Amazon S3 (Simple Storage Service) buckets are containers for storing objects in the Amazon Web Services (AWS) cloud. They are essentially folders within the S3 service where you can store and organize data, such as documents, images, videos, and application data.

S3 SECURITY:

S3 is private by default

Identity-based policies are attached to IAM (Identity and Access Management) users, groups, or roles. These policies define what actions a specific IAM identity can perform on Amazon S3 resources.

resource-based policies are attached directly to S3 buckets or objects. These policies define who can access the resources within the bucket or object and what actions they can perform. In this policies we define the cross region access as S3 being the regional service

STATIC WEBSITE HOSTING:

We generally access S3 objects using AWS API's but using static website hosting makes it more secure because it allows access through standard https by individuals using web browser.

While hosting a static website we enable index and error documents these documents come  into action when you try to access a unspecified page you will get the index document for example you searched amazon you will get a amazon main index page because you didn't specify what you want in amazon. Now when you try to access a anything that you are restricted or anything that doesn't exist you will receive and error page.

Now if you host a static website by enabling static website hosting you can host a website but still you cannot access the website because S3 is always private inorderr to access the website you need to add the bucket policy making the website publicly accessible to everyone.

VERSIONING:

In S3 bucket versioning it is a feature in S3 which allows to store multiple versions of an object in a bucket without overriding and it gives you the latest version keeping all the previous versions archived but you still have access to those previous versions. You can enable versioning from disable to enable but can't disable it again you can suspend and reenable it but cannot disable. .Versioning is controlled at the bucket level.

Now if you enable versioning and upload an object the object is assigned with a Version ID and now lets say we have uploaded an object A and A is assigned with an object ID now you want to make some changes to A so you upload a new object A with some additions changes now the new A is assigned with other ID and this one will be available in the bucket but still you have the older version with old version id in the bucket and can also have access to that object. this is where you will have the older versions and can avoid overriding. the one which you uploaded recently is the current version running in the bucket.

In versioning lets assume you have uploaded A and B now if you delete A the deleted object A is stored as deleted mark A in the bucket but not deleted where you can still have access to the deleted one it is just marked a deleted but not deleted.If you want to delete it permananelty you need to select the deleted marked object enter the version ID and then delete permanently.

PERFORMANCE OPTIMIZATION : We generally upload objects into S3 buckets lets assume we are uploading an object consists of data 7GB and it had uploaded unto 6.5 GB and due to some technical issues the upload fails the only way to continue this is the reuploasd from starting which causes the data loss and is a time consuming to improve this performance they came up with a solution the same 6GB file it split into many sections and these section can contain from 5MB to 5GB and all these sections transfer the data paralally at same time and if the one section fails the particular section starts reuploading from beginning and the data is divided into section each section takes less time to make a reupload. this process is known as performance optimization.

S3 REPLICATION: S3 replication is a feature in S3 buckets which automatitally copies objects from one amazon S3 bucket to other bucket in same or different region. This enables you to replicate objects in buckets for various reasons.

Explain S3 replication and mention its uses it is used for various reasons such as data availability and disaster recovery.

PRE ASSIGNED URLs:

where you can give other person or application access to an object inside a bucket using your credentials in a safe and secured way.  
  
Now upload an object into a bucket and now you can generate pre assigned URL using cloud shell and also in console. while generating url you need to assign time till which the URL is valid. now you can have access to that object using this url and now if you add an inline policy that restricts the access of iamadmin now you do not have access to the object but still you can create preassigned URL but this url shows the access denied. This is mainly used in remote work scenarios.