Elysium Journal of Engineering Research & Management

P-ISSN: 2347-4408
E-ISSN: 2347-4734

A SURVEY ON OPTIMIZED CLOUD INSTANCE MANAGEMENT STRATEGIES USING AMAZON EC2

Febin J[1], Suma Sira Jacob[2], Dr Kezi SelvaVijila[3]

[1]*PG Scholar, Department Of Computer Science, Christian College of Engineering and Technology, Oddanchatram, Dindigul.*
[2]*Assistant Professor, Department Of Computer Science, Christian College of Engineering and Technology, Oddanchatram, Dindigul.*
[3]*Principal, Christian College of Engineering and Technology, Oddanchatram, Dindigul.*

Abstract -- Cloud computing has become more and more popular now a day. This is due to the fact that it is highly compatible to provide an effective and efficient service to customers on demand. This is due to the benefits from cloud computing. The main characteristics of cloud computing are high performance, scalability, high computing power, cheap cost of services, accessibility and availability of cloud services. The cloud vendors are getting a steady growth in recent times. This growth rate is up to 50% in recent years. Some of the cloud computing providers are Amazon web services, rack space hosting, windows Azure. The aim behind this survey is that how effectively system can optimize cloud instance management so that both the cloud providers and clients gets benefits. For this purpose an Automated Cloud Instance Management System which controls all the services provided by cloud service provider. This system can automate the start and stop instances at the specified indicated times, if required at a click system can start or stop an instance at any time. The images of each instance called AMIs can be created at a single click. The custom reports can be generated based on the run time of each instances. The Run log of each instance can be stored to monitor the cloud service provider service. Billing calculation reports for each instance so that there is no loss per month for us. Each week running hour calculations reports makes our clients feel better about our company. Automated Cloud Instance Management System contains a Cost and utilization optimization mechanism on a set of running Amazon EC2 instances. Proposed system receives information on the currently used instance types and proposes a new set of instances for serving the same load that minimizes cost and maximizes utilization and performance efficiency.

Keywords: Public Clouds, Amazon web Services, Performance Evaluation, Efficiency, Cost Optimization

1. INTRODUCTION

Cloud computing is an internet based computing which provides shared resources and data clients. Cloud Computing provides on-demand access to shared pool of computing resources like networks, servers, storage, applications and service which can be made available with minimal management effort. Cloud Computing stores and processes the data of users and enterprises in third-party data centres. Due to the service-oriented architecture, high-capacity networks, autonomic and utility computing cloud computing is growing day by day.

Virtualization is the main idea of cloud computing. Cloud computing separates physical computing device different virtual devices through virtualization. These virtual devices can separately be used and managed to perform computing tasks. Virtualization helps to speed up IT operations reduce the cost of resources. Virtualization is an inevitable concept in cloud computing. This is by increasing infrastructure utilization. Cloud computing provides services to clients based on architecture called Service Oriented Architecture. The SOA architecture helps the user to break the affected issues into services. These issues be integrated to provide a solution. Cloud computing provides all of its resources as services. Cloud computing make use of recognized standards and practices gained in the Service Oriented Architecture which made the cloud services global and easy access.

The aim behind this survey is that how effectively system can optimize cloud instance management so that both the cloud providers and clients get benefits. The benefit of clients will be in service and cost level and the main benefit of service providers will be in saving wastage of resources. For this system called Automated Cloud Instance Management System. This system can automate the start and stop instances at the specified indicated times, if required at a click system can start or stop an instance at any time. The images of each instance called AMIs can be created at a single click. The custom reports can be generated based on the run time of each instances. The Run log of each instance can be stored to monitor the cloud service provider service. Billing calculation reports for each instance is performed so that there is no loss per month for the customer. Each week running hour calculations reports makes our clients feel better about our company. Automated Cloud Instance Management System contains a Cost and utilization optimization mechanism for set of running Amazon EC2 instances. With presently used instance information system analyses and proposes a new set of instances for serving the same load that minimizes cost and maximizes utilization and performance efficiency.

