Lab Report 2

Group 10

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In this lab, we followed a two-phase process to convert a virtual environment into a nested virtual environment using VMware vSphere. Each phase had distinct objectives and steps, which were organized based on tasks and components involved. This documentation is written in past tense to accurately describe the procedures followed. The formatting is as follows: buttons are **bold**, options are italicized, text entered into the computer is in 'code', and menu navigation is indicated by the pipe symbol and italic words: Start | Programs | MS Office | Word.

2.1 Phase I: Setting Up the Environment

2.1.1 1. Install ESXi Servers:

- Configured hardware settings: set CPU, hard disk, memory, and port group.
  - CPU: 8 CPUs
  - Memory: 32 GB RAM
  - Hard Disk: 1 TB Thin Provisioned Disk
  - Enable hardware virtualization: Check **Expose hardware-assisted virtualization to the guest OS** under the CPU tab.
- Launched the ESXi server installer:
  - Inserted the ESXi installer ISO and booted the server.
  - Accepted the default options to complete the installation.
- Connected to the ESXi server via a Windows 10 machine:
  - Opened a browser and navigated to the ESXi server's IP address.
  - Logged in with the credentials created during installation.

2.1.2 2. Install vCenter Server Virtual Appliance:

- Accessed the RTFM fileshare and opened the installer:
  - Navigated to the folder containing the installer: win32 installer.
  - Launched the installer.
- Followed the installation steps:
  - Entered the ESXi IPv4 settings, username, and password.
  - Set up the root password and name.
  - Configured the deployment size (left as default).
  - Enabled thin disk mode.
  - Assigned an IP address, set the default gateway and network mask.
  - Entered the DNS server IP from the Windows server.
  - Verified settings and clicked **Finish**.
  - Waited for the installation to complete.

2.1.3 3. Configuration and Deployment:

- Completed Phase I and proceeded to Phase II by clicking **Next**.
- Added the ESXi host:
  - Opened vCenter and logged in with 'administrator@vsphere.local'.
  - Navigated to Hosts and Clusters.
  - Clicked **Add Host**.
  - Entered the ESXi host IP address, username, and password.
  - Accepted the default options to complete the addition of the host.
- Activated SSH:
  - Selected the ESXi host and navigated to Configure | Services.
  - Located **SSH**, clicked **Edit**, and set it to **Start and stop with host**.
- Created a new Single Sign-On (SSO) domain:
  - During vCenter setup, created an SSO domain named 'vsphere.local'.
  - Set up the SSO password, clicked **Next**, and finished the setup.
  - Closed the setup wizard.

2.1.4 4. vSphere Setup:

- Logged into vSphere using 'administrator@vsphere.local'.
- Created a new datacenter:
  - Navigated to Hosts and Clusters.
  - Right-clicked on the vCenter server and selected **New Datacenter**.
  - Named the datacenter and clicked **OK**.
- Added ESXi hosts:
  - Right-clicked the newly created datacenter and selected **Add Host**.
  - Entered the IP address, username, and password of the ESXi host.
  - Accepted the default prompts to add the host to the datacenter.
- Configured the ESXi management network:
  - Pressed 'F2' on the ESXi host console to customize the system.
  - Navigated to Configure Management Network | IPv4 Configuration.
  - Set static IPv4 address, subnet mask, and default gateway.
  - Navigated to DNS Configuration and set the DNS server to the Windows server IP.
  - Restarted the management network.

2.1.5 5. Active Directory Integration:

- Configured NTP, hostname, DNS, and gateway for vCenter:
  - Logged into vSphere.
  - Navigated to Administration | System Configuration.
  - Selected the vCenter server and clicked **Configure**.
  - Set NTP settings, hostname, DNS, and gateway.
- Joined Active Directory Domain:
  - Navigated to Administration | Active Directory Domain.
  - Clicked **Join Domain**, entered the domain details, and rebooted the node.
- Configured forward zone for vCenter in the DNS server.

2.1.6 6. Moving Windows 10 Virtual Machine:

- Used VMware Converter to move the VM from Windows 10 Workstation to ESXi server:
  - Opened VMware Converter.
  - Selected **Convert Machine**.
  - Chose the option for VMware Workstation or other VMware virtual machine.
  - Browsed and selected the virtual machine file.
  - Entered vCenter IP and SSO information.
  - Verified settings and clicked **Finish**.

