

# Building scalable web applications with Azure services

April 28<sup>th</sup> 2022



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# Agenda for today

01

Intro

02

Modern web applications

03

Essentials of building a scalable web application on Azure

04

Case study

05

Q&A

## Facts:

**30+**

Years in business

**100+**

Customers

**200+**

Employees

## Cloud services:

- ✓ Consulting & advisory
- ✓ Modernisation & migration
- ✓ Optimisation & automation
- ✓ Support & maintenance



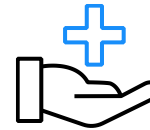
**Banking &  
finance**



**Energy**



**Telecommunications**



**Healthcare &  
Pharmacy**



**Insurance**



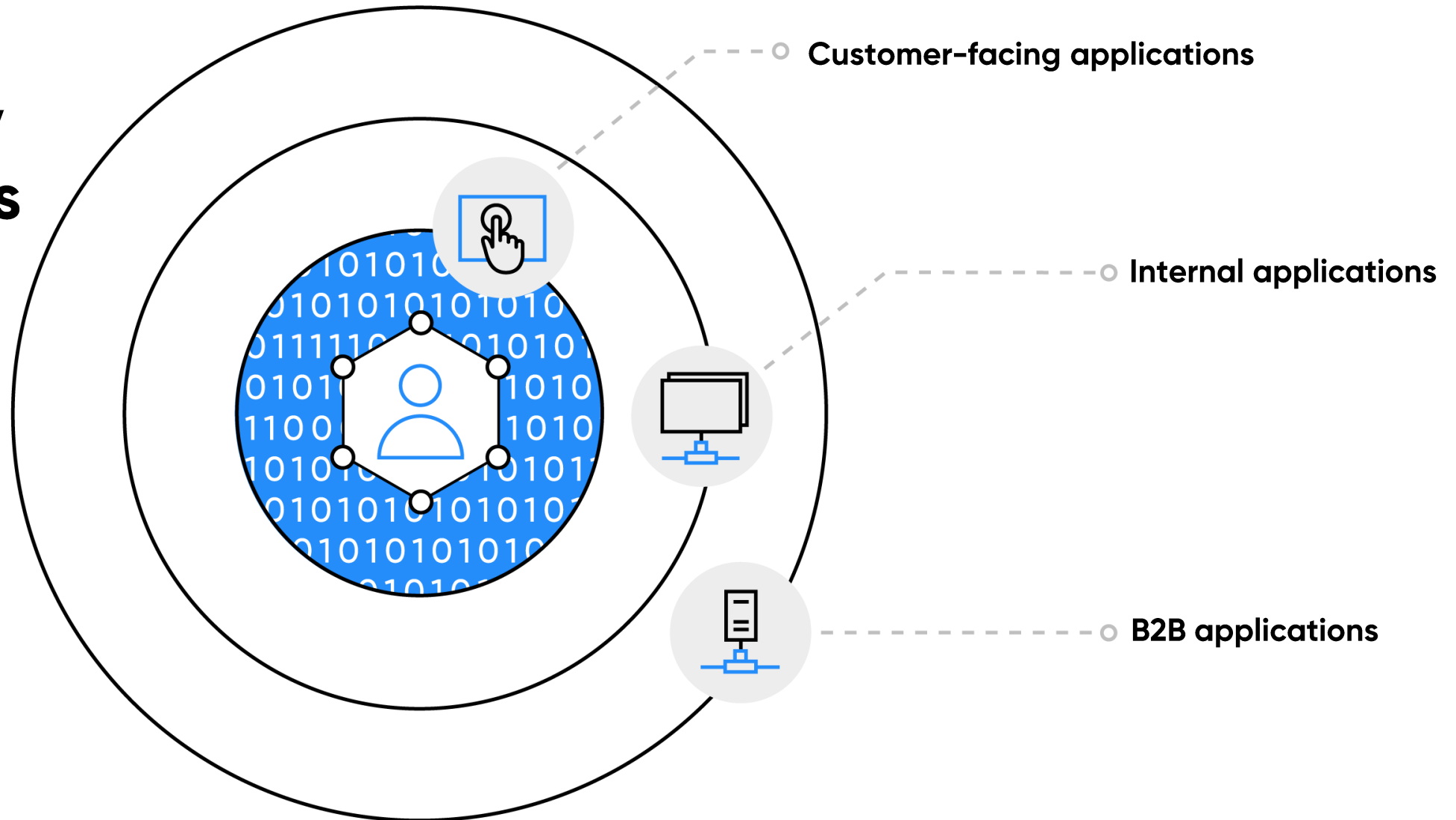
**IT &  
consulting**

**Microsoft  
Partner**



Gold Cloud Platform  
Gold Data Analytics  
Gold Application Integration  
Gold Application Development

