

Amazon Web Services

Introduction, What's New & Java API

Markus Dale, November 2015

Presentation Online

- ▶ <https://github.com/medale/presentations>
- ▶ Slides, notes and code sample with Maven

Amazon Web Services: AWS

- ▶ Started in 2006
 - ▶ Elastic Compute Cloud (EC2)
 - ▶ Simple Storage Service (S3)
- ▶ By 2010: Amazon.com retail web services mostly on AWS
- ▶ 2015: Over a Million Active Customers in 190 Countries
 - ▶ e.g. Netflix, Dropbox, Airbnb, Supercell

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)

Gartner: Infrastructure As A Service Magic Quadrant



Figure : IaaS Magic Quadrant Leong (2015)

AWS Regions and Edge Points of Presence

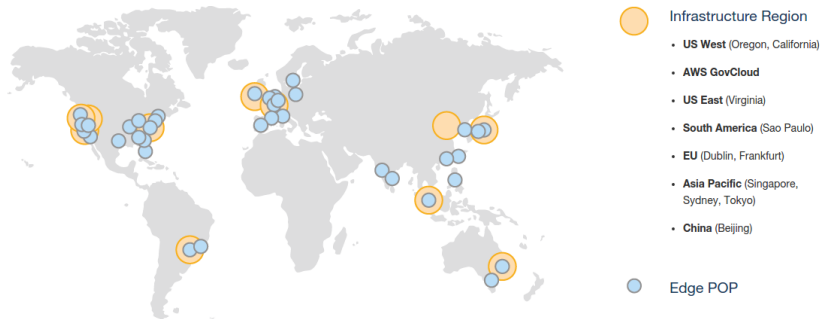
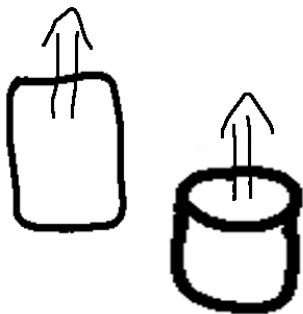


Figure : 10+2 Regions (2015)

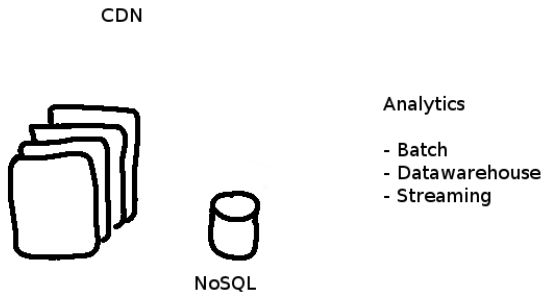
Multiplayer Mobile Game Application



Scaling Up/Vertical - Getting Beefy



Scaling Out/Horizontal, Content Delivery Network & Analytics

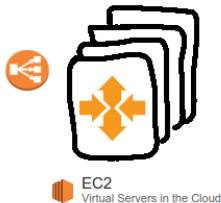


Redundant Environments

- ▶ Development
- ▶ Testing
- ▶ Production
 - ▶ DevOps - Blue/Green Deployments?
 - ▶ Disaster Recovery

Amazon Elastic Compute Cloud (EC2)

CDN



NoSQL

Analytics

- Batch
- Datawarehouse
- Streaming

 **Route 53**
Scalable DNS and Domain Name Registration

Amazon RDS, DynamoDB, ElastiCache

CDN




 **EC2**
Virtual Servers in the Cloud

 **Route 53**
Scalable DNS and Domain Name Registration



 **RDS**
Managed Relational Database Service

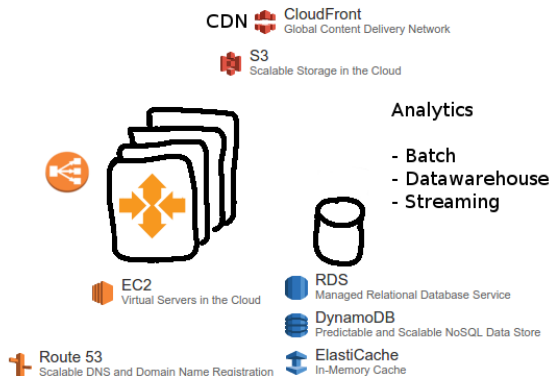
 **DynamoDB**
Predictable and Scalable NoSQL Data Store

