

Event-driven Architecture

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CSYE 6225

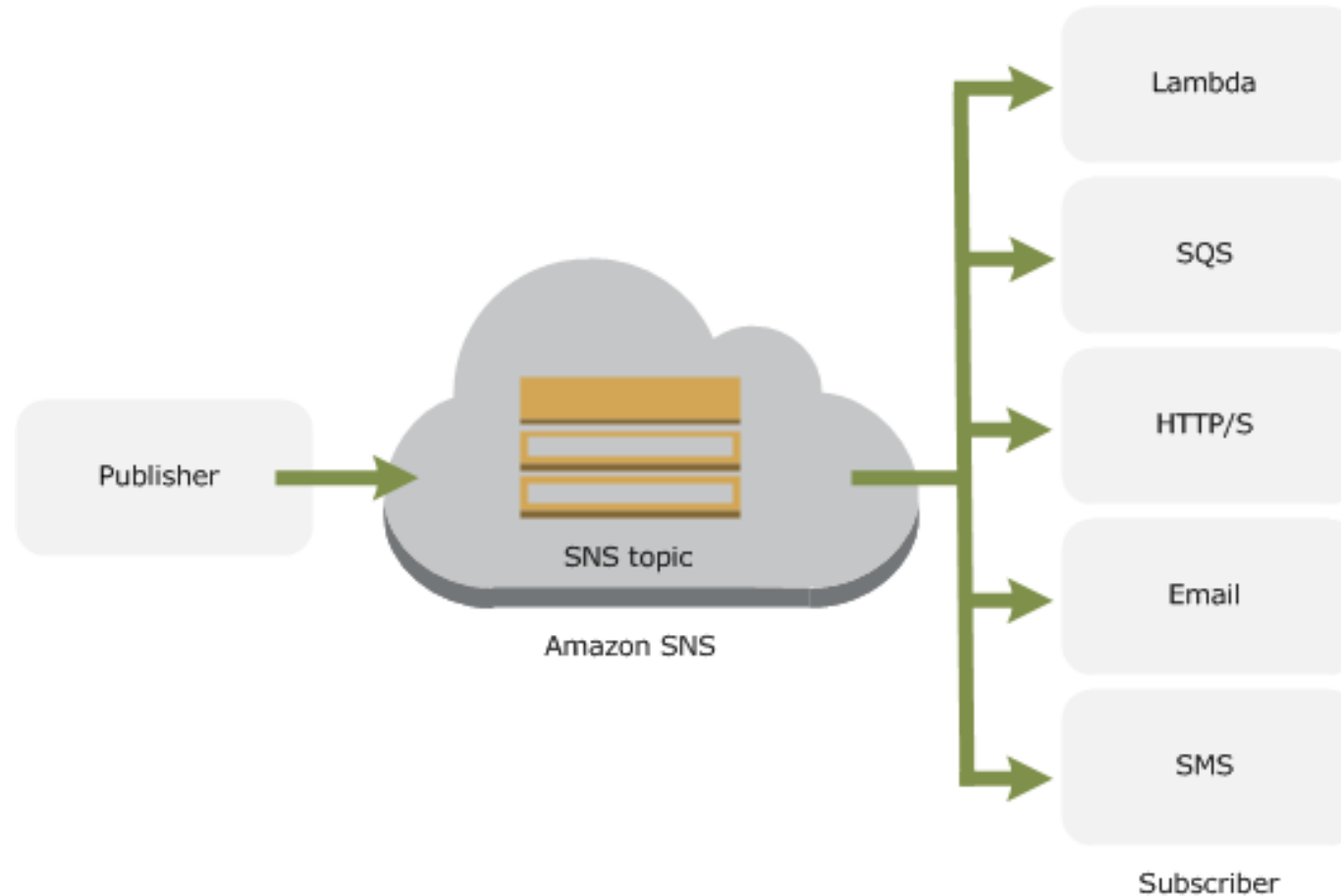
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Amazon Simple Notification Service

Amazon Simple Notification Service

- Amazon Simple Notification Service (Amazon SNS) is a web service that coordinates and manages the delivery or sending of messages to subscribing endpoints or clients.
- In Amazon SNS, there are two types of clients—publishers and subscribers—also referred to as producers and consumers.
- **Publishers** communicate asynchronously with subscribers by producing and sending a message to a topic, which is a logical access point and communication channel.
- **Subscribers** (i.e., web servers, email addresses, Amazon SQS queues, AWS Lambda functions) consume or receive the message or notification over one of the supported protocols (i.e., Amazon SQS, HTTP/S, email, SMS, Lambda) when they are subscribed to the topic.

