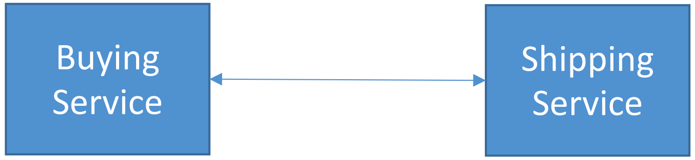
Cloud Integration Section

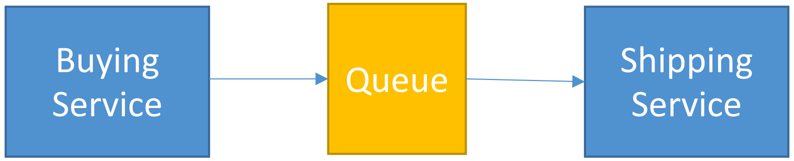
Section Introduction

- When we start deploying multiple applications, they will inevitably need to communicate with one another
- There are two patterns of application communication

1) Synchronous communications (application to application)



2) Asynchronous / Event based (application to queue to application)

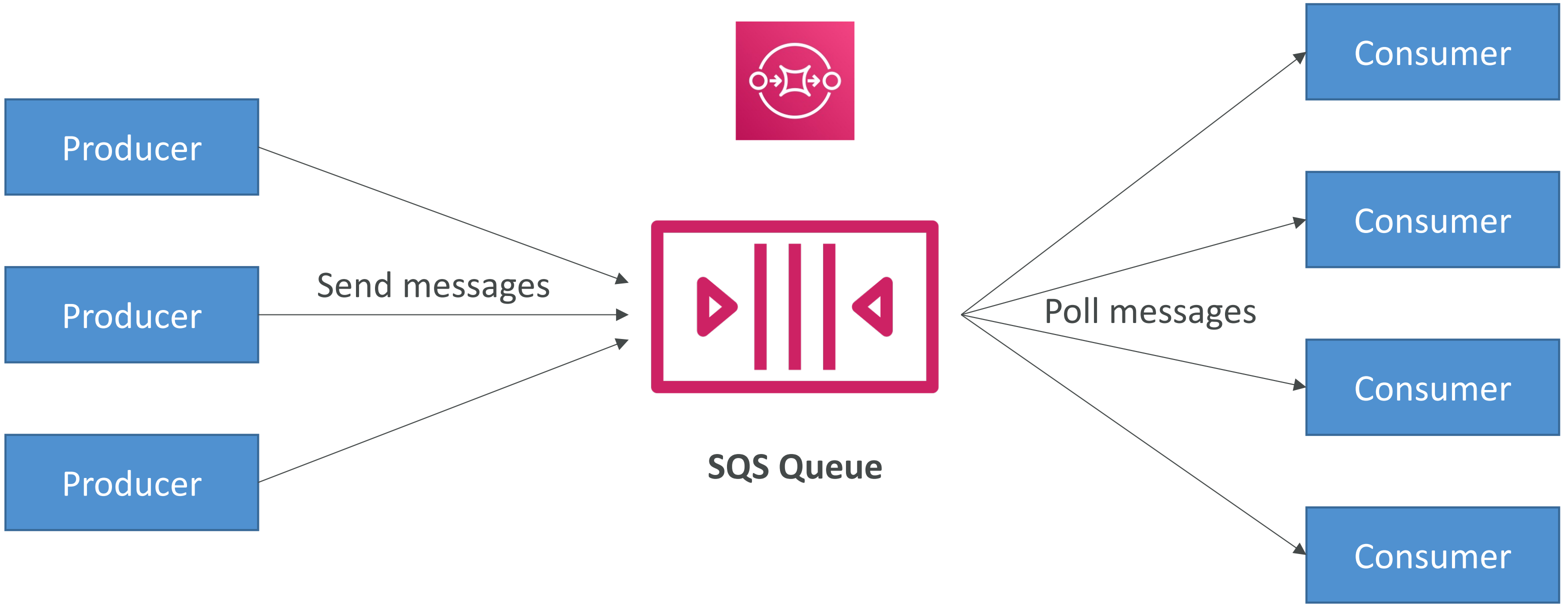


Section Introduction

- Synchronous between applications can be problematic if there are sudden spikes of traffic
- What if you need to suddenly encode 1000 videos but usually it's 10?

- In that case, it's better to **decouple** your applications:
  - using SQS: queue model
  - using SNS: pub/sub model
  - using Kinesis: real-time data streaming model
- These services can scale independently from our application!

