Cloud Computing Workshop

11 August - 2018

Agenda

➤ Introductions

➤ Overview of AWS Cloud Platform

➤ Lab - S3 and Cloudfront

➤ Lab - EC2

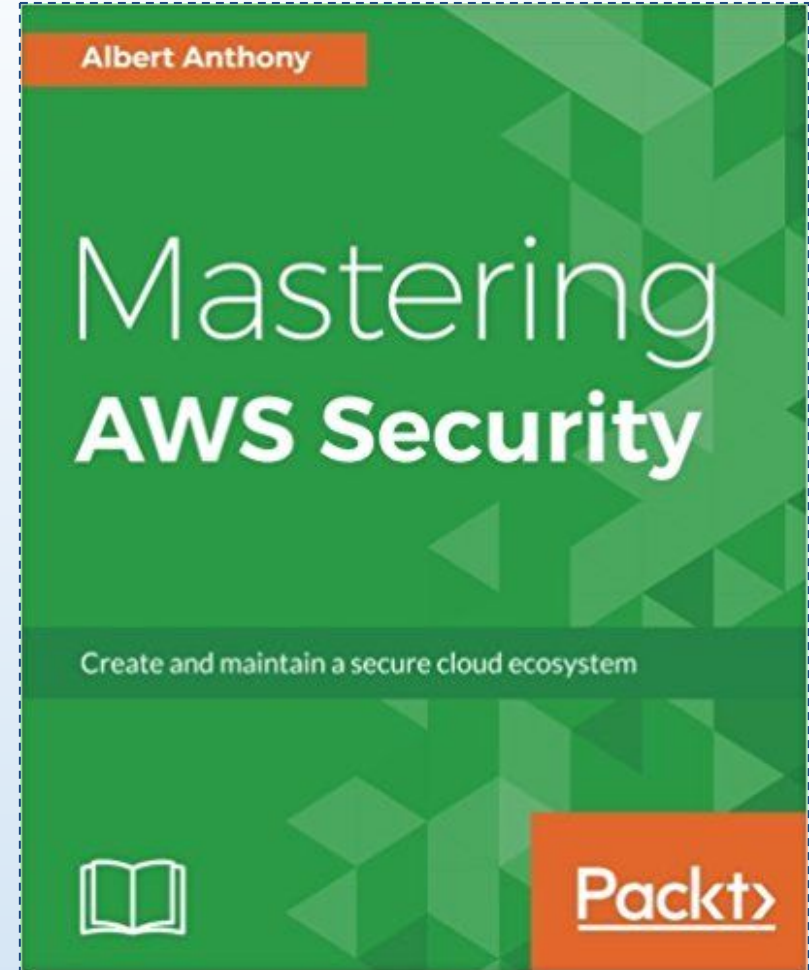➤ Lab - Lambda - Serverless

➤ AWS Best Practices

Albert

➤ Founder - Loves Cloud

➤ Solutions Architect

➤ Trainer - Cloud & DevOps

➤ Author - Mastering AWS Security

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- DevOps & Cloud Architect
- Trainer - Cloud & DevOps
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Rajni

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‣ Jenkins & Docker Expert

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Workshop Training Methodology

➤ Access to AWS Account

➤ Downloadable Lab Instructions Document

➤ Introduce Problem Statement for a Web Application

➤ Group Assignments

➤ Building Live Project through Hands-on Labs

➤ Best Practices
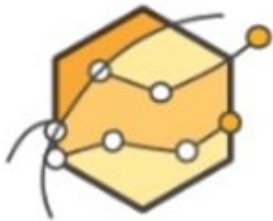
Why Use Cloud?

Trade capital expense for variable expense.

Increase speed and agility.

Benefit from massive economies of scale.

Stop spending money on running and maintaining data centers.

Stop guessing capacity.

Go global in minutes.

