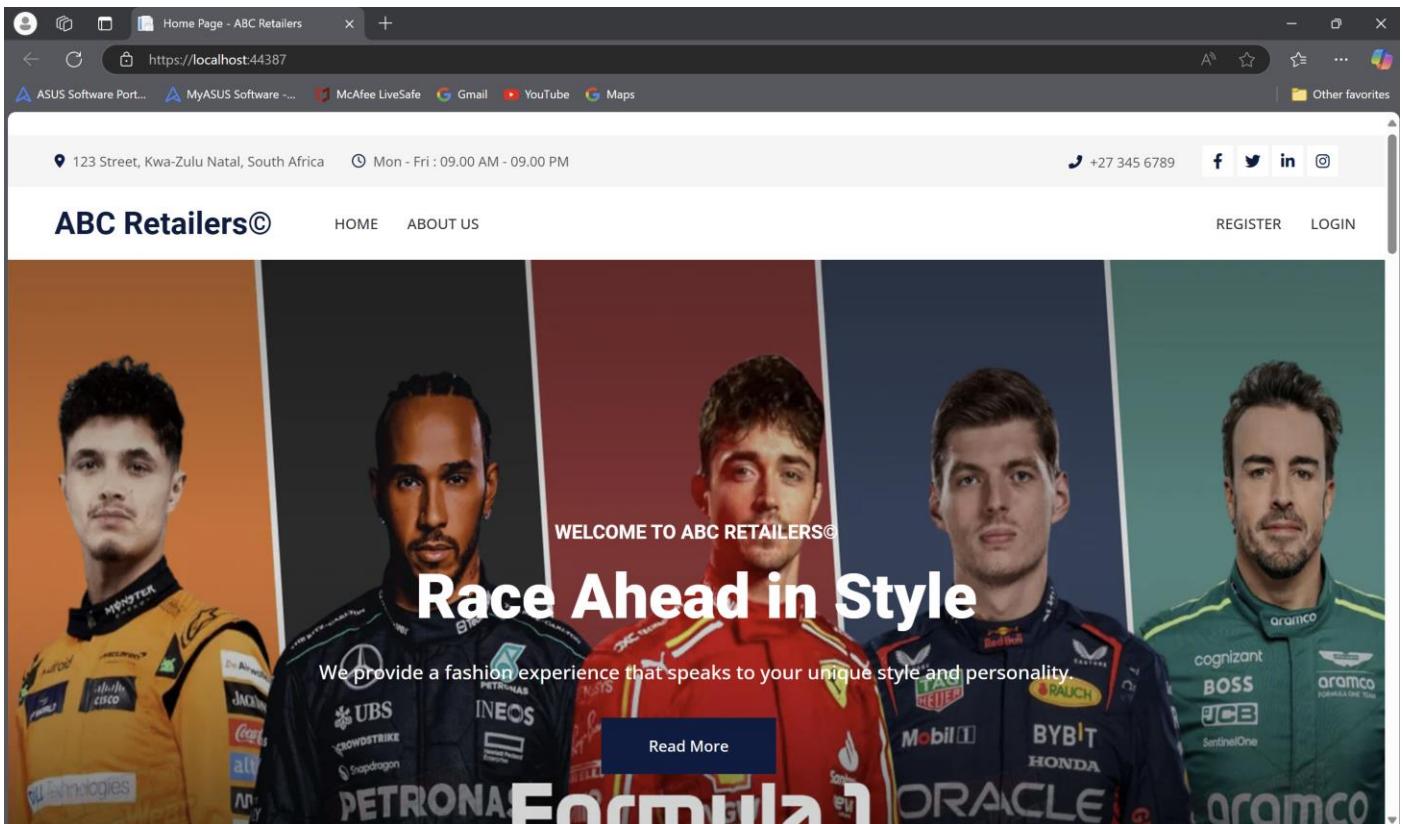
The style of ABC Retail's F1 MVC app is modern, clean, and user-centric, focusing on delivering an intuitive and visually appealing shopping experience. The design incorporates a minimalist aesthetic with easy navigation, using a consistent color palette that aligns with the brand's identity. Interactive elements like hover effects, smooth transitions, and responsive design ensure the app looks and functions seamlessly across various devices, including desktop, tablet, and mobile. The layout is visually structured to guide users effortlessly through product browsing, order placement, and checkout processes, with attention to detail on the product images and descriptions, making the shopping experience engaging and straightforward.

Structure

The structure of the app follows the Model-View-Controller (MVC) architecture, which clearly separates the application into three main components: the Model, which represents the data (customer, product, and order information stored in the database); the View, which manages the user interface and display logic, ensuring that the data is presented in a clear and attractive manner; and the Controller, which handles user input, processes it, and updates the View accordingly. This separation allows for better maintainability and scalability of the app, as each component can be developed and tested independently. The app's structure also ensures that business logic, such as order processing and inventory management, is efficiently handled in the Controller, while the View remains focused on rendering the data to the user in a responsive and user-friendly way.

SCREENSHOTS

A. MVC App Running Locally



B. Web App Deployed

Web App Resource Created

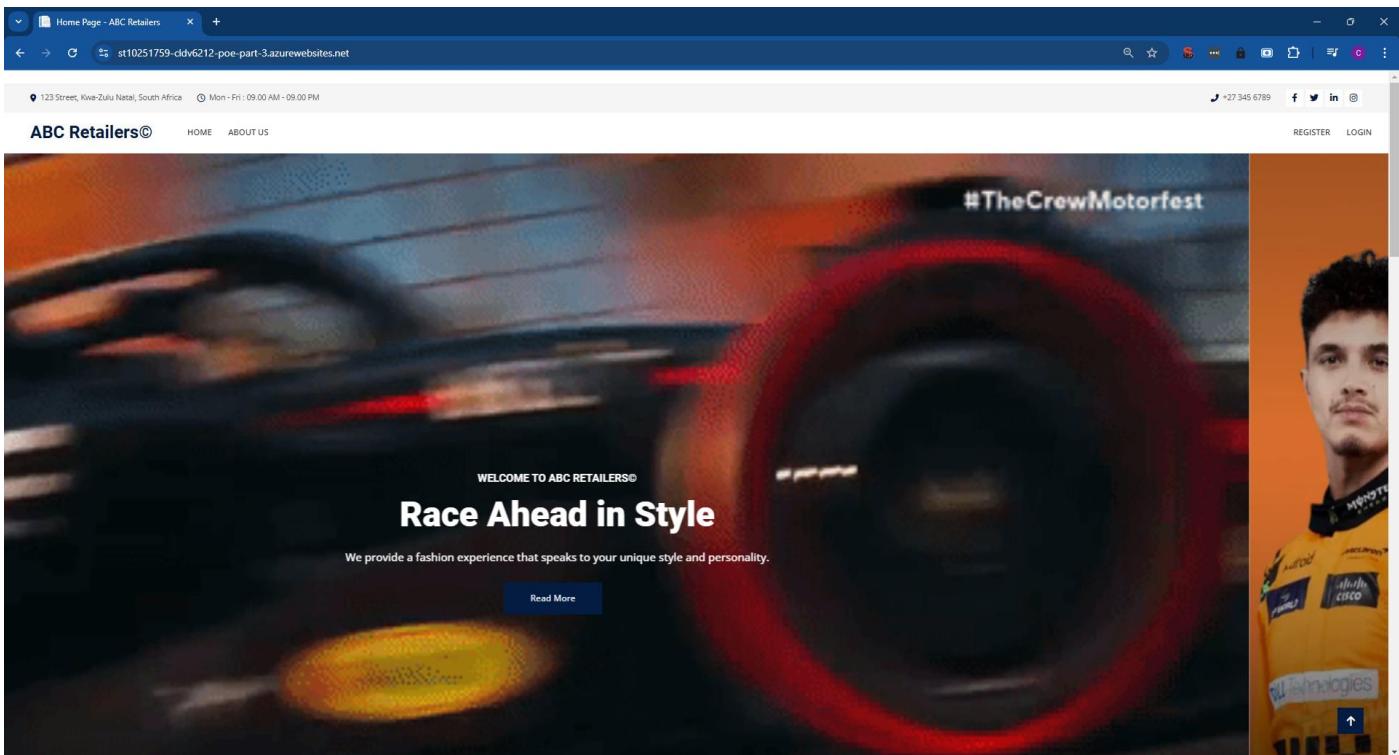
A screenshot of the Microsoft Azure portal interface, specifically the 'Create a resource' section for creating a 'Web App'. The URL in the address bar is 'portal.azure.com/#create/Microsoft.WebSite'. The page title is 'Microsoft Azure' and the sub-section is 'Create Web App'. The 'Review + create' tab is selected. The configuration steps shown are: Basics (Web App by Microsoft, Free SKU), Details (Subscription, Resource Group, Name: 'ST10251759-cldv6212-poe-part-3', Runtime stack: .NET 8 (LTS)), App Service Plan (New) (Name: 'ST10251759cldv6212p3', Region: South Africa North, SKU: Shared Infrastructure, Memory: 1 GB memory), Monitor + secure (New) (Application Insights: Enabled, Region: South Africa North), Deployment (Basic authentication: Enabled, Continuous deployment: Not enabled / Set up after app creation). At the bottom, there are buttons for 'Create', '< Previous', 'Next >', and 'Download a template for automation'.

