CSCI 5902 - Fall 23 - Azure Tutorial

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Recap

- IAM
- Azure Active Directory/Microsoft Entra ID
- Types of Identities -
    - User
    - Workload - Application, Service principal, Managed identities
    - Device
    - Groups - M365, SG
    - Hybrid
    - External
- Active Directory vs Microsoft Entra ID
- Azure AD External Identities
- Azure RBAC
- Azure Security

T9: Serverless Architecture in Azure

What is Serverless Computing?

Serverless Computing

- Serverless computing enables developers to build applications faster by eliminating the need for them to manage infrastructure.
- With serverless applications, the cloud service provider automatically provisions, scales, and manages the infrastructure required to run the code.
- Benefits:
  - No Infrastructure Management
  - Dynamic Scalability
  - Faster time to Market
  - More efficient use of resources

Azure Serverless Compute

Serverless Compute

- Services that run your code/containers.
- Serverless Containerized Microservices: Containerized Apps without maanging complex infrastructure. → **Azure Container Apps**
- Serverless Kubernetes: Based on opensource Kubernetes Event Driven Autoscaling(KEDA). Helps elastically provision pods inside container instances that start in seconds without the need to manage additional compute resources.
- Serverless Functions: An event driven compute service which helps in code execution for the code written in language of your choice. Scale on demand and pay only for the time code is executed.

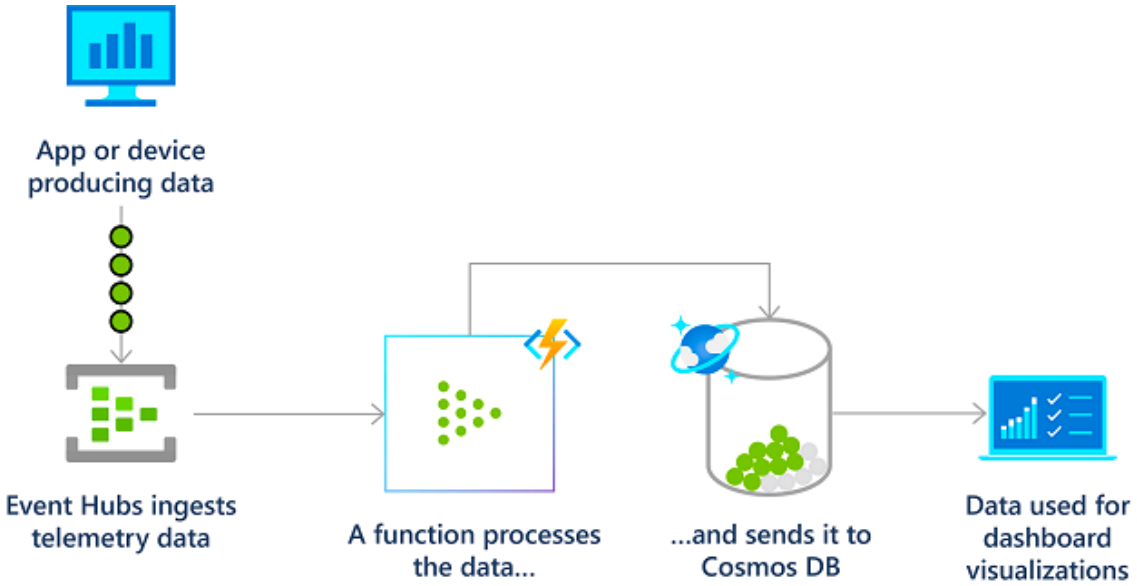
Serverless Compute(Contd.)

- Serverless App Environments: Azure App Service offers option to be created on serverless tier. This would help you to run and scale web/ mobile apps on your choice of platform.

