Introduction to Amazon Web Services

Neel Shah
nshah95@gwu.edu
ACM Workshop 11/18/2016

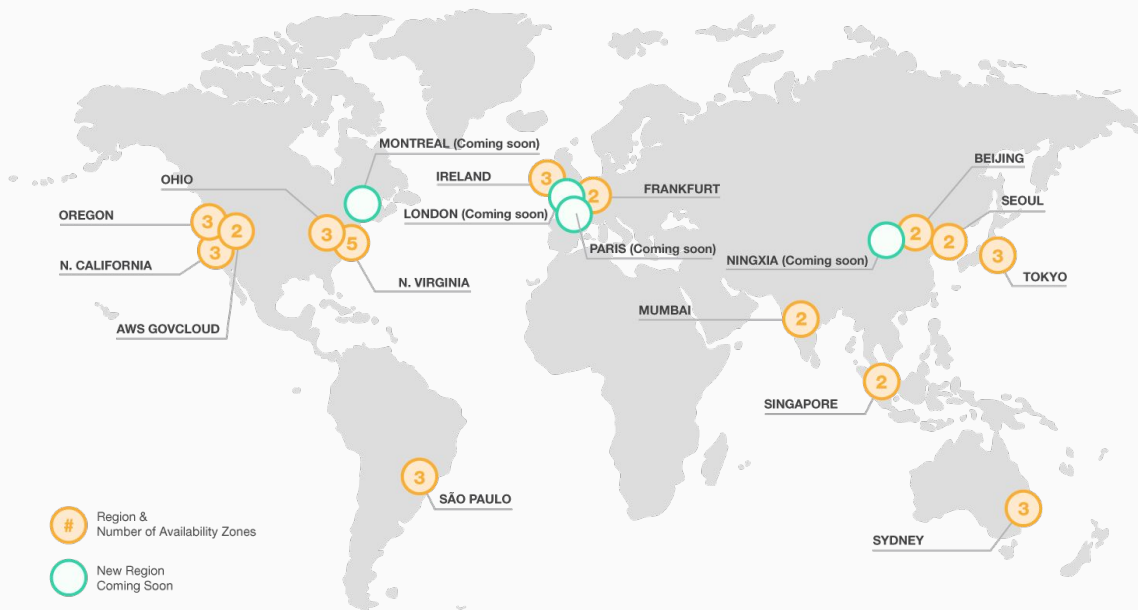# Introduction

What is the cloud?