Successfully Published Web App

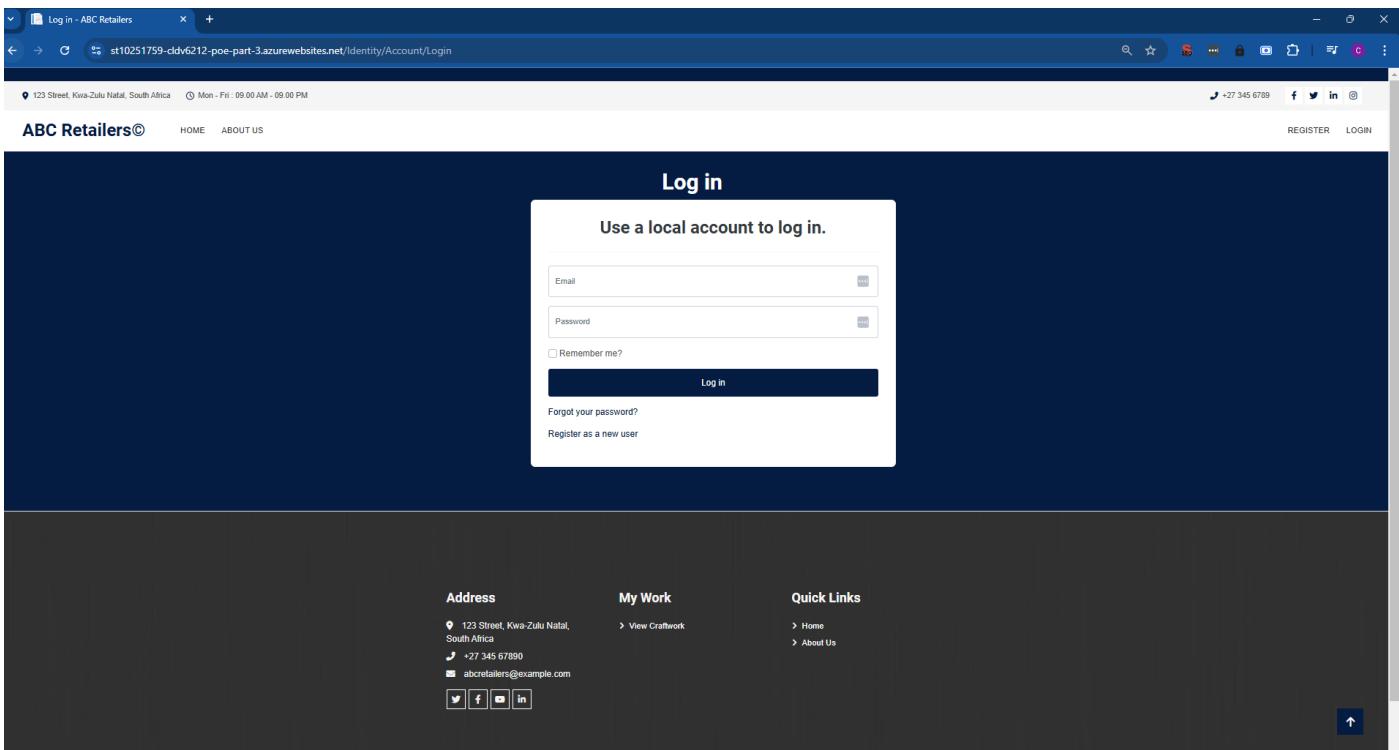
Page | 23

Web app running on URL (<https://st10251759-cldv6212-poe-part-3.azurewebsites.net/>)

Home Page



Login Page



Product Inventory

| Product Inventory | | | | | | |
|-------------------------------|---|-----------|----------|--------------|-------|---|
| Create New | | | | | | |
| Filter By Category: | | | | | | |
| Name | Description | Price | Category | Availability | Image | Action |
| Ferrari F1 Hoodie Puma | Carlos Sainz 55 Ferrari Hoodie by Puma - Red Yellow and White | R1,200.01 | hoodie | True | | <input checked="" type="checkbox"/> Edit <input type="button"/> Details <input type="button"/> Delete |
| Ferrari Leclerc Jersey Red | Red Ferrari Long Sleeve Jersey Leclerc - Red Yellow and White | R1,400.99 | jersey | True | | <input checked="" type="checkbox"/> Edit <input type="button"/> Details <input type="button"/> Delete |
| Ferrari Running Sneakers Puma | Puma x Ferrar F1 Running Sneakers - Black, Red and white | R2,000.00 | sneakers | True | | <input checked="" type="checkbox"/> Edit <input type="button"/> Details <input type="button"/> Delete |
| Amg F1 Running Sneakers Puma | F1 Amg x Puma Club Running Sneakers - White and Green | R1,800.00 | sneakers | True | | <input checked="" type="checkbox"/> Edit <input type="button"/> Details <input type="button"/> Delete |
| Hamilton Violet Rose Jersey | Introducing the Hamilton Violet Rose Jersey. Featuring a white color base | R1,600.00 | t-shirt | True | | <input checked="" type="checkbox"/> Edit <input type="button"/> Details <input type="button"/> Delete |
| Hamilton Away T-shirt | Black and Green Lewis Hamilton Baseball T-Shirt | R1,200.00 | t-shirt | True | | <input checked="" type="checkbox"/> Edit <input type="button"/> Details <input type="button"/> Delete |
| Norris Away T-Shirt | Mclaren Gulf Blue and Orange Lando T-Shirt | R1,500.00 | t-shirt | True | | <input checked="" type="checkbox"/> Edit <input type="button"/> Details <input type="button"/> Delete |

All Links

- Home: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/>
- About Us: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/About>
- Products: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/Products>
- Process Orders: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/Orders/Admin>
- Order Requests: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/OrderRequests/>
- Document: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/Document/Index>
- Register: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/Identity/Account/Register>
- Login: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/Identity/Account/Login>
- MyWork: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/MyWork/Index>
- Shopping Cart: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/MyWork/Cart>
- Order History: <https://st10251759-cldv6212-poe-part-3.azurewebsites.net/Orders/OrderHistory>

C. Azure SQL Database

Select Azure Database Single Database

The screenshot shows the Azure portal at portal.azure.com/#create/Microsoft.AzureSQL. The title is "Select SQL deployment option".

How do you plan to use the service?

SQL databases: Best for modern cloud applications. Hyperscale and serverless options are available. Resource type: Single database. Buttons: Create, Show details.

SQL managed instances: Best for most migrations to the cloud. Lift-and-shift ready. Resource type: Single instance. Buttons: Create, Show details.

SQL virtual machines: Best for migrations and applications requiring OS-level access. Lift-and-shift ready. Buttons: Create, Show details, High availability.

SQL DB Server Configuration

The screenshot shows the Azure portal at portal.azure.com/#create/Microsoft.SQLDatabase. The title is "Create SQL Database".

Subscription: Azure for Students. **Resource group**: (New) st10251759-cldv-part-3. Buttons: Create new.

Database details:

- Database name**: st10251759db
- Server**: (new) st10251759-cldv-part-3 (South Africa North). Buttons: Create new.
- Want to use SQL elastic pool?**: No (radio button selected).
- Workload environment**: Development (radio button selected). Note: Default settings provided for Development workloads. Configurations can be modified as needed.

Compute + storage: Basic, 2 GB storage. Buttons: Configure database.

Backup storage redundancy: Locally-redundant backup storage (radio button selected).

