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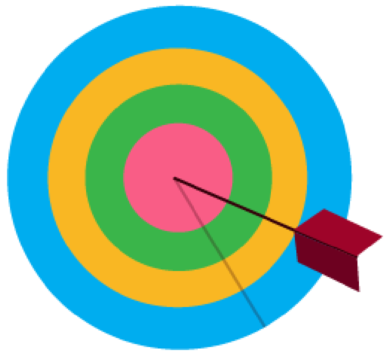
Amazon Web Services

Lesson 3 : Amazon S3

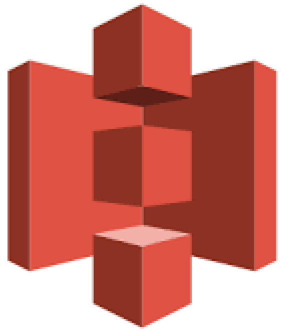
Session Objectives

This session will help you to:

- Understand S3



Amazon S3



- Amazon S3 is Secure, durable, highly-scalable object storage accessible via a simple web services interface
- It store & retrieve any amount of data for use alone or together with other AWS services

S3 Features

Durable	Available	Low Cost	Scalable
High Performance	Secure	Integrated	Easy to Use
Backup & Archiving	Big Data Analytics	Static Website Hosting	Disaster Recovery
	Content Storage	Distribution Cloud-native Application Data	

Amazon S3 vs EBS

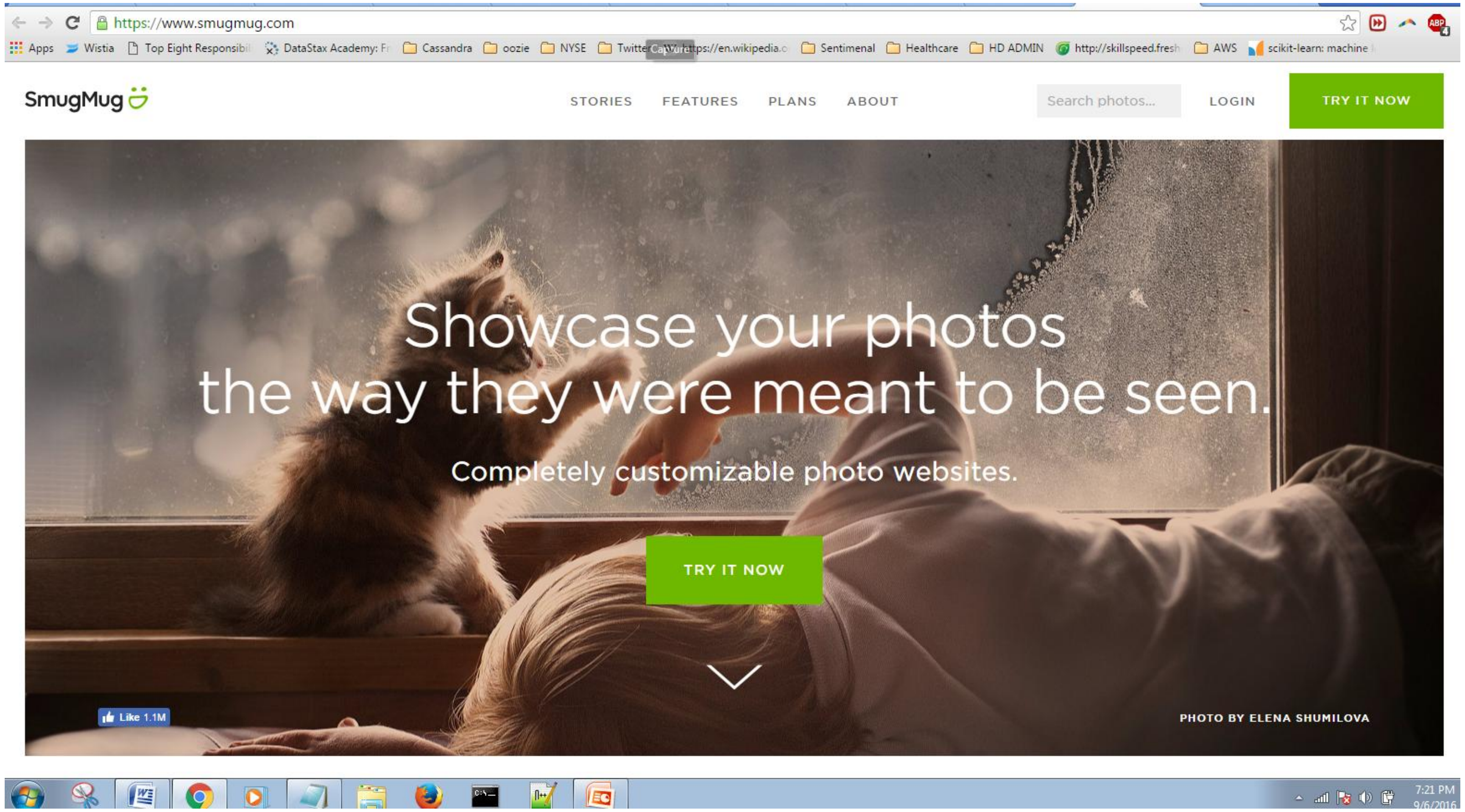
Amazon S3	Amazon EBS
Web Interface (object storage)	File system interface (block storage)
Scalable	Not easily scalable
Static website hosting	Databases: PostgreSQL, MS SQL, Oracle
Clod Storage / Reduced redundancy storage	Application that require lots of read/write operations