AWS As A Market Leader – Gartner 2018

https://aws.amazon.com/resources/analyst-reports/

AWS Fundamentals

➤ AWS Global Infrastructure

- ◆ Regions
- ◆ Availability Zones
- ◆ Edge Locations

➤ Scope of Services

- ◆ Global
- ◆ Regional
- ◆ Availability Zone
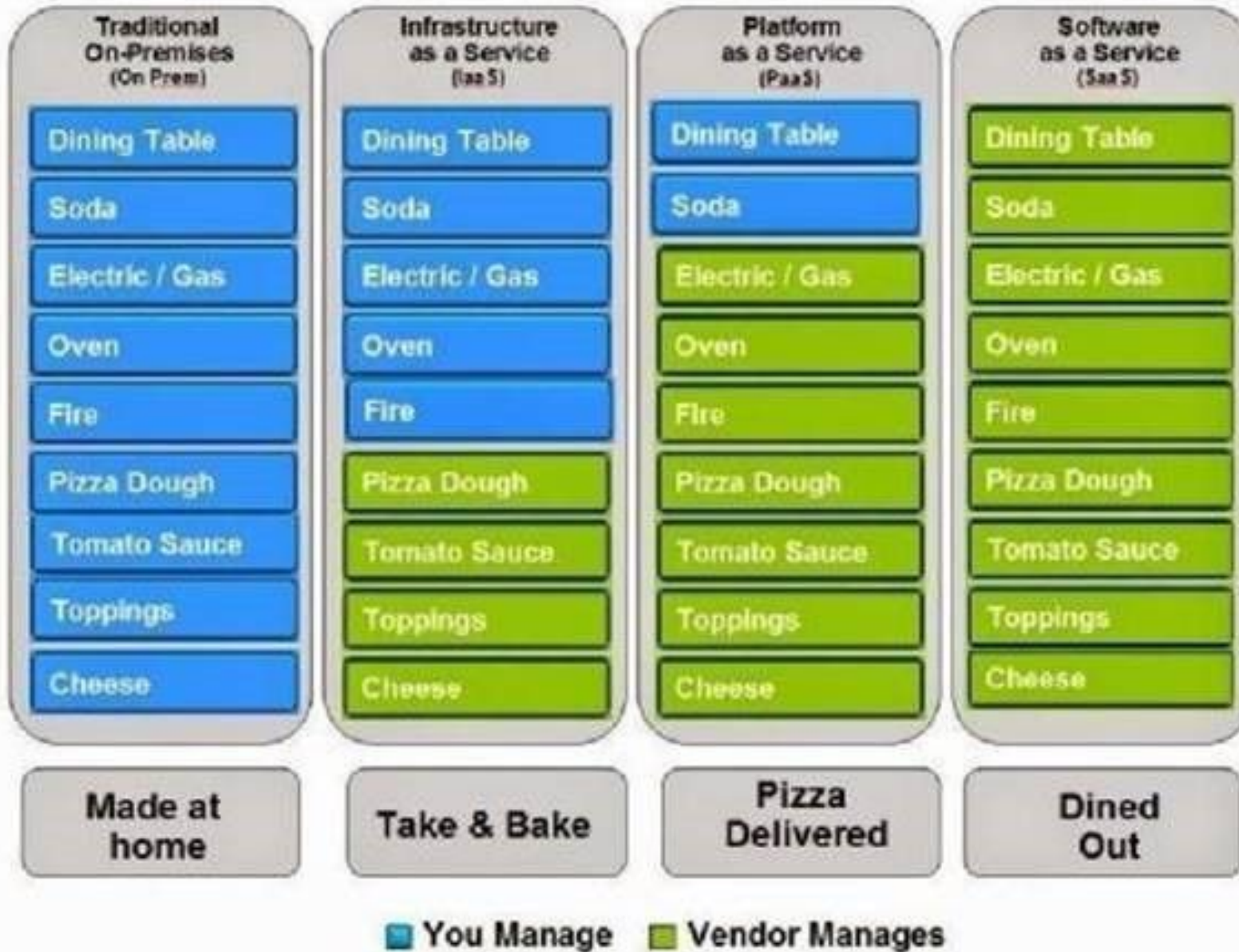
➤ IaaS, PaaS & SaaS Offerings

Identity & Access Management

- Identities
  - Users
  - Groups
  - Roles
- Access Management
  - Policies
  - Permissions
- Identity Federation
- Multi Factor Authentication

Pizza as a Service

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Project - Build Highly Available Web Application

➤ Deploy a highly available web application that scales with your business.

➤ Individual product pages should contain images, pdf manual and customer reviews.

➤ Website should be available all over the world.

