MSc. INFORMATION TECHNOLOGY

PART – II

SEMESTER – III

PAPER – IV

DATA CENTER VIRTUALIZATION

SUBMITTED BY

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SAKET COLLEGE OF ART'S, SCIENCE & COMMERCE

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For the Academic year 2021 – 2022

Practical In-Charge

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Date :-

Paper I :-

Place :- Kalyan East

Paper II :-

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PRACTICAL 1.Configuring Esxi Host

a)Install ESXi on a VM using your student Desktop

b)Install ESXi

The core of the vSphere product suite is the hypervisor called **ESXi**. A hypervisor is a piece of software that creates and runs virtual machines. Hypervisors are divided into two groups:

- **Type 1 hypervisors** – also called **bare metal hypervisors,** Type 1 hypervisors run directly on the system hardware. A guest operating-system runs on another level above the hypervisor. VMware ESXi is a Type 1 hypervisor that runs on the host server hardware without an underlying operating system.
- **Type 2 hypervisors** – hypervisors that run within a conventional operating-system environment, and the host operating system provides I/O device support and memory management. Examples of Type 2 hypervisors are VMware Workstation and Oracle VirtualBox

ESXi provides a virtualization layer that abstracts the CPU, storage, memory and networking resources of the physical host into multiple virtual machines. That means that applications running in virtual machines can access these resources without direct access to the underlying hardware. VMware refers to the hypervisor used by VMware ESXi as **vmkernel**. vmkernel receives requests from virtual machines for resources and presents the requests to the physical hardware.

ESXi is supported on Intel processors (Xeon and above) and AMD Opteron processors. ESXi includes a 64-bit VMkernel and hosts with 32-bit-only processors are not supported. However, both 32-bit and 64-bit guest operating systems are supported. ESXi supports up to 4,096 virtual processors per host, 320 logical CPUs per host, 512 virtual machines per host and up 4 TB of RAM per host.

ESXi can be installed on a hard disk, USB device, or SD card. It has an ultralight footprint of approximately 144 MB for increased security and reliability.

- What is ESXi used for?

VMware ESX and VMware **ESXi** are hypervisors that **use** software to abstract processor, memory, storage and networking resources into multiple virtual machines (VMs). Each virtual machine runs its own operating system and applications

- What OS does ESXi run on?

VMware **ESXi** is an **operating system**-independent hypervisor based on the VMkernel **operating system** that interfaces with agents that **run on** top of it. **ESXi** stands for Elastic Sky X Integrated. **ESXi** is a type-1 hypervisor, meaning it **runs** directly on system hardware without the need for an **operating system** (**OS**).

- What is the difference between ESX and ESXi server?

The primary **difference between ESX and ESXi** is that **ESX** is based on a Linux-based console OS, while **ESXi** offers a menu for **server** configuration and operates

independently from any general-purpose OS.

- Does ESXi have a firewall?

The **ESXi** management interface is protected by a **firewall** that sits between the management interface and the network. The **firewall** is enabled by default and blocks all ports, except ports needed for the management services, such as SSH, DNS, DHCP, NFS, vMotion.

The ability to use unlimited hardware resources (CPUs, CPU cores, RAM) allows you to **run** a high number of **VMs** on the **free ESXi** host with the limitation of 8 virtual processors per VM (one physical processor core **can** be used as a virtual CPU).

1. Download and Burn the ESXi Installer ISO Image to a CD or DVD.
2. Format a USB Flash Drive to Boot the ESXi Installation or Upgrade.
3. Create a USB Flash Drive to Store the ESXi Installation Script or Upgrade Script.
4. Create an Installer ISO Image with a Custom Installation or Upgrade Script.
5. Network Booting the ESXi Installer.

PRACTICAL 2
Configuring ESXi Host
a. Examine the Option in DCUI
b. Configure the Management Network
c. Enable SSH

The Direct Console User Interface (DCUI) allows you to interact with the hos using text-based menus. Evaluate carefully whether the security requiremen environment support enabling the Direct Console User Interface.

You can use the Direct Console User Interface to enable local and remote ac the ESXi Shell. You access the Direct Console User Interface from the physic attached to the host.

What is DCUI console?

Direct **Console** User Interface (**DCUI**)

The **DCUI** is the **console** interface normally displayed on the real monitor ou ESXi host. This is the black and orange screen that you may access directly shut down the host, for example, without using the VSphere client.

What is ESXi management network?
The **management network** is the **network** on which the VCH endpoint VM cc vCenter Server and **ESXi** hosts. By designating a specific **management netw** isolate connections to vSphere resources from the public **network**. The VCH this **network** to provide the attach function of the Docker API.

What is VM network?
Virtual **networking** enables communication between multiple computers, vir machines (**VMs**), virtual servers, or other devices across different office and locations. ... Virtual **networking** enables devices across many locations to fu the same capabilities as a traditional physical **network**.

What is the purpose of management network?
The primary goal of a **management network** is to monitor, manage, create, c configure, and upgrade VMs and hosts within the virtualized environment.

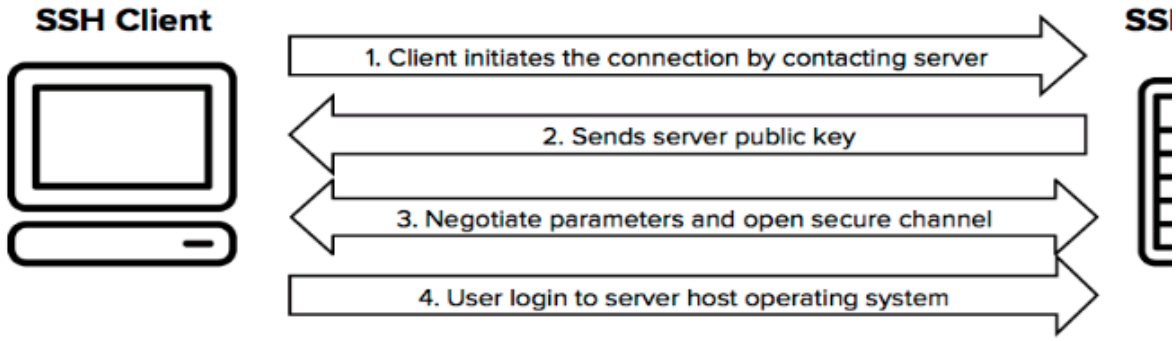
How does a virtual network work?
When a **virtual network** is configured, a zone sends traffic to an external hos same way as a system without a **virtual network**. Traffic flows from the zon the VNIC to the **virtual** switch, and then to the physical interface, which send to the **network**.

What is SNMP data?

Simple Network Management Protocol (**SNMP**) is an Internet Standard protoc
collecting and organizing information about managed devices on IP networks
modifying that information to change device behavior. **SNMP** is widely used ir
management for network monitoring.

The SSH protocol

The SSH protocol uses encryption to secure the connection between a client a
server. All user authentication, commands, output, and file transfers are encry
protect against attacks in the network.



Method 3: Enable SSH on ESXi via vCenter

1. Navigate to the Configure tab.
2. Scroll down and select Security Profile under the System section.
3. Locate the Services section and click the Edit button.
4. Locate and click the SSH entry on the list. Click Start to enable SSH.

Practical 3

Deploying and configuring Virtual Machine

1) What is VMware and what are their benefits?

- VMware provides different applications and software for virtualization. VMware products are categorized into two levels, desktop applications, and Server applications.
- It is useful for:
- Running multiple operating systems and applications on a single computer
- Consolidate hardware to get vastly higher productivity from fewer servers.
- Save more than 50% of total cost spend on IT
- It simplifies IT management and speeds up the deployment of new application

2) What are the different types of virtualization available?

Different types of virtualization available are

- Application virtualization
- Presentation virtualization
- Network virtualization
- Storage virtualization

3.List different types of server software do VMware provides?

