Preface

Cloud basically stands for Common Location-independent Online Utility service, available on-Demand. It's a pool of virtualized computer resources which supports large variety of different workloads, including batch-style back-end jobs and interactive, user-facing applications. Cloud computing thus offers computing technologies being offered at cloud. Cloud computing offer lots of advantages over traditional computing such as online resources, offline access, flexibility, and savings. It is distributed into three segments namely, applications, platforms and infrastructure. Majorly, the definition of cloud computing specifically revolves round the terms like scalability, pay-per use model, and virtualization. In fact, enablers supporting cloud computing are interoperability, portability, integration of components, ease of deployment, pay as per use, economic, rapid provisioning and elasticity and so on. Because of the appealing features mentioned above, cloud computing is becoming a temptation for all business organizations. Due to dynamic nature of cloud computing it is quite easy to increase the capacity of hardware or software, even without investing on purchases of it. From last few years, cloud computing has become a promising business concept. All existing business applications are complicated in nature and much too expensive. To run these applications there is a need of data centers having supporting staff and infrastructure like bandwidth, networks and server etc. along with a dedicate team for its execution. For deploying such kind of applications, organizations have to invest large amount of funds which makes it difficult for small businesses to establish themselves. Therefore, cloud computing provides a simple alternative to start IT based business organization with much less initial investment.

OBJECTIVE OF THE BOOK

The purpose of this book is to present the concept of cloud computing and explore the various shortcomings of cloud. The background of assorted issues that arises in the field of cloud computing is to be discussed. It also highlights the comparison among the existing techniques of various problems. Furthermore, the future work

will be provided to pursue the research in the same field. The main aim of this book is to provide the information to research community, students, practitioners and academician also in the form of various aspects.

ORGANIZATION OF THE BOOK

This book contains 14 chapters arranged in different four sections. Section 1 comprises three chapters and mainly focuses on scope and issue of scalability in cloud environment and a case study on it. This section describes that how mobile agents deployed in cloud environment. Section 2 consists of five chapters which provide the sensitive area of cloud, i.e., security and trust management in cloud paradigm. It also provides the different security algorithm by which the providers and users can secure their data. Section 3 depicts an approach of cloud towards the new era of internet, i.e., Internet of things (IOT) and big data. It consists of three chapters which represent the security issues of IOT and new rising of big data. Section 4 detailed the concept of networks and energy efficiency in cloud computing. The summary of book organization is as follows:

SECTION 1: SCALABILITY ISSUES OF CLOUD ENVIRONMENT – SCOPE AND CASE STUDY

This section highlights the scalability issues occurred in cloud computing along with a case study of Copperbelt University in Zambia.

Chapter 1: This chapter focuses on scaling in Cloud environment, especially resource scaling for applications. Authors have started with a brief introduction to Cloud and scaling in the cloud. After the introduction, related literature is visited. It explains the necessity of scaling with real life examples. It also covers virtualization and some important hypervisors from the scaling perspective. Vertical scaling and horizontal scaling is also addressed by authors.

Chapter 2: This chapter presents the architecture of scalability by using mobile agents. It also highlights the main issues prevailing in cloud paradigm. Authors have presented the hybrid architecture for data security which is also the one of major concern of it. This chapter mainly highlights the solution for scalability and security.

Chapter 3: This chapter insight the case study of Copperbelt University in Zambia. The Copperbelt University Computer Centre runs five physical servers 24/7 throughout the academic year calendar. These machines consumed a lot of

resources such as electricity used to run and cool them. In addition, the Computer Centre employed a lot of technicians to run, maintain and service the named servers. All the discussed costs were incurred throughout the year including the idle workload period when there was very little work to be processed. Author focuses on the capacity of the Centre to scale up and down resources acted as a cost serving measures in utilizing the hardware and software resources.

SECTION 2: SECURITY AND TRUST ISSUES OF CLOUD PARADIGM

This section throws a light on security issues and provides the mechanisms so that no one can breach the security. It also highlights the trust issue and its management in cloud computing.

