COMP5349 Assignment 1 Report: AWS Image Captioning Web Application

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Service Descriptions & Configuration

1. Amazon EC2

- **AMI**: Amazon Linux 2
  Chosen for being lightweight, free, and offering fast boot times.
- **Instance Type**: t3.small (2GB RAM, 2 vCPU)
  Suitable for lightweight workloads such as the Flask-based image captioning app.
- **Security Group Inbound Rules**:
  - **Port 5000 (TCP)**: Enables access to the Flask web server.
  - **Port 3306 (MySQL/Aurora)**: Allows communication with the RDS MySQL database.
- **App Deployment**:
  Flask app (app.py) and MySQL table creation (create-database.sh) configured with the correct S3 bucket name, RDS endpoint, credentials, and Google Gemini API key.

2. Amazon S3

- **Bucket Versioning**: **Enabled**
  Ensures that when the same image is re-uploaded, existing versions are preserved.
- **Bucket Policy**:

```
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Sid": "PublicReadGetObject",
         "Effect": "Allow",
         "Principal": "*",
         "Action": "s3:GetObject",
         "Resource": "arn:aws:s3:::image-   caption-bucket-<your-username>/*"
      }]
}
```

- **Purpose**:
  - Stores uploaded images.
  - Enables public read access so users can retrieve and view images.

3. Amazon RDS

- **Instance Class**: t3.small (2GB RAM, 2 vCPU)
- **Engine**: MySQL
- **Storage**: 20GB **gp2** with auto-scaling up to 100GB.
- **Purpose**:
  Stores image metadata and generated captions.
- **Connection**:
  Accessible from EC2 over port 3306 as per the configured security group rule.

4. AWS Cloud9

- **Issue Faced**: Pre-installed Python 3.7 was incompatible with required libraries.
- **Solution**: Installed Python 3.11.4 for improved compatibility and performance.

Conclusion

This deployment involved integrating EC2, S3, and RDS services in AWS to create a functional Image Captioning application using Google Gemini API. The system is lightweight, cost-effective, and scalable, supporting versioned image uploads and persistent storage of captions.

Architecture Diagram: