

Virtualization of Resources and Services in Cloud Environment

V.P. Dhivya and A. Sowendariya

K.S. Rangasamy College of Technology,
Department of Information Technology, Tiruchengode, Tamil Nadu, India

Abstract: The cloud computing has evolved from cluster, grid and utility computing. The cloud resources can be either centralized or distributed computing. Cloud can be built with physical or virtualized resources over a large datacentre. Some benefits of cloud are scalability, reliability and efficiency. Cloud computing applies a virtualized platform with elastic resources on-demand by provisioning hardware, software and dataset. The purpose of virtual machine is to enhance resource sharing by many more users and improve computer performance in terms of resource utilization and flexibility. Citrix XenApp is an application virtualization product where each application can be virtualized whereas XenDesktop will virtualize the whole desktop and this paper defines the features and installation of XenDesktop.

Key words: Virtual Desktop Interface • Virtual Desktop Agent • XenApp • XenDesktop

INTRODUCTION

Cloud computing is a delivery of computing resources over internet which has been evolved from cluster, grid and utility computing [1]. Cloud computing is a new distributed commercial computing model that aims at providing computational resources or services to users over a network in a squat-cost manner. Resource allocation and scheduling (RAS) is the key focus of cloud computing, its policy and algorithm have a direct effect on cloud performance and cost [2]. Cloud allow businesses and individual to utilize resources (both hardware and software) managed by third parties. Cloud services are on-demand and available as pay-as-you use or subscription model. A cloud can private or public sometimes it can be hybrid cloud. Example for cloud services is social networking sites, web mail and online file storage.

Cloud provides communal pool of resources such as processing power, data storage space and user applications. The advent of Cloud Computing technologies brings a new statistics infrastructure to users. The Cloud workload categories can provide a basis for common communication for various viewpoints from players, including facility managers, Cloud IT or service providers, Cloud users, consumers, IT managers and hardware vendors [3].

Characteristics of Cloud Computing:

- Broad network access
- Resource pooling
- Rapid elasticity
- Measured services

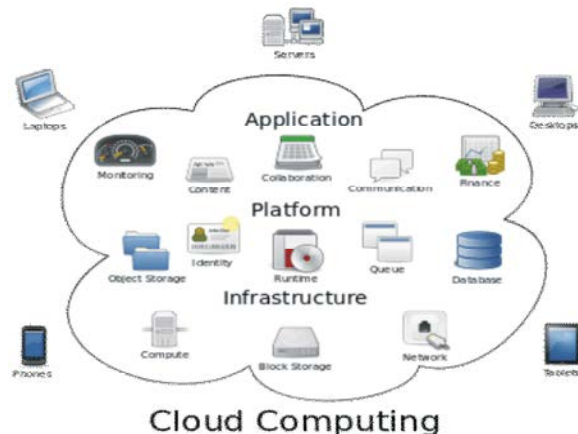


Fig. 1: Architecture of Cloud

Cloud Service Models:

Software as a Service(SaaS): Software as a Service is browser initiated application software over thousands of paid customers [1].

Platform as a Service(PaaS): Platform as a Service enables the user to deploy user built application onto a virtualized cloud platform.

Infrastructure as a Service(IaaS): Infrastructure as a Service put together infrastructures demanded by users.

The cloud computing enables the user to access the application and documents anywhere in the world through internet. Cloud computing applies a virtualized platform with stretch resources on-demand by provisioning hardware, software and dataset.

Reason for Virtualization:

- Resource optimization
- Consolidation
- Maximizing uptime
- Automatically protect applications from server failure
- Easily migrate workload as needs changes

Citrix XenApp is an application virtualization product that will enable the users to connect their applications from computer and mobile devices. It can host applications on central server and allow users to interact with them remotely. It has application virtualization and streaming technologies. The streaming technology enables application delivery to user device. It extends the Microsoft Remote Desktop session, Host Desktop session and applications. Citrix XenApp and Remote Desktop allow windows applications and resources to be managed centrally in datacentre.

A XenApp environment consists of three parts:

- A multi-user operating system: Microsoft Windows Server along with the Remote Desktop Session Host feature allows multiple users to independently access the server.
- XenApp software: Citrix XenApp extends the Remote Desktop Services applications and desktops to client devices via the HDX protocol. HDX afford remote display capabilities, multimedia redirection, USB redirection and a variety of other range of ability, depending on the client device.
- Client devices: XenApp sessions and applications can be access by client devices using a software client called Citrix Receiver.

Citrix Xen Desktop is a desktop virtualization product from Citrix systems [4]. XenDesktop has different types of virtual desktops. In XenApp each application should be

virtualized and added to desktop, but in XenDesktop the desktop can be virtualized. In XenDesktop each client receives full virtual machine i.e. each client can have their own instance of windows but desktop instances are not shared between users , whereas XenApp provide access to hosted resources from multiple users and user share their physical resources.

Related Work: Citrix XenDesktop is a desktop virtualization that delivers windows desktops to any user at any time as an on-demand service. XenDesktop can quickly & securely deliver individual application or complete desktop to whole scheme using flexcast delivery technology. User can access their desktop at any time on any device with high definition user experience.

XenDesktop FlexCast is an intelligent delivery technology that can deliver any type of virtual desktop to any device. Flex cast can knows the user, deliver & network which delivers the correct virtual desktop & applications to the users [4].

The Categories are;

- Hosted shared desktop
- Hosted virtual machine-based desktop (VDI)
- Streamed VHD desktop
- Local virtual machine desktop
- FlexCast

Citrix Xen Server: XenDesktop is not only designed to provide virtual desktop delivery but also designed to be hypervisor, XenDesktop can utilize Citrix XenServer. VMware VSphere, Microsoft Hyper-V for hosting the virtual desktop infrastructure. Citrix XenServer has all the capabilities needed to create & manage a virtual infrastructure at half cost [4].

High-Definition User Experience (HDX) Technology: HDX has software & hardware products, advanced delivery protocol and intelligent algorithm to optimize end to end system performance XenDesktop use HDX for high definition desktop and application virtualization on any device. HDX technology provides best user experience over any network.

Citrix XenDesktop Hosted VDI: Hosted VDI use hypervisor to host the entire desktop in a datacentre. Hosted VDI desktop can either be pooled or assigned. The user can stream a single desktop image to create multiple virtual desktop on more than one hypervisor using Citrix provisioning service [4].

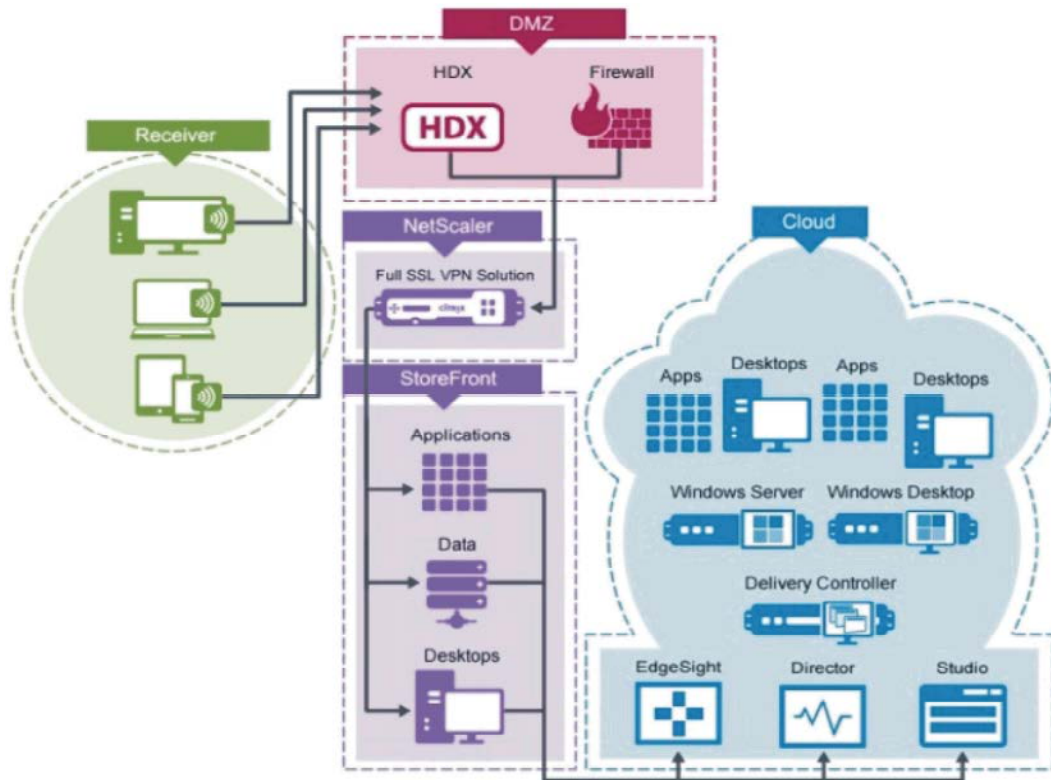


Fig. 2: Citrix Flex Cast Technology

Features Of XenDesktop:

- XenDesktop 4 deliver an HDX user experience on any device over any network with better reliability and higher availability than traditional PC [5].
- FlexCast delivery technology: Across various enterprises different types of workers have changeable performance and personalization requirements. Some may require simplicity and standardization while others need high performance or a fully personalized desktop. FlexCast can deliver every type of virtual desktop.
- On-demand application by XenApp: To shrink desktop management cost and complexity, XenDesktop offer on-demand apps by XenApp.
- Open architecture: XenDesktop works with existing hypervisor, storage and Microsoft infrastructures, enabling the user to use current investments.
- Single-instance management: XenDesktop enables IT to separate the devices, OS, applications and user personalization and maintain a single master image of apiece.
- Data security and access control: XenDesktop improves endpoint security by eliminating the need for data to reside on the user devices. Centralized

data, encrypted delivery and multi factor authentication further helps make sure that only authorized users connect to their desktops, rational property is protected and rigid compliance requirements are met.

- Enterprise-class scalability: XenDesktop include applications, desktop and server virtualization that scales to meet the challenging requirements of global enterprise. Built in virtualization features such as high availability, live migration and bare-metal server provisioning make the infrastructure robust and resilient.

XenDesktop Components: Citrix XenDesktop integrates different distributed components with advanced configuration tools and provides a complete virtual desktop [6].

Delivery Controller (DC):

- Provisioning Services (PVS)
- Machine Creation Services (MCS)
- Virtual Delivery Agent (VDA)
- License Server
- Citrix Personal VDisk Technology
- Citrix Provisioning Server Operation

By delivering server workloads on-demand rather than deploying them on individual desktops, Provisioning Server for Desktops provide [7]:

- Innovative software streaming technology for delivering operating systems and applications as a service, on-demand to physical desktops from the network.
- Desktops with the same OS and application stack can be provisioned on-demand from a single and standard image.
- No software is pre-installed or eternally installed on the desktop hardware.
- Application processing takes place at the desktop.
- Desktops can operate disklessly.

Configuration of Citrix XenDesktop with DSFW

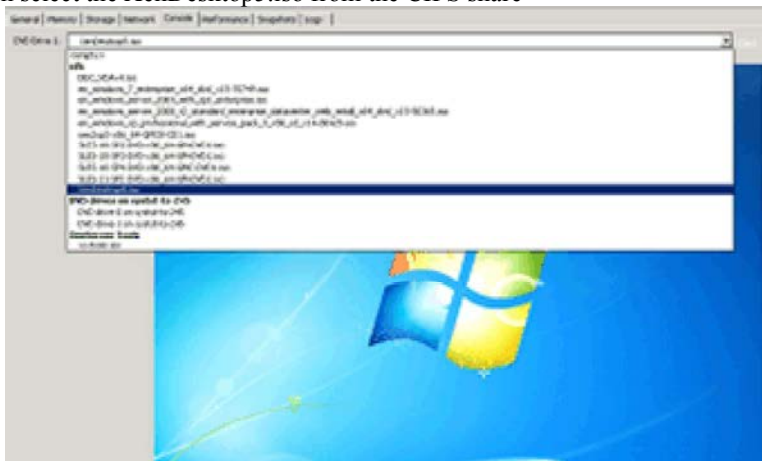
Configuration of Citrix XenDesktop with DSFW: Citrix XenDesktop facilitates the user to deliver on-demand virtual desktops and applications. XenDesktop 5 Quick Deploy is the best way to deploy a fully functional XenDesktop installation. The user should state a master VM and select some users and then Quick Deploy creates virtual desktops.

Prerequisites:

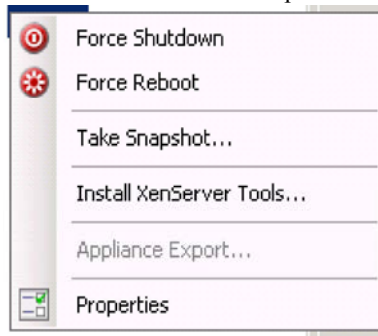
- DSFW server is installed and configured.
- Window 2008 R2 VM is installed on XenServer
- Windows 7 VM is installed on XenServer.
- ISO of XenDesktop5 is available.
- Windows File Share (CIFS) is setup.

Installing XenServer Tools on VMs:

Select the VM and then select the XenDesktop5.iso from the CIFS share



Right-click on the VM and select the Install XenServer Tools option.

