



# **2017 Fall**

## **CSYE6225**

### **Final Presentation**

**Jin Li**

001234402

li.jin3@husky.neu.edu

**Chenyang Zhao**

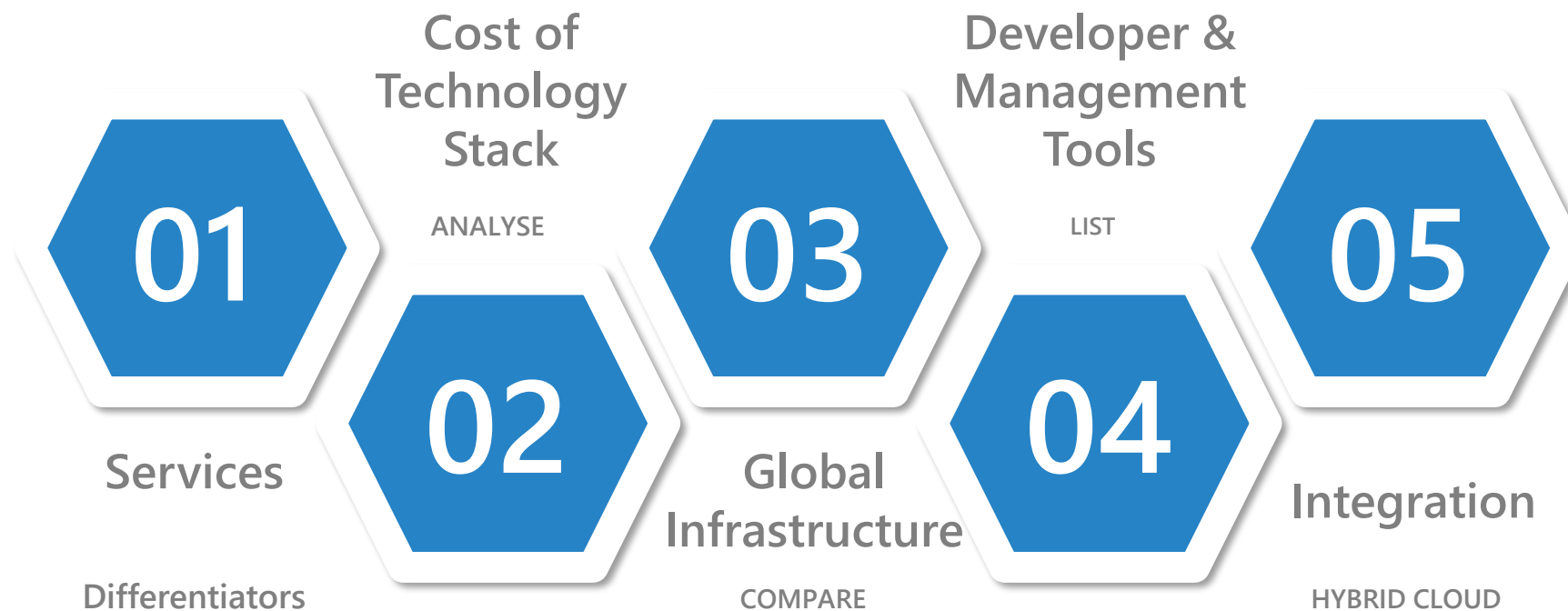
NUID: 001239935

zhao.chenya@husky.neu.edu

**Yuting Wu**

001235254

wu.yutin@husky.neu.edu



01

Difference

# Services of AWS and GCP

# Amount of Services available



### AWS

The quantity and quality of the services available on AWS is extremely **broad and wide**, and it builds up a huge set of opportunities for many different needs.



### GCP

The list of Google Cloud Platform of product is way smaller, yet Google **leads in SAAS**. One area where Google is particularly strong is Big Data.