Azure Functions

- Hosting Options - Fully Serverless(Consumption), Premium Plan
- Functions can also be hosted on existing App Service Plans which helps in predictable scaling and costs.
- Example use-cases:
    - Process file uploads
    - Real time and event processing
    - Respond to DB changes
    - Creating reliable message systems

Real Time Stream and Event Processing



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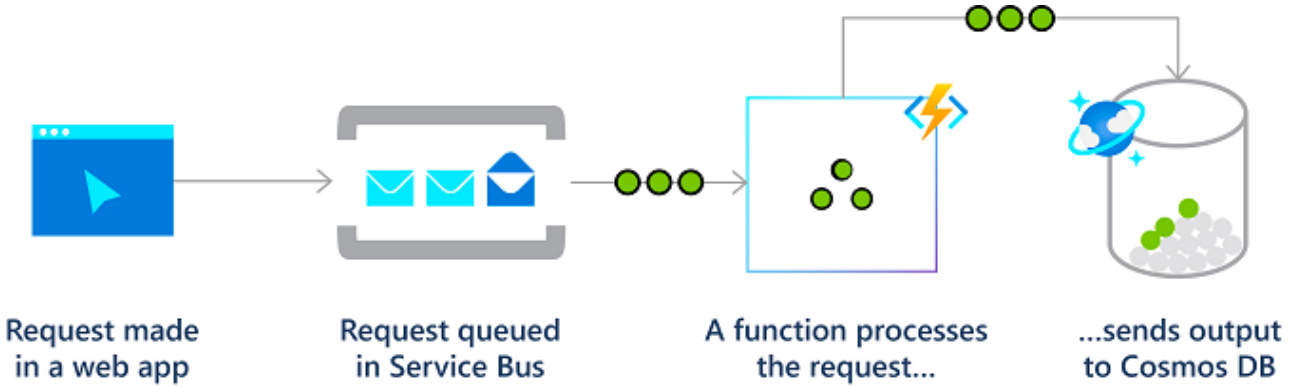
Reliable Message Systems



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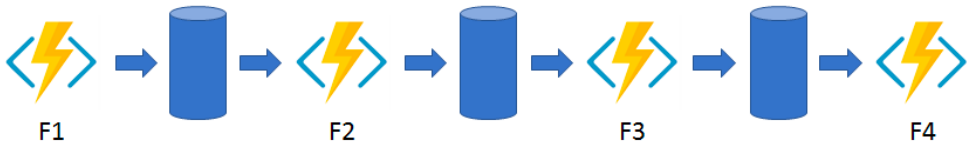
Durable Functions

Durable Functions

- *Durable Functions* is an extension of Azure Functions that lets you write stateful functions in a serverless compute environment. The extension lets you define stateful workflows by writing *orchestrator functions* and stateful entities by writing *entity functions* using the Azure Functions programming model. Behind the scenes, the extension manages state, checkpoints, and restarts for you, allowing you to focus on your business logic.[3]