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

Basics

Microsoft Azure

Create SQL Database

Subscription: Azure for Students

Resource group: (New) st10251759-cldv-part-3

Database details

Database name: st10251759db

Server: (new) st10251759-cldv-part-3 (South Africa North)

Want to use SQL elastic pool?: No

Workload environment: Development

Compute + storage: Basic, 2 GB storage

Backup storage redundancy: Locally-redundant backup storage

Review + create Next : Networking >

Deployment Complete

Microsoft Azure

Microsoft.SQLDatabase.newDatabaseNewServer_6b1947ef98974d2c8bbcd | Overview

Your deployment is complete

Deployment name: Microsoft.SQLDatabase.newDatabaseNewServer_6b1947ef98974d2c8bbcd

Subscription: Azure for Students

Resource group: st10251759-cldv-part-3

Start time: 11/7/2024, 10:04:29 PM

Correlation ID: d8eb2429-6351-4ff7-a217-dd169defa7a1

Deployment details

Next steps

Go to resource

Give feedback

Tell us about your experience with deployment

Resource Created

Microsoft Azure

st10251759db (st10251759-cldv-part-3/st10251759db) | Overview

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

Essentials

Resource group: st10251759-cldv-part-3

Status: Online

Location: South Africa North

Subscription: Azure for Students

Tags: Add tags

Getting started

Monitoring Properties Features Notifications (0) Integrations Tutorials

Start working with your database

Configure access

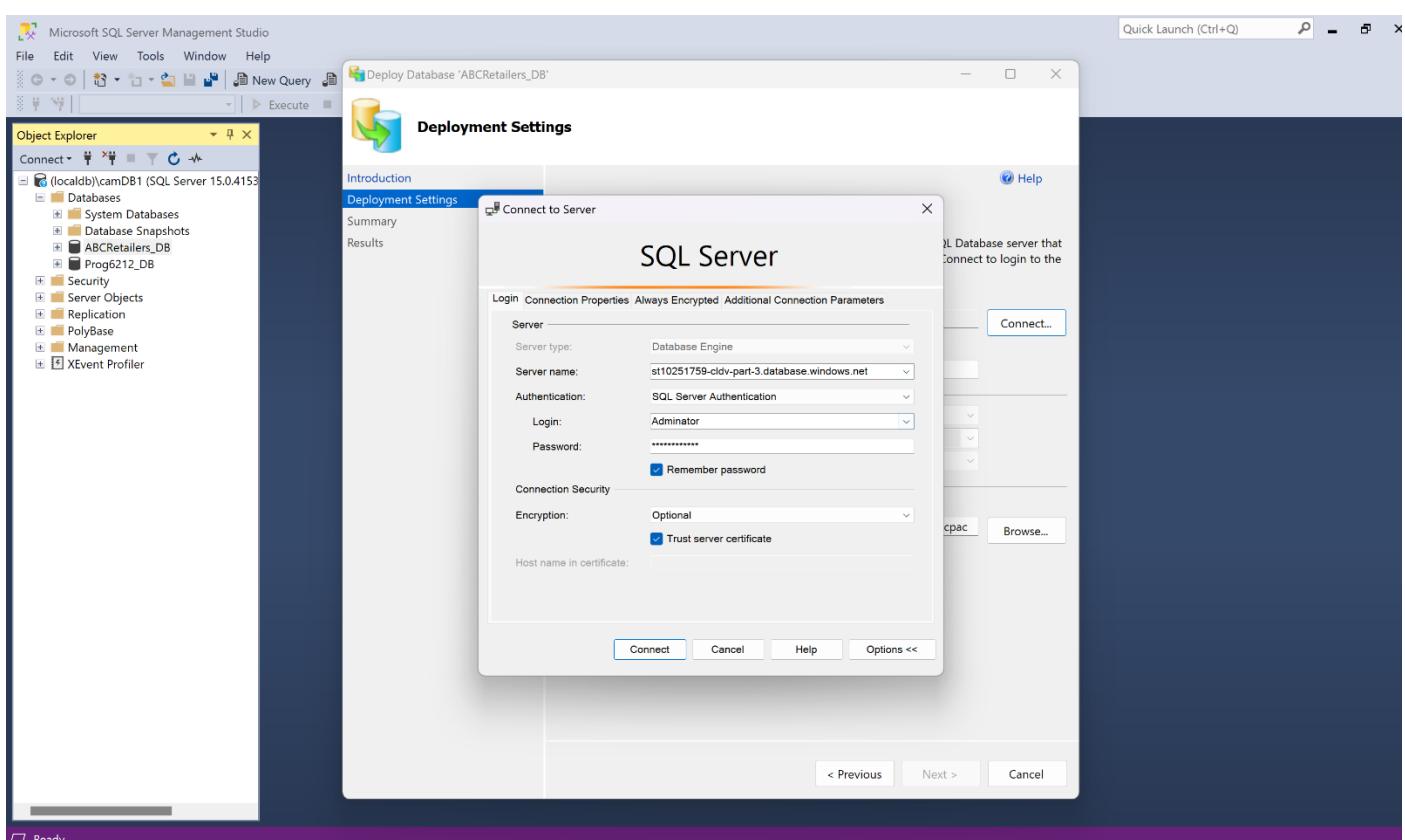
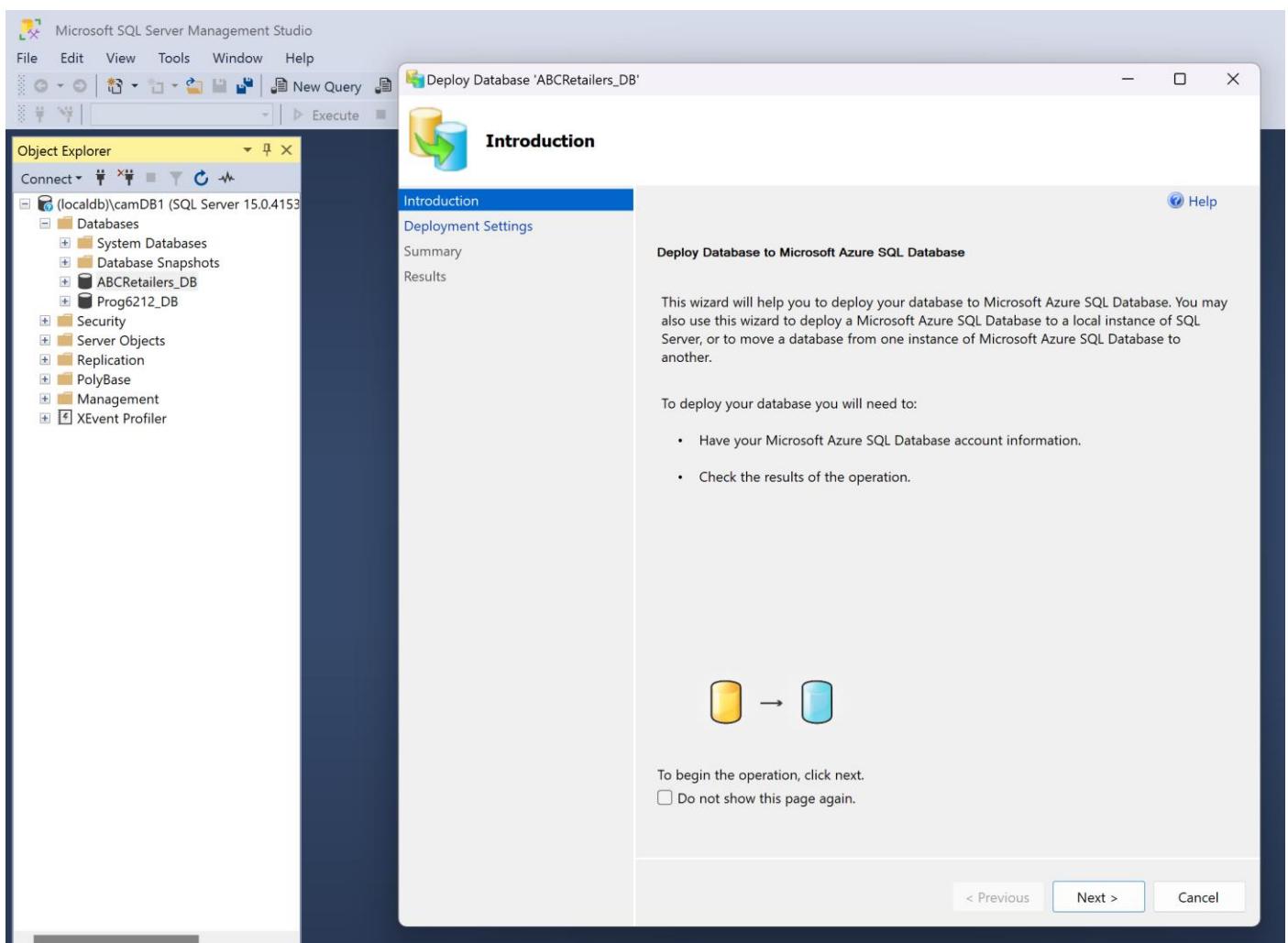
Connect to application

