**Cost Effective Resource Provisioning Approach for Cloud Environments**

# Project Title

# Cost Effective Resource Provisioning Approach for Cloud Environments

# Objective

1. To monitor and analyze cost pattern on cloud accounts.
2. To analyze usage of the cloud services and give suggestions for future plans according to the user’s usage.
3. To give the suggestions about cost optimization and delivering cost containment.
4. To improve system performance and service quality.

# Problem Statement

# To implement a scheme i.e. “Cost Effective Resource Provisioning Approach for Cloud Environments” to reduce the infrastructure cost of cloud usage and evaluate the performance of workloads on EC2 instances.

# Motivation

The infrastructure resources of cloud computing can be widely distributed in different phases according to the needs of different users. In the course of a cloud, implementation users have the flexibility to choose the EC2 instance type that provides the appropriate mix of resources for the target application and workload. The charges are applied on the basis of resource utilization, but it is very high as most of them not used in an optimal way.

The main purpose of the system is to create private cloud (test bed) by using (Amazon Account) along with monitoring critical resources like RAM, CPU, memory, bandwidth, partition information, running process information and utilization and swap usages etc. Also, recommend the price reduction strategy.

# Introduction

The key characteristics of cloud computing are the ability to scale resources practically infinitely, the capability to pay only when a resource is actually needed, and the elimination of large upfront costs for users. In addition, low prices and ease of use support enterprises to use cloud computing to host their IT infrastructure. Cloud computing is offered by cloud providers for examples, Amazon Web Services (AWS), Google Cloud 2, and Microsoft Azure 3. Every cloud provider has different pricing strategies; however, for computing resources, they offer two categories of products: on-demand instances and reserved instances. On-demand instances are virtual machines created and paid for only when utilized. On the other hand, reserved instances are computational resources reserved and paid for a certain period, with an upfront fee. AWS provides a suite of Elastic Compute Cloud (EC2) instance types for different use cases. These instance types provide varying combinations of CPU, memory, storage and network capacity.

In the course of a cloud, implementation users have the flexibility to choose the EC2 instance type that provides the appropriate mix of resources for the target application and workload. As in cloud computing, there are two main actors involved, there are two sides of cost optimization: cost optimization performed by providers and cost optimization performed by users. Cost optimization performed by cloud providers mainly focuses on minimizing the cost to maintain a physical data center. The cost minimization is typically achieved by reducing electricity consumption. We develop a system that monitors VMs (EC2 Instances) on private clouds like Amazon or Google and provides solutions to reduce infrastructure cost from the customer's point of view. Here we present the model for an efficient assignment of workloads to servers in order to reduce cost as well as to maximize resource utilization

# Existing System

The current expectation of the cloud market is, customers of AWS will increase by up to 25% depending on how frequently customers start and stop new EC2 instances. But certainly, lots of big companies are investing billions of money in buying cloud infrastructure which is not used in an optimal/effective way. This system is very expensive and they services provided by these systems are less are not very imperative.

