

## Use of VMware virtualization technology to deploy private cloud computing infrastructure as a service on business organizations

<sup>1</sup>Muhammad Garzali Qabasiyu, <sup>2</sup>Umar Danjuma Maiwada

<sup>1</sup>Department of Computer Studies, Hassan Usman Katsina Polytechnic, Katsina, Nigeria

<sup>2</sup>Department of Computer Science, Umaru Musa Yar'adua University, Katsina, Nigeria

Email – <sup>1</sup>garzaliqabasiyu@gmail.com, <sup>2</sup>Umar.danjuma@umyu.edu.ng

**Abstract:** Cloud computing, which is enabled by network virtualization, symbolizes a transition from conventional ownership of infrastructure and other resources by distinct businesses to a more scalable paradigm in which computer resources are rented online to organizations on a pay-per-use or subscription basis. The research is conducted because of the growing knowledge of cloud computing, which has resulted in increased use of the technology by businesses. We set up a virtual computer as part of an IaaS. Vsphere ESXi was utilized for the design, while Vsphere vclient was used to administer the virtual machines in ESXi. The research explains why using this system is vital and how it improves knowledge.

**Key Words:** Vsphere, Vclient, ESXi, VMware, IaaS.

### 1. INTRODUCTION:

Computers have become an integral element of everyday life. Computers are required in almost every industry, including employment, research, and education. As the usage of computers in our daily lives grows, so does the amount of computing resources we require. Harnessing resources as and when needed is not an issue for corporations like Google and Microsoft. When it comes to smaller businesses, though, cost is a major consideration. Problems like as equipment failure, hard drive failures, software defects, and other issues arise as a result of the massive infrastructure. For such a group, this may be a major burden. This problem has a solution in Cloud Computing [2].

Cloud computing is a paradigm shift in which computing is relocated from individual PCs and even company application servers to a 'cloud' of computers. A cloud is a virtualized server pool that may supply customers with a variety of computer resources. Users of this system just have to worry about the computing service they've requested. The user is not given access to the underlying specifics of how it is accomplished. Data and services are stored in massively scalable data centres and may be accessed from any connected device anywhere on the planet.

Cloud computing is a computing model in which massively scaled IT-related capabilities are delivered as a service through the internet to various external consumers and invoiced based on usage. There have been a slew of cloud computing companies emerge, and the service's popularity is skyrocketing. Cloud computing services are now available from Google, Microsoft, Yahoo, VMware, IBM, and Amazon [6].

Web hosting, parallel batch processing, graphics rendering, financial modelling, web crawling, and more applications employ cloud computing.

### 2. STATEMENT OF THE PROBLEM:

Due to the utilization of conventional IT infrastructure that has always been in business organizations, the businesses face several issues. As a result, this initiative has gone to great lengths to highlight some of the issues: Machines failure, High cost of IT maintenance, Hard drive crashes, High cost of software/hardware installation, Poor application performance.

Managing these jobs independently wastes time, leads to customer loss, lowers staff productivity, lowers bottom line income, and depletes the organization's resources. This makes it difficult for management to carry out their responsibilities, but by utilizing cloud computing services, the obstacles will be reduced.

### 3. AIM AND OBJECTIVES:

The purpose of this research is to examine the influence of cloud computing on businesses, how it is incorporated into businesses, how cloud computing may improve knowledge and information management, and how cloud computing infrastructure looks. The objectives are as follows;

- To intend to serve as a resource for businesses looking to leverage the cloud to achieve their goals, as well as cloud service providers interested in learning more about the demands of their customers so that I can make recommendations on how they may achieve their objectives.
- To use the findings which will aid businesses in improving their teamwork.
- To look at how cloud computing model help in massively scaled IT-related capabilities that are delivered as a service through the internet to various external consumers and invoiced based on usage.

### 4. LITERATURE REVIEW:

Several definitions have been given on cloud computing by different authors. However, the word ‘cloud computing’ has become a popular marketing term that needs clarification through suitable definitions. The vaguest definition of cloud computing is the one given in [1] that defines it as “computing on the Internet, as opposed to computing on a desktop”. This definition succeeds only on recognizing the dependency of cloud computing on the Internet. [5] In its own attempt defines cloud computing as “IT resources and services that are abstracted from the underlying infrastructure and provided “on-demand” and “at scale” in a multitenant environment”.