2.1.7 7. Physical to Virtual (P-to-V) Conversion:

- Installed VMware Converter on the domain controller:
  - Downloaded and installed VMware Converter.
  - Launched the Converter and selected the domain controller as the source.
  - Set the destination as vCenter using its IP and SSO credentials.
  - Chose thin provisioning and accepted defaults.
  - Shut down the original server.
  - Powered on the new virtual server in vCenter.
  - Reconfigured IPv4 settings to the previous settings for the domain controller.

2.2 Phase II: Configuring SAN Datastore and Managing Virtual Machines

2.2.1 1. Configure SAN Datastore:

- Logged into vCenter.
- Clicked on the ESXi host, navigated to Configure | Storage Adapters.
- Added a new iSCSI adapter:
  - Clicked **Add Software Adapter**.
  - Selected the iSCSI adapter created.
  - Went to Dynamic Discovery and added the SAN IP address.

2.2.2 2. Network Adapter Configuration:

- Opened vCenter, selected the ESXi server.
- Under VM Hardware, added a new network adapter:
  - Clicked **Edit** under the VM Hardware section.
  - Selected **Add New Device** and chose **Network Adapter**.
  - Configured the new network adapter to use the CNIT242 iSCSI port group.
  - Clicked **OK**.

2.2.3 3. Storage Configuration:

- Repeated the above steps for the second ESXi host.
- Created a new VMFS datastore:
  - Clicked **Storage**.
  - Selected **New Datastore**.
  - Chose **VMFS** and selected the FreeNAS iSCSI disk.
  - Used the full disk and selected VMFS 6.
- Added VM Kernel NIC:
  - Navigated to Networking.
  - Clicked **Add VMkernel NIC**.
  - Created a new port group named CNIT242 iSCSI.
  - Selected the appropriate vSwitch and set IPv4 to static.
  - Entered IP address '192.168.52.10' and subnet mask '255.255.255.0'.
  - Clicked **Create**.

2.2.4 4. Enable iSCSI Adapter:

- Navigated to Storage.
- Selected the iSCSI adapter and ensured it was enabled.
- Added dynamic targets:
  - Clicked **Port Bindings** and selected the VMkernel interface created.
  - Added a dynamic target with IP address '192.168.52.254' and port '3260'.

2.2.5 5. Installed Windows Server 2019 Virtual Machine:

- Inside vCenter, navigated to the target datastore (e.g., datastore1).
- Clicked **Upload Files**.
- Accessed the network location '\.cit.lcl'.
- Located and selected the Windows Server 2019 ISO file.
- Selected an ESXi host (e.g., 44.100.10.91).
- Created a new virtual machine:
  - Named it WindowsServer2019.

  - Selected datastore and compute resource (ESXi host address).
  - Chose storage (same datastore as before).
  - Compatibility set to ESXi 8 and later.
  - Accepted defaults for guest OS.
  - Modified disk provisioning to **Thin**.
  - Added CD/DVD drive, connected ISO file (‘datastore1‘ → Windows Server 2019 ISO).
  - Finished setup.
- Powered on Windows Server 2019 VM.
- Proceeded with installation, created admin account.
- Installed VMware Tools, mounted and ran setup.
- Configured network settings (Ethernet0):
  - Set IP address to 44.100.10.11, subnet mask to 255.255.255.0, default gateway to 44.100.10.1, DNS to 44.100.10.10.
- Restarted Windows Server 2019.
- Checked for updates, installed, and restarted.
- Configured NTP time server:
  - Opened Command Prompt as admin.
  - Configured time server: ‘w32tm /config /manualpeerlist:“tick.cit.lcl” /syncfromflags:manual /reliable:YES /update‘.
  - Resynchronized time: ‘w32tm /resync‘.
  - Verified changes: ‘w32tm /query /status‘.
- Powered off Windows Server 2019.
- Converted VM to template: Right-clicked → **Template** → **Convert to template**.
- Moved template to SAN datastore:
  - Navigated to ESXi host interface holding Windows Server 2019.
  - Went to **Storage** → **Datastore Browser**.
  - Located template on ‘datastore1‘, moved it to ‘SANdatastoreG10‘.
- Registered template as VM in vCenter:
  - Navigated to the folder where Windows Server 2019 template was moved (SANdatastoreG10).
  - Found ‘.vmtx‘ file, clicked to select.
  - Clicked **Register VM**.
  - Named VM, selected datastore, compute resource, and finished.

