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

Design an application architecture solution

Learning Objectives

- 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
- Learning recap

AZ-305: Design infrastructure solutions (30-35%)

Design an Application Architecture

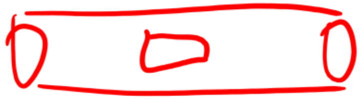
- Recommend a messaging architecture
- Recommend an event-driven architecture
- Recommend a solution for API integration
- Recommend a caching solution for applications
- Recommend an application configuration management solution
- Recommend an automated deployment solution for applications

Describe message and event scenarios

Determine message and event scenarios

TCP / IP
1962
Vint Cerf

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

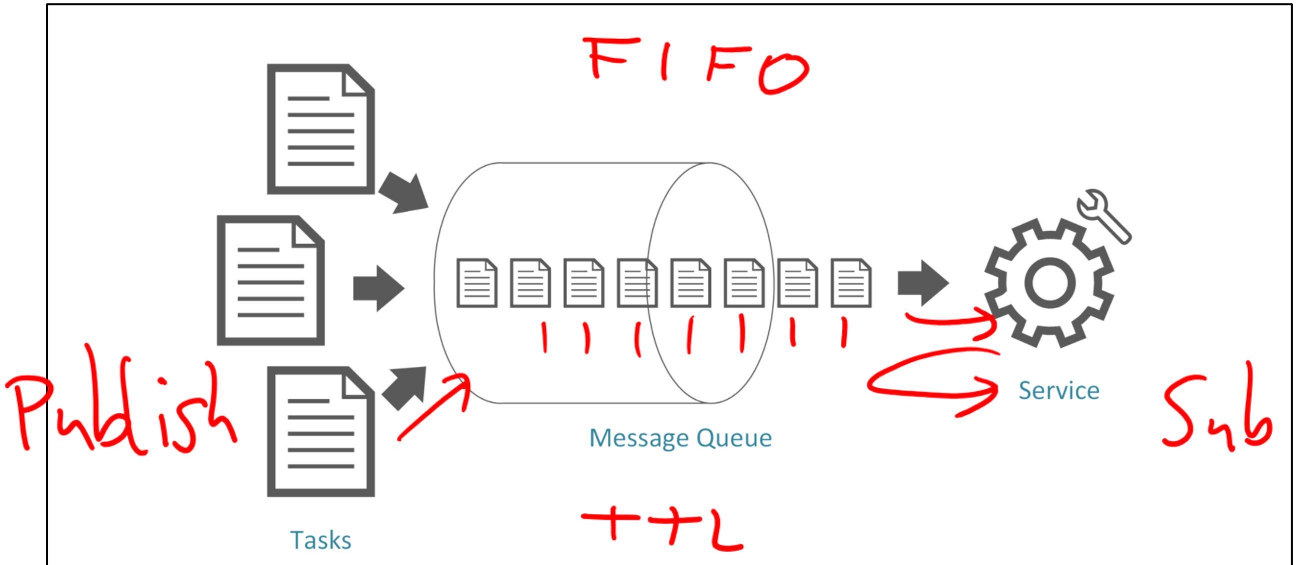
Action	Description	When to use
Event	• Light weight • Includes a publisher and a subscriber pub  sub UDP	Used for broadcasts and are often ephemeral. Ephemeral means the communication might not be handled by any receiver if none is currently subscribing.
Message	• Contains raw data, produced by one component,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

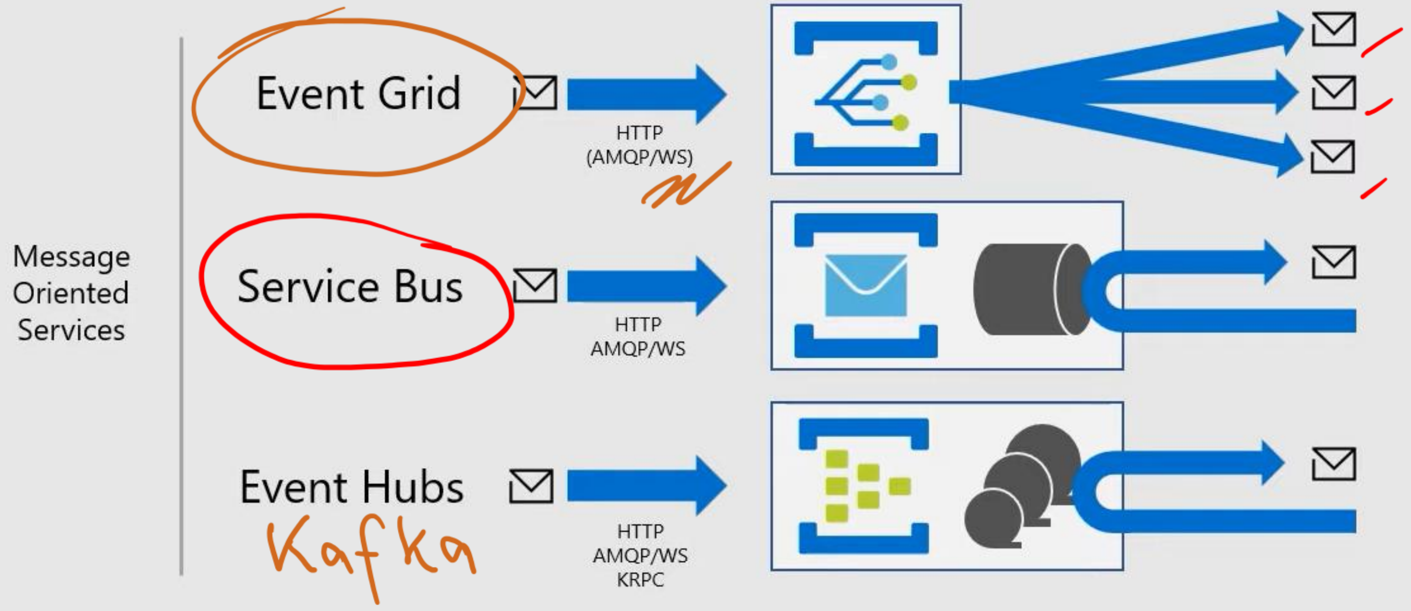
- Accessed with authenticated calls using HTTP or HTTPS
- May contain millions of messages, up to the total capacity limit of a storage account