➤ Customers expect pages to load quickly.

➤ Customers want a "contact us" form for communicating with company.

Group Assignment

- ‣ Prepare a solution that meets all requirements
- ‣ Group of 4-6
- ‣ Time Limit - 10 Minutes

High Level Architecture

users

Open www.example.com

Website

Static Assets

/contactus request

AWS

VPC

Amazon EC2

```
Apache --> Web Server
Website  Content-->
/ -> Website Content
/<>/
```

EC2 Server

virtual private cloud

Amazon CloudFront

Amazon S3

Amazon API Gateway

AWS Lambda

AWS cloud
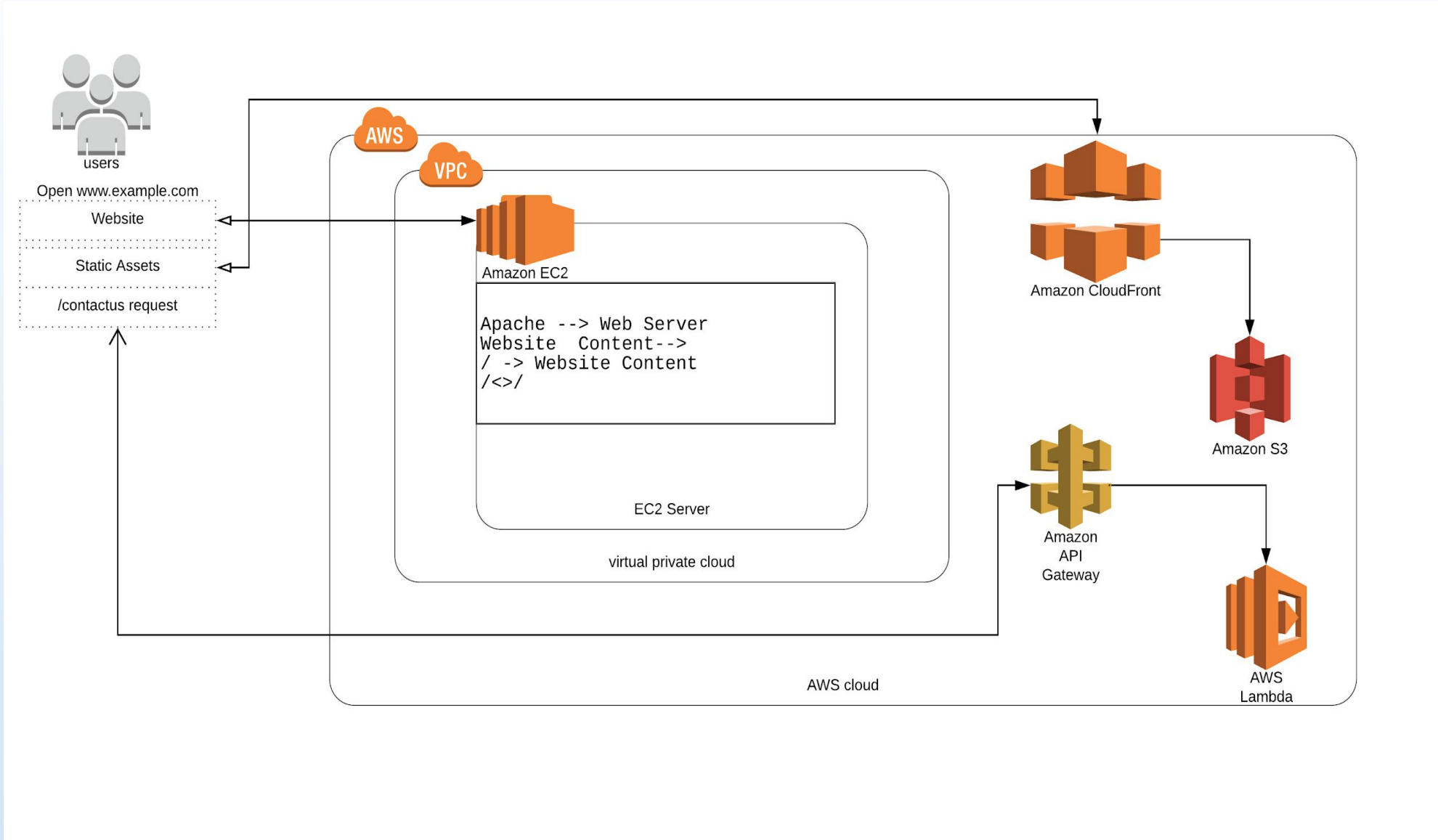
Part 1

S3 & Cloudfront

by

Rajni

S3-Simple Storage Service

➤ Platform as a Service

➤ Tiered Object Storage

➤ Decouples Storage from Compute

➤ Durable, Secure, Scalable and Highly Available

➤ Most Economical Storage Option in AWS

S3 -Pricing

S3 - Glacier $4/TB 〉〉〉〉 **S3 - Standard $23/TB** 〉〉〉〉 **EBS - $100/TB** 〉〉〉〉 **EFS - $300/TB**

Case Study - Saving US $ 1.8 Million in AWS Costs

AWS Service	Feb-17	Jun-17
Elastic Block Storage	$61,001	$5,119
EC2	$50,886	$15,330
Elastic File Service	$49,335	$23,076
EC2 - EMR	$21,501	$2,604
