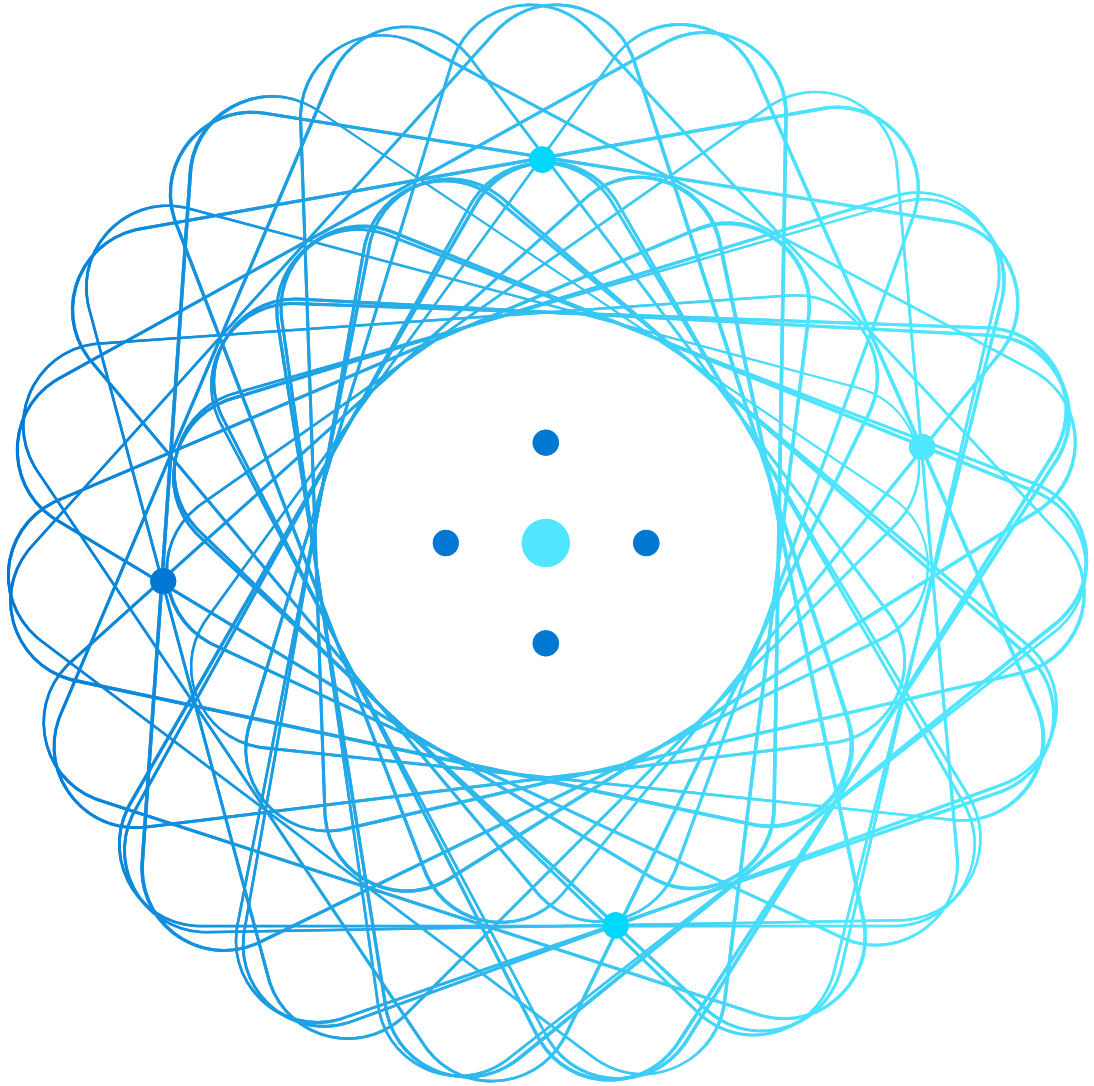
Microsoft Azure

AZ-305

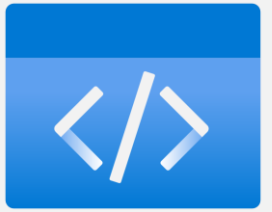
Designing Microsoft Azure Infrastructure Solutions



AZ-305 Agenda

Module 01 Design a governance solution
Module 02 Design a compute solution
Module 03 Design a non-relational data storage solution
Module 04 Design a data storage solution for relational data
Module 05 Design a data integration solution
Module 06 Design an application architecture solution
Module 07 Design Authentication and Authorization Solutions
Module 08 Design a solution to log and monitor Azure resources
Module 09 Design a network infrastructure solution
Module 10 Design a business continuity solution
Module 11 Design a migration solution

Module 06: Design an application architecture solution



Introduction

Cloud native ?

Container

~~K8s~~

microservices

DevOps

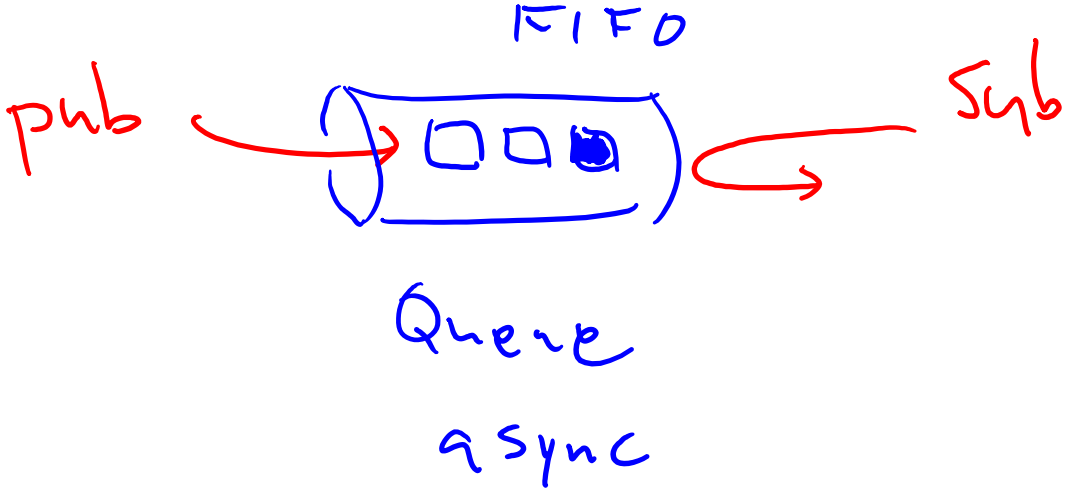
- Describe message and event scenarios
- Design a messaging solution
- Design an event solution (Event Hub and Event Grid)
- Design an application optimization solution
- Design application lifecycle
- Case study
- Summary and resources

AZ-305: Design infrastructure solutions (25-30%)

Design an Application Architecture

- Recommend a caching solution for applications
- Recommend a messaging architecture
- Recommend an event-driven architecture
- Recommend an automated deployment solution for your applications
- Recommend an application configuration management solution
- Recommend a solution for API integration

FaaS



Describe message and event scenarios

Determine message and event scenarios

Does the sending component expect the communication to be processed in a specific way?