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

Azure Eventing and Messaging Core Services

IFTTT Function Event Subscription

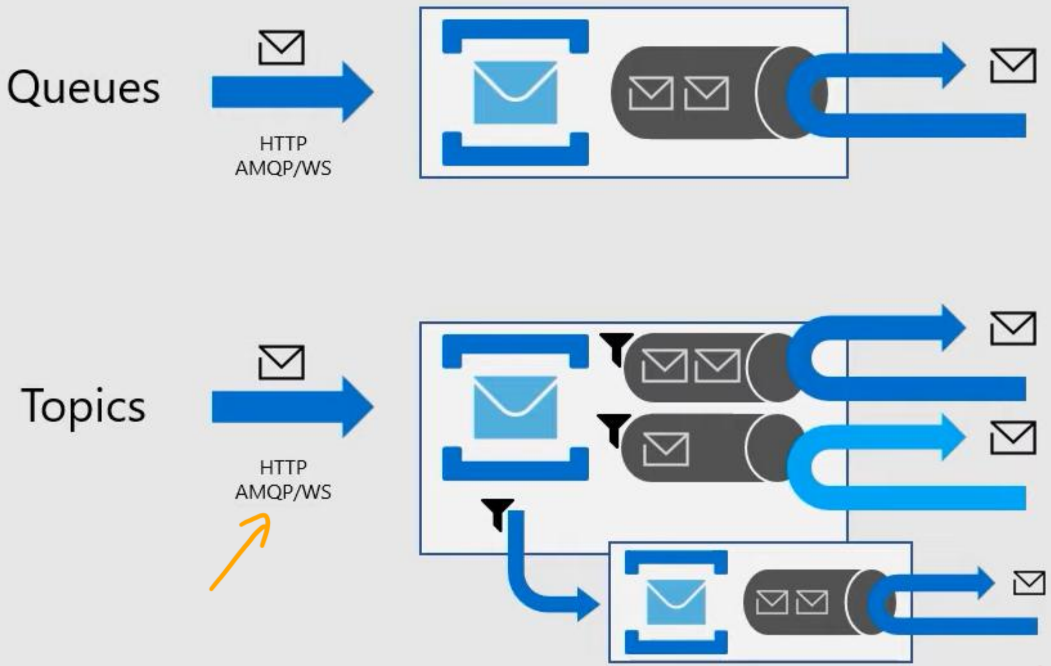


Push-style distribution of discrete events to serverless workloads

Pull-style, queue-based transfer of jobs and control via message queues and topics

Partitioned, high-volume, tape-drive-style sequential recording and unlimited, pull-style re-reads of event streams.

Service Bus Architectural Patterns



- Assignment of work with load-aware balancing
- Load-leveling for "spiky" workload traffic shapes
- Transactional, once-and-only-once processing
- Multiplex handling of in-order message sequences
- Deduplication, deferral, and "poison" handling

- All of the above, plus:
- Copies to 100s of concurrent subscribers
- Filter rules and message markup
- Message routing

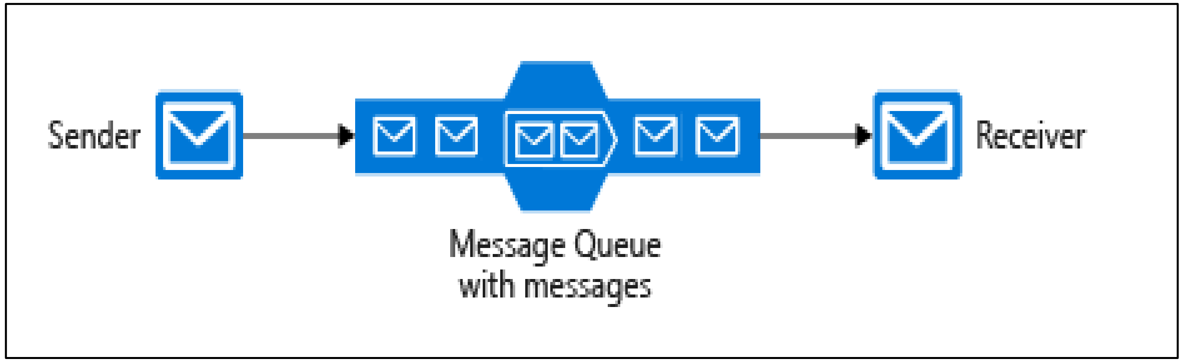
Dead Letter

Service Bus is a "swiss army knife" for messaging-driven workloads.