## Services - Compute



### Compute



Google Cloud Platform



**AWS EC2**

IaaS

**Google Compute Engine**



**AWS Elastic Beanstalk**

PaaS

**Google App Engine**



**AWS Lambda**

Serverless  
functions

**Google Cloud Functions**



## Services - Network



### Network



**Elastic Load Balancer**

**Load  
Balancer**

**Google Cloud Load Balancing**



**Direct Connect**

**Peering**

**Google Cloud Interconnect**



**Amazon Route 53**

**DNS**

**Google Cloud DNS**



## Services - Storage



**Storage**



**Amazon S3**

**Object Storage**

**Google Cloud Storage**



**Amazon Elastic  
Block Store**

**Block Storage**

**Google Compute Engine  
Persistent Disks**



**Amazon Glacier**

**Cold Storage**

**Google Cloud Storage  
Nearline**



# Services - Database



## Database



Google Cloud Platform



Amazon RDS

**RDBMS**

Google Cloud SQL



Amazon DynamoDB

**NoSQL:  
Key-value**

Google Cloud Datastore,  
Google Cloud Bigtable



Amazon SimpleDB

**NoSQL: Indexed**

Google Cloud Datastore







### EC2 vs GCE



An area where Google might beat AWS is the **IaaS computing platform**, probably the most important service for both.

GCE's persistent disk can be attached to multiple instances in read-only mode, an opportunity that is not available in AWS and allows to distribute data to a large workforce effectively.



# Amazon Load Blancer vs Google Cloud Load Balancing



Google Cloud Platform

In AWS, ELB allows load balance incoming traffic among your backend instances in multiple availability zones (within a single region).

For Google Cloud Load Balancing, in addition to distributing incoming traffic between backend instances, unlike AWS, it allows balancing **between regions**, supports content-based routing, and does not require pre-warming.

02

ANALYSE

# Cost of Technology Stack

# Pricing



**AWS** prices their compute time by the hour, but requires a 1 hour minimum.

If you start an instance and run it for 61 minutes then shut it down, you get charged for 2 hours of compute time.



**Google Compute Engine** pricing is also listed by the hour for each instance, but they charge you by the minute, rounded up to the nearest minute, with a 10 minute minimum charge.

If you run for 1 minute, you get charged for 10 minutes. However, if you run for 61 minutes, you get charged for 61 minutes.

**AWS**  
**Monthly**  
**Cost**

**Total**

**\$ 94.73**



**Compute**

**\$ 25.5**

In AWS, we use 3 EC2 instances.



**Storage**

**\$ 50.93**

In AWS, we use RDS. We create a RDS instance and estimate its cost per month.



**Load Balancer**

**\$ 18.3**

In AWS, we use Load Balancer.

**GCP**  
**Monthly**  
**Cost**

**Total**

**\$ 77.00**



**Compute**

**\$ 7.66**

In GCP, we use 3 Compute Engines.



**Storage**

**\$ 51.01**

In GCP, we use Cloud SQL. We create a SQL instance and estimate its cost per month.



**Load Balancer**

**\$ 18.33**

In GCP, we use Load Balancing.

## Conclusion for Cost

For the same service, GCP has the less expensive price than AWS. Actually, AWS has a lot of hidden costs and limitations.

**GCP** wins this time for its cheaper cost!

03

Compare

# Global Infrastructure



# Global Infrastructure --- Regions

Comparison of Regions at the end of 2017

- \$29.4 Billing Trailing 3 Year CAPEX investment
- 8 new regions in 2017 for GCP
- 3 new regions in 2017 for AWS

	GCP	AWS
REGIONS	17	18
us-east	SC, VA	OH, VA
us-central	IA	
us-west	CA, OR	CA, OR
ca-central	Montreal	Canada
eu-west	Belgium, London	Ireland, London, Paris
eu-central	FRA, NL, Hamina	FRA, Stockholm
asia-east	Taiwan	Beijing, Ningxia
ap-northeast	Tokyo	Tokyo, Seoul
ap-southeast	SGN, Sydney	SGN, Sydney
ap-south	Mumbai	Mumbai
sa-east	Sao Paulo	Sao Paulo

# Global Infrastructure --- Regions

Comparison of Regions as of 2017 Q3

- 10 regions versus 15
- 30 availability zones versus 42

Today, AWS has 30% more than regions and zones than GCP.

Google is catching up fast, by early 2018 the gap will be very small.

