DAY - 17
AWS ARCHITECTURE

AWS Architecture and Design

1. Day 1 Overview of Cloud Computing
2. Day 2 Overview of AWS
3. Day 3 Amazon EC2*
4. Day 4 Amazon EBS *
5. Day 5 Amazon CloudWatch *
6. Day 6 Amazon S3*
7. Day 7 Amazon Elastic Load Balancer *
8. Day 8 Amazon Auto Scaling *
9. Day 9 Amazon VPC *
10. Day 10 Amazon IAM *
11. Day 11 Amazon RDS
12. Day 12 Amazon Route 53 *
13. Day 13 Amazon DynamoDB* & Glacier
14. Day 14 Amazon Cloudfront* & Import Export & Amazon SES *
15. Day 15 Amazon ElasticBeanStalk & Amazon Cloudformation & Amazon OpsWorks
16. Day 16 AWS Economics & AWS Account Overview *
17. **Day 17 AWS Architecture**
18. Day 18 AWS Certification Preparation

[With Hands on Demo]

AWS Architecture
&
Best Practices

AWS Architecture & Best Practices

- → AWS Architecture Key Components
- → Scaling with AWS
- → AWS Security
- → AWS Cost Optimization
- → High Performance with AWS

AWS Architecture Key Components

Scalable

Cost Effective

Performance

Secure

Design to Scale with AWS

- Scaling Services
- No capacity planning
- Automated Deployments
- Application Design
- DB Scaling
- Design for Performance
- Reduce Load on Application

Scalable AWS Design

- Design considering everything is going to fail
  - Built failover in each and every component
  - Design to scale with increase in load (stateless)
  - Multi-zone/Region setup
    - ELB + Auto Scaling for resiliency
    - RDS with Multi AZ
- Use Scalable services
  - ELB, Auto Scaling, Cloudwatch
- No Capacity Planning
  - Request resources on-demand
  - Pay for services and capacity you are using
- Automated Deployments
  - Cloudformation /OpsWorks
  - Elastic Beanstalk for PaaS

Scalable AWS Design

- Application Design
  - Stateless Apps
  - Decoupling of App
  - Session management
- DB Scaling
  - Read Replica
  - Aurora
  - DynamoDBD
  - PIOPS
- Design for Performance
  - IOPS
  - Instane Size
  - EBS Optimized Instances
- Reduce Load on application
  - Caching, CDN

Securing App with AWS

- Shared Responsibility Model
- Security at every level
- Data protection
- Backup & DR Planning
- Enable Traceability
- Privilege Management

Securing App with AWS

- Shared Responsibility Model
- Security @ every level
  - EC2 : Key-pair, security group
  - VPC : Security group, private subnet, ACL, route tables
  - S3 : Secure Access with Policy
  - Understand security tool for each service
  - MFA
- Data Protection
  - Encryption
    - Encrypt data at rest (S3, Snapshot, EBS, RDS, Glacier, DynamoDB)
    - Encrypt data in transit (SSL)
  - Version Management
    - AMI
    - S3 versions

Securing App with AWS

- Backup & DR Planning
  - Snapshot
  - Multi-zone/Region
  - Copy to Region/share with another account
  - Backup for each & every service
- Enable Traceability
  - Cloudtrail
  - Logs for S3, ELB
  - OS level logs
- Privilege Management
  - IAM
  - Policy with users & groups
  - IAM Roles

Cost Optimization with AWS

- Pay as you go Model
- Free Tier
- Transparent
- Managed Service for cost optimization
- Monitoring & Billing Alarms
- Different Pricing Models
- Scale on-demand to reduce cost

Cost Optimization with AWS

- Pay as you go Model
  - All Capex converted to Opex
  - Provision capacity as you need (If you need 5 GB provision 5 only)
  - Vertical Scale for some of services when need arises
- Free Tier
  - Learning AWS service
  - Demo
  - POC
- Transparent Pricing
  - Pricing defined for each and every service
  - AWS billing gets updated every few hours
  - Support team to solve any billing issue
  - The Amazing customer support help remove cost of your mistakes

Cost Optimization with AWS

- Managed Service
  - PaaS
  - Monitoring & Deployment services
  - RDS / NoSQL
  - S3 lifecycle, Glacier for storage cost optimization
- Monitoring & Billing Alarms
  - Set billing alarms with cloudwatch
  - Set Costing Budgets and notifications
- Different Pricing Models
  - Reserved, Spot, On-Demand
  - Pricing per regions
- Scale On-demand
  - Start with desired need
  - Scale horizontally as per need with On-demand
  - Save cost by scaling in/out as per need