This next definition is a fairly good attempt as it points out three (3) key attributes of cloud computing namely – on demand, at scale, and multitenant environment. Similarly, [7] defines cloud computing as “the dynamic provisioning of IT capabilities (hardware, software, or services) from third parties over a network”. This definition acknowledges the on demand, at scale and multitenant nature of cloud computing. Another definition is that given by [1] which states as follows – “cloud computing is the renting of infrastructure and software, as well as bandwidth, under defined service conditions. These components should be adjusted daily to the needs of the customer and offered with the utmost availability and security. Included in cloud computing are end-2-end service level agreements (SLAs) and use-dependent service invoices”. This definition is very elaborate but rather too long. Furthermore, [9] defines cloud computing as “the style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service to external customers using internet technologies”. This is a good attempt. However, the most generally accepted definition comes from United States National Institute for Standard and Technology (NIST) which defines cloud computing as “a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction”.

### 5. METHODOLOGY:

In this research, a variety of data gathering strategies might be used. Depending on the type of data, these approaches are utilized to obtain and collect it. Methods of data collection are a method or procedure that the study employs in order to obtain the essential data for the achievement of the research's overall goals. In this research, we used transcription of papers and interviews, as well as observational approaches to observe exactly what was going on with the technology. We also gathered all of the essential knowledge about cloud computing as an infrastructure.

Because each system is different, there are no standard techniques for acquiring information or data. The methods used in this research are:

1. Observation
2. Interviewing

#### • INTERVIEW

An interview is a dialogue between two persons in which the interviewer asks questions to elicit information from the interviewee. If a researcher has only a rudimentary knowledge of the problem or situation he or she is studying, or if the topic is sensitive, a flexible interviewing strategy is advantageous. An interview is held and the results are written down. It allows us to encourage the interviewee to react freely and honestly to questions while also allowing us to elicit more information from the subject. Interviews allow us to tailor or reward specific questions for each person. Personal touch enables us to respond quickly and adjust to the user's needs. As a result, interviewing delivers high-quality results. The methods used in this research are interview and observation method.

These methods allow us to cover the scope of the research as full information were entered using each method. Both methods help to understand the problem as well as solution to the problem.

## 6. DATA ANALYSIS AND DISCUSSION OF FINDINGS:

In an effort to facilitate easy understanding of finding in the research, we decide to use statistical technique for the purpose of clarity. The techniques used for data analysis in this research are as follows:

- **STATISTICAL METHOD:** Tables and pie chart are used to present the information sourced, aimed at interpreting large amount of data into a concise, clear and manageable information.
- **PERCENTAGE METHOD:** In order to narrow down the data obtained, percentages are used to reduce the information into figure represented by a percentage of (100%).

The process of analysing, cleaning, manipulating, and modelling data with the purpose of obtaining valuable ideas and conclusions is referred to as data analysis.

We concluded that the difficulties with traditional IT systems boost the necessity for cloud computing systems based on our personal observation. The newly planned system would offer improvements to the current system.

Also the analysis obtained from the interview and observation shows that 80% of the business organization responded “yes” that they experienced problems while working with traditional IT infrastructure, while the remaining 20% responded “no” The pie chart below illustrated the information.

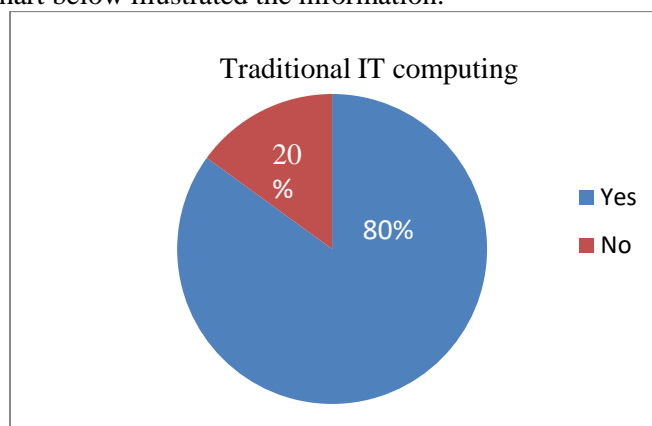


Figure 1: Pie Chart showing Traditional IT Computing

### 6.1 THE IMPACT OF CLOUD COMPUTING ON BUSINESS ORGANIZATION:

Figure below Shows that 85% of business organization agreed that cloud computing has great impact on business while 15% of them agreed to use the traditional IT system.