Advantages to Amazon S3

- Create Buckets – Create and name a bucket that stores data. Buckets are the fundamental container in Amazon S3 for data storage.
- Store Data In Buckets – Store an infinite amount of data in a bucket. Upload as many objects as you like into an Amazon S3 bucket. Each object can contain up to 5 TB of data. Each object is stored and retrieved using a unique developer-assigned key.
- Download Data – Download your data or enable others to do so. Download your data any time you like or allow others to do the same.
- Permissions – Grant or deny access to others who want to upload or download data into your Amazon S3 bucket. Grant upload and download permissions to three types of users. Authentication mechanisms can help keep data secure from unauthorized access.
- Standard Interfaces – Use standards-based REST and SOAP interfaces designed to work with any Internet-development toolkit.

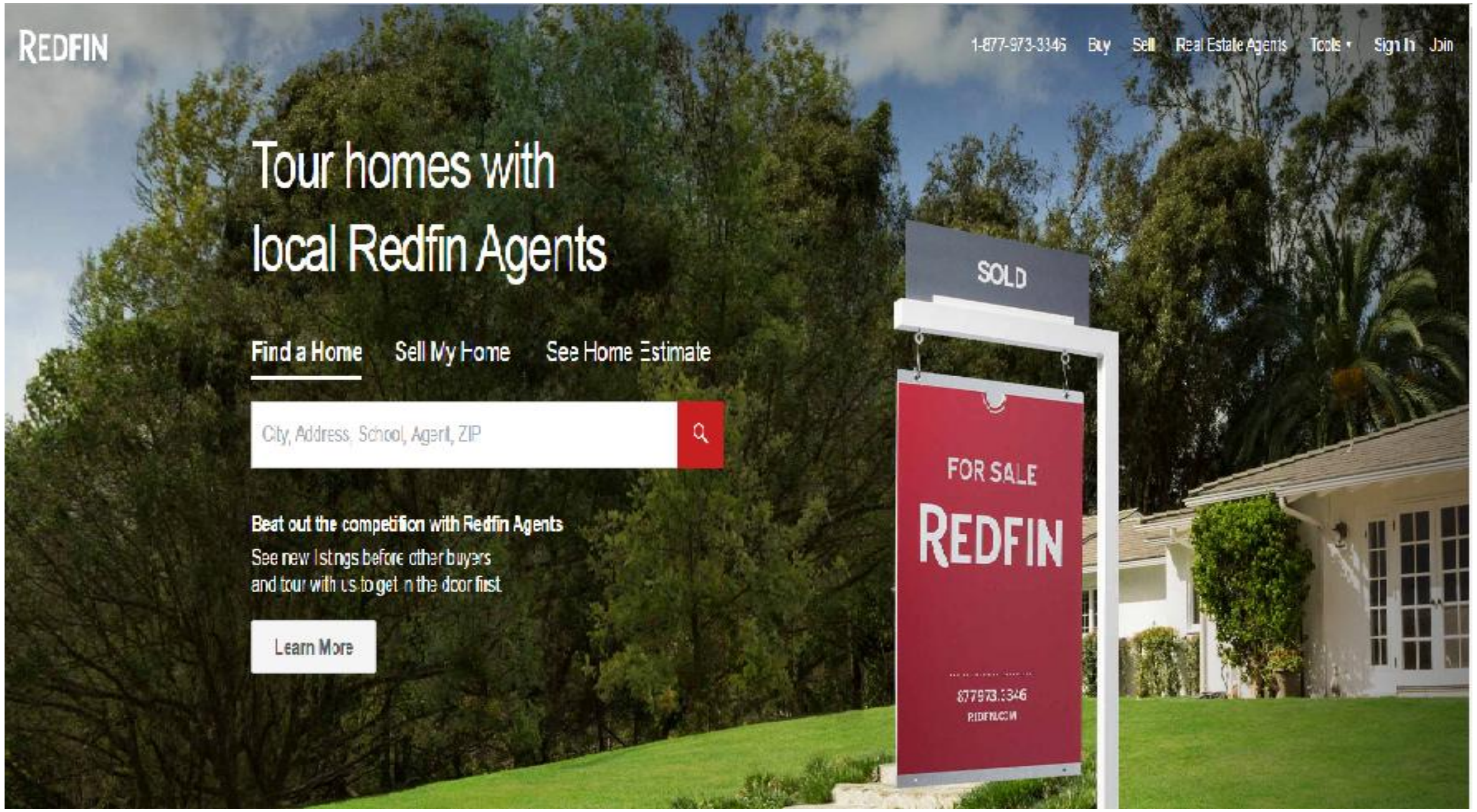
S3 Use Case - 1

- SmugMug's Cloud Migration : SmugMug stores billions of photos and images on Amazon S3



S3 Use Case - 2

- Redfin manages data on hundreds of millions of properties using AWS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Amazon S3 Concepts

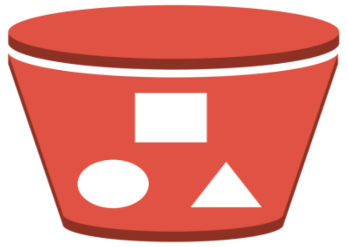
- Buckets
- Objects
- Keys
- Regions
- Amazon S3 Data Consistency Model

Buckets & Objects

- A Bucket is a Container for objects stored in Amazon S3.
- Every Object is contained in a Bucket.
- Objects are the fundamental entities stored in Amazon S3.
- Objects consist of object data and metadata.
- An Object is uniquely identified within a Bucket by a key (name) and a version ID