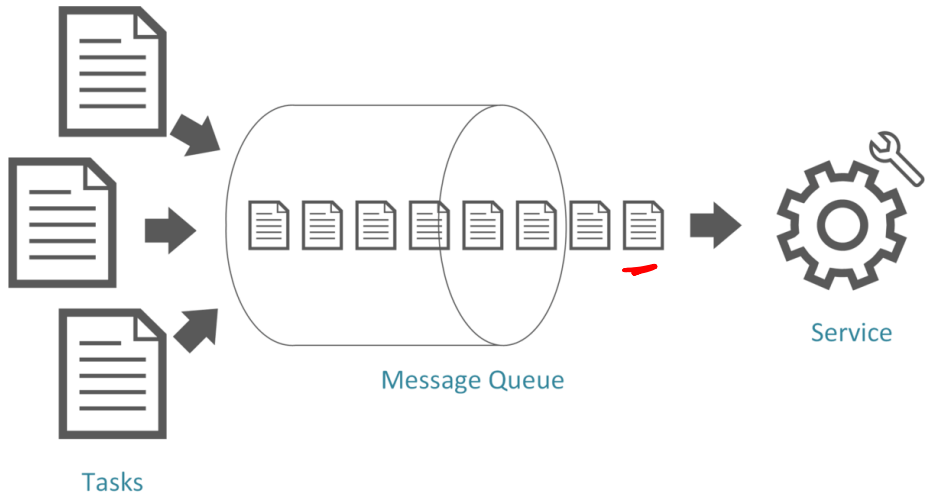
Action	Description	When to use
Event	• Light weight • Includes a publisher and a subscriber	Used for broadcasts and are often ephemeral. Ephemeral means the communication might not be handled by any receiver if none is currently subscribing.
Message	• Contains raw data, produced by one component, that will be consumed by another component. • Contains the data itself, not just a reference to that data.	Used where the distributed application requires a guarantee that the communication will be processed.

Design a messaging solution

Design for Azure Queue storage

Azure Storage Queue is a service for storing large number of messages.

- Accessed with authenticated calls using HTTP or HTTPS
- Messages can be up to 64 KB in size
- May contain millions of messages, up to the total capacity limit of a storage account



- Create a backlog of work to process asynchronously
- Example: customer placing orders online added to the queue and processed

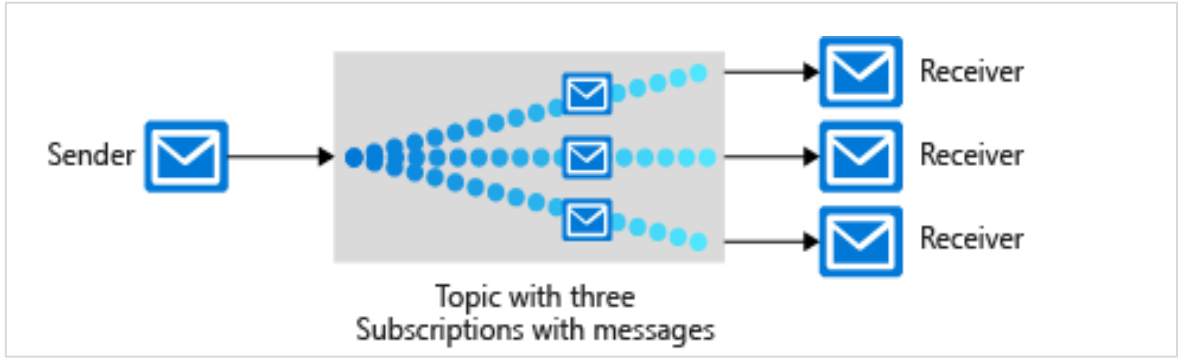
Design for Service Bus queues and topics

Service Bus decouples applications and services from each other.

Service bus queues

- Built on top of a dedicated messaging infrastructure
- Holds messages until the target is ready to receive them – different from queues

Service bus publish-subscribe topics

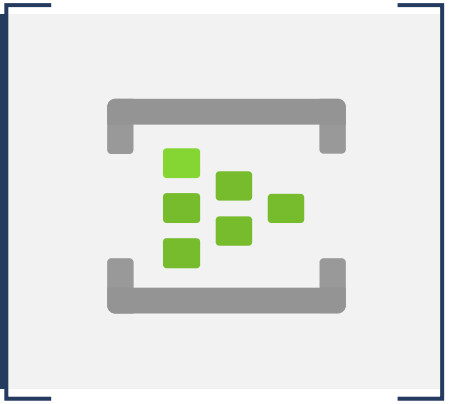


- Like bus queues but with multiple subscribers
- When a message is sent to a topic, multiple components can be triggered to perform a task

Compare messaging solutions

Solution	Usage cases	SLA
Queue storage	• A simple queue to organize messages. • Queue to exceed 80 GB in size. • To track progress for processing a message inside of the queue. • Maximum message TTL of 7 days	Based on storage tier
Service bus queues	• A first-in-first-out guarantee. • At least once delivery of a message. • Can group messages into transactions. • Receive messages without polling the queue. • Provide a role-based access model to the queues. • Publish and consume batches of messages.	99.9%
Service bus topics	• Multiple receivers to handle each message. • Multiple destinations for a single message.	99.9%

