Amazon Web Services

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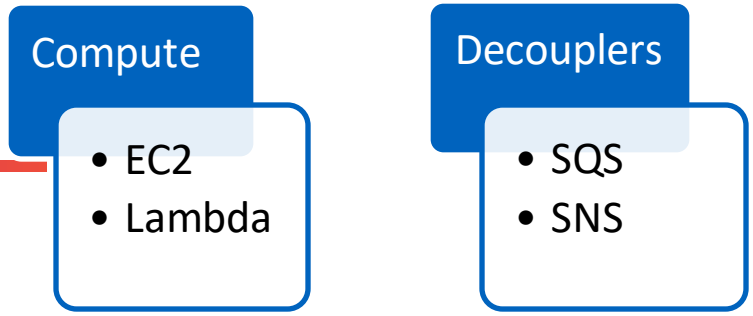
Day 4:



Amazon Elastic Cloud Compute

- Amazon Elastic Compute Cloud (Amazon EC2) provides scalable, resizable computing capacity (Virtual Machine) in the AWS cloud.
- Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly deploy your applications, scale capacity as your computing requirements change and pay only for capacity that you actually use.
- Secure and reliable with SLA commitment of 99.99%
- Supports a variety of Linux and Windows Operating systems.
- You have the root user / Windows administrator access and have full control of your instance in AWS
- You can install software of your choice and are fully responsible for the instance (including security, patching, system administration, recovery etc.)

EC2 Instance: Tenancy

- Shared Tenancy
  - Instances from other customers may also be running on the Physical Hosts that run your instances
  - This is the default Tenancy Option
- Dedicated Instances
  - Launch instances within Amazon VPC that run on hardware dedicated to a single customer
  - For BYOL and highly sensitive/regulated workloads

EC2 Instance Launch Types

- On Demand
  - Short workload, predictable pricing
- Reserved Instances
  - Long workload(>=1 year)
- Convertible Reserved Instances
  - Long workload(>=1 year), Flexible instances
- Scheduled Reserved Instances
  - Launch within time window you reserve
- Spot Instances
  - Short workload, Can bid prices, Can lose instances
- Dedicated Instances
  - No other customers will share your h/w
- Dedicated Hosts
  - Book an entire physical server, Control instance placement

EC2 AMIs

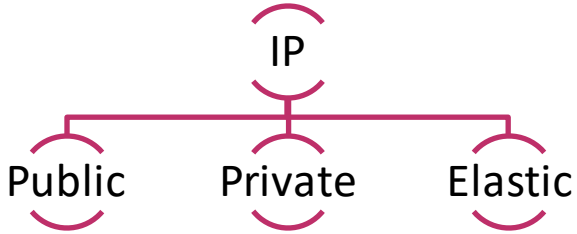
- Amazon Machine Images
- An image is the underlying OS of our instance
- Linux, Redhat, Windows, etc
- You can also custom build an AMI when specific packages are required to be pre-installed, and sell them on Amazon Marketplace
- Faster boot time
- AMI limited to regions(Can be copied)
- AMIs can be shared to another accounts without affecting the ownership

EC2 Instance Types

- Instance types comprise varying combinations of CPU, memory, storage, and networking capacity and give you the flexibility to choose the appropriate mix of resources for your applications.
- https://aws.amazon.com/ec2/instance-types/
- General purpose – T3,T2,M5,M4
- Compute Optimized – C5,C4
- Memory Optimized - R5, R4, X1, High memory
- Storage Optimized – I2 – High I/O instances
- Dense-Storage-Instances – D2
- Graphics Intensive - G2
- General Purpose GPU compute – P2
- Field Programmable (gives hardware acceleration) – F1

Elastic IP

- Public IP can communicate with www directly
- Private IP can communicate with www through Internet Gateway
- Elastic IP used to fix a public IP to your instance
- Can mask the failure of 1 instance by remapping it to another instance
- You can only ssh to your instance through Public IP/Elastic IP



EC2 Security Group

- A *security group* acts as a virtual firewall that controls the traffic for one or more instances
- https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-security-groups.html
- SG locked down to a region/VPC
- By default:
  - All inbound traffic is blocked
  - All outbound traffic is authorised
- An SG can reference IP address, CIDR blocks and other SGs

