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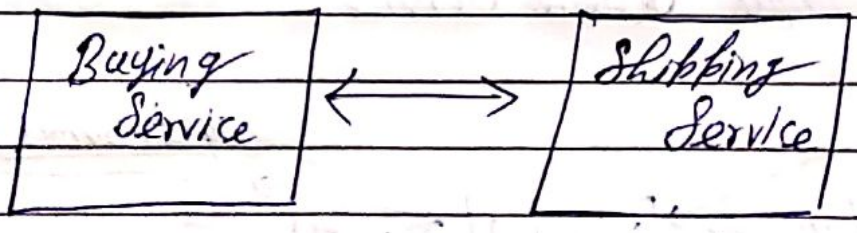
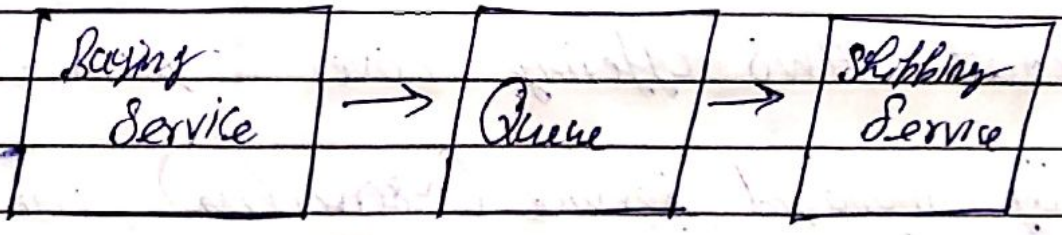
Day 20/100: Cloud Integration

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

1) Syncronous Communications
[application to application]



2) Asynchronous / Event baried
[application to queue to application]

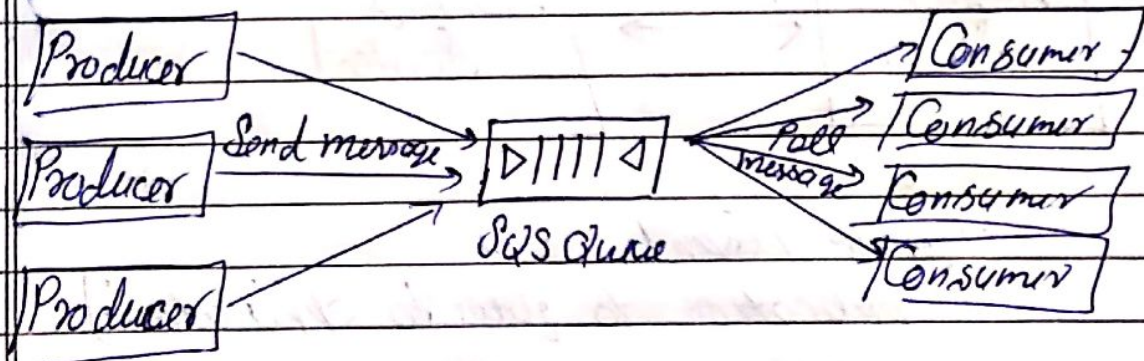


- Synchronous b/w application can be problematic if there are sudden spikes of traffic
- What if you need to suddenly encode 1000 videos but usually it's 10?

- In that case, it's better to decouple your application
  - Using SQS: queue model
  - Using SNS: pub/sub model
  - Using Kinesis: real time data streaming model.

- There service can scale independently from our application.

SQS - Simple Queue Service



- Oldest AWS offering [over 10 years old]
- Fully managed service (~serverless), use to decouple applications
- Scales from 1 message per second to 10,000 per second.