Purpose

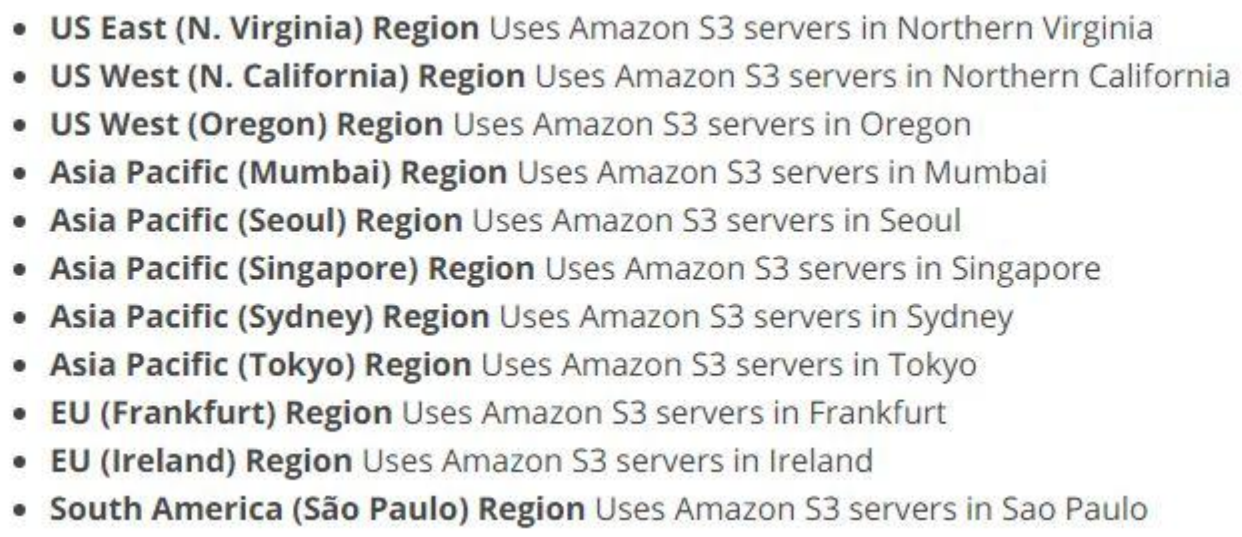
- Organize the Amazon S3 namespace at the highest level,
- Identify the account responsible for storage and data transfer charges,
- Play a role in access control, and serve as the unit of aggregation for usage reporting.



Keys & Regions

- A Key is the unique identifier for an Object within a Bucket.
- Every Object in a Bucket has exactly one Key.

- Regions - You can choose the geographical region where Amazon S3 will store the Buckets you create.

