Microsoft

Module 11: Develop message-based solutions

Microsoft

Topics

- Azure Service Bus
- Azure Queue Storage

Lesson 01: Azure Service Bus

Comparing cloud messaging options

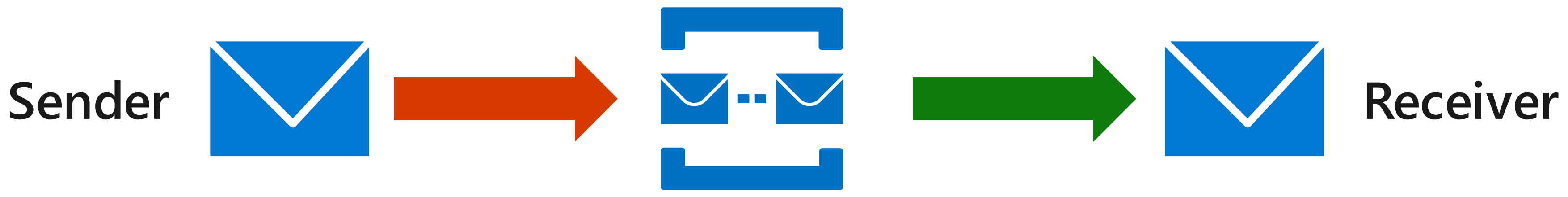
Requirement	Simple queuing	Eventing and PubSub	Big data streaming	Enterprise messaging
Product	Queue storage	Event Grid	Event Hubs	Service Bus
Supported advantages	• Communication within an app • Individual message • Queue semantics / polling buffer • Simple and easy to use • Pay as you go	• Communication between apps / orgs • Individual message • Push semantics • Filtering and routing • Pay as you go • Fan out	• Many messages in a Stream (think in MBs) • Ease of use and operation • Low cost • Fan in • Strict ordering • Works with other tools	• Instantaneous consistency • Strict ordering • Java Messaging Service • Non-repudiation and security • Geo-replication and availability • Rich features (such as deduplication and scheduling)
Weaknesses	• Ordering of messaging • Instantaneous consistency	• Ordering of messaging • Instantaneous consistency	• Server-side cursor • Only once	• Cost • Simplicity
Type	Serverless	Serverless	Big data	Enterprise

Events vs. messaging services

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

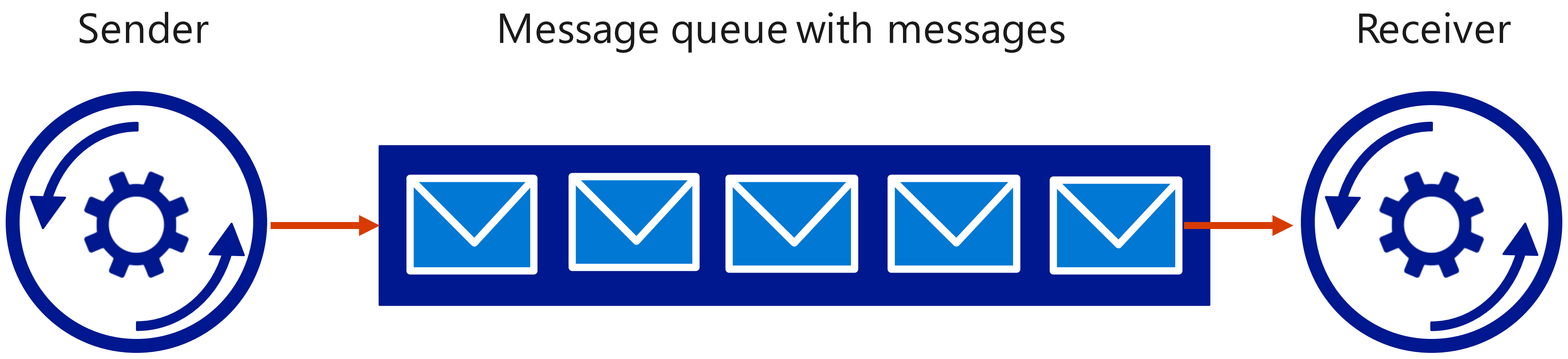
Queues

- Messages are sent to and received from queues
- Enables you to store messages until the receiving application is available to receive and process them
- Supports a brokered messaging communication model
- A general-purpose technology that can be used for a wide variety of scenarios



