CLOUD COMPUTING ISSUES FOR REAL TIME OS

Ramdasi A. P.[*1], Kulkarni A A[2],Shabad M.A.R.[3]

[*1]Computer Engineering Department, Sinhgad Academy of Engineering, Pune, Maharashtra, India
ramdasiap@gmail.com[1]

[2]Computer Engineering Department, Abhinav College of Engineering, Pune, Maharashtra, India
amrutak0307@gmail.com

[3]Computer Engineering Department, Sinhgad Academy of Engineering, Pune, Maharashtra, India
muzaffar.shabad@gmail.com[1]

Abstract: In this paper, we try to analyse how real time operating systems can put on Cloud Computing environment. In this paper, we place pointers upon the future research directions that involve Cloud computing with real time operating systems. The literature has been surveyed and discussions about the same have been undertaken. The future scope along with the issues in applying cloud computing to real time OS is being discussed.

INTRODUCTION

Cloud computing is important field in the area of pervasive computing. Pervasive computing deal with use of various machines all around the human centric environment [1].
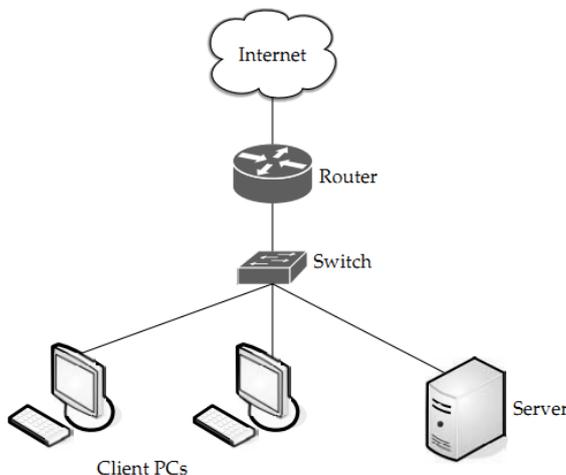

Figure-1. Cloud over network [1]

Figure-1 shows how cloud works over the network. Here a client PC and a server is connected across network. The switch is used for connecting devices with appropriate data.

Cloud computing has following important services which are critical in implementing the cloud:-

a. Platform As a Service (PAAS)
b. Hardware As a Service (HAAS)/ Infrastructure As a Service (IAAS)
c. Software As a Service (SAAS)

Platform is an important via-media of delivering services to the client in Cloud Computing infrastructure. The requisite amount of resources are directly made available from the internet without any need to separately install any software [1].

Hardware is available resources whose utilization can be optimized when being placed in cloud computing environment. This is accomplished by making use of hardware resources when they are no longer in use by the distributed or local environment.
Implementation Models
a. Public
b. Private
c. Community
d. Hybrid

Public cloud allows access to be made available to all the general public while private cloud allows acess to restricted users only. The hybrid approach gives the facility of both private as well as public. The community cloud allows access across a given community of users [1].

Cloud computing has various applications across the fields, some them are as follows:-

a. Operating system.
b. Software Engineering
c. Machine Learning
d. Natural Language Processing
e. Image Processing
    etc.

In our paper, we look at applying cloud computing to real time operating system.

OPERATING SYSTEM

The operating system provides a platform for interaction between the user and the hardware. Operating system consists of various management techniques of file, memory, device, process, scheduling etc [2].

LITERATURE REVIEW

Daneil et.al. develop a cloud computing based system named *Eucalyptus.* The authors show the design, operational aspects and architectural trade-offs of the newly designed system. The authors provide proof of *Eucalyptus* allows

users with existing grid and HPC system to explore novel functionalities of cloud computing without changing existing system [3].

Daneil et. al. discuss various factors which critically affect cloud computing's implementation in the metropolitan area of Monterrey. The mention the list of these factors and claim that cronbach's alpha check is used in validating measuring instruments. They have also utilized various statistical techniques for validating the factors [4].

Pawan et. al. present employ cloud computing environment for undertaking machine translation. They have utilized MapReduce framework in Could Computing to deploy Transfer Based Machine Translation systems [6].

Arutyum et. al. provide a new test bed for cloud computing named *open ciruss*. It provides a open source service stack along with other features to enhance the research and development in the field of computing. The paper also strives to make use distributed databases into cloud computing environment [7].

Vivek Kundra has described the federal government's (USA) implementation of cloud computing services in government sector. He estimates an $80 million spending by the government for the implementation of cloud [8].

Hoang et. Al. have provided a extensive survey of the mobile computing architecture, approaches and the applications. Mobile Cloud Computing (MCC) is proposed by the authors to be an emerging field in the area of cloud computing. The author proposes the existing solutions and approaches are for Mobile Cloud Computing (MCC). In addition, the future research directions of MCC are discussed by the authors [9].

