



# An Introduction to the Amazon Cloud AWS



Information gathered from AWS partner documentations

**Rashmi Kansakar**

# Certification Path in Cloud

<https://docs.microsoft.com/en-us/learn/certifications/browse/?products=azure>

<https://aws.amazon.com/certification/>

<https://cloud.google.com/certification/register>

# What are we going to talk about?

- Introduction to Cloud Computing
- Where do I start?
- Introduction to AWS
- AWS Services



# What is AWS?

Amazon Web Services (AWS) is a secure cloud services platform, offering compute power, database storage, content delivery and other functionality to help business scale & grow.



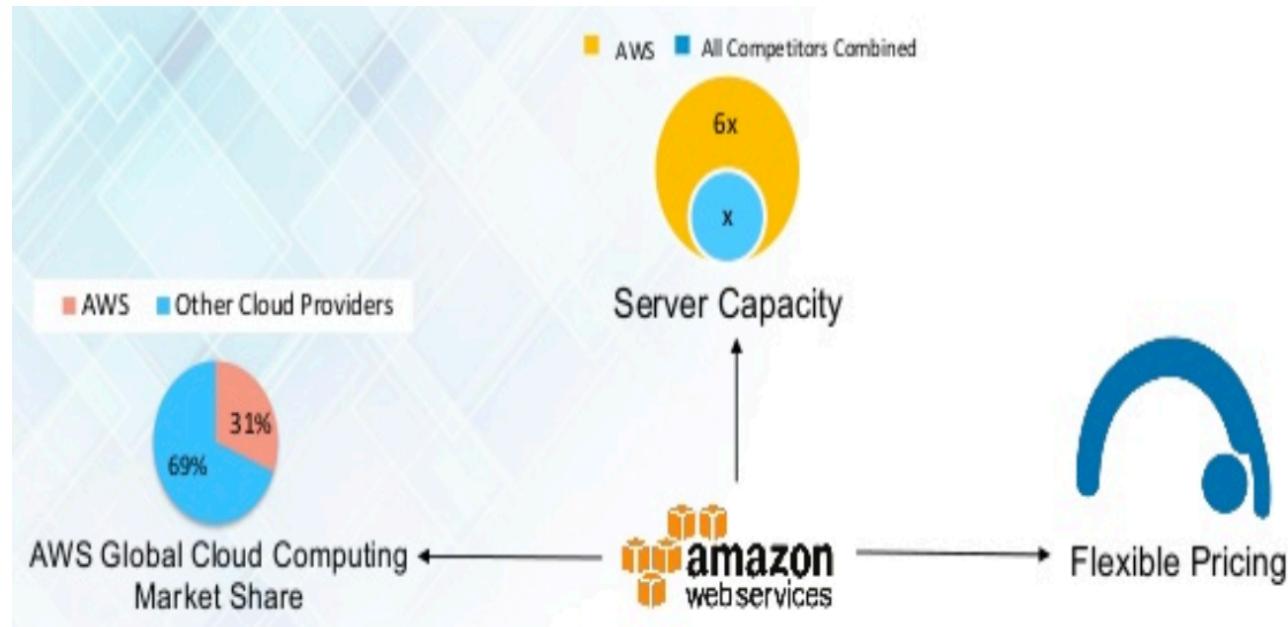
# Why move to the AWS Cloud?

- Is it cost (dollars and hours) savings?
- Is it because it's (near infinitely) scalable?
- Is it a shiny object?



# Why move to the AWS Cloud?

- Is it cost (dollars and hours) savings?
- Is it because it's (near infinitely) scalable?
- Is it a shiny object?



# Cost Savings

- Minimize/eliminate up front investment in hardware, software, support, connectivity, etc.
- Adopt a OpEx (versus CapEx) cost model, which might align well with your business model.
- Minimize/eliminate complexities in cross charging for shared services
- Achieve higher economies of scale

# Scalability

- Resource + People + Business  
(Increased Agility and Speed to Market for less)
- Someone else now pays to maintain that excess hardware capacity
- Automation allows for the horizontal scale up/scale down of infrastructure
- Abstracted services eliminate the guesswork in scaling of storage and other services