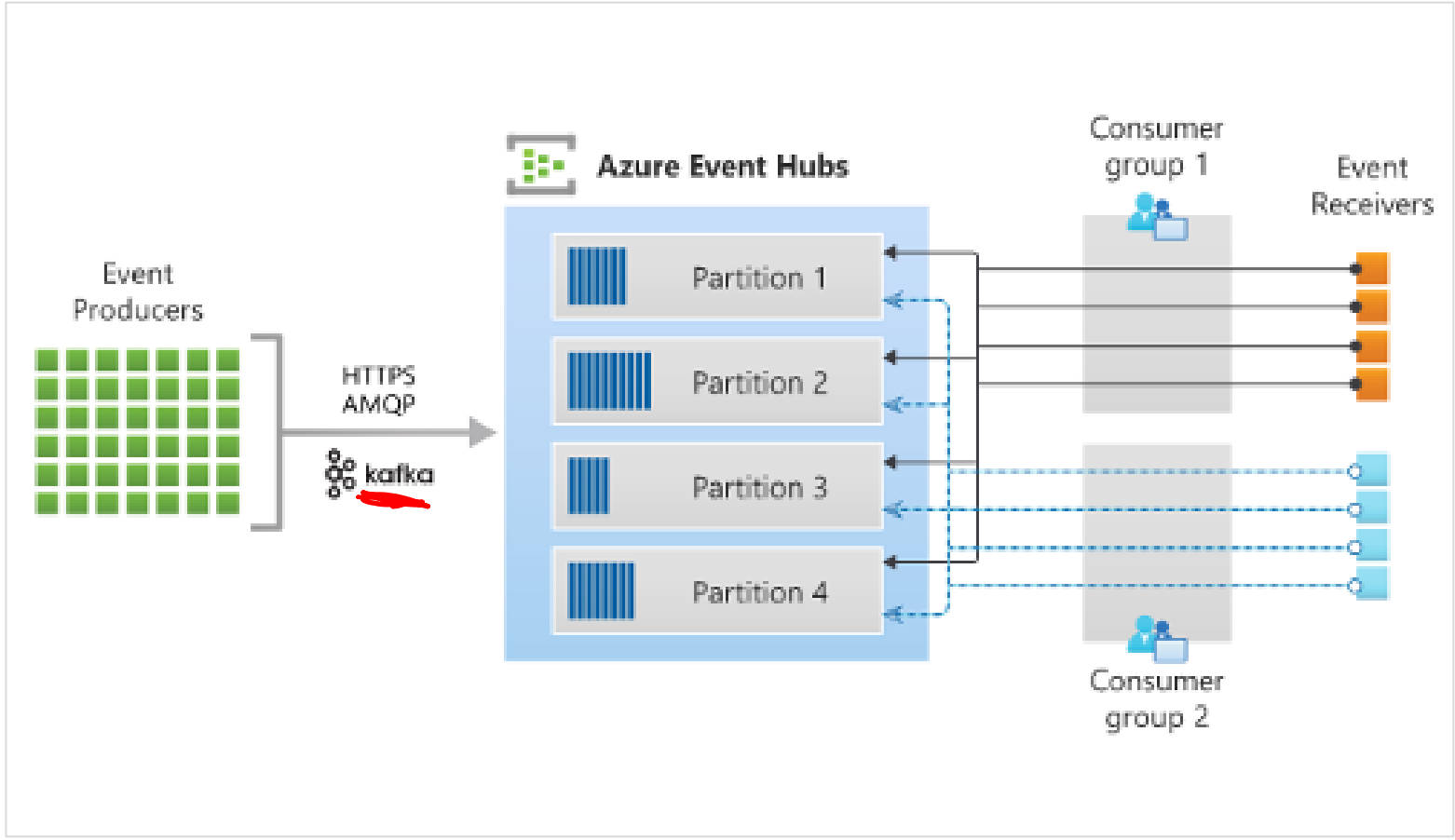
Design an event solution



Design an Event Hub messaging solution

Azure Event Hubs is a fully managed, real time data ingestion service

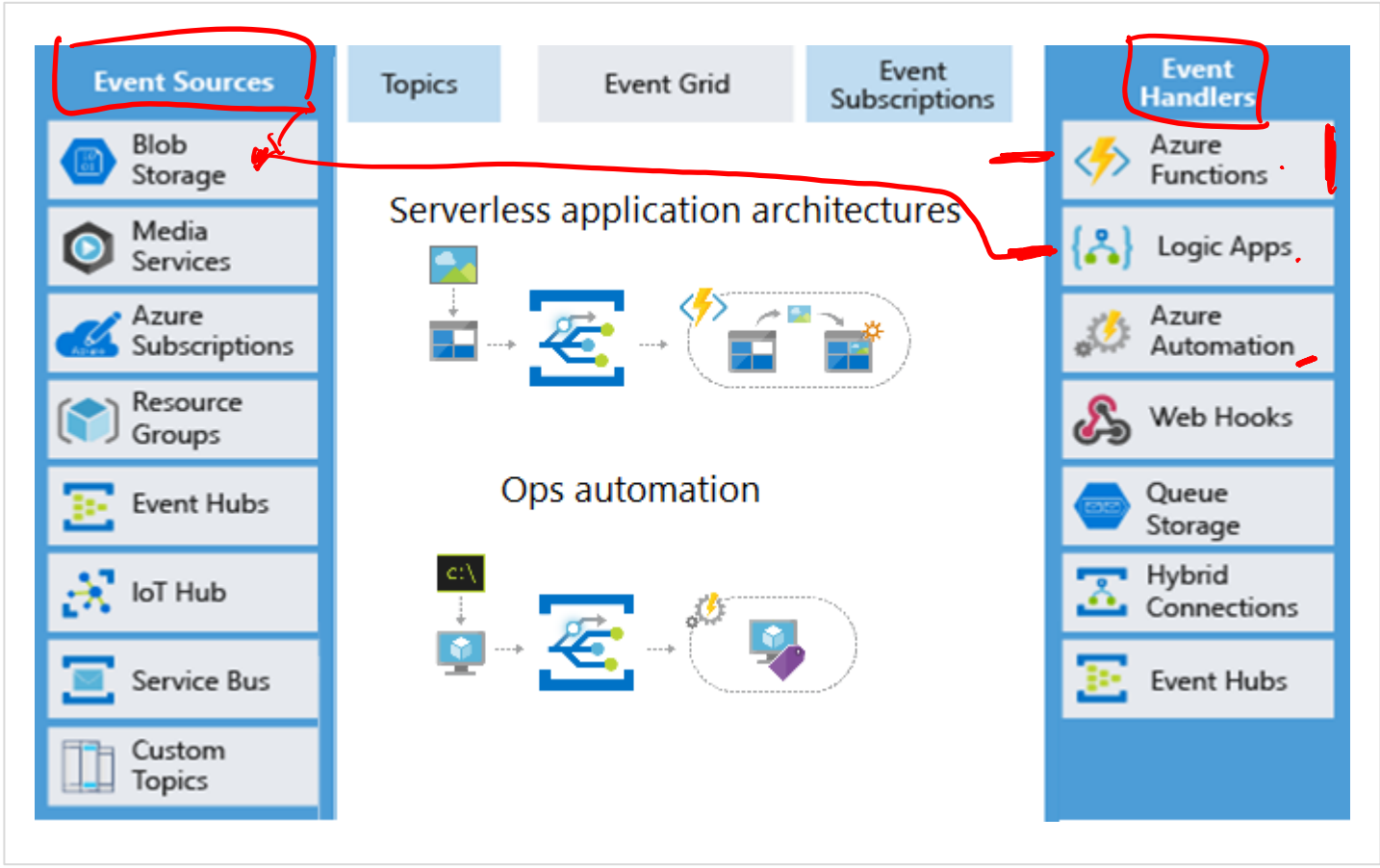
- Orders events by when they are received - by time offsets
- Uses a pull model allowing multiple reads from consumers
- Scaling is controlled by how many throughput units or processing units you purchase
- Doesn’t account for messages that aren't processed
- Receiving IoT and real-time streaming data



