



RQF LEVEL 4



SWDWS401
SOFTWARE
DEVELOPMENT

Windows Server Administration

TRAINER'S MANUAL

October, 2024



WINDOWS SERVER ADMINISTRATION

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Original published version: October, 2024

ACKNOWLEDGEMENTS

The publisher would like to thank the following for their assistance in the elaboration of this training manual:

Rwanda TVET Board (RTB) extends its appreciation to all parties who contributed to the development of the trainer's and trainee's manuals for the; TVET Certificate IV in Software Development, specifically for the module " **SWDWS401: Windows Server Administration**".

We extend our gratitude to KOICA Rwanda for its contribution to the development of these training manuals and for its ongoing support of the TVET system in Rwanda.

We extend our gratitude to the TQUM Project for its financial and technical support in the development of these training manuals.

We would also like to acknowledge the valuable contributions of all TVET trainers and industry practitioners in the development of this training manual.

The management of Rwanda TVET Board extends its appreciation to both its staff and the staff of the TQUM Project for their efforts in coordinating these activities.

This training manual was developed:

Under Rwanda TVET Board (RTB) guiding policies and directives



Under Financial and Technical support of



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ACRONYMS

AD: Active Directory
ADDS: Active Directory Domain Services
ADSS: Active Directory Sites and Services
ADUC: Active Directory Users and Computers
BIOS: Basic Input/ Output System
CBT: Competency-Based Training
CD: Compact Disc
CGI: Common Gateway Interface
C Name: Canonical Name
CPU: Central Processing Unit
CSS: Cascading Style Sheets
DHCP: Dynamic Host Configuration Protocol
DNS: Domain Name System
DSRM: Set Directory Services Restore Mode
DVD: Digital Video Disc or Digital Versatile Disc
FQDN: Fully Qualified Domain Name
FTP: File Transfer Protocol
GPMC: Group Policy Management Console
GPOs: Group Policy Objects
HDDs: Hard Drives
HTTPS: Hypertext Transfer Protocol Secure
IIS: Internet Information Services
IP: Internet Protocol
IP Config: Internet Protocol Configuration
IPV4: Internet Protocol Version 4
IPV6: Internet Protocol Version 6
KOICA: Korea International Cooperation Agency
MAC: Media Access Control Address
MX: Mail Exchange
MySQL: My Structured Query Language
NOS: Network Operating System
NS: Name Server
OS: Operating System
OU: Organizational Unit
PTR: Pointer Record
RAID: Redundant Array of Independent Disks
RAM: Random Access Memory

RRA: Rwanda Revenue Authority
RSAT: Remote Server Administration Tools
RTB: Rwanda TVET Board
SOA: Start Of Authority
SOD: Software Development
SQL: Structured Query Language
SSDs: Solid-State Drives
TQUM: TVET Quality Management Project
UEFI: Unified Extensible Firmware Interface
UTB: University of Tourism, Technology and Business Studies
VMs: Virtual Machines
WSUS: Windows Server Update Services
WWW: World Wide Web

INTRODUCTION

This trainee's manual includes all the knowledge and skills required in **Software Development** specifically for the module of " **Windows Server Administration** ". Trainees enrolled in this module will engage in practical activities designed to develop and enhance their competencies. The development of this training manual followed the Competency-Based Training and Assessment (CBT/A) approach, offering ample practical opportunities that mirror real-life situations.

The trainee's manual is organized into Learning Outcomes, which is broken down into indicative content that includes both theoretical and practical activities. It provides detailed information on the key competencies required for each learning outcome, along with the objectives to be achieved.

As a trainee, you will start by addressing questions related to the activities, which are designed to foster critical thinking and guide you towards practical applications in the labour market. The manual also provides essential information, including learning hours, required materials, and key tasks to complete throughout the learning process.

All activities included in this training manual are designed to facilitate both individual and group work. After completing the activities, you will conduct a formative assessment, referred to as the end learning outcome assessment. Ensure that you thoroughly review the key readings and the 'Points to Remember' section.

MODULE CODE AND TITLE: SWDWS401-WINDOWS SERVER ADMINISTRATION

Learning Outcome 1: Manage Server Services

Learning Outcome 2: Manage Users

Learning Outcome 3: Deploy web application

Learning Outcome 1: Manage Server Services



Indicative contents

- 1.1 Introduction to Server Administration**
- 1.2 Installation of Server OS**
- 1.3 Creation of Domain Controller**
- 1.4 Installation of Server Roles and Features**
- 1.5 Configuration of DNS**
- 1.6 Configuration of DHCP Parameters**
- 1.7 Monitoring of Server Services**

Key Competencies for Learning Outcome 1: Manage Server Services

Knowledge	Skills	Attitudes
• Description of Windows Server • Description of Active Directory (AD) • Identification of Server Services and Roles Overview • Description of Hypervisor • Description of Virtualization • Description of RAID	• Installing windows server OS • Configuring RAID • Creating virtual machines • Creating domain controller • Installing Hypervisor • Installing server roles and features • Configuring DNS • Configuring DHCP • Monitoring server services	• Being attentive to Details • Having adaptability • Being patient • Having Customer Service Orientation • Having Teamwork • Having Time Management • Having Troubleshooting • persistence • Having ethical Conduct • Being Resourceful • Being calm Under Pressure • Having ownership and Accountability



Duration: 35 hrs

Learning outcome 1 objectives:



By the end of the learning outcome, the trainees will be able to:

1. Describe correctly key concepts that are used in server administration.
2. Describe clearly Windows Server in server administration.
3. Describe correctly Active Directory (AD) in server administration.
4. Identify correctly Server Services and Roles Overview in server administration.
5. Describe clearly Hypervisor and virtualization in server administration.
6. Describe correctly RAID as used in server administration.
7. Install properly windows server OS in virtual machine
8. Configure effectively RAID on physical server
9. Create appropriately virtual machines on server
10. Create effectively domain controller in windows server
11. Install properly Hypervisor in virtual machine
12. Install properly Hypervisor in virtual machine
13. Configure properly DNS and DHCP in windows server
14. Monitor appropriately server services in client machine



Resources

Equipment	Tools	Materials
● Computer ● Server machine	● VMWare workstation ● VMWare ESXI ● Oracle VirtualBox ● VMWare V-Sphere ● Windows Server OS bootable image ● Browser ● Flash disk ● CD/DVD Drive ● Rufus ● PowerISO	● Electricity ● Internet

	• ImgBurn	
 Advance Preparation: Before delivering this learning outcome, you are recommended to: • Have prepared computer lab		



Indicative content 1.1: Introduction to Server Administration



Duration: 5hrs



Theoretical Activity 1.1.1: Description of server administration



Notes to the trainer:

- While delivering this content, a group can be used for description of server administration.
- Avail sample videos to be used as didactic materials.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to answer to the following questions:

- i. How does a server differ from a client?
- ii. What is Network Operating System? Give three examples.
- iii. Define the following:
 - a) Server administration
 - b) Virtualization
 - c) Hypervisor
- iv. What are hypervisor technologies. Provide examples of each type?
- v. Explain the types and benefits of server virtualization.
- vi. What are the hardware and software requirements used in windows server administration?

Step 2: Ask trainees to write answers on paper or flipchart

Step 3: Involve trainees in presentation of their findings.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

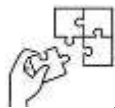
Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 1.1.1 in the trainee manual.



Points to Remember

- Server administration: Involves managing and maintaining computer servers, which are powerful computers that provide services to other computers on a network.
- Virtualization: The process of creating virtual versions of physical resources to maximize efficiency and flexibility.
- Hypervisor: Software that creates and manages virtual machines by abstracting physical hardware.
- There are different types of server virtualization such as: Full Virtualization, Para-Virtualization and Hardware-Assisted Virtualization
- In server virtualization there are different technologies which include: Type 1 Hypervisor (Bare-Metal) and Type 2 Hypervisor (Hosted)



Application of learning 1.1.

XYZ Company is planning to set up a new server and needs guidance to understand more about server administration. The company is looking for a system administrator who can describe the windows server administration and both hardware and software requirements. You are hired as a system administrator to help company to get information needed.

CHECKLIST

Key points to check	Observation	
	YES	NO
1. Windows server is well described		
2. Hardware requirements are well identified		
3. Software requirements are well identified		



Indicative content 1.2: Installation of Server OS



Duration: 5 hrs



Theoretical Activity 1.2.1: Description of server OS



Notes to the trainer:

- While delivering this content, small groups can be used for Description of server OS in server administration.
- Avail sample videos to be used as didactic materials.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

- i. What is RAID?
- ii. What are the levels of RAID?
- iii. What are the advantages and disadvantages of using RAID?

Step 2: Ask trainees to write answers on paper or flipchart

Step 3: Involve trainees in presentation of their findings.

Step 4: Provides expert view for more clarification.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 1.2.1 in the trainee manual.



Points to Remember

- RAID (Redundant Array of Independent Disks) combines multiple physical disks into a single logical unit to improve performance, redundancy, and/or storage capacity.
- RAID Levels are RAID 0 (Striping), RAID 1 (Mirroring), RAID 5 (Striping with Parity), RAID 6 (Striping with Double Parity), RAID 10 (1+0) (Striping and Mirroring).
- Advantages of RAID Technology are: Performance, redundancy, storage efficiency.
- Disadvantages of RAID Technology are: Cost, complexity, performance Trade-offs.



Practical Activity 1.2.2: Creating virtual storage (RAID)



Notes to the trainer

- This activity should take place in a Computer Lab. Where the trainees will create virtual storage
- Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As the server administrator for your organization, you are tasked with improving data redundancy and performance on the company's physical server. The server has multiple hard drives, and you must create a **RAID 1 array** to ensure both data protection and optimized storage usage.
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to create virtual storage (RAID). While demonstrating the steps for creating RAID in physical machine.
- Step 4:** Asks trainees to create virtual storage and monitor the activity.
- Step 5:** Verify whether configuration and creation of RAID on physical server is properly performed.
- Step 6:** Ask trainees to read key reading 1.2.2 in trainee's manual



Points to Remember

- While Creating Virtual Storage (RAID) on physical server follow steps below:
 - ✓ Enter System Setup by pressing F2 at startup.
 - ✓ Navigate to **Device Settings**.
 - ✓ Select the appropriate **RAID controller**.
 - ✓ Access the **Main Menu**.
 - ✓ Go to **Configuration Management**.
 - ✓ Select **Create Virtual Disk**
 - ✓ Confirm by checking the box and clicking **Yes**.
 - ✓ The virtual disk is created successfully; click **Ok** to finish



Practical Activity 1.2.3: Installation of Hypervisor



Notes to the trainer

- This activity should take place in a Computer Lab.
- Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As a Trainee in Level 4 software development, you are tasked with installing of Hypervisor on the windows server.
- Step 2:** Explain the task and provide clear work instructions.
- Step 3:** Demonstrate how to install hypervisor in server.
- Step 4:** Ask trainees to perform the activity and monitor the process.
- Step 5:** Verify whether the tasks are clearly performed.
- Step 6:** Ask trainees to read key reading 1.2.3. in trainee's manual



Points to Remember

- To install a hypervisor in a virtual machine (VM), you'll generally follow these steps:
 - ✓ Prepare Your Environment
 - ✓ Create a New Virtual Machine
 - ✓ Install the Operating System
 - ✓ Install the Hypervisor: choose a hypervisor like VMware ESXi, Hyper-V, or another one.
 - ✓ Configure the Hypervisor
 - ✓ Test and Verify



Practical Activity 1.2.4: Creating of virtual machines



Notes to the trainer

- This activity should take place in a Computer Lab.
- Avail VMware workstation on your computer
- Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As a Trainee in Level 4 software development, you are requested to create a virtual machine on server.
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to create of virtual machine. While demonstrating explain the steps to follow.
- Step 4:** Asks learners to perform the activity and monitor it.
- Step 5:** Verify whether the tasks are clearly performed.
- Step 6:** Ask trainees to read key reading 1.2.4 in trainee's manual



Points to Remember

- To Create of virtual machine, follow these steps:
 - ✓ Open VMWare Workstation Pro
 - ✓ From the **Home** tab, click on the “**Create a New Virtual Machine**”
 - ✓ In a new window that opened, select the “Typical (recommended)” and click Next
 - ✓ Then, select “I will install the operating system later” and click Next



Practical Activity 1.2.5: Installation of guest OS



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
 - i. Avail OS (win 7,10,11) ISO image, DVD, or other installation media.
 - ii. Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As a Trainee in Level 4 software development, you are asked to Install the guest OS (win 7 or win 10) in VMware workstation.
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to install the guest OS. While demonstrating steps to install the guest OS
- Step 4:** **Step 4:** Asks trainees to install the guest OS and monitor.
- Step 5:** Verify whether the tasks are clearly performed.
- Step 6:** Ask trainees to read key reading 1.2.5 in trainee's manual



Points to Remember

- To install a guest operating system (OS) in VMware workstation follow steps:
 - ✓ Select the virtual machine and go to **VM > Settings**.
 - ✓ Select **CD/DVD drive**, choose **Use ISO image file**, and browse to the ISO location.
 - ✓ Enable **Connect at power on**.
 - ✓ Press any key to start the OS installation and follow the prompts.



Application of learning 1.2.

Bxz Solutions Inc. is a company specializing in providing IT solutions for small and medium businesses. It aims to enhance its infrastructure by setting up a new server environment to improve its virtualization capabilities and manage its data efficiently. As a System Administrator, you are requested by Bxz Solutions Inc. to Configure RAID on the Physical Server, Install a Hypervisor, Create a Virtual Machine (VM) and Install Guest Operating System (OS) to establish a robust server environment.

CHECKLIST

SN	Criteria	Indicators	Observation	
			Yes	No
1	RAID on physical server is well configured	1.1. RAID level is selected		
		1.2. Disks is prepared		
		1.3. Array is created		
		1.4. Data integrity is protected		
2	hypervisor is well installed	2.1. Compatible hypervisor is installed		
		2.2. Network is configured		
		2.3. Licensing is validated		
3	Virtual machine is well created	3.1. VM is configured with resources		
		3.2. OS is installed		
		3.3. Network is connected		
		3.4. Resources is allocated		
4	Guest OS is well installed	4.1. OS is installed		
		4.2. Drivers and updates is applied		
		4.3. Network and security settings are configured		



Indicative content 1.3: Creation of domain controller



Duration: 5 hrs



Theoretical Activity 1.3.1: Description of Server Administrative tools



Notes to the trainer:

- While delivering this content, a small group can be described of Server Administrative tools.
- Avail sample videos to be used didactic materials



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to answer to the following questions:

- I. Define term “domain controller”
- II. Explain Server Administrative Tools.

Step 2: Ask trainees to write answers on paper or flipchart

Step 3: Involve trainees in presentation of their findings

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainee to read the key reading 1.3.1 in the trainee manual.



Points to Remember

- A domain controller (DC)** is a server that runs the Active Directory Domain Services (AD DS) role in a Windows Server environment.
- Server Administrative tools are:** Server Manager, Active Directory Administrative Center (ADAC), Active Directory Users and Computers (ADUC), Group Policy Management Console (GPMC), DNS Manager, Hyper-V Manager, Task Scheduler, Performance Monitor, Windows Admin Center, Event Viewer, Windows PowerShell



Practical Activity 1.3.2: Installation of Active Directory Domain Services (ADDS) and Promotion of server to a domain controller



Notes to the trainer

- This activity should take place in a Computer Lab.
- Avail video as didactic material



Key steps:

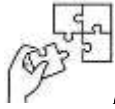
While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As a Trainee in Level 4 software development, you are requested to go to the computer lab to install Active Directory Domain Services (ADDS) and Promotion of server to a domain controller in the windows server.
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to install AD DS and promoting server to a domain. While demonstrating the steps for install AD DS and promoting server on a domain
- Step 4:** Asks trainees to install AD DS and promoting server to a domain and monitor
- Step 5:** Verify whether the task is clearly performed.
- Step 6:** Ask trainees to read key reading 1.3.2 in trainee's manual



Points to Remember

- A.** Install ADDS Role follow the following steps:
- ✓ Open Server Manager
 - ✓ Add Roles and Features
 - ✓ Role-Based or Feature-Based Installation
 - ✓ Select Destination Server
 - ✓ Select Server Roles
 - ✓ Complete Installation
- B.** Promote the Server to a Domain Controller
- ✓ Access AD DS Configuration Wizard
 - ✓ Deployment Configuration
 - ✓ Domain Controller Options
 - ✓ Additional Options
 - ✓ Review Options
 - ✓ Prerequisites Check
 - ✓ Server Restart



Application of learning 1.3.

Bxz Solutions Inc. is a company specializing in providing IT solutions for small and medium businesses. Located in Rwanda, Eastern area, Bxz Solutions Inc. aims to enhance its infrastructure by setting up a new server environment to improve its data management and network capabilities.

As an IT technician hired by Tech Solutions Inc., you are tasked with the following:

Tasks:

1. Install Active Directory Domain Services (AD DS)
2. Promote the Server to a Domain Controller

CHECKLIST:

SN	Criteria	Indicators	Observation	
			Yes	No
1	Pre-installation is well prepared	1.1. Server specifications are verified		
		1.2. Static IP address is applied		
		1.3. Windows Server is installed and updates are applied		
		1.4. Network and internet connectivity is checked		
		1.5. Administrative rights are granted		
2	Active Directory Domain Services	2.1. AD DS role is installed		
		2.2. AD DS role visibility is confirmed		
3	Server to Domain Controller is well promoted	3.3. DNS settings are prepared		
		3.4. Review the summary and proceed with the promotion process		
		3.5. Deployment configuration option is selected		
		3.6. Domain name is created		
		3.7. DSRM password is set and confirmed		
4	Post-installation is well Verified	4.1. AD DS service status is checked		
		4.2. DNS settings and records are verified		



Indicative content 1.4: Installation of server role and features



Duration: 5 hrs



Theoretical Activity 1.4.1: Description of server roles and features



Notes to the trainer:

- While delivering this content, a small group can describe server roles and features in server administration
- Avail sample videos or images to be used didactic materials



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

- What is the primary function of a DNS server?
- What are DNS root hints used for?
- How do zones and zone files work in DNS?
- Discuss the key messages involved in the DHCP communication process.
- Why is DHCP fault tolerance important?

Step 2: Ask trainees to write answers on paper or flipchart

Step 3: Involve trainees in presentation of their findings.

Step 4: Provides expert view for more clarification.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 1.4.1 in the trainee manual



Points to Remember

Description of server roles and features

1. The Domain Name System (DNS) is a critical service that translates human-readable domain names (e.g: www.example.com) into IP addresses.

2. Root Hints: A list of root DNS servers that a DNS server can use to resolve queries for domains it doesn't know.

3. Zones and Zone Files

4. Key messages involved in the DHCP communication process are:

DHCP Discover, DHCP Offer, DHCP Request, DHCP Acknowledgment

5. **Fault Tolerance Implementations:** To ensure continuous DHCP service availability, administrators can implement fault tolerance.



Practical Activity 1.4.2: Installation of server roles and features



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
 - i. Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to do the task described below:

As a Trainee in Level 4 software development, you are requested to go to the computer lab to install DNS and DHCP in server administration.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to install AD DS and Promotion of server to a domain controller. While demonstrating the steps for installing AD DS Promotion of server to a domain controller

Step 4: Asks trainees to install AD DS and Promotion of server to a domain controller

Step 5: Verify whether the tasks are clearly performed.

Step 6: Ask trainees to read key reading 1.4.2 in trainee's manual



Points to Remember

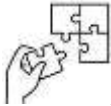
Installation of server roles and features

- **Installing DNS Server Role:**
 - ✓ Open **Server Manager**.

- ✓ Click on **Add roles and features**.
- ✓ Proceed through the wizard by clicking **Next**.
- ✓ Select **Role-based or feature-based installation** and click **Next**.
- ✓ Choose the local server and click **Next**.
- ✓ Check **DNS Server** and click **Add Features**.
- ✓ Click **Next** through the subsequent screens.
- ✓ Click **Install**.
- ✓ Once installation completes, close the wizard.

● **Installing DHCP Server Role:**

- ✓ Open **Server Manager**.
- ✓ Click on **Add roles and features**.
- ✓ Proceed through the wizard by clicking **Next**.
- ✓ Select **Role-based or feature-based installation** and click **Next**.
- ✓ Choose the local server and click **Next**.
- ✓ Check **DHCP Server** and click **Add Features**.
- ✓ Click **Next** through the subsequent screens.
- ✓ Click **Install**.
- ✓ Once installation completes, close the wizard.



Application of learning 1.4.

Bxz Solutions Inc. is a company specializing in providing IT solutions for small and medium businesses. Located in Rwanda, Eastern area, **Bxz Solutions Inc.** aims to enhance its network infrastructure by setting up essential server roles, including DNS and DHCP, to improve network management and efficiency.

As an System Administrator hired by Tech Solutions Inc., you are tasked with the following:

Tasks: Installation of Server Roles and Features (DNS and DHCP)

CHECKLIST:

SN	Criteria	Indicators	Observation	
			Yes	No
1	DNS Server and DHCP Server Role are well	1.1. Network requirements is verified		
		1.2. DNS Server role is Installed		
		1.3. DNS Server settings is well Configured		
		1.4. DNS functionality is verified		

	installed	1.5. DHCP Server role is well installed		
		1.4. DHCP settings is well verified		
		1.6. DHCP failover (if required) is applied		
		1.7. DHCP functionality is verified		
		1.8. DNS and DHCP configuration is well done		



Indicative content 1.5: Configuration of DNS



Duration: 5 hrs



Practical Activity 1.5.1: Configuring lookup zones



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
- Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As a Trainee in Level 4 software development, you are requested to go to configure the Lookup zones in server administration.
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to configure Lookup zones in the server administration.
- Step 4:** Ask trainees to configure the Lookup zones in server.
- Step 5:** Verify whether the tasks are clearly performed.
- Step 6:** Ask trainees to read key reading 1.5.1 in trainee's manual



Points to Remember

- To configure DNS lookup zones, you can follow these steps:
 1. Open the DNS Manager on your Windows Server. You can access it through the Server Manager or directly from the Start menu.
 2. In the DNS Manager, you will see different sections such as Forward Lookup Zones, Reverse Lookup Zones, and Conditional Forwarders.
 3. To configure a Forward Lookup Zone:
 4. To configure a Reverse Lookup Zone:
 5. You can also configure zone transfer settings for each zone to control how the zone information is replicated between DNS servers.



Practical Activity 1.5.2: Creation of Alias (CNAME)



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
 - i. Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to do the task described below:

As a server administrator, you are requested to go to create an Alias (CNAME) record in DNS server administration.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to create an Alias (CNAME) record of DNS the server administration.

Step 4: Ask learners to perform the activity in step 3 and monitor the process.

Step 5: Verify whether the tasks are clearly performed.

Step 6: Ask trainees to ready the key reading 1.5.2 in trainee's manual



Points to Remember

- To create an Alias (CNAME) record in DNS, you can follow these steps:
 1. Open the DNS Manager on your Windows Server.
 2. In the DNS Manager, navigate to the Forward Lookup Zone where you want to create the Alias (CNAME) record.
 3. Right-click on the zone and select "New Alias (CNAME)" from the context menu.
 4. In the New Resource Record window, enter the Alias name.
 5. In the Fully qualified domain name (FQDN) for target host field, enter the fully qualified domain name or hostname to which the alias should point.
 6. Click "OK" or finish to create the CNAME record.



Practical Activity 1.5.3: Configuring DNS records



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
- Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

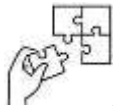
- Step 1:** Introduce the topic and ask trainees to do the task described below:
As a server administrator, you are requested to go to configure different types of DNS records, including A, AAAA, CNAME, MX, PTR, NS, and SOA server administration.
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to configure different types of DNS records, including A, AAAA, CNAME, MX, PTR, NS, and SOA in server administration.
- Step 4:** Ask learners to perform the activity in step 3 and monitor the process.
- Step 5:** Verify whether the tasks are clearly performed.
- Step 6:** Ask trainees to read key reading 1.5.3



Points to Remember

To configure different types of DNS records, including A, AAAA, CNAME, MX, PTR, NS, and SOA, you can follow these steps:

1. Open the DNS Manager on your Windows Server.
2. In the DNS Manager, navigate to the appropriate Forward Lookup Zone or Reverse Lookup Zone where you want to create the DNS record.
3. Right-click on the zone and select the type of record you want to create (example "New Host (A or AAAA)," "New Alias (CNAME)," "New Mail Exchanger (MX)," etc.).
4. Follow the wizard or the prompt to provide the necessary information for the specific record type you are creating.
5. Complete the process to create the DNS record.
6. You can manage and modify the properties of the DNS record by right-clicking on it and selecting "Properties."



Application of learning 1.5.

Bxz Solutions Inc. is a company specializing in providing IT solutions for small and medium businesses. Located in Rwanda, Eastern area, Bxz Solutions Inc. aims to enhance its network infrastructure by setting up essential server roles, including DNS Configuration to improve network management and efficiency.

As an System Administrator hired by Bxz Solutions Inc., you are tasked with the following:

Task: Configure DNS Zones, Create Alias (CNAME) Records, Manage DNS Records

CHECKLIST:

SN	Criteria	Indicators	Observation	
			Yes	No
1	Server is well prepared	1.1. DNS Server role is installed		
		1.2. Static IP address is configured		
		1.3. Network connectivity is verified		
2	DNS Zones are well created and configured	2.1. Primary DNS Zone is created		
		2.2. Reverse Lookup Zone is created		
		2.3. Zone replication and transfer settings are applied		
3		3.1. Host (A) records are created		
		3.2 Alias (CNAME) records are created		
	DNS records are well managed	3.3. MX records are configured		



Indicative content 1.6: Configuration of DHCP Parameters



Duration: 6 hrs



Practical Activity 1.6.1: Configure DHCP scope parameters



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
 - i. Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As a Trainee in Level 4 software development, you are requested to go to configure DHCP scope parameters in server administration.
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to configure DHCP scope parameters in the server administration. While demonstrating the steps for configuring DHCP scope parameters.
- Step 4:** Asks trainees to configure DHCP scope parameters.
- Step 5:** Verify whether the tasks are clearly performed.
- Step 6:** Ask trainees to read key reading 1.6.1. in trainee's manual



Points to Remember

To configure DHCP scope parameters, including scope name, range of IP addresses, subnet mask, exclusions, lease time, and starting the DHCP service, you can follow these steps:

1. Open the DHCP Manager on your Windows Server.
2. In the DHCP Manager, expand the server name and navigate to "IPv4" or "IPv6"
3. Right-click on "IPv4" or "IPv6" and select "New Scope" from the context menu.
4. Follow the New Scope Wizard to configure the DHCP scope parameters.
5. Complete the wizard to create the DHCP scope with the specified parameters.
6. Once the scope is created, you can modify its properties by right-clicking on it and selecting "Properties."