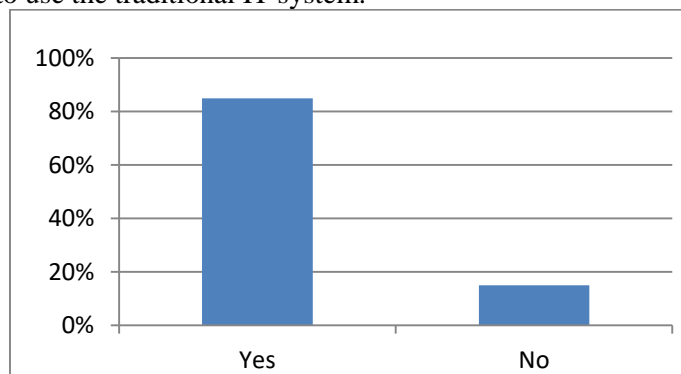


Figure 2: Impact of Cloud Computing on Business Organization

### 6.2 CLOUD COMPUTING IMPROVE KNOWLEDGE AND INFORMATION MANAGEMENT:

Figure below Shows that 75% of business organization agreed that cloud computing improve knowledge and information management while 25% of them agreed to use the traditional IT system.

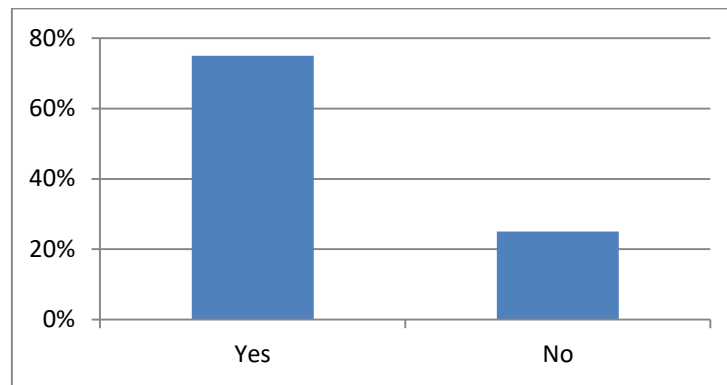


Figure 3: Improved knowledge and Information Technology

## 7. ANALYSIS:

The analysis is dedicated to analyse the data that we have gain through the research and how this data is going to help us achieve our aim and objectives.

### • The effect of cloud computing on the IT sector and revenue

Because all data is stored on a server, the service provider is responsible for its security and maintenance, and users have better and easier access to the data, cloud computing has had a huge impact on the industry and revenue. We agree that cloud computing is a good way for a company to improve information flow between its employees because a company can choose which employees have access to specific parts of the data stored on the server if they use cloud computing, which provides services such as data storage, transfer, and creation.

Cloud computing platforms may assist businesses of all kinds in increasing revenue by lowering IT expenditures, as investments in IT hardware and software are reduced. We believe that cloud computing will have a beneficial influence on firms that choose to use this technology because it will enable them to develop on the market by allowing them to utilize only the services that they require and only pay for those services. They won't have to design their own system until they start using the cloud. This indicates that the corporation was paying much more on resources such as staff, software, and hardware to support the services produced.

### • Cloud computing contributes to the advancement of knowledge and information management

Because new technologies are released on a daily basis, businesses must stay up with the latest developments, and knowledge management is a key area in which businesses must spend when adopting the cloud. The cloud's architecture makes it easy for businesses to collect and share knowledge across their staff. As a result, cloud computing offers enormous potential for providing employees with access to knowledge management systems. Enterprise intelligence, market intelligence, business intelligence, competitive intelligence, and strategic intelligence all rely heavily on knowledge and knowledge management.

### • Cloud infrastructure

The customer is given the power to supply processing, storage, networks, and other basic computer resources, allowing them to deploy and execute arbitrary software, such as operating systems and applications. The consumer has no control over the underlying cloud physical infrastructure, but he or she does have control over operating systems, storage, installed applications, and maybe limited control over chosen networking components.

Infrastructure is commonly thought to be used to offer a uniform virtual server. The consumer is in charge of the guest Operating System (OS) and software configuration and operation.

## 8. SYSTEM DESIGN AND IMPLEMENTATION:

Systems implementation and design are a set of operations performed in order to assess, deploy, and begin utilizing the system.

### • THE USER INTERFACE DESIGN

User interface is a visual part of computer application or operating system through which a user interacts with a computer or a software. It determines how commands are given to the computer or the program and how information is displayed on the screen.