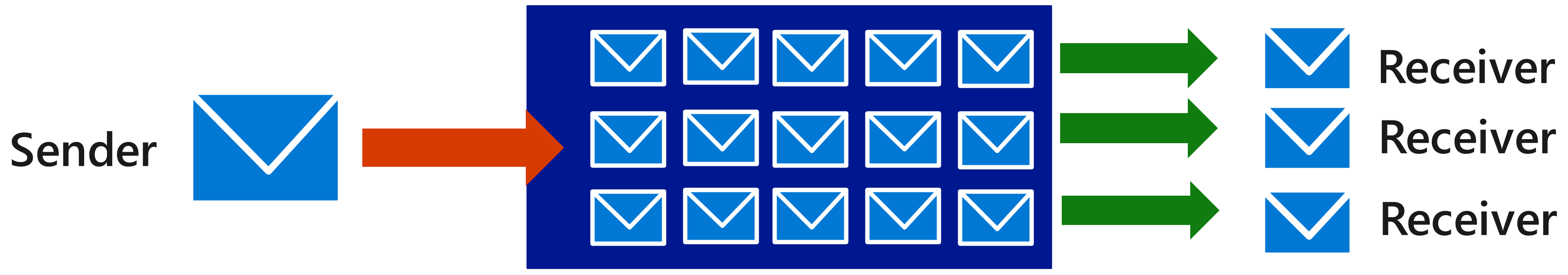
Message queue with messages

Queue-based load leveling



Topics and subscriptions

- Implements publish/subscribe (pub-sub) model
  - Receivers subscribe to a topic, and they can even filter down by interest
  - A sender publishes messages to the topic
  - Asynchronously, receivers get their own copy of the message
- Subscriptions are independent, which allows for many independent “taps” into a message stream



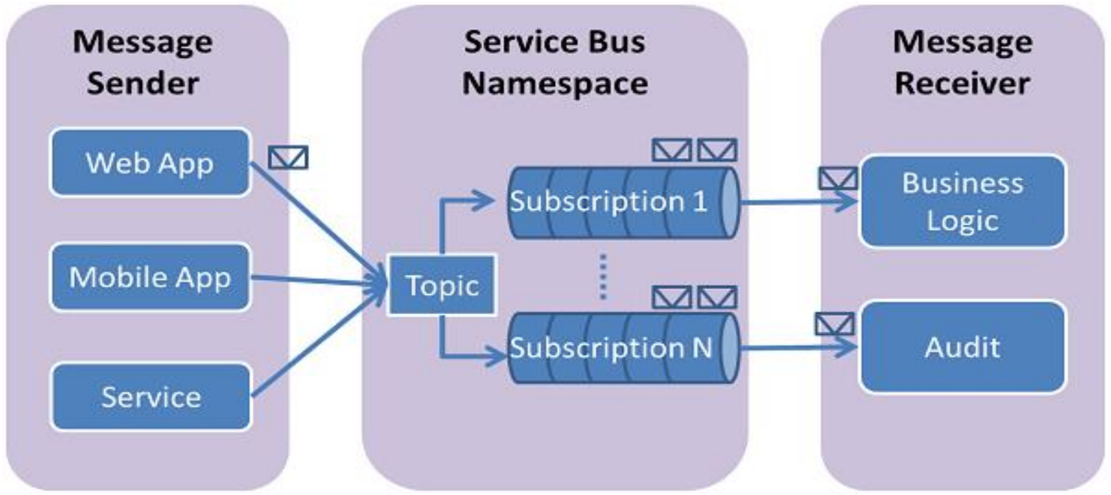
Topic with three subscriptions
with messages

Messages, payloads, and serialization

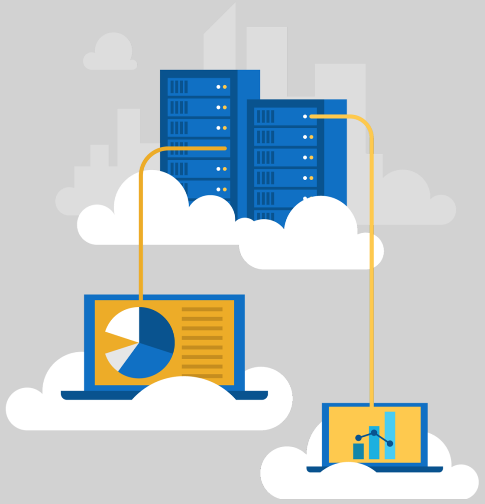
- Messages carry multiple things
  - Metadata about the message itself (in key-value pairs)
  - Predefined Broker properties
  - The message binary payload
- Message payload is not visible to Service Bus at any point
  - Serializes as opaque, binary content
  - Can be deserialized by using client SDK libraries
  - Gives you the flexibility to explicitly define how you want to serialize content

Azure Service Bus

- Enables your applications to interact in several different ways
- Uses a namespace as a scoping container for all messaging components
- The three communication mechanisms are:
  - Queues
  - Topics
  - Relays