7. To start the DHCP service, right-click on the DHCP server name and select "Authorize" or "Start" from the context menu.



Practical Activity 1.6.2: Configuring DHCP reservations



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
 - i. Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees to do the task described below:

As a Trainee in Level 4 software development, you are requested to go to configure DHCP reservations in server administration.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to configure DHCP reservations in server administration.

Step 4: Ask learners to perform the activity in step 3 and monitor the process.

Step 5: Verify whether the tasks are clearly performed.

Step 6: Ask trainees to read key reading 1.6.2. in trainee's manual



Points to Remember

- To configure DHCP reservations, which assign specific IP addresses to specific devices based on their MAC addresses, you can follow these steps:
 - a. Open the DHCP Manager on your Windows Server.
 - b. In the DHCP Manager, expand the server name and navigate to "IPv4" or "IPv6" (depending on the IP version you are configuring).
 - c. Expand the DHCP scope where you want to create the reservation.
 - d. Right-click on "Reservations" and select "New Reservation" from the context menu.
 - e. In the New Reservation window, provide the following information:
 2. Reservation Name
 3. IP Address.

4. MAC Address
5. Description (optional)
6. Click "Add" or "OK" to create the reservation.
7. The reservation will now be added to the DHCP scope, ensuring that the specified device always receives the assigned IP address.



Practical Activity 1.6.3: Configuring DHCP failover



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
 - i. Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees to do the task described below:

As a Trainee in Level 4 software development, you are requested to go to configure DHCP failover for high availability and redundancy in server administration.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to configure DHCP failover for high availability and redundancy, in server administration.

Step 4: Ask trainee to configure DHCP failover and monitor the process.

Step 5: Verify whether the tasks are clearly performed.

Step 6: Ask trainees to read key reading 1.6.3. in trainee's manual

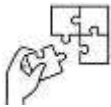


Points to Remember

To configure DHCP failover for high availability and redundancy, you can follow these steps:

1. Open the DHCP Manager on your Windows Server.

2. In the DHCP Manager, expand the server name and navigate to "IPv4" or "IPv6" (depending on the IP version you are configuring).
3. Right-click on "IPv4" or "IPv6" and select "Configure Failover" from the context menu.
4. In the Configure Failover Wizard, choose the appropriate options for your failover
5. Complete the wizard to configure the DHCP failover relationship.
6. The DHCP failover relationship will now be established between the primary and partner servers, providing redundancy and high availability for DHCP service.
7. You can monitor and manage the DHCP failover relationship by right-clicking on the DHCP scope and selecting "Manage Failover" from the context menu.



Application of learning 1.6.

Bxz Solutions Inc. is a company specializing in providing IT solutions for small and medium businesses. Located in Rwanda, Eastern area, Tech Solutions Inc. aims to enhance its network infrastructure by setting up essential server roles, including DNS and DHCP, to improve network management and efficiency.

As an System Administrator hired by Bxz Solutions Inc., you are tasked with implementing best practices for configuring DHCP Scopes, Reservations, and Failover in Windows Server.

CHECKLIST:

SN	Criteria	Indicators	Observation	
			Yes	No
1	Server for DHCP configuration is well prepared	1.1. DHCP Server role is installed		
		1.2. Static IP address is configured		
		1.3. Network connectivity is verified		
2	DHCP Scope is effectively created and configured	2.1. Scope range is defined (Start IP, End IP)		
		2.2. Subnet mask is applied		
		2.3. Lease duration is set		
		2.4. Scope options (Router, DNS Server) are configured		
	DHCP Reservations are well configured	3.1 Specific IP addresses are reserved		
		3.2. Reservation settings are applied		
	4. DHCP Failover is effectively configured	4.1. Failover relationship is created		
		4.2. Load balance or hot standby mode is selected		
	5. DHCP Scope functionality is well tested	5.1. IP addresses to clients are correctly assigned		
		5.2. Reservations are verified		
		5.3. Failover operation is tested		



Indicative content 1.7: Monitoring of Server Services



Duration: 3 hrs



Practical Activity 1.7.1: Use nslookup command for resolving DNS



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
- Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees to do the task described below:

As a Trainee in Level 4 software development, you are requested to go to use nslookup command is a useful tool for troubleshooting and monitoring DNS resolution in server administration.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to use nslookup command is a useful tool for troubleshooting and monitoring DNS resolution in the server administration.

Step 4: Ask trainee to use nslookup command tool for troubleshooting and monitoring DNS resolution in server and monitor the process.

Step 5: Verify whether nslookup command tool is clearly used.

Step 6: Ask trainees to read key reading 1.7.1. in trainee's manual



Points to Remember

- The nslookup command is a useful tool for troubleshooting and monitoring DNS resolution. It allows you to query DNS servers and retrieve information about domain names and IP addresses. Here's how you can use it:
 1. Open a command prompt on your client machine.
 2. Type "nslookup" followed by the domain name or IP address you want to resolve.
 3. Press Enter to execute the command.

4. The command will display the corresponding IP address or domain name, along with additional information such as the DNS server used for the lookup. Example:
nslookup rtb.local



Practical Activity 1.7.2: Checking IP DHCP configuration on client



Notes to the trainer

- This activity should take place in a Computer Lab.
- While delivering this content, you are required to:
 - i. Avail video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

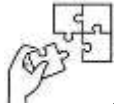
- Step 1:** Introduce the topic and ask trainees to do the task described below:
As a Level 4 software development trainee, you are requested to check the IP DHCP configuration on a client machine using Windows.
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to check the IP DHCP configuration. While demonstrating the steps to check the IP DHCP configuration in windows server
- Step 4:** Ask trainees to check the IP DHCP configuration on a client machine.
- Step 5:** Verify whether the IP DHCP is well configured.
- Step 6:** Ask trainees to read key reading 1.7.2. in trainee's manual



Points to Remember

To check the IP DHCP configuration on a client machine using Windows, you can use the following commands:

1. Open a command prompt.
2. Type "ipconfig" and press Enter.
3. The command will display the IP address, subnet mask, default gateway, and other network configuration details for all active network interfaces. Example: ipconfig



Application of learning 1.7.

FFF Ltd company, located in Gicumbi District, Northern Province, is hiring a System Administration Technician to use nslookup command as a useful tool for troubleshooting and monitoring DNS resolution and check the IP DHCP configuration on a client machine in windows server administration. The technician will also be responsible for documenting the entire process. All tasks must be completed within a three-hour timeframe.

CHECKLIST:

SN	Criteria	Indicators	Observation	
			Yes	No
1	Environment is well prepared	1.1. Command Prompt or PowerShell is accessed		
		1.2. Admin privileges on the client machine are confirmed		
2	DNS server response is well verified	2.1. nslookup command is verified		
		2.2. Server response time and accuracy are checked		
3	Domain name resolution is well tested	3.1. nslookup command is used to resolve specific domain names		
		3.2. Correct IP addresses are returned		
4	Reverse DNS lookup is well performed	4.1 nslookup command is used to perform reverse lookups		
		4.2. Domain names associated with IP addresses are verified		
5	Process is well documented	5.1. Steps for DNS and DHCP checks are documented		
		5.2. Issues and results are recorded		
6	Task completion is well reported	6.1 Report is prepared and submitted within the three-hour timeframe		



Learning outcome 1 end assessment

Theoretical assessment

Question 1. Circle the letter corresponding to the correct answer:

i. What is a primary function of a server in a network?

- A) To request data from clients
- B) To provide resources, data, or services to clients
- C) To manage network operating systems
- D) To run on top of a hypervisor

Answer: B) To provide resources, data, or services to clients

ii. What type of hypervisor runs directly on the physical hardware without needing a host operating system?

- A) Type 2 Hypervisor
- B) Hosted Hypervisor
- C) Bare-Metal Hypervisor
- D) Managed Hypervisor

Answer: C) Bare-Metal Hypervisor

iii. Which of the following is an advantage of server virtualization?

- A) Increased hardware costs
- B) Decreased resource utilization
- C) Improved disaster recovery
- D) Reduced scalability

Answer: C) Improved disaster recovery

iv. What is the key characteristic of RAID 0?

- A) It provides redundancy by duplicating data across multiple disks.
- B) It splits data into blocks and distributes them across multiple disks without redundancy.
- C) It combines mirroring and striping for performance and redundancy.
- D) It uses double parity to protect against up to two disk failures.

Answer: B) It splits data into blocks and distributes them across multiple disks without redundancy.

v. Which RAID level offers protection against up to two disk failures?

- A) RAID 0
- B) RAID 1
- C) RAID 5
- D) RAID 6

Answer: D) RAID 6

vi. For a general-purpose server, which of the following is a recommended minimum hardware requirement?

- A) 4 GB of RAM
- B) 250 GB SSD
- C) Dual-core processor
- D) 100 GB SSD

Answer: B) 250 GB SSD

vii. What does a Type 2 Hypervisor require to operate?

- A) Direct access to physical hardware
- B) A host operating system
- C) Additional storage drives
- D) Higher network bandwidth

Answer: B) A host operating system

viii. Which RAID level combines striping and mirroring for high performance and fault tolerance?

- A) RAID 0
- B) RAID 1
- C) RAID 5
- D) RAID 10

Answer: D) RAID 10

ix. What is a disadvantage of RAID 5?

- A) It requires double storage capacity.
- B) It offers no redundancy.
- C) It has slower write performance due to parity calculations.
- D) It does not support multiple disk failures.

Answer: C) It has slower write performance due to parity calculations.

x. Which software component is essential for managing a network and enabling communication between servers and clients?

- A) Web Server Software
- B) Virtualization Software
- C) Network Operating System (NOS)
- D) Backup Software

Answer: C) Network Operating System (NOS)

xi. What is the primary function of a domain controller (DC) in a Windows Server environment?

- A) To manage virtual machines
- B) To authenticate and authorize users and computers
- C) To configure DHCP scopes
- D) To troubleshoot DNS issues

Answer: B) To authenticate and authorize users and computers

xii. Which RSAT tool is used to manage users, groups, and organizational units in Active Directory?

- A) DNS Manager
- B) Active Directory Users and Computers (ADUC)
- C) Group Policy Management Console (GPMC)
- D) Remote Desktop Services Manager

Answer: B) Active Directory Users and Computers (ADUC)

xiii. Which RSAT tool would you use to manage DNS zones and records?

- A) DHCP Manager
- B) Hyper-V Manager
- C) Active Directory Sites and Services (ADSS)
- D) DNS Manager

Answer: D) DNS Manager

xiv. What is the purpose of the Group Policy Management Console (GPMC)?

- A) To manage virtual networks
- B) To configure DHCP scopes
- C) To manage Group Policy Objects (GPOs)
- D) To oversee server performance

Answer: C) To manage Group Policy Objects (GPOs)

xv. Which tool is used to configure and manage DHCP scopes and IP address leases?

- A) Server Manager
- B) DHCP Manager
- C) Active Directory Sites and Services (ADSS)
- D) Hyper-V Manager

Answer: B) DHCP Manager

xvi. What role does Active Directory Domain Services (AD DS) serve in a server environment?

- A) It manages the replication topology and site configuration.
- B) It provides virtual machine management and storage.
- C) It handles user authentication and authorization.
- D) It manages server roles, features, and performance.

Answer: C) It handles user authentication and authorization.

xvii. What is the purpose of server roles in a Windows Server environment?

- A) To provide additional features to enhance server capabilities
- B) To manage user sessions and server performance
- C) To enable the server to perform specific functions for users or other computers
- D) To troubleshoot and configure DNS issues

Answer: C) To enable the server to perform specific functions for users or other computers

xviii. Which RSAT tool would you use to manage virtual machines and virtual networks?

- A) Hyper-V Manager
- B) Server Manager
- C) Remote Desktop Services Manager
- D) Group Policy Management Console (GPMC)

Answer: A) Hyper-V Manager

xix. What do server features in Windows Server do?

- A) They allow remote management of the server operating system.
- B) They provide optional components that enhance server capabilities.
- C) They manage the replication and site configuration.
- D) They handle user authentication and authorization.

Answer: B) They provide optional components that enhance server capabilities.

xx. Which RSAT tool provides an overview and management of server roles, features, status, and performance?

- A) Active Directory Sites and Services (ADSS)
- B) DNS Manager
- C) Server Manager
- D) Remote Desktop Services Manager

Answer: C) Server Manager

Question 2. Fill in the Blanks space with the appropriate words. Select from the given choices

i. A _____ query involves the DNS server handling the entire resolution process and returning the final result to the client. (Root Hints, Caching, Recursive)

Answer: Recursive

ii. In DNS operations, _____ helps improve performance by storing recently resolved query results. (Root Hints, Caching, Recursive)

Answer: Caching

iii. _____ are lists of IP addresses of root DNS servers used by DNS servers to start the resolution process. (Root Hints, Caching, Recursive)

Answer: Root Hints

iv. An _____ DNS server provides definitive answers for queries about domains it is responsible for.

Answer: Authoritative

v. A _____ file contains DNS resource records such as A, CNAME, and MX records for a zone. (message, Zone, Authoritative)

Answer: Zone

vi. The DHCP client starts the process by sending a _____ message to locate available DHCP servers. (Discover, message, Zone)

Answer: Discover

viii. The DHCP server confirms the assignment of an IP address and provides additional configuration settings with a _____ message. (Acknowledgement, Discover, Zone)

Answer: Acknowledgement

ix. The DHCP process begins with the client sending a _____ message.