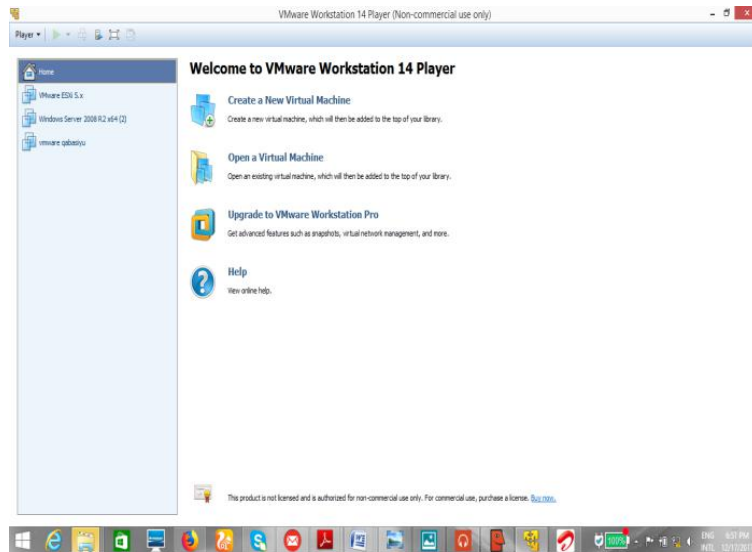


Figure 6: VMware workstation home page

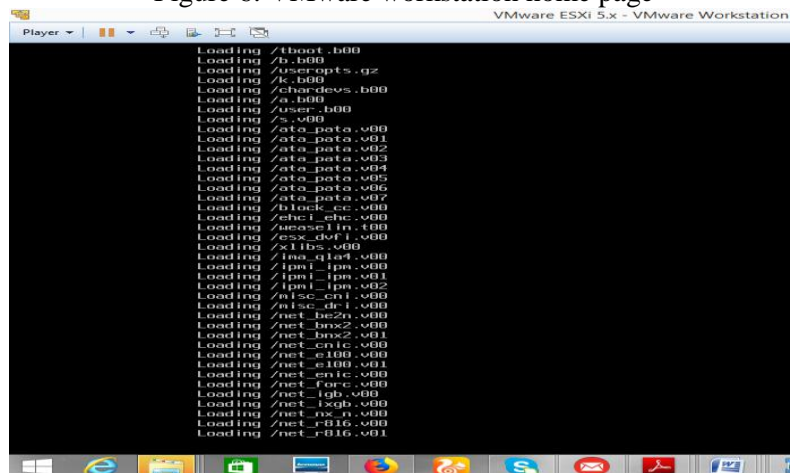


Figure 7: ESXi is loading ESXi IP address

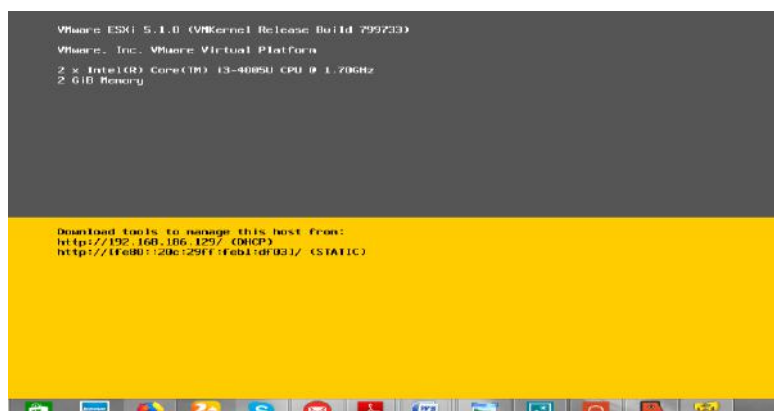


Figure 8: ESXi IP address

- **USER LOGIN PAGE**

The login screen will not allow any person to enter into the main menu of the software without knowing the secret code which is the user's name or password provided by the authorized user of the software.