Design an event-driven solution

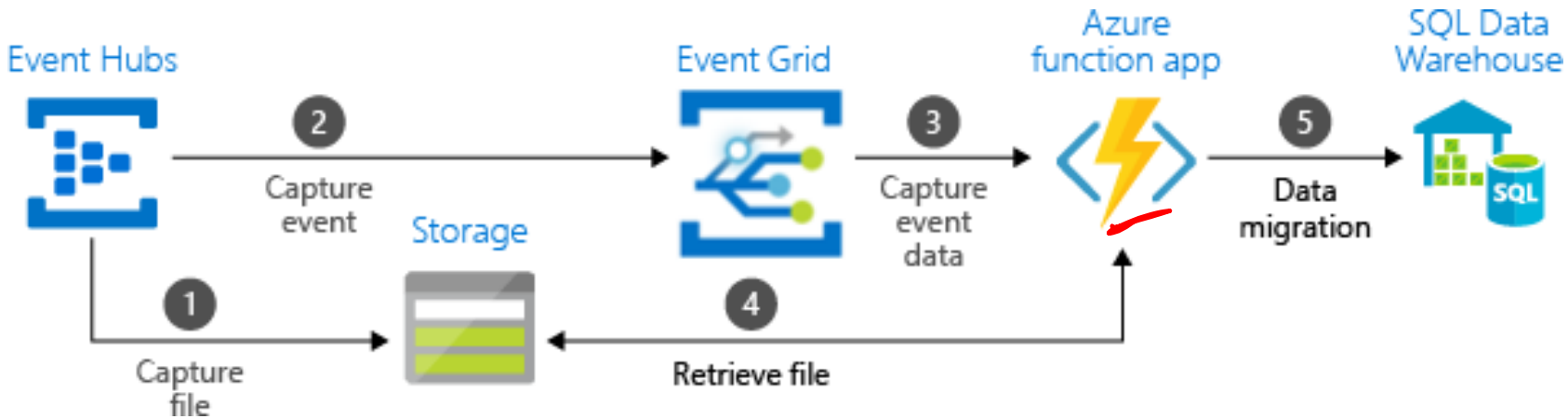
Azure Event Grid is a routing service connecting data sources with event handlers.

- Events sources include Azure resources or custom topics (you create)
- Event handlers react to an event
- Useful for serverless applications and operations automation
- Use *filters* to route and multicast events
- Uses a pay-per-event pricing model



Comparison of message and event solutions

Consider combining several solutions



Service	Purpose	Type	When to use
Event Grid	Reactive programming	Event distribution (discrete)	React to status changes
Event Hubs	Big data pipeline	Event streaming (series)	Telemetry and distributed data streaming
Service Bus	High-value enterprise messaging	Message	Order processing and financial transactions

Design an IoT Hub solution

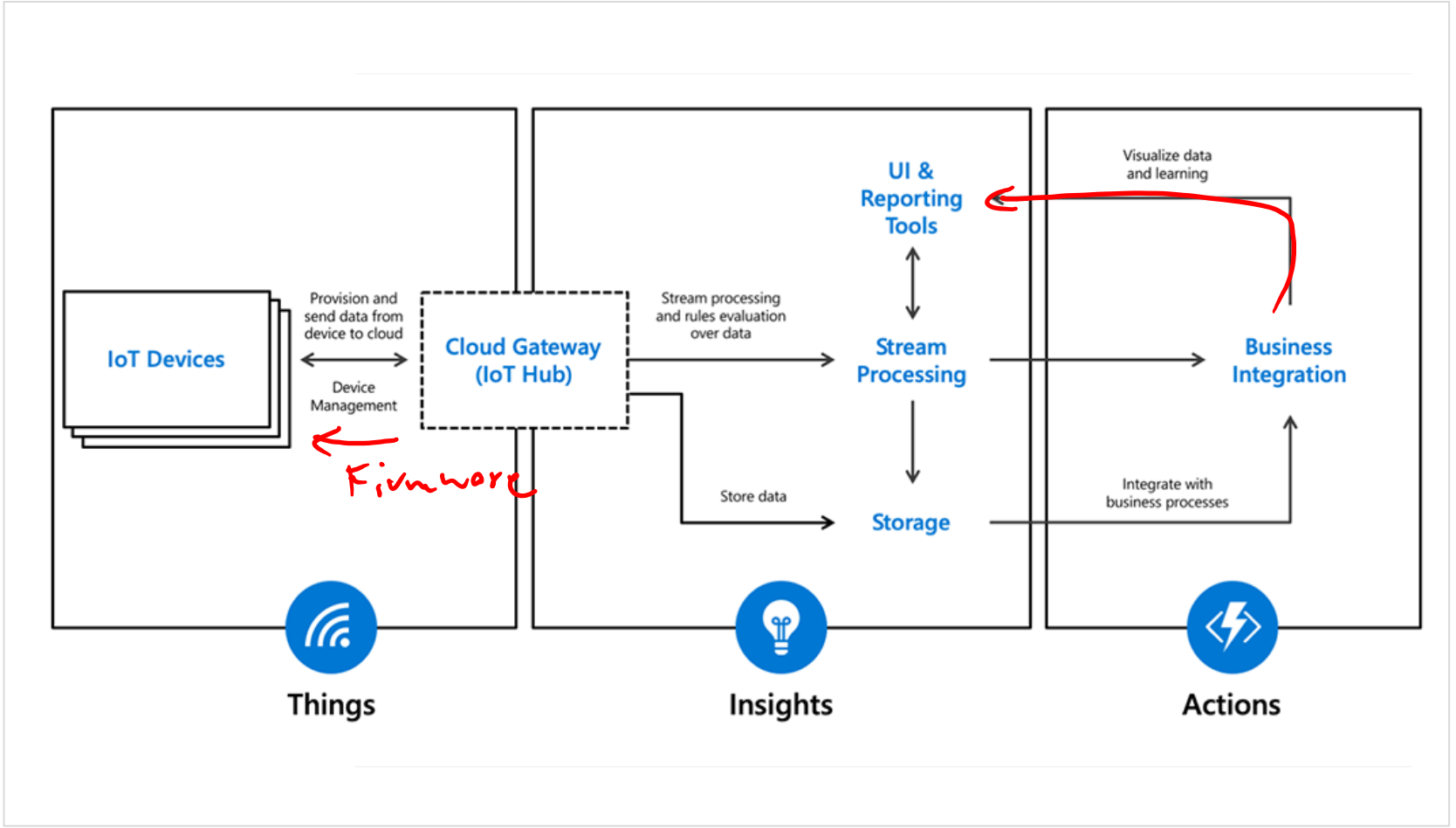
Central message hub for IoT applications and its attached devices.

When to use IoT Hub?

- Application complexity
- Data throughput
- Securing solution end to end allowing for per-device authentication
- Bi-directional communication

Capabilities over Event Hub:

- Per-device identity
- File upload from devices
- Device provisioning service

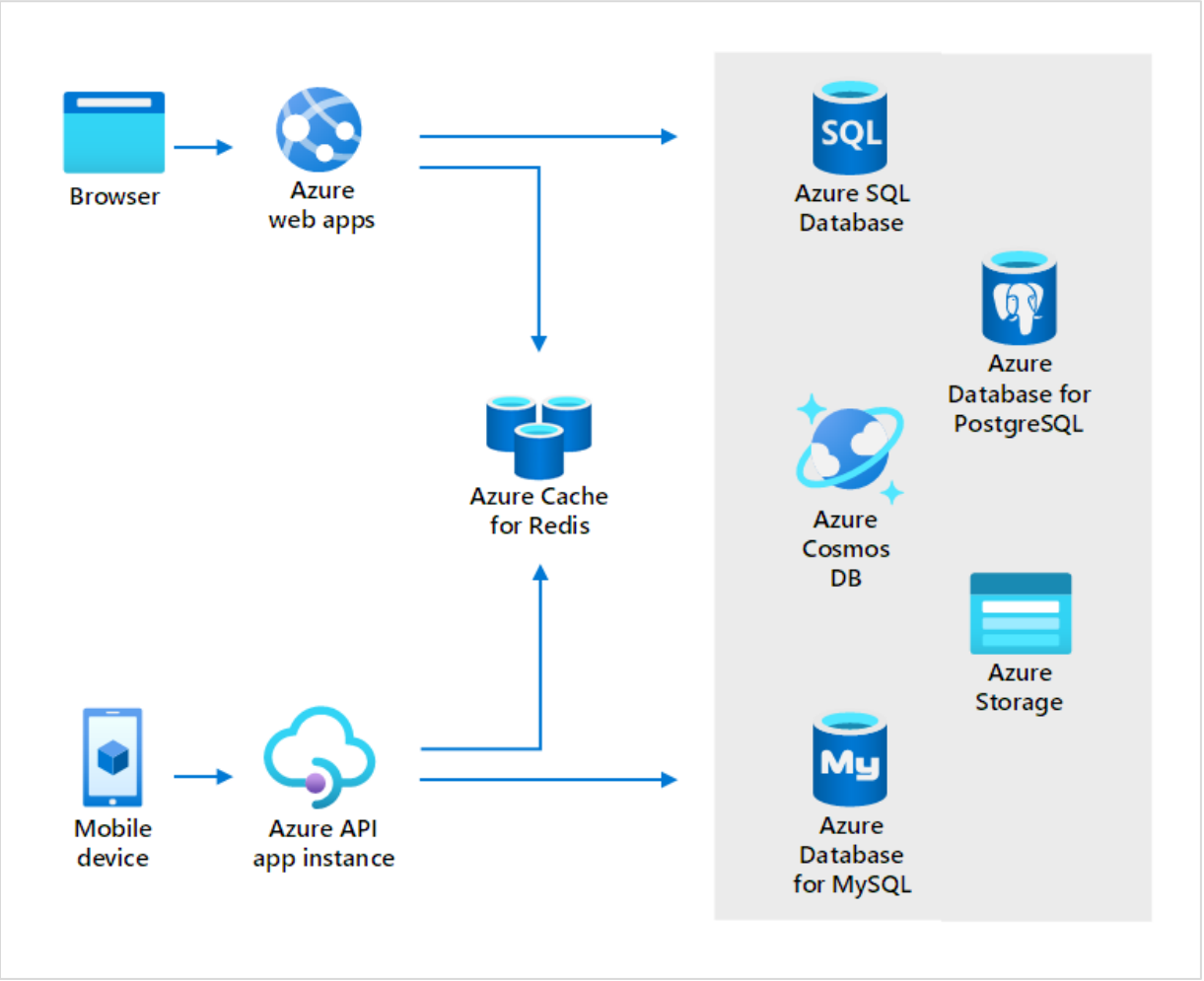


Design an application optimization solution

When to use Azure Cache for Redis

Store frequently accessed data so that applications can be responsive to users.

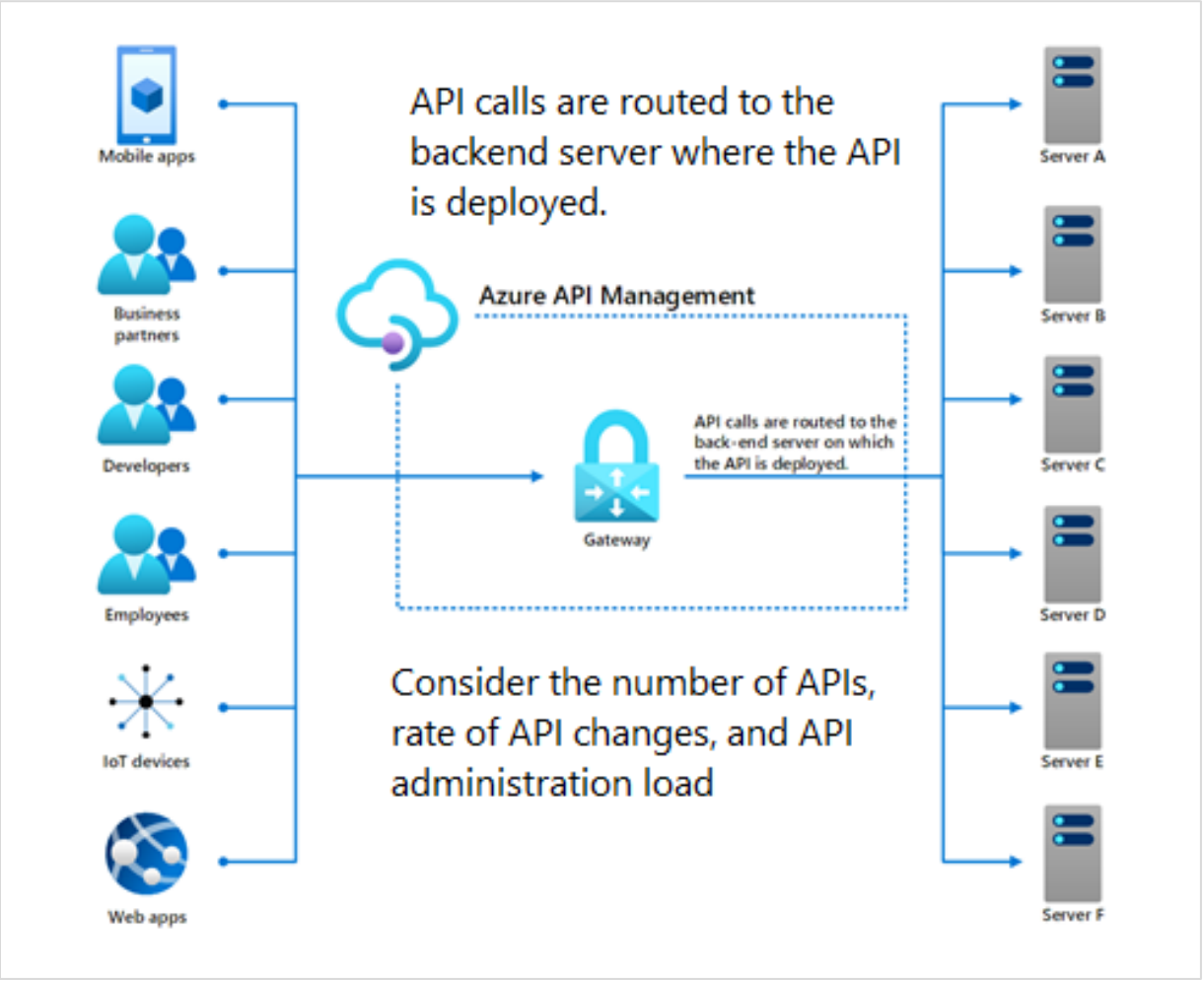
- Key scenarios - data cache, content cache, session store, job and message queuing, and distributed transactions
- Fully managed solution
- High availability - responds automatically to both anticipated and unanticipated changes in demand
- Same performance and scaling benefits throughout the world – network isolation, data encryption in transit



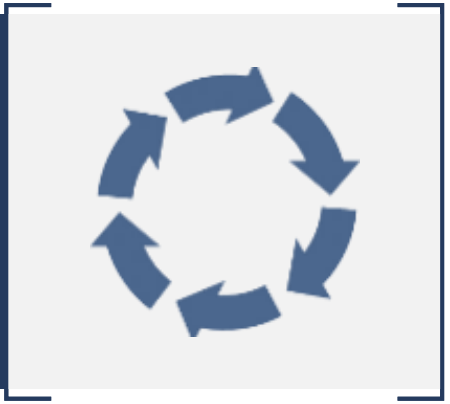
Design an Azure API management solution

Publish, secure, maintain, and analyze all your company's APIs.