Answer: Discover

x. DHCP _____ involves configuring two DHCP servers to share lease information, allowing one server to take over if the other fails. (Failover, Discover, Acknowledgement)

Answer: Failover

xi. To prevent unauthorized DHCP servers from providing IP addresses, network administrators use _____ on switches. (Forwarding, Relay, operates, DHCP Snooping)

Answer: DHCP Snooping

xii. A DHCP _____ agent forwards DHCP messages between clients and servers when they are on different subnets. (Forwarding, Relay, operates, DHCP Snooping)

Answer: Relay

xiii. The DHCP relay agent operates by receiving DHCP requests from clients and _____ them to the appropriate DHCP server. (Forwarding, Relay, operates)

Answer: Forwarding

Practical assessment

Bxz Solutions Inc. is a company specializing in providing IT solutions for small and medium businesses. Located in Rwanda, Eastern area, Bxz Solutions Inc. aims to enhance its network infrastructure by setting up essential server roles, including Active Directory and various network services, to improve network management and efficiency.

As a System Administrator hired by Bxz Solutions Inc., you are tasked with the following:

1. Prepare the Windows Server OS Environment
2. Install and Configure Active Directory
3. Install and Configure Services and Feature

Checklist:

SN	Criteria	Indicators	Observation	
			Yes	No
1	Windows Server OS Environment is well prepared	1.1. Latest Updates installed		
		1.2. System Settings is well configured		
		1.3. Server is secured		
		1.4 Disk Space is prepared		
2	Active Directory is well configured	2.1. Active Directory Domain Services (AD DS) Installed		
		2.2. Server to Domain Controller is well promoted		
		2.3. DNS for Active Directory is done		
		2.4. AD Installation is verified		
3	Services and Features are well configured	3.1. Required Services and Features are done		
		3.2. Services and Features installed		
		3.3. Services and Features are configured		
		3.4. Test and Validate Configurations is well done		

END



Further information to the trainer

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Krause, J. (2024). *Mastering Windows Server 2022*.

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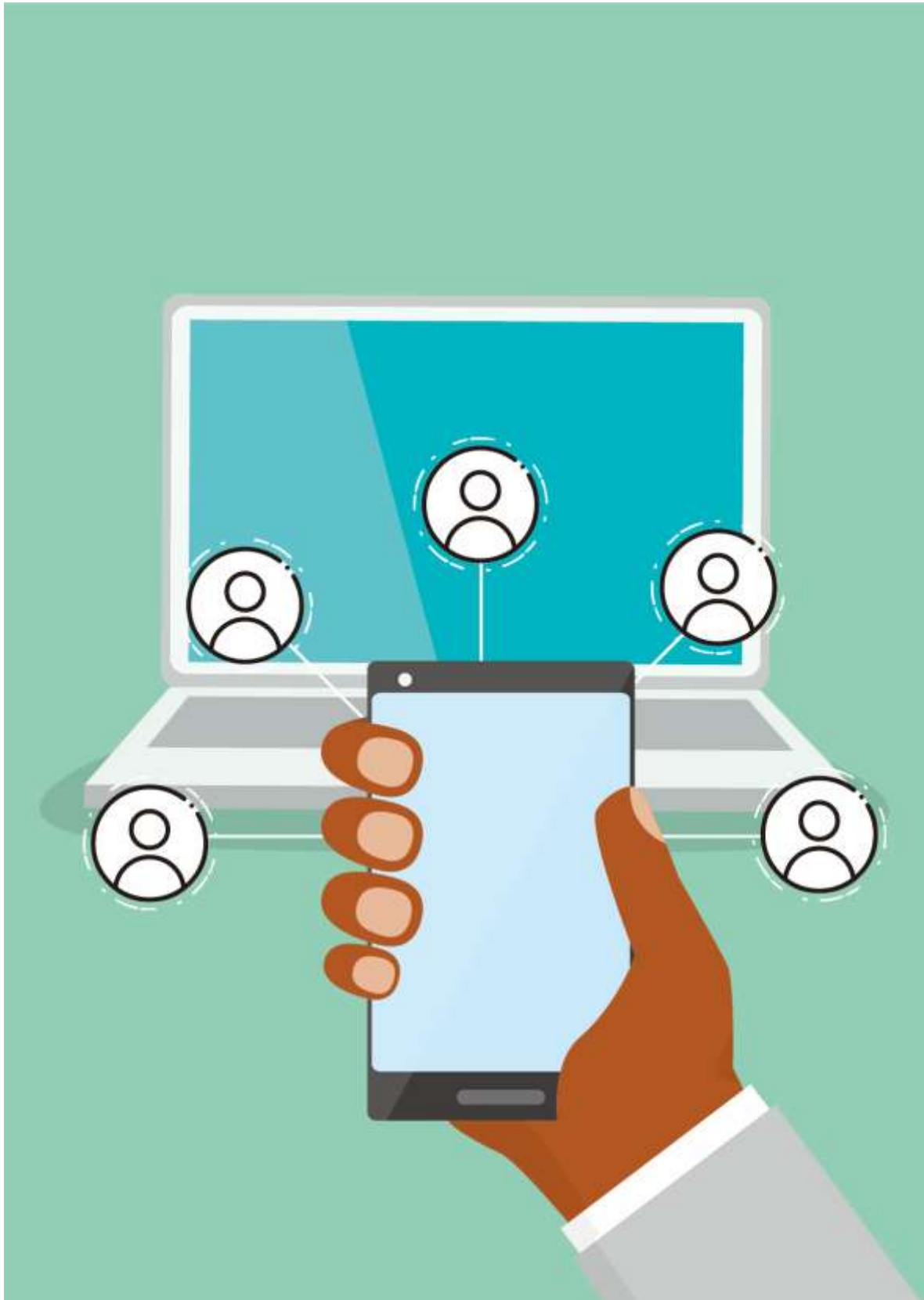
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Learning Outcome 2: Manage Users



Indicative contents

- 2.1 Creation of Users Accounts
- 2.2 Management of Users Accounts
- 2.3 Management of User Groups
- 2.4 Management of Organization Units (OU)
- 2.5 Assignment of Permission to Users
- 2.6 Management of Client Machines

Key Competencies for Learning Outcome 2: Manage Users

Knowledge	Skills	Attitudes
• Description of user account policies • Differentiate user account levels • Description of Group Policy Object (GPO)	• Creating account • Managing user accounts • Managing user groups • Applying permission to users • Joining client to the domain • Managing GPO settings • Applying delegation of control	• Being problem solver • Having ethical conduct • Being patience • Being calm • Working in a Team • Engaging in Continuous Learning.



Duration: 30 hrs



Learning outcome 2 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe clearly user accounts in windows server
2. Differentiate properly user account levels used in server
3. Create properly user accounts in windows server
4. Manage properly user accounts in windows server
5. Manage properly the user groups in windows server
6. Manage properly organisation units in windows server
7. Join properly client to the domain in windows server
8. Describe clearly Group Policy Object (GPO) used in client machine
9. Manage properly GPO settings in server machine
10. Apply clearly delegation of control in server machine
11. Assign clearly permissions on user accounts control
12. Manage appropriately client machine based on ICT policies



Resources

Equipment	Tools	Materials
• Computer • Server machine	• VMWare workstation, • VMWare ESXI • Oracle VirtualBox	• windows • Internet • Electricity



Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail computers with internet connections



Indicative content 2.1: Creation of User Accounts



Duration: 5 hrs



Theoretical Activity 2.1.1: Description of user accounts



Notes to the trainer:

- Trainer may use small groups for describing user account.
- Avail computers with installed windows server OS and guest OS



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

1. Define user account and user account policies
2. Differentiate standard and Administrator account

Step 2: Ask trainees to write answers on paper or flipchart

Step 3: Involve trainees in presentation of their findings.

Step 4: Provide an expert view

Step 5: Provide support for asked questions if any

Step 6: Ask trainees to read the key reading 2.1.1 in the trainee manual.



Points to Remember

- **A user account** refers to an individual's account within the Active Directory or local user database.
- **User account policies** in Windows Server refer to a set of rules and configurations that govern the security and management
- generally categorized based on the level of access and permissions they have within the system. The most common levels are:
 1. **Standard User Account**
 2. **Administrator Account**



Practical Activity 2.1.2: Creation of user account in windows server



Notes to the trainer

- The trainer has to make sure that they have installed server, guest computer in virtual machine.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As a learner in Level 4 software development, you are tasked with managing student accounts within an Active Directory environment. Your first task is to create a new user account for a new student. After that, you need to copy an existing student account to create a second account.
- Step 2:** Explain the task and provide clear work instruction
- Step 3:** Demonstrate how to create an account and copy an account in windows server. While demonstrating clearly step by step how to it.
- Step 4:** Asks trainees to user their computer and login to their virtual machine, then create an account and copy an account
- Step 5:** Check whether the creation of user account is properly performed.
- Step 6:** Ask trainees to read key reading 2.1.2 in trainee manual.



Points to Remember

- To Create New User Account follow the following
 - ✓ Run Server Manager and Open Tools.
 - ✓ Under Local Users and Groups Right click on Users
 - ✓ Fill in User Information
 - ✓ Set the Password
 - ✓ Complete the Wizard



Application of learning 2.1.

Company Named Rwanda Revenue Authority (RRA) is hiring an IT System Administrator to manage their Active Directory environment.

As part of the assessment, the candidate is required to complete two tasks within a 1-hour timeframe: First, create a new user account for **Eric Murindwa** with the username eric.murindwa and password Kigali@123. Second, copy the Eric Murindwa account to create a new user named **Pepe Uwitonze** with the username pepe.uwitonze and the same password. The tasks will perform in 1hour.

Checklist:

SN	Criteria	Indicators	Observations	
			YES	NO
1	Active Directory environment is well prepared	1.1 Access to ADUC is confirmed		
		1.2 Admin privileges are verified		
2	Eric Murindwa's account is well created	2.1 Username eric.murindwa is created		
		2.2 Password Kigali@123 is set and applied		
3	Pepe Uwitonze's account is well created	3.1 To create Pepe Uwitonze, Eric Murindwa's account is copied		
		3.2 Username pepe.uwitonze is created		
		3.3 Password Kigali@123 is set and applied		
4	Accounts are well verified	4.1 Both user accounts are checked		
5	Task completion is well reported	5.1 In one hour Report is prepared and submitted		



Indicative content 2.2: Management of User Accounts



Duration: 5 hrs



Practical Activity 2.2.1: Managing user account



Notes to the trainer

- Trainer may know that in computer lab and trainees' computer had configured AD DS features on their windows server.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to do the task described below:

As the system administrator for a medium-sized company, you need to manage the user account for **Kamana** in a Windows Server environment. Your tasks include resetting Kamana's password, reactivating the account, deactivating it temporarily, and customizing account parameters.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can reset user account, reactivating and deactivate the account and customize account parameters. While demonstrating the steps for resetting user, reactivating and deactivating the user account.

Step 4: Asks trainees to reset user account, reactivating, deactivate and monitor the activity.

Step 5: Verify whether resetting user, reactivating and deactivating are properly performed.

Step 6: Ask trainees to read the key readings on practical activity 2.2.1 in trainee manual



Points to Remember

- To Change user account password, follow the following steps:
 - ✓ Log in
 - ✓ Changing a password
 - ✓ Under user Account headings, then click on **Change account type account type**
 - ✓ Click on the user you want to change the password.
 - ✓ Click on Change the password and fill password fields
 - ✓ Click on Change password.

- To remove a user account, follow the steps
 - ✓ Open ADUC from Server Manager
 - ✓ Navigate the Default Container
 - ✓ Find and Delete the User Account
- To activate a user account, follow the steps:
 - ✓ Open the Windows Server Essentials Dashboard.
 - ✓ On the navigation bar, click **Users**.
- To deactivate a user account, follow the steps
 - ✓ Open the Windows Server Essentials Dashboard.
 - ✓ On the navigation bar, click **Users**.



Application of learning 2.2.

As the system administrator, you are tasked with managing a single user account for **Kamana** in a Windows Server environment. The tasks include resetting Kamana's password to Gisenyi@100, reactivating the account, temporarily deactivating it, and customizing account parameters such as setting logon hours from 8:00 AM to 6:00 PM and updating the home directory to [\\Server\Home\Kamana](#).

Checklist:

SN	Criteria	Indicators	Observation	
			Yes	No
1	Kamana's account is well accessed	1.1. Active Directory Users and Computers (ADUC) is accessed		
		1.2 Kamana's account is located and confirmed		
2	Password is well reset	2.1. Kamana's new password Gisenyi@100 is applied		
3	Account is well reactivated/ deactivated	3.1. Kamana's account is reactivated		
		3.2. Kamana's account is temporarily deactivated		
4	Logon hours are well configured	4.1. Logon hours from 8:00 AM to 6:00 PM are applied		
		4.2. Home directory \\Server\Home\Kamana is configured		

5	Account is well changed	5.1. All changes to Kamana's account are verified and confirmed		
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Indicative content 2.3: Management of User Groups



Duration: 5 hrs



Theoretical Activity 2.3.1: Description of user groups



Notes to the trainer:

- Trainer may involve trainees by forming small groups

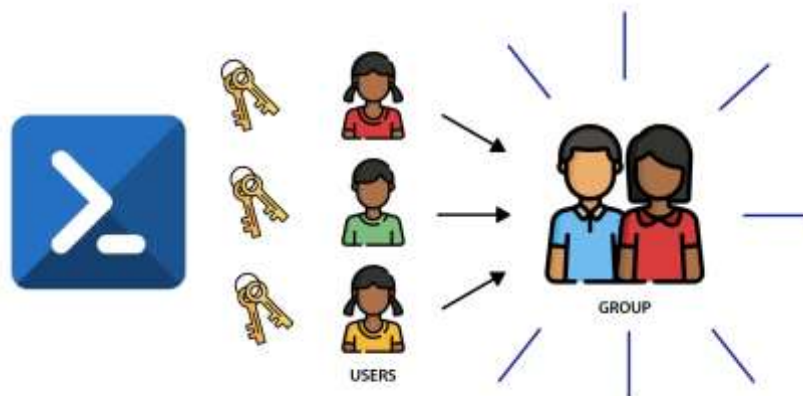


Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to respond to the following questions:

Define term groups in windows server



Step 2: Explain types of user groups in windows server

Step 3: Ask trainees to write answers on paper or flipchart

Step 4: Ask trainees to present their findings to the whole class

Step 5: Provides expert view for more clarification.