Amazon EC2

Elysium Journal of Engineering Research & Management

P-ISSN: 2347-4408
E-ISSN: 2347-4734

Amazon EC2 is an Infrastructure-as-a-Service (IaaS) that widely opens Amazon's large computing infrastructure to its users. The Amazon EC2 service is very elastic and flexible to users. This means Amazon EC2 extend or shrink its infrastructure by launching or terminating new virtual machines or so called instances.

Table 1: List of cloud service providers. VM – virtual machine, S - storage.

Service type	Examples
VM,S	Amazon (EC2 and S3), Mosso (+CloudFS)
VM	GoGrid, Joyent, infrastructures based on Condor Glide-in/Globus VWS/Eucalyptus
S	Nirvanix, Akamai, Mozy
non-IaaS	3Tera, Google AppEngine, Sun Network

Amazon Elastic Computing Cloud (called Amazon EC2) is one of the most important web services, providing resizable compute capability as and when required. The basic unit of Amazon EC2 is "instance". Instance represents a virtual resource with specific storage, network and computational characteristics. Each instance will be having an operating system and will be located physically in one of the Amazon's data centres across the world.

Table 2: The Amazon EC2 instance types. The ECU is the CPU performance unit defined by Amazon

Name	ECUs (Cores)	RAM [GB]	Archi [bit]	I/O Perf.	Disk [GB]	Cost [$/h]
m1.small	1 (1)	1.7	32	Med	160	0.1
m1.large	4 (2)	7.5	64	High	850	0.4
m1.xlarge	8 (4)	15.0	64	High	1690	0.8
c1.medium	5 (2)	1.7	32	Med	350	0.2
c1.xlarge	20 (8)	7.0	64	High	1690	0.8

The user can use any of the five instance types currently available on over, the characteristics of which are summarized in Table 2.

Table 3 Amazon EC2 instance types in numbers

14 main types of machines	'm1.small', 'm1.medium', 'm1.large',
	'm1.xlarge', 't1.micro', 'm2.xlarge',
	'm2.2xlarge', 'm2.4xlarge', 'c1.medium',
	'c1.xlarge', 'cc1.4xlarge', 'cc2.8xlarge',
	'cg1.4xlarge', 'hi1.4xlarge'
7 different regions – datacenters	US East (Northern Virginia), US West
	(Oregon), US West (Northern California),
	EU (Ireland), Asia Pacific (Singapore),
	Asia Pacific (Tokyo), South America (Sao
	Paulo)
2 Operating Systems	Windows
	Linux
3 RI utilization types	low, medium, high
2 RI year terms	1 or three years

As Amazon EC2 does not provide job execution or resource management services, a cloud resource management system can act as middleware between user and Amazon EC2. This can reduce resource management complexity, avoids resource wastage and optimizes cost of resource utilization. Amazon EC2 guarantees a service level agreement in which the client is compensated if the resource (instance) is not available for acquisition at least 99.95% of the time, 365 days/year.

2. RELATED WORK

Clouds bring a completely new environment and introduce new requirements for IT monitoring tools, involving a very large number of heterogeneous physical and virtual reso-urces and producing a huge amount of raw monitoring information. A number of works attempt to aggregate (or summarize) the raw monitoring data.

In paper [6] authors evaluated the performance of the Amazon Elastic Computing Cloud(EC2). Authors compared clouds with other scientific computing alternatives. This is using trace-based simulation and the results of our performance evaluation. Long-term tracing of cost models of clouds and performance characteristics and with those of other platforms accessible to scientists were compared by author. Instead of this evaluation of performance, system make use of amazon trace log to check the performance of instances. In peak time of product usage system manage to switch the instance to higher configuration.

In paper [7] is a comparative study of individual processing tasks to available cloud instances. This is based on the availability and predetermined time-to-completion (TTC) constraints. Accurate resource prediction method by make use of AMIDS algorithm. This study made efficient

P-ISSN: 2347-4408
E-ISSN: 2347-4734

control of the cloud instances servicing workloads, in order to optimize between completing workloads in a timely fashion and reducing resource utilization costs. This paper is based on service rate allocation mechanism. Paper analysis is based on TTC constraints and proportional fairness, Kalman-filter focus on the resource prediction algorithm. Additive increase multiplicative decrease (AIMD) algor-ithm provides around 27% reduction in Amazon EC2 spot instance cost when comparing with methods based on reactive resource prediction and 38% to 60% reduction of the billing cost. System inherit the idea of cost optimization by effectively managing the cloud resources using Cloud Instance Management System.