# Availability

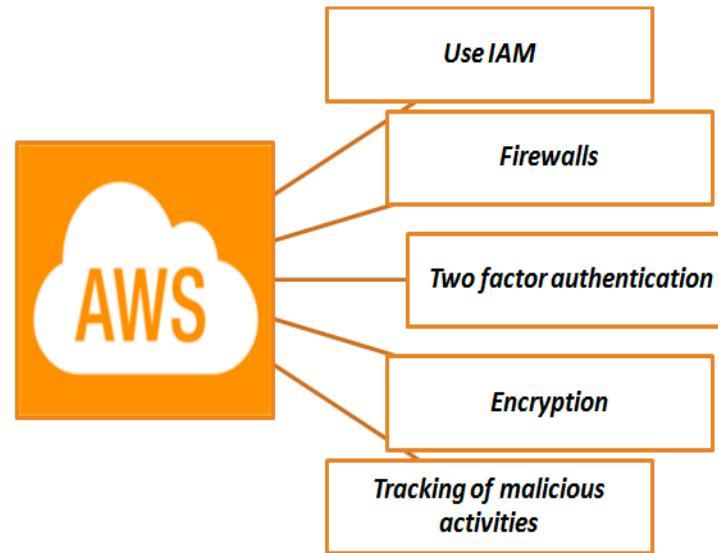
- Without physical constraints replacement of failed infrastructure occurs faster
- Applications leverage abstracted services where the availability characteristics aren't your problem
- Human error is minimized with automation

Availability %	Downtime per year
99.8%	17.52 hours
99.9% ("three nines")	8.76 hours
99.95%	4.38 hours
99.99% ("four nines")	52.56 minutes
99.999% ("five nines")	5.26 minutes
99.9999% ("six nines")	31.5 seconds
99.99999% ("seven nines")	3.15 seconds

Source: Wikipedia, "High Availability"  
[http://en.wikipedia.org/wiki/High\\_availability](http://en.wikipedia.org/wiki/High_availability)

# Security

- Each host becomes its own security zone
- Infrastructure lifecycle management no longer has a physical component
- Administrative activities are done with automation in mind
- Shared Responsibility security model across your cloud environment



Identity & access  
management



Detective  
controls



Infrastructure  
protection



Data  
protection



Incident  
response

# AWS – Where do you start? Knowledge

- Documentation available from AWS
  - *Documentation*
  - *Community/Meetups/Github*
  - *Wizards/Targeted E-Mails*
  - *Reference Architecture/Quickstarts*
  - *Ecosystem/Marketplace/Partners*
  - *Best Practices/Trusted Advisor/PHD/Targeted E-Mails*
  - *AWS Support*
  - *AWS Training & Certification*
- Interacting with AWS
  - *AWS Console*
  - *AWS CLI, Tools, Tookits, SDKs and Mobile SDKs*
  - *AWS Billing and Cost Management*
- Keep Up to Date
  - *Blogs*
  - *Whats New*



# How to build and try a project in AWS?

- Over 25 guides that provide step-by-step instructions to help build projects on AWS?
- Most projects take less than 60 minutes to complete and are organized by use case.

[Getting Started Resource Center](#)

# Websites and Web Applications

<h3>Host a Static Website</h3>  <p>Host your personal or simple marketing website on AWS.</p> <p>7 Steps   Amazon S3, Route 53, and Cloudfront</p>	<h3>Build a WordPress Website</h3>  <p>Deploy and host a production-ready WordPress website.</p> <p>5 Steps   Amazon EC2 and more</p>	<h3>Host a .NET Application</h3>  <p>Build and deploy a .NET application using AWS Elastic Beanstalk.</p> <p>3 Steps   Amazon EC2 and more</p>
<h3>Deploy a Node.js Web App</h3>  <p>Launch and run a highly available Node.js web application on AWS.</p> <p>6 Steps   AWS Elastic Beanstalk and more</p>	<h3>Build a LAMP Stack Web App</h3>  <p>Launch and run a highly available PHP web application on AWS.</p> <p>5 Steps   Amazon EC2 and more</p>	<h3>Build a SharePoint Server Farm</h3>  <p>Quickly build a Microsoft SharePoint Server farm and start collaborating.</p> <p>6 Steps   Amazon S3, EC2, VPC, and more</p>
<h3>Build a Drupal Website</h3>  <p>Deploy and host a production-ready Drupal website on AWS.</p> <p>5 Steps   AWS Elastic Beanstalk and more</p>	<h3>Deploy a Python Web App</h3>  <p>Launch and run a highly available Python web application on AWS.</p> <p>6 Steps   AWS Elastic Beanstalk and more</p>	

# Databases, DevOps, Big Data & Analytics

## Migrate from Oracle to Aurora



Migrate your Oracle Database to Amazon Aurora with minimal downtime.