AWS Support	$9,491	$1,376

AWS Billing — $210,659 (Feb-17), $113,350 (Mar-17), $101,778 (Apr-17), $84,850 (May-17), $54,815 (Jun-17)

Elastic Block Storage	Storage	592 TB --> 50 TB
Elastic File Service	Storage	164 TB --> 77 TB
EC2-EMR	Nodes	43 --> 2
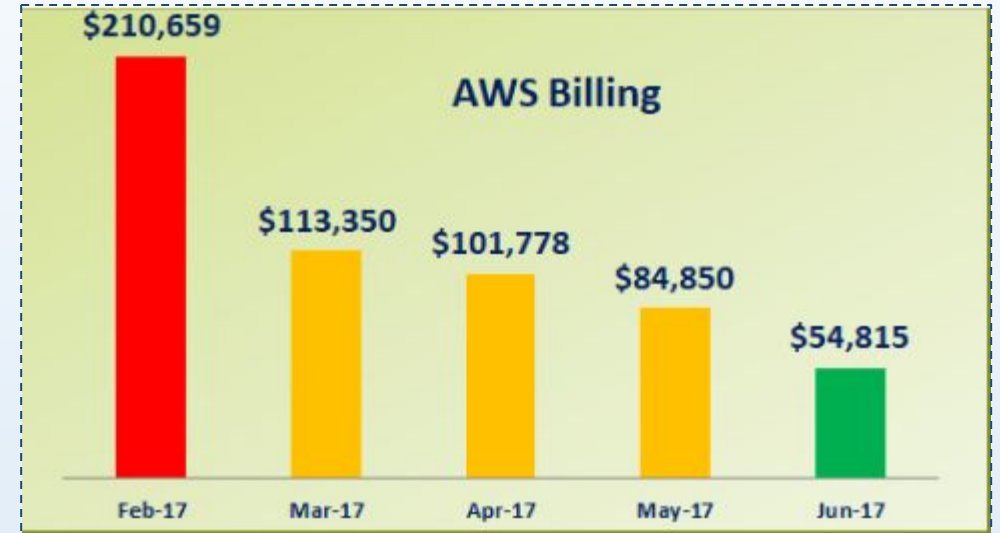
▸▸ **Re-architected application to utilize S3 instead of EBS and EFS**

▸▸ **Used spot instances for EMR task nodes instead of on-demand nodes**

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S3 Storage Classes

	S3 Standard	S3 Standard-IA	S3 One Zone-IA	Amazon Glacier
Designed for Durability	99.999999999%	99.999999999%	99.999999999%†	99.999999999%
Designed for Availability	99.99%	99.9%	99.5%	N/A
Availability SLA	99.9%	99%	99%	N/A
Availability Zones	≥3	≥3	1	≥3
Minimum Capacity Charge per Object	N/A	128KB*	128KB*	N/A
Minimum Storage Duration Charge	N/A	30 days	30 days	90 days
Retrieval Fee	N/A	per GB retrieved	per GB retrieved	per GB retrieved**
First Byte Latency	milliseconds	milliseconds	milliseconds	select minutes or hours***
Storage Type	Object	Object	Object	Object
Lifecycle Transitions	Yes	Yes	Yes	Yes