Step 6: Address any questions or concerns.

Step 7: Ask them to read the Key readings 2.3.1 in trainee's manual



Points to Remember

- ✓ A group is a collection of Active Directory objects. The group can include users, computers, other groups and other AD objects.
- ✓ Types of groups in windows server are: Security Groups and Distribution Groups



Practical Activity 2.3.2: Managing users in group



Notes to the trainer

- The trainer asks trainees to have users created locally in the virtual machine



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to do the task described below:

As trainees in L4SOD, you are tasked with managing user groups within a Windows Server virtual machine. Your objective is to create a new group named L4SOD, add a previously created user to this group, and subsequently remove the user. Document each step of this process by capturing screenshots after creating the group, adding the user, and removing the user.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can create group, add user into group and remove user from group within windows server virtual machine. While demonstrating the steps for creating, adding user into group and removing user from group.

Step 4: Ask trainees to create a new group, add user to created group and remove the user

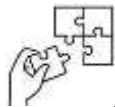
Step 5: Verify whether creating group, adding user into group and removing user from group is properly performed.

Step 6: Ask trainees to read key reading 2.3.2 in trainee's manual.



Points to Remember

- To Manage users in group, pass through the following steps:
- ✓ In Server Manager, click on "**Tools**" and select "**Active Directory Users and Computers.**"
- ✓ Right click on click on domain name then Select "**New**" > "**Group**".
- ✓ In the **New Object - Group** window: type **Group name**, **Group scope**: Global, **Group type**: Security.



Application of learning 2.3.

Company Rwanda TVT Board (RTB), dedicated to promoting quality education in technical and vocational training from levels one (1) to five (5), RTB is hiring an IT System Administrator. As part of the assessment, the IT System Administrator must complete the following tasks within 1 hour: Create a new group named students in Active Directory. Then, add the users **Eric Murindwa** and **Pepe Uwitonze** to the students group. Finally, remove Eric Murindwa from the students group. These tasks will demonstrate the IT System Administrator's ability to manage group memberships and use Active Directory tools effectively.

Checklist

SN	Criteria	Indicators	Observations	
			YES	NO
1	Group is Effectively Created	1.1 The group named "students" is prepared and created		
		1.2 Group scope and type are correctly configured		
2	Users are well added/removed	2.1 Eric Murindwa is added to the "students" group and confirmed		
		2.2 Pepe Uwitonze is added to the "students" group and confirmed		
		2.3 Eric Murindwa is removed from the "students" group and confirmed		
3	User is Effectively Removed from the Group	3.1 Located the user "Eric Murindwa" in the "students" group		
		3.2 Removed "Eric Murindwa" from the "students" group		
		3.3 Verified that "Eric Murindwa" is no longer a member of the "students" group		
4	4. Group membership is well confirmed	4.1 Membership of the "students" group is confirmed and verified		



Indicative content 2.4: Management of Organization Units (OU)



Duration: 5 hrs



Practical Activity 2.4.1. Creation of Organization Units



Notes to the trainer

- The trainer may guide trainees in computer lab, to create Organization unit, add user in organization unit and removing a user from organization unit.
- Make sure that users and groups were created before



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
You are L4 SOD trainees, Your school is expanding its IT infrastructure. As part of this expansion, you need to organize users into specific Organizational Units (OUs) for better management and security. You have been tasked with creating an OU named “OU-Department”, adding created user **kamana** Andre to this OU, and then removing **kamana** from this OU. Document each step with screenshots.
- Step 2:** Explain the task and provide instruction to trainees
- Step 3:** Demonstrate how to create an OU, create and add user to OU and remove user from OU. While demonstrating the steps for creating OU, adding user to OU and removing from OU.
- Step 4:** Ask trainees to create an OU, create and add user to OU and remove user from OU
- Step 5:** Provide support where necessary
- Step 6:** Check whether OU is created, user added to OU and user removed from Organization unit completely.
- Step 7:** Ask trainees to read key reading 2.4.2. in trainee’s manual



Points to Remember

- To Create Organization Units pass through the following steps:
 - ✓ In **Active Directory Users and Computers**, select the top-level organizational unit you created
 - ✓ Right-click and select **New > Organizational Unit**.
- To Create user in organization Units follow the following steps:
 - ✓ In the 'Active Directory Users and Computers' console, navigate to the OU where you want to create the users.
 - ✓ Right-click on the OU and select '**New**' > '**User**'.



Application of learning 2.4.

RISA has the mission of digitizing the Rwandan society through increased usage of Information and Communication Technologies and innovation technology as a cross-cutting enabler for the development of other sectors, spearheading Rwanda's digital and social economic transformation. As part of the hiring process for an IT System Administrator at RISA, you are required to complete the following tasks within 1 hour: Create a new Organizational Unit (OU) named **"Training Department"**, add the users **"Eric Murindwa"** and **"Pepe Uwitonze"** to this OU, and then remove **"Pepe Uwitonze"** from the **"Training Department"** OU.

N.B: Capture screenshots of each step.

Checklist

SN	Criteria	Indicators	Observations	
			YES	NO
1	Organizational Unit (OU) is Effectively Created	1.1 The Organizational Unit (OU) named "Training Department" is created		
		1.2. OU properties such as name and description are configured		
		1.3. The OU is verified to be located in the correct parent OU or container		

2	Users are Effectively Added/ removed to the OU	2.1 Eric Murindwa is added to the “Training Department” OU and confirmed		
		2.2 Pepe Uwitonze is added to the “Training Department” OU and confirmed		
3	User is Effectively Removed from the OU	3.1 Pepe Uwitonze is removed from the “Training Department” OU and confirmed		
4	Screenshots are well captured	4.1 Screenshots of each step (creation, adding, and removing users) are captured		
		4.2. Screenshots are named and organized according to the steps performed		
5	Changes are well confirmed	5.1 All changes (creation, addition, removal) are verified as correct		



Indicative content 2.5: Assignment of Permission to Users



Duration: 5 hrs



Practical Activity 2.5.1: Granting User account permissions



Notes to the trainer:

- Trainer may use this activity to grant and revoke permission to the created user account
- Avail installed windows server



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to do the task described below:

In this practical task, you are required to manage user account permissions for **Kamana Andre** within your company's Active Directory, specifically related to the **L4SOD** group. Your goal is to grant **Kamana Andre** full permissions related to the **L4SOD** group, ensuring he has comprehensive access. After verifying that Kamana has been granted full permissions, you will then revoke these permissions to remove his access. Document each step with screenshots.

Step 2: Explain the task and provide clear work instruction

Step 3: Demonstrate how to grant and revoke permission to the user in windows server. While demonstrating the steps to granting and revoking permissions to the user.

Step 4: Ask trainees to grant and revoke permission to the user

Step 5: Provide support where necessary

Step 6: Remind trainees to read the key readings on activity 2.5.1 in trainee's manual



Points to Remember

- **Grant Users account permissions steps:**
 - ✓ Open Active Directory Users and Computers (ADUC) from the Start menu.
 - ✓ Locate and select the desired object (user, group, or OU) in the ADUC console.
 - ✓ Right-click the object, go to "Properties," and under the "Security" tab, click "Add" to find the user.

- ✓ Assign the necessary permissions to the user, apply changes, and verify the permissions.

B. Revoke Users account permissions steps:

- ✓ Open Active Directory Users and Computers (ADUC) from the Start menu.
- ✓ Locate the user, group, or Organizational Unit (OU) and open its properties.
- ✓ In the "Security" tab, select the user and uncheck the permissions to revoke.
- ✓ Click "Apply" and "OK," then review to ensure permissions are removed.



Practical Activity 2.5.2: Change remote account permission for a user account



Notes to the trainer

- Avail of video as didactic material.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
- Step 2:** "As a system administrator, use the Delegation of Control Wizard to assign **Kamana** from the '**HelpDesk**' group permissions to create, delete, and manage user accounts, as well as reset user passwords and force password changes at the next logon. Ensure that these permissions are limited to the specified organizational unit (OU). Document the steps and permissions configured."
- Step 3:** Explain the task and provide clear work instruction
- Step 4:** Demonstrate how to change remote account permission for a user account. While demonstrating the steps to change remote account permission on user account.
- Step 5:** Ask trainee to change remote account permission for a user account
- Step 6:** Verify whether remote account permission is properly performed.
- Step 7:** Ask trainees to read key reading 2.5.2 in trainee manual.



Points to Remember

- **Change remote account permission for a user account**

- ✓ Open **Active Directory Users and Computers (ADUC)**, locate and right-click the user account, then select **Properties**.
- ✓ Go to the **Security** tab and check if the user or group needing remote access is listed; if not, click **Add** to include them.
- ✓ Modify the permissions by checking or unchecking relevant boxes like **Remote Desktop Users** or **Allow log on through Remote Desktop Services**.
- ✓ Click **Apply**, then **OK**, and verify the changes in the **Security** tab or the **Remote Desktop Users** group.



Application of learning 2.5

The UNIVERSITY OF TOURISM, TECHNOLOGY AND BUSINESS STUDIES (UTB), a center of excellence for vocational and technical training in hotel, tourism, business, and information technology, requires an IT System Administrator to manage user account permissions effectively. The tasks to be completed within 1 hour include: creating a new user within the “IT” group in “UTB”, assigning specific permissions to the user account, such as full control or read/write access, and revoking these permissions as needed to ensure proper access control. Additionally, the tasks involve changing remote access permissions for the user account by enabling or disabling remote access to the system. Documentation of each step, including screenshots, is required to demonstrate the creation of the user, the changes made to permissions, and the modifications to remote access settings.

Checklist

SN	Criteria	Indicators	Observations	
			YES	NO
1	User is well created	1.1. The new user within the “IT” group in “UTB” is created		
		1.2. The user in “IT” group is added		
		1.3. The user creation and group membership are confirmed		
2	Permissions are well assigned	2.1. Specific permissions (full control or read/write access) are assigned		
		2.2. Specific permissions to the user account are well assigned.		

		2.3. Unnecessary permissions are revoked as required		
		2.4. All permission changes are confirmed and verified		
3	Remote access permissions are well configured	3.1. Remote access is either enabled or disabled as required		
		3.2. Changes to remote access settings are confirmed		
4	Screenshots are well organized	4.1. Screenshots of each step are captured		
		4.2. Screenshots are named and organized according to the steps performed		



Indicative content 2.6 Management of Client Machines



Duration: 5 hrs



Practical Activity 2.6.1: Joining a client computer to the domain



Notes to the trainer

- Avail installed server and client computer (windows 7/10/11)
- Ensure you have a domain controller set up and running.
- Make sure that the client computer must be on the same network and able to communicate with the domain controller.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As trainees, you practice key tasks related to managing client machines, including changing the computer name to your family name, establishing connectivity between a client and server, and changing the client's membership from a Workgroup to a Domain.
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to change the computer name, connectivity client and server and client's membership from a workgroup to a domain.
- Step 4:** Ask trainees to change computer name, connect client and server and client from workgroup to a domain.
- Step 5:** Verify whether computer name changed, client connected to server from workgroup to a domain.
- Step 6:** Ask trainees to read key reading 2.6.1. in trainee manual



Points to Remember

- To Join a client to a Domain, follow the steps below:
- ✓ Open **System Properties** on the computer and click **Advanced system settings**.
- ✓ Under the **Computer Name** tab, click **Change** and update the computer's name if needed.
 - ✓ Switch from **Workgroup** to **Domain** and enter your domain name.
 - ✓ Enter the **Domain Admin** username and password when prompted.
 - ✓ If the credentials are correct, you'll be welcomed to the domain.



Practical Activity 2.6.2: Implementation of delegation of control



Notes to the trainer

- Trainer may remind trainees to keep well present practical activity,



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
- Step 2:** "As a system administrator, use the Delegation of Control Wizard to assign **Kamana** from the '**HelpDesk**' group permissions to create, delete, and manage user accounts, as well as reset user passwords and force password changes at the next logon. Ensure that these permissions are limited to the specified organizational unit (OU). Document the steps and permissions configured."
- Step 3:** Explain the task and provide clear work instruction
- Step 4:** Demonstrate how to apply delegation. While demonstrating, explain the steps to delegate control in Active Directory Users and Computers.
- Step 5:** Asks trainees to apply delegation in organization unit.
- Step 6:** Verify whether delegation control wizard applied.
- Step 7:** Ask trainees to read key reading 2.6.2 in trainee manual



Points to Remember

- To Implement delegation Control to Domain Users, follow steps below:
- ✓ Open **Active Directory Users and Computers**, right-click on the **Organizational Unit (OU)** (e.g: Sales) and create a new group (e.g: Helpdesk) by selecting **New > Group**.
- ✓ Set the group scope to **Global** and type to **Security**, then add users to the group through the **Properties** console.
- ✓ Right-click the **OU (Sales)** again and select **Delegate Control** to launch the wizard.



