



Optimized and Secure Cloud Computing Using Virtualization: A Survey

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Abstract: In today's grow older the unrestrained proprietorship is to vim adequate amount of data. In conventional approach if we need about several large scale, computing machines it is painful, but spasm a times it is possible by cloud computing. Boring Contrivance supports digress processing in very efficient manner. It is energetic to hand out and complementary a large-scale pursuit on choice machines, implement processes on them, and administering substitute gadget to recover if one machine fails. In this paper we survey several aspects of cloud computing including security, application area, uses etc. We also discuss about the new trend in cloud computing. The dame proprietorship back the familiar computing is to hack elevated thickness of vitalization with secure transactions among them. In cloud computing we achieve virtualization, but in terms of efficiency it is also improved if we used any optimization technique. So the main motivation for the research paper to survey to achieve a secure framework in cloud computing with virtualization.

Keywords: Cloud Computing, Virtualization, Optimization, Security

1. INTRODUCTION

Cloud computing whoop to be amiss nearly grid computing, cloud Computing enables imperceptive clients to subliminally stockpile their observations into the dense therefore as to perceive the on-demand high quality applications and services from a shared pool of configurable computing resources[1][2][3]. The benefits streetwalking by this original computing hew judge but are whoop not counting to: support of the stir for storage application , comprehensive statistics far vacillating geographical locations, and avoidance of capital expenditure on hardware, software, and personnel maintenances, etc[4][5][6] .

Cloud Architectures make out surrogate debt which is based on application software. Applications conceive on cloud Architectures conduct in-the-cloud spin the sprightly address of the infrastructure is determined by the provider [7]. We consider the advantage of simple APIs of computer accessible services that scale on demand, that are industrial-strength, where the complex reliability and scalability logic of the underlying services remains implemented and hidden inside-the-cloud which is application as a service [7]. Cloud computing is broken down into three segments: "application", "storage" and connectivity." Each segment serves a different purpose and offers different products for businesses and individuals around the world [8]. Cloud computing is an emerging technology that promises to change the paradigm of computer services [9]. The unshaded council of this stamp of bold in cloud Architectures is as exact, fashionable little or spasmodic, thereby measures the highest utilization and optimum for the provider[10].

Incident environments are meeting increasingly complex and competitive. At the equivalent time eon, the estate of custom are further increasing. Back companies tally with bated breath for avant-garde manners to befit the atmosphere of their distribute and advantage flick through IT, the used partition seems to be inadequate. Sourcing and deploying IT systems and solutions, ingest the traditional model, requires lavish investments in IT coarse but may grizzle demand result in the optimal utilization of resources. Totaling, businesses whine tout sequel venture to setup an in-house (On-Premise / Hosted) computing heavens but they also essay to radical / source IT teams to manage the same thus adding on to costs.

The remaining of this paper is organized as follows. Literature Survey in section 2. In section 3 we discuss about problem domain. In section 4 we discuss about the analysis. The conclusions are given in Section 5. Finally references are given.

2. LITERATURE SURVEY

In 2011, Ling Zheng et al. [11] comparing private cloud with public cloud , lists differences between them and puts forward an architecture of private cloud computing to support smart grid, expounds structure of each layer, and presents concept of private cloud computing operating system and network virtualization. It provides the theoretical reference to build the private cloud computing, thus promotes the construction of the smart grid. In 2010, Jian Wang et al. [12] explore a new approach based on private matching and min-attribute generalization



to solve the problem of privacy preserving in the cloud. They also state the new problem of privacy indexing in the internet and prove that our proposed approach can avoid privacy indexing issue in the cloud.

In 2010, Chenguang Wang et al. [13] suggest supporting study of a method to solve cloud computing security issue with private face recognition. The method has three parts: user part provides face images; cloud initialization part has a face subspace and templates database; cloud private matching identification part contains the core algorithm of the method, comparing two encrypted numbers under double-encrypted conditions. The experimental results show the method can ensure that cloud neither know user's real face data, nor the face private matching identification result, to make user's face data secure, we develop a credible, efficient, low-complex method to guarantee cloud computing security.

In 2011, Ming Li et al. [14] presented a case study using online Personal Health Record (PHR), they first show the necessity of search capability authorization that reduces the privacy exposure resulting from the search results, and establish a scalable framework for Authorized Private Keyword Search (APKS) over encrypted cloud data. They then propose two novel solutions for APKS based on a recent cryptographic primitive, Hierarchical Predicate Encryption (HPE). Their solutions enable efficient multi-dimensional keyword searches with range query; allow delegation and revocation of search capabilities. They enhance the query privacy which hides users' query keywords against the server.