- Bring multiple APIs under a single administrative umbrella – centralized management
- Manage permissions and access
- Ensure compliance across API
- Standardize API specs
- Protect the APIs from malicious usage



Design an application lifecycle

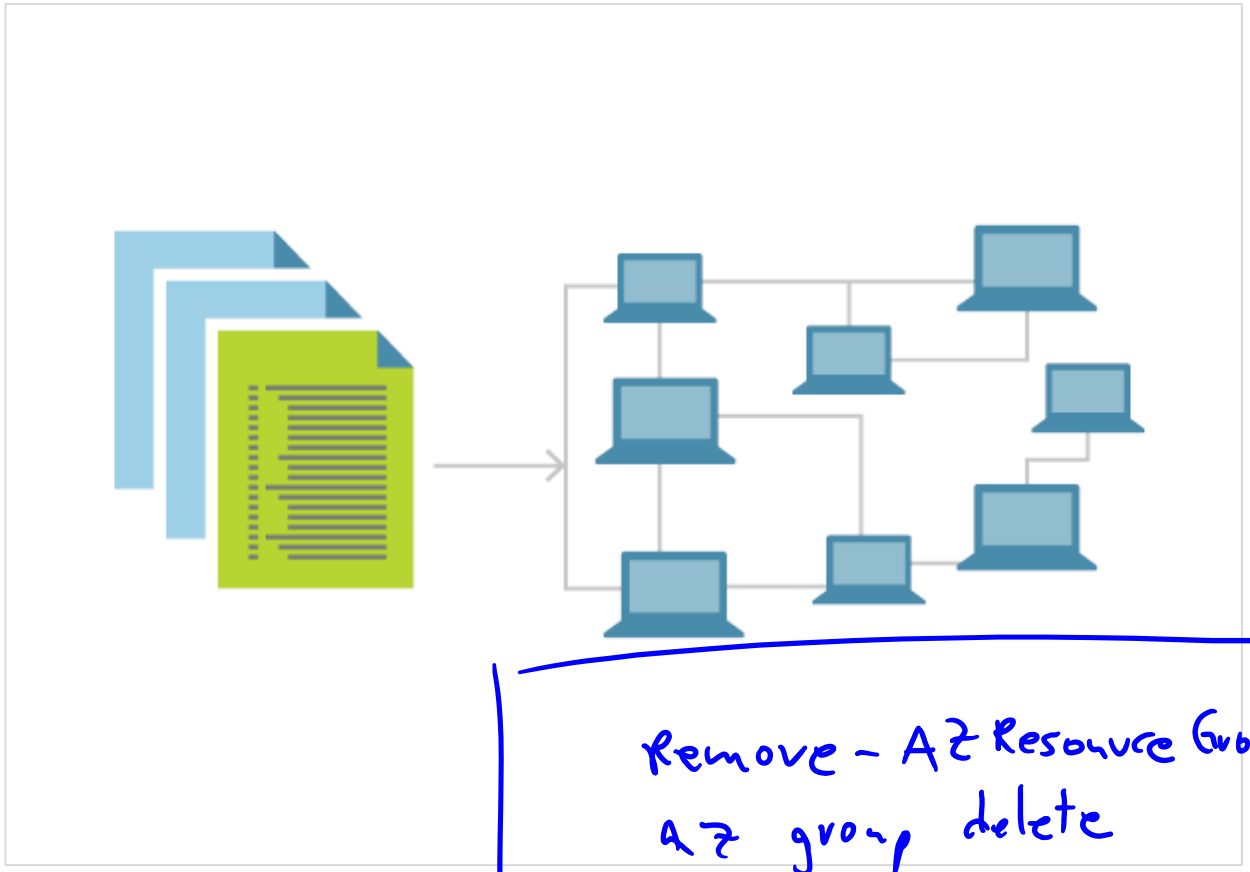


What is Infrastructure as Code?

Bicep → ARM (json)

Infrastructure as Code (IaC) is the process of automating your infrastructure provisioning.

- The IaC model generates the same environment every time it is applied
- Solves the problem of environmental drift
- Enables teams to test applications in production-like environments early
- Where possible, uses declarative definition files



Semper idem!

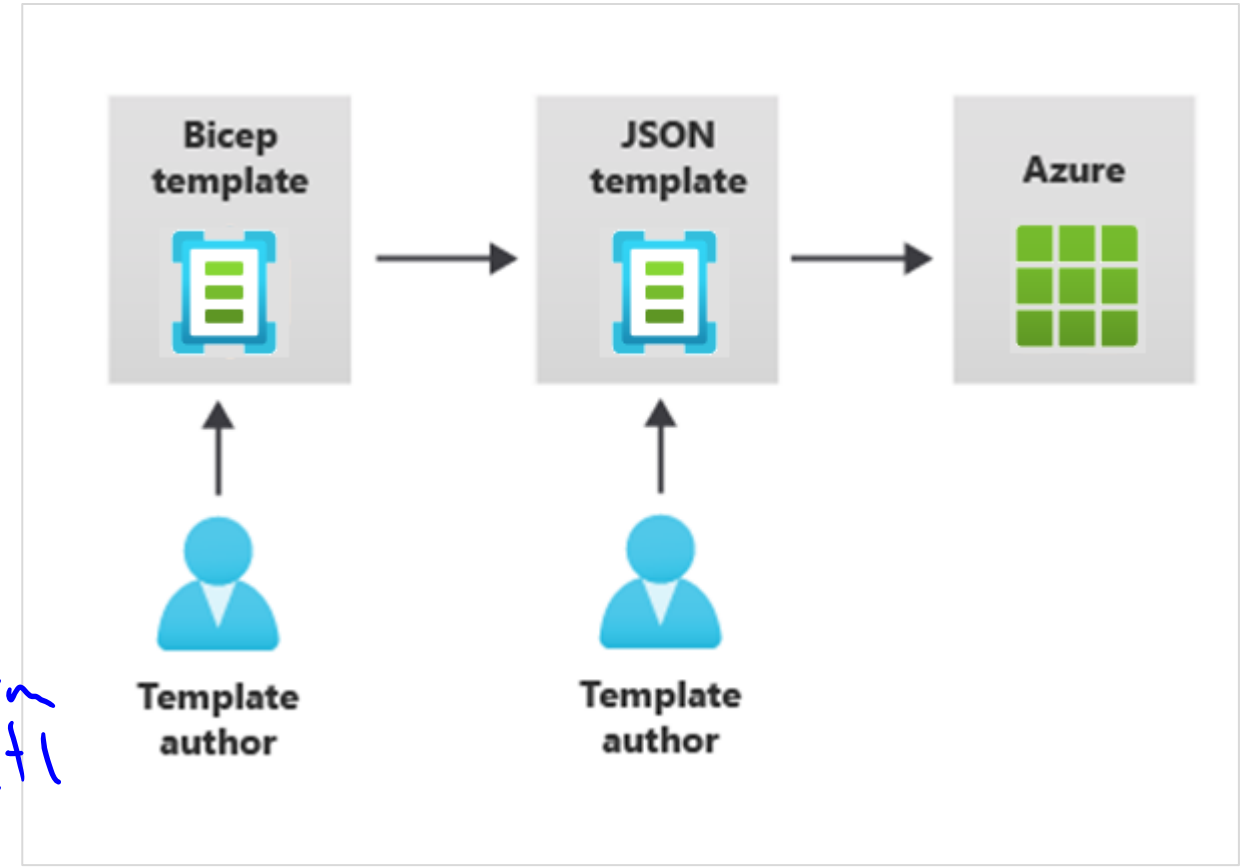
Remove-AzResourceGroup
az group delete

script

Provision resources with Infrastructure as Code

Azure supports IaC with Azure Resource Manager and third-party platforms.