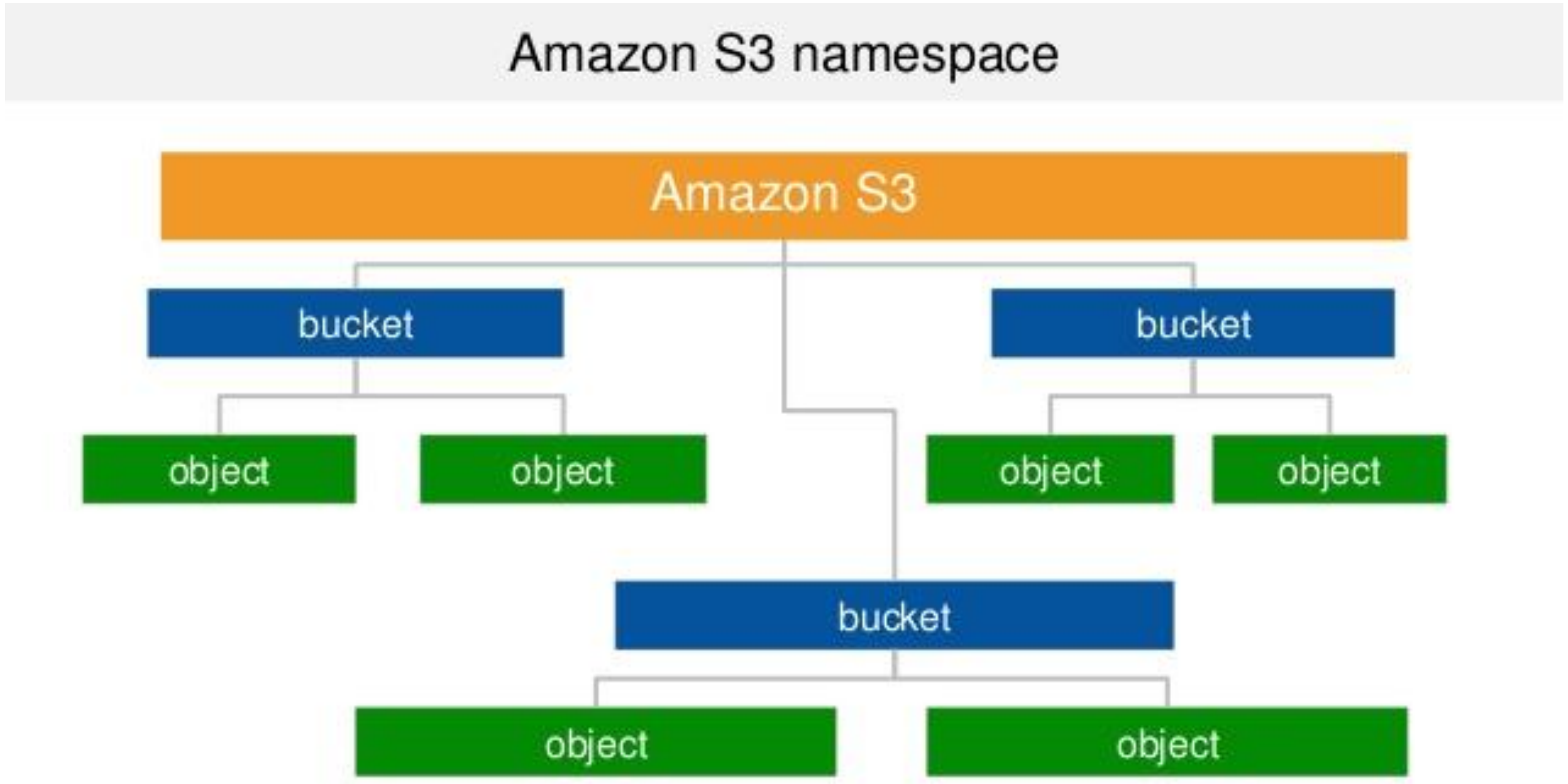


- **US East (N. Virginia) Region** Uses Amazon S3 servers in Northern Virginia
- **US West (N. California) Region** Uses Amazon S3 servers in Northern California
- **US West (Oregon) Region** Uses Amazon S3 servers in Oregon
- **Asia Pacific (Mumbai) Region** Uses Amazon S3 servers in Mumbai
- **Asia Pacific (Seoul) Region** Uses Amazon S3 servers in Seoul
- **Asia Pacific (Singapore) Region** Uses Amazon S3 servers in Singapore
- **Asia Pacific (Sydney) Region** Uses Amazon S3 servers in Sydney
- **Asia Pacific (Tokyo) Region** Uses Amazon S3 servers in Tokyo
- **EU (Frankfurt) Region** Uses Amazon S3 servers in Frankfurt
- **EU (Ireland) Region** Uses Amazon S3 servers in Ireland
- **South America (São Paulo) Region** Uses Amazon S3 servers in Sao Paulo

Amazon S3 Data Consistency Model

- Amazon S3 provides read-after-write consistency for PUTS of new objects in your S3 bucket in all regions with one caveat.
- Caveat is that if you make a HEAD or GET request to the key name (to find if the object exists) before creating the object, Amazon S3 provides eventual consistency for read-after-write.
- Amazon S3 offers eventual consistency for overwrite PUTS and DELETES in all regions.
- Updates to a single key are atomic.

Amazon S3 namespace



Protecting Data Using Encryption

- Use Server-Side Encryption – You request Amazon S3 to encrypt your object before saving it on disks in its data centers and decrypt it when you download the objects.

- Use Client-Side Encryption – You can encrypt data client-side and upload the encrypted data to Amazon S3. In this case, you manage the encryption process, the encryption keys, and related tools.

