University of Science and Technology

College of Post Graduate Studies and Academic Advancement

A Thesis submitted in Partial Fulfillment of the

Requirements for the Degree of Master of Information Systems

Implementation of a Private Cloud Infrastructure as a Service

"NTC as case study"

By: Sara Abd El.Monem Mohammed Suliman

Supervisor: Dr. Adil Yousif

December 2014

Abstract

Cloud computing originated as a new way to deliver IT services, this thesis discusses the fundamentals and principles of cloud computing technology on private environment and how it can be the solution to improve and promote the IT services by providing advantages of speed, agility, highly automation and efficiency provision of IT services while quality of services is an essential key.

The main objective of this study is to adoption cloud-based services and adding flexible and robust system to the datacenter. This can be achieved by using cloud computing concepts for more efficiency in different aspects to lead the data center to its full potential. The study used open source solution to implementing a two server machine model for building private cloud in order to provisioning infrastructure recourses (servers, storages, network) in the form of what is called in cloud computing by Infrastructures as a service (IaaS).

The results obtained from convert from traditional data center to cloud based system show an improvement of quality of services and efficiency improvement of infrastructure services of the IT.

المستخلص

الحوسبة السحابية نشأت كوسيلة جديدة لتقديم خدمات تكنولوجيا المعلومات، تتناول هذه الرسالة أساسيات ومبادئ تكنولوجيا الحوسبة السحابية على بيئة خاصة، وكيف يمكن أن تكون الحل لتحسين وتعزيز خدمات تكنولوجيا المعلومات من خلال تقديم مزايا السرعة وخفة الحركة، والتشغيل الآلي وتوفير كفاءة خدمات تكنولوجيا المعلومات بينما جودة الخدمات هي مفتاح أساسي. الهدف الرئيسي من هذه الدراسة هو اعتماد الخدمات القائمة على السحابة وإضافة نظام مرن وقوي لمراكز البيانات. ويمكن تحقيق ذلك عن طريق إستخدام مفاهيم الحوسبة السحابية لمزيد من الكفاءة في الجوانب المختلفة لقيادة مراكز البيانات إلى كامل إمكاناتها. هذه الدراسة استخدمت إحدي البرمجيات مفتوحة المصدر لتنفيذ نموذج يتكون من جهازين كخوادم لبناء بنية سحابية في بيئة خاصة بغرض توفير خدمات البيئة التحتية (الخوادم والتخزين والشبكات) في شكل ما يسمى البنية التحتية للحوسبة السحابية.

النتائج التي تم الحصول عليها من التحويل من مراكز البيانات التقليدية إلى نظم تعتمد مفاهيم الحوسبة السحابية تظهر في تحسين نوعية وكفاءة خدمات البنية التحتية المقدمة بواسطة تقنية المعلومات.

1.1 Introduction

The data center is an essential corporate asset that connects all servers, applications and storage services. As the vital part it needs to be planned and managed carefully to meet the growing performance demands of users and applications. Cloud computing originated as a new way to deliver IT services by providing a customer interface to automated, self-service catalogs of standard services, and by using auto scaling to respond to increasing or decreasing user demand. From an IT perspective, a private cloud offers the key advantages of speed, agility, and efficiency while maintaining control of sensitive workloads. Installation and implementation of a private cloud model using open source solution is applied for adoption cloud-based services and adding flexible and robust system to datacenter. This can be achieved by using cloud computing concepts for more efficiency in different aspects to lead the data center to its full potential.

Now days Organizations are increasingly adopting cloud-based services to meet their business needs. However, due to the complexity and diversity of cloud systems it is important to understand the different aspects of Cloud Computing and to assess their own situation and decide which types of solutions are appropriate for their unique needs.

1.2 Problem Statement

For small organizations buying an infrastructure is considered a great challenge because of the cost of the computers, servers, network and storage that will consume a large amount of budget for establishing IT infrastructure need for operates applications and services, and for the services rabidly grow .we need robust Infrastructure capable to provide flexible, scalable, quick responses to changes in demand, reduce risk for IT infrastructure server, rabid deployment.

Furthermore for the organization to manage the infrastructure they need to pay for the maintenance, technician and also for the security.

1.3 Research Objectives

- The main aim of this thesis is to develop the performance demands of users and applications by Provide cloud computing infrastructure as a service (hardware, storage, and network) in private environment.
- Provide better equipped Infrastructure to maintain and update server's equipment.
- The study will develop solution to expand the services and identify how the new cloud computing trends will expand infrastructure sharing in promoting spread of services with acceptable quality of services.
- Another goal of this thesis is to clarify the impact of private cloud computing in order to encourage adoption of this technology as the solution enhancing and developing the IT flexible managing and faster performance.

1.4 Research Aim

The aim of this thesis is to provide infrastructure as a service (hardware, storage, and network, server) for small organization in private environment.

1.5 Research Methodology

This section briefly explains the methodology adopted in this research for this section, also Elaborate on the practical aspects concerning the installation and implementation of a private cloud using open source solution "Eucalyptus", will used two physical machines (CLC/WS3/CC/SC) are grouped on the first physical machine, and the (NC) component is installed on the second physical machine,

furthermore there will be a need of another machine that can serve as a administrator client machine.

1.6 Thesis Structure

This thesis is organized as follows:

- Chapter two: Describes an overall idea of cloud computing.
- Chapter three: Research methodologies describes framework.
- Chapter four: Describes Design private cloud computing.
- Chapter five: Describes Building private cloud computing.
- Chapter six: Provides Discussion, Conclusion and Recommendation for future work is given.