# Business is powered by applications

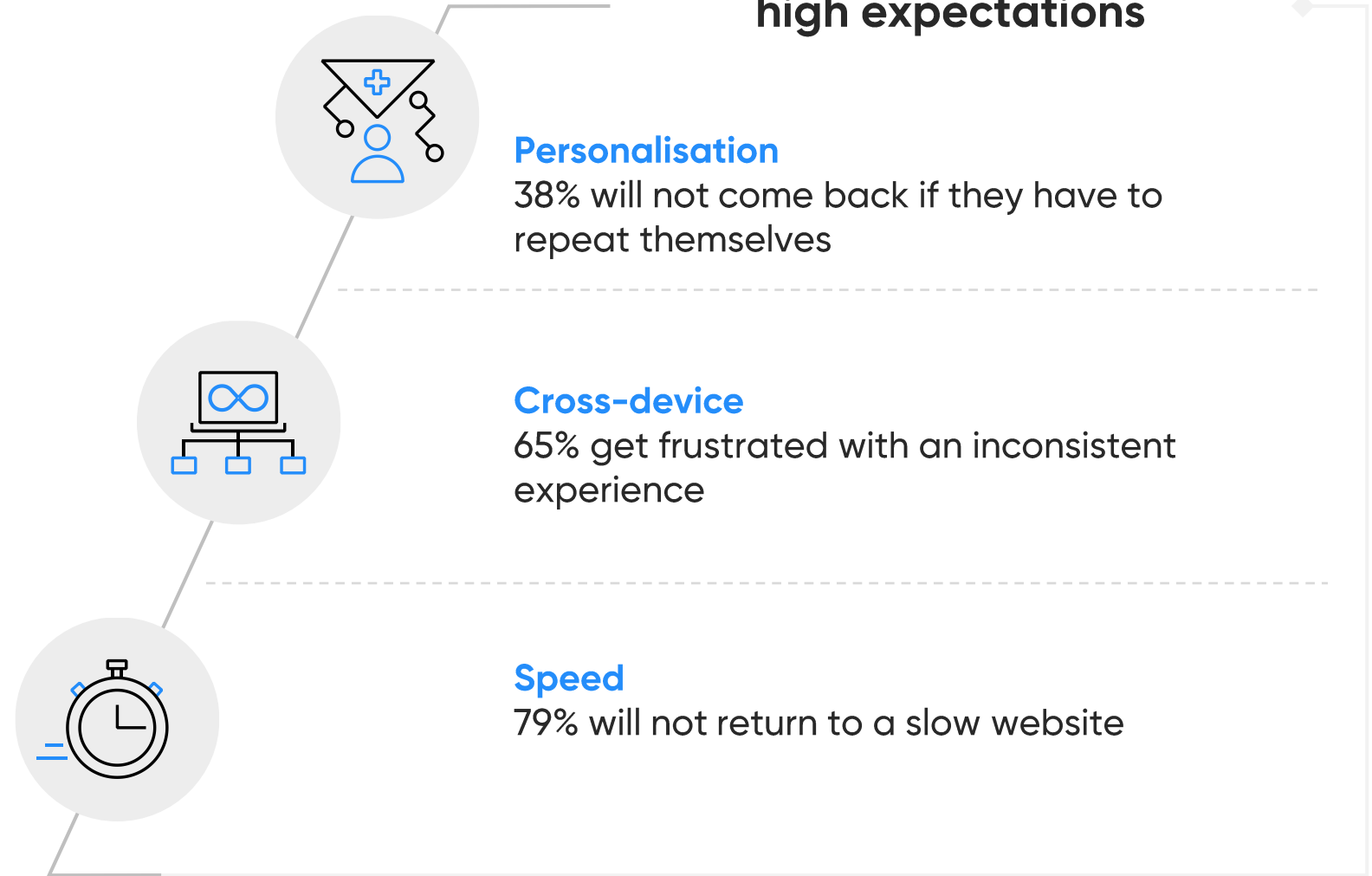


# Customer experience is crucial

*"More than any other factor, customer experiences determine whether companies thrive and profit, or struggle and fade"\**

\*Source: Forrester Research, "Outside In"

Your end users have high expectations



# Modern web applications challenges

Fast, fluid, and  
reliable experience

Intelligent  
customisation

Quick functionality and  
content updates

Authentication and identity,  
sensitive data handling

Cross-platform  
engagement

New ways to interact  
with customers



# Scalable Web Applications **with Azure Services**



# What are you going to learn?

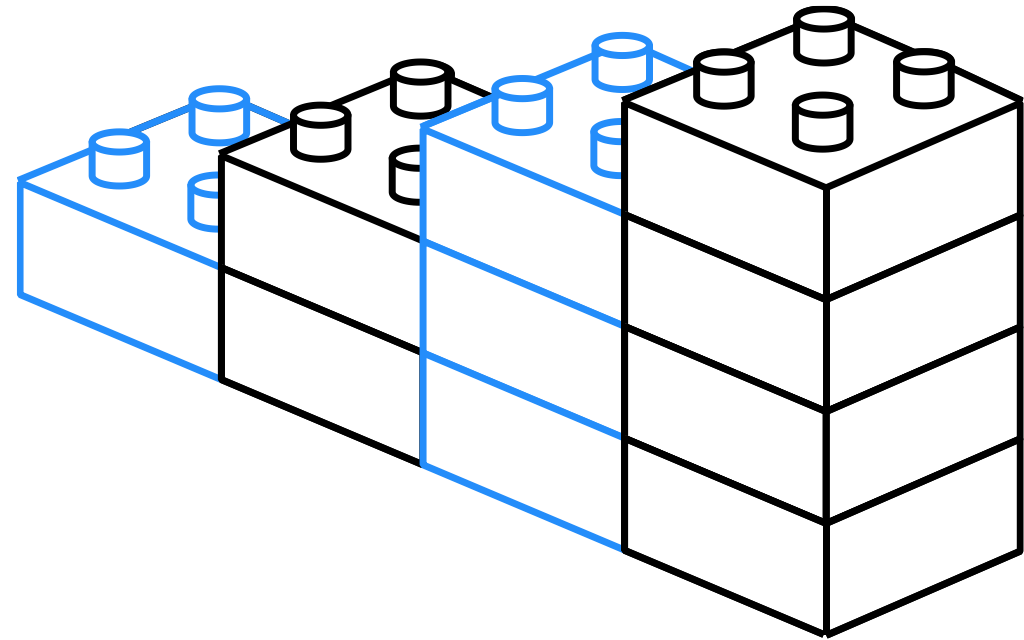
- ✓ What is web application scalability?
- ✓ Why is it essential?
- ✓ What are two main ways to scale?
- ✓ Why should you design to scale out?
- ✓ Real-world scenario.
- ✓ Some Azure cloud services.



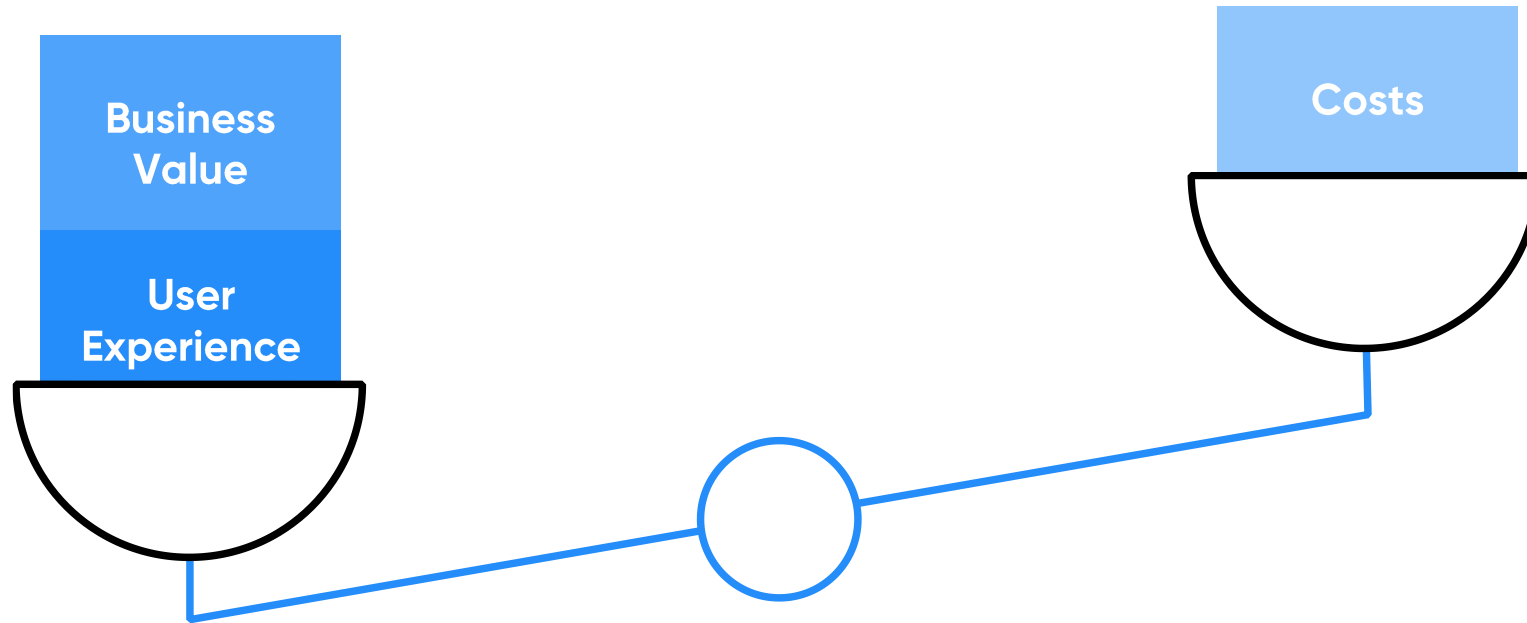
# What is scalability?