Theoretical Activity 2.6.3: Description of Group Policy Object (GPO)



Notes to the trainer:

- Trainer may ask trainees to form small group by discussing on Group Policy Object (GPO)



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Monitor group discussion on given task that reflect on the following questions:

1. Compare term Group policy and Group Policy Object (GPO)
2. Describe 3 types of Group Policy Object
3. Discuss on the following Hierarchy finds on Group Policy Object:
 - a) Local
 - b) Site
 - c) Domain
 - d) OU
4. What is group Policy Template (GPT)?
5. Where group policy template stored?

Step 2: Asks any trainees to write answers provided on paper.

Step 3: Involve trainees in presentation of their findings.

Step 4: Provides expert view for more clarification.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 2.6.3 in the trainee manual.



Points to Remember

- **Group Policy** is a tool used by system administrators to quickly and easily make configuration changes to users and computers within Active Directory.
- **Group Policy** works by applying GPO (Group Policy Objects) to the OU structure you have created in Active Directory
- A **Group Policy Object** contains configuration settings for both users and computers. When a GPO is applied to an OU, the settings configured in the GPO are applied the users and computers that are within the OU.
- **There are three types of GPO:**
 1. **Local Group Policy Objects.** Refers to the collection of group policy settings that only apply to the local computer and to the users who log on to that computer.
 2. **Non-local Group Policy Objects.** Is used when policy settings have to apply to on or more Windows computers or users.
 3. **Starter Group Policy Objects.** A starter GPO is a type of nonlocal group policy object that's used as a template when creating a new GPO within ADDS.
- **GPO Hierarchy/Precedence: *Precedence*** in group policy, like the name suggests, simply refers to the order or rank that policy applies.
 1. **Local:** GPOs that are applied to the computer's local policy for each user; Local is applied since nothing else is configured.
 2. **Site:** GPOs that are applied to the site of which the computer is a member.
 3. **Domain:** GPOs that are applied to the domain of which the computer is a member
 4. **OU:** GPOs that are applied to the OUs on which the computer is placed.
 - 5.



Practical Activity 2.6.4: Managing GPO settings



Notes to the trainer

- Trainer may have client computer and server
- Avail configured domain



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** **Step 1:** Introduce the activity and ask trainees to do the task described below:
As Level 4 trainees, you are tasked with managing Group Policy Objects (GPOs) in a Windows Server environment. Your goal is to create and configure a GPO named "**Student-GPO**", utilize the Group Policy Editor, and manage user settings through the Group Policy Management Console (GPMC).
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to create GPO using GPO Editor and manage user settings through GPMC. While demonstrating, explain the steps to pass through.
- Step 4:** Asks trainee to create GPO and manage setting using GPMC.
- Step 5:** Verify whether the GPO creation using GPO and user setting management is clearly performed.
- Step 6:** Ask trainees to read key reading 2.6.4 in trainee's manual.

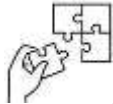


Points to Remember

- Steps to Create a Group Policy Object (GPO):
- ✓ Open Group Policy Management and navigate to the desired container (site, domain, or OU).
- ✓ Right-click the container, select "Create a GPO in this domain," and name the GPO.
- ✓ Click OK, then right-click the new GPO and select "Edit" to configure the settings.
- ✓ Close the editor after making your changes.
- ✓ Verify the GPO application using the Group Policy Results tool to ensure it's linked to the correct container.
- Using the GPO Editor
- ✓ After creating the GPO, right-click the newly created GPO under the appropriate OU in the GPMC.
- ✓ Select "**Edit**" from the context menu to open the Group Policy Management Editor (GPO Editor).
- ✓ In the GPO Editor, navigate through the policy settings under **Computer Configuration** or **User Configuration** depending on the policy you want to manage.
- ✓ Make the necessary changes to the policy settings. For example, you can configure password policies, software installation policies, or security settings.

C. Using GPMC to Manage GPO

- ✓ In the GPMC, you can manage existing GPOs by right-clicking on a GPO and selecting **"Edit," "Delete," "Back Up,"** or other management options.
- ✓ You can also **"Link an Existing GPO"** to other OUs or domains by right-clicking the desired OU or domain and selecting **"Link an Existing GPO..."**.
- ✓ Use the **"Group Policy Results"** and **"Group Policy Modeling"** features in GPMC to simulate and analyze the impact of GPOs on specific users or computers.
- ✓ Monitor GPO status and replication by using the **"Status"** tab in the GPMC, which provides information on the GPO's deployment and status.



Application of learning 2.6.

In the company TYZ, the IT Administrator is tasked with implementing a security policy across all employees' computers. To achieve this, they create a Group Policy Object (GPO) named "TYZ-SecurityPolicy" using the Group Policy Management console (GPMC) on the windows server. After creating the GPO, they open the Group Policy Management Editor (GPO Editor) to configure specific security settings, such as restricting USB access and enforcing strong password policy. Once the GPO setting are defined the administrator links the "TYZ-SecurityPolicy" GPO to the "TYZ-Users" Organizational Unit (OU), ensuring that all users within the OU are subjected to the new security policies. Finally, they use GPMC to verify that the GPO is properly applied to all users and troubleshoot any issues that arise

Checklist

SN	Criteria	Indicators	Observation	
			YES	NO
1	Group Policy Object (GPO) is Effectively Created	1.1 The GPO is created and visible.		
2	GPO Settings are Effectively Configured	2.1 The GPO Editor is opened		
		2.2 USB access restriction settings are configured.		
		2.3 Strong password policy is applied.		
3	GPO is Effectively Linked to the OU	3.1 The GPO linkage to the OU is established and visible.		
4	GPO is well Applicable and well Verified	4.1 The GPO application to the OU is verified		
		4.2 Security policies are confirmed to be applied		
		4.3 Any application issues are troubleshoot and fixed.		
5	Documentation and Time Management are ensured	5.1 Screenshots of all activities (creation, settings configuration, linking to the OU, and verification) are captured.		
		5.2 All tasks are finished within 1 hour.		



Learning outcome 2 end assessment

Theoretical assessment

Question 1. Circle the letter corresponding to the correct answer:

- i. Which of the following is a security group in Windows Server?
- a) Distribution Group
 - b) Global Group
 - c) Universal Group
 - d) All of the above

Answer: Global Group

- ii. What is the purpose of an Organizational Unit (OU) in Active Directory?
- a) To group users for email distribution
 - b) To provide security permissions to objects
 - c) **To organize objects hierarchically and logically**
 - d) To create a backup of Active Directory

Answers: To organize objects hierarchically and logically

- iii. Which of the following is not a common user account permission in Active Directory?
- a) Full Control
 - b) Modify
 - c) Read and Write
 - d) **Administrator**

Answers: Administrator

- iv. What is the default user account type created when a new user is added to Active Directory?
- a) Administrator
 - b) **Standard User**
 - c) Guest
 - d) Domain User

Answer: Standard User

Question 2. Read the following statement related to carry out finishing activity and Answer following questions by using **True or False**

- i. A user account policy can be used to restrict the number of failed login attempts before an account is locked out.

Answer: True

- ii. The Domain Admins group has full control over all objects in an Active Directory domain.

Answer: True

- iii. You can create a new user account by copying an existing one.

Answer: True

Question 3. Fill in the Blanks space with the appropriate words. Select from the given choices

1. A(n) is a collection of user accounts and other objects in Active Directory.
(Domain, Forest, **Group**, Site)
2. The tab in the user account properties dialog allows you to manage group memberships. (member of, groups, security, general)
3. To change a user's password in Active Directory, you need to have.

Practical assessment

As the IT Administrator for Special Solutions, you are responsible for effectively managing user accounts, permissions, and network security. Create new user accounts for Umutoni Claudine (Sales Department), Kamali Emmanuel (IT Department), and Kanyana Viviane (Human Resources). Assign appropriate permissions based on their roles: Umutoni Claudine (access to sales-related systems and data), Kamali Emmanuel (full administrative privileges), Kanyana Viviane (access to HR systems and employee data). Set strong password policies for all accounts. Manage existing user accounts by resetting passwords, deactivating/activating accounts, and updating contact information. Create and manage user groups: "Sales Team" and "IT Support." Assign permissions to these groups based on their roles. Organize users into OUs: Sales, IT, and Human Resources. Move users to their respective OUs and apply specific policies or settings. Delegate permissions to a help desk technician for password resets and user account creation/deletion within the "Sales" and "IT" OUs. Ensure proper oversight and control over delegated permissions. Implement strong password policies, enable account lockout policies, and regularly review user permissions. Provide user training on proper password management, security practices, and the use of company systems. Maintain detailed documentation of all user accounts, permissions, and policies. Regularly audit user account activity to identify potential security threats and compliance issues. By successfully completing these tasks, you will demonstrate your ability to effectively manage user accounts, permissions, and OUs in a dynamic and growing business environment.

CHEKLIST

SN	Criteria	Indicator	Observation	
			YES	No
1	User Accounts are Effectively Created	1.1 User accounts for Umutoni Claudine, Kamali Emmanuel, and Kanyana Viviane are created.		
		1.2 Passwords are set and strong password policies are configured.		
2	Permissions are Effectively Assigned	2.1 Permissions are configured		
		2.2 Full admin rights are granted.		
		2.3 Kanyana Viviane to access HR is granted .		
3	User Accounts are Properly Managed	3.1 Passwords are successfully reset.		
		3.2 Accounts are correctly deactivated/reactivated.		
		3.3 Contact details are updated correctly.		
4	User Groups and Organizational Units (OUs) are Well Managed	4.1 Groups are created and named appropriately.		
		4.2 On each group, Permissions are applied correctly		
		4.3 OUs "Sales," "IT," and "Human Resources" are created.		
		4.4 Policies/settings are correctly applied.		
5	Permissions are Effectively Delegated	5.1. Delegated permissions for password resets and user account management within the "Sales" and "IT" OUs are effectively configured.		

END



Further information to the trainer

Dauti, b. B. (2024). *Windows Server 2022 Administration Fundamentals*. Third Edition.

Krause, J. (2024). *Mastering Windows Server 2022*.

Lee, T. (2024). *Windows Server Automation with PowerShell Cookbook*.

Microsoft. (n.d.). *Microsoft Windows Server Administration Essentials*. Open Library. Retrieved from [\[https://openlibrary.org/books/OL29072895M/Microsoft_Windows_Server_Administration_Essentials\]](https://openlibrary.org/books/OL29072895M/Microsoft_Windows_Server_Administration_Essentials)(https://openlibrary.org/books/OL29072895M/Microsoft_Windows_Server_Administration_Essentials)

Microsoft. (n.d.). Manage online accounts for users. Microsoft Learn. Retrieved from [\[https://learn.microsoft.com/en-us/windows-server-essentials/manage/manage-online-accounts-for-users\]](https://learn.microsoft.com/en-us/windows-server-essentials/manage/manage-online-accounts-for-users)(<https://learn.microsoft.com/en-us/windows-server-essentials/manage/manage-online-accounts-for-users>)

Microsoft. (n.d.). Manage user accounts in Windows Server Essentials. Microsoft Learn. Retrieved from [\[https://learn.microsoft.com/en-us/windows-server-essentials/manage/manage-user-accounts-in-windows-server-essentials\]](https://learn.microsoft.com/en-us/windows-server-essentials/manage/manage-user-accounts-in-windows-server-essentials)(<https://learn.microsoft.com/en-us/windows-server-essentials/manage/manage-user-accounts-in-windows-server-essentials>)

Microsoft. (n.d.). Add Windows Server Essentials as a member server. Microsoft Learn. Retrieved from [\[https://learn.microsoft.com/en-us/windows-server-essentials/install/add-windows-server-essentials-as-a-member-server\]](https://learn.microsoft.com/en-us/windows-server-essentials/install/add-windows-server-essentials-as-a-member-server)(<https://learn.microsoft.com/en-us/windows-server-essentials/install/add-windows-server-essentials-as-a-member-server>)

Learning Outcome 3: Deploy Web Application

WEB SERVER

Configuration, Deploy, Maintain and Troubleshoot



Indicative contents

- 3.1 Introduction to Web Servers
- 3.2 Configure IIS with Window Server
- 3.3 Management of IIS Web Server
- 3.4 Setting Environment of Developed Web App
- 3.5 Verify Server Environment Requirement
- 3.6 Hosting Web App
- 3.7 Verification of Successfully Hosted Web App

Key Competencies for Learning Outcome 3: Deploy Web Application

Knowledge	Skills	Attitudes
• Description of web servers • Description of FTP and HTTPs protocol • Description web hosting platforms	• Applying IIS with web server • Managing IIS web server • Setting up environment of web app • Verifying server environment • Hosting web app • Testing hosted app	• Being a team player • Being creative • Having attentiveness • Having persistence in troubleshooting • Being patient • Being effective in time management



Duration: 25hrs



Learning outcome 3 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe clearly web servers/hosting platform used in windows server
2. Describe clearly FTP and HTTPs protocol used in communication
3. Describe correctly web hosting platforms used for hosting
4. Set up properly environment of web app in server
5. Verify clearly server environment used in windows server
6. Apply properly IIS in windows server to web server

7. Manage correctly web server for hosting application
8. Host correctly a web app in web server via windows server
9. Test clearly hosted app in web server



Resources

Equipment	Tools	Materials
• Computer • Server machine	• VMWare workstation • VMWare ESXI • Oracle VirtualBox	• Internet



Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail computer Labs
- Avail Installed Software including IIS and any other tools
- Avail domain name and network Settings



Indicative content 3.1: Introduction to Web Servers



Duration: 3 hrs



Theoretical Activity 3.1.1: Description of web server/hosting platforms



Notes to the trainer:

- Trainer may have computers and internet
- Avail projector



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to form small groups to respond to the following questions:

- Define the term "**Web Server**"
- What does "**IIS**" stand for?
- Explain the following types of Web Servers/Web Hosting Platforms:
 - IIS Web Server
 - Apache Web Server
 - Nginx Web Server
 - Litespeed Web Server
 - Apache Tomcat
 - Node.js
 - Lighttpd
- Mention the benefits and drawbacks of IIS

Step 2: Asks any trainees to write answers provided on paper.