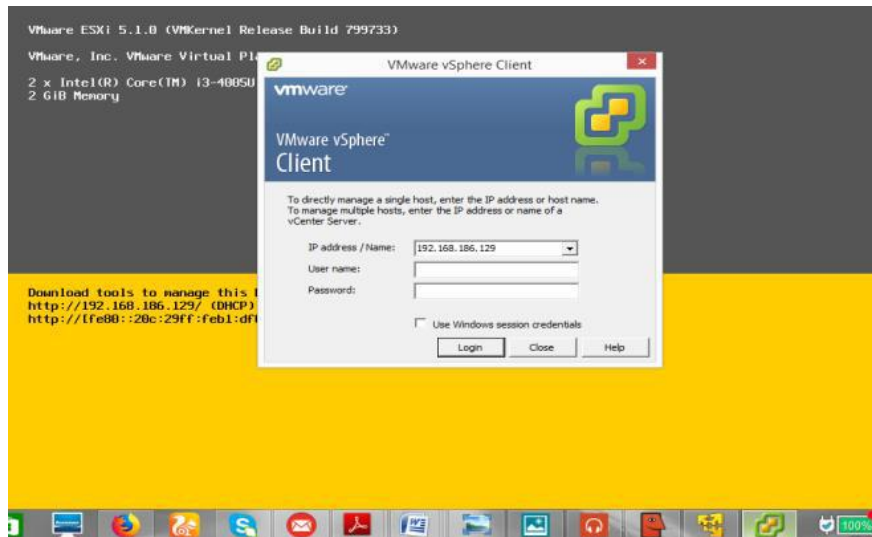


Figure 9: Vsphere Vcleint login page

### • HOME PAGE OF VCLEINT

This is the first page the user will see at the first visit of the site, it also contains some links (i.e. house for sale, house for rent and management section). The login allows users to logon and access different aspect of the application, depending on their privileges defined by the application.