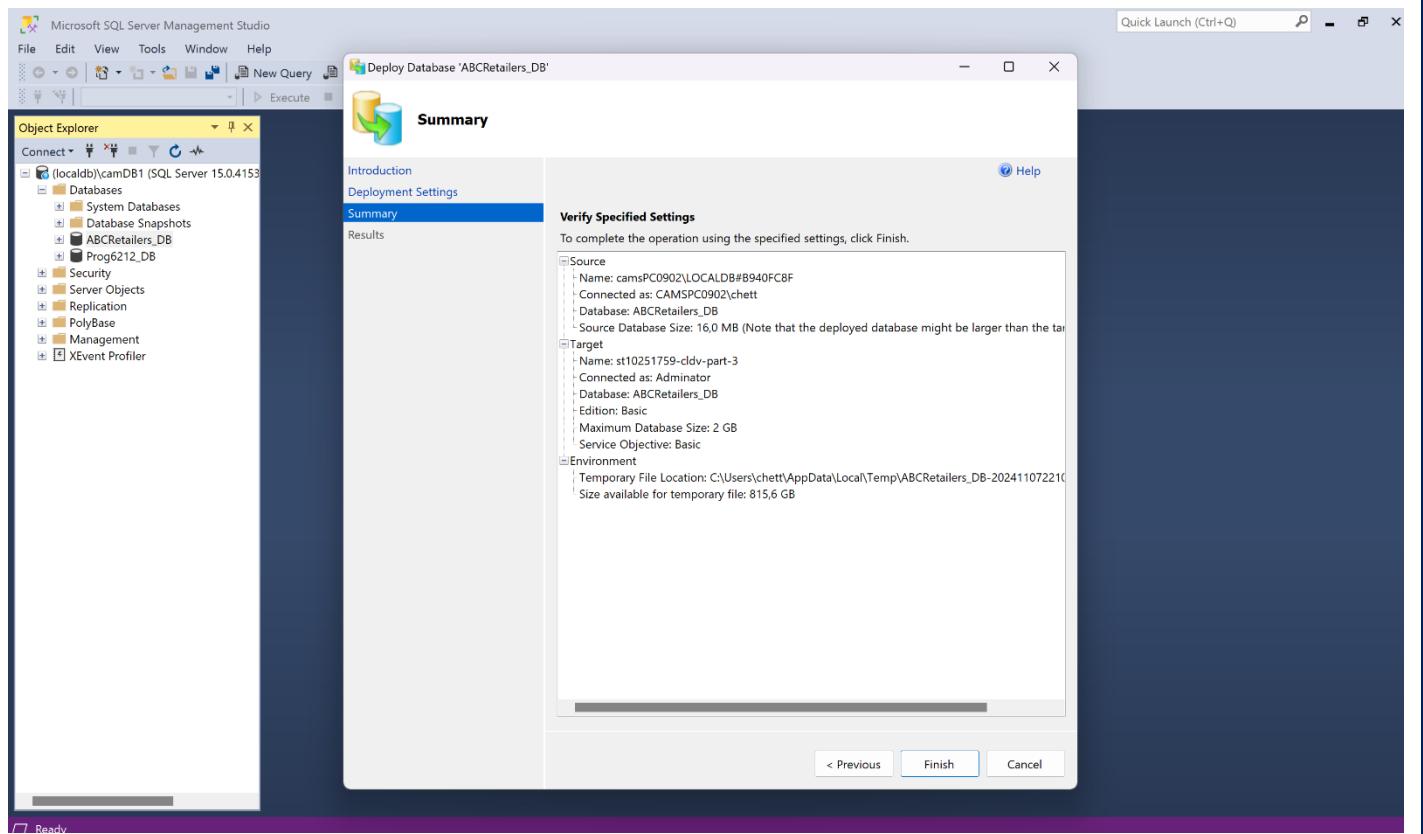
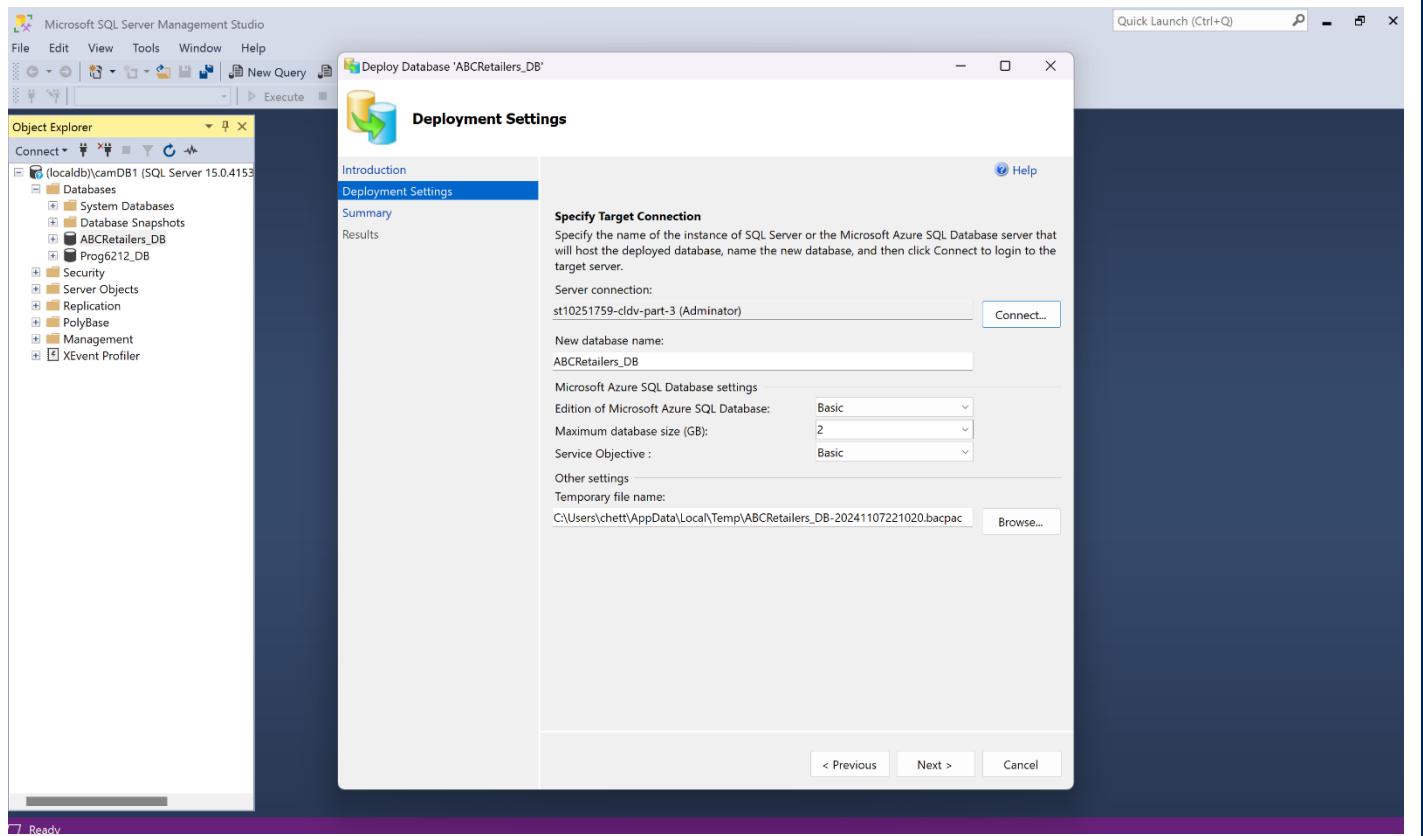
Start developing

Mirror database in Fabric

Open Azure Data Studio Open in Visual Studio Open in Visual Studio Code

Deploy Local DB to Azure DB





D. Records in the Database

Product Table

```
SQLQuery7.sql - st..DB (Administrator (81))  ✎ ×
SELECT TOP (1000) [ProductId]
    ,[Name]
    ,[ProductDescription]
    ,[Price]
    ,[Category]
    ,[Availability]
    ,[ImageUrlpath]
FROM [dbo].[Product]

100 % ▾
Results Messages


|   | ProductId | Name                          | ProductDescription                                       | Price   | Category | Availability | ImageUrlpath                                                                                                          |
|---|-----------|-------------------------------|----------------------------------------------------------|---------|----------|--------------|-----------------------------------------------------------------------------------------------------------------------|
| 1 | 4         | Ferrari F1 Hoodie Puma        | Carlos Sainz 55 Ferrari Hoodie by Puma - Red Yellow ...  | 1200.01 | hoodie   | 1            | <a href="https://st10251759cldv6212poe.blob.core.windows....">https://st10251759cldv6212poe.blob.core.windows....</a> |
| 2 | 5         | Ferrari Leclerc Jersey Red    | Red Ferrari Long Sleeve Jersey Leclerc - Red Yellow a... | 1400.99 | jersey   | 1            | <a href="https://st10251759cldv6212poe.blob.core.windows....">https://st10251759cldv6212poe.blob.core.windows....</a> |
| 3 | 1002      | Ferrari Running Sneakers Puma | Puma x Ferrari F1 Running Sneakers - Black, Red and...   | 2000.00 | sneakers | 1            | <a href="https://st10251759cldv6212poe.blob.core.windows....">https://st10251759cldv6212poe.blob.core.windows....</a> |
| 4 | 1003      | Amg F1 Running Sneakers Puma  | AMG F1 Amp x Puma Club Running Sneakers - White and ...  | 1800.00 | sneakers | 1            | <a href="https://st10251759cldv6212poe.blob.core.windows....">https://st10251759cldv6212poe.blob.core.windows....</a> |
| 5 | 1004      | Hamilton Violet Rose Jersey   | Introducing the Hamilton Violet Rose Jersey. Featurin... | 1600.00 | t-shirt  | 1            | <a href="https://st10251759cldv6212poe.blob.core.windows....">https://st10251759cldv6212poe.blob.core.windows....</a> |
| 6 | 2002      | Hamilton Away T-shirt         | Black and Green Lewis Hamilton Baseball T-Shirt          | 1200.00 | t-shirt  | 1            | <a href="https://st10251759cldv6212poe.blob.core.windows....">https://st10251759cldv6212poe.blob.core.windows....</a> |
| 7 | 2003      | Norris Away T-shirt           | McLaren Gaul Blue and Orange Lando T-Shirt               | 1500.00 | t-shirt  | 1            | <a href="https://st10251759cldv6212poe.blob.core.windows....">https://st10251759cldv6212poe.blob.core.windows....</a> |