# Global Infrastructure --- CDN

## Amazon CloudFront

Amazon CloudFront is a global content delivery network (CDN) service that securely delivers data, videos, applications, and APIs to your viewers with low latency and high transfer speeds. CloudFront is integrated with AWS – both physical locations that are directly connected to the AWS global infrastructure, as well as software that works seamlessly with services including AWS Shield for DDoS mitigation, Amazon S3, Elastic Load Balancing or Amazon EC2 as origins for your applications, and AWS Lambda to run custom code close to your viewers.

## Amazon CloudFront Benefits

- Global, Growing Content Delivery Network
- Secure Content at the Edge
- Deep Integration with Key AWS Services
- High Performance
- Cost Effective
- Easy to Use

# Global Infrastructure --- CDN

- **CLOUD CDN**

Google Cloud CDN leverages Google's globally distributed edge points of presence to accelerate content delivery for websites and applications served out of Google Compute Engine and Google Cloud Storage. Cloud CDN lowers network latency, offloads origins, and reduces serving costs. Once you've set up HTTP(S) Load Balancing, simply enable Cloud CDN with a single checkbox.

## Amazon CloudFront Benefits

- Global Reach
- SSL Shouldn't Cost Extra
- Seamless Integration

# Global Infrastructure --- CDN

	GCP	AWS
Feature	Cloud CDN	CloudFront
Global PoPs	82	88
Origin of Content	GCS, GCE, LB	S3, EC2, ELB
External/Custom Origin	No	Yes
Invalidate Multiple Objects	Yes	Yes
Large Object Caching	No	Yes
GZIP Compression	No	Yes
HTTP/2 Protocol	Yes	Yes
Origin Push	No	Partially
Configuration	Load Balancer	Create Distribution
Functions Integration	No	Yes
Vedio Streaming	No	Yes
Reports & Analytics	No	Yes
Anycast IP	Yes	No



04

Manage  
**Developer and Management Tools**

# Developer and Management Tools

	AWS	GCP
Developer	CodeDeploy	Cloud Developer Tools
Management Tools	CloudWatch	Stackdriver Monitoring
	CloudFormation	Cloud Deployment Manager

# Developer and Management Tools

## CodeDeploy

### Pros

- Rapidly release new features.
- Update AWS Lambda function versions.
- Avoid downtime during application deployment.
- Handle the complexity of updating your applications, without many of the risks associated with error-prone manual deployments.

## Cloud Developer Tools

### Pros

- Essential Tools for Cloud Platform
- Simplify Your Cloud Management
- Collaborative Development on Git
- Make IntelliJ Your Cloud Platform IDE
- PowerShell on Google Cloud Platform
- Visual Studio as Your Cloud Platform IDE
- Firebase Test Lab for Android



# Developer and Management Tools

## CloudWatch

### Pros

- Monitor Amazon EC2
- Monitor Other AWS Resources
- Monitor Custom Metrics
- Monitor and Store Logs
- Set Alarms
- View Graphs and Statistics
- Monitor and React to Resource Changes

## StackDriver Monitoring

### Pros

- Identify Trends, Prevent Issues
- Reduce Monitoring Overhead
- Improve Signal-to-Noise
- Fix Problems Faster

# Developer and Management Tools

## CloudFormation

### Pros

- Model It All
- Automate and Deploy
- It's just Code

## Cloud Deployment Manager

### Pros

- Repeatable Deployment Process
- Declarative Language
- Focus on the Application
- Template-Driven

05

## Hybrid Cloud Integration with Existing Infrastructure

# Hybrid Cloud on AWS



Core Public Cloud Service

Advanced Hybrid Cloud Service

# AWS Service for Hybrid Cloud

- Data Integration
- **AWS Storage Gateway**
- **Amazon RDS**
- **Amazon S3**
- **AWS Snowball**
- 

