Building Resilient Systems on AWS

Instructor: Rock Mutchler
What this course will cover

- Introduction / Review of some of AWS’s Core Services
- Managed vs. UnManaged Services
- Monitoring and Dashboards / Glass Pane
- HA Design Patterns
  - Always with DR in Mind
- Fault tolerant and self healing systems on AWS
- Disaster Recovery
- DDoS mitigation
- Lab
  - Implement a resilient fault tolerant design
  - See where the class leads us
Little about me – Rock Mutchler

- Lead Architect at Pythian (worked with tons of companies via Pythian)
  - Blackbird (acquired by Pythian)
  - DriveDev (merged with PalominoDB became Blackbird)
- Worked at Zend (the PHP company – Sr. Technical Consultant)
  - Always stuck close to the data
  - Swat fixes are the best fixes
- Started Programing Online Late 1998
  - The Wild West of the Internet
- Some other things
  - Self taught
  - Had a music company for 6 years (BetaTV)
  - Invested in a vinyl record store (The Record Parlour)
AWS Core Services
Review Of Service Offerings
9:30 – 10:30
Cloud Products – Brief Listing

- Compute
- Storage
- Databases
- Analytics
- Networking
- Mobile
- Developer Tools
- Management Tools
- IoT
- Security
- Enterprise Applications

AWS allows for Full Life Cycle Development, Deployment along with Security and Enterprise Level HA/DR … so much more.
Compute

- Compute
  - EC2
  - VPC
    - Provision Isolated Sections
  - Elastic Beanstalk
  - EC2 Container Registry
    - Docker Images
  - EC2 Container Services
    - Manage Docker Containers
  - Lambda
  - Auto Scaling
Compute

- Compute – cnt...
  - Batch
  - Lightsail
Storage

- S3
- Glacier
- EBS
- Storage Gateway
  - Hybrid Gateway for Storage on S3, Glacier, and EBS
- Elastic File System
- Snowball
- Snowball Edge
- Snowmobile
Databases

- RDS
- Aurora
- ElasticCache
- Redshift
- DynamoDB
- DAX
  - DynamoDB Accelerator
    - In memory cache for DynamoDB
- Migration Services
  - Homogenous
    - Oracle – Oracle, Oracle – Aurora, MS SQL – MySQL
Databases - cnt

- Migration Services - cnt
  - Streaming
    - Redshift, DynamoDB, S3 – from – Aurora, PostgreSQL, MySQL, MariaDB, Oracle, SAP ASE, SQL, and Mango DB
  - Continuous Data Replication
    - HA
Analytics

- Data Tools for Retrieving Data Analytics
  - ElasticSearch
  - Redshift
    - PostgreSQL like
    - Provides Common Interface for items like Tableau / QuickSight
  - Data Pipeline
    - Move data from one source to another, example RDS to S3 or Redshift
  - EMR
    - Hadoop Framework
  - Kinesis
    - Firehose
    - Amazon’s Version of Spark
Analytics

- Athena
  - SQL Query S3 Data
- Cloud Search
- QuickSight
  - Business Analytics from various data sources
- Glue
  - Connect to Any JDBC data store
  - Crawls and suggests schemas and transformations
Networking / Content Delivery

- Networking
  - VPC
  - Direct Connect
  - ELB
  - Route53

- Content Delivery
  - CloudFront
    - CDN
Mobile

- Mobile SDK
- Device Farm
  - Test Devices in the Cloud (Android, iOS, FireOS)
- Mobile Hub
  - Build, Test, and Monitor
- Pinpoint
  - Push Notifications
- Mobile and WebApp
  - Cognito
    - Single Signon
  - API GateWay
    - Test, Manage, and Secure Application API’s
Developer Tools

- Newer tools for AWS hitting CI/CD and more
- CodeStar
- CodeCommit
- CodeBuild
- CodeDeploy
- CodePipeline
  - CD
- X-Ray
  - Analyze and Debug Applications
    - SDK requires code modification
- AWS CLI
  - Many uses – OpsWorks
  - I Use the Chef Supermarket cloudcli cookbook regularly to manage all things AWS via Chef
Management Tools