```

Order Table

The screenshot shows the Microsoft SQL Server Management Studio interface. The title bar reads "SQLQuery8.sql - st10251759-cldv-part-3.database.windows.net.ABCRetailers_DB (Administrator (81)) - Microsoft SQL Server Management Studio". The left sidebar is the Object Explorer, showing the database structure including tables like "Orders", "Products", and "Categories". The main pane displays a query results grid for a SELECT statement on the "Orders" table.

| | OrderId | UserId | OrderDate | Status | TotalPrice |
|----|---------|--------------------------------------|-----------------------------|----------|------------|
| 1 | 1 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-02 00:05:56.9344773 | Approved | 2501.00 |
| 2 | 2 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-02 00:41:12.8426748 | Approved | 1200.01 |
| 3 | 1002 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-02 21:38.74848632 | Pending | 1400.99 |
| 4 | 1003 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-02 21:44:56.2547767 | Pending | 2601.00 |
| 5 | 2002 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-05 22:16.03 9147987 | Approved | 3200.01 |
| 6 | 3002 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-05 22:28.45.4743397 | Approved | 3200.99 |
| 7 | 4002 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-06 16:28.14.9072337 | Pending | 1800.00 |
| 8 | 5002 | 854c98e7-a5e4-49e4-9615-e5936ca8bcfc | 2024-11-06 22:10:53.0071520 | Approved | 1200.00 |
| 9 | 5003 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-06 22:15:11.2335070 | Approved | 6201.00 |
| 10 | 5004 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-06 23:15:11.2380000 | Pending | 4200.01 |
| 11 | 5005 | 95033459efab-4c32-9cac-aee020c3f64e | 2024-11-07 21:46:09.2706759 | Pending | 5300.00 |

Order Requests

The screenshot shows the Microsoft SQL Server Management Studio interface. The Object Explorer on the left lists the database structure, including the ABCRetailers_DB database and its tables. The central pane displays a query window with the following SQL code:

```
SELECT TOP (1000) [OrderRequestId]
      ,[OrderId]
      ,[ProductId]
      ,[OrderStatus]
   FROM [dbo].[OrderRequests]
```

The Results pane shows the output of the query, which consists of 22 rows of data. The columns are OrderRequestId, OrderId, ProductId, and OrderStatus. The data includes various order requests with different product IDs and statuses like Pending.

| | OrderRequestId | OrderId | ProductId | OrderStatus |
|----|----------------|---------|-----------|-------------|
| 1 | 1 | 1 | 4 | Pending |
| 2 | 2 | 1 | 5 | Pending |
| 3 | 1002 | 2 | 4 | Pending |
| 4 | 2003 | 1002 | 5 | Pending |
| 5 | 2004 | 1003 | 4 | Pending |
| 6 | 2005 | 1003 | 5 | Pending |
| 7 | 3002 | 2002 | 4 | Pending |
| 8 | 3003 | 2002 | 1002 | Pending |
| 9 | 4002 | 3002 | 5 | Pending |
| 10 | 4004 | 3002 | 1003 | Pending |
| 11 | 6004 | 5002 | 2002 | Pending |
| 12 | 6005 | 4002 | 1003 | Pending |
| 13 | 6006 | 5003 | 4 | Pending |
| 14 | 6007 | 5003 | 5 | Pending |
| 15 | 6008 | 5003 | 1002 | Pending |
| 16 | 6009 | 5003 | 1004 | Pending |
| 17 | 6010 | 5004 | 4 | Pending |
| 18 | 6011 | 5004 | 2002 | Pending |
| 19 | 6012 | 5004 | 1003 | Pending |
| 20 | 6013 | 5005 | 2003 | Pending |

At the bottom of the screen, a message indicates "Query executed successfully." and shows the session details: st10251759-cldv-part-3.database.windows.net, Administrator (68), ABCRetailers_DB, 00:00:00, 22 rows.

Document Table

The screenshot shows the Microsoft SQL Server Management Studio interface. The Object Explorer on the left lists the database structure, including the ABCRetailers_DB database and its tables. The central pane displays a query window with the following SQL code:

```
SELECT TOP (1000) [Id]
      ,[Title]
      ,[UploadDate]
      ,[FilePath]
      ,[Description]
   FROM [dbo].[Documents]
```

The Results pane shows the output of the query, which consists of 5 rows of data. The columns are Id, Title, UploadDate, FilePath, and Description. The data includes document entries such as Employment CONTRACT, NDA.pdf, Partnership Agreement, and Sales CONTRACT.

| | Id | Title | UploadDate | FilePath | Description |
|---|------|-------------------------------------|-----------------------------|---|---|
| 1 | 2 | ABC Retailers Employment CONTRACT | 2024-11-02 11:45:06.6373832 | uploads\ABC Retailers Employment CONTRACT.pdf | General Employee Contract Legal Form |
| 2 | 1002 | ABC Retailers NDA.pdf | 2024-11-02 22:30:58.4927149 | uploads\ABC Retailers NDA.pdf | Non Disclosure Agreement Contract Form |
| 3 | 1003 | ABC Retailers Partnership Agreement | 2024-11-02 22:31:23.5157307 | uploads\ABC Retailers Partnership Agreement.pdf | ABC Retailers Partnership Agreement Form |
| 4 | 1004 | ABC Retailers SALES CONTRACT | 2024-11-02 22:32:27.2212263 | uploads\ABC Retailers SALES CONTRACT.pdf | ABC Retailers Sales Contract Form |
| 5 | 1006 | ABC Retailers Terms and Conditions | 2024-11-07 21:44:29.7409440 | uploads\ABC Retailers Terms and Conditions.pdf | ABC Retailers Terms and Conditions Legal Form |

AspNetUsers Tables

SQL Server Management Studio - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

ABCRetailers.DB

Object Explorer

SQLQuery11.sql - s_8 (Administrator (77))

SQLQuery10.sql - s_8 (Administrator (91))

SQLQuery9.sql - st_DB (Administrator (68))

```
SELECT TOP (1000) [Id]
      ,[Discriminator]
      ,[Firstname]
      ,[Lastname]
      ,[UserName]
      ,[NormalizedUserName]
      ,[Email]
      ,[NormalizedEmail]
      ,[EmailConfirmed]
      ,[PasswordHash]
      ,[SecurityStamp]
      ,[ConcurrencyStamp]
      ,[PhoneNumber]
      ,[PhoneNumberConfirmed]
      ,[TwoFactorEnabled]
      ,[LockoutEnd]
      ,[LockoutEnabled]
      ,[AccessFailedCount]
  FROM [dbo].[AspNetUsers]
```