Amazon Simple Notification Service

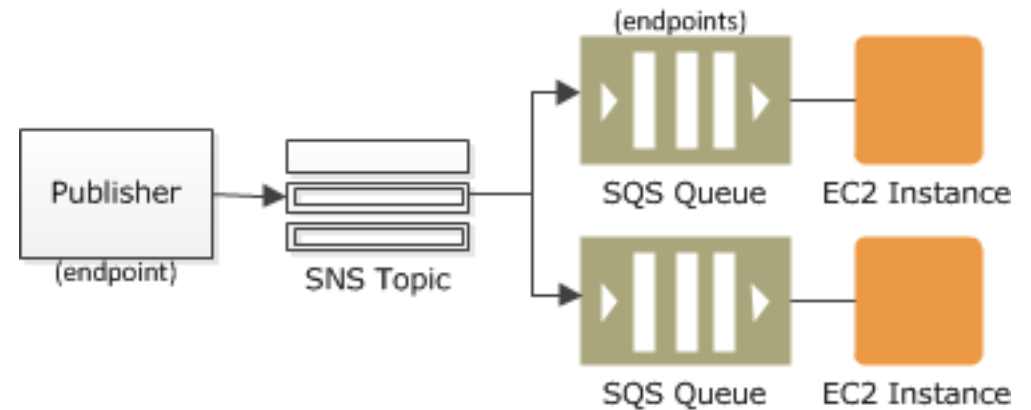


Common Amazon SNS Scenarios

- **Application and system alerts are notifications**, triggered by predefined thresholds, sent to specified users by SMS and/or email. For example, since many AWS services use Amazon SNS, you can receive immediate notification when an event occurs, such as a specific change to your Amazon EC2 Auto Scaling group.
- **Push email and text messaging** are two ways to transmit messages to individuals or groups via email and/or SMS.
- **Mobile push notifications** enable you to send messages directly to mobile apps.
- **Message Durability** - Amazon SNS provides durable storage of all messages that it receives. When Amazon SNS receives your Publish request, it stores multiple copies of your message to disk. Before Amazon SNS confirms to you that it received your request, it stores the message in multiple isolated locations known as Availability Zones. The message is stored in Availability Zones that are located within your chosen AWS Region, such as the US East (N. Virginia) Region. Although rare, should a failure occur in one Availability Zone, Amazon SNS remains operational, and the durability of your messages persists.

Common Amazon SNS Scenarios - Fanout

- The "fanout" scenario is when an Amazon SNS message is sent to a topic and then replicated and pushed to multiple Amazon SQS queues, HTTP endpoints, or email addresses.
- This allows for parallel asynchronous processing.



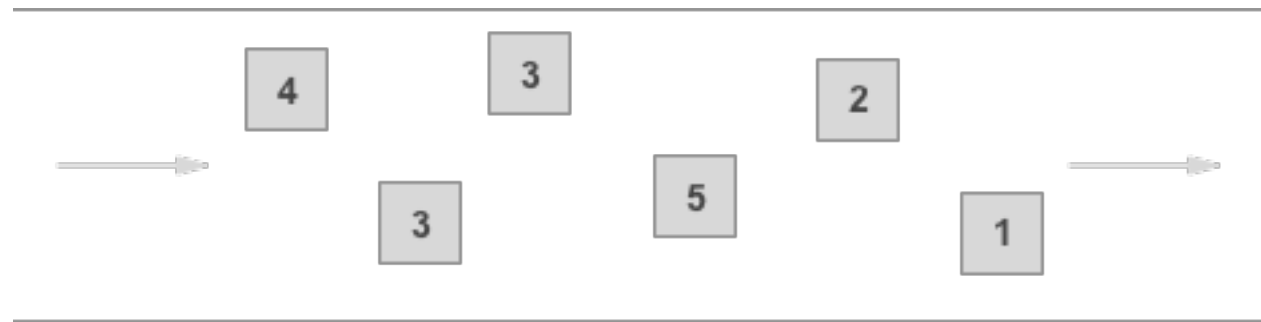
Amazon Simple Queue Service

Amazon Simple Queue Service

- Amazon Simple Queue Service (SQS) is a fully managed message queuing service that enables you to decouple and scale microservices, distributed systems, and serverless applications.
- SQS eliminates the complexity and overhead associated with managing and operating message oriented middleware, and empowers developers to focus on differentiating work.
- Using SQS, you can send, store, and receive messages between software components at any volume, without losing messages or requiring other services to be available.
- SQS offers two types of message queues.
 - **Standard queues** offer maximum throughput, best-effort ordering, and at-least-once delivery.
 - **FIFO (First In, First Out)** queues are designed to guarantee that messages are processed exactly once, in the exact order that they are sent.