11 Steps | Amazon Aurora, RDS, DMS, and more

## Set Up a Jenkins Build Server



Quickly create a build server for continuous integration (CI) on AWS.

4 Steps | Amazon EC2 and Amazon EBS

## Analyze Big Data with Hadoop



Create a Hadoop cluster and run a Hive script to process log data.

5 Steps | Amazon EMR and S3

## Deploy a Data Warehouse



Deploy a fast, scalable, and cost-effective data warehouse using Amazon Redshift.

7 Steps | Amazon Redshift and S3

## Set Up a CI/CD Pipeline on AWS



Automate software delivery using continuous integration and delivery pipelines.

6-8 Steps | AWS CodePipeline and more

## Build a Log Analytics Solution



Collect, process, and analyze log data using AWS.

8 Steps | Amazon Kinesis and more

## Migrate from Oracle to Redshift



Migrate from Oracle to Amazon Redshift with minimal downtime.

11 Steps | AWS Redshift, RDS, DMS, and more

## Migrate a Git Repository to AWS



Securely store and version your project with AWS CodeCommit.

5 Steps | AWS CodeCommit

## Build a Machine Learning Model



Build and train a predictive model with Amazon Machine Learning.

6 Steps | Amazon Machine Learning and S3

# Backup & Recovery and App Services

## Migrate Petabyte-Scale Data



Use an AWS appliance to migrate petabyte-scale data into Amazon S3.

15 Steps | AWS Snowball and Amazon S3

## Connect Your Data Center to AWS



Use AWS Direct Connect to securely link your on-premise environment.

7 Steps | AWS Direct Connect

## Set Up Email-Receiving Pipeline



Deliver email to your application cost-effectively.

6 Steps | Amazon SES, Route 53, and more

## Set Up a Compliant Archive



Use an AWS appliance to migrate petabyte-scale data into Amazon S3.

3 Steps | Amazon Glacier and AWS IAM

## Deploy an Elastic HPC Cluster



On-demand resources for High-Performance Computing (HPC) workloads.

6 Steps | Amazon EC2, EBS, and more

## Replace Tape Backup with Cloud



Eliminate on-premises tape and automation with durable, affordable online archive.

6 Steps | AWS Storage Gateway and more

## Provision Desktops in the Cloud



Provision, manage, and provide access to Amazon WorkSpaces.

8 Steps | AWS WorkSpaces and more

# Key Concepts

- AWS Regions and Availability Zones
- AWS Services generally build on one another
- Categories of Services Offered by AWS
  - *IaaS*
    - Building Blocks, Comparable to On-Premises virtualization technologies
  - *PaaS*
    - Managed or Abstracted, Typically in support of IaaS
  - *SaaS*
    - Enterprise Aligned, Ready out of the box but can be enhanced with PaaS

# AWS Global Infrastructure



Region & Number of Availability Zones

AWS GovCloud (2)	
US West	Europe
Oregon (3), Northern California (3)	Ireland (2), Frankfurt (2), London (2)
US East	Asia Pacific
Northern Virginia (5), Ohio (3)	Singapore (2), Sydney (3), Tokyo (3), Seoul (2), Mumbai (2)
Canada	China
Central (2)	Beijing (2)
South America	
São Paulo (3)	



New Region (coming soon)

