Amazon Web Services, What's New & Java API

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Amazon Web Services (AWS) In the News

Wired Magazine July 2015

Amazon has figured out how to make cloud pay

> *$391 million profit based on $1.82 billion in revenue. That's a 407 percent increase in profit from the year before, and an 81 percent bump in revenue.*

(Finley 2015)

AWS

- Started in 2006
- 2015: Over a Million Active Customers in 190 Countries

Gartner: Infrastructure As A Service Magic Quadrant

Figure : IaaS Magic Quadrant Leong (2015)
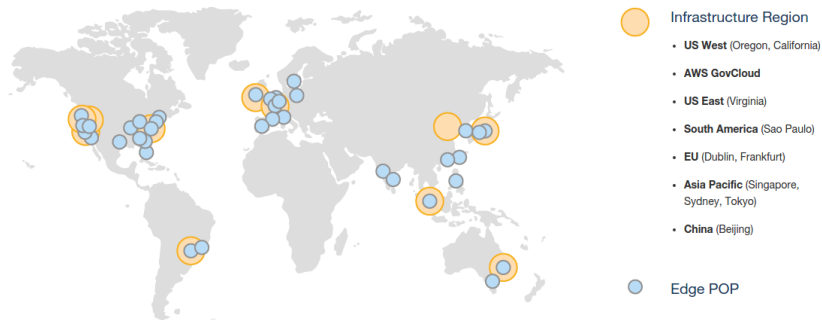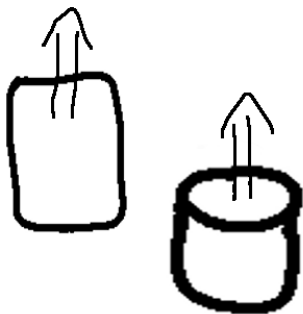
AWS Regions and Edge Points of Presence

Infrastructure Region

- **US West** (Oregon, California)
- **AWS GovCloud**
- **US East** (Virginia)
- **South America** (Sao Paulo)
- **EU** (Dublin, Frankfurt)
- **Asia Pacific** (Singapore, Sydney, Tokyo)
- **China** (Beijing)

Edge POP

Figure : 11+1 Regions (2015)

Multiplayer Mobile Game Application

Scaling Up - Getting Beefy
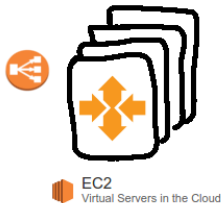
Content Delivery Network & Analytics

CDN

Analytics

- Batch
- Datawarehouse
- Streaming

NoSQL

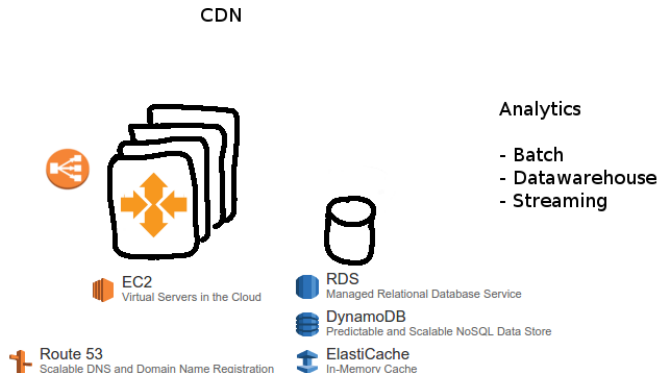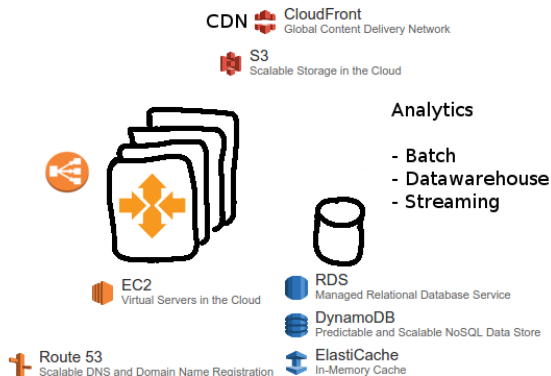# Amazon Elastic Compute Cloud (EC2)

