

Intro

- ▶ Markus - first used AWS for Data Science MOOC in 2013 (EMR)
- ▶ Several AWS classes later...

Lambda Simian army Evolutionary architectures Operating expense instead of capital expense Scale horizontally

Pricing: On Demand Reserved Spot Instances (Amazon EC2 history Clark 2012)

Amazon Web Services: AWS

- ▶ Started in 2006
 - ▶ Elastic Compute Cloud (EC2)
 - ▶ Simple Storage Service (S3)
 - ▶ (Amazon EC2 history Clark 2012)
- ▶ By 2010: Amazon.com retail web services mostly moved to AWS
- ▶ 2015: Over a Million Active Customers in 190 Countries
 - ▶ e.g. Netflix, Dropbox, Airbnb, Supercell (Clash of Clans, Hay Day, Boom Beach)

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.*

Gartner: Infrastructure As A Service Magic Quadrant

- ▶ X-axis: Completeness of vision
- ▶ Y-axis: Ability to execute
- ▶ Four quadrants: Niche players, visionaries, challengers, leaders

AWS Regions and Edge Points of Presence

- ▶ 10 public, 2 US government regions
 - ▶ AWS GovCloud
- ▶ Each region: 3 or more Availability Zones (~ each AZ is 1 or more independent data centers)
 - ▶ Connected with
- ▶ Points of Presence - edge nodes for content delivery network (CloudFront - cache)
- ▶ "Every day, AWS installs enough server infrastructure to host the entire Amazon e-tailing business from back in 2004" (Rare Peek into Massive Scale of AWS Morgan 2014)

Multiplayer Mobile Game Application

- ▶ Start-up: Mobile device, backend server and database

Scaling Up - Getting Beefy

- ▶ Scaling up/Scale vertically - bigger equipment (sell old?)
- ▶ Must provision for peak demand?

Content Delivery Network & Analytics

- ▶ User experience - forward deploy

Re:Invent 2015: Internet of Things

- ▶ From AWS IoT Tutorial right on AWS Management Console
-> IoT
- ▶ Control Unit, light bulb (and mobile app)
- ▶ IoT Gateway/Message broker: X509 certs or Amazon Cognito IDs, MQTT/HTTPS
- ▶ Rules engine - transform to AWS endpoints (Kinesis Stream, S3, Lambda)
- ▶ Device shadow - keep state if device offline
- ▶ Device registry - unique ID to each thing, metadata (capabilities, attributes)

Re:Invent 2015: QuickSight

- ▶ Business Intelligence Service
- ▶ Visualizations, ad-hoc analysis
- ▶ Super-fast, Parallel, In-Memory Calculation Engine (SPICE)
- ▶ Data sources: Redshift, RDS, EMR, DynamoDB, Kinesis Streams, S3, MySQL, Oracle

Re:Invent 2015: Amazon Kinesis Firehose

- ▶ Managed service - automatically scale
- ▶ Compression, encryption to designated S3 bucket
- ▶ Run Lambda as objects arrive or EMR over bucket
- ▶ Redshift: CVS, JSON, AVRO etc. only selected columns, data type conversion

Re:Invent 2015: AWS Import/Export Snowball

- ▶ 50lbs, self-contained, tamper resistant, up to 50TB
- ▶ 100TB on 100MB/s dedicated > 100 days
- ▶ AES 256-bit encryption at host, stored encrypted
- ▶ Decrypt when loaded into S3 bucket
- ▶ Sanitize after use using NIST standard
- ▶ Send email to SNS when in bucket
- ▶ \$200 per job, plus shipping, \$15 per extra day

Re:Invent 2015: Security

- ▶ Inspector: 100s of rules mapped to common security compliance standards (e.g Payment Card Industry Data Security Standard PCI DSS), regular updates by AWS Security researchers
- ▶ WAF: Web Application Firewall - protect against SQL injection, cross-site scripting
- ▶ AWS Config Rules: cloud governance, define standards, monitor for compliance. Pre-built best practices or custom (e.g. proper tagging, use of elastic IPs etc.)
- ▶ AWS Config: All AWS resources with configurations over time

Re:Invent 2015: Other Services

- ▶ Amazon Elasticsearch Service: Document indexing (Lucene), log analytics, time series queries, works with visualization like Kibana
- ▶ Amazon Kinesis Streams Extended Retention - from 24hrs to 7 days
- ▶ AWS Database Migration Service (Preview): Oracle to Oracle, RDS etc. Data, SQL, functions, stored procedures, warn about things that cannot be auto-converted
- ▶ Amazon RDS for MariaDB - MySQL clone by creator of MySQL
- ▶ Amazon Cloudwatch Dashboards: reusable graphs of AWS CloudWatch and custom metrics
- ▶ AWS Lambda
 - ▶ Python, Versioning, Scheduled Jobs, and 5 Minute Functions

References I

Links



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