Design for Service Bus queues and topics

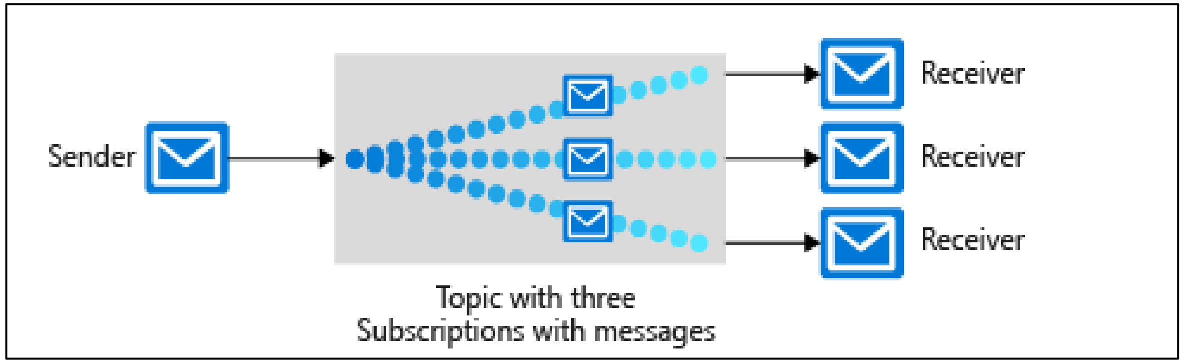
Service Bus decouples applications and services from each other.

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.	Based on storage tier
Service bus queues	• A first-in-first-out guarantee. • At-Least-Once message processing (PeekLock receive mode) • At-Most-Once message processing (ReceiveAndDelete receive mode) • Can group operations into transactions • Receive messages without polling the queue. • 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%

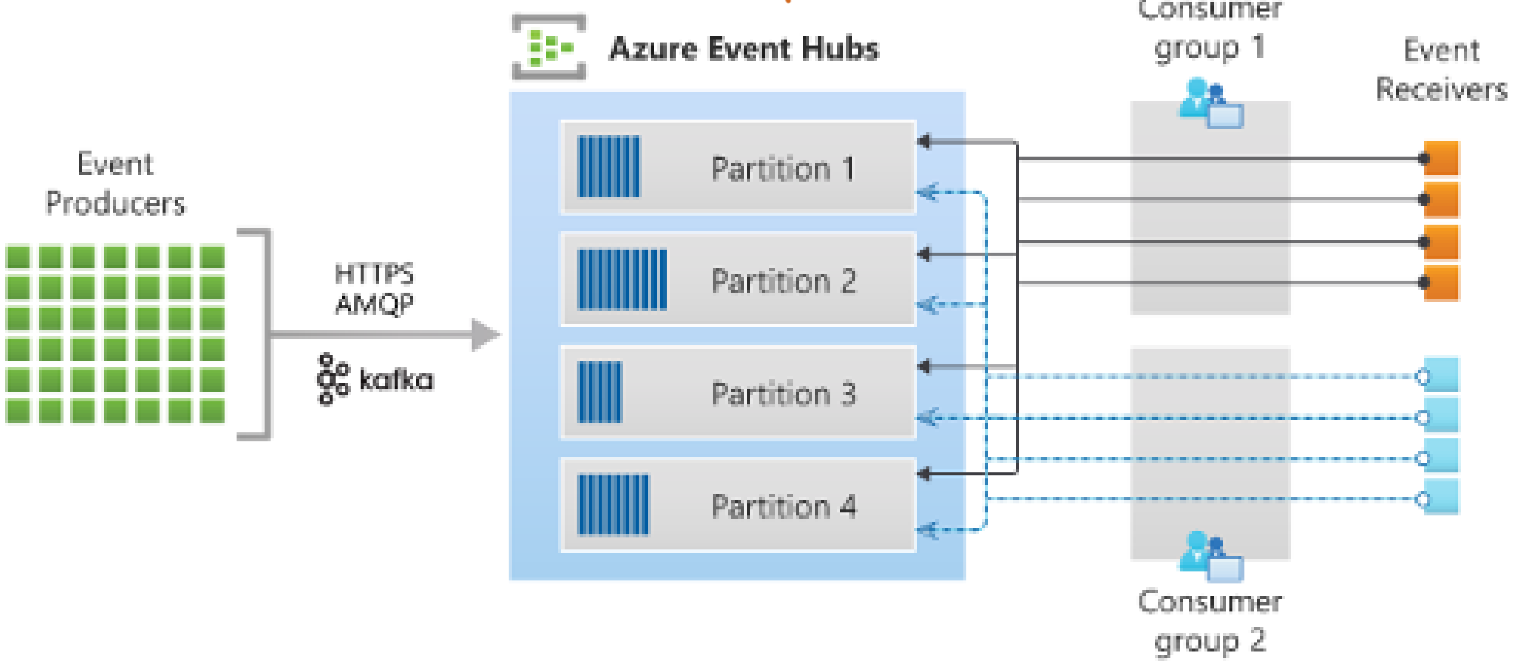
Design an event solution

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
- Receiving real-time streaming data