Ability to handle increased load

Add resources without modifying the system

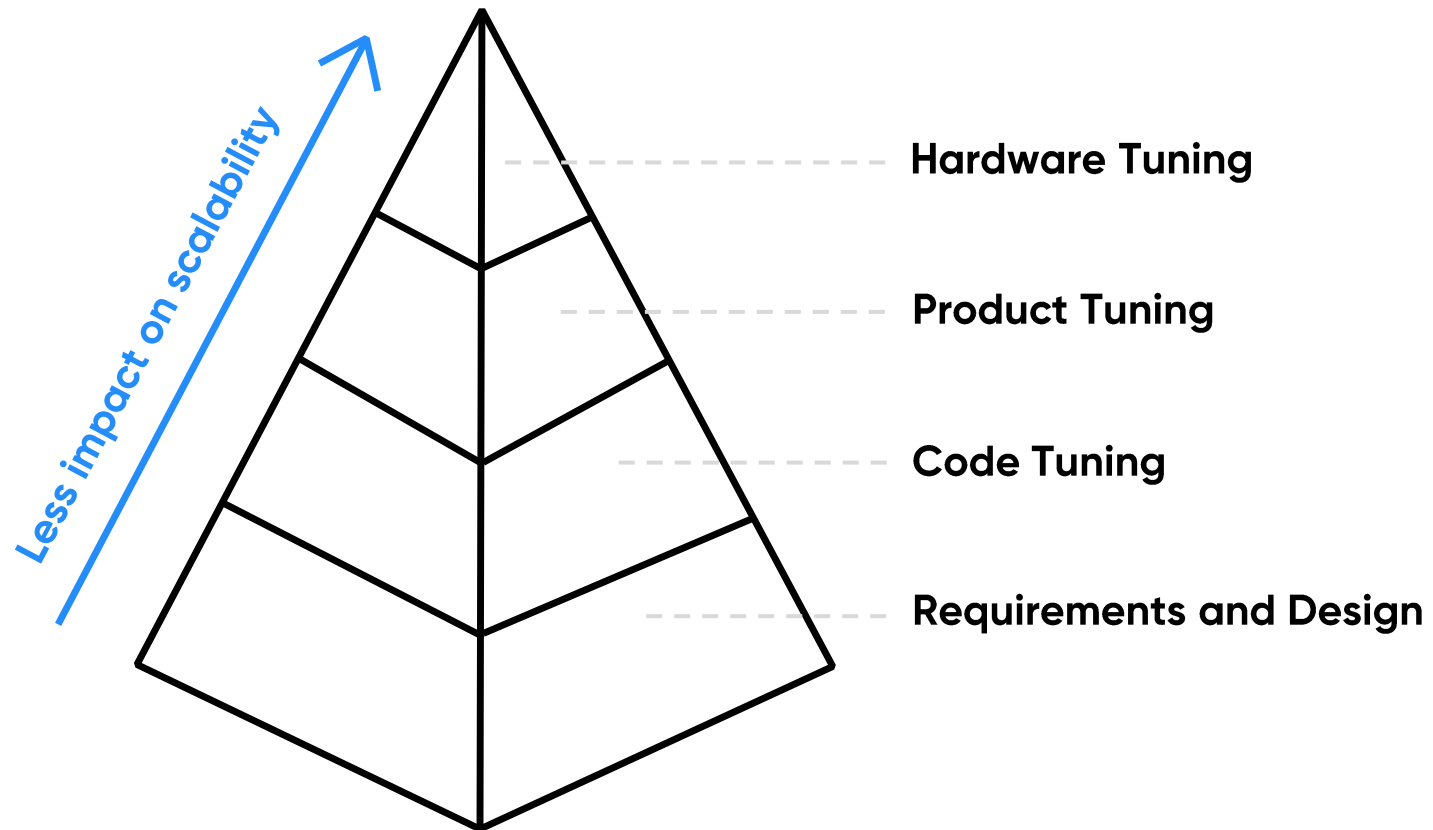


# Scalability, why should you care?

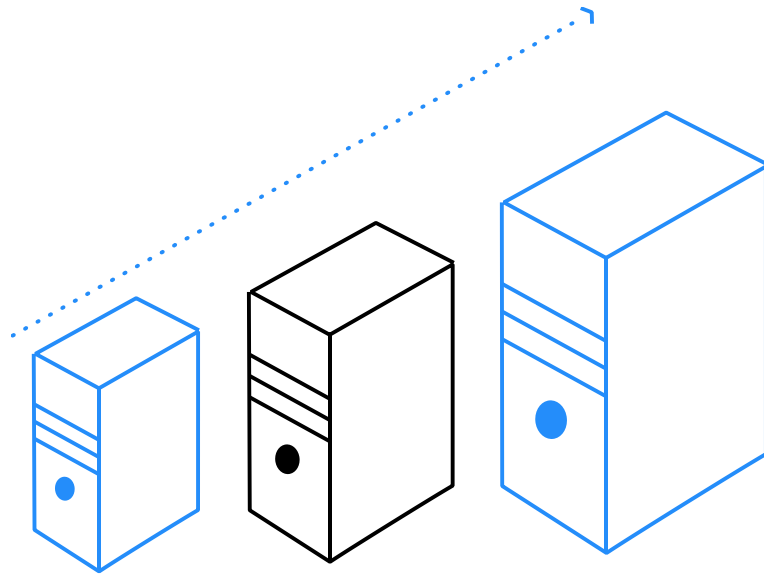


# Impact on scalability

## The Scalability Pyramid

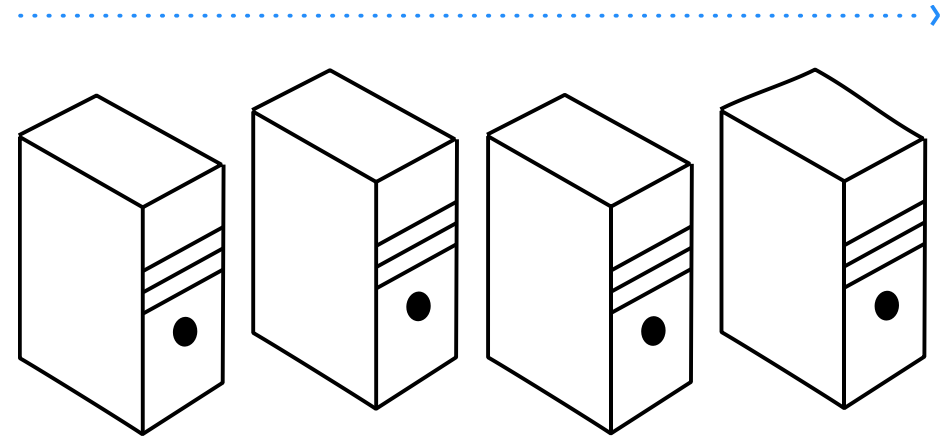


# Two methods to scale



## Scale Up (vertical scaling)

Increase capacity by adding RAM/CPU  