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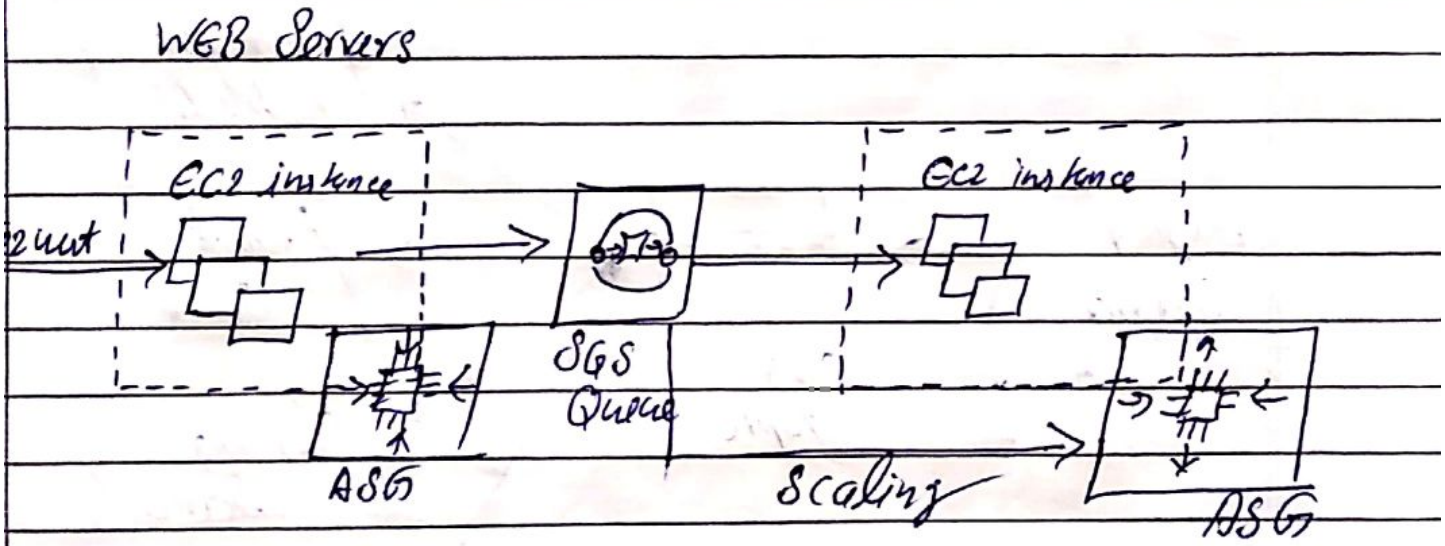
- Default retention of message: 4 days, maximum of 14 days.
- No limit to how many message can be in the queue.
- Message are delete after they're read by Consumer.
- Low latency (<10ms on publish and receive)
- Consumer share the work to read message & Scale horizontally

⇒ SQS to decouple b/w application tiers:



SNS : Simple Notification Service

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

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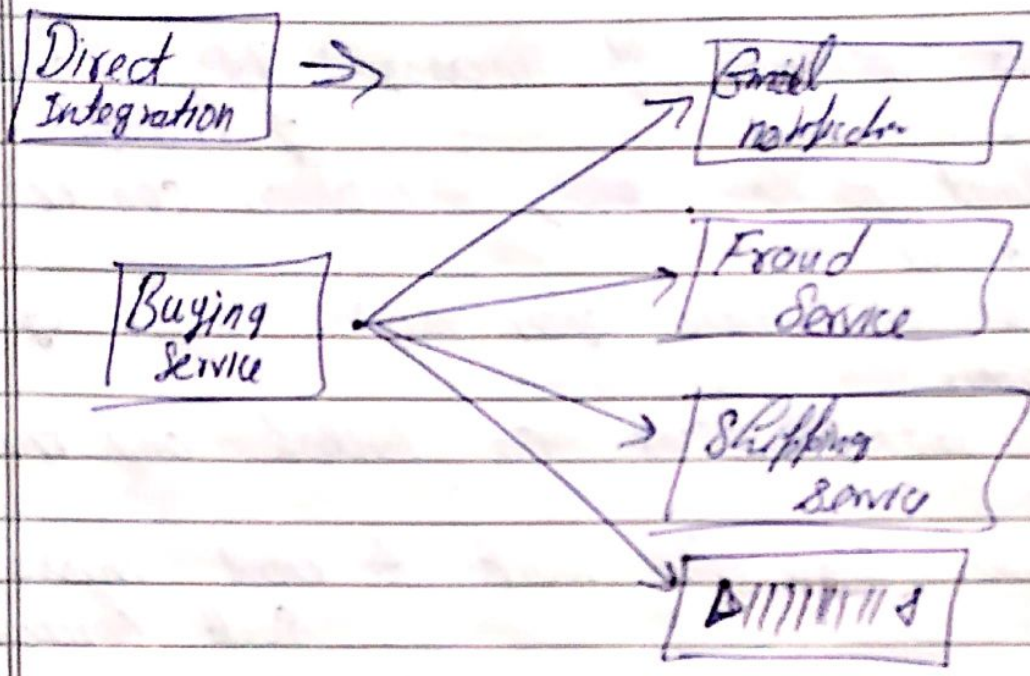