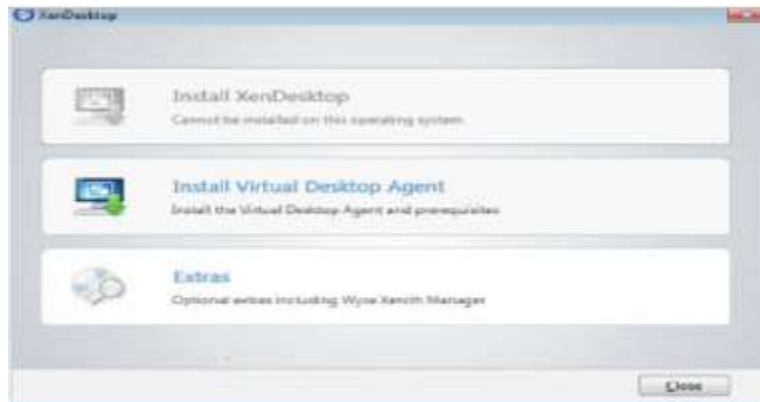


Click Install XenServer Tools.

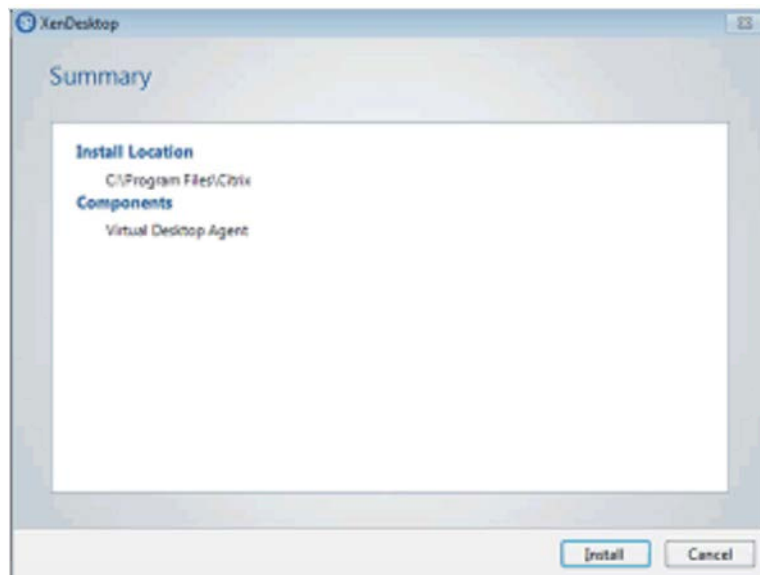


Configuring Virtual Desktop Agent:

Select the Install Virtual Desktop Agent option.

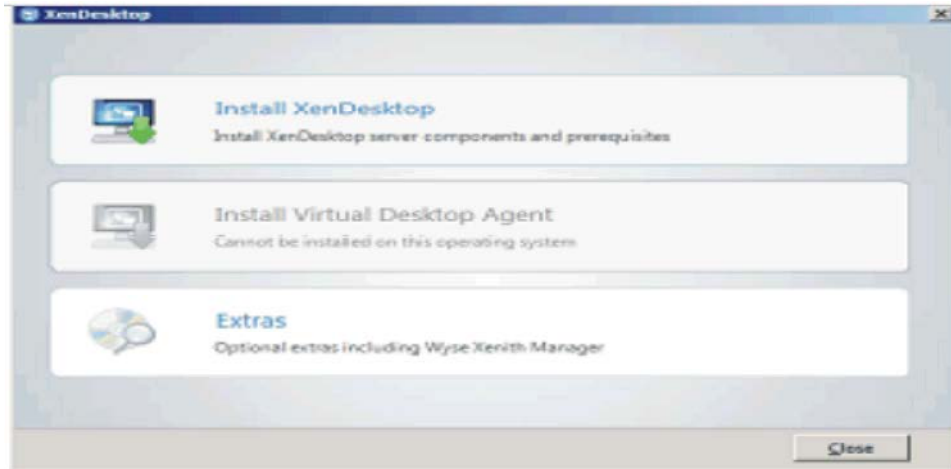


Select the Quick Deploy option and Select Install and complete the installation of Virtual Desktop Agent option.