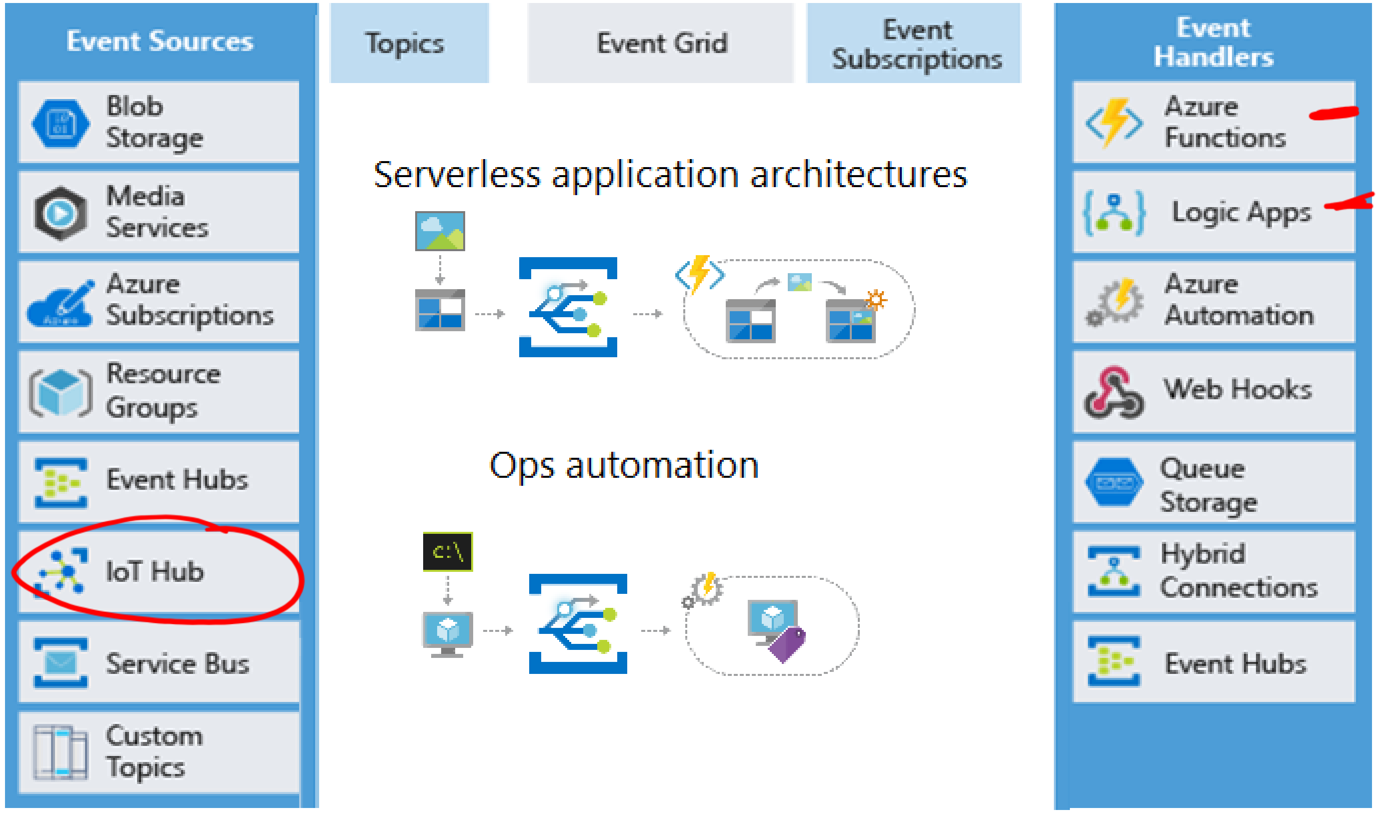
Kafka



Design an event-driven solution

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

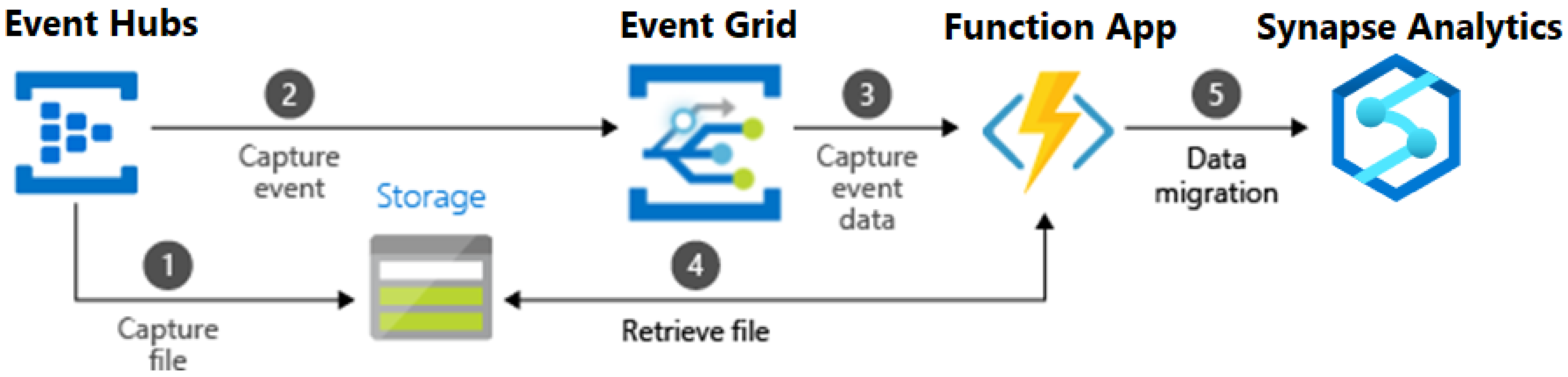
- Events sources include Azure resources or custom topics (you create)
- Event handlers react to an event
- Useful for serverless applications and operations automation
- Uses a pay-per-operation or pay-per-use pricing models



IOT

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
Storage Queues	Large-volume messaging queues	Message	Cost-effective, simple messaging mechanism

