
Thank you for a great class today, I hope the team was able to find value in the Business Essential's presentation. There was a lot of information that was presented so I have provided some links for your reference to the major topics we covered. Also, for your reference, I added in audit specific links at the bottom of this email.

Interesting links:

Great resources for a better understanding of AWS's architecture from a global footprint.

<https://infrastructure.aws> ← **Bookmark this URL !**

AWS Regional Table based on services

AWS Global Services Health Status

Busting Myths about Storing Data in the Cloud

Mike's 4 Pillars of Cyber Security:

1. **Visibility** – I need to see everything. Without full visibility I am increasing my risk profile.
2. **Control** – If I can see it, then I can control it. Visibility and Control are both required. Without both the environment is in peril and flying blind.
3. **Contextual Awareness** - Who, what, when, where, how, why? Key word is "context". I need to have as much information as possible to take next steps.
4. **Actionable Intelligence** – Key word is "actionable". I cannot take proper action without pillars 1, 2 and 3 correctly aligned.

Amazon S3 – object lifecycle management

<https://docs.aws.amazon.com/AmazonS3/latest/dev/object-lifecycle-mgmt.html>

S3 storage tiers and their correlating pricing structure:

<https://aws.amazon.com/s3/pricing/?nc=sn&loc=4>

Example S3 Standard storage pricing for the N. VA Region:

PUT, COPY, POST, or LIST Requests = \$0.005 per 1,000 requests

GET, SELECT and all other Requests = \$0.0004 per 1,000 requests

Lifecycle Transition Requests into Standard - Infrequent Access or One Zone - Infrequent Access or Intelligent-Tiering = \$0.01 per 1,000 requests.

[AWS Simple Monthly Calculator](#) ← Current calc from slides.

[AWS Calculator](#) ← New calc.

[AWS TCO Calculator](#)

[AWS Economics Center](#)

Q: How durable is Amazon S3?

Amazon S3 Standard, S3 Standard-IA, S3 One Zone-IA, and S3 Glacier are all designed to provide 99.999999999% durability of objects over a given year. This durability level corresponds to an average annual expected loss of 0.000000001% of objects. For example, if you store 10,000,000 objects with Amazon S3, you can on average expect to incur a loss of a single object once every 10,000 years. In addition, Amazon S3 Standard, S3 Standard-IA, and S3 Glacier are all designed to sustain data in the event of an entire S3 Availability Zone loss.

As with any environment, the best practice is to have a backup and to put in place safeguards against malicious or accidental deletion. For S3 data, that best practice includes secure access permissions, Cross-Region Replication, versioning, and a functioning, regularly tested backup.

Benefits of the Cloud

- <https://aws.amazon.com/what-is-cloud-computing/>

AWS Global Compliance (brag slide): <https://aws.amazon.com/compliance/programs/> ← Lots of logos!

AWS Whitepapers: Great place for deep dives and information from AWS: <https://aws.amazon.com/whitepapers/>

Shared Responsibility Model: One of the most important concepts in AWS: <https://aws.amazon.com/compliance/shared-responsibility-model/>

[AWS Security Blog](#)

[DOD Whitepaper](#)

[Secure Network Connections Whitepaper](#)

Netflix Case Study: <https://aws.amazon.com/solutions/case-studies/netflix/>

BMW Case Study: Car-as-a-sensor (CARASSO) <https://aws.amazon.com/solutions/case-studies/bmw/>

MLBAM Case Study: MLB Advanced Media <https://www.youtube.com/watch?v=847HY-JATrs>

Illumina Case Study: DNA sequencing systems <https://aws.amazon.com/solutions/case-studies/illumina/>

Capital One Case Study: Financial Institution <https://aws.amazon.com/solutions/case-studies/capital-one/>

• Well Architected Framework

○ <https://aws.amazon.com/architecture/well-architected/> ← Bookmark this URL !

- 5 Pillars of the WAF
 1. Security
 2. Reliability
 3. Performance Efficiency
 4. Operational Excellence
 5. Reliability

- **S3- Simple Storage Solution**

- <https://aws.amazon.com/s3/>
 - Versioning
 - Object Storage
 - Lifecycle policy
 - Different tiers
 - S3 IA, S3-IA One Zone, Glacier
 - Static Web Hosting

- **EC2- Elastic Cloud Compute**

- <https://aws.amazon.com/ec2/>
 - “Server” in the cloud
 - AMI- (Amazon Machine Image) template for root volume
 - <https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AMIs.html>
 - AMI Sources
 - AWS provided
 - AWS Marketplace
 - <https://aws.amazon.com/marketplace/>
 - Customer Provided- tools available to build your own
 - VmWare
 - <https://aws.amazon.com/vmware/>
 - AWS Community- Open source - non-reviewed use at own risk.
 - EBS- boot volume attaches to single instance
 - EFS/FSx- shareable file system for Linux/Windows workloads
 - Hardware optimized for use cases
 - <https://aws.amazon.com/ec2/instance-types/>
 - Multiple sizes for different workloads
 - 3 Pricing Models
 - <https://aws.amazon.com/ec2/pricing/>
 - On Demand