Chapter 4: This chapter discussed the Information Dispersal technique in the field of cloud computing. It is a technique in which pieces of data are distributed among various nodes such that the data can be reconstituted from any threshold number of these pieces. Information Dispersal Algorithms employ a method in which a file F needs to be dispersed among n nodes such that any m pieces will be sufficient to reconstruct the whole file F. The size of each piece is |F/m|. Authors have ensured that the complete knowledge of any m-1 pieces is insufficient to reconstruct the complete file F. The ideas for accomplishing this have been given in many literatures in the past. A discussion and comparison of some of these is covered in this chapter.

Chapter 5: This chapter presents various security issues that are underlying in cloud computing. Authors have exemplified various issues such as Trust, Encryption, Authenticity, Confidentiality and Multi Tenancy. Also, some of the proposed solutions have also been addressed by the authors.

Chapter 6: In this chapter, the authors explain the deployment model of cloud computing. Authors have also discussed the different attacks, i.e., DOS, Malware Injection, Wrapping, Authentication, Insider Attacks. After that authors explains the concept of sniffing, its working and how it is custom in cloud computing.

Chapter 7: This chapter presents how a trust is built between any user and a cloud service provider. Various techniques have been adopted to calculate the value of trust and further how it can be strength. Authors have also explained various trust models based on the necessities of a user. This chapter has also thrown some light over the concept of TTP, i.e., Trusted Third Party which further helps in maintaining trust over the cloud environment.

Chapter 8: This chapter presents DOS threats and methods to mitigate them in varied dimensions. DOS attacks are a major concern for different organization engaged in using cloud based services. The denial of service attack and distributed denial of service attacks in particular in cloud paradigms are big threat on a cloud network or platform. The author explained that how attacks operate by rendering the server and network useless by sending unnecessary service and resource requests.

SECTION 3: APPROACH OF CLOUD TOWARDS INTERNET OF THINGS

Technologies are changing day by day. This is the time that researchers have to think about the data stored on cloud. To manage this thing, researchers are moving towards big data, Internet of Things. This section depicts the approach of cloud towards the new era.

Chapter 9: This chapter explains the five issues from the security issues in IOT are discussed; Access Control, Authentication, Privacy, Policy Enforcement, and Trust. After that, major proposed solutions from the literature is listed by the authors and compared according to the strength and weakness points for each of them.

Chapter 10: This chapter focuses on how big data, with the emergence of cloud computing and the Internet of Things (IOT), can be used via several applications and technologies.

Chapter 11: This chapter throws light on various dimensions in which cloud computing concept is used and reveals that cloud computing drives various firms to become more customer centered and focused by enabling them quickly respond needs. The author has described the potential and opportunities for cloud computing in the healthcare industry, tourism, defense and military applications and various another aspects.

SECTION 4: NETWORKS AND ENERGY EFFICIENCY IN VIRTUAL CLOUD

This section describes the concept of network and energy efficiency in cloud computing. It also explains the broadcast method based on probabilistic scheme, disaster plan in networked enterprises and provides the solution for optimum utilization of energy consumption.

Chapter 12: This chapter addresses the described problem by outlining and discussing insights from the extensive literature review to produce a generic approach for cross-management. A set of prerequisites of disaster planning is also provided with comparative analysis and arguments. The proposed approach is focused on risk assessment methodology based on Fuzzy Cognitive Map. The method is able to aggregate all assessment variables of the whole stakeholders involved in the business network. The key findings of this study aim to assist enterprises in improving risk readiness capability and disaster recovery. Finally, the author indicates the open challenges for further researches and an outlook on our future research.

Chapter 13: In this chapter, the authors are interested to introduce the different broadcast methods based on the probabilistic scheme which is simple implement code with speed broadcast and to reduce a storm broadcast problem effects and to alleviate redundancy through rebroadcast by using different routing protocols, such as AODV, DSR, LAR, PAR, that we interested in MANETs.

Chapter 14: This chapter discusses the energy efficient approaches in cloud computing environment. The energy efficiency has become the major concern for the service providers. In this chapter, the major concern is the high lightly of resource allocation challenges and there are some which will be given in the data center energy consumption. The focus is done on the power management task and even the virtualization of saving the energy.

This book is expected to assist academicians, IT professionals, researchers, industry people, advanced-level students, government officials who are working in the field cloud computing. The book is expected to serve as a reference for the postgraduate students as it offers the requisite knowledge for understanding the security, scalability issues along with different solutions. This book is based on a research studies carried out by experienced academicians and is expected to shed new insights for researchers; academicians, students and improves understanding of cloud computing.

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