2.2.6 6. Set Permissions:

- Inside vCenter, navigated to Windows 11 VM.
- Went to **Permissions** tab.
- Clicked **Add**.
- Changed domain to Active Directory domain ('group10.c242.cit.lcl').
- Added user (e.g., ESstudents).
- Assigned role (e.g., Read only).
- Clicked **OK**.

2.2.7 7. Migrated Storage to SAN (Storage vMotion):

- Inside vCenter, found Windows 11 VM in the sidebar.
- Right-clicked and selected **Migrate**.
- Chose **Change storage only**.
- Clicked **Next**.
- In **Select Storage**, chose:
  - Virtual disk format: **Thin Provision**.
  - Destination datastore: 'SANdatastoreG10'.
- Clicked **Next** and **Finish**.
- Monitored progress in **Monitor → Tasks and Events → Tasks**.
- VM could still be used during migration.

2.2.8 8. Migrated Compute Resource (vMotion):

- Inside vCenter, found Windows 11 VM in the sidebar.
- Right-clicked and selected **Migrate**.
- Chose **Change compute resource only**.
- Clicked **Next**.
- Selected the target ESXi host (e.g., '44.100.10.92').
- Accepted default options.
- Clicked **Finish**.
- VM remained operational during migration.

3 Problem Solving (Sam)

4 Results (Sam)

In this lab, a nested virtual environment was successfully created and configured using VMware vSphere. This involved setting up two ESXi servers, installing a vCenter server, and migrating existing virtual machines from a VMware Workstation environment into the new ESXi environment. Various VMware tools and techniques were utilized to manage and optimize the virtual environment, ensuring efficient resource allocation and network configuration. The following sections detail the physical and logical network setups, the IP schema, and computer names along with login information.

4.1 Summary of Accomplishments

- Installation and Configuration of ESXi Servers
  - Two ESXi servers were successfully installed and configured with 8 CPUs, 32 GB RAM, and 1 TB thin provisioned disks. Hardware virtualization was enabled.
- Deployment of vCenter Server
  - vCenter Server was installed, configured, and joined to the Active Directory domain.
- Migration of Windows 10 VM
  - The Windows 10 VM was successfully migrated from VMware Workstation to the ESXi server and added to the inventory.
- P-to-V Conversion of Domain Controller
  - Using VMware Converter, the domain controller was migrated from a physical to a virtual environment on the ESXi server.
- Configuration of SAN Datastore
  - Both ESXi servers were configured to access an iSCSI SAN LUN and formatted as a VMFS datastore.
- Installation and Template Creation of Windows Server 2019
  - A fresh Windows Server 2019 was installed, updated, and saved as a template for future use.
- Virtual Machine Management
  - VMware Snapshots were used to protect configurations during changes, and virtual machine access was controlled through vCenter permissions.
- Virtual Machine Migration
  - VMs were migrated between datastores and ESXi hosts using vMotion and storage vMotion.

4.2 Machine Networking/Login Information Table

	ESXi1.2 Server	ESXi2.1 Server	vCenter	Windows 10 VM	Windows 2019 Srv.
Pnic1 (CNIT242G10A)	44.100.10.191	44.100.10.192	44.100.10.170	44.100.10.111	44.100.10.11
Pnic2 (CNIT242iSCSI)	192.168.52.10	192.168.54.10	N/A	N/A	N/A
Subnet Mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
Default Gateway	44.100.10.1	44.100.10.1	44.100.10.1	44.100.10.1	44.100.10.1
DNS	44.100.10.10	44.100.10.10	44.100.10.10	44.100.10.10	44.100.10.10
SAN server IP	192.168.52.254	192.168.54.254	N/A	N/A	N/A
Login	root	root	administrator	Administrator	Administrator
Password	Cnit242!	Cnit242!	Cnit242!	Cnit242!	Cnit242!