International Journal of Advanced Mechanical Engineering.
ISSN 2250-3234 Volume 8, Number 1 (2018), pp. 229-236

http://www.ripublication.com

Cloud Computing- A Tool for Revival of Sick Industries

Dr. Himanshu S. Moharana[1*], Krutibas Khuntia[2], Dr. Ranjan K. Mallick[3], and Ramesh C. Nayak[4]

[1]Professor & Head, Department of Mechanical Engineering, HIT, Khordha, Bhubaneswar, 752057, India
[2]Asst. Professor, Department of Mechanical Engineering, GIET, Ghangapatna, Bhubaneswar, 751013, India
[3]Professor and Head, Department of Civil Engineering, REC, Bhubaneswar, 751017, India
[4]Asst. Professor, Dept. of Mech. Engg, KIST, Bhubaneswar, 752050, India
**E-mail: dr.hsmoharana@gmail.com*

Abstract

Cloud computing is the idea that all forms of computing can be delivered wholly over the Internet and is based on cloud drawings. Cloud computing has virtual shared servers which provide software, infrastructure, platform, devices and other resources and hosting to customers on a payment as per their use basis. It affects the regular conventional process because one should not have to go to the workspace to collect information which affects monetary transactions in IT spending. Sometimes it is reported on the manner in which companies make their solutions without examining the characteristics, models and services involved in understanding what cloud computing is. All information is digitized provided as a service in the cloud computing model. Users can access these services available on the "Internet cloud" without having any previous know-how on managing the resources involved and simultaneously users concentrate on their core business processes. Cloud computing customers are not supposed to own the infrastructure physically; rather the usage is taken on rent from a third-party provider. Sharing resources amongst can improve, as servers are not unnecessarily left idle, which can reduce costs significantly while increasing the speed of application development. The whole system is administered via a central server that is also used for monitoring clients' demand and traffic ensuring smooth functioning of the system, also must have a copy of all its clients' data to restore the service which may arise due to a device breakdown due to redundancy. Private clouds describe offerings that deploy cloud computing on private networks. It consists of applications or virtual machines in a company's own set of hosts. They provide the benefits of utility computing -shared hardware costs, the

ability to recover from failure, and the ability to scale up or down depending upon demand. This paper is organized as related work done by several researchers as documentation and discusses about the cloud infrastructure, its key issues and open challenges. This describes different cloud situations to be applied to a cluster of sponge iron industries in the state and can be applied to other industries as well, the concept could be an eye opener for reviving the sick industries in the nation perspective.

Keywords: *Cloud computing, Cost optimization, Resource allocation, Virtual machine*

I. Introduction

Because of the issues put forwarded by Big Data Technology and its volume, velocity and variety, Big Data requires its solutions. This could develop a software library for reliable and distributed computing systems with the Big Data deluge and provides the first viable platform for Big Data analytics. Hadoop has been used by the pioneers in the field which distributes the storage and processes large data sets among clusters of server computers with the help of a simple programming model. The number of servers in a cluster can be scaled at ease as per requirement from number of machines. Whereas traditional large-scale computing solutions rely on expensive server hardware with a high fault tolerance, it detects and compensates for hardware failures or other system problems. This allows a high level of service to be delivered from clusters to individual server computers. Processing vast quantities of data across large, lower-cost distributed computing entities becomes a viable proposition. At present, many Big Data entrepreneurs are deploying an ecosystem across legacy IT systems in order to allow them to combine all new and old data in newer ways. However, Hadoop may be destined to replace many traditional data warehouse and rigidly-structured relational database technologies to become the dominant platform over many types of data processing. Many organizations normally do not have the resources and expertise to implement their own solutions. Fortunately they do not have cloud solutions already available. Here, public Big Data sets is ought to be utilized, running everything in the cloud makes a lot of sense since the data is not required to be downloaded to an organization's own system. Big Data progresses in leaps and bounds as advances on artificial intelligence as new form of computer processing power is available. In this paper, a cloud computing suggestion has been taken up as a most important tool for semi-conductor industries.