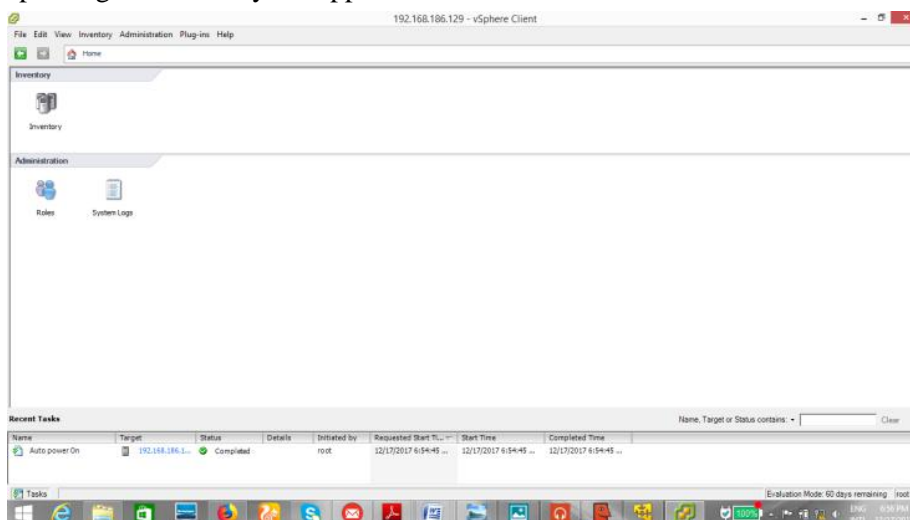


Figure 10: Home page of Vsphere client



Figure 11: inventory page

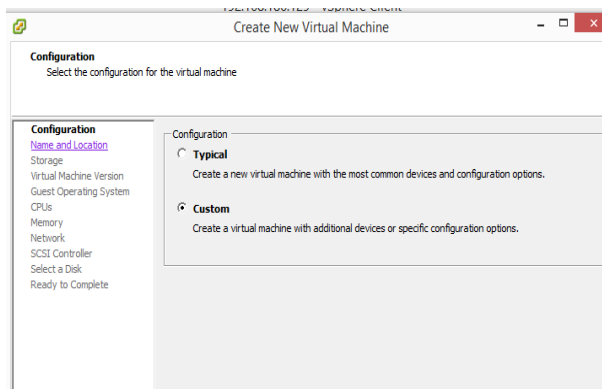


Figure 12: Configuration

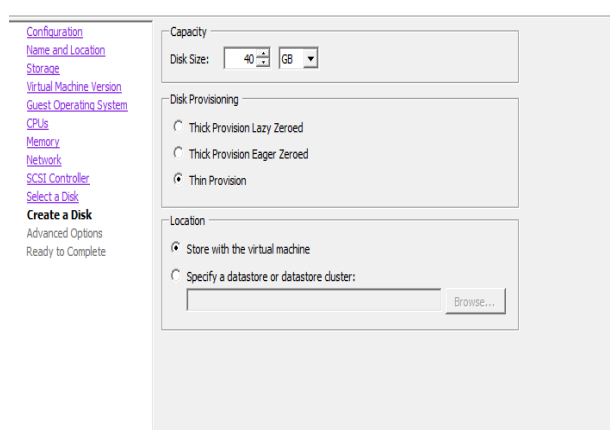


Figure 13: shows creating virtual disk

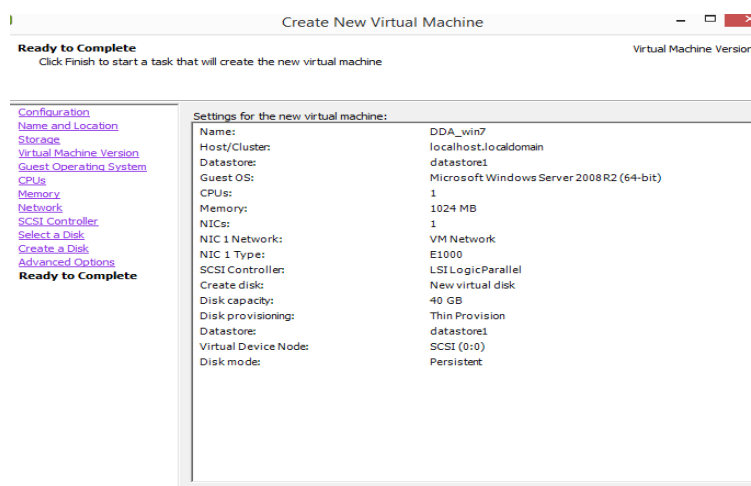


Figure 14: shows review settings

## 9. CONCLUSION:

Cloud computing is a novel abstraction that is scalable, dependable, and available for large-scale data processing systems. Large self-managed server pools are accessible in cloud computing, which minimizes overhead and removes administrative headaches. Cloud computing services may also expand and contract based on demand. Small and medium

enterprises, in particular, benefit from cloud computing since they need effective and cheap IT tools to help them become more productive without spending a lot of money on in-house resources and technical equipment. It's also a brand-new architecture that'll help the Internet grow into the computing platform of the future. Given the potential for huge cost reductions and increased productivity in a hard economic context, the case for virtualization is more compelling than ever.

## **10. RECOMMENDATION:**

Business organizations play a vital role in every market and contribute considerably to each economy. Although business organizations, particularly small and medium companies (SMEs), are not powerful enough to affect the economy on their own, they have a significant impact on the economy as a whole. As a result, introducing innovative techniques and technology to assist SMEs become more efficient and successful also benefits the whole economy. Investing in IT is one technique that helps SMEs compete against larger firms. The findings of this research have both practical and scholarly consequences, and they contribute to both commercial and academic activity. The findings of this research are beneficial to both scholars and business practitioners. Users can use the service on an as-needed basis and only pay for what they need.

## **REFERENCES:**

1. Arthur du Pauw "Cloud computing- solution for companies that what to have a significant advantage", September 2014
2. Bitta, M. N. (2015). A framework to guide companies on adopting cloud computing technologies (Doctoral dissertation).
3. M. Dan "Cloud Computing in Education", September 12, 2011, [Online]. Available: <http://www.cloudave.com/14857/cloud-computingin-education>
4. Willcocks, L., Venters, W., & Whitley, E. A. (2011). Clear view of the cloud: The business impact of cloud computing. Outlook, (1).
5. Intel "Virtualization and cloud computing", 2016
6. <https://www.slideshare.net/idadapath/virtalization-101-everything-you-need-to-know-to-get-started-with-vmware>
7. <https://www.slideshare.net/markanamehul/virtualization-in-cloud-computing>
8. [http://docs.trendmicro.com/all/ent/dda/v2.95/en\\_us/dda\\_2.95\\_olh/adm\\_ch\\_intro.html#id1265KF00KYK](http://docs.trendmicro.com/all/ent/dda/v2.95/en_us/dda_2.95_olh/adm_ch_intro.html#id1265KF00KYK)
9. <https://www.ablebits.com/office-addins-blog/2014/05/23/make-gantt-chart-excel/>
10. <https://www.safaribooksonline.com/library/view/vmware-vsphere-design/9781118493946/>
11. Cloud\_computing\_technologies\_and\_applicationsv2 2016
12. Making the Business Case for Virtualization 2016
13. David Linthicum "Why companies using the cloud are so happy"
14. Cloud Computing. Wikipdia. Available at [http://en.wikipedia.org/wiki/Cloud\\_computing](http://en.wikipedia.org/wiki/Cloud_computing)
15. <http://www.ibm.com/cloud-computing/us/en/>
16. <http://www.dummies.com/how-to/content/cloud-computing-standards-organizations.html>
17. <https://www.scribd.com/document/80219025/Sdlc-on-Cloud-Computing>