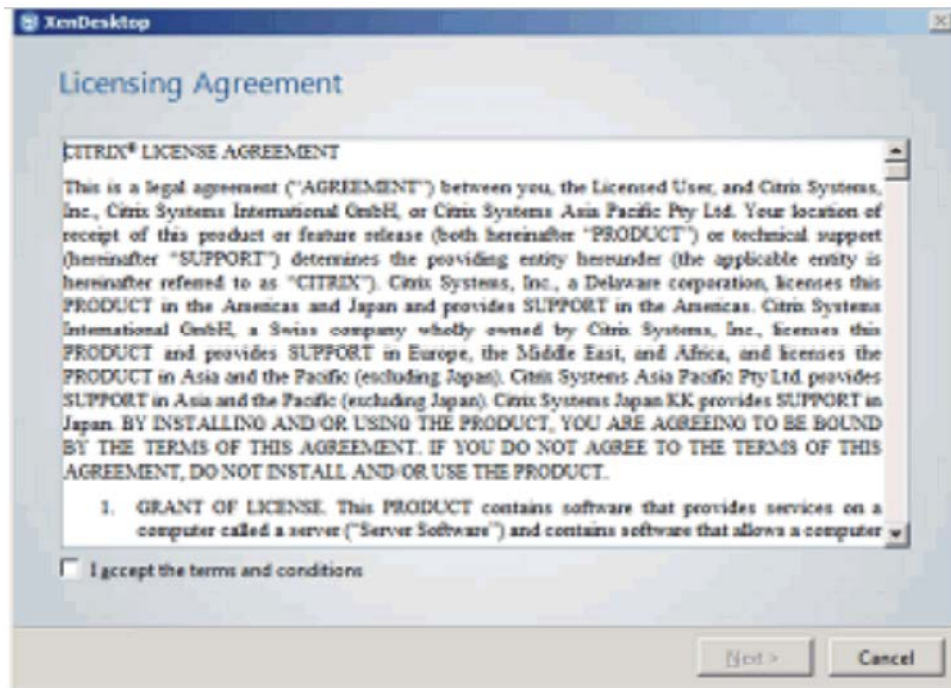


Installing XenDesktop:

Select the Install XenDesktop option.



Verify the Licensing Agreement click Next and Install Click Close and complete the XenDesktop installation

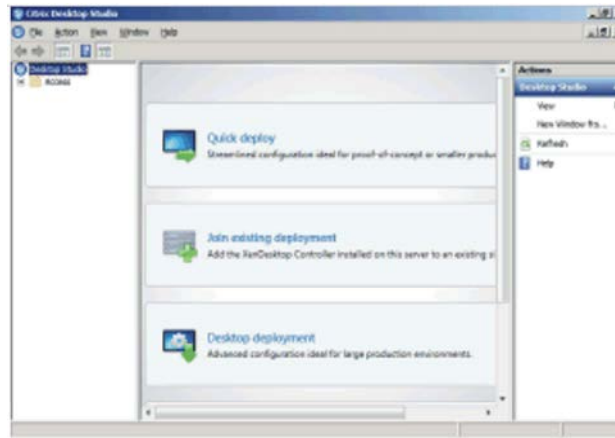


Creating a Base Image:

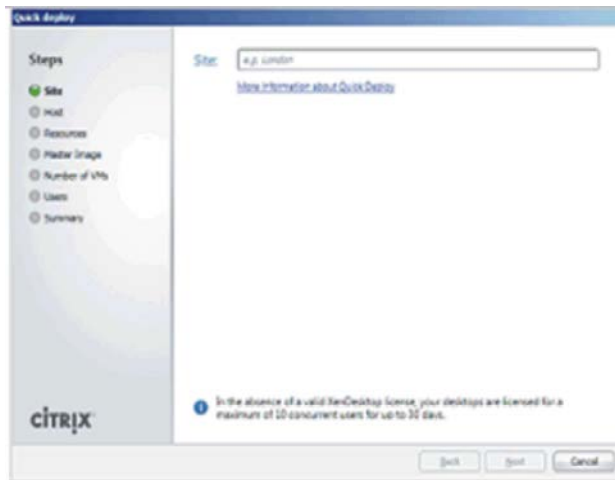
- Install Windows 7 Client on a XenServer and Install XenServer tools.
- Add the Windows 7 client to the DSFW domain.
- OES 2 SP3: Domain Services for Windows Administration Guide Client can be added to the AD domain also.
- After rebooting the client , Install XenDesktop
- Install the OES applications that user want on the Windows7 Client. For example, user can install applications such as Novell Client or iPrint Client.
- Shutdown the client and then take the snapshot of the client.

Creating Quick Virtualized Desktops:

Install Windows 2008 R2 server and XenServer tools. Add the Windows 2008 R2 server to the DSFW domain. Install XenDesktop. and Select the Quick deploy option.

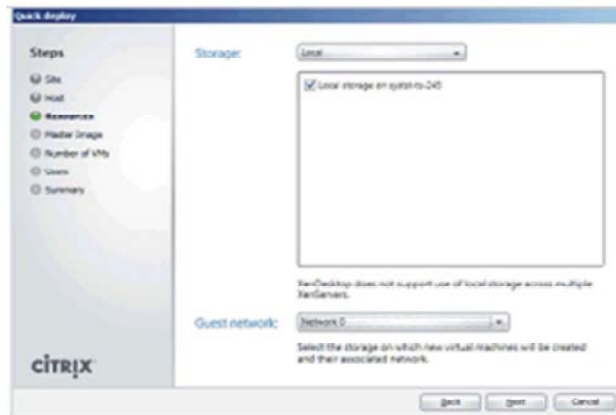


Specify the name of the site and click Next.