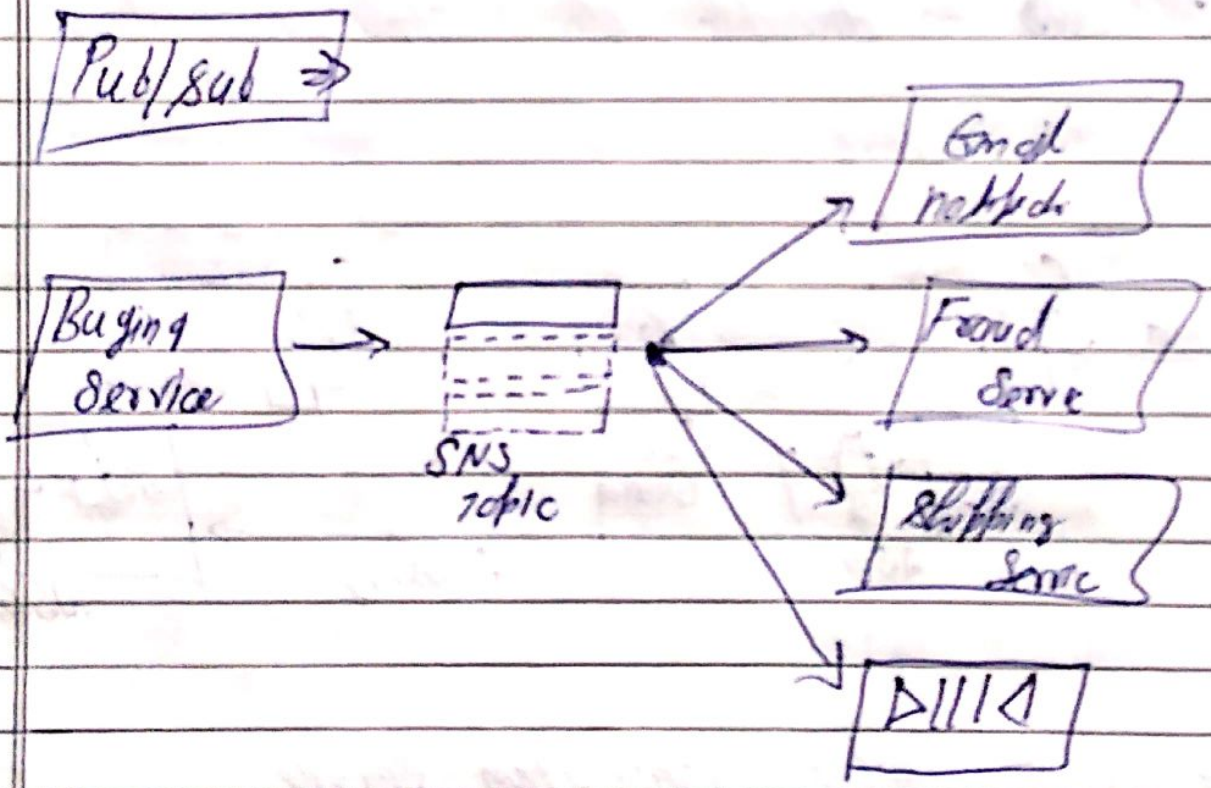

Amazon SNS =>

- The "event publishers" only sends message to one SNS topic
- As many "event subscribers" as we want

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to listen to the SNS topic notification.
- Each subscriber to the topic will get all the messages
- Up to 10,000,000 subscriptions per topic 100,000 topics limit
- SNS Subscribers can be:
  - HTTP/HTTPS (with delivery retries - how many times)
  - Emails, SMS message, Mobile notification.
  - SQS queues (Fan-out pattern), Lambda functions (write-your-own integration).

Amazon Kinesis

- Kinesis = real-time big data Streaming
- Managed service to collect, process and analyze real time Streaming data at any scale.

~~So Exactly for the~~

- 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, Elastic Search etc.
- Kinesis Data Analytics: perform real time analytics on Streams using SQL.
- Kinesis Video Stream: monitors real time video Streams of analytics or ML.

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Amazon MQ

- SQS, SNS are "cloud-native" service, they're using proprietary protocols from AWS
- Traditional applications running from on premises may use open protocols such as MQTT, AMQP, STOMP, Openwire, WSS.
- When migrating to cloud instead of re-engineering the application to use SQS & SNS, we can use Amazon MQ.
- Amazon MQ = managed Apache ActiveMQ.
- Amazon MQ doesn't "scale" as much SQS/SNS
- Amazon MQ runs on a dedicated machine (not serverless)
- Amazon MQ has both queue feature (~SQS) and topic features (~SNS).