CDN

Analytics

- Batch
- Datawarehouse
- Streaming

EC2
Virtual Servers in the Cloud

NoSQL

Route 53
Scalable DNS and Domain Name Registration

Amazon RDS, DynamoDB, ElastiCache

CDN

Analytics

- Batch
- Datawarehouse
- Streaming

EC2
Virtual Servers in the Cloud

RDS
Managed Relational Database Service

DynamoDB
Predictable and Scalable NoSQL Data Store

ElastiCache
In-Memory Cache

Route 53
Scalable DNS and Domain Name Registration

Amazon CloudFront CDN, S3

Amazon Scalable Analytics - Batch, Streaming, Datawarehouse
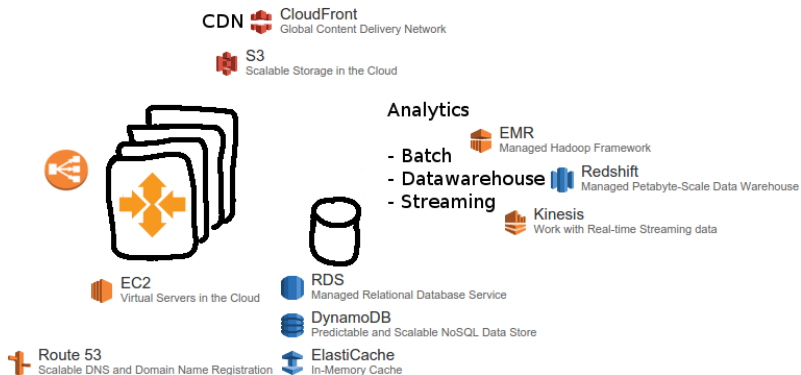
Security At Every Layer
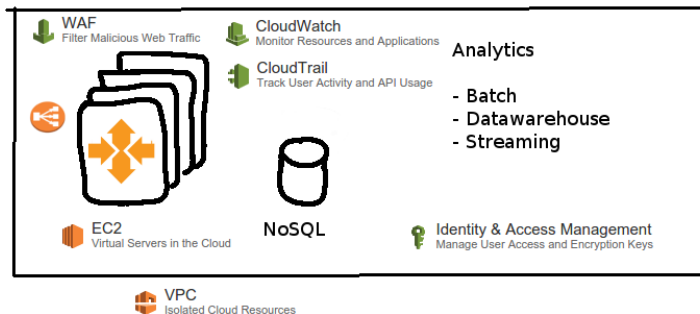
Compute As A Service
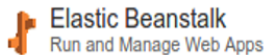
52 AWS Services:

Compute

EC2
Virtual Servers in the Cloud

EC2 Container Service
Run and Manage Docker Containers

Elastic Beanstalk
Run and Manage Web Apps

Lambda
Run Code in Response to Events

Storage & Content Delivery

S3
Scalable Storage in the Cloud

CloudFront
Global Content Delivery Network

Elastic File System PREVIEW
Fully Managed File System for EC2

Glacier
Archive Storage in the Cloud

Import/Export Snowball
Large Scale Data Transport

Storage Gateway
Integrates On-Premises IT Environments with Cloud Storage

Database

RDS
Managed Relational Database Service

DynamoDB
Predictable and Scalable NoSQL Data Store

ElastiCache
In-Memory Cache

Redshift
Managed Petabyte-Scale Data Warehouse Service

Networking

VPC
Isolated Cloud Resources

Direct Connect
Dedicated Network Connection to AWS

Route 53
Scalable DNS and Domain Name Registration

Developer Tools

CodeCommit
Store Code in Private Git Repositories

CodeDeploy
Automate Code Deployments

CodePipeline
Release Software using Continuous Delivery

Management Tools

CloudWatch
Monitor Resources and Applications

CloudFormation
Create and Manage Resources with Templates

CloudTrail
Track User Activity and API Usage

Config
Track Resource Inventory and Changes

OpsWorks
Automate Operations with Chef

Service Catalog
Create and Use Standardized Products

Trusted Advisor
Optimize Performance and Security

Security & Identity

Identity & Access Management
Manage User Access and Encryption Keys

Directory Service
Host and Manage Active Directory

Inspector PREVIEW
Analyze Application Security

WAF
Filter Malicious Web Traffic

Analytics

EMR
Managed Hadoop Framework

Data Pipeline
Orchestration for Data-Driven Workflows

Elasticsearch Service
Run and Scale Elasticsearch Clusters

Kinesis
Work with Real-time Streaming data

Machine Learning
Build Smart Applications Quickly and Easily

Internet of Things

AWS IoT BETA
Connect Devices to the cloud

Mobile Services

Mobile Hub BETA
Build, Test, and Monitor Mobile apps

Cognito
User Identity and App Data Synchronization

Device Farm
Test Android, Fire OS, and iOS apps on real devices in the Cloud

Mobile Analytics
Collect, View and Export App Analytics

SNS
Push Notification Service

Application Services

API Gateway
Build, Deploy and Manage APIs

AppStream
Low Latency Application Streaming

CloudSearch
Managed Search Service

Elastic Transcoder
Easy-to-use Scalable Media Transcoding

SES
Email Sending Service

SQS
Message Queue Service

SWF
Workflow Service for Coordinating Application Components

Enterprise Applications

WorkSpaces
Desktops in the Cloud

WorkDocs
Secure Enterprise Storage and Sharing Service

WorkMail PREVIEW
Secure Email and Calendaring Service

Infrastructure As Code - RESTful via Management Console

Infrastructure As Code - RESTful via AWS CLI

```
aws emr create-cluster
--ec2-attributes SubnetId=subnet-xxxxx \
--release-label emr-4.0.0 \
--instance-groups InstanceGroupType=MASTER,\
InstanceCount=1,InstanceType=m3.xlarge \
InstanceGroupType=CORE,\
InstanceCount=2,InstanceType=m3.xlarge \
--auto-terminate
```

Infrastructure As Code - RESTful via AWS SDKs

Java

JavaScript

Python (boto)

PHP

.NET

Ruby

Node.js

iOS

Android

AWS Toolkit
for Visual
Studio

AWS Toolkit
for Eclipse

AWS Tools for
Windows
PowerShell

AWS CLI

Infrastructure As Code - CloudFormation JSON

```json
...
"WebServerSecurityGroup": {
      "Type": "AWS::EC2::SecurityGroup",
      "Properties": {
    "GroupDescription": "Enable HTTP access via port 80
      locked down to the load balancer + SSH access",
       "SecurityGroupIngress": [
         {
            "IpProtocol": "tcp",
            "FromPort": "80",
            "ToPort": "80",
            "SourceSecurityGroupOwnerId": {
              "Fn::GetAtt": [
                "ElasticLoadBalancer",
                "SourceSecurityGroup.OwnerAlias"
              ]
...
```

AWS Marketplace

Re:Invent 2015

- 2013: 8,000
- 2014: 13,000 attendees
- 2015: Over 20,000 attendees (TechRepublic)
- Capital One and GE as part of key note

Re:Invent 2015: Internet of Things
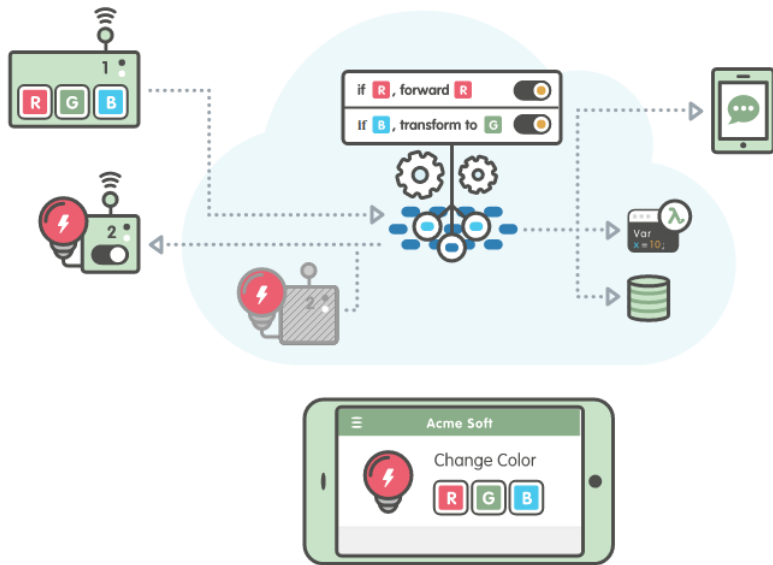
Re:Invent 2015: QuickSight
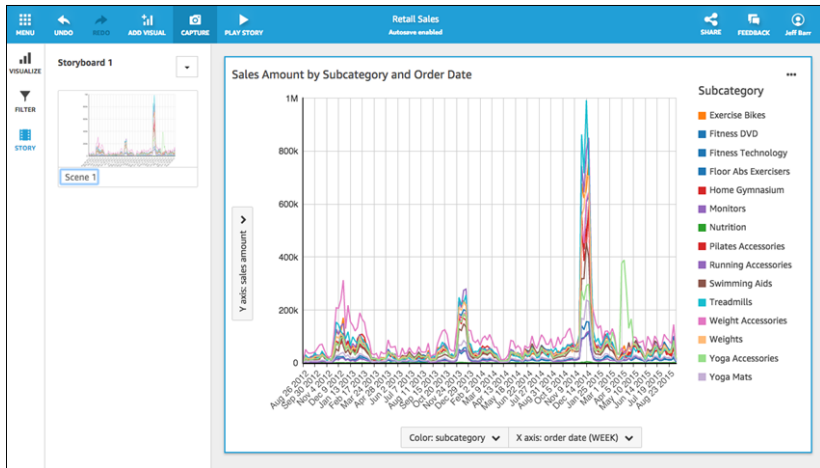
Re:Invent 2015: Amazon Kinesis Firehose