II. Literature review

Research on resource management strategies in different fields (Chia-Ming et al., 2014) of distributed computing with different policies is not new. However in CC, dynamic resource provisioning (Quang-Hung et al., 2014) without delay or any

compromise on delay is of utmost concern. Since, ubiquity and cost-effectiveness are two keywords describing CC, cost effectiveness centers on optimal resource allocation. Literature has been reviewed to explore existing strategies of resource allocation and scope of improvement. Buyya et al., 2002 and Buyya et al., 2003 presented resource allocation frameworks which could optimize the objective function for users and resource providers. Li et al. (2009) offered scheduling and optimization techniques based on Service Level Agreement (SLA) ignoring the throughput and response time of data centers. Bennani and Menasce (2005) presented a predictive multi-class queuing network model for computing the mean response time but the model was not good enough to evaluate the cost in case server switches from one application to another. Singh et al. (2015) have presented an agent based load balancing mechanism. Arfeen and his coworkers (Arfeen et al., 2011) focused on network awareness and consistent optimization of resource allocation strategies and highlighted the research issues prevailing in this field. Zhang et al. (2010) emphasized that more efforts are required to make the existing performance models predictive and responsive. Zheng et al. (2009) proposed a binary integer programming method to solve independent optimization but linear problems only and is not suitable for dynamic and complex problems. Also, a few authors (Christodoulou et al., 2007 and Doulamis et al., 2007) had proposed the game theoretic method to solve the optimization of resource allocation in network systems from the resource providers' perspectives. Ji et al. (2014) proposed a job scheduling algorithm based on greedy approach. Authors have implemented their algorithm in cloud environment and indicated success in reducing completion time of a task. Their implementation divides the tasks based on completion time and bandwidth requirements. However, in case resources are not found in a particular data center, this issue has not been paid attention. Hassan and Alamri (2014) proposed a resource allocation mechanism based on Nash Bargaining system for multimedia cloud computing, their scheme provides dynamic resource allocation with reduced cost. Authors have compared their algorithm with greedy approach of migration in case of overloaded *VM*s and indicated better results. However there is no bargaining for resource utilization. Marrone and Nardone (2015) proposed a model driven approach for resource allocation. Authors have deployed an automatic negotiation model using UML and Bayesian Network modeling approach. This works is completely based on negotiations. However, response time and cost optimization have been left unattended. Xiao et al. (2013) has introduced concept of skewness to measure unevenness in multi-dimensional resource utilization of a server. Different types of workloads can be combined to minimize skewness and improve overall server resource utilization. This mechanism provides overload avoidance while concerning green computing. Yee-Ming and Hsin-mie (2010) provided an allocation and pricing mechanism as a market-based model for allocating resources in a cloud computing environment. But this model is also not able to handle large scale problems adequately. Many more resource allocation mechanisms are available in Buyya et al., 2008, Jung and Sim, 2011, Stoesser et al., 2007 and Streitberger et al., 2007 which reflects that substantial efforts had already been put toward resource management in cloud computing but to the best of our knowledge none has proved to be suitable under all conditions. From the literature

review it is clear the main purposes of scheduling algorithms are to minimize the resource starvation and to ensure the effective and fair resource scheduling (Singh and Malhotra, 2013). In fact, optimal resource allocation strategies have always been of utmost concern for researchers and hence the need to pay more attention on the resource scheduling policies is chirping in. Traditionally optimal resource allocation makes use of the Hungarian algorithm, which can work only on symmetric number of resources and requests. But, cost sharing model of CC deploys multi-tenancy, thus resource scheduling cannot be optimized using the Hungarian method always. This gave us motivation for the present work which focuses on an intelligent agent-based automated scheduling and service composition framework for cost optimization of resource provisioning in cloud computing. Next section elaborates the proposed framework.