- You have the following two options for using data encryption keys:
  - Use an AWS KMS-managed customer master key
  - Use a client-side master key

Protecting Data Using Server-Side Encryption

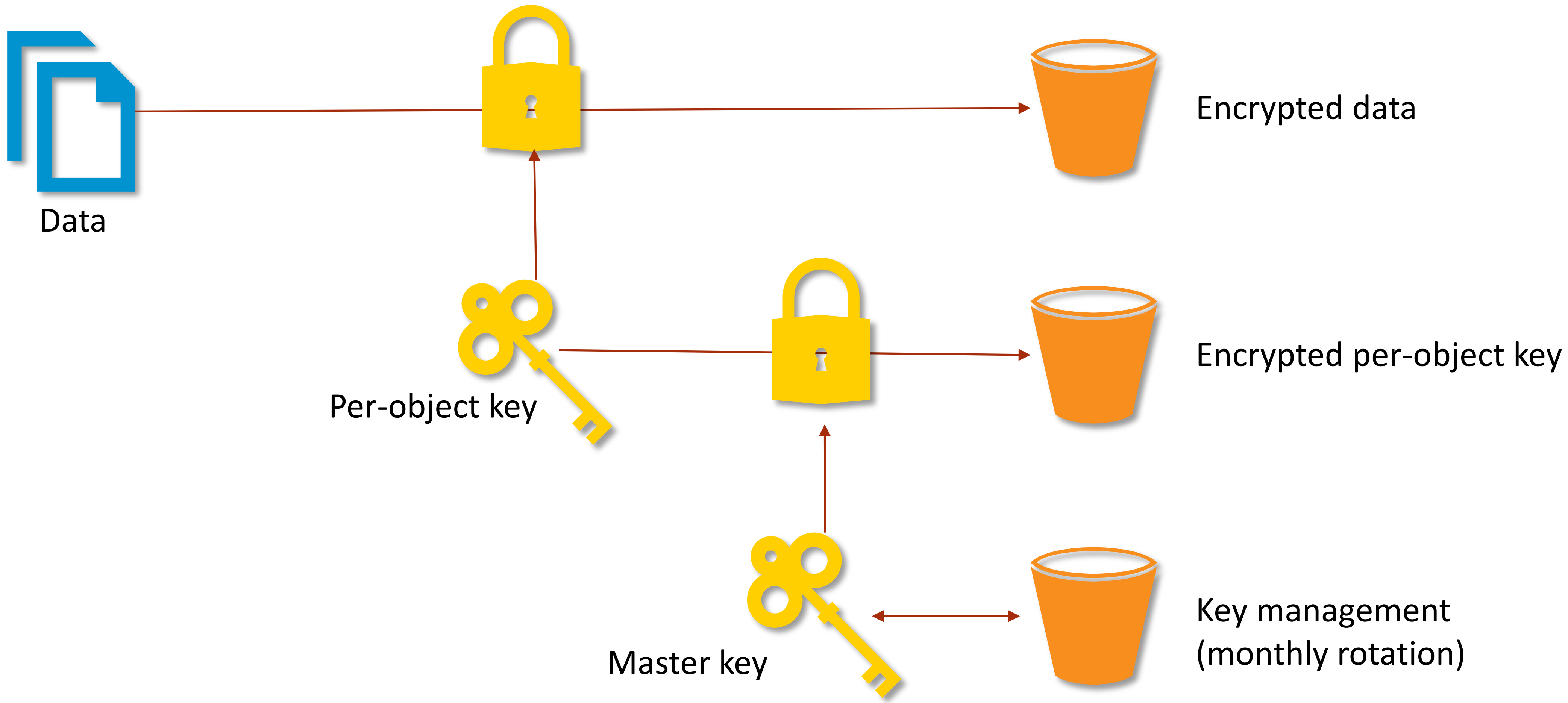
- Use Server-Side Encryption with Amazon S3-Managed Keys (SSE-S3) - Each object is encrypted with a unique key employing strong multi-factor encryption.