Paris

Ningxia



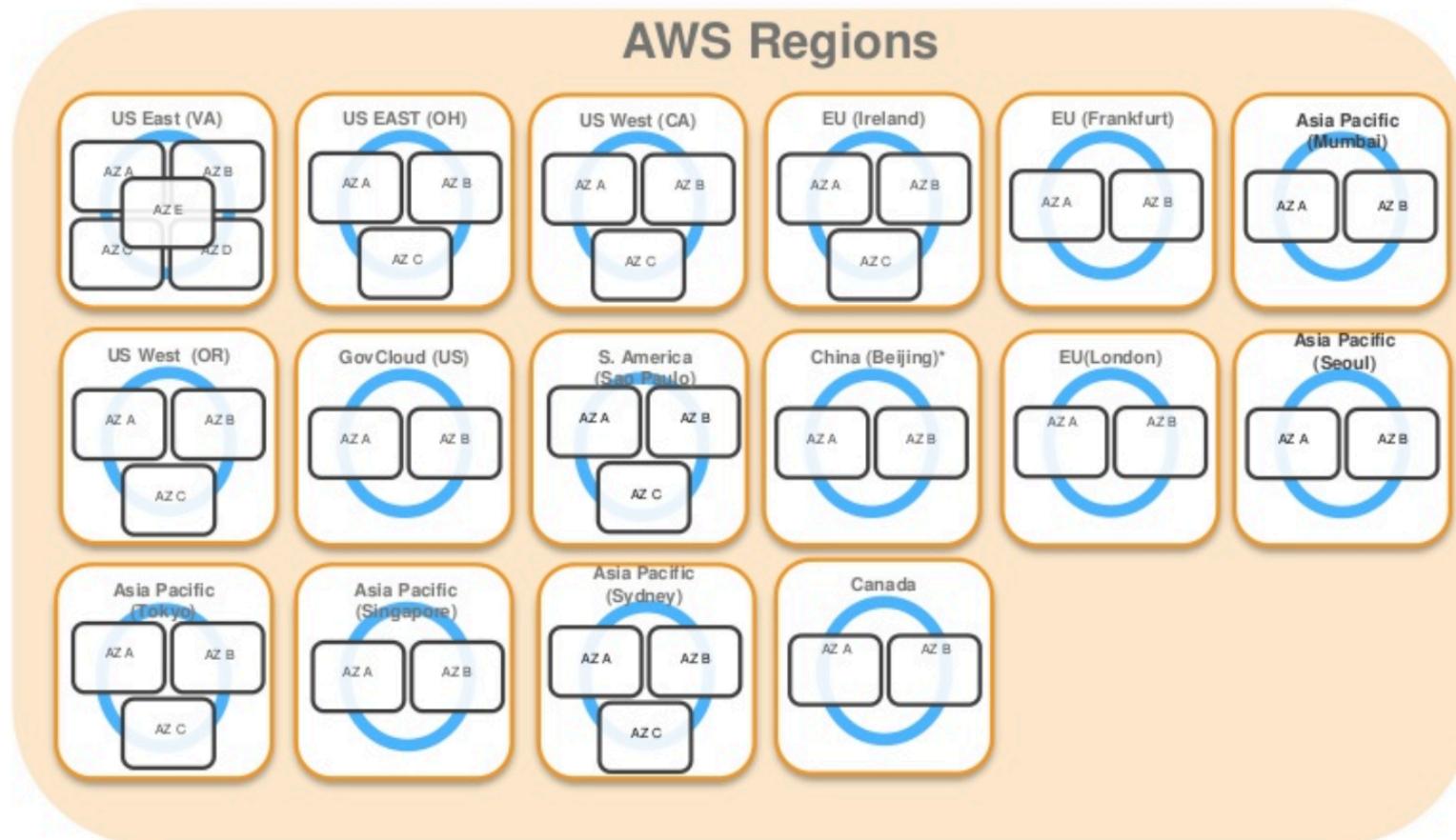
**16** Regions

**42** Availability Zones

**63** Edge Locations

# AWS Regions and Availability Zones

## AWS Regions



# Service Breadth & Depth



# Architecture Framework

- Design for failure and nothing fails
- Build security in every layer
- Leverage different storage options
- Implement elasticity
- Think parallel
- Loose coupling sets you free
- Don't fear constraints
- Security
- Reliability
- Scalability
- Predictable Performance
- Cost Control

# Cloud Adoption Framework

- Business Perspective
- Platform Perspective
- Maturity Perspective
- People Perspective
- Process Perspective
- Operating Perspective
- Security Perspective

# Infrastructure & managed services stack

- Route53 (DNS) – feature rich
- CloudFront (Content Delivery Network)
- S3 (Object Storage, ideal for Static Content) – 3 flavors
- ELB (Load Balancing)
- ASG (Auto Scaling)
- EC2 (Virtual Servers)
- RDS (Managed Database) – numerous flavors
- ElastiCache (Managed Cache)
- SES (SMTP Gateway)