Disk to a single resources

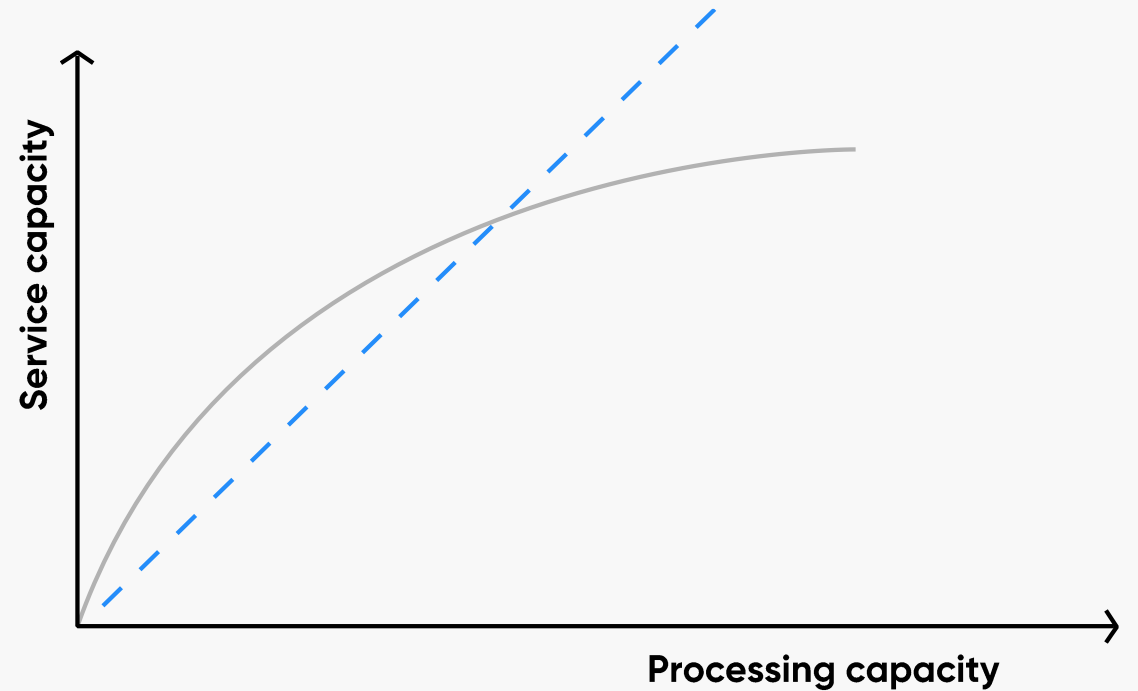


## Scale Out (horizontal scaling)

Increase capacity by adding resources

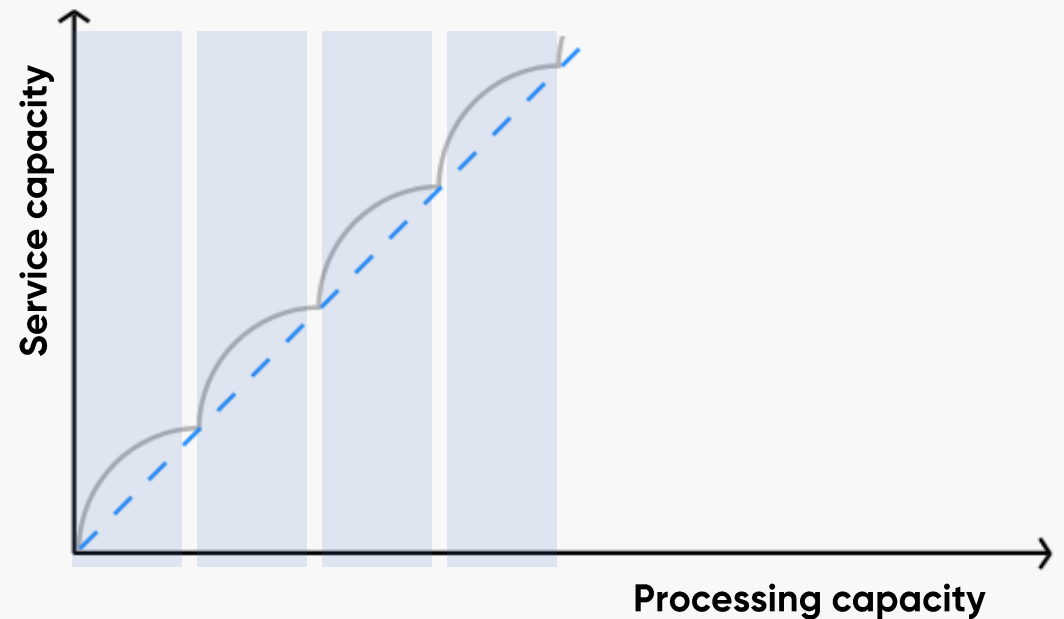
# Scaling up

- ✓ Application does not have to be designed for scalability;
- ✓ Easy to implement;
- ✓ Costly;
- ✓ Not linear performance growth;
- ✓ Has upper scalability limit.