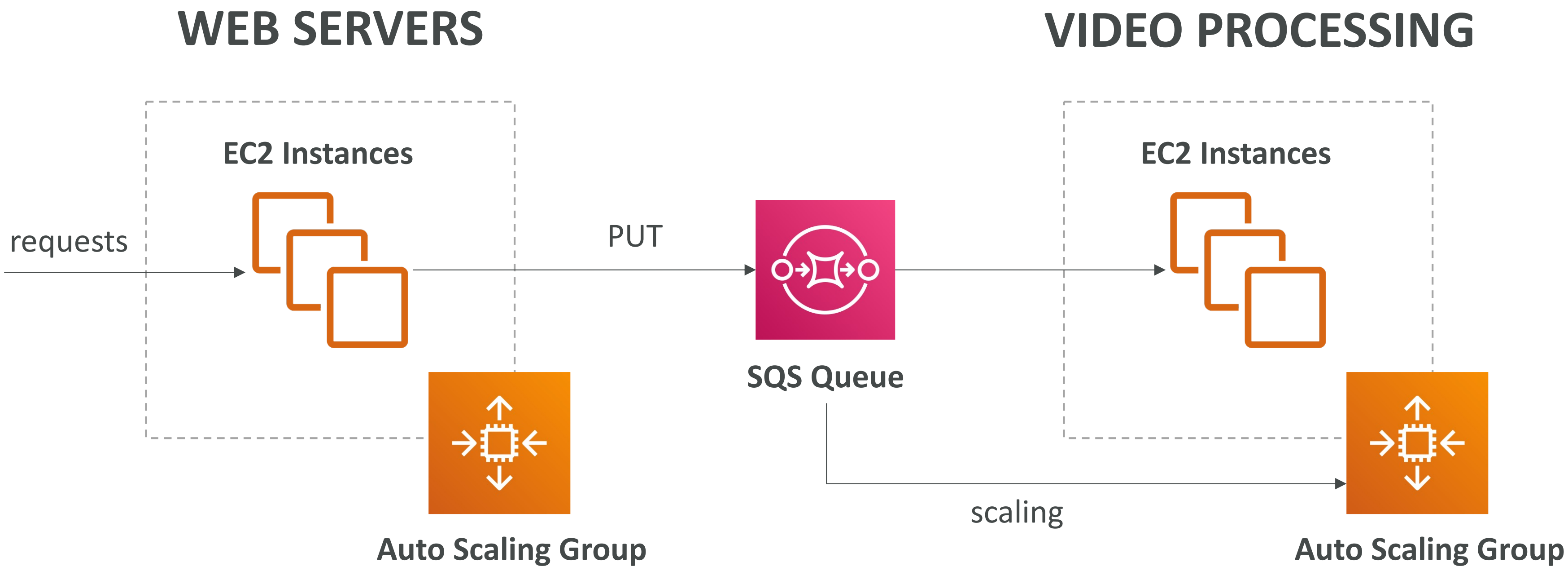
Amazon SQS – Simple Queue Service
What's a queue?



Amazon SQS – Standard Queue

- Oldest AWS offering (over 10 years old)
- Fully managed service (~serverless), use to **decouple** applications
- Scales from 1 message per second to 10,000s per second
- Default retention of messages: 4 days, maximum of 14 days
- No limit to how many messages can be in the queue
- **Messages are deleted after they're read by consumers**
- Low latency (<10 ms on publish and receive)
- **Consumers share the work to read messages & scale horizontally**