- Delivery model of computing services
- Availability
- Scalability
- Elastic

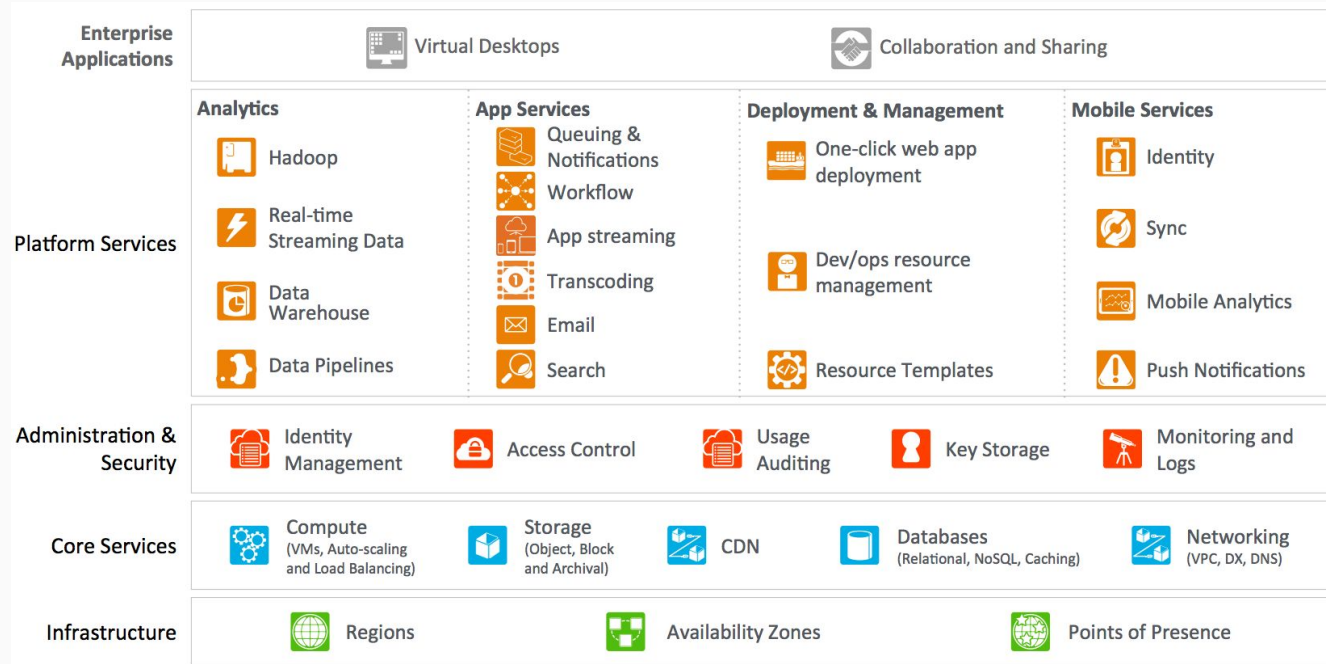# Amazon Web Services

AWS Global Footprint

- 14 regions
- 38 availability zones
- 900+ government agencies
- 3,400+ educational institutions
- Over 1 million active customers

MONTREAL (Coming soon)
IRELAND
BEIJING
OHIO
LONDON (Coming soon)
FRANKFURT
SEOUL
OREGON
3 2
PARIS (Coming soon)
2 2
N. CALIFORNIA
3
3 5
NINGXIA (Coming soon)
3
N. VIRGINIA
TOKYO
AWS GOVCLOUD
MUMBAI
2
SINGAPORE
2
SÃO PAULO
3
SYDNEY
3

— Region & Number of Availability Zones

New Region Coming Soon

AWS Customers

AWS Platform

Enterprise Applications	Virtual Desktops		Collaboration and Sharing	

Platform Services	**Analytics**	**App Services**	**Deployment & Management**	**Mobile Services**
	Hadoop	Queuing & Notifications	One-click web app deployment	Identity
	Real-time Streaming Data	Workflow		Sync
		App streaming	Dev/ops resource management	
	Data Warehouse	Transcoding		Mobile Analytics
		Email		
	Data Pipelines	Search	Resource Templates	Push Notifications

Administration & Security	Identity Management	Access Control	Usage Auditing	Key Storage	Monitoring and Logs

Core Services	Compute (VMs, Auto-scaling and Load Balancing)	Storage (Object, Block and Archival)	CDN	Databases (Relational, NoSQL, Caching)	Networking (VPC, DX, DNS)

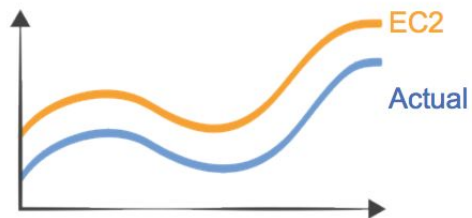| Infrastructure	Regions	Availability Zones	Points of Presence

Compute Services

Amazon EC2

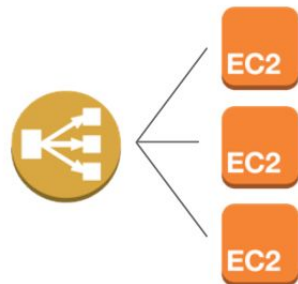Elastic **Virtual servers** in the cloud

Auto Scaling

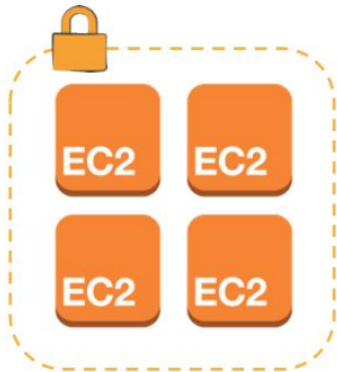**Automated scaling** of EC2 capacity

Elastic Load Balancing
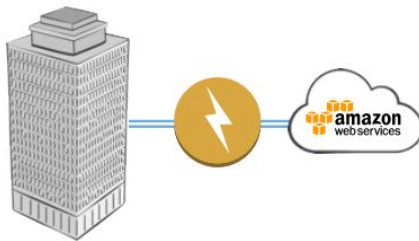
Dynamic **traffic distribution**

Networking Services

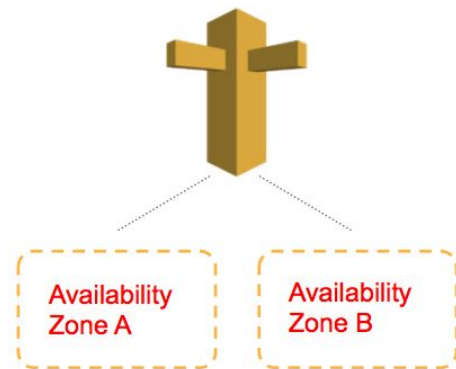## Amazon VPC:

Private, **isolated** section of the AWS Cloud

EC2 EC2
EC2 EC2

AWS DirectConnect

Private connectivity between AWS and your datacenter

amazon
web services

Amazon Route 53

Domain Name System (DNS) web service.