Standard Queues

- **Unlimited Throughput** - Standard queues support a nearly unlimited number of transactions per second (TPS) per API action.
- **At-Least-Once Delivery** - A message is delivered at least once, but occasionally more than one copy of a message is delivered.
- **Best-Effort Ordering** - Occasionally, messages might be delivered in an order different from which they were sent.

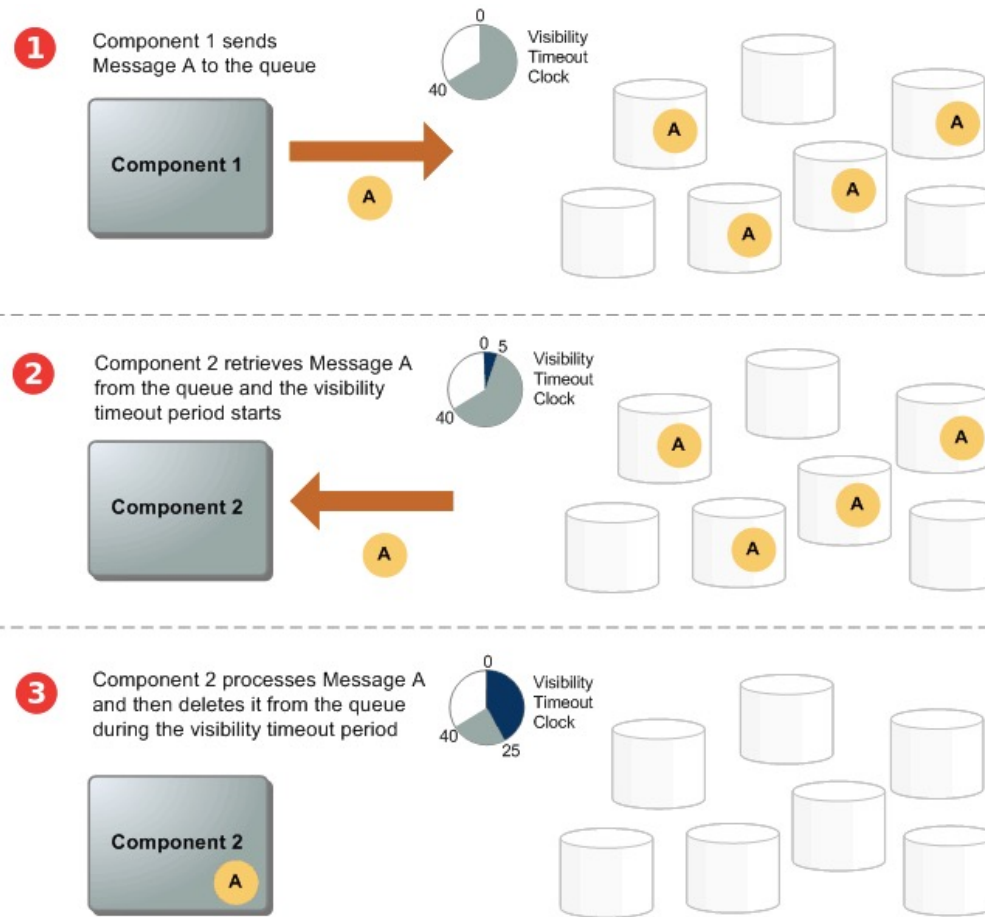


FIFO Queues

- **High Throughput** - By default, FIFO queues support up to 300 messages per second (300 send, receive, or delete operations per second). When you batch 10 messages per operation (maximum), FIFO queues can support up to 3,000 messages per second.
- **Exactly-Once Processing** - A message is delivered once and remains available until a consumer processes and deletes it. Duplicates aren't introduced into the queue.
- **First-In-First-Out Delivery** - The order in which messages are sent and received is strictly preserved (i.e. First-In-First-Out).



Message Lifecycle



Working with Amazon SQS Messages

- The following guidelines can help you process messages efficiently using Amazon SQS.
 - Processing Messages in a Timely Manner
 - Handling Request Errors
 - Setting Up Long Polling
 - Capturing Problematic Messages
 - Setting Up Dead-Letter Queue Retention
 - Avoiding Inconsistent Message Processing
 - Implementing Request-Response Systems

Additional Resources

See Lecture Page