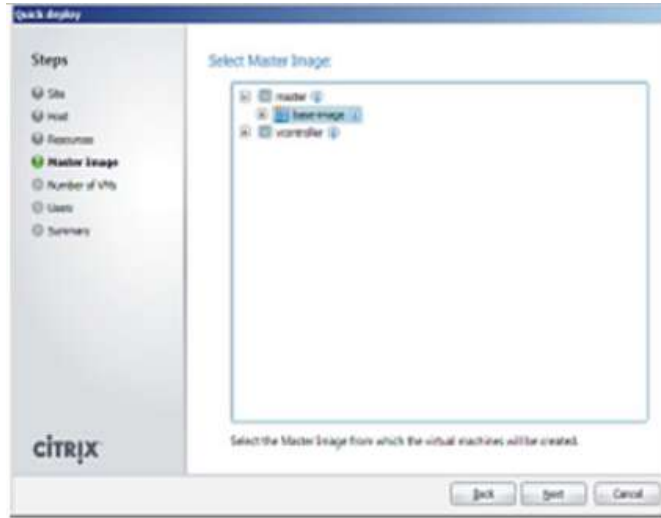


Specify the Host type. Specify the Xenserver IP address and the credentials and click Next.

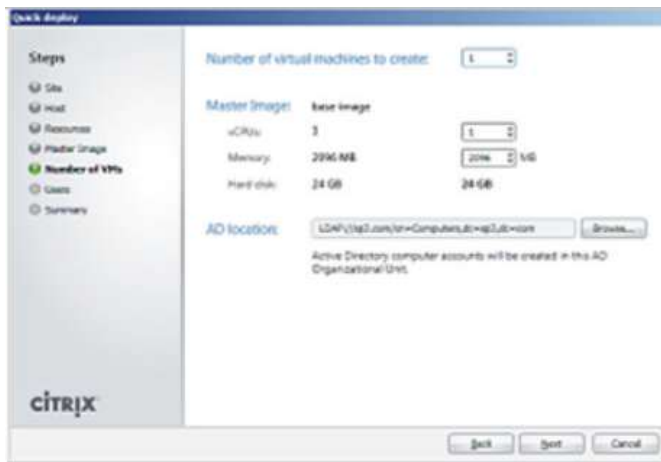
Specify the storage type and Network and click Next.



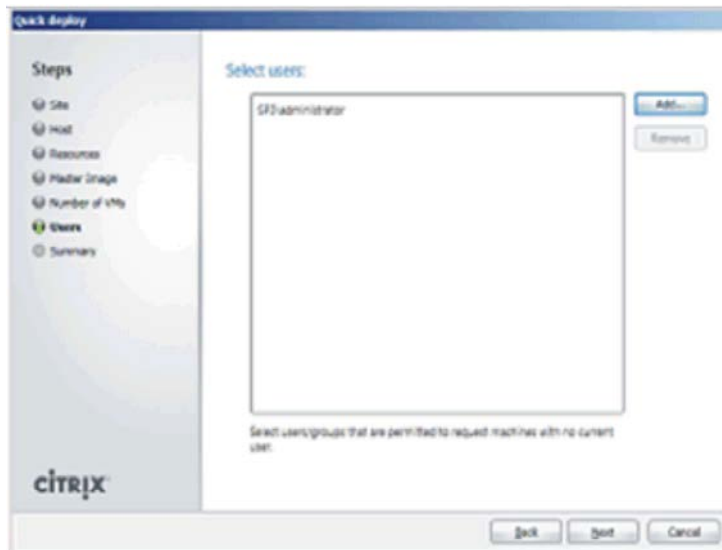
Select the Base Image and click Next.



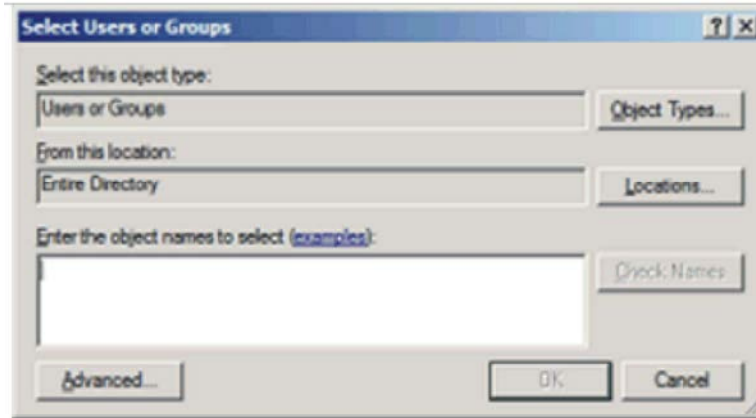
Specify the Number of virtual machines to create and click Next.