Design an IoT Hub solution

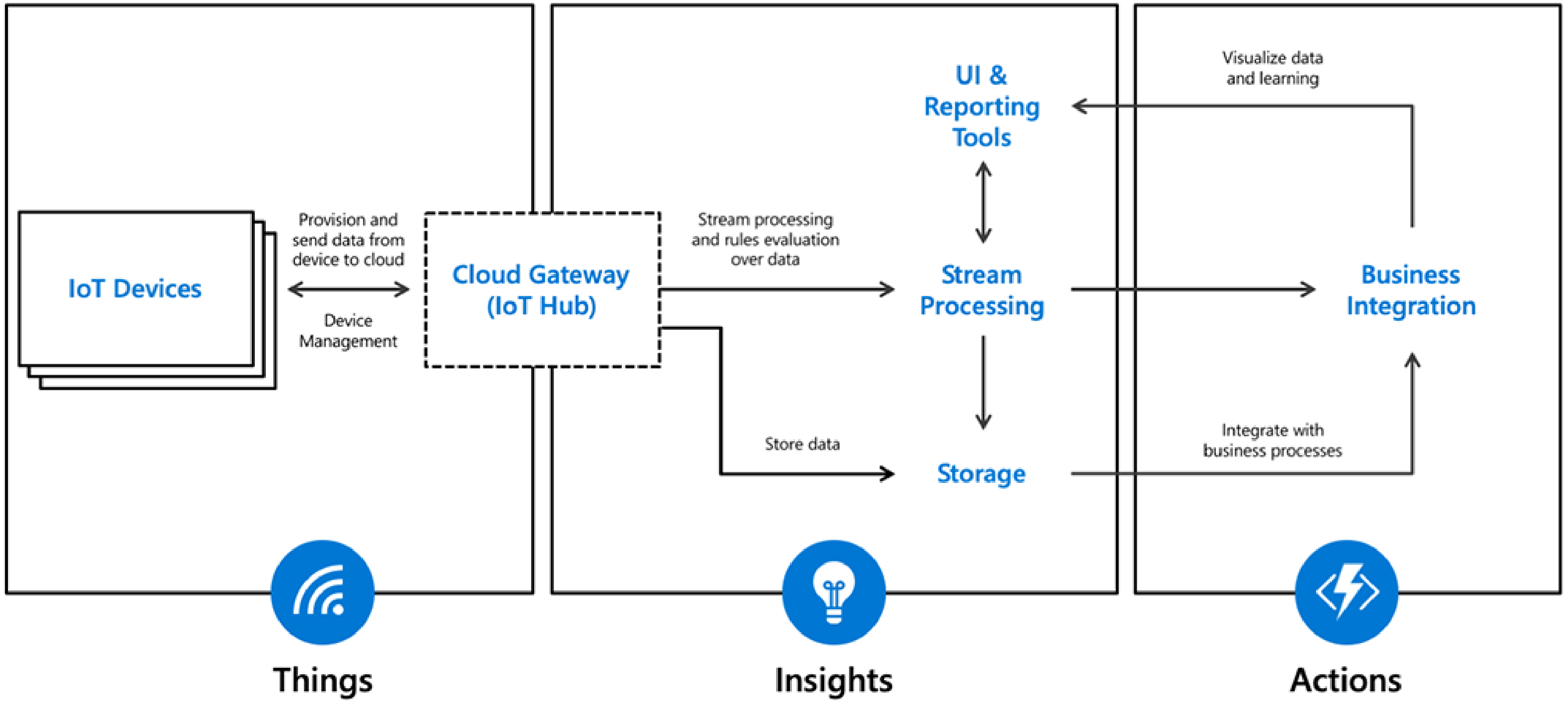
Central message hub for IoT applications and its attached devices.

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



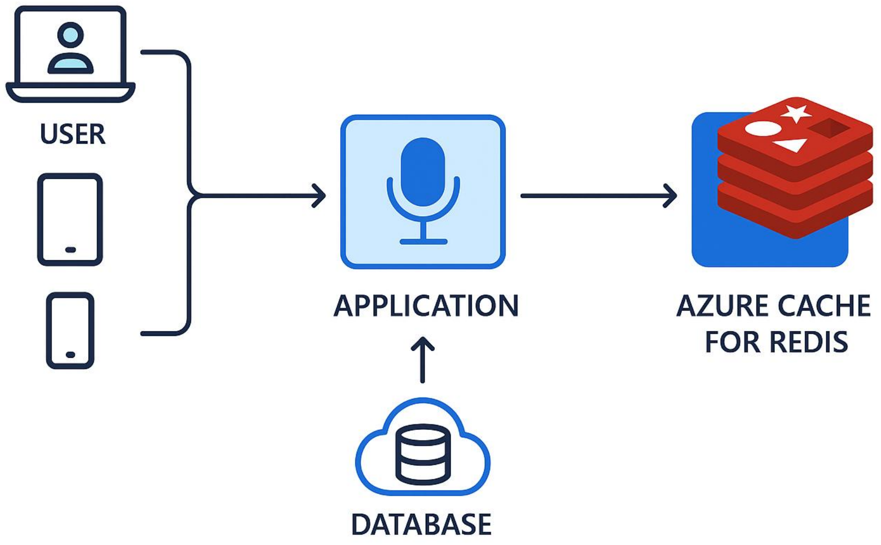
IoT Devices
Provision and send data from device to cloud
Device Management
Cloud Gateway (IoT Hub)
Stream processing and rules evaluation over data
Store data
UI & Reporting Tools
Stream Processing
Storage
Visualize data and learning
Business Integration
Integrate with business processes
Things
Insights
Actions

Design an application optimization solution

When to use Azure Managed Redis

Fully managed, in-memory data store based on the open-source Redis engine.