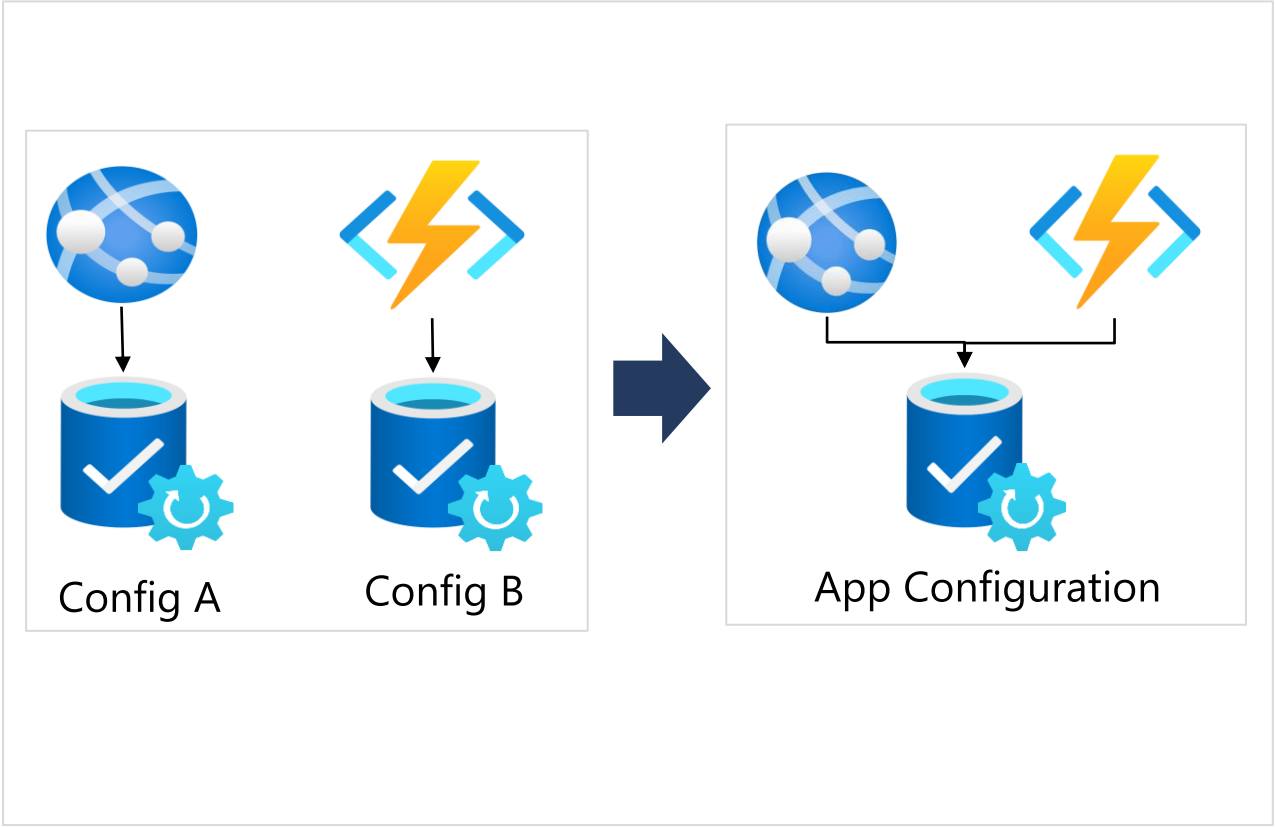
- Azure Resource Manager templates – Bicep, JSON
- Azure Automation
- Azure DevOps services
- GitHub actions
- Terraform
- Jenkins



Design an Azure App Configuration solution

Azure App Configuration centrally manages application settings and feature flags.

- Flexible key representations and mappings
- Point-in-time replay of settings - dedicated UI for feature flag management
- Comparison of two sets of configurations on custom-defined dimensions
- Enhanced security through Azure-managed identities and encryption

