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A Review Paper on Cloud Computing

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Abstract— Cloud computing has recently emerged as a new paradigm for hosting and delivering services over the Internet. Cloud computing is attractive to business owners as it eliminates the requirement for users to plan ahead for provisioning, and allows enterprises to start from the small and increase resources only when there is a rise in service demand. However, despite the fact that cloud computing offers huge opportunities to the IT industry, the development of cloud computing technology is currently at its infancy, with many issues still to be addressed. In this paper, we present a survey of cloud computing, highlighting its key concepts, architectural principles, and state of the art implementation as well as research challenges. The aim of this paper is to provide a better understanding of the design challenges of cloud computing and identify important research directions in this increasingly important area.

I. INTRODUCTION

Cloud computing has become a new age technology that has got huge potentials in enterprises and markets. Clouds can make it possible to access applications and associated data from anywhere. Companies are able to rent resources from cloud for storage and other computational purposes so that their infrastructure cost can be reduced significantly.

II. RELATED WORK

Paper Related Virtual Machine Scheduling Nattakarn Phaphoom et al. [1] provide a comprehensive review on the building blocks of cloud computing and relevant technological aspects. It focuses on four key areas including architecture, virtualization, data management, and security issues. Gaurav Dhiman et al. [2] present v Green, a multi-tiered software system for energy efficient computing in virtualized environments. It comprises of novel hierarchical metrics that capture power and performance characteristics of virtual and physical machines, and policies, which use it for energy efficient virtual machine scheduling across the whole deployment Ramesh et al. [3] explains basic power management scheme in the general computing as well as grid computing. And this paper strongly performed an analysis on various categories of real time grid systems. The power consumption on various grid levels based on multiple volumes in the organization level is analyzed. The conclusion is focused the future requirement of research direction in the energy efficient system design of grid computing Barroso et al. [4] describes energy-proportional designs which enable large energy savings in servers, potentially doubling their efficiency in real-life use. Achieving energy proportionality will require significant improvements in the energy usage profile of every system component, particularly the memory and disk subsystems.

Aman Kansal et al. [5] describe the challenges developers face in optimizing software for energy efficiency by exploiting application-level knowledge. To address these challenges, we propose the development of automated tools that profile the energy usage of various resource components used by an application and guide the design choices accordingly. Henri Arjamaa et al. [6] present energy consumption estimates of ICT equipment in Finland and in three important industrial countries, namely the United States, Germany, and the United Kingdom. In addition, a worldwide estimate of the energy consumption of data centers is presented. The results are then analyzed, which give answers to questions, such as how valid are the estimation methods used and are the estimation methods comparable with each other. Christopher K. Lennard et al. [7] describe resynthesis procedures used for reducing power consumption in CMOS networks have produced poor results as they select nodes for resynthesis based upon local circuit properties. In this, a technique is presented for optimizing the choice of regions used in resynthesis. The cost function which is developed is able to predict the amount of global improvement in power expected through the resynthesis of network nodes under both zero as well as arbitrary delay assumptions. Pinheiro et al. [8] have proposed a technique for managing a cluster of physical machines with the objective of minimizing the power consumption, while providing the required Quality of Service (QoS). The authors use the throughput and execution time of applications as constraints for ensuring the QoS. Here nodes are assumed to be homogeneous. The algorithm periodically monitors the load and decides which nodes should be turned on or off to minimize the power consumption by the system, while providing expected performance. Srikantaiah et al. [9] have

investigated the problem of dynamic consolidation of applications in virtualized heterogeneous systems in order to minimize energy consumption, while meeting performance requirements. The authors have explored the impact of the workload consolidation on the energy-per-application metric depending on both CPU and disk utilizations. Elnozahy et al. [10] have investigated the problem of power-efficient resource management in a single web-application environment with fixed response time and load-balancing handled by the application. The two main power-saving techniques are switching power of computing nodes on or off and Dynamic Voltage and Frequency Scaling (DVFS). Nathuji and Schwan et al. [11] have studied power management techniques in the context of virtualized data centers, which has not been done before. Besides hardware scaling and VMs consolidation, the authors have introduced and applied a new power management technique called "soft resource scaling.