- CloudWatch
- EC2 Systems Manager
- CloudFormation
  - Templated Resources
- CloudTrial
  - Activity and Usage Tracking
- Config
- OpsWorks
  - Automate With Chef (some differences here than out of the box chef)
- Service Catalog
- Trusted Advisor
- Personal Health Dashboard
Internet of Things

- IoT Platform
  - Connect Devices
- GreenGrass
  - Local compute, messaging, and sync for devices
- IoT Button
  - Cloud Programmable Dash Button
Security

- WAF
- Shield
  - DDoS Protection
- IAM
  - User Access
- Directory Service
  - Active Directory
- Cloud Directory
- Cert Manager
- CloudHSM
  - Hardware based key storage for regulatory compliance
- Key Management Service
Security

- Organizations
- Inspector
  - Analyze Application Security
Enterprise Applications

- Messaging
  - SQS
  - SNS
  - SES
  - PinPoint (mentioned in mobile already)

- Business
  - Chime
  - WorkDocs
  - WorkMail

- Game Development
  - Gamelift
  - Lumberyard
So Many Services

- Amazon Provides a Ton of Services
  - You can easily be locked into a full AWS Life Cycle
  - Amazon Way of Things
    - Some Differences in Common Services
- Poll
  - What are you using?
  - What Services are you thinking of using?
  - What would you all like to go more in-depth on? (time permitting)
Morning Break

Quick Break

10:30 – 11:00
Managed vs Unmanaged Services

11:00 – 12:30
Unmanaged Services

- The old way of doing things!
Unmanaged Services

- Semi-Cowboy Coding – Code Drift / Repo Sync Issues
- Infrastructure Configured By Hand – Causes Drift
- Some Local Development Done
- DB Changes Applied by Hand Directly to DB and No Revision History
- Reconciliation Nightmare
Unmanged Services – Normal Progression

- Step in the Right Direction, allows for some testing and less code / infrastructure drift into production due to the implementation of a build/release manager.
Managed Services

- Getting things under control
  - One step at a time
    - Source Code Commits
      - Application / Infrastructure / DB
    - Build
      - Example: Jenkins
        - Unit Testing
    - User / Load Testing
      - Examples: selenium, apica, jmeter
    - Deploy Code
      - Custom Deploy Scripts
    - DB Changes
      - Production Review Manual Intervention
Managed Services

- Getting things under control
  - Blue / Green Deploys
    - Standing Versions Up Next To One Another
    - Easy to flip back
    - DNS
    - ELB / Zones
Managed Services – Fully Managed

- CI/CD with Code Pipeline
Refuel – Lunch Time

Grab a bite – free talk

12:30 – 1:30
Monitoring

Observe and Report

1:30 – 3:00
Monitoring

- AWS Tools
  - CloudWatch
  - X-Ray
- Tool Section
  - Different Strokes for Different Applications and Infrastructures
Monitoring

- It’s a crowded world, choose what is right for you situation
  - https://bigpanda.io/monitoringscape/
Monitoring

- DEMO TIME!
  - ELK Stack
  - TICK
Afternoon Break

Stretch / Clear out the Cobwebs

3:00 – 3:30
HA Patterns in AWS

High-availability design patterns

3:30 – 5:00
HA Design Patterns

- Application
  - Zone
  - Region
- Detection
  - Redirection
- HA can add overhead
  - Overhead considerations
    - Cost
      - Full HA only in Production
      - Auto Scaling
    - Speed
      - Cross Zone/Region Traffic
HA Database Pattern

- Basic Non-HA Layout
HA Database Pattern

- Basic Starter HA Layout
HA Geo Multi-Regional with Aurora Cluster

- Geo Routing Multi-Regional LB with Multi-Regional Aurora Cluster Read End Points
End of Day 1

Thank you!

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