# Virtual Machines, Containers, Functions

- Virtual Machines
  - *AMI*
  - *Patching*
  - *Multi-threaded/Multi-task*
  - *Hours to Months*
  - *Per VM/Per Hour*
- Containers
  - *Container File*
  - *Versioning*
  - *Multi-threaded/Single-task*
  - *Minutes to Days*
  - *Per VM/Per Hour*
- Functions
  - *Code*
  - *Versioning*
  - *Single-threaded/Single-task*
  - *Microseconds to Seconds*
  - *Per Memory/Second/Per Request (Free Tier)*

# Migration

- AWS Application Discovery Service – Agent based application discovery
- AWS Database Migration Service – Migration and replication of same/disparate database platforms
- AWS Import/Export – BYOD “sneakernet” migration
- AWS Migration Hub – Ties Application Discovery and Server Migration together
- AWS Server Migration Service – VMWare integrated server migration + replication
- AWS Schema Conversion Tool – Migration of same/disparate database schemas
- AWS Snowball – 80 TB hardened storage device for “sneakernet” migration
- vmimport + vCenter Addon – VM Image or ISO import as an EBS Snapshot or AMI

# Leverage many storage options

One size does **NOT** fit all

- **Amazon S3** – large objects
- **Amazon Glacier** – archive data
- **Amazon CloudFront** – content distribution
- **Amazon DynamoDB** – simple non-relational data
- **Amazon EC2 Ephemeral Storage** – transient data
- **Amazon EBS** – persistent block storage with snapshots
- **Amazon RDS** – Automated, managed MySQL
- **Amazon Redshift** – Data warehouse workloads

# AWS Services – Page 1

- Compute
  - *EC2*
  - *EC2 Container Service*
  - *Lightsail*
  - *Elastic Beanstalk*
  - *Lambda*
  - *Batch*
- Storage
  - *S3*
  - *EFS*
  - *Glacier*
  - *Storage Gateway*
- Database
  - *RDS*
  - *DynamoDB*
  - *ElastiCache*
  - *Amazon Redshift*
- Networking & Content Delivery
  - *VPC*
  - *CloudFront*
  - *Direct Connect*
  - *Route 53*