Results Messages

| ID | Discriminator | Firstname | Lastname | UserName | NormalizedUserName | Email | NormalizedEmail | EmailConfirmed | PasswordHash | SecurityStamp | |
|----|--------------------------------------|-----------------|-----------|-------------------|----------------------------|----------------------------|----------------------------|----------------|---------------------|-----------------------------------|-----|
| 1 | 02006535444-20d-8495-a5aeed200009 | ApplicationUser | Aly | skoodeo@gmail.com | ALLYSKOODEO@GMAIL.COM | allyskoodeo@gmail.com | ALLYSKOODEO@GMAIL.COM | 0 | AGAAAAAAAAYegAAAAE= | RJUJHIVDVA...P4V4C9M200242MHHY | c4d |
| 2 | 823ac4f8-ac-43b4-8e3c-9611a70fcfae4f | ApplicationUser | TheSharan | Nain | THESHARANRANI@GMAIL.COM | the الشاران@gmail.com | THESHARANRANI@GMAIL.COM | 0 | AGAAAAAAAAYegAAAAE= | DCNBK628LY16FJTYV6B20V2VNGXGHE | c11 |
| 3 | 95033494-4016-4192-a39d-473836446565 | ApplicationUser | Rafe | Cameron | rafecameron@gmail.com | rafecameron@gmail.com | rafecameron@gmail.com | 0 | AGAAAAAAAAYegAAAAE= | LOCOQAUJCHPP0508...66f7N... | f6c |
| 4 | 8ed03396-4016-4192-a39d-473836446565 | ApplicationUser | Rafe | Cameron | rafecameron@gmail.com | rafecameron@gmail.com | rafecameron@gmail.com | 0 | AGAAAAAAAAYegAAAAE= | TUNMSJBLG3DMW9R2DUNPNRPGGEKFHFJ | 482 |
| 5 | 95033494-4c32-432c-9cac-ae020c3654 | ApplicationUser | Mick | Client | mick@client.com | mick@client.com | mick@client.com | 0 | AGAAAAAAAAYegAAAAE= | RNNAHOAFRLJKW9RTGMZUZY4UAJSPZUMLY | a1c |
| 6 | 990db093-174b-4556-8486-d490096568 | ApplicationUser | Carmy | Test | chetycameron0902@gmail.com | chetycameron0902@gmail.com | chetycameron0902@gmail.com | 0 | AGAAAAAAAAYegAAAAE= | KEBR3G3SE2UVZEBZ9KHONYA0dMTY2 | a4d |

E. Database Replication Screenshots

Navigated to Replicas under Data management of the SQL database resource

Microsoft Azure

ABCRetailers_DB (st10251759-cldv-part-3/ABCRetailers_DB)

Overview

Mirror databases in Microsoft Fabric

Resource group (move) : st10251759-cldv-part-3

Status : Online

Location : South Africa North

Subscription (move) : Azure for Students

Subscription ID : 1961926c-92d1-4ecf-9994-1af7369c1c33

Tags (edit) : Add tags

Server name : st10251759-cldv-part-3.database.windows.net

Elastic pool : No elastic pool

Connection strings : Show database connection strings

Pricing tier : Basic

Earliest restore point : 2024-11-07 20:26 UTC

Getting started Monitoring Properties Notifications (0) Integrations Tutorials

Start working with your database

Configure access

Connect to application

Start developing

Mirror database in Fabric

Create Replica

Microsoft Azure

Home > ABCRetailers_DB (st10251759-cldv-part-3/ABCRetailers_DB) | Replicas

+ Create replica Refresh Feedback

Want to enable disaster recovery at lower price? Create standby replica for General Purpose or Business Critical service tier, with savings of up to 40%. Learn more

Geo replicas for your database are listed below. Geo replicas reside on a different logical server from the primary and protect against regional failures or prolonged data center outage. Learn more

| Name ↑ | Server ↑ | Region ↑ | Failover policy ↑ | Pricing tier ↑ | Replica state ↑↓ |
|-------------------|----------|----------|-------------------|----------------|------------------|
| No replicas found | | | | | |

Overview Activity log Tags Diagnose and solve problems Query editor (preview) Mirror database in Fabric (preview) Settings Compute + storage Connection strings Properties Locks Data management Replicas Sync to other databases Integrations Power Platform Security Intelligent performance Monitoring Automation Help

Created New Server at a different Region

The screenshot shows the Microsoft Azure portal interface for creating a new SQL database server. The URL in the address bar is `portal.azure.com/#view/SqlAzureExtension/SharedCreateServer/isNewServer~/true/subscriptionId/1961926c-92d1-4ecf-9994-1af73...` . The page title is "Create SQL Database Server".

Server details

Enter required settings for this server, including providing a name and location. This server will be created in the same subscription and resource group as your database.

Server name *: st10251750-cldv-part-3-replica
(.database.windows.net)

Location *: (Asia Pacific) Japan East

Allow Azure services to access server

Authentication

Azure Active Directory (Azure AD) is now Microsoft Entra ID. [Learn more](#)

Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Microsoft Entra authentication [Learn more](#), or using an existing Microsoft Entra user, group, or application as Microsoft Entra admin [Learn more](#), or select both SQL and Microsoft Entra authentication.

Authentication method: Use Microsoft Entra-only authentication (selected)
 Use both SQL and Microsoft Entra authentication
 Use SQL authentication

Set Microsoft Entra admin: ST10251750@vcconnect.edu.za
Admin Object/App ID: 68a1deaar-deda-48f0-a22c-862335a1ffdd
Set admin

Server admin login *: Administrator
Password *:
Confirm password *:

OK

Basics

[Home > ABCRetailers_DB \(st10251759-cldv-part-3/ABCRetailers_DB\) | Replicas >](#)

Create SQL Database - Geo Replica

Microsoft

[Basics](#) [Networking](#) [Additional settings](#) [Review + create](#)

SQL Database Hyperscale: Low price, high scalability, and best feature set. [Learn more](#)

Want to enable disaster recovery at lower price? Create standby replica for General Purpose or Business Critical service tier, with savings of up to 40%. [Learn more](#)

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

| | |
|----------------|---|
| Subscription | <input type="text" value="Azure for Students"/> |
| Resource group | <input type="text" value="st10251759-cldv-part-3"/> |

Primary database details

Additional settings will be defaulted where possible based on the primary database.

| | |
|------------------|---|
| Primary database | <input type="text" value="ABCRetailers_DB"/> |
| Region | <input type="text" value="southafricanorth"/> |

Geo-secondary database details

Project details

Select the subscription of geo secondary database to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

| | |
|------------------|---|
| Subscription * | <input type="text" value="Azure for Students"/> |
| Resource group * | <input type="text" value="st10251759-cldv-part-3"/> Create new |

Database details

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

[Home](#) > [ABCRetailers_DB \(st10251759-cldv-part-3/ABCRetailers_DB\) | Replicas](#) >

Create SQL Database - Geo Replica

Microsoft

Enter required settings for this database, including picking a logical server and configuring the compute and storage resources

Database name

ABCRetailers_DB

Server * ⓘ

(new) st10251750-cldv-part-3-replica (Japan East)

[Create new](#)

Region

Japan East

Want to use SQL elastic pool? ⓘ

 Yes No

Compute + storage * ⓘ

Basic

2 GB storage

[Configure database](#)

Transparent data encryption key management

Transparent data encryption encrypts your databases, backups, and logs at rest without any changes to your application. To enable encryption, go to each database. Database level settings if enabled, will override the server level setting. [Learn more](#)

Database level key ⓘ

Not configured[Configure transparent data encryption](#)

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.

The default backup storage redundancy setting is taken from the setting of the source.

Backup storage redundancy ⓘ

 Locally-redundant backup storage Zone-redundant backup storage Geo-redundant backup storage Geo-Zone-redundant backup storage[Review + create](#)[Next : Networking >](#)

Review+Create

The screenshot shows the Azure portal interface for creating a SQL database replica. At the top, the URL is <https://portal.azure.com/#view/SqAzureExtension/CreateSQLDatabaseReplicaBlade/primaryDatabaseResourceId/%2Fsubscriptions%2F1961926c-92d1-4ecf-9994-1af7369c1c33%2FresourceGroups%2Fst10251759-cldv...>. The title bar says "Microsoft Azure" and "Create SQL Database - Geo Replica". The main content area has tabs for "Basics", "Networking", "Additional settings", and "Review + create" (which is selected).
Product details
SQL database by Microsoft
Estimated cost per month: 5.53 USD
Terms of use | Privacy policy
Terms
By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. For additional details see [Azure Marketplace Terms](#).
Basics
Subscription: Azure for Students
Resource group: st10251759-cldv-part-3
Primary database: ABCRetailers_DB
Region: Japan East
Database name: ABCRetailers_DB
Server: (new) st10251750-cldv-part-3-replica
Authentication method: SQL and Microsoft Entra authentication
Server admin login: Administrator
Microsoft Entra Admin: ST10251759@vcconnect.eduza
Compute + storage: Basic 2 GB storage
Database level customer-managed key: Not configured
Database level user assigned managed identity: Not configured
Backup storage redundancy: Locally redundant backup storage
Networking
Allow Azure services to access server: Yes
Additional settings
Enable Microsoft Defender for SQL: Not now
Actions
Create | < Previous | Download a template for automation

Deployment

The screenshot shows the Azure portal interface for monitoring a deployment. The title bar says "Microsoft Azure" and "Microsoft.SQLDatabase.newDatabaseCopyNewServer_c42d1af88b5247d2b | Overview". The left sidebar shows "Overview", "Inputs", "Outputs", and "Template". The main content area shows a deployment status:
Deployment is in progress
Deployment name: Microsoft.SQLDatabase.newDatabaseCopyNewServer_c42d1af88b5247d2b
Subscription: Azure for Students
Resource group: st10251759-cldv-part-3
Start time: 11/10/2024, 5:34:30 PM
Correlation ID: 20fcf71d-17c8-4988-85b0-570ca34e15ed
Deployment details table:
Resource | Type | Status | Operation details
(empty)
There are no resources to display.
Right sidebar:
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

portal.azure.com/#view/HubsExtension/DeploymentDetailsBlade/-/overview/id/%2Fsubscriptions%2F1961926c-92d1-4ecf-9994-1af7369c1c33%2FresourceGroups%2Fr10251759-cldv-part-3%2Fproviders%2F...