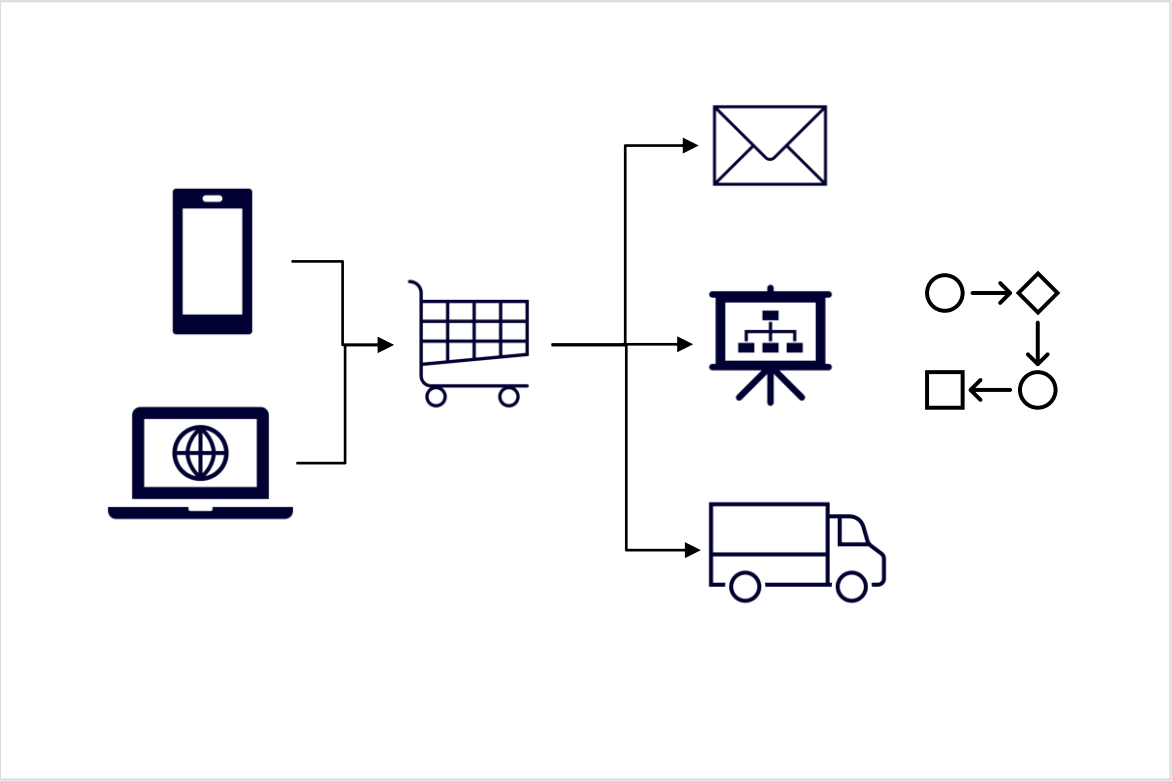


Review

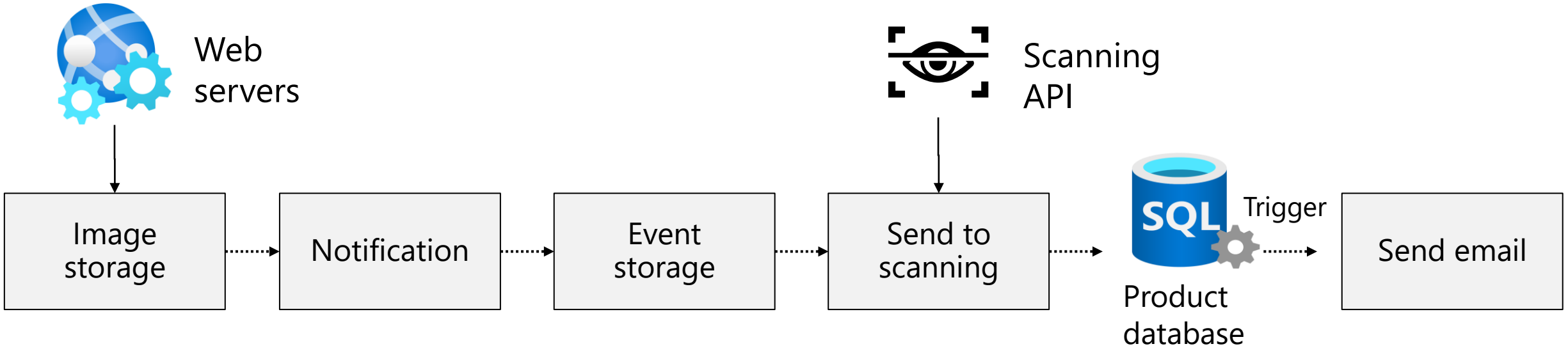
Case Study – Application architecture

A new product catalog design

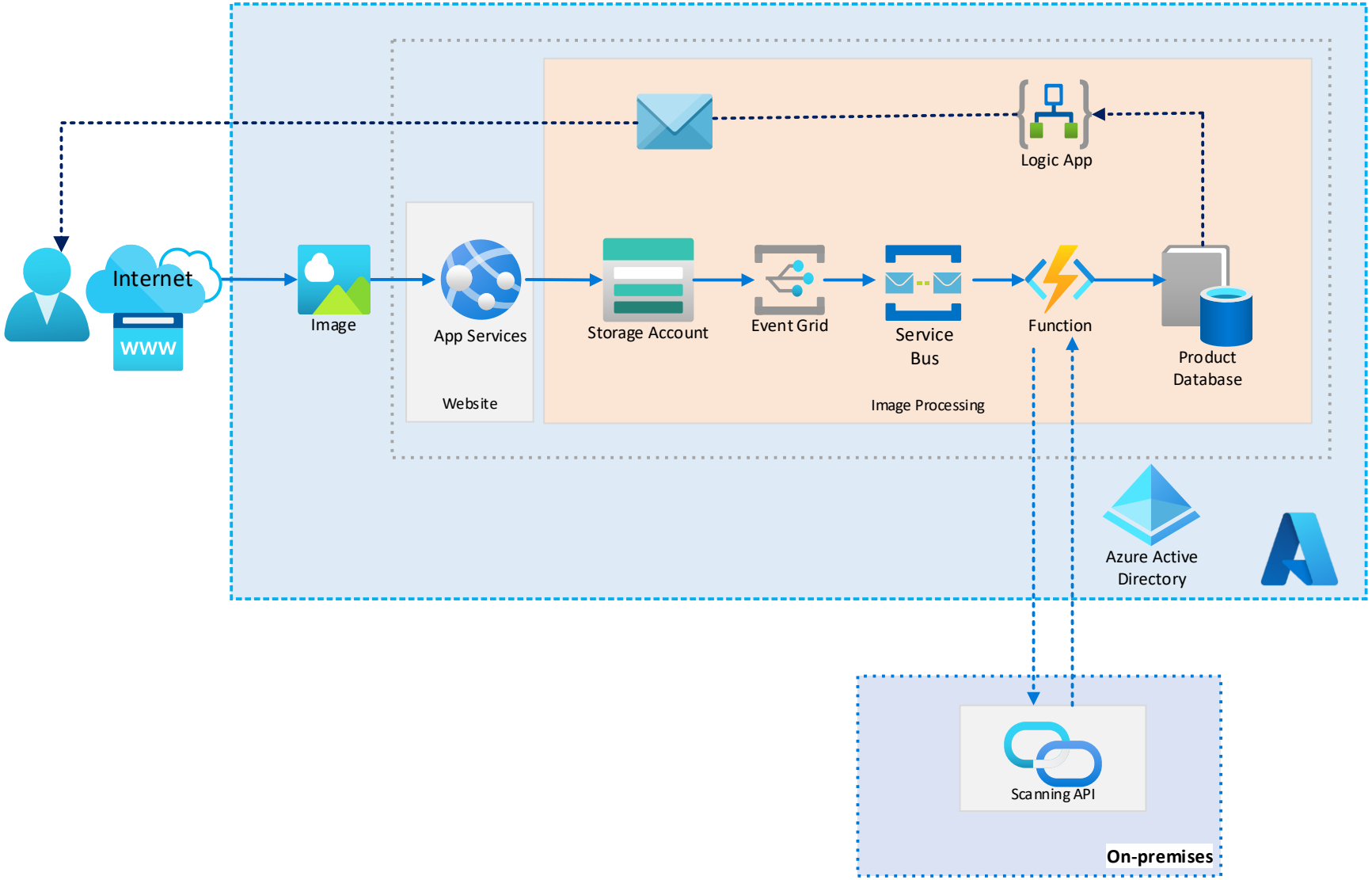
- New product catalog, ordering process, and shopping cart
- Services will rely on a combination of relational and non-relational data
- It is critical that the service hosting the application supports rapid autoscaling and high availability



Instructor case study discussion



Instructor Solution Diagram



Summary and resources

Check your knowledge

Microsoft Learn Modules (docs.microsoft.com/Learn)

- Choose a messaging model in Azure to loosely connect your services
- Introduction to Azure API Management
- Introduction to Event Hubs
- Deploy Azure infrastructure by using JSON ARM templates
- Introduction to infrastructure as code using Bicep
- Message queues and stream processing
- Introduction to Azure Cache for Redis

Optional hands-on exercise - Implement a Service Bus topic and queue - Learn | Microsoft Docs

End of presentation