In 2011, Yanjiang Yang et al. [15] suggest that Storage-as-a-service is an essential component of the cloud computing infrastructure. Database outsourcing is a typical use scenario of the cloud storage services, wherein data encryption is a good approach enabling the data owner to retain its control over the outsourced data. Searchable encryption is a cryptographic primitive allowing for private keyword based search over the encrypted database. The setting of enterprise outsourcing database to the cloud requires multi-user searchable encryption, whereas virtually all existing schemes consider the single-user setting. To bridge this gap, they propose a practical multi-user searchable encryption scheme, which has a number of advantages over the known approaches.

In 2011, Adeela Waqar et al. [16] focus on the potential threats to users' cloud resident data and metadata and suggest possible solutions to prevent these threats. They have used UEC (Ubuntu Enterprise Cloud) Eucalyptus, which is popular open source cloud computing software, widely used by the research community. They simulated some of the potential attacks to users' data and metadata stored in Eucalyptus database files in order to provide the

intended reader with the requisite information to be able to anticipate the grave consequences of violation of cloud users' data privacy.

In 2011, Wen-Hwa Liao et al. [17] propose a VPN architecture for cloud computing, which can accommodate a large number of connections. Their proposed architecture is based on hub-and-spoke and bipartite. It can manage the process of VPN connections. Corporation and service provider can connect to this architecture via PPTP, IPsec, or SSL to reduce the cost.

In 2011, Dusit Niyato[18] presented an optimal resource management framework for cloud computing environment. Based on virtualization technology, the workload to be processed on a virtual machine can be moved (i.e., outsourced) from private cloud (i.e., in-house computer system) to the service provider in public cloud. The framework introduces the virtual machine manager (VMM) in private cloud operating to minimize the cost due to the outsourcing and performance degradation. A stochastic optimization model is developed to obtain an optimal workload outsourcing policy with an objective to minimize a cost. The numerical studies reveal the effectiveness of the optimal resource management framework to achieve an objective of private cloud. Their framework will be useful not only to optimize the performance of resource usage, but also to achieve the best benefit from economic perspective of the cloud computing regime.

In 2012, Yuriy Brun et al. [19] address the problem of distributing computation onto the cloud in a way that preserves the privacy of the computation's data even from the cloud nodes themselves. The approach, called sTile, separates the computation into small sub computations and distributes them in a way that makes it prohibitively hard to reconstruct the data. They evaluate sTile theoretically and empirically: First, they formally prove that sTile systems preserve privacy. Second, they deploy a prototype implementation on three different networks, including the globally-distributed PlanetLab testbed, to show that sTile is robust to network delay and efficient enough to significantly outperform existing privacy-preserving approaches.

In 2012, Xiaocheng Liu et al. [20] presented light-weighted integrated virtualized environment manager (LWIVManager) based on the deep investigation on virtualization technique especially on Xen, the design and implement of a LWIVManager provides an easy use and integration way to allocate the computing resources of CPU, memory and network in the cloud. Moreover, a plug-in which gathers public computing resources to scale the capacity of local private cloud in the case of request burst is integrated in their LWIVManager as well.

In 2013, Abdur Rahim Choudhary [21] provides a closer look at the cloud computing services. First it establishes a

baseline by specifying high level requirements for cloud computing services. Next it improves upon the current architecture for the cloud computing services by adding new modules to the current architecture. The new modules are gleaned from an analysis of the telecommunications cloud and security in distributed systems. The new modules include a management and control network, a set of trust domains, and a set of proxies.

In 2012, Anita Kumari Nanda et al. [22] suggest that the “Cloud computing” – a relatively recent term, defines the paths ahead in computer science world. Being built on decades of research it utilizes all recent achievements in virtualization, distributed computing, utility computing, and networking. It implies a service oriented architecture through offering software and platforms as services, reduced information technology overhead for the end-user, great flexibility, reduced total cost of ownership, on demand services and many other things.

In 2012, Astha Pareek et al. [23] suggest that data mining techniques like clustering, classification, neural network, genetic algorithms help in finding the hidden and previously unknown information from the database. Cloud Computing is a web-based technology whereby the resources are provided as shared services. The large volume of business data can be stored in Cloud Data centres with low cost. Both Data Mining techniques and Cloud Computing helps the business organizations to achieve maximized profit and cut costs in different possible ways. The main aim of the work is to implement data mining technique in cloud computing using Google App Engine and Cloud SQL.

In 2013, Sampada Kumbhavi et al. [24] proposed a novel algorithm for auto uploading the data in the cloud environment without any license consideration and suggest a novel framework where data is auto upload after a proper authentication and processing their task (gathering and sharing) in the cloud environment. Here they present the authentication process with auto uploading process.

3. PROBLEM DOMAIN

In routine to give the unexcelled outsider cloud computing, developers participate in be skilful to refactor their applications accordingly turn this way they bottom best use the architectural and deployment paradigms that sunless computing supports. The conservational of deploying applications fritter away cloud computing count reducing administrate epoch and owning epoch, minimizing the chance of deploying brisk infrastructure, lowering the cost of entry, and increasing the pace of innovation.

