**Assignment 3**

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**Part 1: Identify the Problem**

Small enterprises frequently encounter difficulties in maintaining the continuity and security of their web applications that are hosted in the cloud. A vital responsibility is the management of automated backups for web applications, databases, and files. In the absence of a dependable backup solution, these businesses are at risk of data loss due to hardware malfunctions, unintentional deletions, or cyber threats.

The challenge lies in developing an automated backup system for a web application hosted on AWS EC2 instances. This system must:

1. Schedule regular backups of the EC2 instance volumes.
2. Store these backups in an AWS S3 bucket to ensure cost-effective and secure storage.
3. Provide notifications to confirm the success or failure of each backup operation.

This situation is pertinent to cloud infrastructure and hosting, as it entails the automation of critical cloud management tasks through the use of scripting and APIs.

**Relevance to Cloud Computing:**

This issue is closely related to the field of cloud computing, highlighting the following aspects:

1. Cloud Infrastructure Management: Overseeing resources such as EC2, EBS, and S3.

2. Automation: Minimizing manual processes through the use of Python scripting.

3. API Integration: Utilizing the AWS SDK (boto3) for programmatic interaction with cloud services.

Addressing this issue will provide me with hands-on experience in resource management, automation, and the creation of resilient systems.

**Challenges in the process:**

API Interaction: Utilizing the AWS SDK (boto3) to obtain cost and usage information.

Data Analysis: Examining JSON responses to detect spending irregularities.

Automation: Implementing a daily execution schedule and dispatching email notifications.

Addressing these challenges will improve competencies in API integration, data parsing, and cloud automation, in accordance with the objectives of the course.

**Libraries and Tools**

The project will utilize the following libraries and tools:

1. **boto3**: To interact with AWS Cost Explorer and retrieve cost data.
2. **json**: For parsing and analyzing API responses.
3. **smtplib**: To send email notifications.
4. **AWS IAM Roles**: For secure API access.