In paper [12] the authors identify primitive algorithmic operations. This is a part of a cloud optimization and analysis. Resource resizing, resource profiling, performance spike detection and prediction are some methods through which the authors investigate ways the collected information can be processed. They implemented an open source tool, SuMO which contains the necessary functionalities for collecting monitoring data from Amazon Web Services (AWS), analysing them and providing resource optimization suggestions. SuMo makes easy for anyone to analyse AWS instances behaviour, incorporating a set of basic modules that provide profiling and spike detection functionality.

Instead of SuMO, integrates cloud Instance Management Software which make available the cloud web services in a efficient way so that customer can reduce the cost of usage of cloud service. The system can automate the start and stop instances at the specified indicated times, if required at a click system can start or stop instance at any time. So no resource will run unnecessarily. It saves cloud resource and saves cost.

The paper [14] focus on providing an overall perspective on cloud evaluation criteria and thus highlight it with help of analysis and evaluation of cloud performance in various scenarios like evaluation, security and recovery. Evaluation is based on criteria and characteristics of cloud instances. Some of the performance evaluation of various cloud instances are average response time per unit time, Network capacity per unit time, Average waiting time per unit time, the number of requested executed per unit time. This analysis can be made by make use of Amazon inspector in our system. Amazon Inspector monitors the behaviour of the EC2 instance on which it is installed, including network, file system, and process activity, and collects a wide set of behaviour and configuration data. The Amazon inspector secure channels, network traffic among running processes, and details of communication with AWS services.

The paper [15] investigates the benefits that organisations can reap by using “Cloud Computing” providers to augment the computing capacity of their local infrastructure. An organisation that operates a cluster managed by virtual machine technology is evaluated using the cost of seven scheduling strategies. This enables the authors to seeks to utilise resources from a remote Infrastructure as a Service (IaaS) provider. This is to reduce the response time of its user request. System inherit the idea of cost- benefit by effectively managing the cloud resources using Cloud Instance Management System.

The paper [16] considers that key factor in achieving a better performance in cloud computing scientific workflows in distributed environments is efficient data management. In this paper authors investigate some of the ways in which data can be managed for workflows in the cloud. They ran experiments using typical workflow applications on Amazon’s EC2. Authors discusses the various storage and file systems used, describe the issues and problems encountered deploying them on EC2, and analyse the resulting performance and cost of the workflows. Performance evaluation and cost optimization are the key factors that system inherit through cloud instance management system.

The paper [17] focuses on the area of Green computing. This concept is becoming increasingly important in a world with very limited energy resources and an rising demand for more computational power. Using minimal virtual machine design, live migration, variable resource management, power-aware scheduling techniques and a minimal virtual machine design, overall system efficiency will be improved dramatically in a data centre based cloud service with minimal performance overhead. The paper focuses on a new framework is presented that provides efficient utilization of resources so as to achieve green enhancements within a scalable Cloud computing architecture. In cloud instance management system energy resources can be limited and also manage the cloud instance run time and thus save the cost

The main concepts of the paper [6] is to make it easy for scientific and educational projects to check with EC2-style cloud computing, and better understanding of the potential and challenges that cloud computing faces and what can be done to overcome them. Cost utilization evaluation of cloud instances are handled in this work. System inherit the concept of cloud utilization evaluation through the cloud Instance Management System, where system integrate detailed billing and cost estimation of each instances through amazon ec2 APIs

The paper [18] deals with concept that the Cloud computing infrastructures enable companies to cut costs by outsourcing computations on-demand. Clients of cloud computing services currently have no methods to verify the con-fidentiality and integrity of their data and computation. To address this problem authors propose the design of a tru-sted cloud computing platform (TCCP). A closed box execution strategy is guaranteed which TCCP enables Infrastructure as a Service (IaaS) providers such as Amazon EC2. This strategy guarantees confidential execution of guest virtual machines.