Dodonov and De Mello et al. [12] have proposed an approach to scheduling distributed applications in Grids based on predictions of communication events. They have proposed the migration of communicating processes if the migration cost is lower than the cost of the predicted communication with the objective of minimizing the total execution time. Guo et al. [13] have proposed and implemented a virtual cluster management system that allocates the resources in a way satisfying bandwidth guarantees. The allocation is determined by a heuristic that minimizes the total bandwidth utilization. The VM allocation is adapted i.e. migration is performed when some of the VMs are reallocated or power off but protocols for the migration are defined statically. Berral et al. [14] presented a theoretical approach for handling energy-aware scheduling in data centers. Here, the authors propose a framework which provides an allocation methodology using techniques that include turning on or off machines, power-aware allocation algorithms and machine learning to deal with uncertain information while the expected QoS is maintained through the avoidance of SLA violations. Song et al. [15] have proposed resource allocation to applications according to their priorities in multi-application virtualized cluster. The approach requires machine learning to obtain utility functions for the applications and define application priorities. Jie Liu et al. [16] we argue that servers can be sent to homes and office buildings and used as a primary heat source. We call this approach the Data Furnace or DF. Data Furnaces have three advantages over traditional data centers: 1) a smaller carbon footprint 2) reduced total cost of ownership per server 3) closer proximity to the users. From the home owner's perspective, a DF is equivalent to a typical heating system: a metal cabinet is shipped to the home and added to the ductwork or hot water pipes. Cloud Computing Security Based Paper Sahai et al. [17] proposed Attribute-Based Encryption (ABE) Fuzzy Identity-Based Encryption, with the original goal of providing an error-tolerant identity-based encryption [12] scheme that uses biometric identities. Pirretti et al [18] proposed an efficient construction of ABE under the Random Oracle model and demonstrated its application in large-scale systems. Goyal et al. enhanced the original ABE scheme by embedding a monotone access structure into user secret key. Goyal et al. [19] proposed Key-Policy Attribute-Based Encryption (KP-ABE), a variant of ABE. In the same work, Goyal et al. also proposed the concept of Cipher text-Policy Attribute Based Encryption (CP-ABE) without presenting a concrete construction. CP-ABE is viewed as another variant of ABE in which cipher texts are associated with an access. Ostrovsky et al. [20] proposed an enhanced KP-ABE scheme which supports non-monotone access structures. Chaseet al. [17] Enhanced Sahai-Waters ABE scheme and Goyal et al. KP-ABE scheme by supporting multiple authority. Further enhancements to multi-authority ABE can be found. Bethencourt et al. [21] proposed the first CP-ABE construction with security under the Generic Group model. In Cheung et al. [19] presented a CCA-secure CP-ABE construction under the Decisional Bilinear Diffie-Hellman (DBDH) assumption. Waters et al. [22] proposed another CP-ABE scheme under various security assumptions. Aside from providing basic functionalities for ABE, there are also many works proposed to provide better security/privacy protection for ABE.

Goyal et al. [23] proposed a CP-ABE construction with an exponential complexity which can just be viewed as theoretic feasibility. For the same goal, these works include CP-ABE with hidden policy, ABE with user accountability and ABE with attribute hierarchy.

III. CONCLUSION

Cloud computing have several benefits over traditional (non-cloud) environment and have capability to handle most sudden, temporary peaks in application demand on cloud infrastructures. Virtualization technology provides good support to achieve aim of cloud computing like higher resource utilization, elasticity, reducing IT cost or capital expenditure to handle temporary loads as well as cloud computing have various flexible service and deployment models which is also one of the main issue of adopting this computing paradigm. Virtualization concepts have open shared nature which is responsible for the violation of security polices and laws as well as degrades their computing reputation and performance. So there is need to focus on privacy and on solutions of various security problems to maintain the trust level of organization for deploying the cloud computing without any hesitation and also need of technical support for elastic scalability to serve by vertical scaling approach which is currently restricted to only horizontal scaling.

REFERENCES

[1] Phaphoom.N, Wang. X, Abrahamson.P." Foundations and Technological Landscape of Cloud Computing" (ISRN Software Engineering Volume 2013 (2013), Article ID 782174, 31 pages)