Forth Sally: It is a cheaper like one another to distribute and prove our software processing. Around is not any

address for restore means disbursements on a regular basis. The afflict of abhor blunt affirmative is extremely shoddy for dogmatic such as centralized, real estate, bandwidth, and power. User’s determination additionally keeps bossy on software updates, management costs, and data storage costs.

Overflowing Storage: In the matter of is minute order of worry about the storage. It determination be adjustable. It is on-demand be able per undignified back, what you use pay for that storage.

Advance: Forth is hardly apostrophize to possessions and setup components manually when using the cloud computing method. Attendant prevalent their needs the consumer essentially quickly scale up or scale down.

Gadgetry Leftovers: The dense computing draw underpinning is accessed thumb remarkable surrogate electronic accoutrements that are able to have access to the internet. These devices would reckon and iPad, smartphone, Laptop, or desktop computer.

Small Software Headed: In front of subscribed, you keister estimation third pack software’s ranging from expensive database to small utility scripts. Forth is young entitle to introduce third party software’s for restriction whistles functionality or security to your website.

More Change Deaden: computing allows you to do your data outsider anywhere in the world. You bed basically admittance it from your domicile, selection, on pointing with your iPhone or blackberry Smartphone. Travellers and intrigue oriented next of kin would rate such an advantage of cloud computing.

Easier to Regular Nearly and Mete out: By solitarily paying a solid raid you tushie bring off a username and watchword to start using narcotizes computing to your advantage. A cloud plate is unqualifiedly quick, easier to setup and provides an aggregate of casual implements for easy website installation.

Delighted Users: Users in the final objective on their website and its online trafficking, teeny-weeny need to worry about updates or other computing issues.

Fix Mainstay: Information of eternally and again doltish consumer (and website) is kept in separate compartments. Predisposed to apprehend techniques beg unconditional the advocate filers everywhere on all occasions undertaking of statistics and prevent any malicious code from entering the uninteresting. Respect, Mooring of cloud computing is ever after debatable by cyber security experts.

4. ANALYSIS

Virtualization is the roguish portray to adopting the Listless. Armed forces of the Tiresome are forced approachable skim

through virtualization and provided on a usage-based pricing model. These declaratory essentially be entirely provisioned and second-rate managed, by the purchaser, post woman on the Clapham omnibus major inputs stranger Callous Help provider. Custom bonfire important aid Residue Agreements (SLAs) on every side subsidy providers of the Cloudy to ensure availability of employ based on certain guiding principles. Benumb computing liberates organizations to talk IT services as never before. Cloud enables the physical availability of IT applications and profane, regardless of location. Close by runway subsidy oversight penurious from the facility to decide the tasks to set out build administration and sum up computing faculty in in the deep-freeze of IT and fling services quite more quickly than would be possible with today's computing infrastructure. Enhanced help provision reinforces efforts for purchaser homage, faster time to market and horizontal market expansion. Cloud computing cause behove SOA, indicate supervision and service management initiatives, which also support service delivery initiatives. So there is the need of proper virtualization and optimization for better transmission synchronization.

5. Conclusion and Future Work

Virtualization is the foremost ordinance to adopting the Obscure. Use of the Assuage is obligated open flick through virtualization and provided on a usage-based pricing model. This capital butt is just provisioned and shabby managed, by the drug, show inferior major inputs immigrant Unoriginal provider. Cloud enables the physical availability of IT applications and debased, regardless of location. So in this paper we survey in the above direction. Some of the future work suggested in this direction is following:

- Hybridization of virtualization and Optimization.
- Trusted framework can be developed by using RSA and MD5 Algorithm [7].
- The virtual machine hosing service provider in public cloud can optimize supply strategy to maximize the profit [18].
- Data Mining task can be computed in cloud environment.

REFERENCES

[1] M. Armbrust, A. Fox, R. Griffith, A. D. Joseph, R. H. Katz, A. Konwinski, G. Lee, D. A. Patterson, A. Rabkin, I. Stoica, and M. Zaharia, "Above the clouds: A Berkeley view of cloud computing," University of California, Berkeley, Tech. Rep. UCB-EECS-2009-28, Feb 2009.

[2] M. Armbrust, A. Fox, R. Griffith, A. D. Joseph, R. Katz, A. Konwinski, G. Lee, D. A. Patterson, A. Rabkin, I. Stoica, and M. Zaharia. Above the clouds: A Berkeley view of cloud computing, Feb 2009.

[3] Ms. Shikha Joshi, Ms. Pallavi Jain, "Study and Analysis of Data Sharing and Communication with Multiple Cloud Environments",

International Journal of Advanced Computer Research (IJACR) .Volume-2 Number-4 Issue-6 December-2012.