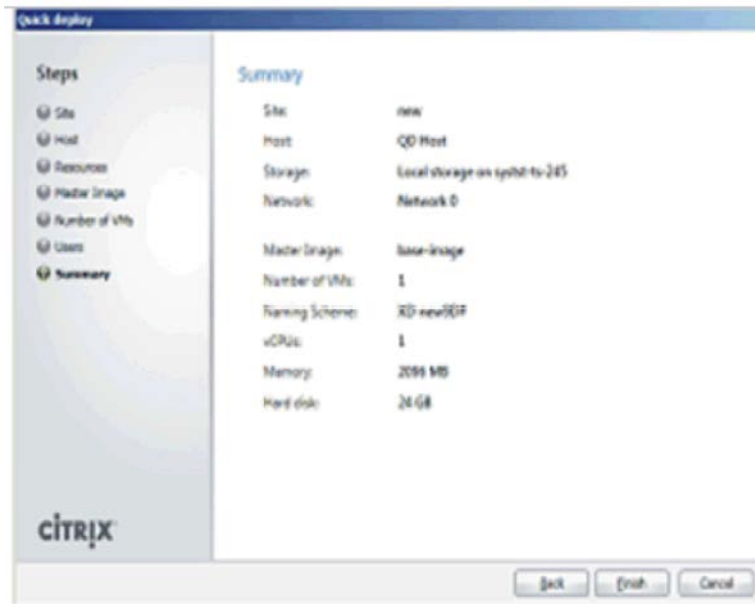
Click Add to add the user accounts.



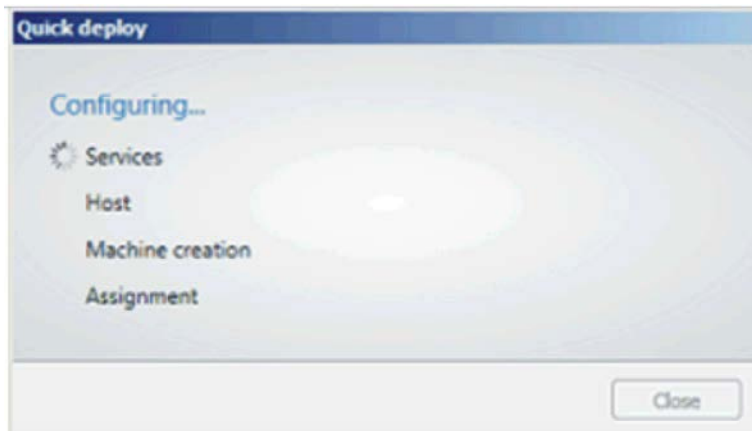
Specify the user and check for the domain users in the Enter the object names to select field. Click OK.



Verify the summary and click Finish to proceed with the configuration.



The configuration will begin.



Click Close. This will complete the creation of virtualized desktops.

**Performance Evaluation:
Parameters for Cloud Service Providers**

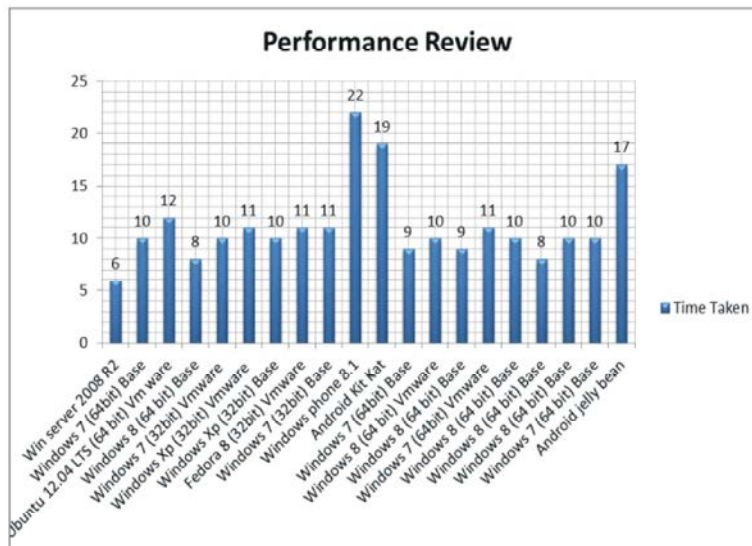
Resource Utilization Metrics: The Utilization of resource parameter is important factor in cloud as these servers make up the cloud.

Infrastructure Response Time (IRT): IRT Provides the overall performance of cloud and it would check the time taken for transaction to complete.

