# Cloud Cost Analyzer & Price Reduction Recommendation: Survey

**Mr. Shekhar Jalane[1] Ms. S. V. Bodake[2]**
[1]Student [2]Professor
[1,2]Department of Computer Engineering
[1,2]PVPIT, College of Engineering, Pune, Maharashtra, India

*Abstract*— Cloud computing is an emerging commercial infrastructure paradigm that promises to eliminate the need for maintaining expensive computing facilities by companies and institutes alike. In addition, low prices and ease of use encourage enterprises to utilize cloud computing to host their IT infrastructure. Currently, the choice of an instance type is usually based on a heuristic approach and does not guarantee that an optimal solution is selected with regards to performance and cost. Companies are investing billions of money in buying cloud infrastructure which is not used in an optimal/effective way. Hence we propose to develop a system that monitors VMs (EC2 Instances) on private clouds like Amazon or Google and provide solutions to reduce infrastructure cost from the customer's point of view. This paper gives a brief survey of different methods that provide solutions to reduce infrastructure cost and utilization of cloud resources.

***Key words:*** EC2 Instances, Cloud computing, AWS, Cost Optimization, Price Reduction Recommendation

## I. Introduction

Cloud computing is the delivery of computing services—servers, storage, databases, networking, software, analytics and more—over the Internet ("the cloud"). Companies offering these computing services are called cloud providers and typically charge for cloud computing services based on usage, similar to how you are billed for water or electricity at home. Here are 6 common reasons organizations are turning to cloud computing services i.e. Cost, Speed, Global Scale, Productivity, Performance and Reliability.

Most cloud computing services fall into three broad categories: infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (Saas). These are sometimes called the cloud computing stack, because they build on top of one another. Knowing what they are and how they are different makes it easier to accomplish your business goals.

Reduction of cost is considered as an important advantage of Cloud. Commercial providers such as Amazon and Microsoft, all offer environments for developing and deploying applications in the cloud. Every cloud provider has different pricing strategies for computing resources.

The ability to scale resources practically infinitely, the capability to pay only when a resource is actually needed is distinct cloud services from other services. In the 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. Researchers have addressed various problems: minimizing cost given the performance requirements [1].

But the available systems are not enough to give efficient resource utilization by suggesting memory cut down, CPU cut down, and storage cut down. In the course of a cloud, implementation they apply charges on the basis of resource utilization, but it is very high. 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. These systems are very expensive and the services provided by these systems are less and are not very imperative.

So there is need to develop a can evaluate the performance of workloads on EC2, reduce infrastructure cost from the customer's point of view in addition with optimum utilization of cloud resources and generate the secure channel for private key distribution to a receiver. The Monetary cost optimizations have been classic research topics in grid and cloud computing environments.

## II. Literature Review

Below are some techniques used by different researcher for cloud cost minimization and resource utilization. Subhas Chandra Misra et al. [1] gives a framework for helping companies to analyze several characteristics of their own business as well as pre-existing IT resources to identify their favorability in the migration to the Cloud Architecture. A general Return on Investment (ROI) model has also been developed for taking into consideration various intangible impacts of Cloud Computing, apart from the cost. The analysis presented herein provides a much broader perspective and insight into Cloud Computing to its prospective adopters.

Ryan Chard et al. [2] propose a 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.

Xinhui Li et al.[3] fills the gap in between cost calculation and analysis in Cloud environment using suits of metrics and formulas for the calculation of Cloud Total Cost of Ownership (TCO) and Utilization Cost, considering the elastic feature of Cloud infrastructure and widely adopted virtualization technology in Cloud. This provides a foundation for evaluating economic efficiency of Cloud and provides indications for cost optimization of Cloud. This calculation and analysis approach into a web tool which is used in the internal Cloud environment and demonstrate initially its analysis capability on the cost distribution and utilization imbalance factor.

Keith R et al. [4] present a system whose performance of a set of benchmarks designed to represent a typical HPC workload run on Amazon EC2. The system clearly shows a strong correlation between the percentage of

All rights reserved by *www.ijsrd.com* 

time an application spends communicating and its overall performance on EC2. Also, variability in EC2 performance is given.