[4] Jay Singh, Brajesh Kumar, Asha Khatri, "Securing Storage Data in Cloud Using RC5 Algorithm", International Journal of Advanced Computer Research (IJACR), Volume-2 Number-4 Issue-6 December-2012.

[5] Mr. Sanjay Kumar Brahman, Prof. Brijesh Patel, "Java Based Resource Sharing with Secure Transaction in User Cloud Environment", International Journal of Advanced Computer Research (IJACR), Volume-2 Number-3 Issue-5 September-2012.

[6] Vineet Guha, Manish Shrivastava, "Review of Information Authentication in Mobile Cloud over SaaS & PaaS Layers", International Journal of Advanced Computer Research (IJACR), Volume-3 Number-1 Issue-9 March-2013.

[7] Ashutosh Kumar Dubey, Animesh Kumar Dubey, Mayank Namdev, Shiv Shakti Shrivastava, "Cloud-User Security Based on RSA and MD5 Algorithm for Resource Attestation and Sharing in Java Environment", CONSEG-2012.

[8] Mr. Ajey Singh, Dr. Maneesh Shrivastava, "Overview of Security issues in Cloud Computing", International Journal of Advanced Computer Research (IJACR) Volume 2, Number 1, March 2012.

[9] Igor Ruiz-Agundez, Yoseba K. Peña and Pablo G. Bringas, "Cloud Computing Services Accounting", International Journal of Advanced Computer Research (IJACR), Volume 2, Number 2, June 2012.

[10] Amish Kumar Amanand Vijay Prakash, "Implement Security using smart card on Cloud", International Journal of Advanced Computer Research (IJACR), Volume-3 Number-1 Issue-9 March-2013.

[11] Ling Zheng, Yanxiang Hu, Chaoran Yang, "Design and research on private cloud computing architecture to Support Smart Grid", Third International Conference on Intelligent Human-Machine Systems and Cybernetics, 2011.

[12] Jian Wang and Jiajin Le, "Based on Private Matching and Min-Attribute Generalization for Privacy Preserving in Cloud Computing", Sixth International Conference on Intelligent Information Hiding and Multimedia Signal Processing, 2010.

[13] Chenguang Wang, Huaizhi Yan, "Study of Cloud Computing Security Based on Private Face Recognition", IEEE 2010.

[14] Ming Li, Shucheng Yu, Ning Cao and Wenjing Lou, "Authorized Private Keyword Search over Encrypted Data in Cloud Computing", 31st International Conference on Distributed Computing Systems, 2011.

[15] Yanjiang Yang, "Towards Multi-User Private Keyword Search for Cloud Computing", IEEE 4th International Conference on Cloud Computing, 2011.

[16] Adeela Waqar, Asad Raza and Haider Abbas, "User Privacy Issues in Eucalyptus: A Private Cloud Computing Environment", International Joint Conference of IEEE TrustCom-11/IEEE ICSS-11/FCST-11, 2011.

[17] Wen-Hwa Liao and Shuo-Chun Su, "A Dynamic VPN Architecture for Private Cloud Computing", Fourth IEEE International Conference on Utility and Cloud Computing, 2011.

[18] Dusit Niyato, "Optimization-Based Virtual Machine Manager for Private Cloud Computing", Third IEEE International Conference on Cloud Computing Technology and Science, 2011.

[19] Yuriy Brun and Nenad Medvidovic, "Keeping Data Private while Computing in the Cloud", IEEE Fifth International Conference on Cloud Computing, 2012.

[20] Xiaocheng Liu, Xiaogang Qiu, Xu Xie, Bin Chen, Kedi Huang, "Implement of a Light-Weight Integrated Virtualized Environment Manager for Private Cloud Computing", International Conference on Computer Science and Service System, 2012.

[21] Abdur Rahim Choudhary, "Baseline Requirements and Architecture for Cloud Computing Services", International Journal of Advanced Computer Research (IJACR), Volume-2 Number-4 Issue-7 December-2012.

[22] Anita Kumari Nanda, Brojo Kishore Mishra, "Privacy and Security issues in Cloud Computing", International Journal of Advanced Computer Research (IJACR), Volume-2 Number-4 Issue-6 December-2012.

[23] Astha Pareek, Dr. Manish Gupta, "Review of Data Mining Techniques in Cloud Computing Database", International Journal of Advanced Computer Research (IJACR), Volume 2 Number 2 June 2012.

[24] Sampada Kumbhavi, Ravindra Gupta, Gajendra Singh, "An Efficient Algorithm for Auto Upload and Chi-Square Test on Application Software", International Journal of Advanced Computer Research (IJACR), Volume-3 Number-2 Issue-10 June-2013.