- Integrated Networking
- **Amazon VPC**
- **AWS Direct Connect**
- 

Integrated Identity and Access

- **AWS IAM**
- **AWS Directory Service**

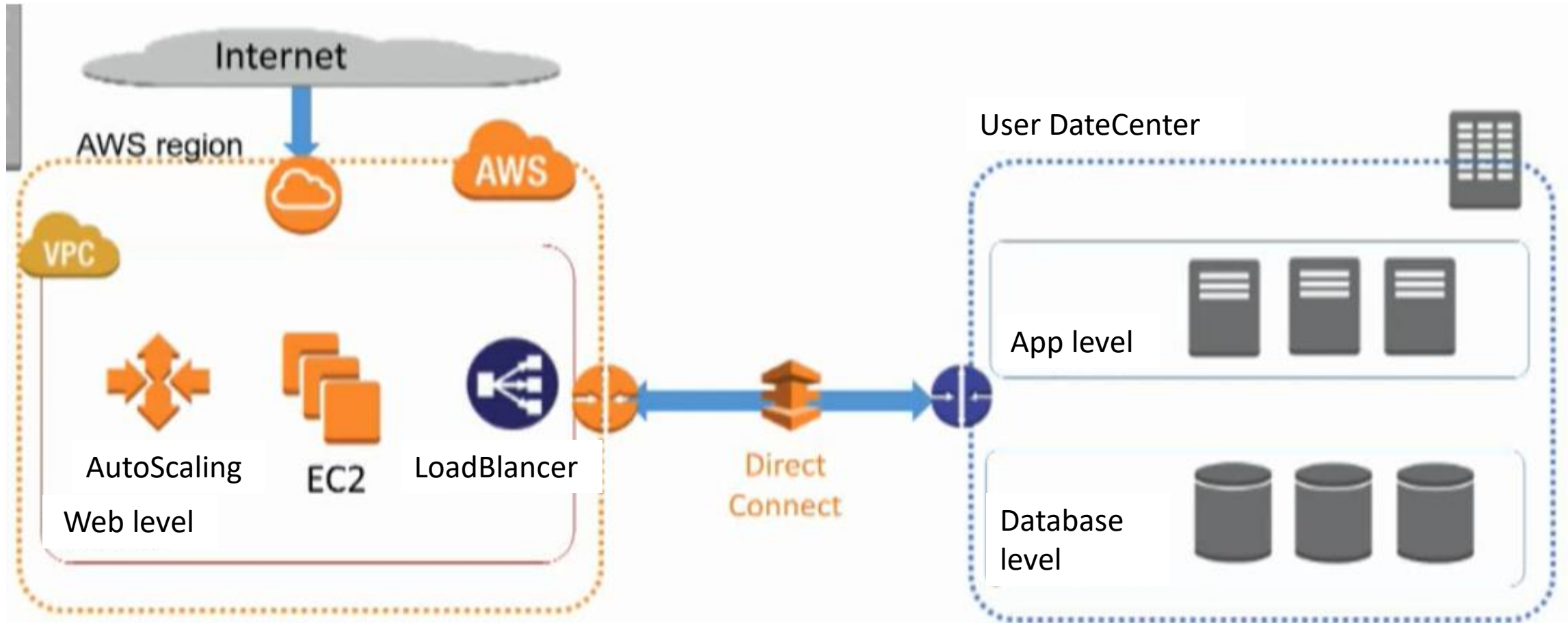
Integrated Resource and Deployment Management

- **VMware Cloud on AWS**
- **AWS OpsWorks**
- **AWS CodeDeploy**
- **Amazon EC2 Run Command**

Integrated Devices and Edge Systems

- **AWS Greengrass**
- **AWS Snowball Edge**

# AWS Hybrid example



## Google Hybrid Cloud

- Google cooperates with Cisco to allow Cisco private cloud to meet Google public cloud environment.
- Combine the network management, security and service technology with Google's container Kubernetes cluster.

Google hybrid cloud example encompass three key components:

- On-premise: Nutanix infrastructure
- Public cloud: Google Cloud Platform (GCP)
- Open source: Kubernetes and Containers

# GCP Service for Hybrid Cloud

- Google Kubernetes Engine
- Google Cloud Endpoints:
- STACKDRIVER MONITORING
- Deploying Hybrid Cloud Storage with Swiftstack



## Summary

- AWS is having more number of data centers than Google
- AWS has focus on retail customer and traditional webhosts
- Google is good at pricing
- Google is productizing what they are using
- Google Cloud is great if you want an easy to use option that takes all the advantages of the cloud with great pricing, great speed, and great tools by a company that really understands scale

The background features a complex geometric pattern of thin blue lines forming a large, irregular star-like shape. Several small, hollow blue triangles are scattered around the main structure. The word "THANKS" is centered within the largest triangular void of the star.

**THANKS**