Microsoft Azure Microsoft.SQLDatabase.newDatabaseCopyNewServer_c42d1af88b5247d2b | Overview

Your deployment is complete

Deployment name : Microsoft.SQLDatabase.newDatabaseCopyNewServer_c42d1af88b5247d2b
Subscription : Azure for Students
Resource group : st10251759-cldv-part-3

Start time : 11/10/2024, 5:34:30 PM
Correlation ID : 20fcf71d-17c8-4988-85b0-570ca34e15ed

Deployment details

| Resource | Type | Status | Operation details |
|--|------------------------------------|---------|-----------------------------------|
| st10251750-cldv-part-3-replica/ABCRetailers_DB | Microsoft.Sql/servers/databases | Created | Operation details |
| st10251750-cldv-part-3-replica/AllowAllWindowsAzureips | Microsoft.Sql/servers/firewallrule | OK | Operation details |
| st10251750-cldv-part-3-replica | Microsoft.Sql/servers | Created | Operation details |

Next steps

[Go to resource](#)

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 >](#)

Replica Overview

portal.azure.com/#@advtechonline.onmicrosoft.com/resource/subscriptions/1961926c-92d1-4ecf-9994-1af7369c1c33/resourceGroups/st10251759-cldv-part-3/providers/Microsoft.Sql/servers/st10251750-cldv...

ABCRetailers_DB (st10251750-cldv-part-3-replica/ABCRetailers_DB)

SQL database

Overview

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 ↗](#)

Essentials

| | | | |
|---|--|------------------------|---|
| Resource group (move) | : st10251759-cldv-part-3 | Server name | : st10251750-cldv-part-3-replica.database.windows.net |
| Status | : Online | Elastic pool | : No elastic pool |
| Location | : Japan East | Connection strings | : Show database connection strings |
| Subscription (move) | : Azure for Students | Pricing tier | : Basic |
| Subscription ID | : 1961926c-92d1-4ecf-9994-1af7369c1c33 | Earliest restore point | : No restore point available |
| | | Replica type | : Geo |
| | | Primary database | : ABCRetailers_DB |

Tags

Activity log

Diagnose and solve problems

Query editor (preview)

Mirror database in Fabric (preview)

Settings

Compute + storage

Connection strings

Properties

Data management

Replicas

Sync to other databases

Integrations

Power Platform

Security

Intelligent performance

Monitoring

Automation

Help

Getting started [Monitoring](#) [Properties](#) [Features](#) [Notifications \(0\)](#) [Integrations](#) [Tutorials](#)

Start working with your database

Connect to your database and start working with data with a few simple steps. [Learn more ↗](#)

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.

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 ↗](#)

[Configure](#) [See connection strings](#) [Open Azure Data Studio](#) [Open in Visual Studio](#) [Open in Visual Studio Code](#)

Replica and Primary DB under Data Management

The screenshot shows the Microsoft Azure portal interface for managing databases. The main page displays the 'ABCRetailers_DB (st10251750-cldv-part-3-replica/ABCRetailers_DB) | Replicas' section. It lists two replicas: the primary database 'ABCRetailers_DB' located in 'st10251759-cldv-part-3' and a geo replica 'ABCRetailers_DB' located in 'st10251750-cldv-part-3-replica'. The geo replica is in 'Japan East' region. The portal also includes a sidebar with various management options like Compute + storage, Connection strings, Properties, Locks, and Data management.

Connecting to Replica Server

The screenshot shows the Microsoft SQL Server Management Studio (SSMS) interface. A 'Connect to Server' dialog box is open, prompting for connection details. The 'Server name:' field is set to 'st10251750-cldv-part-3-replica.database.windows.net'. Other fields include 'Authentication: SQL Server Authentication', 'Login: Administrator', and 'Password:'. The 'Connection Security' section has 'Encryption: Optional' and 'Trust server certificate' checked. The SSMS interface shows the 'Object Explorer' on the left and a query results grid on the right.

Database and Tables successfully Replicated

The screenshot shows the Microsoft SQL Server Management Studio (SSMS) interface with a query results grid. The query executed is: 'SELECT TOP (1000) [ProductID], [Name], [ProductDescription], [Price], [Category], [Availability], [ImageUriPath] FROM [dbo].[Product]'. The results grid displays 9 rows of product data, including details like Product ID, Name, Description, Price, Category, Availability, and Image URI. The 'Messages' pane at the bottom of the results grid shows no errors or warnings.

F. Azure Storage Account

Blob Storage

The screenshot shows the Azure Storage browser interface for a blob account named 'st10251759clvd6212poe'. The left sidebar navigation includes 'Storage browser' under 'Storage account'. The main content area displays a list of blobs in the 'products' container. The table has 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 |
|---|-----------------------|----------------|------------|-----------|-------------|
| Ang sneakers.png | 11/2/2024 10:35:27 PM | Hot (Inferred) | Block blob | 782.99 kB | Available |
| CarlosSainzFerrariRaceSuitsHoodie.png | 11/1/2024 3:20:14 PM | Hot (Inferred) | Block blob | 52.67 kB | Available |
| Ferrari sneakers.png | 11/2/2024 10:34:29 PM | Hot (Inferred) | Block blob | 1.24 MB | Available |
| hamilton-away-jersey-753494_1800x1800.png | 11/5/2024 10:31:18 PM | Hot (Inferred) | Block blob | 46.66 kB | Available |
| hamilton-violet-rose-jersey.png | 11/2/2024 10:30:35 PM | Hot (Inferred) | Block blob | 42.89 kB | Available |
| leclerc-away-hockey-jersey-259798_1800x1800.png | 11/1/2024 3:30:11 PM | Hot (Inferred) | Block blob | 76.66 kB | Available |
| norms-away-jersey-649963_1800x1800.png | 11/7/2024 11:42:29 PM | Hot (Inferred) | Block blob | 44.51 kB | Available |
| test11.jpeg | 9/30/2024 7:14:46 PM | Hot (Inferred) | Block blob | 965.71 kB | Available |
| tester.png | 9/29/2024 11:13:58 PM | Hot (Inferred) | Block blob | 1.26 MB | Available |

Queue Storage

ProcessOrders

The screenshot shows the Azure Storage browser interface for a queue account named 'st10251759clvd6212poe'. The left sidebar navigation includes 'Storage browser' under 'Storage account'. The main content area displays a list of messages in the 'processororders' queue. The table has columns for Id, Insertion time, Expiration time, and Dequeue count. The messages listed are:

| Id | Insertion time | Expiration time | Dequeue count |
|---------------------------|------------------------|-------------------------|---------------|
| 121e1b1e-c2d9-d4d6-b... | 11/5/2024, 10:31:35 PM | 11/12/2024, 10:31:35 PM | 0 |
| Sacaaad65-ba77-412e-9a... | 11/5/2024, 10:31:40 PM | 11/12/2024, 10:31:40 PM | 0 |
| S31a0f5b-8a74-413d-b7... | 11/5/2024, 10:31:40 PM | 11/12/2024, 10:31:40 PM | 0 |
| cd59a9f7-72e3-4432-9d... | 11/6/2024, 10:20:42 PM | 11/13/2024, 10:20:42 PM | 0 |
| bd0bb83c-dab4-4a1d-9... | 11/7/2024, 11:43:34 PM | 11/14/2024, 11:43:34 PM | 0 |

ImageUpload

The screenshot shows the Azure Storage browser interface for a queue account named 'st10251759clvd6212poe'. The left sidebar navigation includes 'Storage browser' under 'Storage account'. The main content area displays a list of messages in the 'imageupload' queue. The table has columns for Id, Insertion time, Expiration time, and Dequeue count. The messages listed are:

| Id | Insertion time | Expiration time | Dequeue count |
|--------------------------|------------------------|-------------------------|---------------|
| db6fc16a-303b-4390-9d... | 11/5/2024, 10:31:19 PM | 11/12/2024, 10:31:19 PM | 0 |
| 8ca0fcdd-6a37-42e3-92... | 11/7/2024, 11:42:30 PM | 11/14/2024, 11:42:30 PM | 0 |