Zhaoxia Yin et al.[5] gives a scheme for analyzing the performance of cloud computing services for scientific computing workloads. They quantify the presence in real scientific computing workloads of Many-Task Computing (MTC) users, that is, of users who employ loosely coupled applications comprising many tasks to achieve their scientific goals. These results indicate that the current clouds need an order of magnitude in performance improvement to be useful to the scientific community, and show which improvements should be considered first to address this discrepancy between offer and demand.

The spot instances in the Amazon Elastic Compute Cloud (EC2) offer low resource costs in exchange for reduced reliability; these instances can be revoked abruptly due to price and demand fluctuations. Sangho Yi, et al. study the mechanisms that how checkpointing and migration, can be used to minimize the cost and volatility of resource provisioning in [6]. By comparing different adaptive checkpointing schemes in terms of monetary costs and improvement of job completion times the proposed scheme gives predictive methods for spot prices. Trace-based simulations show that this schemes can reduce significantly both monetary costs and task completion times of computation on spot instance. An adaptive check pointing scheme [7] which provides adaptive taking point decision function when the cost of checkpointing changes over time is proposed by S. Yi. Their results apply under the assumption that failures occur according to the Poisson process.

Rich Wolsk et al. [8] gives a framework for Probabilistic Execution Duration for Amazon Spot Instances. DrAFTS have been developed to determine the extent to which it is possible to use on-line statistical forecasting to generate a probabilistic guarantee of instance durability when a cloud provider offers dynamically priced "Spot" resources. The experiments conducted on the Amazon Spottier over a long period of time shows that the given system provides a probabilistic guarantee of durability in the Amazon Spottier for large probabilities.

Hao Wu, et al. [9] presents a full EC2 spot instance simulator that uses real EC2 spot pricing history to emulate the spot instance life cycle and expected to charge behavior. The proposed simulator is used to evaluate the eight different bidding strategies in terms of job execution cost, job deadline miss rate and expected job execution length through large simulation runs.

The paper [10] gives an auto-scaling mechanism that completes all jobs within the deadlines in a cost-efficient way specified by the user. The author used two mechanisms like workload bursting and delayed instance acquisitions. The system helps the user to minimize costs for various applications models and workload patterns. The cost-saving range s from 9.8% to 40 .4 % compared to the other approaches. The system improves the instance utilization rate and can efficiently handle both high and low workload volume.

Zhe Wu et al.[11] proposed SPANStore, a key-value store that gives a unified view of storage services in geographically distributed data centers. The system combines three key principles to minimize the cost of an application provider. First, SPANStore spans are used for multiple cloud providers to increase the geographical density of data centers and to minimize cost by exploiting pricing discrepancies across providers. Second, by estimating application workload at the right granularity, SPANStore sensibly trades off greater geo-distributed replication required to satisfy latency goals with the higher storage and data propagation cost to satisfy fault tolerance and consistency requirements. Finally, SPANStore minimizes the use of computer resources to implement tasks, which are necessary to offer a global view of the storage services. The proposed scheme can lower costs by over 10x in the different application.

## III. CONCLUSION

Increasing popularity of utilizing cloud computing services is due to fundamental merits provided by cloud services such as flexibility and economic. With the flexibility IaaS services, users can acquire both computing and storage resources as needed and only need to pay for the resources when they use the resources. Hence, with cloud services, users not only save monetary cost but also save the time and efforts on building computing infrastructures. Because of these advantages, the increased number of companies and organizations has started migrating they're existing compute infrastructures to computer clouds.

Despite the fact that having a cloud infrastructure is usually cheaper than maintaining a physical data center, owners of large and complex IT infrastructure might incur large costs. Therefore, the problem of cost optimization in cloud computing is becoming increasingly important.

This paper gives the various techniques used by the researcher to reduce the problem of cost and resource utilization. There is need an efficient system that analyses the problem of cost optimization in cloud computing and can evaluate the performance of the resource monitoring on private cloud to reduce infrastructure cost from the customer's point of view.