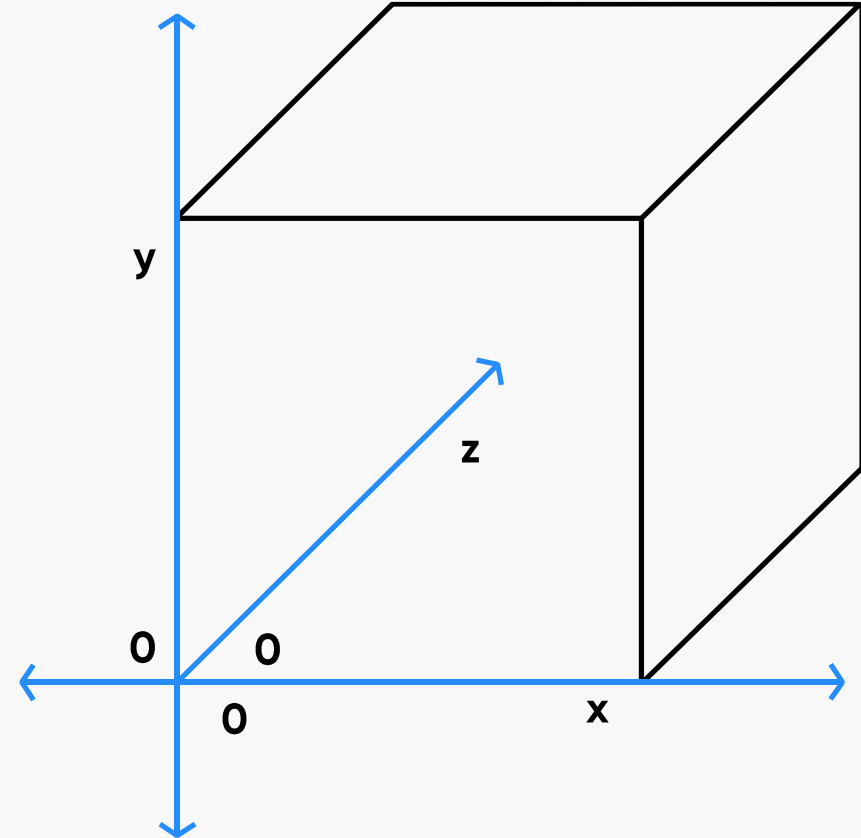
# Scaling Out

- ✓ Application has to be designed for horizontal scalability;
- ✓ Requires more investment to implement;
- ✓ Introduces additional complexity;
- ✓ Nearly linear performance increase.



# Scale Cube

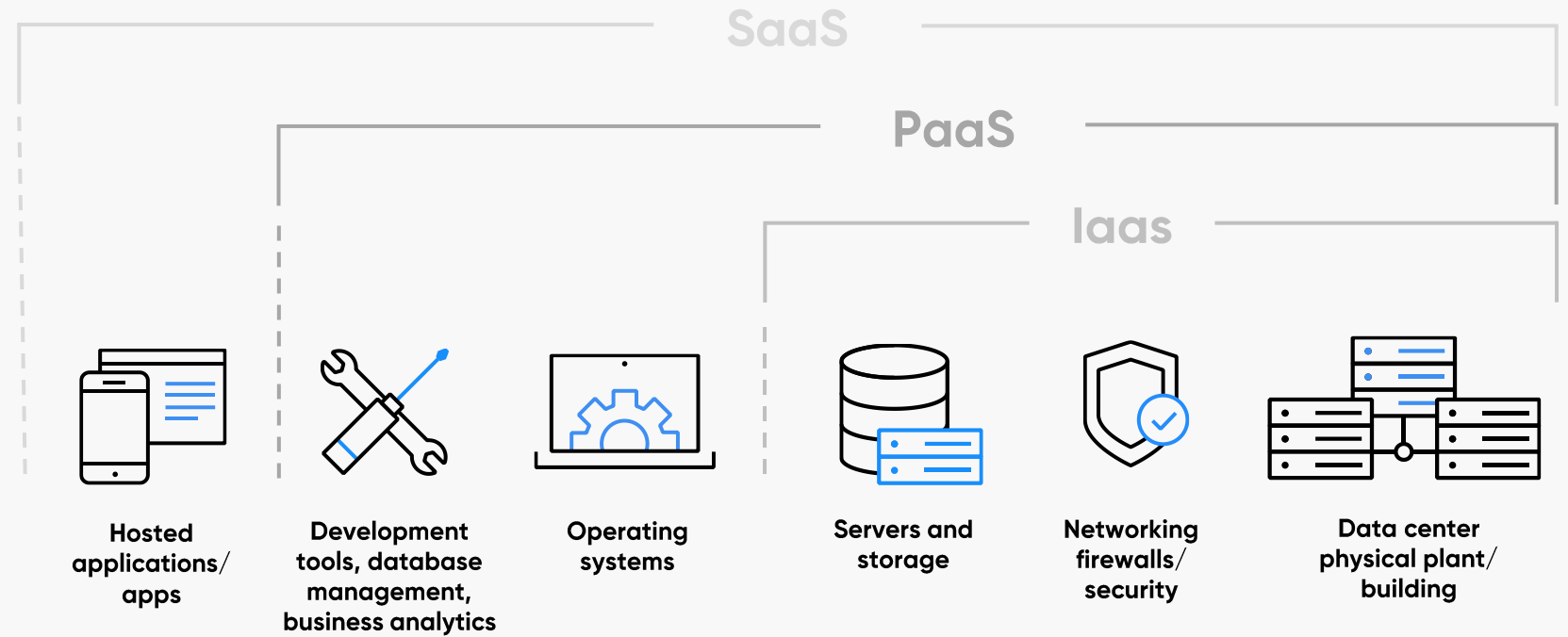
- ✓ Model that allows thinking in terms of scalability;
- ✓ X-axis split: cloning or duplication;
- ✓ Y-axis split: functional decomposition;
- ✓ Z-axis split: segmentation or partitioning



*Scale Cube described by Martin Abbot and Michael Fisher in the "Art of scalability"*