- Write Kinesis stream to S3 or Redshift (structured data)
- Configure buffer size, compression, encryption

Re:Invent 2015: AWS Import/Export Snowball

Re:Invent 2015: Security

- Amazon Inspector
- AWS WAF
- AWS Config Rules

Re:Invent 2015: Other Services

- Amazon Elasticsearch Service
- Amazon Kinesis Streams Extended Retention
- AWS Database Migration Service (Preview)
- Amazon RDS for MariaDB
- Amazon Cloudwatch Dashboards
- AWS Lambda
  - Python, Versioning, Scheduled Jobs, and 5 Minute Functions

AWS SDKs - Credentials

- Environment Variables: AWS_ACCESS_KEY_ID, AWS_SECRET_ACCESS_KEY
- Java System Properties: aws.accessKeyId, aws.secretKey
- Default credentials: ~/.aws/credentials
- Instance credentials (e.g. IAM role assigned to EC2 instance)

AWS Java SDK - Maven

```xml
<dependencies>
    <!-- Contains all APIs -->
    <dependency>
        <groupId>com.amazonaws</groupId>
        <artifactId>aws-java-sdk</artifactId>
        <version>1.10.32</version>
    </dependency>

    <!-- Or API by API:
    <dependency>
      <groupId>com.amazonaws</groupId>
      <artifactId>aws-java-sdk-s3</artifactId>
      <version>1.10.32</version>
    </dependency>
    ...
     -->
</dependencies>
```

AWS Java S3 SDK

```
//See S3Uploader

      String key = args[0];
      String fileName = args[1];
      AmazonS3 s3Client = new AmazonS3Client(new
    ProfileCredentialsProvider());
      try {
          File file = new File(fileName);
          s3Client.putObject(new PutObjectRequest(
      SLPR_CELL_BUCKET, key, file));
      } catch (AmazonServiceException serviceEx) {
          System.out.println(serviceEx);
      } catch (AmazonClientException clientEx) {
          System.out.println(clientEx);
      }
```

AWS S3 Management Console

AWS Java SDK Links

- http://aws.amazon.com/documentation/sdk-for-java/
  - Java SDK Developer Guide
  - Java SDK API Javadocs
  - Tips and Tricks (e.g. how to connect via proxy)

AWS Learning References

- https://aws.amazon.com/training/
  - Free intro labs
  - Training Course
  - Qwiklab online courses
  - Certifications
- 12 month free tier: https://aws.amazon.com/free/
- Re:Invent Videos:
  https://www.youtube.com/user/AmazonWebServices
- Books: For example Amazon Web Services in Action,
  Manning, Sept 2015

Picture References

- https://aws.amazon.com/blogs/aws/amazon-quicksight-fast-easy-to-use-business-intelligence-for-big-data-at-110th-the-cost-of-traditional-solutions/

References I

Finley, Klint. 2015. "Amazon Shares Soar on Surprise Profit, Market Value Tops Wal-Mart's." *Wired Magazine* (July). `http://www.wired.com/2015/07/amazon-web-services-earnings/`.

Leong, Lydia. 2015. "Gartner Magic Quadrant for Cloud Infrastructure as a Service." `https://aws.amazon.com/resources/gartner-2015-mq-learn-more/`.

Regions, Amazon. 2015. "Global Network of Regions and Edge Locations." `http://aws.amazon.com/`.