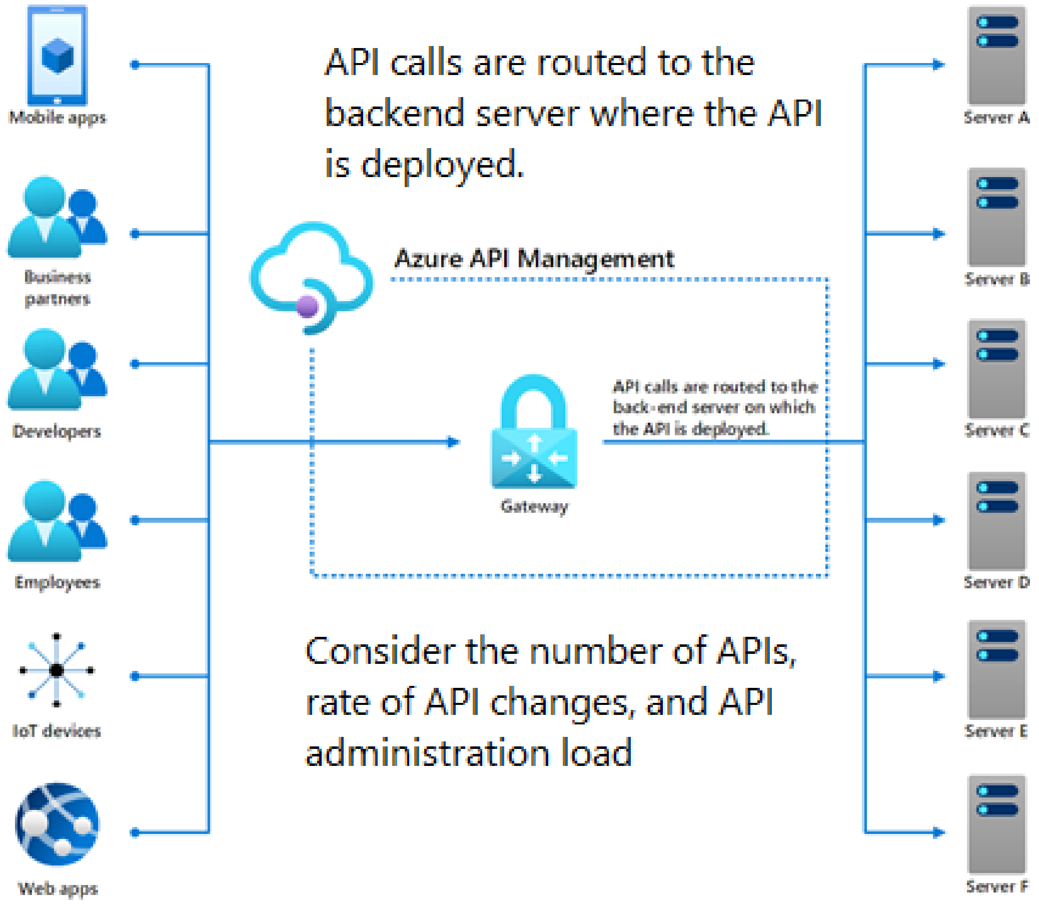
- Key scenarios - caching, session storage, real-time analytics, and event driven messaging
- Multiple tiers with different performance and price levels
- Multiple security and high availability options
- Migration plans for Azure Cache for Redis (deprecated)



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



API calls are routed to the backend server where the API is deployed.

Consider the number of APIs, rate of API changes, and API administration load

Design an application lifecycle

What is Infrastructure as Code?

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

Azure Deployment Stack

- Enables teams to test applications in production-like environments early
- Where possible, uses declarative definition files

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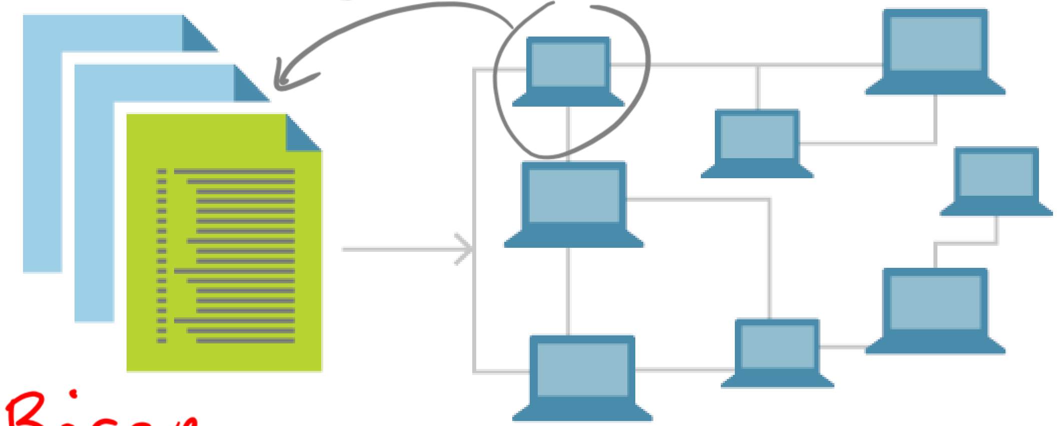
export