CreatedOrders

The screenshot shows the Azure Storage browser interface for a storage account named 'st10251759cldv6212poe'. The left sidebar navigation includes 'Storage browser' under 'File shares'. In the main pane, a queue named 'createdorders' is selected, showing 6 items. The table below lists the items:

| ID | Insertion time | Expiration time | Dequeue count |
|---------------------------|------------------------|-------------------------|---------------|
| a3cd8260-7cbf-4487-9b... | 11/5/2024, 10:29:23 PM | 11/12/2024, 10:29:23 PM | 0 |
| 46707ebd-07c4-4043-9... | 11/6/2024, 10:11:09 PM | 11/13/2024, 10:11:09 PM | 0 |
| 76537114-b5b6-4a9-9b... | 11/6/2024, 10:13:43 PM | 11/13/2024, 10:13:43 PM | 0 |
| 1bd70941-4b00-4d1-9a... | 11/6/2024, 10:19:43 PM | 11/13/2024, 10:19:43 PM | 0 |
| 6992c7c-7928-49f7-9d... | 11/6/2024, 11:16:12 PM | 11/13/2024, 11:16:12 PM | 0 |
| 4d58ff7d7-c15d-4c0d-a4... | 11/7/2024, 11:49:19 PM | 11/14/2024, 11:49:19 PM | 0 |

File Shares

The screenshot shows the Azure Storage browser interface for a storage account named 'st10251759cldv6212poe'. The left sidebar navigation includes 'Storage browser' under 'File shares'. A file share named 'contractshare' is selected, showing several PDF files. The table below lists the files:

| Name | Type | Size |
|---|------|------------|
| ABC Retailers Employment CONTRACT.pdf | File | 166.79 kB |
| ABC Retailers NDA.pdf | File | 200.37 kB |
| ABC Retailers Partnership Agreement.pdf | File | 189.4 kB |
| ABC Retailers SALES CONTRACT.pdf | File | 162.84 kB |
| ABC Retailers Terms and Conditions.pdf | File | 134.8 kB |
| CLDVE212 Poe - Test Document.pdf | File | 1017.86 kB |
| CoverPage.pdf | File | 530.39 kB |

G. Additional Features

The screenshot shows the 'My Work' section of the ABC Retailers website. At the top, there's a navigation bar with links for Home, About Us, Purchase Products, View Cart, My Orders, View Contracts, and a user profile. Below the navigation is a large banner featuring a Formula 1 racing car. Underneath the banner, the heading 'My Work' is displayed above a breadcrumb trail 'Home / My Work'. A 'View Shopping Cart' button is located just below the breadcrumb. The main content area is titled 'My Work' and contains three product cards: a red hoodie with 'FERRARI' and 'SAINT' logos, a red jersey with 'LECLERC' and the number '16', and a black and red sneaker. Each product card has a green 'Available' button next to it. Below each card is its category name: 'hoodie', 'jersey', and 'sneakers'. A small note at the bottom left of the page reads: 'At ABC F1 Retailers, our mission is to bring the thrill of Formula 1 racing to everyday life through premium, race-inspired clothing. Our collection is a tribute to the speed, precision, and passion of the sport, crafted for fans who live and breathe F1. From sleek team jerseys and caps to stylish jackets and accessories, each piece in our store captures the essence of the track, combining comfort and durability with bold, iconic designs. Whether you're supporting your favorite team or simply embracing the adrenaline-fueled world of racing, ABC F1 Retailers offers quality apparel that connects you to the spirit of Formula 1. Explore our collection and wear the race with pride at ABC F1 Retailers.'

I have a My Work Page with Product Cards. I also have a filter with categories.

The screenshot shows the 'Your Shopping Cart' page. The header includes the ABC Retailers logo and navigation links. The main content is a table titled 'Your Shopping Cart' with columns for 'Product', 'Price', and 'Action'. It lists two items: a 'Ferrari F1 Hoodie Puma' priced at R 1200.01 and a 'Ferrari Running Sneakers Puma' priced at R 2000.00. Each item has a red 'Remove' button. Below the table, the total price is shown as 'Total Price: R 3200.01' and a green 'Checkout' button is available. The footer contains sections for 'Address', 'My Work', and 'Quick Links', along with social media icons and copyright information.

Clients can use add and remove items from their cart

ABC Retailers® [HOME](#) [ABOUT US](#) [PURCHASE PRODUCTS](#) [VIEW CART](#) [MY ORDERS](#) [VIEW CONTRACTS](#) [HELLO MICK@CLIENT.COM!](#) [LOGOUT](#)

Order History

| Order ID | Order Date | Total Price | Order Status |
|----------|-----------------------|-------------|--------------|
| 1 | 11/2/2024 12:05:56 AM | R 2601.00 | Approved |
| 2 | 11/2/2024 12:41:12 AM | R 1200.01 | Approved |
| 1002 | 11/2/2024 9:38:47 PM | R 1400.99 | Pending |
| 1003 | 11/2/2024 9:44:56 PM | R 2601.00 | Pending |
| 2002 | 11/5/2024 10:16:03 PM | R 3200.01 | Approved |
| 3002 | 11/5/2024 10:28:45 PM | R 3200.99 | Approved |
| 4002 | 11/6/2024 4:28:14 PM | R 1800.00 | Pending |
| 5003 | 11/6/2024 10:15:11 PM | R 6201.00 | Approved |
| 5004 | 11/6/2024 11:15:11 PM | R 4200.01 | Pending |
| 5005 | 11/7/2024 9:46:09 PM | R 5300.00 | Pending |

Address
123 Street, Kwa-Zulu Natal, South Africa
+27 345 67890
abcRetailers@example.com
[Twitter](#) [Facebook](#) [Instagram](#) [LinkedIn](#)

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Quick Links
[Home](#) [About Us](#)

Clients can see their order history and Status

ABC Retailers® [HOME](#) [ABOUT US](#) [PRODUCTS](#) [PROCESS ORDERS](#) [ORDER REQUESTS](#) [REGISTER USERS](#) [MANAGE CONTRACTS](#) [HELLO MICK@ADMIN.COM!](#) [LOGOUT](#)

Admin - Orders

| Order ID | Order Date | User Email | Total Price | Status | Actions |
|----------|-----------------------|-----------------------|-------------|----------|---------------------------------|
| 1 | 11/2/2024 12:05:56 AM | mick@client.com | R 2601.00 | Approved | ✓ Approve Order |
| 2 | 11/2/2024 12:41:12 AM | mick@client.com | R 1200.01 | Approved | ✓ Approve Order |
| 1002 | 11/2/2024 9:38:47 PM | mick@client.com | R 1400.99 | Pending | ✓ Approve Order |
| 1003 | 11/2/2024 9:44:56 PM | mick@client.com | R 2601.00 | Pending | ✓ Approve Order |
| 2002 | 11/5/2024 10:16:03 PM | mick@client.com | R 3200.01 | Approved | ✓ Approve Order |
| 3002 | 11/5/2024 10:28:45 PM | mick@client.com | R 3200.99 | Approved | ✓ Approve Order |
| 4002 | 11/6/2024 4:28:14 PM | mick@client.com | R 1800.00 | Pending | ✓ Approve Order |
| 5002 | 11/6/2024 10:10:53 PM | mick@admin.com | R 1200.00 | Approved | ✓ Approve Order |
| 5003 | 11/6/2024 10:15:11 PM | mick@client.com | R 6201.00 | Approved | ✓ Approve Order |
| 5004 | 11/6/2024 11:15:11 PM | mick@client.com | R 4200.01 | Pending | ✓ Approve Order |
| 5005 | 11/7/2024 9:46:09 PM | mick@client.com | R 5300.00 | Pending | ✓ Approve Order |
| 5006 | 11/9/2024 7:01:17 PM | rafecameron@gmail.com | R 3200.01 | Pending | ✓ Approve Order |

Admin can Process client orders.

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CODE ATTRIBUTION

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Link: <https://www.w3schools.com/html/>

Date Accessed: 16 August 2024

Author: HTML Codex

Link: <https://htmlcodex.com/>

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Author: w3schools

Link: <https://www.w3schools.com/css/>

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Author: w3schools

Link: <https://www.w3schools.com/js/>

Date Accessed: 16 August 2024

Author: Mick Gouweloos

Link: https://github.com/mickymouse777/Cloud_Storage/tree/master/Cloud_Storage

Date Accessed: 16 August 2024

Author: Microsoft

Link: <https://learn.microsoft.com/en-us/azure/azure-functions/functions-overview?pivots=programming-language-csharp>

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Author: Microsoft

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Author: Microsoft

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*****All Images used throughout project are adapted from Pinterest
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