- Reserved
 - Convertible
 - Standard

<https://docs.aws.amazon.com/aws-technical-content/latest/cost-optimization-reservation-models/standard-vs.-convertible-offering-classes.html>
- Spot
 - <https://aws.amazon.com/ec2/spot/>

• Database

- <https://aws.amazon.com/products/databases/>
 - Relational
 - SQL compatible
 - Amazon RDS
 - MySQL
 - PostgreSQL
 - MariaDB
 - Oracle
 - SQL Server
 - Amazon Aurora- AWS Managed Service
 - MySQL
 - PostgreSQL
 - Amazon Redshift
 - No SQL (Key:Value Pairs)
 - Amazon DynamoDB- AWS Managed Service

• Networking

- VPC
 - <https://aws.amazon.com/vpc/>
 - Logical private network in cloud

- 3 Patterns
 - Single VPC
 - Multi VPC
 - Multi Account
- Network Stack IPv4 and IPv6 = dual stack
 - Route tables require entries for IPv4 and IPv6 if using dual stack configuration.
 - If one stack is not used no entries are required for that stack
- Subnets
 - Public- connects to Internet
 - Private- generally not connect to Internet, internal only
 - Protected- special case with no access to Internet (usually for regulatory compliance (PCI))
- Internet Gateway (IGW)
 - Used to connect public subnets to Internet
- NAT Gateway
 - Used to connect private subnets to Internet

• Load Balancing

<https://aws.amazon.com/elasticloadbalancing/>

- Application Load Balancing
 - Layer 7 (http / https)
- Network Load Balancing
 - Layer 4. (TCP / SSL)
- Classic Load Balancer
 - Legacy AWS Applications – EC2 Classic / pre-VPC.

• Domain Name Service (DNS)

<https://aws.amazon.com/route53/>

- Traffic Shaping
 - <https://aws.amazon.com/route53/features/>

· Identity and Access Management

· <https://aws.amazon.com/iam/>

- Users
 - Root
 - Groups
- Roles
 - Assuming roles (think hard hat!)
 - https://docs.aws.amazon.com/IAM/latest/UserGuide/id_roles_use.html
- Federated Users
 - <https://aws.amazon.com/identity/federation/>
- Cognito
 - <https://aws.amazon.com/cognito/>
 - Web Identity Provider
 - Google, Facebook, Amazon and other SAML 2.0 providers
- Multiple Accounts
 - AWS Organizations
 - <https://aws.amazon.com/organizations/>

· Automation

· <https://docs.aws.amazon.com/systems-manager/latest/userguide/automation-setup.html>

- CloudWatch
 - <https://aws.amazon.com/cloudwatch/>
- CloudFormation
 - <https://aws.amazon.com/cloudformation/>
- System Manger
 - <https://aws.amazon.com/systems-manager/>
- OpsWorks
 - <https://aws.amazon.com/opsworks/>

- Elastic Beanstalk
 - <https://aws.amazon.com/elasticbeanstalk/>

- **Caching**

- <https://aws.amazon.com/caching/>

- ElastiCache
 - <https://aws.amazon.com/elasticache/>
 - CloudFront
 - <https://aws.amazon.com/caching/cdn/>

- **Microservices and Serverless Architectures**

- <https://aws.amazon.com/microservices/>

- <https://aws.amazon.com/serverless/sam/>

- [AWS Elastic Container Service \(ECS\)](#)

- <https://aws.amazon.com/ecs/>

- [Docker](#)

- [AWS Fargate](#)

- Lambda
 - <https://aws.amazon.com/lambda/>
 - API Gateway
 - <https://aws.amazon.com/api-gateway/>
 - Step Functions
 - <https://aws.amazon.com/step-functions/>

- **RTO/RPO and Backups**

- <https://aws.amazon.com/blogs/startups/large-scale-disaster-recovery-using-aws-regions/>

- Backups
 - <https://aws.amazon.com/backup/>

- **Cost Optimizations**

- <https://docs.aws.amazon.com/aws-technical-content/latest/cost-optimization-laying-the-foundation/cost-optimization-pillars.html>
- <https://aws.amazon.com/pricing/cost-optimization/>

- **Certification**

- <https://aws.amazon.com/certification/>
 - Exams
 - <https://www.aws.training/Certification>

- **Next Steps....**

- <https://aws.amazon.com/training/>
- <https://aws.amazon.com/training/self-paced-labs/>
 - Get an AWS account at no cost (restrictions apply)
 - <https://aws.amazon.com/free/>

**** Auditor specific information and links ****

<https://aws.amazon.com/compliance/auditor-learning-path/>
<https://aws.amazon.com/compliance/>
<https://aws.amazon.com/security/>

[**AWS Compliance Solution Guide**](#)

[**AWS Compliance Resources \(Essentials and Best Practices\)**](#)

[AWS Compliance – Latest News](#)

[AWS Artifact](#)

[AWS Identity and Access Management \(IAM\)](#)

[AWS Organizations](#)

Again, thank you!

Mike

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Work Hard. Have Fun. Make History!