(Terraform) HCL
TOFU

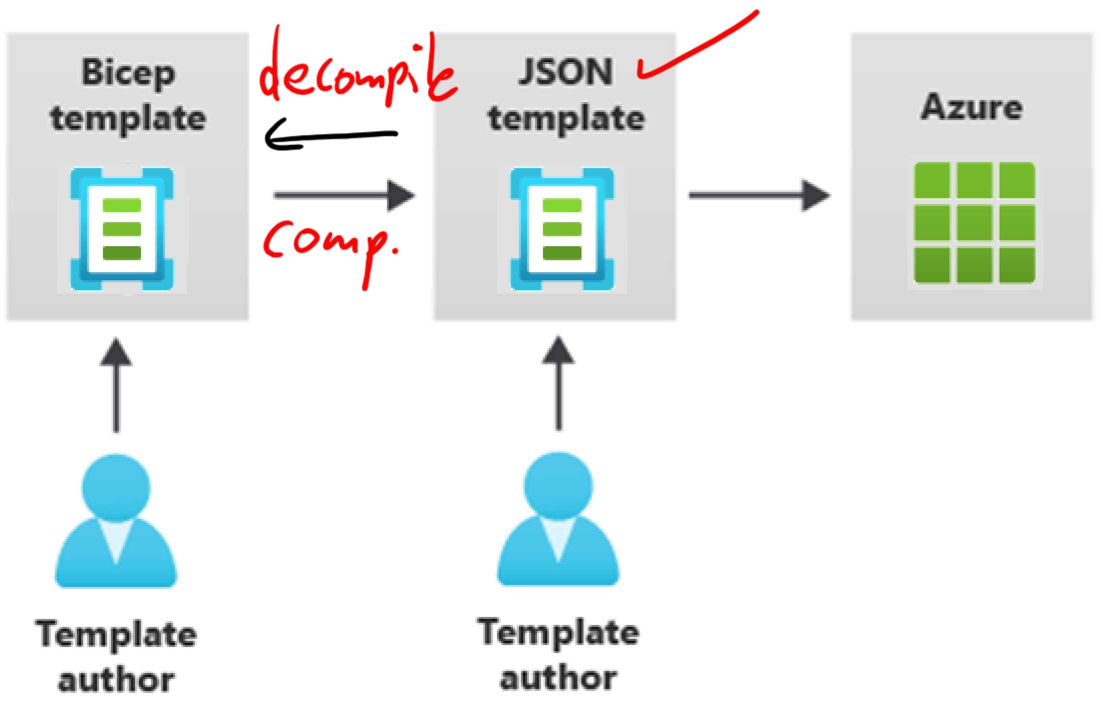
Bicep
↓
json + functions
↓
ARM API

Provision resources with Infrastructure as Code

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

- Azure Resource Manager templates – Bicep, JSON
- Azure Update Manager
- Azure Pipeline services
- GitHub actions
- Terraform
- Jenkins