Function Chaining using Durable Functions

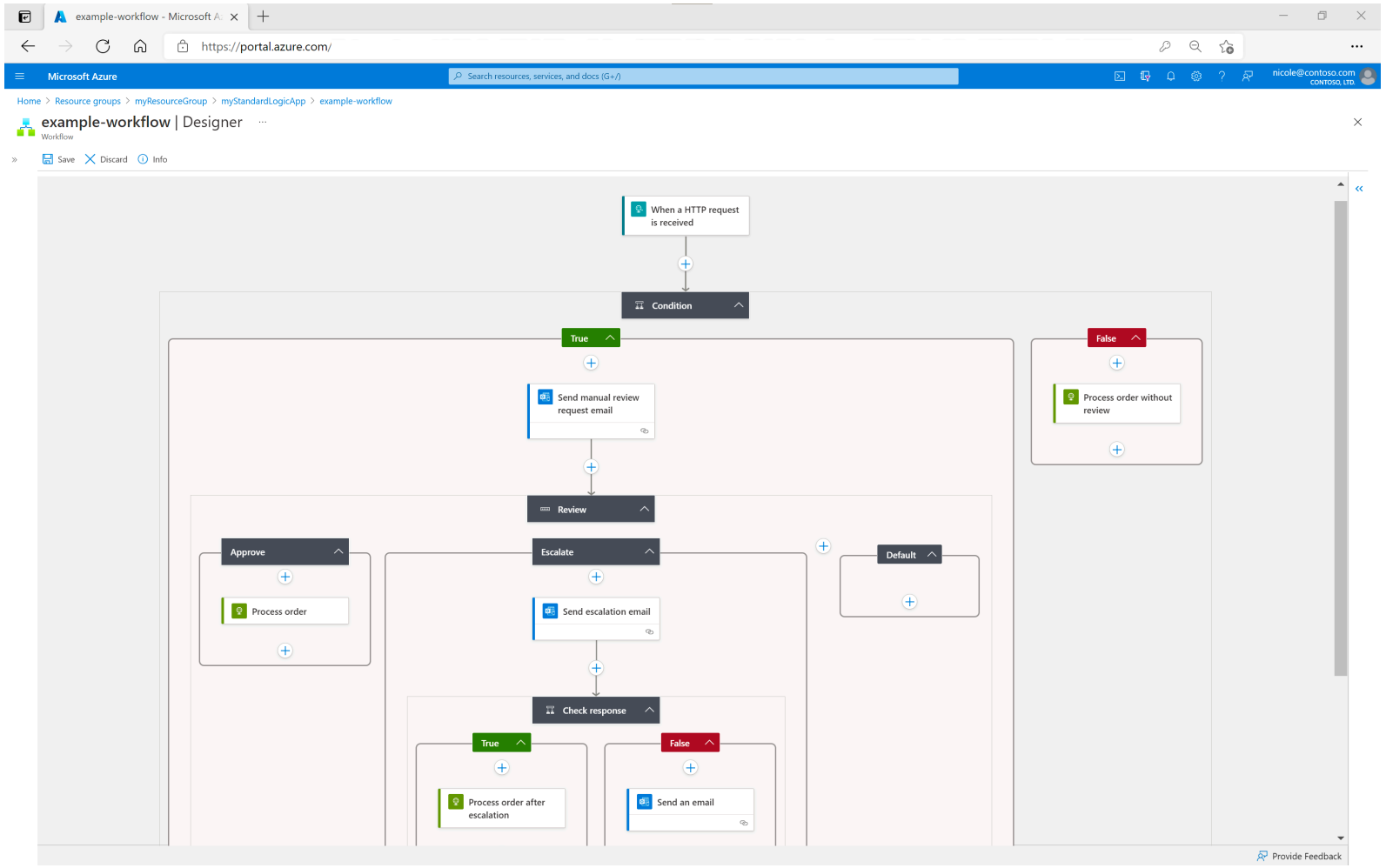
Source: [3]

Serverless Workflow Designer

Azure Logic Apps

- Azure Logic Apps is a cloud platform where you can create and run automated workflows with little to no code.
- It provides a visual designer and provides you options to use prebuilt operations to create workflows.
- The Azure Logic Apps integration platform provides hundreds of prebuilt connectors so you can connect and integrate apps, data, services, and systems more easily and quickly.

Sample Workflow on Logic App



Source: [4]

When serverless has so many good features why can’t we have it for all service types?