# Literature Survey

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| **Sr. No.** | **Paper Name** | **Publication + Year** | **Author** | **Concept** |
| **1** | Joint Optimization of Computational Cost and  Devices Energy for Task Offloading in  Multi-Tier Edge-Clouds | IEEE- 2019 | Elie El Haber , Tri Minh Nguyen , Chadi Assi. | The authors have made an attempt to propose a low-complexity  algorithm based on the successive convex approximation method  to solve and obtain a high-quality solution and also present an inflation-based algorithm for obtaining a polynomial-time and  efficient solution. |
| **2** | "Cost-Aware Cloud Proﬁling, Prediction, and Provisioning as a Service | ,PUBLISHED BY THE IEEE COMPUTER SOCIET, 2017. | Ryan Chard,Kyle Chard,Rich Wolski,Ravi Madduri,Bryan Ng and Kris Bubendorfer,IanFoster | The paper discussed Scalable Cost-Aware Cloud Infrastructure Management and Provisioning (SCRIMP) a service-based system that enables application developers and users to reliably outsource the task of provisioning cloud infrastructure. It shows that by understanding application requirements, predicting dynamic market conditions, and automatically provisioning infrastructure according to user-deﬁned policies and real-time conditions that our approaches can reduce costs by an order of magnitude when using commercial clouds while also improving execution performance and eﬃciency. |
| **3** | Transferable Knowledge for Low-cost Decision Making in Cloud Environments | 2020 IEEE | Faiza Samreen, Gordon S Blair, Yehia Elkhatib | This paper has introduced and approach and evaluate it through extensive experimentation involving three real world applications over two major public  cloud providers, namely Amazon and Google. Our evaluation shows that our novel two-mode TL scheme increases overall efficiency with a factor of 60% reduction in the time and cost of generating a new prediction model. |
| **4** | Monetary Cost Optimizations for Hosting  Workflow-as-a-Service in IaaS Clouds | 2016 IEEE | Amelie Chi Zhou, Bingsheng He and Cheng Liu | The attempt is done to develop a scheduling system called Dyna to minimize the expected monetary cost given the user-specified probabilistic deadline guarantees. Dyna includes an A⋆-based instance configuration method for performance dynamics, and a hybrid instance configuration refinement for using spot instances. |
| **5** | ENERGY-EFFICIENT AND COST-EFFECTIVE RESOURCE PROVISIONING FRAMEWORK FOR MAP REDUCE WORKLOADS USING DCC ALGORITHM | International Journal of Engineering Science Invention Research & Development; Vol. II Issue IX March 2016 | G.Anuprabavathi1, R.Rajmohan2, J.Nulyn Punitha3, D.Dinagaran4, S.G.Sandhya | The proposed Energy Efficient and Cost effective (EECE) resource management framework aim to minimize the infrastructure cost in the data center and energy conservation for cloud clusters. The system helps to reduce the cost for allocating the resources using the virtual clusters globally. The proposed cluster configuration is based on integer partitioning based approach which selects optimal nodes in a dynamic cloud environment to configure a cluster for running Map Reduce jobs. |

# Relevant References

1. Ryan Chard,Kyle Chard,Rich Wolski,Ravi Madduri,Bryan Ng and Kris Bubendorfer,IanFoster,"Cost-AwareCloudProﬁling,Prediction,andProvi- sioning as a Service", PUBLISHED BY THE IEEE COMPUTER SOCIET, 2017.
2. Xinhui Li, Ying Li, Tiancheng Liu, Jie Qiu, Fengchun Wang,"The Method and Tool of Cost Analysis for Cloud Computing",2009 IEEE International Conference on Cloud Computing.
3. G.Anuprabavathi1, R.Rajmohan2, J.Nulyn Punitha3, D.Dinagaran4, S.G.Sandhya ,“ENERGY-EFFICIENT AND COST-EFFECTIVE RESOURCE PROVISIONING FRAMEWORK FOR MAP REDUCE WORKLOADS USING DCC ALGORITHM”, International Journal of Engineering Science Invention Research & Development; Vol. II Issue IXMarch2016.
4. Amelie Chi Zhou, Bingsheng Heand Cheng Liu Nanyang Technological University "Monetary Cost Optimizations for Hosting Workﬂow-as-a-Service in IaaS Clouds", IEEE TRANSACTIONS ON CLOUD COMPUTING, VOL. X, NO. X, AUGUST 2014.
5. Faiza Samreen, Gordon S Blair, Yehia Elkhatib “Joint Optimization of Computational Cost and Devices Energy for Task Offloading in Multi-Tier Edge-Clouds” IEEE-2020
6. Elie El Haber, Student Member, IEEE, Tri Minh Nguyen , Student Member, IEEE, and Chadi Assi , Senior Member, IEEE “Joint Optimization of Computational Cost and Devices Energy for Task Offloading in Multi-Tier Edge-Clouds” IEEE TRANSACTIONS ON COMMUNICATIONS, VOL. 67, NO. 5, MAY 2019