- VMware provides three different types of server software
- VMware ESX Server
- VMware ESXi Server
- VMware Server

4. Explain VMware DRS?

VMware DRS stands for Distributed Resource Scheduler; it dynamically balances resources across various host under a cluster or resource pool. It enables users to determine the rules and policies which decide how virtual machines deploy resources, and these resources should be prioritized to multiple virtual machines.

5) Explain VMware Fault Tolerance?

- VMware fault tolerance is an important component of VMware vSphere, and it offers continuous access to applications by preventing data loss and downtime of virtual machines in the event of ESX server failure.

7. **Name different components used in VMware infrastructure.**

Different components used in VMware infrastructure includes

- It consists of the lowest layer which acts as an ESX server host
- It also uses the virtual center server which keeps tracks of all the VM associated images and manages it from one point
- VMWare infrastructure client, it enables the client to communicate with user's applications that are running on VMware
- Web-browser is used to access the virtual machines
- The license server is used to prepare a server which provides licensing to the applications
- Database servers are availed to maintain a database

8.Define the term VMKenel.

- VMWare Kernel is a proprietary kernel of VMware. It needs an operating system to boot and manage the kernel. A service console is being offered whenever VMWare kernel is booted.

9.What is NFS?

- NFS is a Network file system. It is a file sharing protocol which ESXI host used to communicate with the NAS device. It is a specialized store device which connects to a network and can provide file aces service to ESXI hosts

Follow the below steps to create a virtual machine using VMware Workstation:

1. Launch VMware Workstation.
2. Click **New Virtual Machine**.
3. Select the type of virtual machine you want to create and click **Next**:

1. Select the tab for the virtual machine you just created.
2. Click Edit virtual machine settings.
3. On the Hardware tab, select the CD/DVD drive.
4. On the right side: Select Connect at power on. Select Use ISO image file. ...
5. Click OK.

To Install VMware Tools, follow this procedure:

1. Start the virtual machine.
2. On the menu of the VMware console window, choose Player → Manage → Install VMware Tools. The dialog box shown here appears. ...
3. Click Download and Install. ...
4. Follow the instructions in the Setup program to install the VMware tools.

Practical 4 and 5

https://youtu.be/TEdu6Pm1av8

https://youtu.be/J0pQ2dKFLbg

1.vSphere Client

- The vSphere Client is a cross-platform application that can connect only to vCenter Server. It has a full range of administrative functionality and an extensible plug-in-based architecture. Typical users are virtual infrastructure administrators, help desk, network operations center operators, and virtual machine owners.
- Users can use the vSphere Client to access vCenter Server through a Web browser. vSphere Client uses the VMware API to mediate the communication between the browser and the vCenter Server .

2.vCenter Server

vCenter Server is an application that enables you to manage your vSphere infrastructure from a centralized location. It acts as a central administration point for ESXi hosts and their respective virtual machines.

vCenter Server can be installed on a supported version of Windows or you can use a preconfigured Linux version known as **vCenter Server Appliance**. vCenter Server is required for some advanced vSphere features, such as vSphere High Availability, vSphere Fault Tolerance, vSphere Distributed Resource Scheduler (DRS), VMware vSphere vMotion, and VMware vSphere Storage vMotion.

A vCenter Server instance consist of the following components:

- **vSphere Client and vSphere Web Client** – both tools can be used to manage your vCenter Server. vSphere Web Client is the recommended way to manage an ESXi host when the host is managed by vCenter Server.
- **vCenter Server database** – stores the inventory items, security roles, resource pools, performance data, and other information. Oracle and Microsoft SQL Server are supported databases for vCenter Server.
- **vCenter Single Sign-On (SSO)** – allows authentication against multiple user repositories, such as Active Directory or Open LDAP.
- **Managed hosts** – ESXi hosts and their respective virtual machines.

Windows Deployment:

1. Verify all prerequisites. ...
2. Mount the vCenter Server 6.0 ISO image.
3. If auto-run does not start, execute autorun.exe file.
4. Select vCenter Server for Windows and click Install.
5. Click Next.
6. Accept the license agreements.
7. Select Embedded Deployment and click Next.

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