Availability Zone A

Availability Zone B

Storage Services

Amazon EBS

Block storage for use with Amazon EC2

Amazon S3

Internet scale storage via API

Images
Videos
Files
Binaries
Snapshots

Amazon Glacier

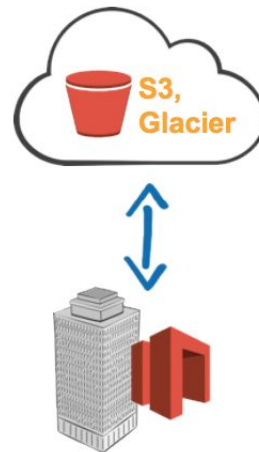Storage for **archiving** and **backup**

Images
Videos
Files
Binaries
Snapshots

AWS Storage Gateway

Integrates on-premises IT and AWS storage

S3, Glacier

Big Data Services

Amazon EMR (Elastic Map Reduce)

Hosted **Hadoop framework**

AWS Data Pipeline

Move data among AWS services and on-premises data sources

Amazon Redshift

Petabyte-scale **data warehouse** service

Application Services

Amazon CloudFront

distribute content globally

Amazon CloudSearch

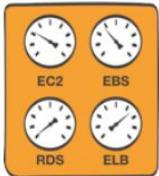Managed **search service**

Amazon Elastic Transcoder

Video transcoding in the cloud

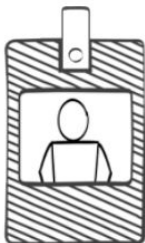# Deployment and Administration

Amazon CloudWatch

Monitor resources

AWS IAM (Identity & Access Mgmt)

Manage **users, groups & permissions**

AWS CloudFormation

Templates to deploy & manage

Web App

Enterprise App

Database

AWS OpsWorks

Dev-Ops framework for application lifecycle management

AWS Elastic Beanstalk

Automate resource management

Use Cases

Common Use Cases

- Web site hosting
- Application/SaaS hosting
- Mobile and social applications
- Internal IT application hosting
- Content delivery and media distribution
- High performance computing, batch data processing, large scale analytics
- Storage, backup, disaster recovery
- Deployment and test environments

Web, Mobile, and Social Apps
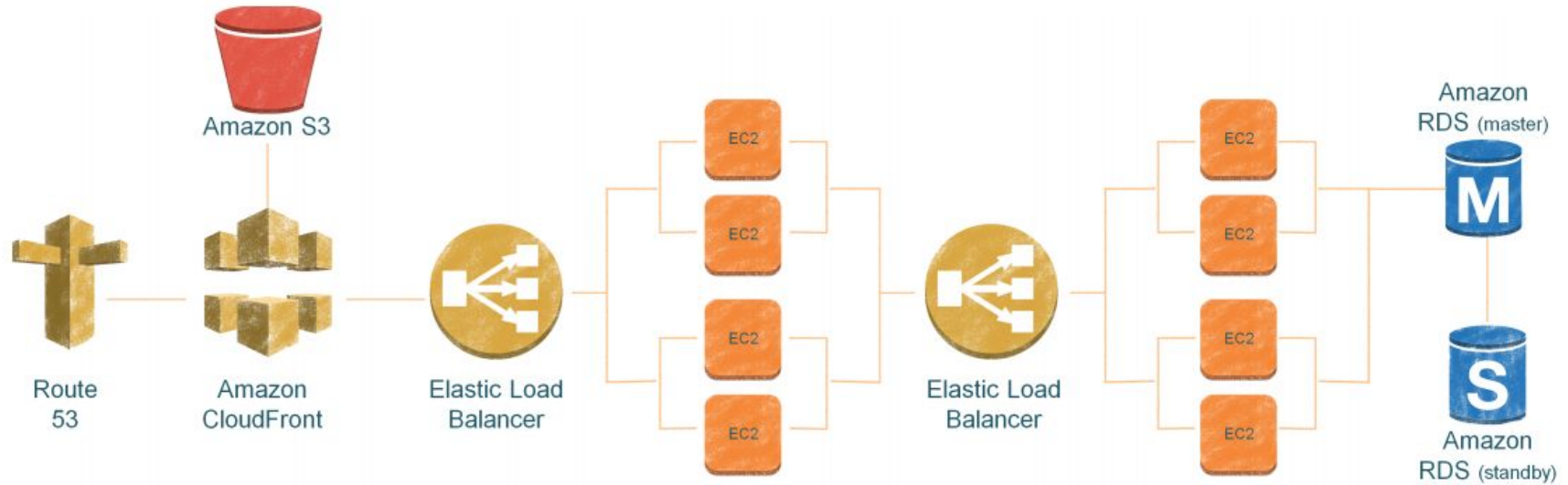
Why should we use AWS?