III. Big data implications

While mining datasets measured in the terabyte, pet byte and even Exabyte is technically challenging, it offers significant implications. In fact, Big Data techniques and technology know how are likely to allow some additional, secondary value to be generated from every piece of digital information that gets stored, It holds the promise of giving enterprises deeper insight into their customers and partners. Big Data has a potential to improve analytical insight as well as allowing the creation of new products and services that have previously been impossible. Experts have already demonstrated how Big Data can permit the delivery of highly personalized search results and product recommendations. It may help entrepreneurs to accurately forecast the failures. Recognizing the potential, the entrepreneurs are advised to greatly improve the tools and techniques needed to access, organize and explore discoveries from huge volumes of digital data which could accelerate the speed of discovery in technology. Big Data developments are fundamentally about creating new IT systems which are more systems of engagement rather than just a mind-set present in some companies when certain departments or sectors do not wish to share information with others and operate in isolation. Since long, we have been using to put data into computer systems for relatively rate of return. But by amalgamation and analysis increasingly big datasets, we may initiate to get more value from computer systems. In manufacturing firms by integrating Big Data across R&D may significantly reduce time to market and improve product quality. Big Data may undoubtedly provide all organizations with a data stalking ability, the positive implications being likely to outweigh the negative possibilities. For example, Big Data may increase sustainability by improving traffic management in most of locations..Big Data is an important thing in the IT arena. It would generate value from the storage and processing of very large quantities of digital information that cannot be analyzed with traditional computing techniques and Cloud computing is about the transition to an online computing infrastructure. The overview of Big Data characteristics, technologies and opportunities has been on talk.

IV. Data explosion

The quantity of data generated on the globe has been growing exponentially for certain related reasons. As a result of e-commerce, retailers are initiating to build up vast database of recorded customer activities. Organizations working in the logistics and many other sectors are now piling up more data and perish an additional value generation out of it. The social media has been creating vast quantities of digital material that may potentially be mined to generate valuable insights. s vision recognition improves, it is additionally starting to become possible for computers to gather useful information and data relationship from still images and video. Big Data is also being generated by an expanding Internet of Things. Lastly, several areas of scientific advancement have been initiated to generate and rely on vast quantities of data that were until very recently almost unimaginable.

V. Volume, velocity and variety

Capturing, storing and generating value from Big Data raises a number of technical and conceptual challenges that go beyond the capabilities of traditional computing. To get a handle on the issues involved, most commentators describe the characteristics and challenges of Big Data. Volume is the greatest challenge and opportunity. This is because storing, interlinking and processing vast quantities of digital information offers tremendous possibilities for a wide range of activities. These include predicting customer behavior, diagnosing and planning services in semiconductor industries, and modeling the same. However, traditional computing solutions like relational databases are increasingly not capable of handling such tasks. Big data velocity also raises a number of key issues. For a start, the rate at which data is flowing into most organizations is increasing beyond the capacity of their IT systems to store and process. Online video, location tracking, and many other applications now rely on large quantities of such high velocity data streams and for many companies delivering them is proving quite a challenge. Big Data is characterized by its variety, with the types of data that many organizations are called on to process becoming increasingly diverse and dense. Today, photographs, audio, video, 3D models, complex simulations and location data are all being piled. Many of these Big Data sources which are not easy to categorize are taken to task that let alone process with traditional computing techniques. This means that Big Data is in reality messy data, with a great deal of effort required in complex pre-processing and data cleansing before any meaningful analysis can be carried out. Due to the challenges of volume, velocity and variety, many organizations at present have little choice either to ignore or rapidly excrete large quantities of potentially quite valuable information. Their sensors and IT systems are simply not up to the job of scanning and interpreting the vast piling of data in which they float. As a consequence, most of the data surrounding organizations has been ignored. We must be very careful for a large portion of the data gathered is not processed with a significant quantity of useful information passing through them as data exhaust. Till today, almost all data captured during operation is being deleted within week. This is almost scandalous for interlinking and intelligently mining these image streams to improve a healthy planning.

VI. The Cloud Computing- a real solution for the problem

The whole world knows the cloud is transforming the world amazingly has such a dramatic effect on communication, efficiency, productivity. There might be some lingering apprehensions about security and sustainability but on the whole these real and critical issues have been taken off the technology articularly when we talk of manufacturing. This indicates a drastic break which does not pose to have provided the details to support. Citing some philosophical issues with ownership and control, it does not appear to render much insight into the problems with technology. We are moving through the honeymoon stage with technology and now is the time for singing its praises. It is taken for granted that the technology exists and will continue for years to come. The only priority is we have to start dealing with in possible practical and productive ways. This is quite exciting to come out of the technology for the years to proceed on and must not wait to observe either how this phase of critical analysis creeps in or the industry responds. The time is right for manufacturers irrespective of large and small to go for modernizing their operations and it is mandatory to conceptualize their supply chain and logistics operations with a view to optimizing their potential investments. A holistic approach may be addressed by the manufacturers to realize the business before making decisions which includes visualization of their supply chain, distribution models and the impacts of these investments on their operations. At the first instance, manufacturers should ask themselves how to approach for capital investments, whether to update equipment or manufacturing processes, software solutions with operational functions to potentially cater the impact on customer demand, sourcing strategy, inventory and working style on distribution models. The following are enumerated as the key points of modernizing the manufacturer's need to forecast and prepare for the future to come. As the manufacturing sectors have focused on automation for decades, advancement in technology has been put forth for innovative automation resources available to many small and medium scale industries. Adopting such solutions can help posing companies for a considerable as well as increased efficiency, production speed under reduced cost constraint. It is equally important for evaluating whether inbound and outbound supply chains could keep pace with the current approach on improvement.