AWS Lambda

- AWS Lambda lets you run code without provisioning or managing servers. You pay only for the compute time you consume.
- Currently supported programming languages for the code are
  - Node.js – 4.3 and 6.10
  - Python – 2.7 and 3.6
  - Java – 8
  - C# (.Net Core 1.0, 2.0)
  - Go 1.x

- You can set up your code to automatically trigger from other AWS services or call it directly from any web or mobile app using AWS APIs

EC2 vs. Lambda

EC2

- Virtual Server
- Limited by RAM and CPU
- Continuously Running
- Scaling means intervention to add/remove servers

Lambda

- Virtual Function
- Limited by Time
- Run on Demand
- Scaling will be automated

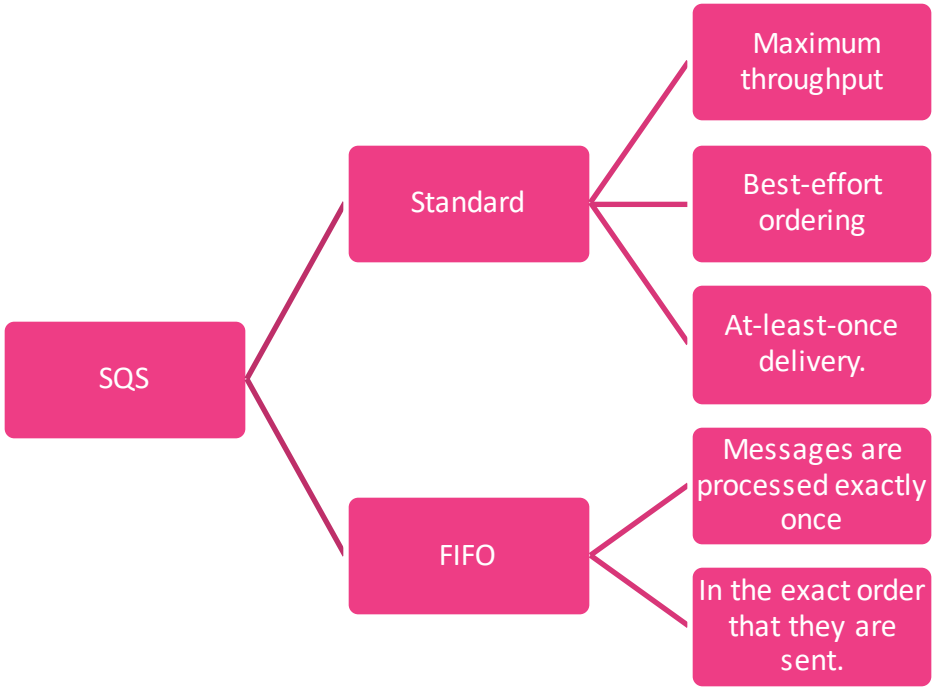
AWS Lambda: Function Definition

- Code – Choose runtime (python, NodeJS etc.), write code inline via console, upload zip file, upload from S3
- Handler() function – the function within your Lambda function code which is called on event trigger
- Trigger – AWS service to allow triggering Lambda function
- Execution Role – IAM role the Lambda function can assume to get privilege for accessing other AWS services
- Memory – Max memory reserved for Lambda function execution
- Timeout – Max time to allow Lambda function execution
- VPC – access resources within you VPC (e.g. Elasticache cluster)
- DLQ (Dead Letter Queue) – send event object for failed Lambda executions to your SQS queues / SNS topic
- Environment variables – reuse code across different setups, encrypted with KMS (for sensitive information)
- https://docs.aws.amazon.com/lambda/latest/dg/lambda-python.html