Step 3: Asks trainees to discuss the provided answer and present to their findings.

Step 4: Provides expert view for more clarifications

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 3.1.1 in the trainee's manual.



Points to Remember

- Description of web server/hosting platforms:
 - A **web server** is a computer that hosts web pages, making them accessible online.
 - IIS** stands for Internet Information Services

- Types of Web Servers/Web hosting Platform are: IIS (Internet Information Services), Apache HTTP Server: Apache HTTP Server, Nginx (pronounced "Engine-X"), LiteSpeed Web Server, Apache Tomcat, Node.js, Lighttpd
- **Advantages of IIS are:** Windows Integration, Ease of Use, Security, Scalability and Language Support
- **Drawbacks (Disadvantages) of IIS are:** Windows Dependency, Resource Intensive, Security Risks, Learning Curve, Limited Customization and Compatibility Issues



Indicative content 3.2: Configure IIS With Window Server



Duration: 5 hrs



Practical Activity 3.2.1: Adding roles and features during IIS configuration



Notes to the trainer

- Trainer may have computers with internet
- Avail projector



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
As trainees in L4 Software Development, you install and configure IIS and DNS Server on Windows Server 2022. You enable essential features for IIS, including HTTP functionality, ASP.NET, CGI, and FTP, and set up the DNS Server role. After installation, you verify the configurations by checking the IIS Welcome page and the DNS Server setup.
- Step 2:** Explain the task and provide clear work instruction
- Step 3:** Demonstrate how to configure DNS server and Install IIS Role in selected Server. While demonstrating the steps for configure DNS server and install IIS roles and features.
- Step 4:** Ask trainees to configure DNS server and install IIS roles and features
- Step 5:** Provide more explanations and support where necessary.
- Step 6:** Verify whether DNS server and IIS roles and features installed
- Step 7:** Ask trainees to read key reading 3.2.1. in trainee's manual.



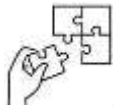
Points to Remember

- DNS is responsible for translating human-friendly domain names into IP addresses that computers use to communicate.
 - Steps to Enable DNS server in windows server
- ✓ Open Server Manager
 - ✓ Choose Installation Type

- ✓ Select Destination Server
- ✓ Add DNS Server Role
- ✓ Review and Confirm
- ✓ Complete Installation

- **Steps to Install IIS Role in selected Server**

- ✓ Open Server Manager: Log in and open Server Manager from the Start menu.
- ✓ Add Roles and Features
- ✓ Select Server Roles
- ✓ Skip Features Selection > On the Select features page, click Next.
- ✓ Configure IIS Role Services: Click Next on the Web Server Role (IIS) page.
- ✓ Confirm and Install
- ✓ Verify IIS Installation



Application of learning 3.2.

FFF Ltd company, located in Gicumbi District, Northern Province, FFF Ltd has a problem that there no way to configure their IIS with windows server hence, they need to install and configure IIS and DNS Server on Windows Server the access to their system they have recently developed so that all users in the company will be able to access it from webpage and DNS server. As an IT technician, you are hired by FFF Ltd to install and configure IIS and DNS Server on Windows Server

Checklist

SN	Criteria	Indicators	Observation	
			YES	NO
1	IIS is Effectively Installed	1.1 IIS role is selected		
		1.2 Installation process for IIS is completed.		
		1.3 Default IIS web page is verified.		
		1.4 Screenshot of IIS installation and default web page is captured.		
2	DNS Server is Effectively Installed	2.1 DNS Server role is selected		
		2.2 Installation process for DNS Server is completed.		
		2.3 DNS Manager is accessed and verified.		
		2.4 Screenshot of DNS Server installation and DNS Manager is captured.		
3	IIS for Web Access effectively configured	3.1 Default website settings are configured		
		3.2 Web application is deployed and verified.		
		3.3 Screenshot of the web application running on IIS is captured.		
	4. DNS for Domain Resolution in well configured	4.1 Forward lookup zone is created		
		4.2 A records in map domain name to server IP are added		
		4.3 DNS resolution is verified		
	5. Task completion is well reported	5.1 All tasks within the allocated 1-hour timeframe are completed		



Indicative content 3.3: Management of IIS Web Server



Duration: 4 hrs



Theoretical Activity 3.3.1: Explanation of handler mapping



Notes to the trainer:

- Trainer may have computers with internet
- Avail projector



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and request trainees to form small groups to respond to the following questions:
- a. Explain handler mapping
 - b. Discuss on different types of requests
- Step 2:** Asks any trainees to write answers provided on paper.
- Step 3:** Asks trainees to present their findings.
- Step 4:** Provides expert view
- Step 5:** Address any questions or concerns.
- Step 6:** Ask trainees to read the key reading 3.3.1 in the trainee's manual.



Points to Remember

- **Handler mapping in Windows Server refers** to the process of associating specific actions or handlers with particular types of requests in Internet Information Services (IIS).
- **The types of requests** include incoming Request, Handler Mapping, Mapping Rules, Choosing the Handler, Processing the Request, and Sending Response.



Theoretical Activity 3.3.2: Explanation Connection tasks



Notes to the trainer:

- Trainer may have computers and internet
- Avail projector



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and request trainees to form small groups to respond to the following question:
- a. Explain Connection tasks
 - b. Discuss on at least three (3) common connection tasks in Windows Server
- Step 2:** Asks any trainees to write answers provided on paper.
- Step 3:** Asks trainees to discuss the provided answer and present to their findings.
- Step 4:** Provides expert view for more clarifications.
- Step 5:** Address any questions or concerns.
- Step 6:** Ask trainees to read the key reading 3.3.2 in the trainee's manual.



Points to Remember

- Connection tasks in Windows Server typically refer to various activities related to managing network connections, remote access, and communications within a network environment.

Breakdown of some common connection tasks in Windows Server:

- ✓ Network Configuration
- ✓ Remote Access Configuration
- ✓ Firewall Configuration
- ✓ Other connection tasks are: Network Monitoring and Troubleshooting, DNS Configuration, Active Directory Integration, Virtual Networking.



Theoretical Activity 3.3.3: Explanation FTP protocol



Notes to the trainer:

- Trainer may have computers and internet
- Avail projector



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and request trainees to form small groups to respond to the following question:
- A. Explain in details the use of FTP protocol
 - B. Differentiate Authentication and Authorization as two vital information security
- Step 2:** Asks any trainees to write answers provided on paper.
- Step 3:** Asks trainees to discuss the provided answer and present to their findings.
- Step 4:** Provides expert view for more clarifications
- Step 5:** Address any questions or concerns.
- Step 6:** Ask trainees to read the key reading 3.3.3 in the trainee's manual.



Points to Remember

- FTP (File Transfer Protocol)

FTP (File Transfer Protocol) is a network protocol used to transfer files between a client and a server over a TCP/IP network

- Authentication vs Authorization

Authentication is the process of verifying who a user is, while Authorization is the process of verifying what they have access to.



Theoretical Activity 3.3.4: Explanation Site binding used by HTTP or HTTPS



Notes to the trainer:

- Trainer may have computers and internet
- Avail projector



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and request trainees to form small groups to respond to the following question:
- Explain Site binding used by HTTP or HTTPS protocols
- Step 2:** Asks any trainees to write answers provided on paper.
- Step 3:** Asks trainees to discuss the provided answer and present to their findings.
- Step 4:** Provides expert view for more clarifications
- Step 5:** Address any questions or concerns.
- Step 6:** Ask trainees to read the key reading 3.3.4 in trainee's manual



Points to Remember

- **Site binding** is a configuration setting used primarily with Internet Information Services (IIS), which is Microsoft's web server software. Here's how it works:
 - ✓ Domain Name: With HTTP or HTTPS site binding, you can associate each website hosted on the server with one or more domain names.
 - ✓ IP Address: You can also bind websites to specific IP addresses on the
 - ✓ server.
 - ✓ Port Number: By default, HTTP uses port 80, and HTTPS uses port 443. However, you can configure IIS to listen on alternative ports if needed.
 - ✓ Protocol (HTTP or HTTPS): Site binding allows you to specify whether a website should handle HTTP requests, HTTPS requests, or both.



Practical Activity 3.3.5: Configuration of site binding of HTTP or HTTPS Protocols



Notes to the trainer

- Have computer installed windows server
- Have internet connection



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to do the task described below:

As trainees in L4 Software Development, you configure site bindings for HTTP or HTTPS protocols in Windows Server, you typically use Internet Information Services (IIS)

Step 2: Explain the task and provide clear work instruction

Step 3: Demonstrate how to configure DNS server and Install IIS Role in selected Server.

Step 4: Ask trainees to configure DNS server and install IIS roles and features

Step 5: Provide feedback and support where necessary.

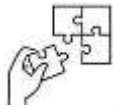
Step 6: Verify whether DNS server and IIS roles and features installed

Step 7: Ask trainees to read key reading 3.3.5. in trainee's manual



Points to Remember

- To configure site bindings for HTTP or HTTPS protocols in Windows Server(IIS) follow steps bellow:
 - ✓ Open Internet Information Services (IIS) Manager
 - ✓ Select Your Website
 - ✓ Add a Binding
 - ✓ Choose Protocol (HTTP or HTTPS)
 - ✓ Specify IP Address and Port
 - ✓ Select SSL Certificate (if configuring HTTPS)
 - ✓ Host Name (Optional for HTTPS)
 - ✓ Apply and OK
 - ✓ Restart the Website



Application of learning 3.3.

FFF Ltd company, located in Gicumbi District, Northern Province, FFF Ltd has a problem that there no way to configure site binding of HTTP or HTTPS Protocols hence, they need to site binding of HTTP or HTTPS Protocols in Windows Server the access to their system they have recently developed so that all users in the company will be able to access it from site. As an IT technician, you are hired by FFF Ltd to configure site bindings for HTTP or HTTPS protocols in Windows Server.

Checklist

SN	Criteria	Indicators	Observations	
			Yes	No
1	Management of IIS Web Server is well done	1.1 Open Internet Information Services (IIS) Server Manager is done		
		1.2 Pick a Website		
		1.3 Add a Binding		
		1.4 Fill in IP Address and Port		
		1.5 Enter the hostname		
		1.6 Save the binding configuration		
		1.7 Restart the Website is done		



Indicative content 3.4: Setting Environment of Developed Web App



Duration: 5 hrs



Theoretical Activity 3.4.1: Describing web hosting platforms



Notes to the trainer:

Trainer may ensure that each group has a sheet of paper to write their answers.

Trainer may facilitate group discussions and provide guidance as needed.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to answer the following questions:

1. How would you define web hosting?
2. What are the key differences between free and paid hosting platforms? provide 4 examples of each type.
3. What are the key technical requirements for hosting a website that involves backend functionalities, and what are some examples of popular database clients that may be needed?
4. How do the technical requirements differ between hosting a dynamic website with backend server support and a static website without backend server needs?

Step 2: Ask trainees to write answers on paper or flipchart

Step 3: Involve trainees in presentation of their findings to the whole class

Step 4: Provides expert view for more clarification.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read more in trainee manual in key reading 3.4.1.



Points to Remember

- Web hosting is an online service that makes your website's content accessible on the internet.
- Free hosting is when a web hosting company provides free access to web domains and hosting.

- Paid hosting is when you pay a fee for a web hosting services provider to host your website on their dedicated servers.
- Hosting with backend server: All of the elements required for the website or application to perform as it should be the backend developer's responsibility. Dynamic Websites: Requires a server to process requests, manage databases, and execute backend code.
Requirements: Server hosting for PHP, Node.js, Python, or other backend languages; database support like MySQL, PostgreSQL.
- Hosting without backend server: A website which only requires displaying pre-defined data essentially does not require any back-end logic.
- Static Websites: Suitable for free hosting or basic paid plans.
- Requirements: HTML, CSS, JavaScript files, no need for server-side processing.