Design for Performance

- Regions & Zones
- High Availability & DR
- High Performance
- Change Management
- AWS SLAs

Design for Performance

- Regions & Zones
  - 12 Regions (5 coming soon) and 30+ zones helps for HA & DR
  - Throughput affected by Region selection
- HA & DR
  - Design to fail
  - Use Multi AZ or Regions
  - Backup with AMI, Snapshot, Copy to regions / accounts
  - Version Management
  - Test your recovery plan and identify RTP / RTO
  - Automated recovery
- High Performance
  - Select size of Instance
  - Volume type and Size
  - PIOPS
  - Horizontal Scaling for better performance

Design for Performance

- Change Management
  - IAM with specific access
  - AWS Resource Config
  - Automated Deployment to avoid manual errors
  - Understand limits for EIP, Instance, S3 etc
  - Design app with better security
  - Monitoring & trend analysis
  - Traceability enablement
- AWS SLAs
  - Understand AWS SLA
  - Design better system with ELB, AS
  - Use Route 53 with LTR,Health Check

Design Best Practices Summary

- → Always design to scale horizontally than vertically
- → Design stateless applications
- → Design loosely couple architecture
  - → Rest Calls / Webservices
  - → Service Discovery
  - → Gateway
- → Distributed approach by distributing a job in multiple tasks
- → Automated Deployment
  - → Configure Bootstrapping
  - → If possible use AMI instead of configuring software in production systems
- → Use Managed Services
  - → Search, Email, Monitoring, Queue, Analytics, Notifications, Workflow, Mobile
- → Use database in cloud for scaling
  - → Understand DB need and select RDS / NoSQL
  - → DB durability & persistence

Design Best Practices Summary

- → Reduce load on servers
- → Cache content
  - → Elasticache, CDN
- → Design for Resiliency
- → Introduce Redundancy
  - → Plan for N+1 (N+10%)
  - → Plan for Multi AZ
- → Security for each layer
  - → for each layer
  - → Auditing
  - → Privilege Management
- → Optimize for cost
  - → Pricing Models
  - → Right sizing with scaling

Some must Reads

AWS Architecture

https://aws.amazon.com/blogs/aws/are-you-well-architected/
http://d0.awsstatic.com/whitepapers/architecture/AWS_Well-Architected_Framework.pdf
http://d0.awsstatic.com/whitepapers/AWS_Cloud_Best_Practices.pdf
http://d0.awsstatic.com/whitepapers/AWS_Serverless_Multi-Tier_Architectures.pdf

AWS Pricing

http://d0.awsstatic.com/whitepapers/aws_pricing_overview.pdf
http://d0.awsstatic.com/whitepapers/Cost_Optimization_with_AWS.pdf

AWS Security

http://d0.awsstatic.com/whitepapers/Security/Intro_to_AWS_Security.pdf
http://d0.awsstatic.com/whitepapers/Security/AWS_Security_Whitepaperpdf
http://d0.awsstatic.com/whitepapers/DDoS_White_Paper_June2015.pdf
http://d0.awsstatic.com/whitepapers/best-practices-for-backup-and-recovery-on-prem-to-aws.pdf
http://d0.awsstatic.com/whitepapers/Backup_Archive_and_Restore_Approaches_Using_AWS.pdf
https://d0.awsstatic.com/whitepapers/compliance/AWS_Security_at_Scale_Logging_in_AWS_Whitepaperpdf

AWS Performance

http://d0.awsstatic.com/whitepapers/managing-your-aws-infrastructure-at-scale.pdf

Resources

http://aws.amazon.com/products/
http://aws.amazon.com/whitepapers/
http://aws.amazon.com/blogs/aws/
https://aws.amazon.com/about-aws/global-infrastructure/
http://aws.amazon.com/architecture/
https://aws.amazon.com/about-aws/events/
http://aws.amazon.com/documentation/
https://aws.amazon.com/free/
https://forums.aws.amazon.com/
https://aws.amazon.com/getting-started/
https://aws.amazon.com/support
http://aws.amazon.com/resources/webinars/
https://aws.amazon.com/solutions
http://aws.amazon.com/security/
http://aws.amazon.com/security/security-resources/
http://aws.amazon.com/developertools
http://calculators3.amazonaws.com/index.html

Summary

In this video we learned AWS Architecture & Best Practices.

In next session we will have discuss about
Preparing for AWS Certification

Thank You

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