SQS to decouple between application tiers

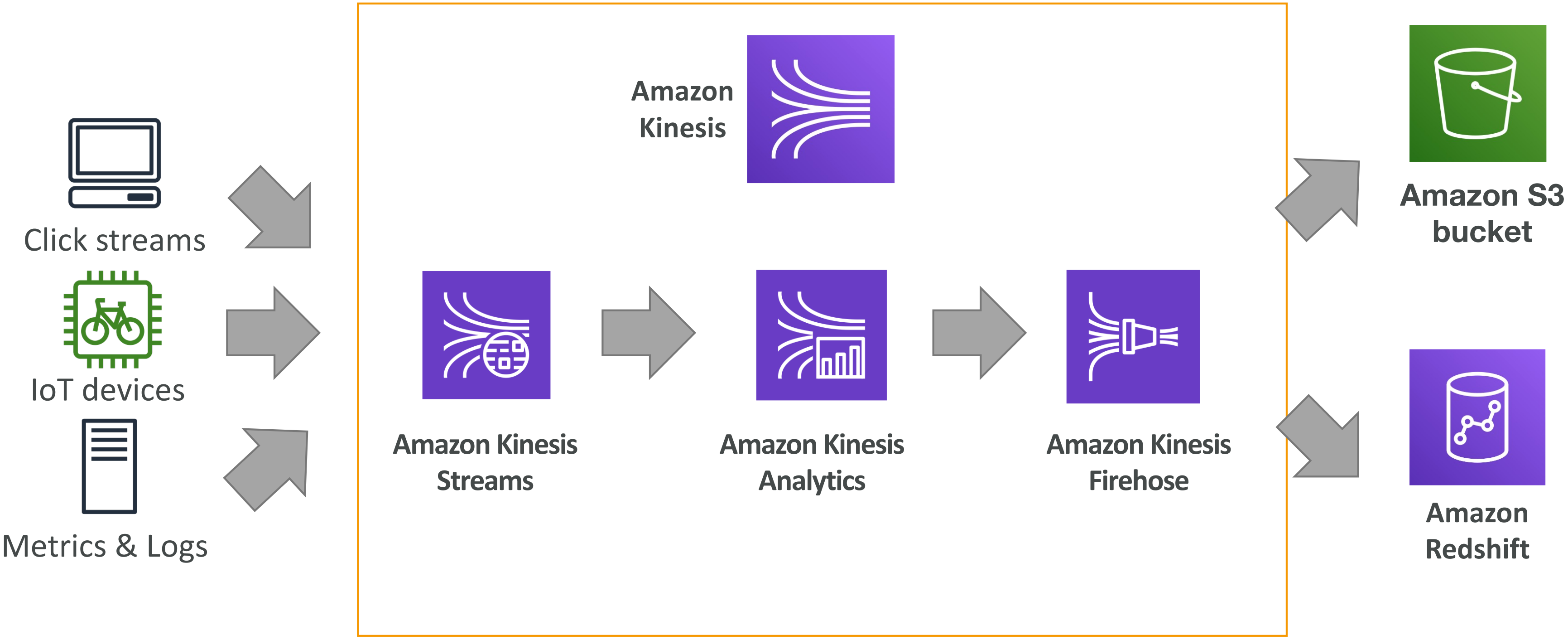


Amazon Kinesis

- For the exam: **Kinesis = real-time big data streaming**
- **Managed service to collect, process, and analyze real-time streaming data at any scale**

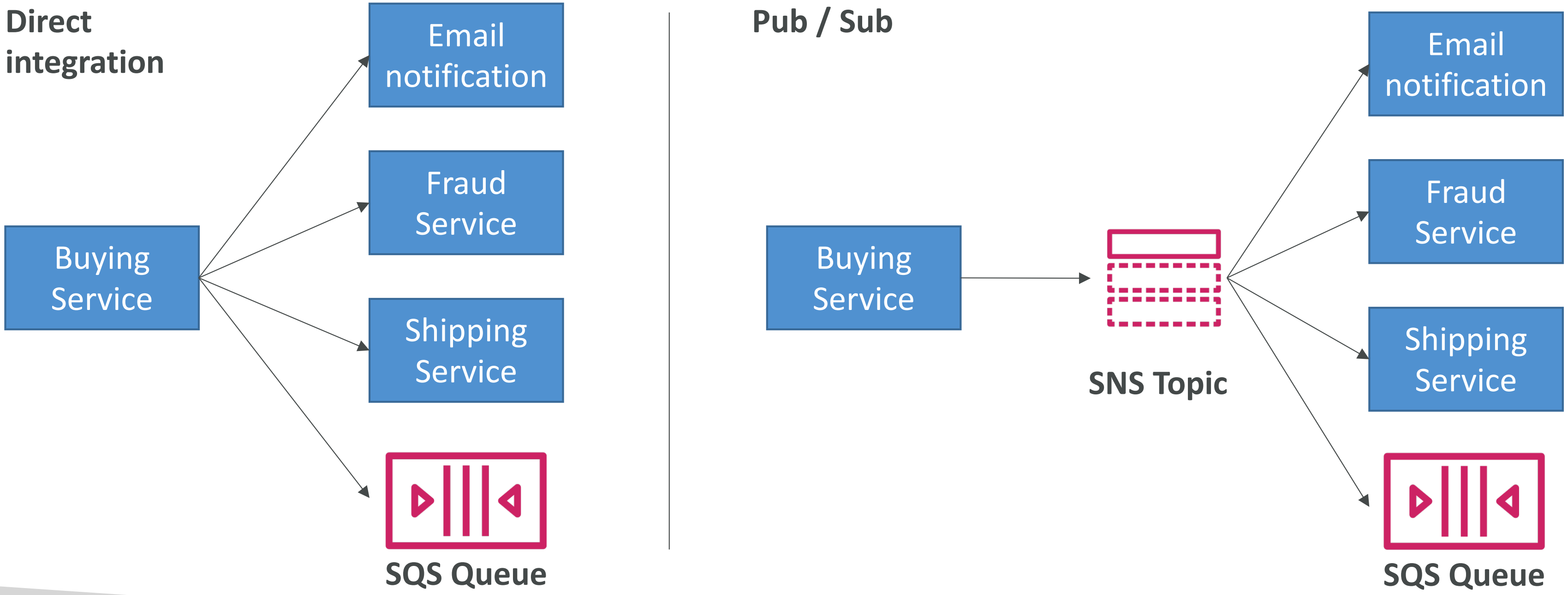
- Too detailed for the Cloud Practitioner exam but good to know:
  - **Kinesis Data Streams:** low latency streaming to ingest data at scale from hundreds of thousands of sources
  - **Kinesis Data Firehose:** load streams into S3, Redshift, ElasticSearch, etc…
  - **Kinesis Data Analytics:** perform real-time analytics on streams using SQL
  - **Kinesis Video Streams:** monitor real-time video streams for analytics or ML

