**S3 (Simple Storage Service)**

**Overview**

* Provides developers and IT teams with secure, durable, highly-scalable object storage
* Safe place to store your files
* Object-based storage (pictures, Word files, videos), not operating system or database
* Files can be anywhere from 0 bytes to 5 TB in size
* Unlimited storage, but you pay by the gig
* Files are stored in **buckets**
* Bucket is a folder in the cloud
* Buckets are universal namespace. Must be unique globally.
* URL looks like [**https://s3-eu-west-1.amazonaws.com/acloudguru**](https://s3-eu-west-1.amazonaws.com/acloudguru)
  + Region + Region # + amazonaws.com + bucket name
* You will receive HTTP 200 code if file upload is successful

**S3 Storage Tiers/Classes**

1. S3 Standard
   * 99.99% availability
   * 99.99999999999% durability
   * Stored redundantly across multiple devices (multiple disks) and multiple facilities (multiple availability zones)
   * Designed to sustain loss of 2 facilities concurrently
2. S3 - IA (Infrequently Accessed)
   * Data accessed less frequently but requires rapid access when needed
   * Lower fee than Standard but charged a retrieval fee
3. S3 One Zone - IA
   * Same as S3 - IA but do not require multiple availability zone data resilience
   * Only stored in one availability zone
4. Glacier
   * Used for archival only
   * Cheapest
   * Expedited, standard, or bulk
     + Expedited: Restored within few mins, high fee
     + Standard: 3-5 hours for restore
     + Bulk: 5-12 hours

* No retrieval fee for Standard, only for the other three

**S3 - Charges**

**Charged for:**

* Storage
* Requests
* Storage management pricing
  + Tags that define who owns an object
* Data transfer pricing
  + Transferring from one region to another
* Transfer acceleration
  + Fast and easy secure transfers across long distances

**S3 Transfer Acceleration**

* Users upload to an edge location instead of directly to S3 bucket
* Once it goes to an edge location, it automatically gets distributed to the S3 bucket
* File goes across Amazon's backbone to transfer much faster

**Read the S3 FAQ before taking the exam!**

**Creating an S3 Bucket**

* Buckets must have unique names
* **Note:** Interface for S3 is Global (similar to IAM), but buckets created can be deployed in any region
* Bucket names must be DNS compliant (3-63 characters, no invalid characters)
* By default, buckets are **private** (recommended)
* You can change storage class and encryption on the fly by using the More menu

**Relational Database Service (RDS)**

Types:

1. SQL Server
2. Oracle
3. MySQL Server
4. PostgreSQL
5. Aurora (Amazon's own database)
6. MariaDB

Two key features:

1. Multi availability zones for disaster recovery
2. Read replicas for performance improvement

* **Multi AZ:** Exact copy of your database in case the primary goes down
  + Disaster recovery
* **Read replica:** Spread read access across five databases, only one is for writing
  + Scaling out / performance

**Nonrelational Databases**

1. Collection (table)
2. Documents (row)
3. Key-value pairs (fields)

* Allows you to add in extra fields all the time
* **Amazon DynamoDB** is Amazon's nonrelational/NoSQL database
  + Fast, flexible
  + Scales with your application

**Aurora**

* Relational, Amazon's own
* 6 copies of itself
* 5 times better performance than MySQL, 1/10 price point
* Choose Aurora if you have an RDS
* Choose DynamoDB if you have nonrelational

**Data Warehousing**

* Used for business intelligence
* Used to pull in large and complex datasets
* Used by management to do queries (current performance targets, etc)
* **Redshift** is Amazon's data warehouse in the cloud for business intelligence
  + Start with a few hundred GB of data, scale to petabyte or more

**Autoscaling**

* Review: EC2 connects to one database that is duplicated to a second database (redundancy).
* No redundancy on the EC2 itself. Autoscaling group will fix this.
* You can set up how many instances you want with Autoscaling. When one fails, it will automatically create a new one
* You can set a startup script to run when each new instance starts

**Route 53**

* Amazon's DNS service
* Domain registration

**Elastic Beanstalk**

* Allows you to deploy everything (provisions everything like EC2 and RDS and everything else) all at one button
* Creates load balancers, auto-scaling groups, security groups, etc.
* Provisioning EC2 instances, installs PHP

**CloudFormation**

* Way of scripting out infrastructure
* Turning infrastructure into code
* Codify creating EC2 instances, security groups, etc
* JSON that describes your cloud environment - this is a template
* Elastic Beanstack and CloudFormation are free, but you pay for the resources that are provisioned as a result of using EB and CF