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Best practices for .NET Core connection pooling in serverless apps

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Problem statement

The ephemeral nature of serverless applications is not something that traditional relational databases were designed to handle. As a result, creating new connections to a database is relatively slow. In addition, the management of those connections at cloud scale can lead to connection-pool exhaustion.

We will work through strategies for mitigating these concerns in your serverless application.

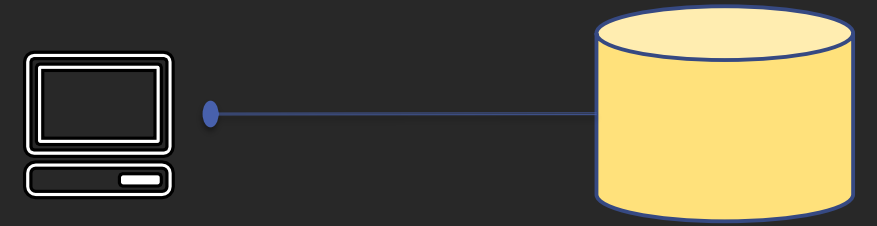
Scope of this session

This session focuses on:

- ADO.NET Core (a part of .NET Core)
- AWS Lambda
- Amazon ECS
- SQL Server
- AWS Cloud9

However, the concepts are relevant to other programming languages, relational databases, and architecturally equivalent designs

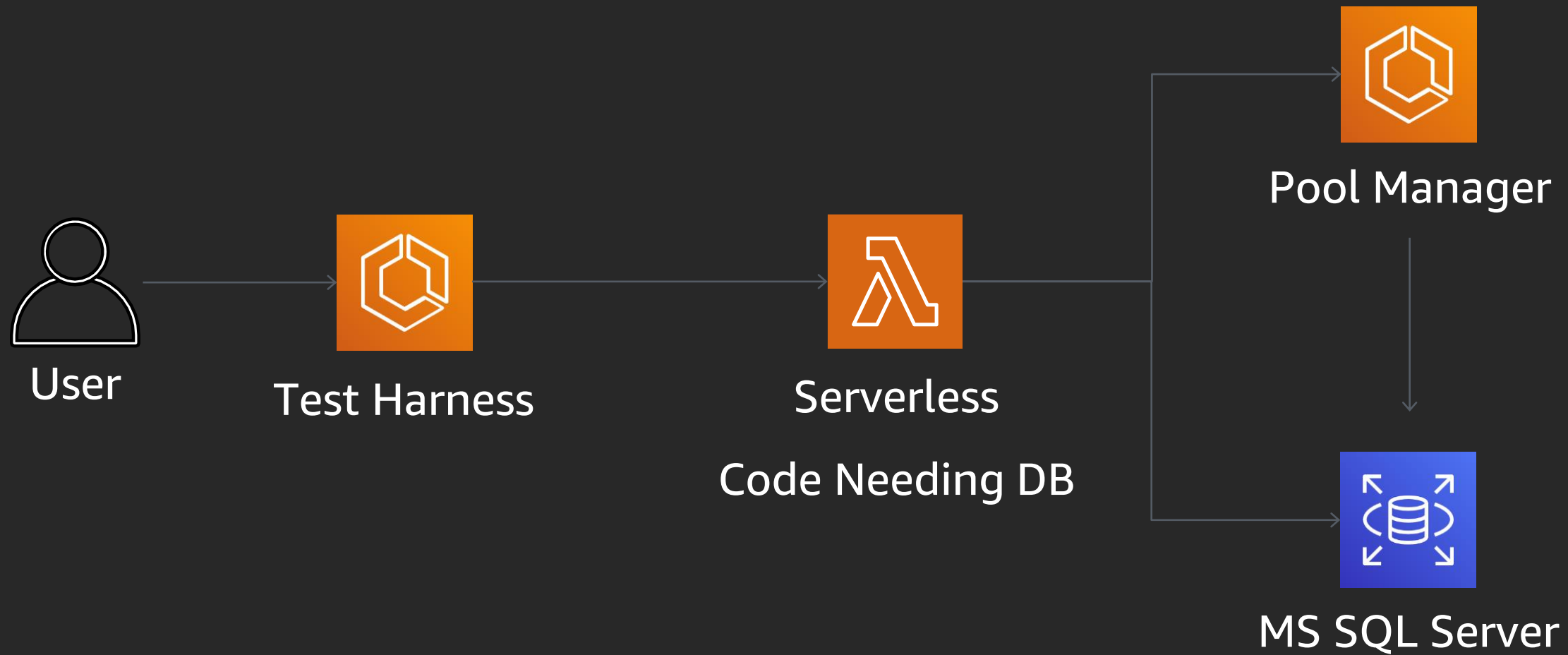
Why connection pooling



Creating a new database connection is slow:

- A physical channel must be established—socket/named pipe
- Connection string parsed & initial handshake with the server
- Connection must be authenticated by the server
- Checks must be run for enlisting in the current transaction
- Most applications use only one or a few different configurations
- Typically, many identical connections will be repeatedly opened and closed
- To minimize this cost, .NET uses connection pooling

Architecture



Let's build!

Best practices

- Lambda connection pool management
 - Make sure the variable containing the connection is defined outside the event handler function. Ideally, database connections should be in a variable with global scope.
- Use long-running compute instances like Amazon ECS, Amazon EKS, or Amazon EC2 for applications that have:
 - Longer periods of inactivity followed by spikes in activity
 - A need for consistent database response times
 - Periods of dynamic scaling that could overwhelm the database with ephemeral connection
- See <https://docs.aws.amazon.com/lambda/latest/dg/best-practices.html> for a full list of general best practices

Thank you!

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