 **ElastiCache**
In-Memory Cache

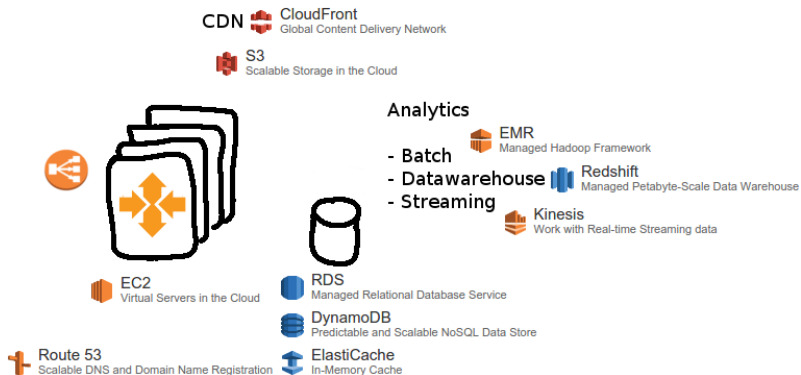
Analytics

- Batch
- Datawarehouse
- Streaming

Amazon CloudFront CDN, S3

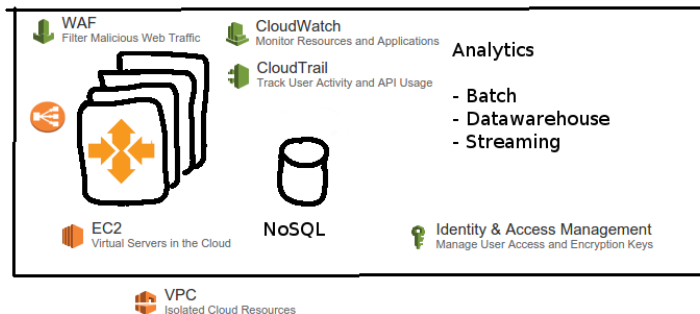


Amazon Scalable Analytics - Batch, Streaming, Datawarehouse

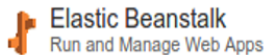


Security At Every Layer

CDN







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

EC2 Instances

- ▶ On Demand
- ▶ Reserved: up to 75% cheaper, 1-3 year contracts
- ▶ Spot Instances

Infrastructure As Code - RESTful via Management Console

EC2 Dashboard

- Events
- Tags
- Reports
- Limits
- INSTANCES
 - Instances
 - Spot Requests
 - Reserved Instances
 - Commands
- IMAGES
 - AMIs
 - Bundle Tasks
- ELASTIC BLOCK STORE
 - Volumes
 - Snapshots
- NETWORK & SECURITY
 - Security Groups
 - Elastic IPs
 - Placement Groups
 - Key Pairs
 - Network Interfaces
- LOAD BALANCING
 - Load Balancers
- AUTO SCALING
 - Launch Configurations
 - Auto Scaling Groups

Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) region:

0 Running Instances	0 Elastic IPs
0 Volumes	0 Snapshots
5 Key Pairs	0 Load Balancers
0 Placement Groups	4 Security Groups

Easily deploy and operate applications - use Chef recipes, manage SSH users, and more. [Try OpsWorks now.](#)

Create Instance

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#)

Note: Your instances will launch in the US East (N. Virginia) region

Service Health

Service Status:

- US East (N. Virginia): This service is operating normally

Availability Zone Status:

- us-east-1a: Availability zone is operating normally
- us-east-1c: Availability zone is operating normally
- us-east-1d: Availability zone is operating normally
- us-east-1e: Availability zone is operating normally

[Service Health Dashboard](#)

Scheduled Events

US East (N. Virginia):