Lab 1 - Create S3 Bucket

- Create a S3 Bucket in **Northern Virginia** Region
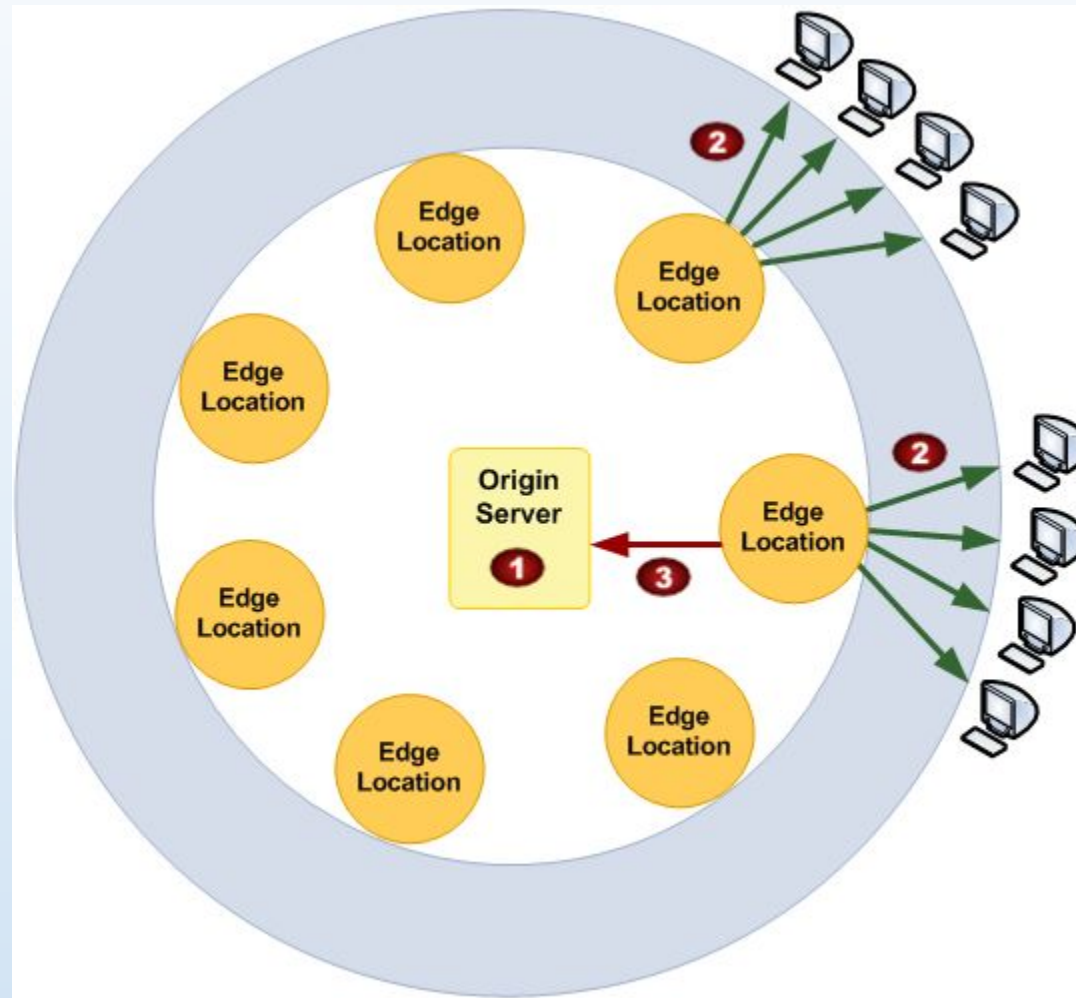- Upload 1 image file in this bucket

CloudFront

- Whole Site Delivery
  - Static Content
  - Dynamic Content
- Supports Multiple Origins
- Make Web Applications
  - Faster
  - Cost Less
  - More Available
  - Easier to Manage

