Cloud Cost Optimization

*Team Name: Cloud Cost Optimization 2.*

*Project name: Cloud Cost Optimization 2.*

1.Problem Statement:

* User has some requirements according to the traffic appearing on cloud
* To monitor and analyse user's historic data and provide suggestion regarding upscaling/downscaling based on the traffic situation.

About Problem Statement:

Cloud cost optimizer refers to techniques, tools, and strategies used to optimize the cost of cloud computing, while maintaining performance, security, and reliability. The goal is to reduce the total cost of ownership (TCO) by identifying underutilized, overprovisioned, or redundant resources and taking steps to right-size, eliminate or consolidate them. This includes optimizing compute, storage, and network resources, reviewing pricing models, and managing usage patterns.

2.Whose problem is solved?

Cloud cost optimization solves the problem of organizations that use cloud computing services and are looking to reduce their cloud costs while maintaining the same level of service or improving it. Cloud cost optimization is relevant to companies of all sizes, including startups, small and medium-sized enterprises (SMEs), and large enterprises.

3.How do you know the problem is solved?

The effectiveness of cloud cost optimization can be measured by tracking key performance indicators such as cost savings, utilization rates, performance, automation, and user satisfaction. By monitoring these KPIs, organizations can determine the success of their cost optimization efforts and make necessary adjustments to achieve their goals.

4.Business outcome/benefit by solving the problem?

By solving the problem of cloud cost optimization, organizations can achieve several business outcomes and benefits, including:

**Cost savings**: The primary benefit of cloud cost optimization is cost savings, which can free up budget for other business initiatives or increase profitability.

**Improved resource utilization:** Cloud cost optimization can help organizations make better use of their cloud resources by eliminating underutilized or redundant resources and right-sizing others. This can lead to better efficiency, lower costs, and improved performance.

**Better decision making:** Cloud cost optimization provides organizations with greater visibility and control over their cloud costs, enabling them to make better-informed decisions about their cloud infrastructure and services.

**Improved user experience:** Cloud cost optimization can lead to improved service quality and availability, resulting in a better user experience for customers and employees

Overall, by solving the problem of cloud cost optimization, organizations can achieve a range of benefits that can improve their bottom line, increase their competitiveness, and enhance their ability to meet the needs of their customers and stakeholders

Solution**:**

To solve the problem of cloud cost optimization, the we are using AWS as their cloud platform and monitoring the CPU usage of one of the EC2 instances using boto3 Python. This approach allows the organization to stay within the free tier account limitations while still monitoring the usage of their cloud resources.

By generating an average CPU usage and providing suggestions to end users, the organization can identify areas where they can right-size their compute resources or adjust their usage patterns to reduce their cloud costs.

Technology Used (Python,Boto3,Streamlit)

* **Python** is a high-level, interpreted programming language that is widely used in various applications, including web development, data analysis, machine learning, and cloud computing.
* **Boto3** is a Python library designed to interact with the Amazon Web Services (AWS) API, allowing developers to manage AWS resources programmatically.
* **Boto3** provides an easy-to-use interface for accessing AWS services and can be used to automate common tasks, such as provisioning EC2 instances, managing S3 buckets, and monitoring CloudWatch metrics.
* For the given problem statement, Python and Boto3 are effective because they provide **a simple and efficient way to** monitor the CPU usage of an EC2 instance and generate suggestions for optimizing cloud costs.
* **Boto3** allows the organization to access AWS services programmatically, enabling them to collect and analyze data on CPU usage and generate insights that can inform cost optimization decisions.
* **Python's simplicity** and ease of use make it easy for developers to write, test, and deploy code quickly, allowing the organization to iterate and improve their cost optimization processes over time.
* **Overall, Python and Boto3** are effective for this problem statement because they provide a flexible, efficient, and scalable way to monitor and optimize cloud costs, enabling organizations to achieve their cost optimization goals and maximize the value of their cloud investments.
* **Streamlit** is a Python library that simplifies the creation of interactive web applications for data science and machine learning projects. It's effective for the given problem statement because it allows developers to create a user-friendly web application that presents the insights generated by the Boto3 and Python code.
* **Streamlit** provides caching and easy deployment to cloud platforms such as AWS, improving the performance of the web application and making it a convenient choice for organizations using AWS for their cloud infrastructure.
* For the given problem statement, **Streamlit** is effective because it provides a simple and user-friendly way to present the insights generated by the **Boto3 and Python code**. **Streamlit** allows the organization to create a web application that displays the average CPU usage and cost optimization suggestions in a clear and intuitive way, making **it easy for end-users** to understand and act upon the insights provided.

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Source Code Size (LOC):

**74**

Reference to project artefacts (document, ppt, source code) in the GitHub

**<https://github.com/Tan12345678/Technothon.git>**

Future Scope:

Future scope for the problem statement includes adding multiple instances of AWS (EC2) and improving the user interface by adding visuals and making it more interactive. Improving the accuracy of the results can also provide better cost optimization recommendations.