## REFERENCES

[1] Amelie Chi Zhou, Bingsheng He and Cheng Liu Nanyang Technological University"Monetary Cost Optimizations for Hosting Workflow-as-a-Service in IaaS Clouds",IEEE Transactions on Cloud Computing 2015.
[2] Rintu Jose, Gincy Abraham A Separable Reversible Data Hiding in Encrypted Image with Improved Performance IEEE International Conference on Microelectronics, Communication and Renewable Energy (ICMiCR-2013), DOI:10.1109/AICERA-ICMiCR.2013.6576038, Pages:1-5
[3] ZhenxingQian, Xinpeng Zhang, GuoruiFeng Reversible Data Hiding in Encrypted Images Based on Progressive Recovery IEEE Signal Processing Letters, DOI:10.1109/LSP.2016.2585580, Volume: 23, Issue: 11, Nov. 2016, Pages:1672-1676
[4] Shuang Yi, Yicong Zhou An Improved Reversible Data Hiding In Encrypted Images Signal and Information Processing (ChinaSIP), 2015 IEEE China Summit and

All rights reserved by *www.ijsrd.com* 

International Conference on, DOI:10.1109/ChinaSIP.2015.7230396, Pages:225-229
[5] haoxia Yin, Andrew Abel, Xinpeng Zhan, Bin Luo Reversible Data Hiding In Encrypted Image Based On Block Histogram Shifting Acoustics, Speech and Signal Processing (ICASSP), 2016 IEEE International Conference on, DOI: 10.1109/ICASSP.2016.7472053, Pages:2129-2133.
[6] Sangho Yi, Member, IEEE, Artur Andrzejak, and Derrick Kondo, Member, IEE"Monetary Cost-Aware Checkpointing and Migration on Amazon Cloud Spot Instances"IEEE TRANSACTIONS ON SERVICES COMPUTING 2017.
[7] S. Yi, J. Heo, Y. Cho, and J. Hong, "Taking point decision mech- anism for page-level incremental checkpointing based on cos t analysis of process execution time," Journal of Information Science and Engineering , vol. 23, no. 5, pp. 1325–1337, September 2007.
[8] Rich Wolski, John Brevik, Ryan Chard, Kyle Chard,"Probabilistic Guarantees of Execution Duration for Amazon Spot Instances",SC17, Denver, CO, USA © 2017 ACM.
[9] Hao Wu,Steven Timm,Seo-Young Noh,"Experimental Study of Bidding Strategies for Scientific Workflows using AWS Spot Instances", CRADA-FRA 2015.
[10] Ming Mao,Marty Humphrey,"A uto - S caling to Minimize Cost and Meet Application Deadlines in Cloud Workflows",SC11, November 12 - 18, 2011, Sea ttle, Washington, USA.
[11] "SPANStore : Cost-Effective Geo-Replicated Storage Spanning Multiple Cloud Services"Zhe Wu , Michael Butkiewicz ⇤ , Dorian Perkins ⇤ , Ethan Katz-Bassett , and Harsha V. Madhyastha UC Riverside and USC,SOSP'13 , Nov. 3–6, 2013, Farmington, Pennsylvania, USA. ACM 978-1-4503-2388-8/13/11.
[12] Xinpeng Zhang, Jing Long, Zichi Wang, and Hang Cheng Lossless and Reversible Data Hiding in Encrypted Images with Public Key Cryptography IEEE Transactions on Circuits and Systems for Video Technology, DOI:10.1109/TCSVT.2015.2433194, Volume: 26, Issue: 9, Sept. 2016, Pages:1622-1631 Z. Ni,
[13] Y. Shi, N. Ansari, and S.Wei, Reversible data hiding, IEEE Trans.Circuits Syst. Video Technol., vol. 16, no. 3, pp. 354 362, Mar.2006.
[14] L. Luoet al., Reversible image watermarking using interpolation, IEEE Trans. Inf. Forensics Security, vol. 5, no. 1, pp. 187193, 2010 .
[15] X. Zhang, Reversible data hiding in encrypted images, IEEE Signal Process. Lett, vol. 18, no. 4, pp. 255258, Apr. 2011.
[16] W. Hong, T. Chen, and H.Wu, An improved reversible data hiding in encrypted images using side match, IEEE Signal Process. Lett, vol.19, no. 4, pp. 199202, Apr. 2012.
[17] Abhishek Chandak , Sourabh Zanwar , A kshay Shinde , Sourabh Kumbhar"Cloud Cost Analyzer and Optimizer",International Research Journal of Engineering and Technology (IRJET).