Serverless Databases

Serverless Databases

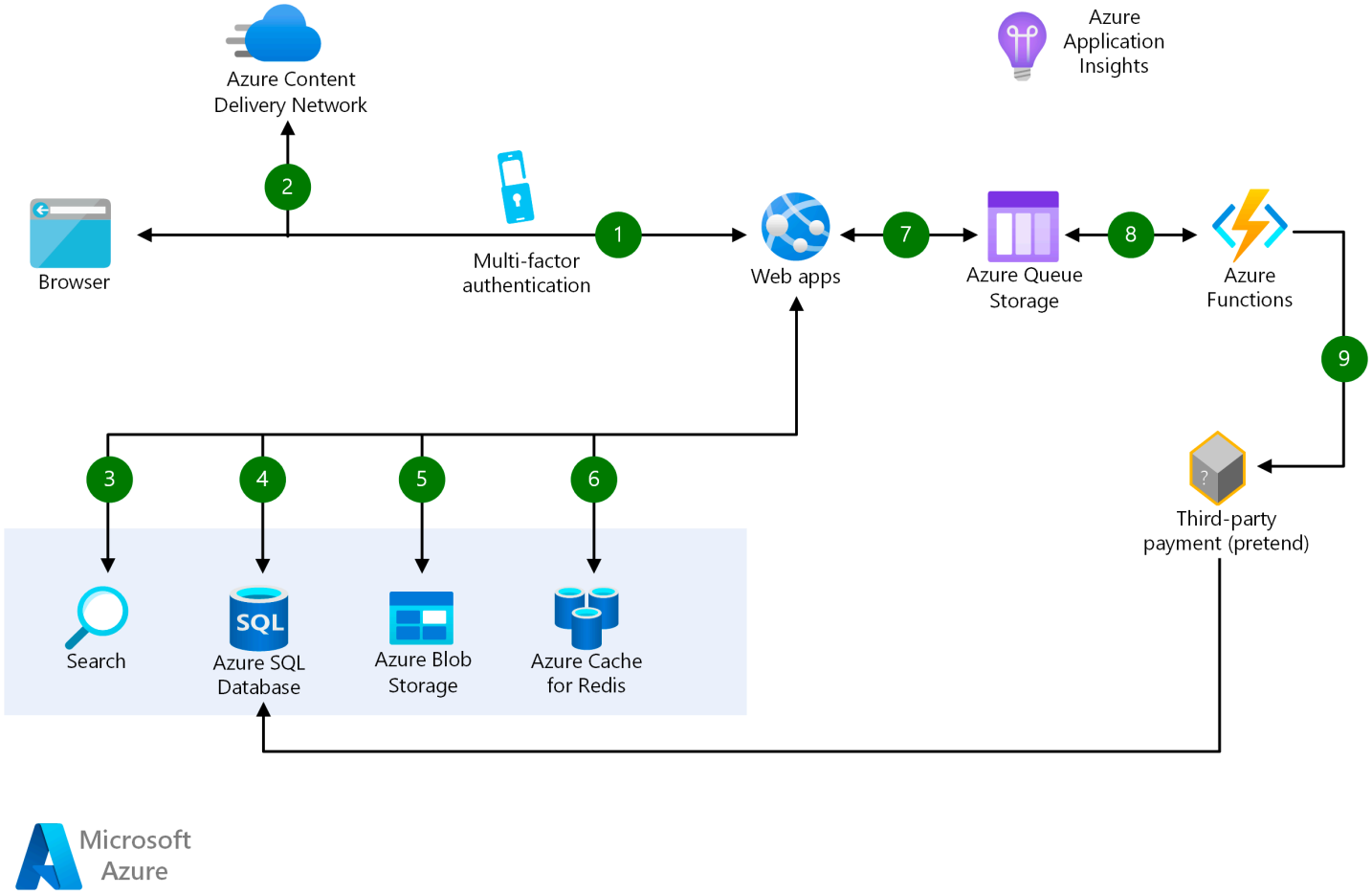
- Azure Sql Database Serverless: Automatically scale compute based on workload demand and pay only for compute used per second.
- Serverless databases can be paused when inactive, you get charged only for storage during inactive periods.
- Azure Cosmos DB: Cosmos DB is offerred as serverless database.

Other serverless services

- Azure Storage
- Azure Devops
- Azure AD

Reference Architecture

E-Commerce Platform



Source: [1]

Limitations

- Lack of troubleshooting options
- Third Party API trust
- Vendor locking
- Complexity increases as services increase
- Latency

AWS vs Azure Serverless Comparison

https://eleks.com/research/azure-vs-aws-comparison-for-serverless-architecture/

Is Microservices same as decoupled architecture?

It’s a wrap

References

[1] https://learn.microsoft.com/en-ca/azure/architecture/web-apps/idea/scalable-ecommerce-web-app

[2] https://learn.microsoft.com/en-us/azure/azure-functions/functions-scenarios?pivots=programming-language-csharp

[3] https://learn.microsoft.com/en-us/azure/azure-functions/durable/durable-functions-overview?tabs=in-process%2Cnodejs-v3%2Cv1-model&pivots=csharp

[4] https://learn.microsoft.com/en-us/azure/logic-apps/logic-apps-overview