Virtualization Metrics: The resource utilization for virtual machine should be collected. The important parameters related to VM's are;

Lap/mobile	Configuration	Ram	Operating system	Time taken	Speed
Dell	I3 processor	6GB	Win server 2008 R2	4-8 sec	2.27 GHZ (4 CPU)
Acer	I5 processor	3GB	Windows 7 (64 bit) Base	6-14 sec	2.27GHZ (4 CPU)
Acer	I5 processor	3GB	Ubuntu 12.04 (64 bit) Vmware	9-16 sec	2.27GHZ (4 CPU)
Sony	I3 processor	4GB	Windows 8 (64 bit) Base	7-10 sec	2.40 GHZ (4 CPU)
Sony	I3 processor	4GB	Windows 7 (32 bit) Vmware	8-12 sec	2.40 GHZ (4 CPU)
Sony	I3 processor	4GB	Windows xp (32 bit) Vm ware	8-14 sec	2.40 GHZ (4 CPU)
Hp	I3 processor	3GB	Windows xp (32 bit) Base	7-14 sec	2.27 GHZ (4 CPU)
Hp	I3 processor	4GB	Fedora 8 (32 bit) Vm ware	8-14 sec	2.27 GHZ (4 CPU)
Compact	Dual core	1GB	Windows 7 (32 bit) Base	8-15 sec	2.1 GHZ (2 CPU)
Nokia lumia 250	Dual core	512MB	Windows phone 8.1	15-30 sec	1.4 GHZ
Sony ersion	Dual core	256MB	Android Kit Kat	15-24 sec	1.4 GHZ
Dell	I7 processor	6GB	Windows 7 (64 bit) Base	6-12 sec	2.27 GHZ (4 CPU)
Dell	I3 processor	6GB	Windows 8 (64 bit) Vm ware	6-14 sec	2.27 GHZ (4 CPU)
Compact	I3 processor	4GB	Windows 8 (64 bit) Base	7-12 sec	2.40 GHZ (4 CPU)
Compact	I3 processor	4GB	Windows 7 (64 bit) Vm ware	9-14 sec	2.40 GHZ (4 CPU)
Hp	I5 processor	4GB	Windows 8 (64 bit) Base	6-14 sec	2.40 GHZ (4 CPU)
Hp	I7 processor	4GB	Windows 8 (64 bit) Base	6-10 sec	2.40 GHZ (4 CPU)
Acer	I3 processor	4GB	Windows 8 (64 bit) Base	7-14 sec	2.27GHZ (4 CPU)
Acer	I7 processor	4GB	Windows 7 (64 bit) Base	6-14 sec	2.27GHZ (4 CPU)
Samsung	Dual core	1GB	Android jelly bean	14-20 sec	2.0 GHZ

Performance Analysis



CONCLUSION

A cloud is a pool of virtualized computer resources. A cloud can host variety of workloads to be deployed and scaled out quickly through rapid provisioning of physical or virtual machines. Cloud services are offered by means of pay as use model. Cloud services are popular because they reduce the cost and complexity. Virtualization is a computer architecture by which multiple virtual machines (VM) can be multiplexed in same machine. The function of virtualization is to virtualize physical hardware on host machine into virtual resources. Citrix XenApp known as Citrix WinFrame Server allow user to connect their application from wide range of computer systems and mobile devices. Using Citrix XenApp user can access the applications from anywhere. XenDesktop has rolled out more features than XenApp. XenDesktop will use Virtual Desktop Infrastructure (VDI), Streaming disk image, On-Demand Apps. In XenDesktop each client receives their own instances of window and desktop instances are not shared between users.

REFERENCES

1. Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra, 2014. Distributed and Cloud Computing April 2014.
2. Tinghuai Ma, Ya Chu, Licheng Zhao & Otgonbayar Ankhbayar, 2014. "Resource Allocation And Scheduling In Cloud Computing: Policy And Algorithm", IETE Technical Review, 31(1).
3. Wira D. Mulia, Naresh Sehgal, Sohun Sohoni, John M. Acken, C. Lucas Stanberry and David J. Fritz, 2013. "Cloud Workload Characterization", IETE Technical Review, 30(5).
4. Reference Architecture-Based Design Citrix Xen Desktop Built on Flex Pod Citrix Xen Desktop Using Citrix Xen Server, Cisco Unified Computing System, Nexus 5000 and NetApp Storage Cisco Validated Design; July 2013.
5. Cisco Desktop Virtualization Solution with Citrix Xen Desktop: Deliver Desktops and Applications as On-Demand Services, © Cisco Public Information; April 2013.
6. Dell DVS Enterprise - Reference Architecture for Citrix XenDesktop; Nov 2013.
7. EMC proven end user computing solution enabled by EMC VMAX Citrix XenDesktop 5.6 with provisioning services 6.1 for 5000 Desktop, © EMC Corporation; Dec 2012.