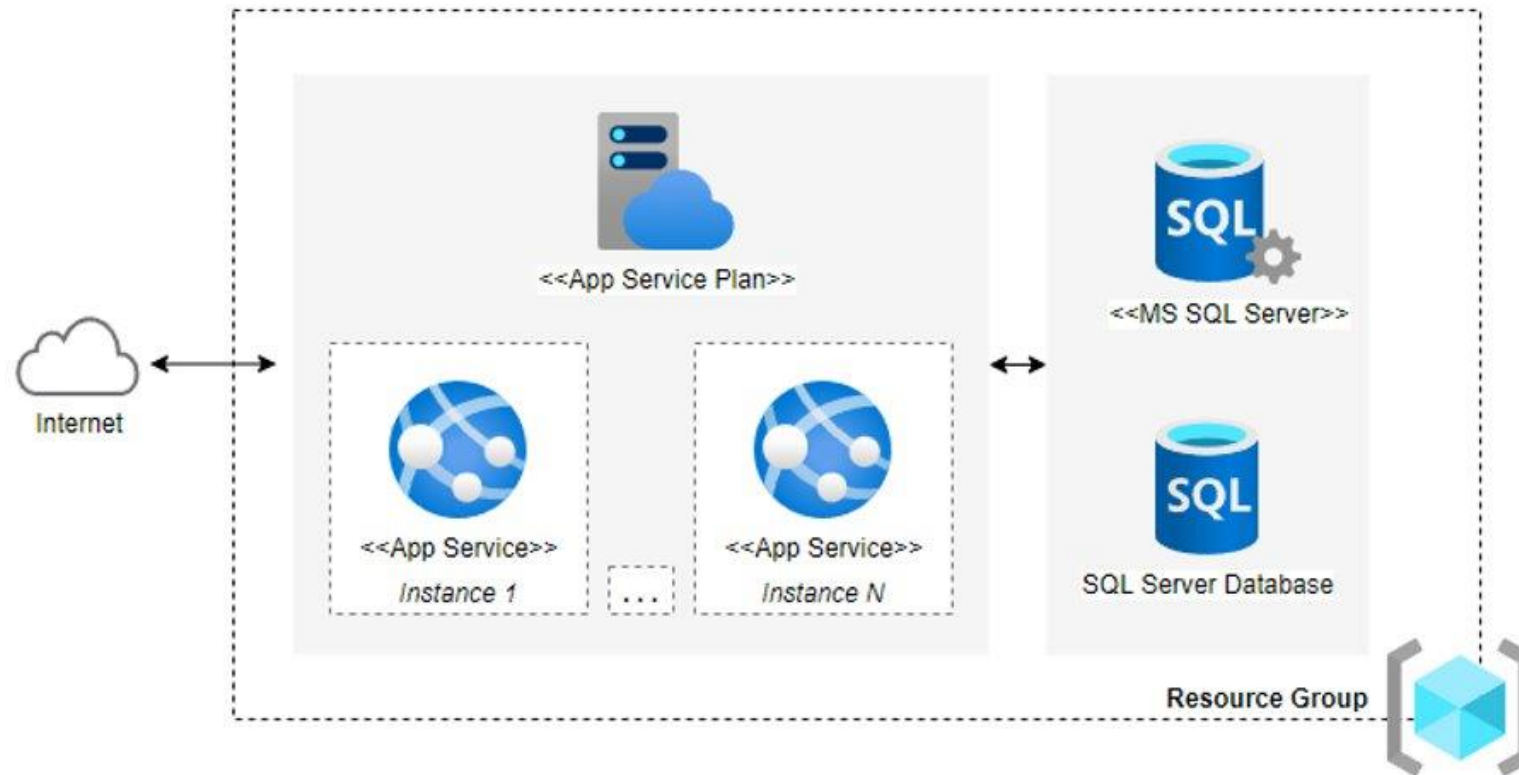


**Azure**





# Initial Architecture



## As Is

- ✓ Monolith MVC application;
- ✓ Hosted as Azure App service;
- ✓ X-axis split achieved with App Services multiple instances and enabling session affinity;
- ✓ Connected to a single MS SQL Relational Database.

## Problems

- ✓ Session affinity is not optimal for load balancing;
- ✓ Single application quickly gets very complex as the code base grows;
- ✓ Single database eventually will become a bottleneck even though the application is scaled out.

## To Be

- ✓ Introduced Y-axis split of application to:
- ✓ get rid of session affinity,
- ✓ reduce code complexity,
- ✓ and introduce fault isolative architecture.

# Azure App Services

Azure App Services is a cloud computing-based platform for hosting websites

## App Service

App Service Plan

App Service

Web App

API App

Mobile App

## Scaling

Scale Up

Scale Out

Auto Scaling

Global Scaling with Azure  
Traffic Manager (Front Door)

## Tiers

Free

Shared

Dedicated (basic, standard)

Isolated (ASE)

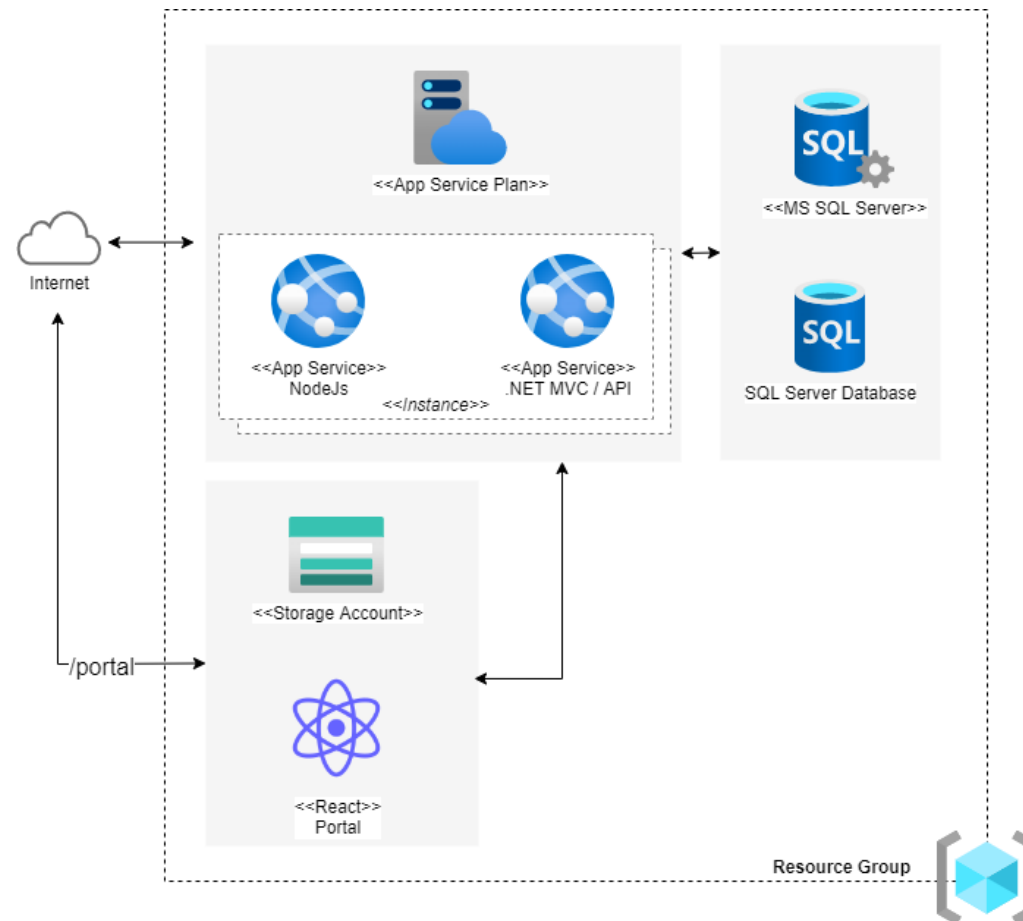
# First Y-axis Split

## As Is

- ✓ Application split into Admin, Portal, and Site applications;
- ✓ The portal React application is hosted in a massively scalable **Storage Account** service.