Demonstration: Using .NET to send and receive messages from a Service Bus queue



Lesson 02: Azure Queue Storage

Azure Queue storage

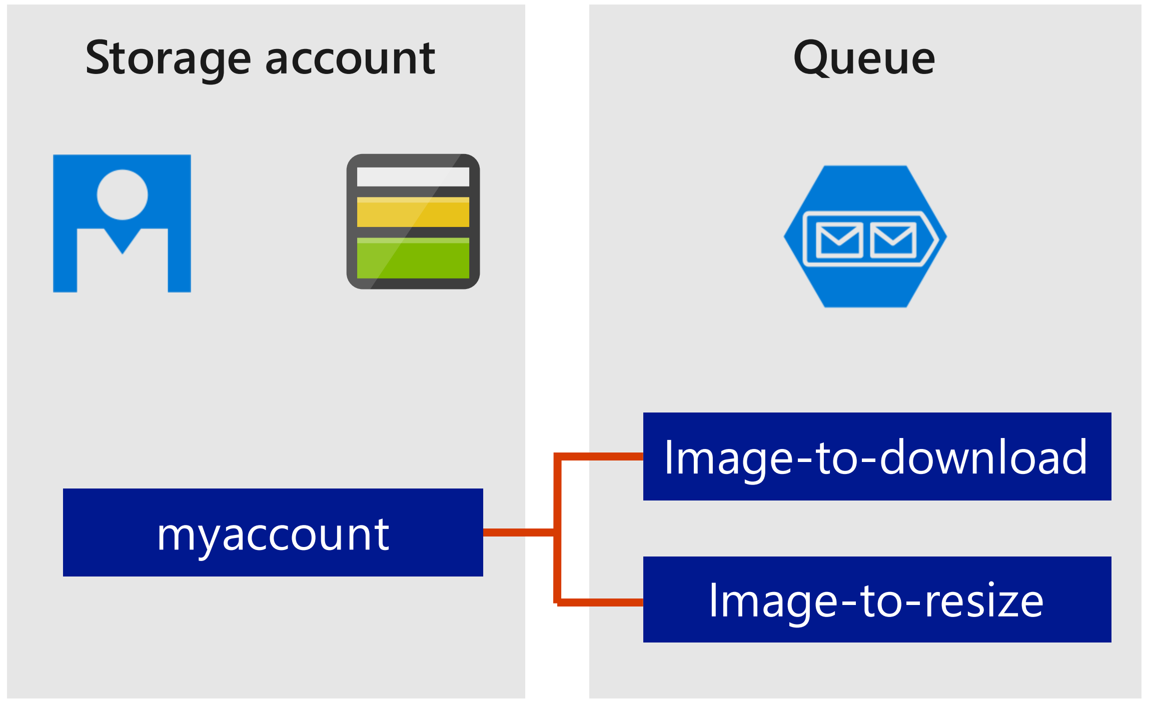
- Service for storing messages in an Azure Storage account
  - Accessed using HTTP or HTTPS
  - Scalable to millions of messages
- Common uses of Queue storage include:
  - Creating a backlog of work to process asynchronously
  - Passing messages from an Azure web role to an Azure worker role

Components

- URL format

```
https://<storage-account>.queue.core.windows.net/<queue>
```

- Storage account
- Queue
- Message



Queue service components

Code examples

```
// connection string in application’s configuration file
<add key="StorageConnectionString"
value="DefaultEndpointsProtocol=https;AccountName=storagesample;AccountKey=GMuzNHjlB3S9
itqZJHHCnRkrokLkcSyW7yK9BRbGp0ENePunLPwBgpxV1Z/pVo9zpem/2xSHXkMqTHHLcx8XRA==" />

// create instance of CloudStorageAccount class
CloudStorageAccount account = CloudStorageAccount.Parse("StorageConnectionString");

// create queue client
CloudQueueClient queueClient = account.CreateCloudQueueClient();

// retrieve reference to queue
CloudQueue queue = queueClient.GetQueueReference("myqueue");

// Create the queue if it doesn't already exist
queue.CreateIfNotExists();
```

C#

Code examples – create and get messages

```
// Create a message and add it to the queue.
CloudQueueMessage message = new CloudQueueMessage("Hello, World");
queue.AddMessage(message);

// Peek at the next message
CloudQueueMessage peekedMessage = queue.PeekMessage();

// Fetch the queue attributes.
queue.FetchAttributes();

// Retrieve the cached approximate message count.
int? cachedMessageCount = queue.ApproximateMessageCount;
```

Code examples – retrieve and change message

```
// Get the next message
CloudQueueMessage retrievedMessage = queue.GetMessage();

//Process the message in less than 30 seconds, and then delete the message
queue.DeleteMessage(retrievedMessage);

// Get the message from the queue and update the message contents.
CloudQueueMessage message = queue.GetMessage();
message.SetMessageContent("Updated contents.");
queue.UpdateMessage(
    message,
    TimeSpan.FromSeconds(60.0), // Make it invisible for another 60 seconds.
    MessageUpdateFields.Content | MessageUpdateFields.Visibility
);
```

Lab: Asynchronously processing messages by using Azure Storage queues

Duration

Lab sign-in information

AZ204-SEA-DEV

Username: Admin

Password: Pa55w.rd