🔐 What Is an AWS S3 Pre-signed URL?

A **pre-signed URL** in Amazon S3 is a time-limited, secure URL that grants **temporary access** to a specific S3 object. It allows someone to **download (GET)** or **upload (PUT)** a file to your S3 bucket **without needing AWS credentials**.

🔧 How Does It Work?

- You (the owner) generate the URL using your credentials and permissions.
- The URL includes:
    - The S3 object path
    - An **expiration time**
    - A **signature** that authenticates the request
- Anyone with the URL can access the object until it expires.

✅ Common Use Cases

Use Case	Description
✅ Secure file downloads	Let users download private files (e.g., invoices, images)
✅ Temporary uploads	Allow users to upload files without giving full S3 permissions
✅ Time-limited sharing	Share a file for a specific time window
✅ Mobile/Web apps	Upload or download media files securely from clients

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🛠️ How to Generate a Pre-signed URL

🔹 **Using AWS SDK (Python Example – boto3)**

```
import boto3
from botocore.exceptions import NoCredentialsError

s3 = boto3.client('s3')

url = s3.generate_presigned_url(
    ClientMethod='get_object',
    Params={
        'Bucket': 'my-bucket-name',
        'Key': 'path/to/myfile.pdf'
    },
    ExpiresIn=3600  # URL valid for 1 hour
)

print("Pre-signed URL:", url)
```

Replace 'get_object' with 'put_object' to generate an upload URL.

🔐 **Security Features**

- **Expires automatically** (you set the duration)
- **Access is limited to a specific file and action**
- **No need to expose your AWS credentials**

⚠️ **Important Notes**

- Only works for objects in **private S3 buckets** (not needed for public files)
- If the file/key does **not exist**, you can still generate a **PUT URL** for uploading

- **Permissions still apply** — the IAM user generating the URL must have permission for the action

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🧠 Example Scenario

You run a document-sharing site. Instead of exposing your S3 bucket, you:

1. Upload files privately to S3
2. Generate a **pre-signed download URL**
3. Email the link to users, valid for 24 hours