## Problems

- ✓ Application split into Admin, Portal, and Site applications;
- ✓ The portal React application hosted in a massively scalable **Storage Account** service.

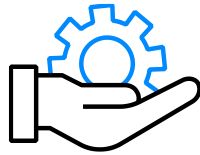


# Azure Storage Account



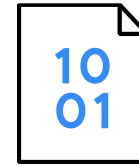
## Storage Account

- ✓ Cloud repository for data
- ✓ Enormously scalable
- ✓ CORS support
- ✓ Role-based access control



## Services

- ✓ Azure Blob
- ✓ Azure Files
- ✓ Azure Queue Storage
- ✓ Azure Table Storage
- ✓ Azure Disk Storage



## Azure Blob Storage

- ✓ Azure Blob storage is an object storage
- ✓ Blob storage objects can be accessed HTTP/HTTPS
- ✓ We used Blob Storage for Storing React application for distributed access

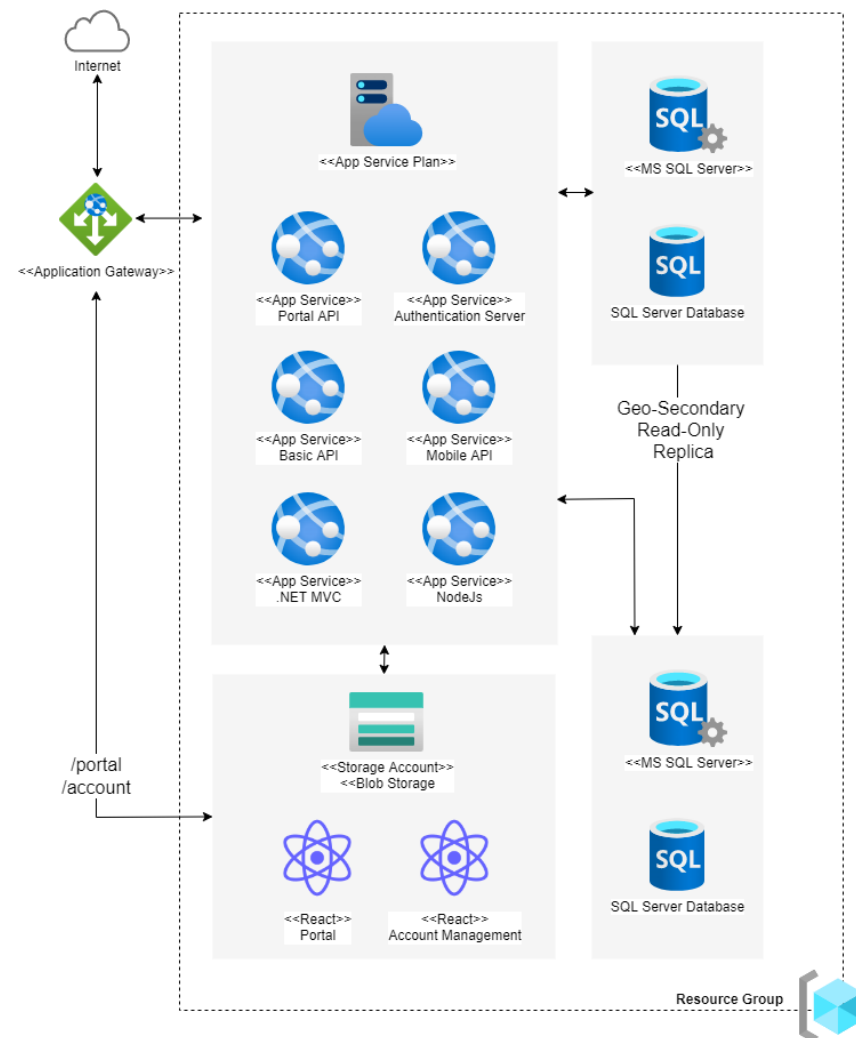
# Database Replica

## As Is

- ✓ Business logic decomposed to separate applications and exposed through REST API;
- ✓ Presentation separated from business logic with SPA application;
- ✓ Secondary Replica created as Read-Only database to balance transactions and create the geographic failover.

## Opportunities

- ✓ Asynchronous and performance demanding tasks could be implemented separately from the application with Azure Functions;
- ✓ Data could be partitioned to increase performance.