Practical Activity 3.4.2: Verifying a local web app and configuring backend Technology in IIS web server



Notes to the trainer

- Avail the client computer and server, ensuring they are properly configured.
- Avail of web browser
- Ensure that IIS (Internet Information Services) is installed and ready for use



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
- Step 2:** As Level 4 SOD trainees, you are tasked with setting up and verifying a local web application stored in a folder named test1site, which contains an index.html file displaying the message "Hello L4 SOD." Your objective is to ensure that this web app runs correctly in your local environment using IIS before deploying it to a production server.
- Step 3:** Explain the task and provide clear work instruction.
- Step 4:** Demonstrate how to configure IIS to host the web application, including adding the site and setting up backend technologies like PHP and Node.js

- Step 5:** Asks trainees to setting up and verifying a local web application
- Step 6:** Verify whether to set up and verify a local web application is properly performed
- Step 7:** Ask trainees to read key reading 3.4.2 in trainee's manual



Indicative content 3.5: Verify Server Environment Requirement



Duration: 2 hrs



Practical Activity 3.5.1: Testing on local/remote computer/Server



Notes to the trainer

- This activity should be conducted in a computer lab, where trainees will practice hosting a simple web application on a Windows Server.
- Avail of videos as dedicated material



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to do the task described below:
Trainees are tasked with Testing on a local or remote computer/server according to network, security, files, and visibility criteria on a Windows Server
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to testing on a local or remote computer/server according to network, security, files, and visibility criteria.
- Step 4:** Asks trainees to Test on a local or remote computer/server according to network, security, files, and visibility on a Windows Server
- Step 5:** Verify whether local or remote computer/server are tested
- Step 6:** Ask trainees to read Key Reading 3.5.1 in trainee's manual.



Points to Remember

- Testing on local/remote computer/Server

a) Network

To perform testing on local or remote computers/servers through a network in Windows Server, you can use various tools and methods depending on what you're trying to achieve.

Here's are the different tools:

- ✓ Ping

- ✓ Tracert
- ✓ Telnet
- ✓ PowerShell Test-NetConnection
- ✓ Remote Desktop
- ✓ Network Monitoring Tools



Practical Activity 3.5.2: Verifying Local URL accessibility



Notes to the trainer

- This activity should be conducted in a computer lab, where trainees will practice hosting a simple web application on a Windows Server.
- Trainer should provide support for handling and troubleshooting any errors encountered during the process.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the topic and ask trainees do the task described below:
Trainees are tasked with Verify local URL accessibility, browser compatibility, website speed, and website size. The goal is to ensure that everything works well on a Windows Server
- Step 2:** Explain the task and provide clear work instruction.
- Step 3:** Demonstrate how to Verifying local URL accessibility, browser compatibility, website speed, and website size. The goal is to ensure that everything works well
- Step 4:** Allow trainees to perform the tasks on their own, using the instructions provided.
- Step 5:** Provide Additional Explanations and Support
- Step 6:** Check that each trainee has successfully Verified local URL accessibility, browser compatibility, website speed, and website size.
- Step 7:** Instruct trainees to read Key Reading 3.5.2



Points to Remember

A. Accessibility

To verify local URL accessibility in a Windows Server environment, you can follow these steps:

- ✓ Open a Web Browser
- ✓ Enter URL
- ✓ Check Accessibility
- ✓ Verify Content
- ✓ Firewall Settings
- ✓ DNS Resolution

B. Browsers

To verify local URL web browsers in Windows Server, you can follow these steps:

- ✓ Open a Web Browser
- ✓ Enter the Local URL
- ✓ Check Access
- ✓ Test with Different Browsers
- ✓ Firewall and Security Settings
- ✓ Additional Troubleshooting

C. Website speed

To verify the speed of a local website hosted on a Windows Server, you can follow these steps:

- ✓ Use Browser Developer Tools
- ✓ Ping Command
- ✓ Traceroute Command
- ✓ Third-Party Tools
- ✓ Performance Monitoring Software

D. Website size

To verify the size of a local website hosted on a Windows server, you can follow these steps:

- ✓ Open Command Prompt
- ✓ Navigate to the website directory
- ✓ Calculate the total size



Indicative content 3.6: Hosting Web App



Duration: 4 hrs



Practical Activity 3.6.1: Hosting a Web Application on Windows Server:



Notes to the trainer

- This activity should be conducted in a computer lab, where trainees will practice hosting a simple web application on a Windows Server.
- trainers should provide support for handling and troubleshooting any errors encountered during the process.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the topic and ask trainees do the task described below:
Trainees are tasked with creating a simple web application that includes two HTML pages: "**index.html**" and "**contact.html**". These files should be stored in a folder named "**rtbschools**". The objective is to host this web app on a Windows Server, making it accessible using both HTTP and HTTPS protocols via the domain name "**www.rtbschools.site**". Students will need to specify the physical path for the web app in IIS, select the appropriate protocols (HTTP and HTTPS), specify the server's IP address, configure DNS settings to point the domain to the server, and set up the appropriate port numbers for HTTP (80) and HTTPS (443). Additionally, they should be prepared to handle and troubleshoot any errors that may arise during the setup process. After completing these steps, students should be able to access the website using both **<http://www.rtbschools.site>** and **<https://www.rtbschools.site>**.
- Step 2:** Instruct trainees to read Key Reading 3.6.1
- Step 3:** Explain the task and provide clear work instruction.
- Step 4:** Demonstrate how to specify the physical path, Configure the site to use both HTTP and HTTPS protocols, how to assign the server's IP address, how to set up DNS settings for the domain, Configure port numbers for both HTTP and HTTPS.
- Step 5:** Allow trainees to perform the tasks on their own, using the instructions provided.

Step 6: Provide Additional Explanations and Support

Step 7: Check that each trainee has successfully hosted their web app and can access it using both <http://www.rtbschools.site> and <https://www.rtbschools.site>



Points to Remember

- **Hosting a Web Application on Windows Server: Enabling HTTP and HTTPS Access follow the following steps:**

- ✓ Upload Web App to Windows Server
- ✓ Specify the Physical Path in IIS
- ✓ Select the Protocols
- ✓ Specify the IP Address
- ✓ Configure Web App DNS
- ✓ Configure Port Number
- ✓ Handle Discovered Errors



Application of learning 3.6.

FFF Ltd company, located in Gicumbi District, Northern Province, FFF Ltd has a problem that there no way to Host a Web Application on Windows Server: Enabling HTTP and HTTPS Access hence, they need to access to their system they have recently developed so that all users in the company will be able to access it.

As an IT technician, you are hired by FFF Ltd to create and host web application in the windows server, making it accessible using both HTTP and HTTPS protocols via the domain name “www.ffrwanda.site”.

Tasks:

- To access the website using both ***http://*** www.ffrwanda.site and <https://www.ffrwanda.site> .

Checklist

SN	Criteria	Indicators	Observations	
			YES	NO
1	Web Application Setup is well prepared	1.1 The web application is effectively prepared.		
2	IIS Configuration is well done	2.1 A new website is well created		
3	HTTP Binding is well configured	3.1 HTTP binding is effectively configured.		
		3.2 HTTP binding is confirmed and applied.		
4	HTTPS Binding is well Configured	4.1 HTTPS binding is effectively configured.		
		4.2 The SSL certificate is correctly installed and applied.		
		4.3 HTTPS binding is confirmed and applied.		
5	DNS Configuration is well done	5.1 DNS records are appropriately configured.		
6	HTTP and HTTPs access is effectively verified.	6.1 http://www.ffrwanda.site in a web browser is successfully accessed.		
		6.2 https://www.ffrwanda.site in a web browser is successful accessed.		
		6.3 Any issues with HTTP/HTTPS access are appropriately managed and resolved.		



Indicative content 3.7: Verification of Successfully Hosted Web App



Duration: 4 hrs



Practical Activity 3.7.1: Testing accessibility on local network and verify size, speed of online web app.



Notes to the trainer

- This activity should be conducted in a computer lab, where trainees practice hosting a simple web application on a Windows Server
- Avail of internet connection



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

Trainees are tasked to test accessibility within a local network, test online website speed and Verify size of online web app on a Windows Server, you can perform several checks and use different various tools.

Step 2: Demonstrate how to test accessibility within a local network, test online website speed and Verify size of online web app on a Windows Server

Step 3: Ask trainees to perform their above task using the instructions provided.

Step 4: Provide feedback where necessary

Step 5: Check that each trainee has successfully tested online website speed and Verify size of online web app

Step 6: Ask trainees to read Key Reading 3.7.1



Points to Remember

Verification of Successfully Hosted Web App

- **Local Accessibility:**

Test using the server's local IP (e.g., <http://192.168.1.10>) or hostname (e.g., <http://rtb1.local>) to ensure the app loads.

- **Online Accessibility:**

- ✓ Access the domain (e.g., <http://www.myapp.com>) from an external device on a different network.
- ✓ Check DNS propagation with tools like WhatsMyDNS.net if it doesn't load.

- **Website Speed Testing:**

Use tools like *Google PageSpeed Insights* or *GTmetrix* to analyze speed and performance metrics.

- **Resource Size Verification:**

- ✓ Analyze resource sizes using *WebPageTest*.
- ✓ Ensure the total page size is below 2MB for optimal loading.



Application of learning 3.7

As a system administrator at **RRA**, you are responsible for verifying the deployment of a web app on the Windows Server. First, test its accessibility within the local network using the server's IP or hostname. Next, check its online availability by accessing the app through its public domain from an external device. Use Google PageSpeed Insights to evaluate the app's speed and performance. Lastly, verify the size of the web app by checking the file size on the server and reviewing the download size using browser Developer Tools. Document your results to ensure everything is functioning properly.

CHECKLIST

SN	Criteria	Indicators	Observations	
			YES	NO
1	Local Network is well accessed	1.1 The web app is well installed		
		1.2 Network settings are well configured		
		1.3 The web app is well verified		
2	Online web is well accessed	2.1 The web app is well configured		
		2.2 Domain and DNS settings are well verified		
		2.3 Online access is well tested		
3	Website Speed is well verified	4.1 The web app size is well verified		
		4.2 The download size is well analyzed		



Learning outcome 3 end assessment

Theoretical assessment

Question 1. Circle the letter corresponding to the correct answer:

i. **What is Handler Mapping in IIS?**

- a) Mapping IP addresses to domain names
- b) **Assigning request handlers to specific types of requests**
- c) Mapping users to their roles in the system
- d) Configuring network connections for the server

Answer: Assigning request handlers to specific types of requests

ii. **Which of the following is NOT a type of web server?**

- a) Apache
- b) IIS
- c) **SQLite**
- d) Nginx

Answer: SQLite

iii. **What protocol is used for secure communication between a client and a web server?**

- a) HTTP
- b) FTP
- c) **HTTPS**
- d) SMTP

Answer: HTTPS

iv. **Which of the following is a benefit of using IIS?**

- a) Cross-platform compatibility
- b) Free licensing
- c) **Tight integration with Windows and .NET**
- d) Open-source availability

Answer: Tight integration with Windows and .NET

v. **Which environment variable should be set to specify the configuration file for PHP in IIS?**

- a) PHP_ENV
- b) **PHP_INI_DIR**

- c) PHP_CONF
 - d) PHP_PATH
- Answer: PHP_INI_DIR**

Question 2. Fill in the Blanks space with the appropriate words. Select from the given choices

- i. The default port number for HTTP is
 - a) **80**
 - b) 443
 - c) 21
 - d) 22
- ii. The PHP handler in IIS is configured using
 - a) CGI
 - b) ISAPI
 - c) **FastCGI**
 - d) ASP.NET
- iii. Node.js applications in IIS are managed using themodule.
 - a) PHP Handler
 - b) **IISNode**
 - c) Apache Tomcat
 - d) LiteSpeed
- iv. Free hosting platforms typically offer resources compared to paid hosting platforms.
 - a) Unlimited
 - b) **Limited**
 - c) Premium
 - d) High-performance
- v. The process of configuring an SSL certificate for secure communication in IIS involves setting up
 - a) HTTP binding
 - b) FTP binding
 - c) **HTTPS binding**
 - d) DNS binding

Question 3: Read the following statement related to carry out finishing activity and Answer following questions by using True or False

- i. IIS can be installed on Linux-based systems. **/False**
- ii. FTP is used to transfer files securely between a client and a server. **/False**
- iii. WinCache is a caching extension for PHP that can be used in IIS to improve performance. **/True**

- iv. Site binding in IIS is used to define how the server listens for incoming connections, specifying the protocol, IP address, port, and hostname. **/True**
- v. The SSL certificate is required to enable HTTP site binding in IIS. **/False**

Practical assessment

FFF Ltd company, located in Gicumbi District, Northern Province, FFF Ltd has a problem that there no way to Host a Web Application on Windows Server: Enabling HTTP and HTTPS Access hence, they need to access to their system they have recently developed so that all users in the company will be able to access it. As an IT technician, you are hired by FFF Ltd to create and host web application in the windows server, making it accessible using both HTTP and HTTPS protocols via the domain name “www.fffrwanda.site”.

Tasks:

- a. To access the website using both ***http://*** www.fffrwanda.site and ***https://*** www.fffrwanda.site .

Checklist

SN	Criteria	Indicators	Observation	
			Yes	No
1	IIS in line with its protocols is properly configured.	1.1 IIS services are installed		
		1.2 The firewall allows traffic on the ports IIS uses is well checked		
		1.3 Security settings are verified		
		1.4 Testing Tools are well organised		
		1.5 IIS is performing under load is well checked		
2	Web app based on environment requirements is properly hosted.	2.1. FTP service is properly configured		
		2.2 Settings for different environments are well adjusted		
		2.3 HTTPS is enabled and SSL/TLS certificates are properly installed and not expired.		
		2.5 Web service is configured		
3	Deployed web app based on environment requirements is properly managed.	3.1 The web app has environment-specific are well configured		
		3.2 The web app is integrated in monitoring tools are organised		
		3.3 Access controls are in well placed		
		3.5 Issue is wellTracked		



Further information to the trainer

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