Whole Site Delivery Use Cases

- News
- Weather
- Sports
- Social Media
- Advertising
- Travel
- Stocks

Global Content Distribution Through CloudFront

Lab 2 - Create CloudFront Distribution

➤ Create CloudFront Distribution

➤ Use Newly Created S3 Bucket
   as Origin

Lab 3 - S3 Versioning

- ▸▸ Prevents Accidental Overwrite & Delete

- ▸▸ Suitable for Small Size Objects

- ▸▸ Creates Full Copy of All Versions of an Object

- ▸▸ Once Enabled, Can't be Disabled

Lab 4 - S3 Lifecycle Management

➤ Move Data Automatically Between S3 Storage Tiers

➤ Expire Objects Automatically

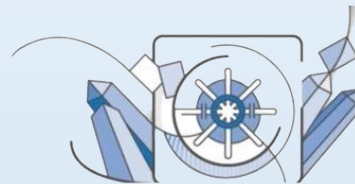➤ Reduce Cost of Storage

Choice of Storage Classes on Amazon S3

Standard   Standard - Infrequent Access   Amazon Glacier

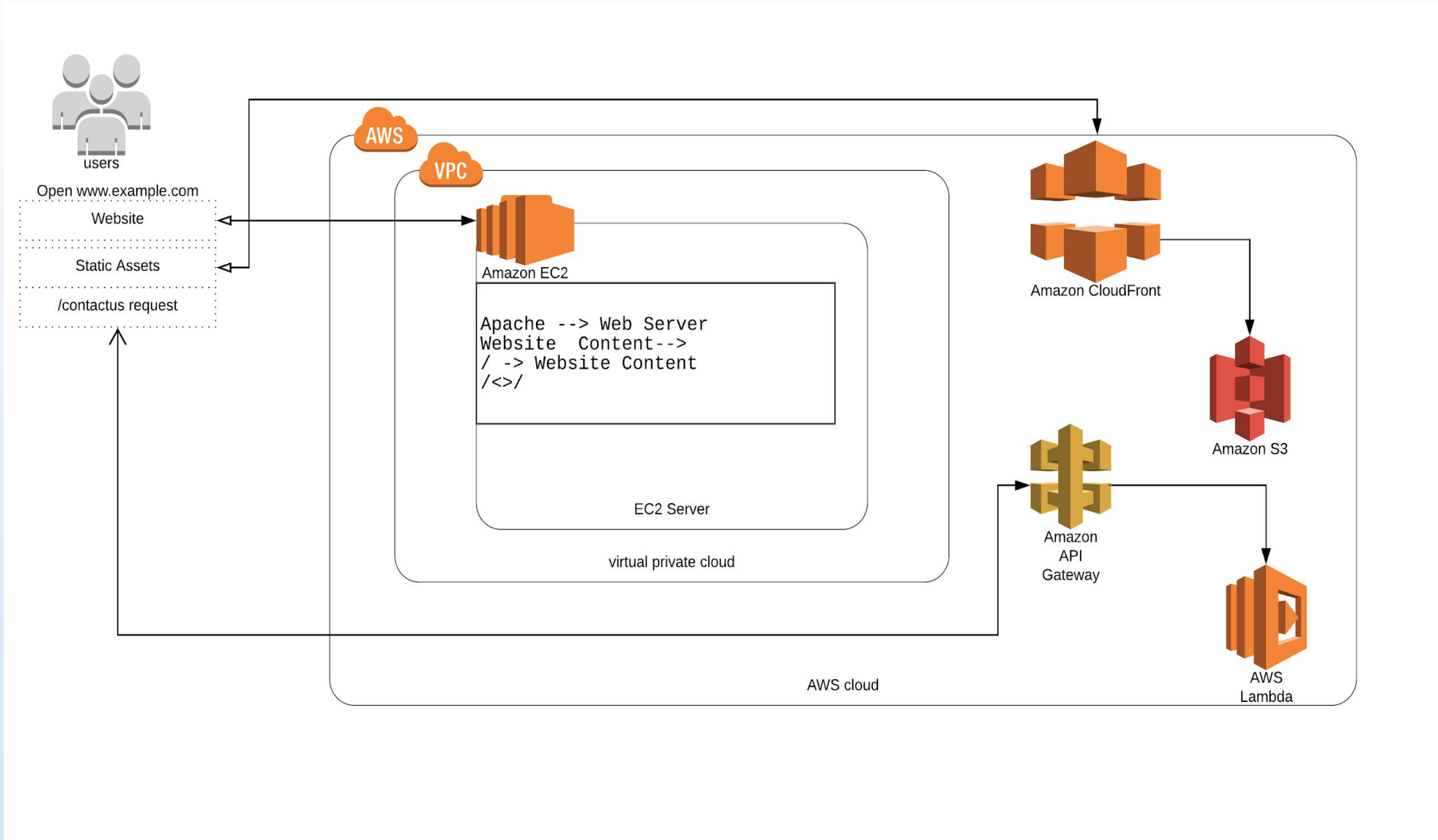Active data   Infrequently accessed data   Archive data