Anandhi et.al. have presented new innovative technologies to implement business strategy. The authors predict the future use of technology as it has been undertaken in various fields of business. In case of cloud computing an assessment of how the real time issues can be addressed from business point of view have been seen and discussed [10].

Virtualization:
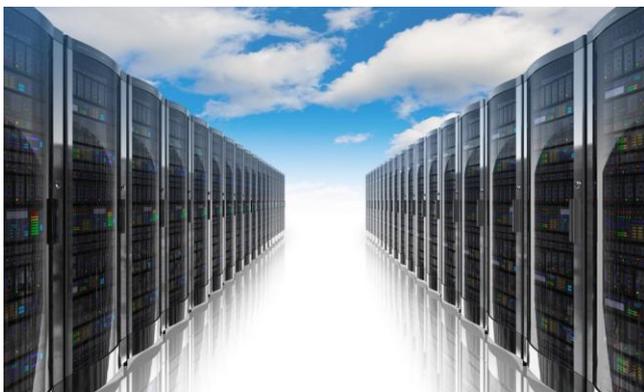
Figure-2. Data Center [1]

Data center as shown in figure 2 shows the actual realization of a data center. The data center is used for keeping vast amount of information. The racks in data centre are used to maintain equipment for keeping the data. Data center is useful in various applications in cloud computing.

Hypervisor is useful for implementing cloud computing in virtualized environment. As shown in Figure -3, hypervisor provides an interface for interaction of various OS working over it with the physical (hardware layer). The platforms for which the hypervisor provides the interface can have different variagetedness
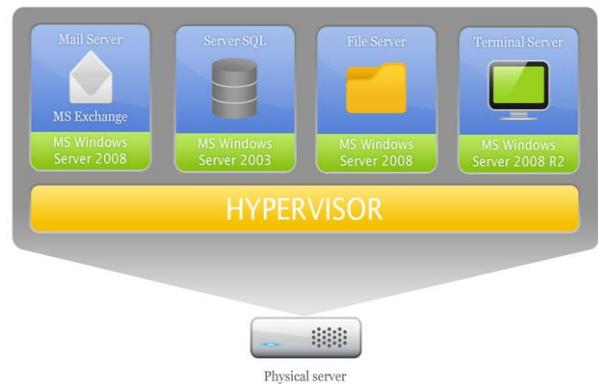

Figure-3. Hyperviser [1]

Problem Areas:

There are following problem areas which are identified:-
a. Cloud Computing infrastructure issues in Real time OS
b. Cloud Computing Platform environment issues in Real time OS
c. Kernel up gradation and management.

Cloud computing as a whole has following issues which need to address with respect to the Real Time OS:-
a. Network related issues
b. Deployment issues
c. Management Issues

SharePoint Services in Cloud Computing Microsoft Dynamics CRM:

Microsoft Dynamics CRM Online is an on-demand customer relationship management service hosted and managed by Microsoft. The Internet service delivers a full suite of marketing, sales, and service capabilities through a web browser or directly into Microsoft Office and Outlook. It provides "instant-on" access to businesses that want a full-featured CRM solution with no IT infrastructure investment or setup required [1].

Amazon:

Amazon may be the most widely known cloud vendor. They offer services on many different fronts, from storage to platform to databases. Amazon seems to have their finger in a number of cloud technologies. There are following cloud technologies in Amazon [1]:-
a. Amazon Elastic Compute Cloud (Amazon EC2)
b. Amazon SimpleDB
c. Amazon Simple Storage Service (Amazon S3)
d. Amazon CloudFront
e. Amazon Simple Queue Service (Amazon SQS)

Salesforce.com CRM:

Salesforce.com is a leader in cloud computing customer relationship management (CRM) applications. Its CRM offering consists of the Sales Cloud and the Service Cloud and can be broken down into five core applications [1].

Solution to problem areas:

The solution is proposed keeping in consonance with the real time constraints. It is proposed that a methodology for development of real time OS in cloud computing's environment.

a.   Assessment of business need
b.   Requirement validation
c.   Design of the Cloud computing OS
d.   Coding for the Cloud computing OS
e.   Testing and Deployment of Cloud computing OS
f.   Maintenance of OS

   The above mentioned steps must be applied in sequence to generate an output which is of good quality.

Table-1 shows classification of issues under Realtime or cloud computing.

Sr. No	Name of the Issue	Real Time OS	Cloud Computing
1	Assessment of business need	No	No
2	Requirement validation	Yes	Yes
3	Design of the Cloud computing OS	Yes	Yes
4	Coding for the Cloud computing OS	No	Yes
5	Testing and Deployment of Cloud computing OS	Yes	Yes
6	Maintenance of OS	Yes	Yes

Proposed Methodology:

Herein we propose a methodology in which the aspects mentioned in Table 1 are considered:-

a.   Analysis of the aspect in cloud computing environment.
b.   Analysis of aspect in real time environment.
c.   Analysis of aspect in cloud computing and real time environment.