On a related term basis, manufacturers should take a query on themselves before they start -

- Whether the inbound raw materials and parts maintain proper inventory levels, reorder points and lead times associated with automated manufacturing
- Whether the existing freight and distribution formalities coincide with this manufacturing

- Whether new automated solution require maintenance and does a company's existing service model allow for quick repair
- Would the companies look for an extended downtime
- Whether partnering with logistics providers with access to multiple modes of transportation and large distribution networks, manufacturers can more easily adjust to the increased supply chain demands
- Whether output resulting from the implementation of automated processes could be accessed at ease
- Whether Logistics providers could provide access to a network on field-stalking locations with faster maintenance of service of automated equipment.

VII.Conclusions

We could start to run the world and allocate resources basing on real intention, not that guessing people in near future demand. The more we can learn the human activities, the less we can need to go on producing and transporting goods to fill up outlets with things that people may not actually want. It has become a corporate computing development and the movement may find it to have great many advocacy in the years ahead. Efforts have been materialized to modernize manufacturing through initiatives such as automation, the integration of cloud-based technologies, the incorporation of additive manufacturing and even the utilization of data management tools all can have an impact on a manufacturer's overall supply chain operations. Advancements in technology in conjunction with the economic rebound have created an environment in the manufacturing sectors as companies proceed on investing in equipment and new software. According to the Association for Manufacturing Technology, we have entered an era where, for the first time, many of the capital investments, that were previously considered out of reach for small and middle-market manufacturers, have now become economically feasible. The work presented in this paper proposes a unique, intelligent and automated assignment strategy for assigning resources in cloud computing environment. In this mechanism various intelligent agents have been deployed to reduce system complexity by modularization. Broker agent facilitates search for optimal data center as per user requirements and service composition on user behalf till a contract is established between two parties or user enters a new service specification. Thus the proposed framework contributes toward eliminating user headache of finding optimal service provider in any situation and ensures efficient service allocation at the data centers. The proposed work also eliminates the limitation of the existing Hungarian algorithm and extends it by introducing two more cases and eliminating the one to one

correspondence for resource allocation. The proposed strategy has also been implemented and results are found to be acceptable.

References:

[1] Arfeen, M.A., Pawlikowski, K., Willing, A. A., 2011, "Framework for resource allocation strategies in cloud computing environment," In: Proceedings in 35th IEEE Conference on Computer Software and Application, pp. 261–266.

[2] Bennani, M. N., Menasce, D. A., 2005, "Resource allocation for autonomic data centers using analytic performance models," In: Proceedings of IEEE International Conference on Autonomic Computing, Seattle, pp. 192–208.

[3] Buyya R., Abramson D., Giddy J., Stockinger H., 2002, "Economic models for resource management and scheduling in grid computing", Concurr. Comput. Pract. Exp., pp. 1507–1542

[4] Buyya R., Abramson D., Giddy J., Stockinger H., 2003, "The virtual laboratory: enabling molecular modeling for drug design on the world wide grid", Concurr. Comput. Pract. Exp., 15 (1), pp. 1–25

[5] Buyya, R., Yeo, C.S., Venugopal, S., 2008. "Market oriented cloud computing: vision, hype, and reality for delivering IT services as computing utilities", In: Proceedings of 10th IEEE International Conference on High Performance Computing and Communications, pp. 234–242.

[6] Wu C. M., Chang R. S., Chan H.Y, 2014, "Green energy-efficient scheduling algorithm using the DVFS technique for cloud datacenters", Future Gener. Comput. Syst., 37, pp. 223-323