- Use Server-Side Encryption with AWS KMS-Managed Keys (SSE-KMS) **-** Similar to SSE-S3, but with some additional benefits along with some additional charges for using this service. There are separate permissions for the use of an envelope key (that is, a key that protects your data's encryption key) that provides added protection against unauthorized access of your objects in S3.

- Use Server-Side Encryption with Customer-Provided Keys (SSE-C) – You manage the encryption keys and Amazon S3 manages the encryption, as it writes to disks, and decryption, when you access your objects.

SSE-S3 with Amazon S3

With SSE-S3, Amazon S3 will encrypt your data at rest and manage the encryption keys for you

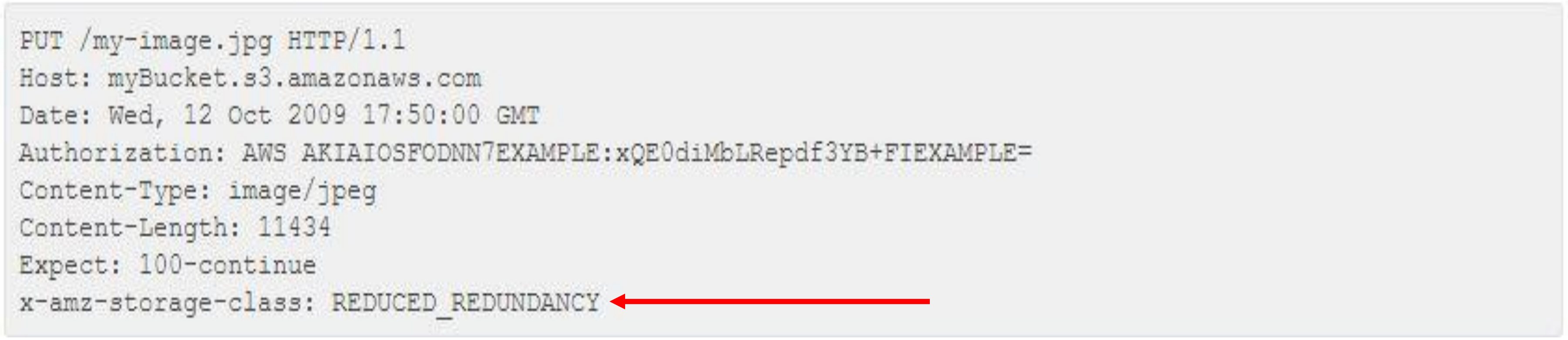


Reduced Redundancy Storage

- Reduced redundancy storage is designed to provide 99.99% durability of objects over a given year.
- Reduced redundancy storage stores objects on multiple devices across multiple facilities, providing 400 times the durability of a typical disk drive, but it does not replicate objects as many times as Amazon S3 standard storage

Setting the Storage Class of an Object You Upload

- To set the storage class of an object you upload to RRS, you set x-amz-storage class to REDUCED_REDUNDANCY in a PUT request.
- The following example sets the storage class of my-image.jpg to RRS.



```
PUT /my-image.jpg HTTP/1.1
Host: myBucket.s3.amazonaws.com
Date: Wed, 12 Oct 2009 17:50:00 GMT
Authorization: AWS AKIAIOSFODNN7EXAMPLE:xQE0diMbLRepdf3YB+FIEXAMPLE=
Content-Type: image/jpeg
Content-Length: 11434
Expect: 100-continue
x-amz-storage-class: REDUCED_REDUNDANCY
```

Changing the Storage Class of an Object in Amazon S3

- We can also change the storage class of an object that is already stored in Amazon S3 by copying it to the same key name in the same bucket.
- To do this, we use the following request headers in a PUT Object copy request:
  - *x-amz-metadata-directive* set to COPY
  - *x-amz-storage-class* set to STANDARD, STANDARD_IA, or REDUCED_REDUNDANCY

Wrap – up

In this lesson we understood

- Amazon S3

Have Questions?

Please raise a **Support Ticket** if you've got any questions

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thank you!