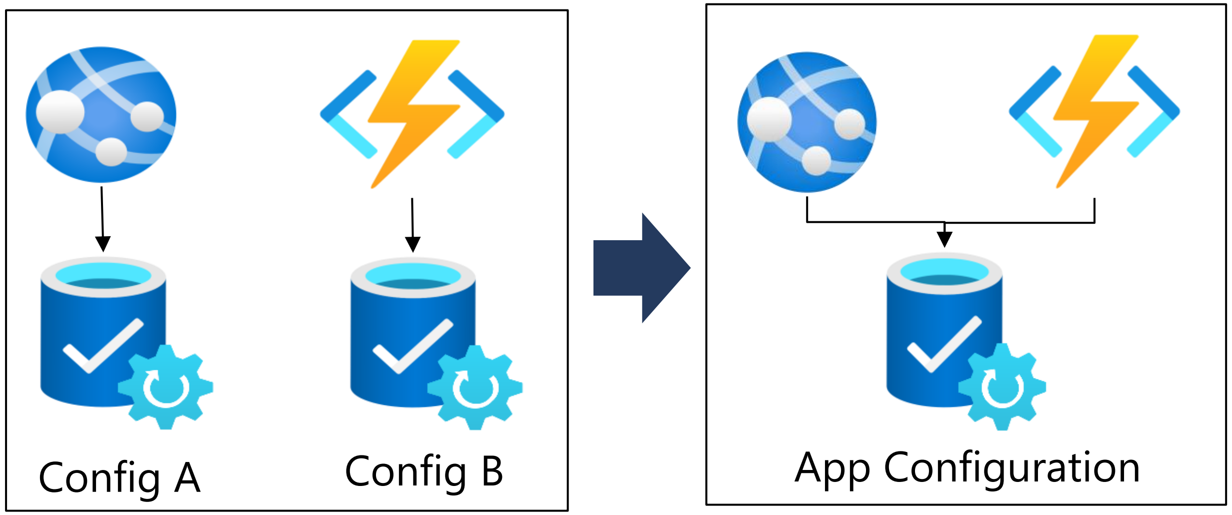
Pulumi



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

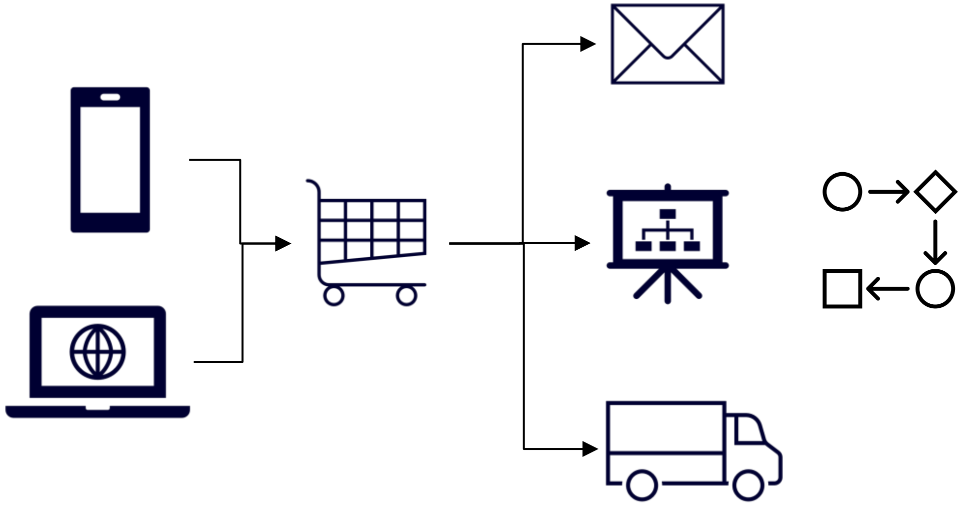


Case study and review

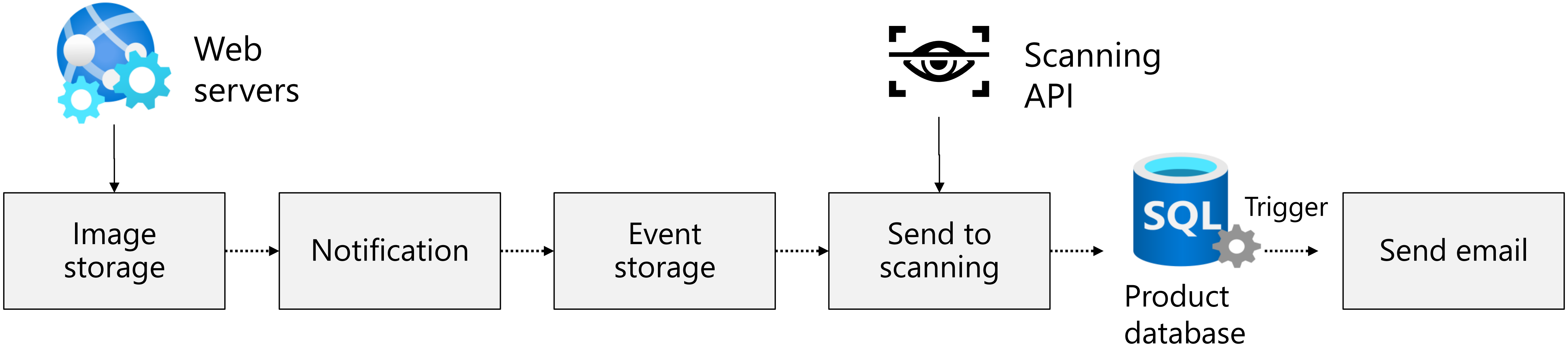
Case Study – Application architecture

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



Web servers

Scanning API

Image storage

Notification

Event storage

Send to scanning

Trigger

Product database

Send email

Event Grid

Function

Logic App

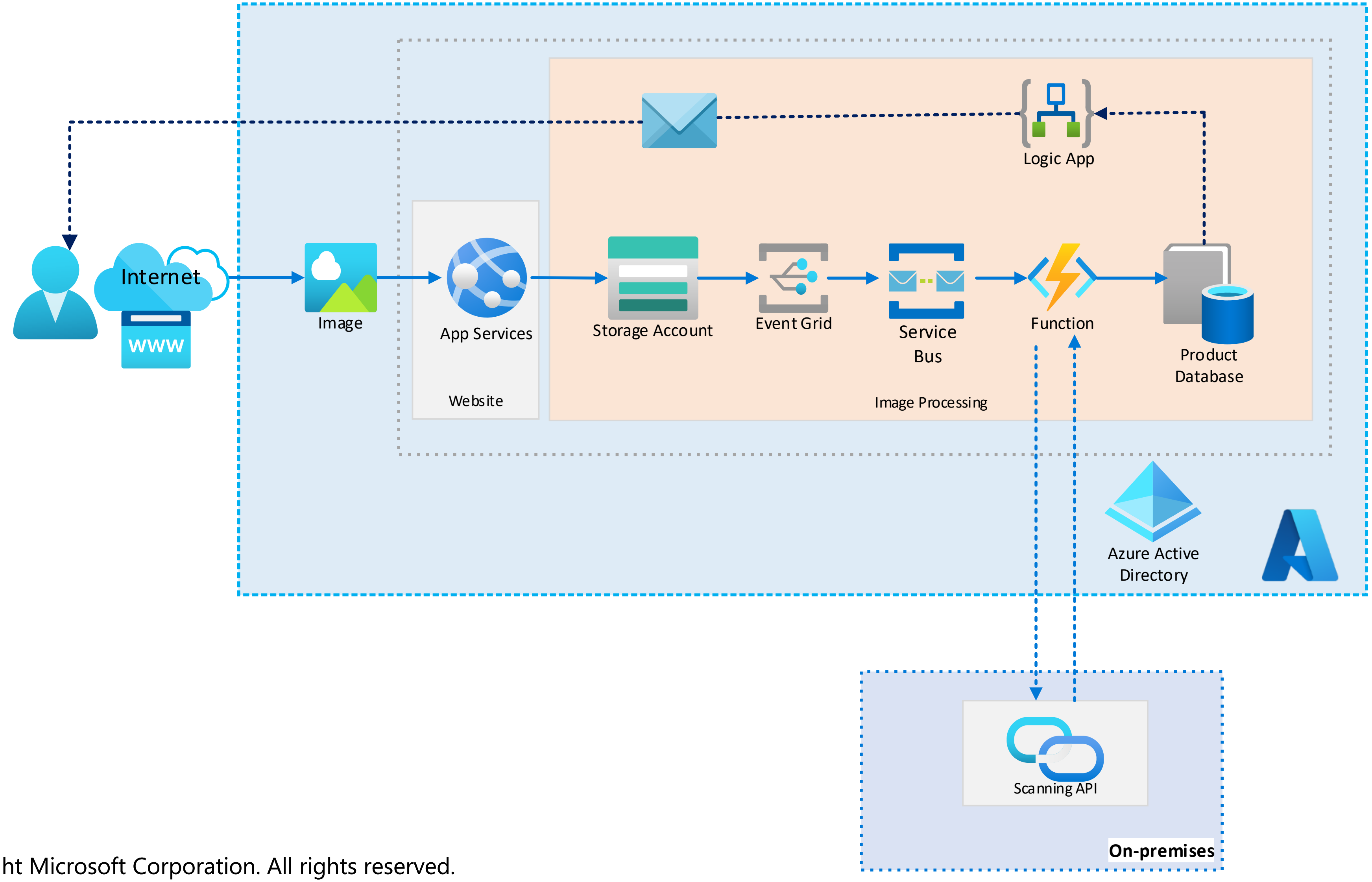
Blob

Automation

Service Bus

Queues

Instructor Solution Diagram



Learning recap – Application architecture solutions

Check your knowledge questions and review

Reference modules

- Implement message-based communication workflows with Azure Service Bus
- Explore Azure Event Hubs
- Deploy Azure infrastructure by using JSON ARM templates
- Introduction to infrastructure as code using Bicep
- Message queues and stream processing

Optional exercise

- Create a function app in the Azure portal

Instructor resources (hidden)

End of presentation