DISCUSSION

Real time OS is also known as embedded OS in that it is developed specifically for the embedded environment. The real time OS when deployed onto the network server cannot fully comply with the real time constraints. This is because of the following reasons:-

a.   Real time OS cannot be held accountable for run time interfaces.
b.   Real time OS is difficult to have a wide area of applicability due to strict limit on real time environment [11].

FUTURE SCOPE AND CONCLUSION

The cloud computing is an emerging area in the field of Computer Science and Engineering. It is expected that various applications and their respective peripherals will get migrated to cloud in due course of time. This being a fact it is hence forth recommended that the real time OS can also be ported to cloud computing environment. The work undertaken in this area is of paramount importance when implementing real time embedded OS on cloud computing environment.

ACKNOWLEDGMENT

REFERENCES

[1]   Anthony T, Toby J., Robert E, (2010), "Cloud Computing: A Practical Approach", McGrawHill.

[2]   Silberschatz, Galvin, (1994),   "Operating System", Addison-Wesley.

[3]   Nurmi D, Wolski, R. ; Grzegorczyk, C. ; Obertelli, G. ; Soman, S. ; Youseff, L. ; Zagorodnov, D. (2009), "The Eucalyptus Open-Source Cloud-Computing System", In. Proc. Cluster Computing and the Grid, 2009. CCGRID '09. 9th IEEE/ACM International Symposium", Page 124-131.

[4]   Alberto Daniel Salinas Montemayor, Jesús Fabián López, Jesús Cruz Álvarez, (2014), "CRITICAL FACTORS AFFECTING THE UTILIZATION OF CLOUD COMPUTING", In. Proc. Natural Sciene and ICT,

[5]   Pawan Kumar, Rasid Ahamed, B.D. Choudhary, Mukul K Sinha, In. Proc., Cloud Computing 2013, The fourth International Conference on Cloud Computing, GRIDS, and Virtualization, IARDIA, Page 179-194.

[6]   Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," IEEE Transl. J. Magn. Japan, vol. 2, pp. 740–741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].

[7]   Arutyum I. Avetisyan, Roy Campbell, Indranil Gupta, Michael T. Heath, Steven Y. Ko, Gregory R. Ganger, Michael A. Kozuch and David O'Hallaron, Marcel Kunze, Thomas T. Kwan, Kevin Lai, Martha Lyons, Dejan S. Milojicic, Hing Yan Lee and Yeng Chai Soh, Ng Kwang Ming and Jing-Yuan Luke, Han Namgoong, (2010), OPEN CIRRUS: A GLOBAL CLOUD COMPUTING TESTBED, In. Proc IEEE Computer, IEEE Computer Society.

[8]   Vivek Kundra (2011), FEDERAL CLOUD COMPUTING STRATEGY, The White House Washington.

[9]   Dinh, H. T., Lee, C., Niyato, D. and Wang, P. (2013), A survey of mobile cloud computing: architecture, applications, and approaches. Wirel. Commun. Mob. Comput., 13: 1587–1611. doi: 10.1002/wcm.1203

[10]   Anandhi Bharadwaj, Omar A. El Sawy, Paul A. Pavlou, N. Venkatraman,"DIGITAL BUSINESS STRATEGY: TOWARD A NEXT GENERATION OF INSIGHTS", MIS Quaterly Special Issues: Digital Bussiness Quarterly.

[11]   Hermann Koptez, "Real-Time Operating System: Design Principles for Distributed Embedded Applications", Second Edition, "Springer.

Short Bio data of All the Author

Ashish Ramdasi is working as Assistant Professor at Sinhgad Academy of Engineering, Pune. He has completed his M.Tech in Computer Science & Engineering from

JNTU, Hyderabad. He has completed his B.E. in Computer Engineering from T.P.C.T. college of Engineering. He did his diploma in E & TC from Govt Polytechnic Osmanabad . His research areas include cloud computing, real time operating system and Ubiquitous computing.

Amruta Kulkarni is currently working in Abhinav College of Engineering, Pune . She has completed her Bachelor of Engineering (BE) from Bharat-Ratna Indira Gandhi College of Engineering, Sholapur. She did her diploma in Information Technology (IT) from Govt.

Polytechnic, Sholapur. Her research areas include Computer Network , database and programming.

Muzaffar Shabad is working as Assistant Professor at Sinhgad Academy of Engineering, Pune. He has completed his ME from Walchand Institute of Technology Sholapur. He has completed B.E. in Computer Science and Engineering from Shivaji University, Kholapur. His research areas include wireless sensor network and cloud computing.