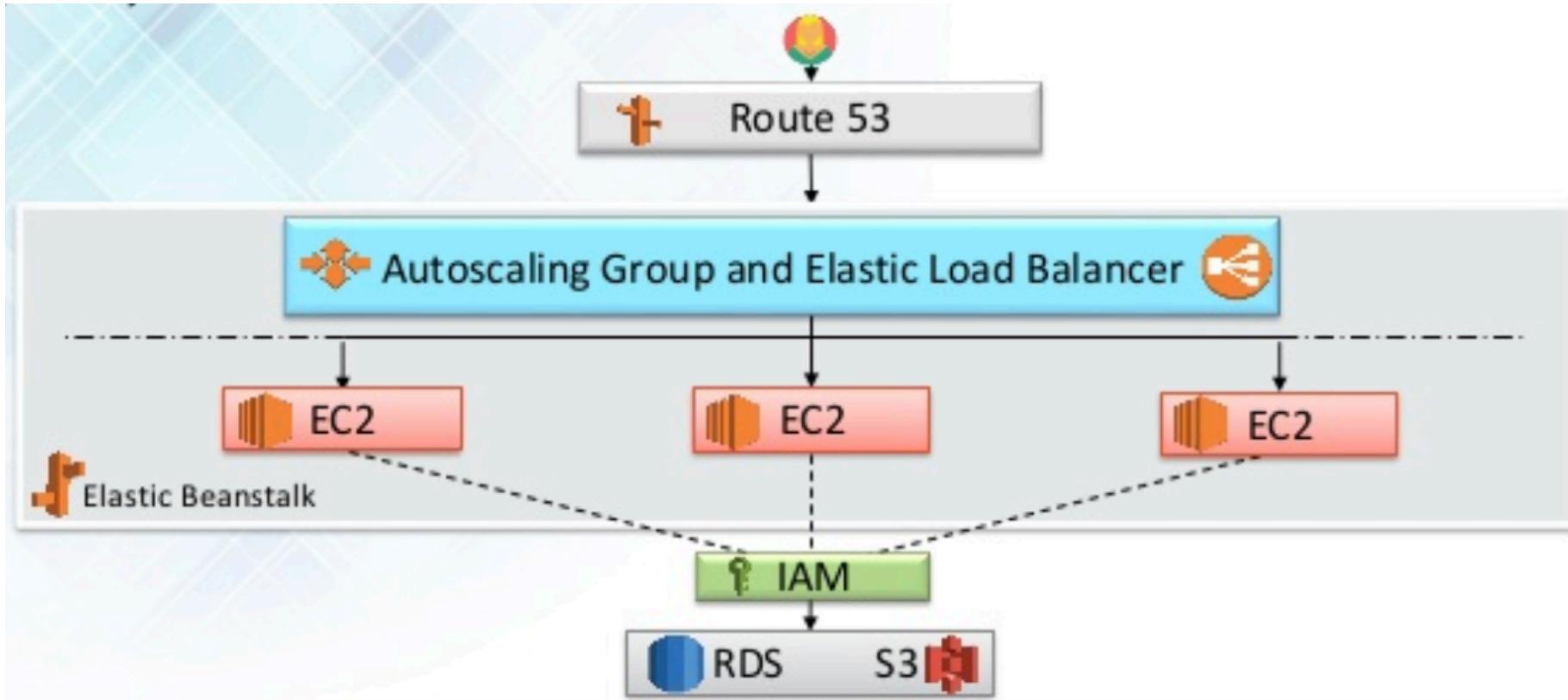
# AWS Services – Page 2

- Migration
  - *AWS Migration Hub*
  - *Application Discovery Service*
  - *Database Migration Service*
  - *Server Migration Service*
  - *Snowball*
- Developer Tools
  - *CodeStar*
  - *CodeCommit*
  - *CodeBuild*
  - *CodeDeploy*
  - *CodePipeline*
  - *X-Ray*
- Management Tools
  - *CloudWatch*
  - *CloudFormation*
  - *CloudTrail*
  - *Config*
  - *OpsWorks*
  - *Service Catalog*
  - *Trusted Advisor*
  - *Managed Services*
- Security, Identity & Compliance
  - *IAM*
  - *Inspector*
  - *Certificate Manager*
  - *Directory Service*
  - *WAF & Shield*
  - *Artifact*
  - *Amazon Macie*
  - *CloudHSM*

# AWS Services – Page 3

- Analytics
  - *Athena*
  - *EMR*
  - *CloudSearch*
  - *Elasticsearch Service*
  - *Kinesis*
  - *Data Pipeline*
  - *QuickSight*
  - *AWS Glue*
- Artificial Intelligence
  - *Lex*
  - *Amazon Polly*
  - *Rekognition*
  - *Machine Learning*
- Internet of Things
  - *AWS IoT*
  - *AWS Greengrass*
- Game Development
  - *Amazon GameLift*
- Mobile Services
  - *Mobile Hub*
  - *Cognito*
  - *Device Farm*
  - *Mobile Analytics*
  - *Pinpoint*
- Application Services
  - *Step Functions*
  - *SWF*
  - *API Gateway*
  - *Elastic Transcoder*
- Contact Center
  - *Amazon Connect*
- Messaging
  - *Simple Queue Service*
  - *Simple Notification Service*
  - *Simple Email Service*
- Business Productivity
  - *WorkDocs*
  - *WorkMail*
  - *Amazon Chime*
- Desktop & App Streaming
  - *WorkSpaces*
  - *AppStream 2.0*

# Simple architecture suing AWS Services



# AWS Certifications



University of  
**CINCINNATI**

Role-based			
Available Certifications	<b>Cloud Practitioner</b>	<b>Solutions Architect</b>	<b>Solutions Architect</b> <b>DevOps Engineer</b>
Recommended Experience	Six months of fundamental AWS Cloud and industry knowledge	One year of experience solving problems and implementing solutions using the AWS Cloud	Two years of comprehensive experience designing, operating, and troubleshooting solutions using the AWS Cloud
<b>aws certified</b>			Two to five years of deep technical experience in the associated Specialty domain as it relates to the AWS Cloud