Kinesis (high level overview)



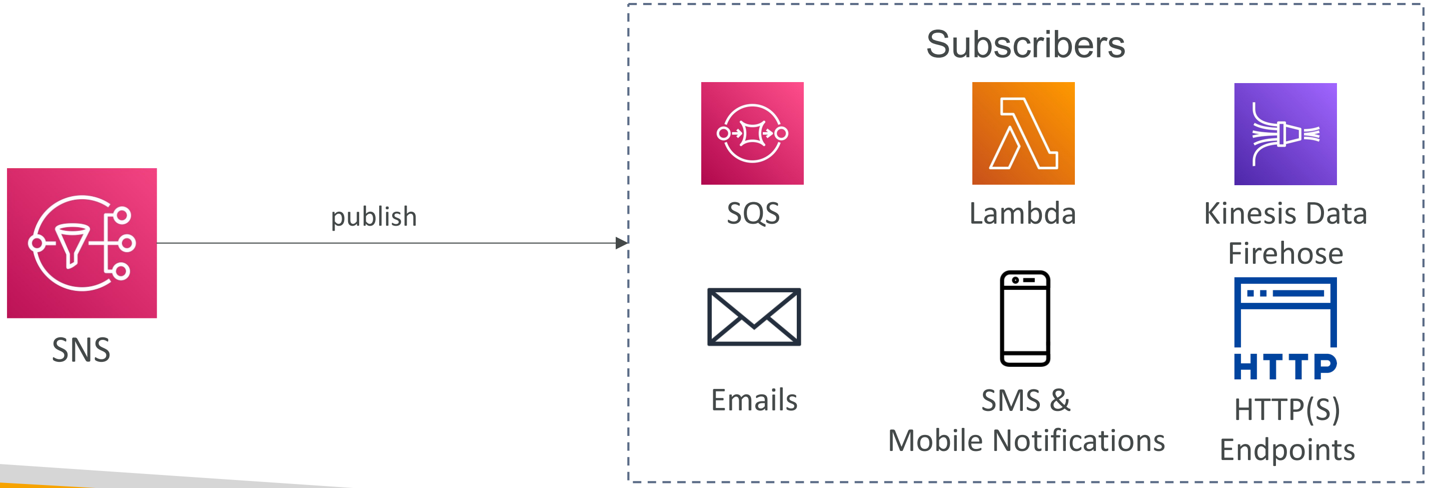
Amazon SNS

- What if you want to send one message to many receivers?



Amazon SNS

- The "event **publishers**" only sends message to one SNS topic
- As many "event **subscribers**" as we want to listen to the SNS topic notifications
- Each subscriber to the topic **will get all the messages**
- Up to 12,500,000 subscriptions per topic, 100,000 topics limit



Amazon MQ

- SQS, SNS are "cloud-native" services, and they're using proprietary protocols from AWS.
- Traditional applications running from on-premise may use open protocols such as: MQTT, AMQP, STOMP, Openwire, WSS
- **When migrating to the cloud**, instead of re-engineering the application to use SQS and SNS, we can use Amazon MQ
- **Amazon MQ = managed Apache ActiveMQ**

- Amazon MQ doesn't "scale" as much as SQS / SNS
- Amazon MQ runs on a dedicated machine (not serverless)
- Amazon MQ has both queue feature (~SQS) and topic features (~SNS)

Integration Section – Summary

- SQS:
  - Queue service in AWS
  - Multiple Producers, messages are kept up to 14 days
  - Multiple Consumers share the read and delete messages when done
  - Used to **decouple** applications in AWS
- SNS:
  - Notification service in AWS
  - Subscribers: Email, Lambda, SQS, HTTP, Mobile…
  - Multiple Subscribers, send all messages to all of them
  - No message retention
- **Kinesis**: real-time data streaming, persistence and analysis
- **Amazon MQ**: managed Apache MQ in the cloud (MQTT, AMQP.. protocols)