"Highly reliable, scalable, low-cost infrastructure platform in the cloud"

Economical

- **"Pay as you go" model**
- Cost optimization with AWS pricing calculator
  - http://calculator.s3.amazonaws.com/calc5.html
- Economics Center
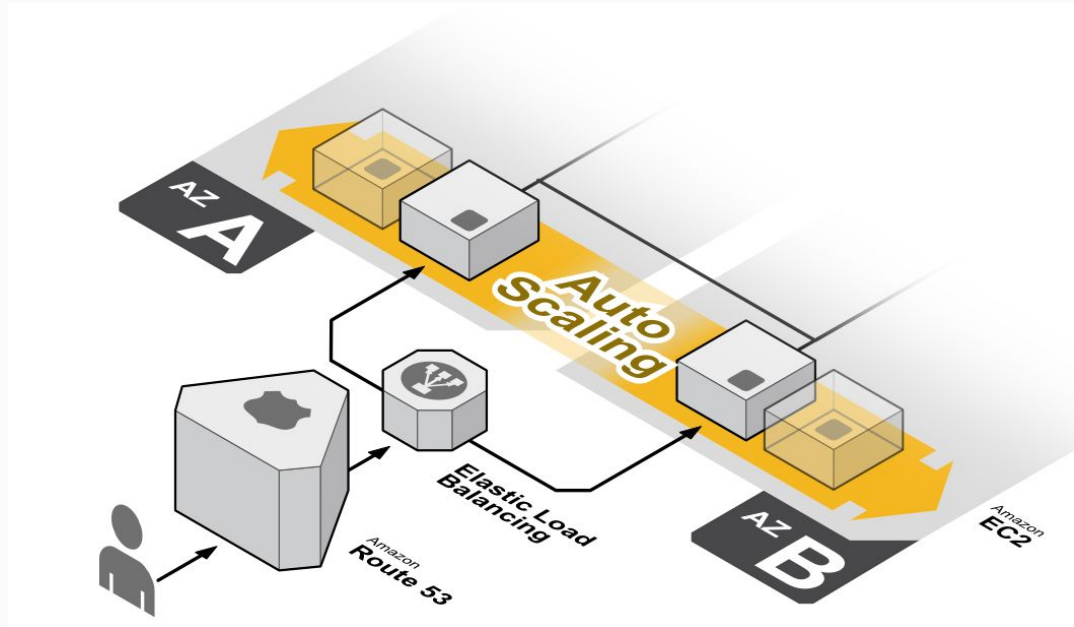 - https://aws.amazon.com/economics/

Ease of use

- **Easier than setting up your own cloud**
- AWS has exceptional documentation
- Support team helping make logistical and technical decisions

| On-Premise Infrastructure | Your Business | Managing All of the "Undifferentiated Heavy Lifting" |
| AWS Cloud-Based Infrastructure | More Time to Focus on Your Business | Configuring Your Cloud Assets |

Scalable and Elastic

- Cloud scales as business scales
  - Most AWS services are "**elastic**"

Industry Standard

- Many **big companies** use AWS to back their operations
- AWS certifications **sought after**
- The cloud **is** the future
- Computer Scientists should know how to **make applications, and serve** applications

Demo (Web server using AWS)

Further Reading

- Comprehensive AWS guide: https://www.airpair.com/aws/posts/building-a-scalable-web-app-on-amazon-web-services-p1
- Serverless App hosted on AWS: https://www.youtube.com/watch?v=i-xokez0ySM
- AWS Documentation: https://aws.amazon.com/documentation/
- AWS for Eclipse: https://aws.amazon.com/eclipse/
- AWS Tutorials: http://docs.aws.amazon.com/gettingstarted/latest/awsgsg-intro/gsg-aws-tutorials.html

? && /* */

References

- http://www.slideshare.net/AmazonWebServices/introduction-to-cloud-computing-with-amazon-web-services-46348295
- http://www.slideshare.net/ProfEdge/introduction-to-cloud-computing-23970527
- http://www.slideshare.net/AmazonWebServices/introduction-to-amazon-web-services-7708257
- https://aws.amazon.com/about-aws/
- https://aws.amazon.com/about-aws/global-infrastructure/