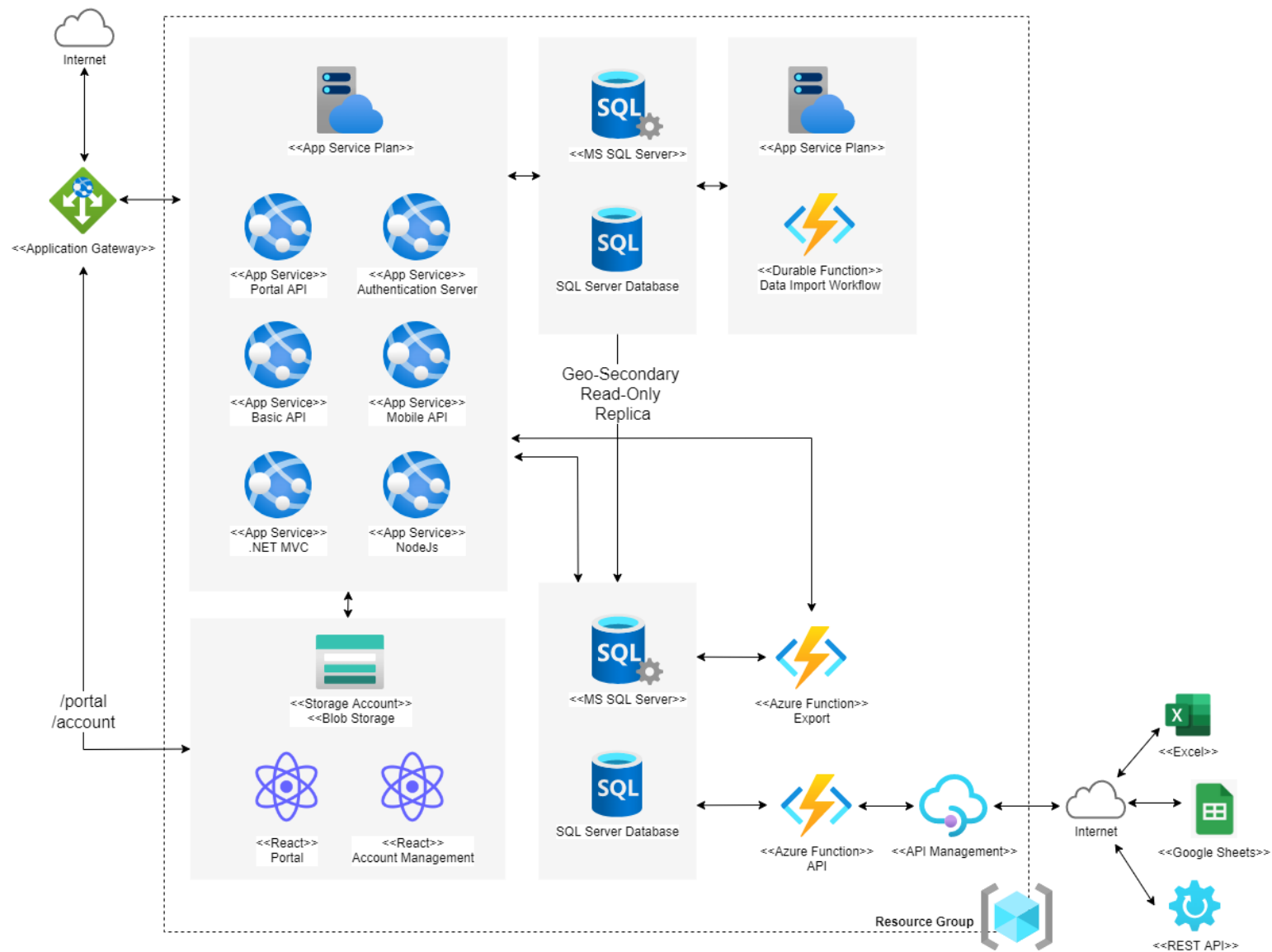




## Azure SQL Database

- ✓ Azure SQL Database is a fully managed platform as a service (PaaS) database engine;
- ✓ Has many Enterprise features: for example, Column Store index;
- ✓ You can dynamically scale single database resources up and down;
- ✓ The serverless computer is available. Automatically scales compute based on workload demand;
- ✓ The single database allows you to configure up to four readable secondary databases in either the same or globally distributed Azure data centers.

# Current Architecture







## Azure Functions

- ✓ Azure Functions is a serverless solution that allows to write less code, maintain less infrastructure, and save on costs;
- ✓ The Consumption plan scales automatically, even during periods of high load;
- ✓ On a consumption plan instances of function hosts are dynamically added and removed based on the workload for functions;
- ✓ For long running workflows Durable Azure Functions are recommended.

# Techologies



**API  
Management**



**Azure  
Fuction**



**Application  
Gateway**



**App  
Service**



**SQL Server  
Database**



**Storage  
Account**

## Alternatives



**Azure Static Web Apps** is a service that automatically builds and deploys full stack web apps to Azure from a code repository.



**Azure Container Apps** is a fully managed serverless container service for building and deploying modern apps at scale.

# What benefits do customers get?



Flexible and modern  
architecture



Fast  
implementation



Easier  
expansion



Enhanced solution  
security and  
maintainability

# Baltic Amadeus offers

**€3,035**

Contact Me

**Publisher**  
Baltic

**Service type**  
Assessment

**Gold competencies**  
Application Development  
Application Integration  
Data Analytics

**Solution Areas**  
App Modernization  
Migration  
Security

**Industries**  
Distribution  
Financial Services  
Healthcare + Life Sciences  
Manufacturing  
Media & Communications  
Retail + Consumer Goods

**Country/Region**  
Austria

**Also available in**  
Belgium  
Bulgaria

## Application Modernization: 4-Wk Assessment

Baltic

Baltic Amadeus application modernization services include in-depth analysis, planning with professional recommendations for the seamless transformation of application to operate in the Azure cloud

Application modernization assessment service helps customers to accelerate the digital transformation to the Azure cloud. Using the latest technologies and frameworks, our certified specialists will help to refine the vision, calculate and optimize the costs, and later execute application modernization and migration to the cloud.

Service deliverables consist of a detailed report of application assessment and modernization roadmap of selected applications.

How the assessment is executed:

1. Assessment of current situation and interviews with engineering teams - 1 week
2. Analysis of gathered information, data aggregation and verification - 1 week
3. Preparation and finalization of a report for modernization scenarios - 1 week
4. Presentation of suggested modernization plan and next steps - 1 week

Modernization types we offer:

1. Lift & shift – this is where we shift an application from an on-premises host to a cloud service (infrastructure or a platform service).
2. Re-factor – this is where we modify your applications to better support the cloud environment by changing the system architecture and applying cloud-native technologies and principles (e.g. containerization and micro-services).
3. Re-place – in this case, we retire the application and replace it with a new cloud-native application.

Value: The right scenario will significantly reduce the modernization duration and optimize the cost of your solution.

Why us: Full visibility & efficiency. We work with an efficient approach and ensure a clear plan and procedures throughout the entire project. Long-year expertise in varied industries. A diverse

**Bring your digital solutions to the cloud:**  
Enable your business transformation with a complete suite of cloud services.

A full suite of cloud services for businesses that are looking to move to empower their cloud computing, migrate existing digital products or create new ones from scratch.

**BENEFIT FROM OUR PARTNERSHIP**

**Focus on strategic business goals**  
A full suite of cloud services for businesses that are looking to move to empower their cloud computing, migrate existing digital products or create new ones from scratch.

**Full spectrum of services on hand**  
We deliver the complete implementation of your most complex or large-scale cloud modernization and migration projects/programmes.

**Efficiency and flexibility in choosing the best solutions**  
We advise you on the optimal combination of cloud services and products. You will have ultimate flexibility and freedom of choice as our solution will not depend on a specific product or cloud service provider.



Available on  
**Microsoft Azure Marketplace**

- Application Modernisation: 4Wk Assessment
- Building Cloud Native Apps: 1-Day Workshop
- BI & Data Warehouse: 4-Wk Assessment
- Data Analytics Solution: 1-Mo implementation



# Time for your questions



Q&A SESSION