aws

Part 2

Deploy Web Application on EC2

by

Ravish

High Level Architecture

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Elastic Compute Cloud

➤ Infrastructure as a Service

➤ Resizable Compute Capacity

➤ IAM Roles for EC2

➤ Elastic Load Balancing

➤ Auto Scaling

➤ High Availability & Fault Tolerant Designs

Elastic Compute Cloud - Wide Range of Choices

EC2 instances: Families and Generations

General-purpose:	M1, M3 , M4, T2
Compute-optimized:	C1, CC2, C3, C4
Memory-optimized:	M2, CR1, R3
Dense-storage:	HS1, D2
I/O-optimized:	HI1, I2
GPU:	CG1, G2
Micro:	T1, T2

Elastic Compute Cloud - EBS
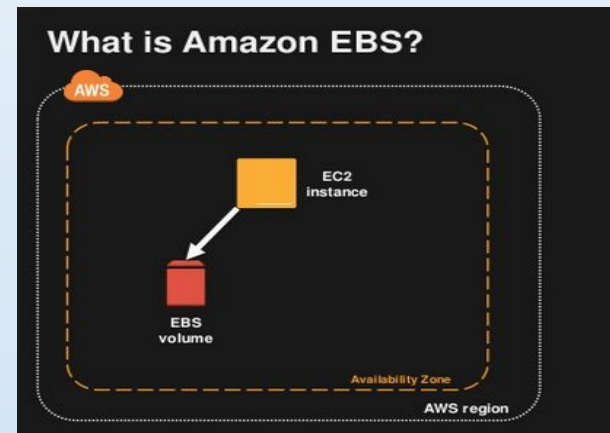
General Purpose SSD

Commonly used for root volume on a system Used on Dev/Test and smaller DB instances 3 IOPS/GiB
(Burstable with baseline performance) Vol Size = 1 GB to 16 GB Max burst upto 3,000 IOPS

Provisioned IOPS

Suited for Mission critical applications Large databases Size 4 GB to 16 GB

Magnetic

Low storage cost Vol size 1 GB to 1024GB

Lab 5 - Create EC2 Instance in Cloud

➤ Ensure Your Region is "**Northern Virginia**"

➤ Follow Instructor and Lab Instruction document

Reserved Instances - Best Practices

➤ Best Used for **"<u>Always On</u>"** Instances

➤ Up to 75% Savings on On-Demand Price

➤ Approx. 20% - 40% Savings for 1 Year

➤ 1 - 3 Year Commitment

➤ AWS Services Offering Reserved Instances

- **EC2 & EC2 Hosts**

- **RDS**

- **Redshift**

- **ElastiCache**

- **DynamoDB (Not an RI, discount for commitment)**

- **CloudFront (Not an RI, discount for commitment)**

Dev &Test Environment are not always on!