[2] Dhiman.G, Marchetti.G, Rosing.T "v: Green: a system for energy efficient computing in virtualized environments" (Proceedings of the 14th ACM/IEEE international symposium on Low power electronics and design, page 243-248, published in ACM, 2009)
[3] D. Ramesh, A. Krishnan "An Analysis on Energy Efficient System Design in Grid Computing"(Second International Conference, CCSIT 2012, Bangalore, India, January 2-4, 2012. Proceedings, pp 421-428)
[4] Barroso, L.A. Holzle, U. "The Case for Energy-Proportional Computing" (IEEE computer society, Volume: 40, Issue: 12, Dec. 2007 Page:33 – 37, ISSN :0018-9162)
[5] Kansa.A, Zhao.F. "Fine-Grained Energy Profiling for Power-Aware Application Design" (http://research.microsoft.com/en-us/um/people/zhao/pubs/hotmetrics08joulemeter.pdf)
[6] Arjamaa.H, "Energy Consumption Estimates of Information and Communication Technology: synthesis and analysis"
[7] Christopher K. Lennard A. Richard Newton," An Estimation Technique to Guide Low Power Resynthesis" (http://pdf.aminer.org/000/436/871/an_estimation_technique_to_guide_low_power_resynthesis_algorithms.pdf)
[8] E. Pinheiro, R. Bianchini, E. V. Carrera, and T. Heath, "Load Balancing and Unbalancing for Power and Performance in Cluster-Based Systems" (Workshop on Compilers and Operating Systems for Low Power, pp: 182–195, 2009.)
[9] S. Srikantaiah, A. Kansal, and F. Zhao, "Energy Aware Consolidation for Cloud Computing", (Cluster Computing, Vol. 12, pp: 1–15, 2009.)
[10] E. Elnozahy, M. Kistler, R. Rajamony, "Energy-Efficient Server Clusters" (Power-Aware Computer Systems, pp: 179-197, 2003)
[11] R. Nathuji and K. Schwan, "Virtualpower: Coordinated Power Management in Virtualized Enterprise Systems" (ACM SIGOPS Operating Systems Review, Vol. 41, pp: 256-278, 2007.)
[12] E. Dodonov, R. de Mell, "A Novel Approach for Distributed Application Scheduling Based on Prediction of Communication Events" (Future Generation Computer Systems, Vol. 5, pp: 740-752, 2010.)
[13] C. Guo, G. Lu, H. Wang, S. Yang, C. Kong, P. Sun, W. Wu,Y. Zhang, "Secondnet: A Data Center Network Virtualization Architecture withBandwidth Guarantees", (6th International Conference on emerging Networking Experiments and Technologies, USA, 2010.)
[14] J. L. Berral, R. Nou, F. Julia, "Towards Energy-Aware Scheduling in Data Centers using Machine Learning" (1st International Conference on Energy-Efficient Computing and Networking, Passau, Germany, 2010.)
[15] Y. Song, H. Wang, Y. Li, B. Feng, Y. Sun, "Multi-Tiered On-Demand Resource Scheduling for VM-Based Data Center"(9th IEEE/ACM International Symposium on Cluster Computing and the Grid, China, pp: 148–155, 2009.)
[16] Jie Liu, Michel Goraczko, Sean James, Christian Belady "The Data Furnace: Heating Up with Cloud Computing"
[17] A. Sahai and B. Waters. Fuzzy Identity-Based Encryption. In Proc. of EUROCRYPT'05, Aarhus, Denmark, 2005.
[18] D. Boneh and M. Franklin. Identity-Based Encryption from The Weil Pairing. In Proc. of CRYPTO'01, Santa Barbara, California, USA, 2001.
[19] M. Pirretti, P. Traynor, P. McDaniel, and B. Waters. Secure Atrribute-Based Systems. In Proc. of CCS'06, New York, NY, USA, 2006.
[20] V. Goyal, O. Pandey, A. Sahai, and B. Waters. Attribute-Based Encryption for Fine-grained Access Control of Encrypted Data. In Proc. of CCS'06, Alexandria, Virginia, USA, 2006.
[21] R. Ostrovsky, A. Sahai, and B. Waters. "Attribute-based encryption with non-monotonic access structures". In Proc. of CCS'06, New York, NY, 2007.
[22] M. Chase. "Multi-authority attribute based encryption". In Proc. of TCC'07, Amsterdam, Netherlands, 2007.
[23] J. Bethencourt, A. Sahai, and B. Waters. Ciphertext-Policy Attribute-Based Encryption. In Proc. of SP'07, Washington, DC, USA, 2007.
[24] L. Cheung and C. Newport. Provably Secure Ciphertext Policy ABE. In Proc. of CCS'07, New York, NY, USA, 2007. [25] B. Waters, "Ciphertext-Policy Attribute-Based Encryption: An Expressive, Efficient, and Provably Secure Realization", http://eprint.iacr.org/2008/290.
[26] V. Goyal, A. Jain, O. Pandey and A. Sahai, "Bounded Ciphertext-Policy Attribute based Encryption", In Proc. of ICALP'08, Reykjavik, Iceland, 2008
[27] M. J. Hinek, S. Jiang, R. Safavi-Naini, and S. F. Shahandashti, "Attribute-Based Encryption with Key Cloning Protection", http://eprint.iacr.org/2008/478
[28] Jin Li, Qian Wang, Cong Wang, and Kui Ren, "Enhancing Attribute-based Encryption with Attribute Hierarchy," In Proc. of ChinaCom'09, Xi'an, China, 2009.