AWS Lambda: Use Cases

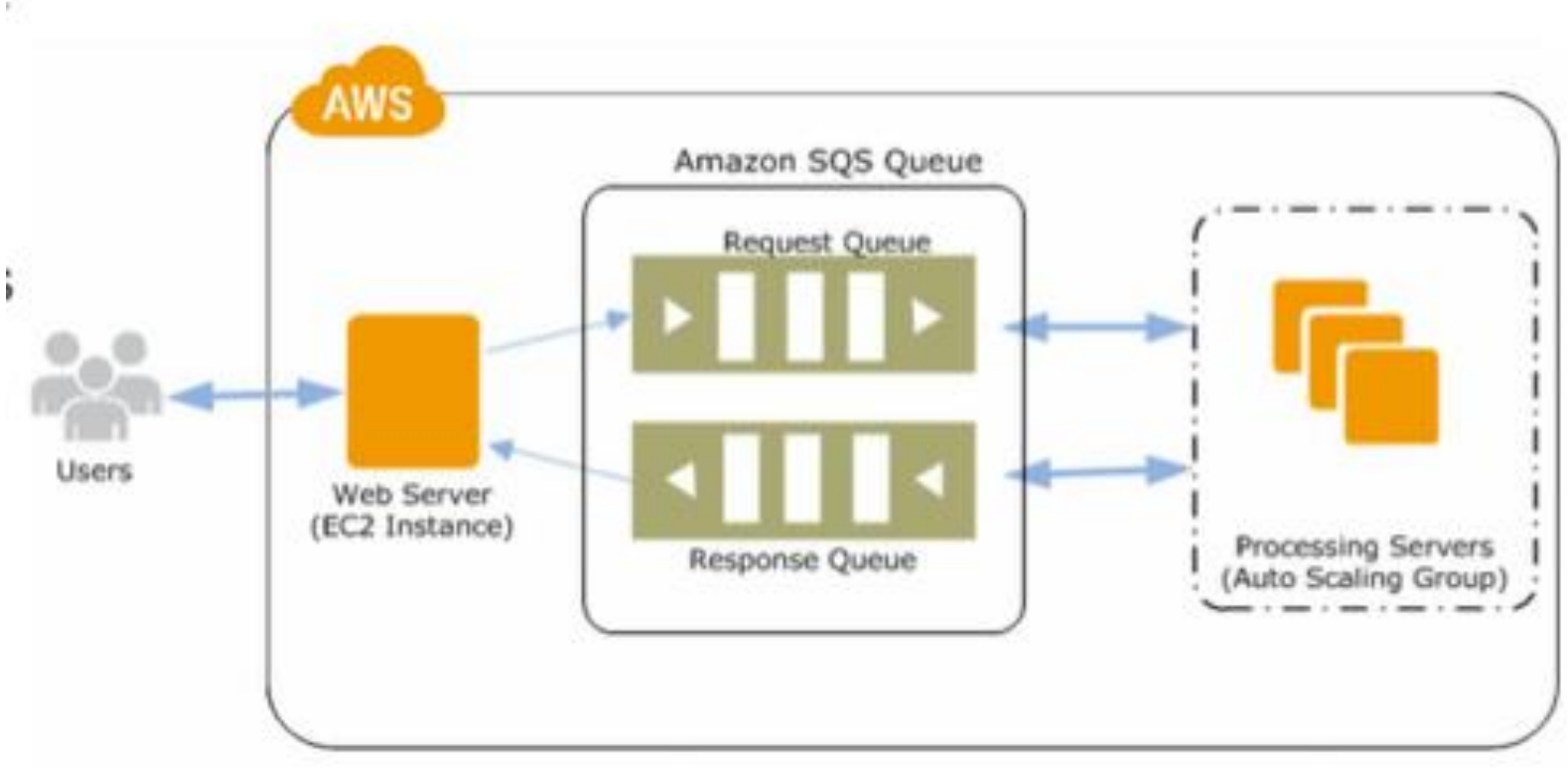
- https://aws.amazon.com/lambda/

SQS

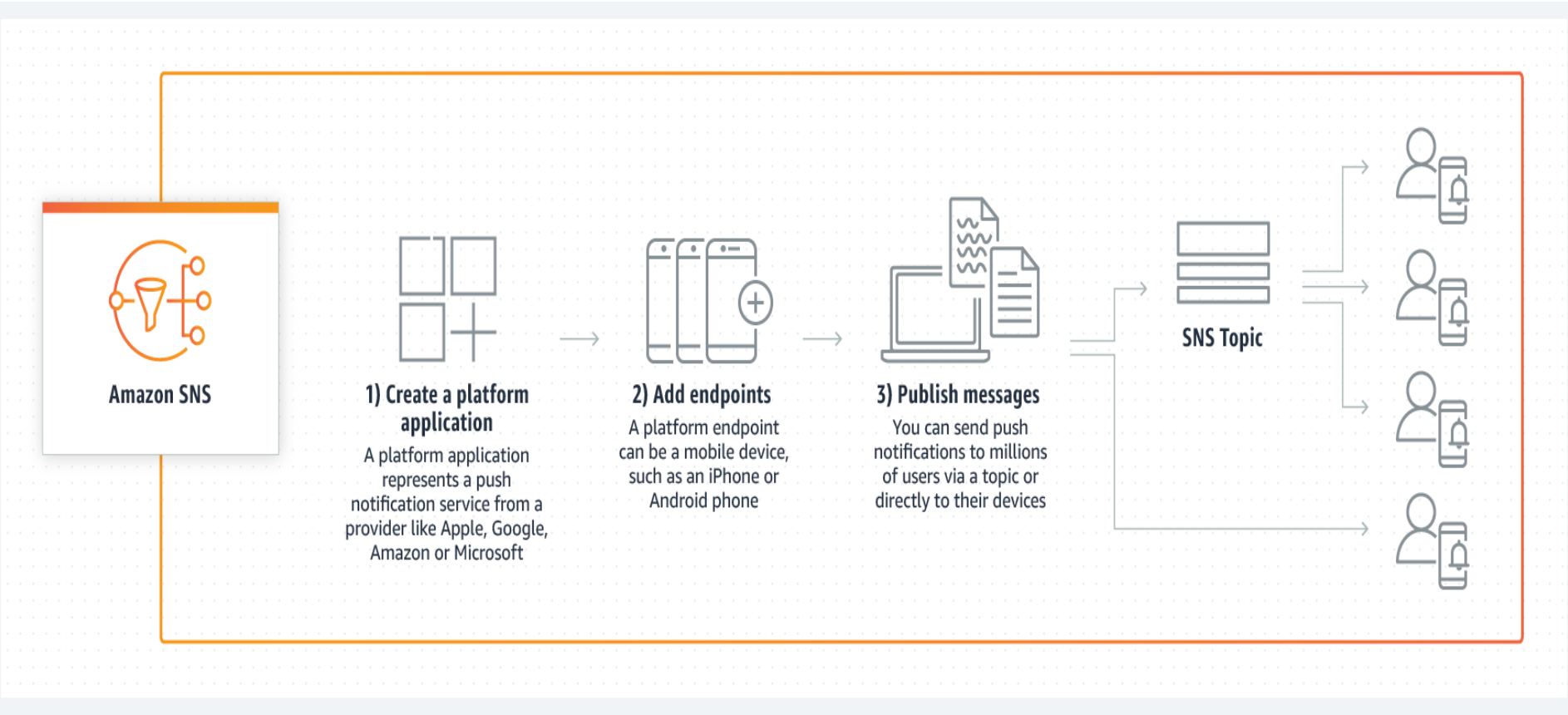


- Fully managed message queuing service
- Enables you to decouple and scale microservices, distributed systems, and serverless applications.
- Eliminates the complexity and overhead associated with managing and operating message oriented middleware,and empowers developers to focus on differentiating work.
- Send, store, and receive messages between software components at any volume, without losing messages or requiring other services to be available.

SQS



SNS



https://aws.amazon.com/sns/?whats-new-cards.sort-by=item.additionalFields.postDateTime&whats-new-cards.sort-order=desc

Handson Links

- https://docs.aws.amazon.com/lambda/latest/dg/with-sns-example.html
- https://docs.aws.amazon.com/AmazonS3/latest/userguide/ways-to-add-notification-config-to-bucket.html
- https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html
- https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AccessingInstancesLinux.html

Thank You