Part 3

Serverless Notifications

By

Ravish

Lambda

➤ Serverless Computing

➤ Run Code without Managing or Provisioning Servers

➤ Supports Node.js, Java, C#, Go and Python

➤ Run Your Code in Response to Events

➤ Lambda Limits

  ◆ Maximum Execution Time is 5 Minutes

  ◆ Maximum Memory Allocation 3 GB

  ◆ Concurrent Execution Per Region 1000

Lab 6 - Serverless Notification Lambda Function
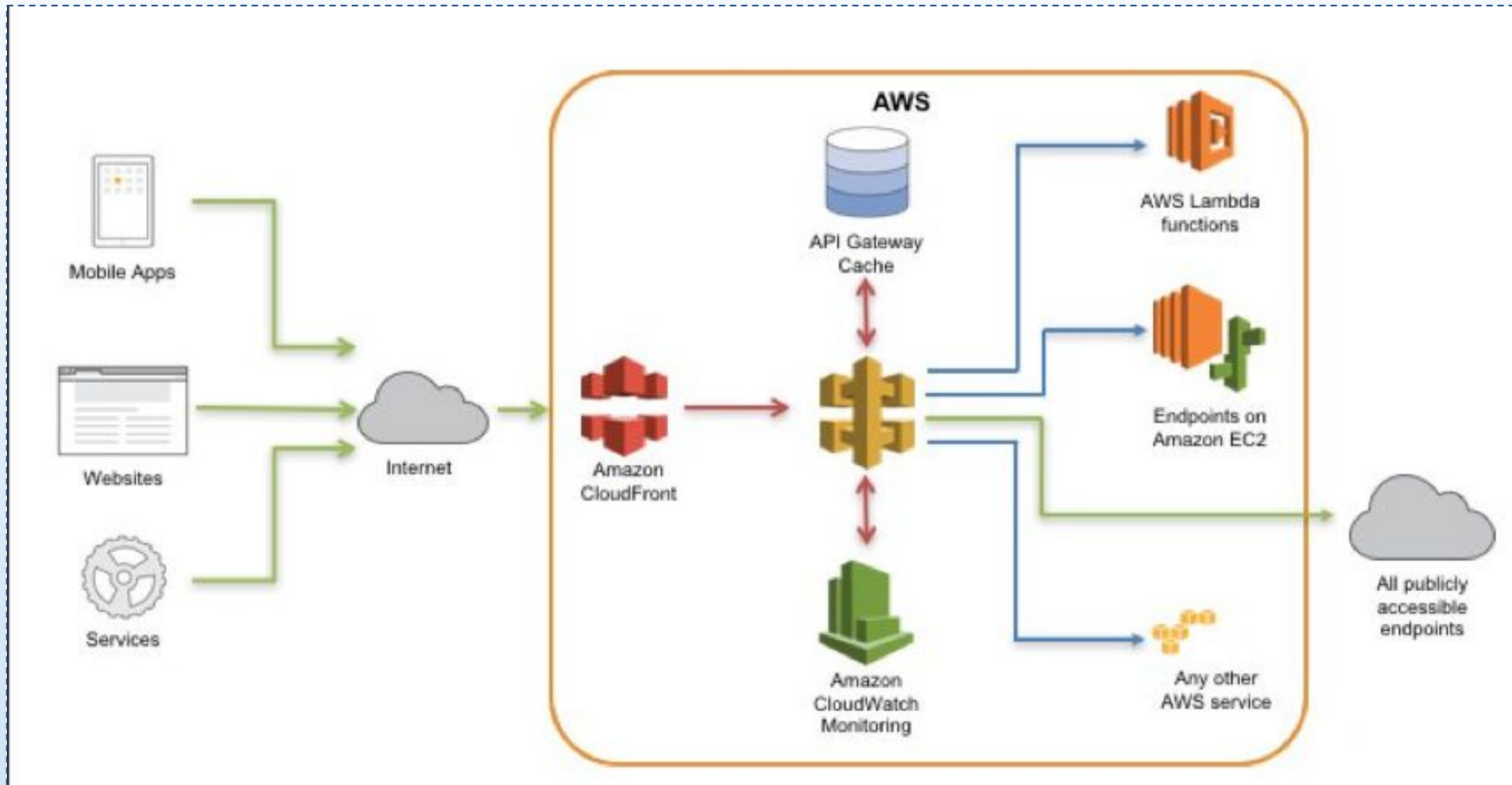
- Ensure Your Region is "**Northern Virginia**"
- Go To Lambda Dashboard
- Follow Step-by-Step Lab instruction document

API Gateway

➤ Fully Managed Service

➤ Create, publish, maintain, monitor, and secure APIs at any scale

➤ Create RESTFul API Endpoints for your Existing Services

➤ Define your REST API and its associated resources and methods

API Gateway Architecture

AWS Services Used

**WebSite Content
Global Content Distribution**

- ▸ S3
- ▸ CloudFront

**Application Hosting
Deployment**

- ▸ IAM
- ▸ EC2

Serverless Notification

- ▸ API Gateway
- ▸ Lambda

Thank You

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