No events

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

...

```
"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

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Shop All Categories ▾

Search AWS Marketplace

GO

[▶ Your Software](#)

Datadog Ops Monitoring

Sold by: [Datadog Inc.](#) | [See product video](#)

Datadog is a monitoring service for IT, Operations and Development teams who write and run applications at scale, and want to turn the metric and event data produced by their apps, tools and services into actionable insight. The product integrates metrics and events from many sources including existing monitoring tools, so you can visualize performance of all your services, systems and applications, without having to switch between tools. And since Datadog runs as a service in the cloud, you can focus your time on performance monitoring rather than managing monitoring servers.

Customer Rating ★★★★★ [\(2 Customer Reviews\)](#)**Delivery Method** Software as a Service ([Learn more](#))**Support** [Included, see details below](#)

Highlights

- Start monitoring all your servers and resources in minutes. The datadog agent installs quickly from the commandline and starts monitoring your systems immediately.

[Visit Site](#)

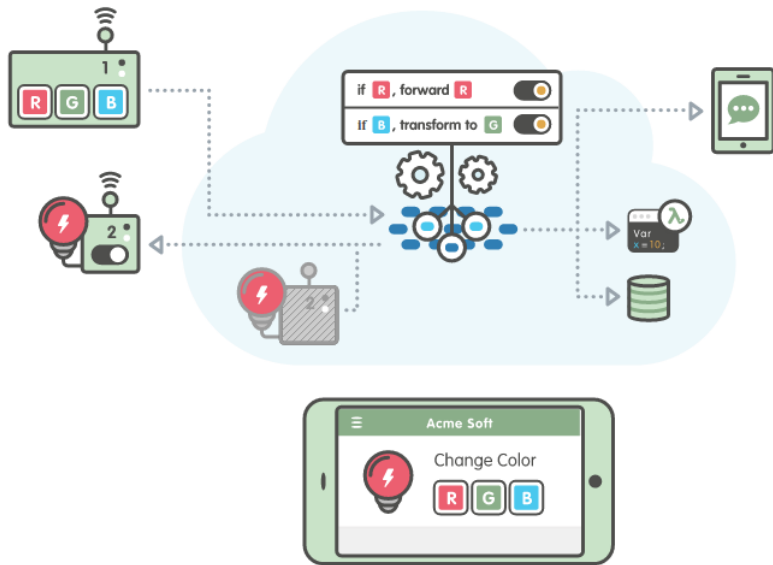
Pricing Details

From \$15 per month

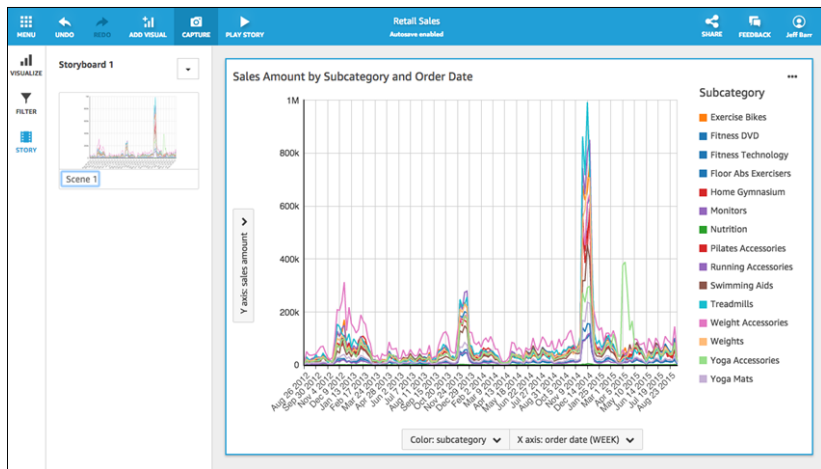
Re:Invent 2015

- ▶ 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 for Java

- ▶ 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

```
<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** ▾ **Services** ▾ **Edit** ▾ Markus

Upload


Create Folder

Actions ▾

None

Prope

[All Buckets](#) / [SLPRCELL](#)

	Name	Storage Class	Size
<input type="checkbox"/>	 damage	Standard	25 bytes

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

End Firehose

Questions? Comments?

Picture References

- ▶ <https://aws.amazon.com/architecture/icons/>
- ▶ <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/>.