P-ISSN: 2347-4408
E-ISSN: 2347-4734

The paper [19] is different from typical scientific computing workloads. In this work for scientific computing workloads authors analyse the performance of cloud computing services. To achieve scientific goals users employ loosely coupled applications comprising many tasks. Then, they perform a scientific evaluation of the performance of four commercial cloud computing services including Amazon EC2, which is currently the largest commercial cloud**.** Comparison of cloud resources through trace-based simulation, MTC-based scientific computing workloads are some of other methods.

3. CONCLUSION

Survey on cloud instance management strategies using amazon ec2 clearly defined that both cost and resources can be effectively saved by efficiently managing the cloud instances. The different strategies applied on various work makes it clear that the available cloud web services can be managed in a efficient way so that customer can reduce the cost of usage of cloud service. The Ease of usage of required cloud service is another motive which the previous work suggests as system work for so that the customer has no burden in utilizing various services. Instance management system creates customized cloud service reports, which make the cloud service usage in an effective manner. The system triggers automatically backups and snapshots of your EC2 instances, RDS databases and deletes old backups. System was built from the ground-up for high-availability and resiliency. Through these systems actions will run on-time, that's the guarantee. Different Work mentioned below focuses on easy to use interface, managing cloud actions is simple and effective. Survey made it possible to have self-control over all the actions performing in cloud services which are very important when security issues are considered.

REFERENCES

[1] Amazon Web Services – AWS: aws.amazon.com

[2]Buyya, R., et al.: Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. Futur.Gener.Comput. Syst. 25, 599–616 (2009)

[3] Ward, J.S., Barker, A.: Semantic Based Data Collection for Large Scale Cloud Systems. DIDC, pp. 13–22 (2012)

[4] Kung, H.T., Lin, C.-K., Vlah, D.: CloudSense: Continuous fine-grain cloud monitoring with compressive sensing. USENIX HotCloud (2011)

[5]Shao, J., Wei, H., Wang, Q., Mei, H.: A Runtime Model Based Monitoring Approach for Cloud. IEEE CLOUD, pp. 313–320 (2010)

[6]Simon Ostermann ,AlexandruIosup , Nezih Yigitbasi ,Radu Prodan , Thomas Fahringer , and Dick Epema : An Early Performance Analysis of Cloud Computing Services for Scientific Computing

[7]Joseph Doyle, Vasileios Giotsas, Mohammad Ashraful Anam and Yiannis Andreopoulos: Cloud Instance Management and Resource Prediction For Computation-as-a-Service Platforms

[8]Amazon Case Studies: aws.amazon.com/solutions/case-studies/

[9]Amazon CloudWatch: aws.amazon.com/cloudwatch

[10]Amazon Elastic Compute Cloud: aws.amazon.com/ec2

[11]M. Frˆıncu: Scheduling highly available applications on cloud environments. Futur.Gener.Comput. Syst. 32, 138–153 (2014)

[12] P. Kokkinos , T. A. Varvarigou , A. Kretsis , P. Soumplis , E. A. Varvarigos : SuMO: Analysis and Optimization of Amazon EC2 Instances

[13]Ferrer, A.J., et al.: OPTIMIS: A holistic approach to cloud service provisioning. Futur.Gener.Comput. Syst. 28(1), 66–77 (2012)

[14] Niloofar Khanghahi and Reza Ravanmehr :Cloud Computing Performance Evaluation : Issues And Challenges

[15] Marcos Dias de Assunção · Alexandre di Costanzo Rajkumar Buyya :A cost-benefit analysis of using cloud computing to extend the capacity of clusters

[16] Gideon Juve, EwaDeelman, Karan Vahi, GaurangMehta :Data Sharing Options for Scientific Workflows on Amazon EC2

[17] Andrew J. Younge, Gregor von Laszewski, Lizhe Wang, Sonia Lopez-Alarcon, WarrenCarithers: Early Experiences in Cloud Computing for Scientific Applications

[18] Nuno Santos, Krishna P. Gummadi ,Rodrigo Rodrigues: Towards Trusted Cloud Computing

[19] AlexandruIosup, Member, IEEE, Simon Ostermann, Nezih Yigitbasi, Member, IEEE, Radu Prodan, Member, IEEE, Thomas Fahringer, Member, IEEE, and Dick Epema, Member, IEEE Performance Analysis of Cloud Computing Services for Many-Tasks Scientific Computing.