WINDOWS SERVER ADMINISTRATION

SWDWS401

Perform Basic Windows Server Administration

Competence

RQF Level: 4

Learning Hours 90

Credits: 9

Sector: ICT and Multimedia

Trade: Software Development

Module Type: Specific

Curriculum: ICTSWD4002 – TVET Certificate IV in Software Development

1200

Issue Date: September 2023

Purpose statement	This specific module describes the skills, knowledge and attitudes required to Perform Basic Windows Server Administration. Upon completion of this module, the learner will be able to; Manage Server Services, Manage Users and Deploy web application.				
Learning assumed to be in place	- Apply Network Fundamentals - Apply PHP Programming - Develop Backend Application using Node js				
Delivery modality	**Training delivery**	**100%**	**Assessment**		**Total 100%**
	Theoretical content	30%	Formative assessment	30%	50%
	Practical work:	70%		70%	
	Group project and presentation — 20%				
	Individual project /Work — 50%				
			Summative Assessment		**50%**

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Elements of Competence and Performance Criteria

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Elements of competence	Performance criteria
1. Manage Server Services	1.1 Windows Server OS environment is appropriately prepared based OS Platform
	1.2 Active directory is properly installed based on required services.
	1.3 Services and features are properly installed based on task to be performed.

	1.4 Services and features are properly configured based on task to be performed.
	1.5 Server is properly monitored based on required services.
2. Manage Users	2.1 User accounts are properly created based on user's privileges.
	2.2 User accounts are properly managed based on user's roles.
	2.3 Permissions are clearly assigned based on user account control.
	2.4 Client machine are effectively managed based on ICT policies.
3. Deploy web application	3.1 IIS is properly configured in line with its protocol.
	3.2 web app is properly hosted based on environment requirements
	3.3 Deployed web app is properly managed based on environment requirements.

Intended Knowledge, Skills, and Attitudes

Knowledge	Skills	Attitudes
✓ Describe Windows Server Versions	✓ Perform Windows Server Installation and Configuration	✓ Attention to Details
✓ Describe Active Directory (AD)	✓ Install and Manage Active Directory Domain Services (ADDS)	✓ Adaptability
✓ Describe File and Print Services	✓ Perform User and Group Management	✓ Patience
✓ Identify Networking services (DNS, DHCP)	✓ Set and Manage Group Policy Objects	✓ Customer Service Orientation
✓ Describe Virtualization	✓ Configure and troubleshoot network settings	✓ Teamwork
✓ Identify Server Roles	✓ Perform Web Hosting	✓ Time Management
✓ Describe Storage Solutions (RAID)	✓ Configure RAID	✓ Troubleshooting Persistence
✓ Identify Server Web Services	✓ Create and manage virtual machines	✓ Ethical Conduct
✓ Describe Patch/Updates Management	✓ Perform documentation	✓ Continuous Learning
✓ Describe Group Policy Objects (GPOs)	✓ Communication skills	✓ Conflict Resolution
	✓ Setup Remote Desktop Services	✓ Resourcefulness
	✓ Leadership Skills	✓ Calm Under Pressure
	✓ Problem-Solving	✓ Ownership and Accountability

Course content

Learning outcomes	At the end of the module the learner will be able to:
	1. Manage Server Services
	2. Manage Users
	3. Deploy web application

Learning outcome 1: Manage Server Services	Learning hours: 35

Indicative content

- **Introduction to server administration**
  - ✓ Description of key terms
    - ♦ Server
    - ♦ Client
    - ♦ Network Operating System (NOS)
    - ♦ Hypervisor
    - ♦ Virtualalisation
  - ✓ Server virtualization
    - ♦ Hypervisor Technologies
    - ♦ Types of server virtualization
    - ♦ Benefits of server virtualization
  - ✓ Server requirements
    - ♦ Hardware requirements
    - ♦ Software requirements
- **Installation of Server OS**
  - ✓ Creation of virtual storage (RAID)
    - ♦ Identification of RAID Levels
    - ♦ Advantages and disadvantages of RAID technology
    - ♦ Configuration of RAID on physical server
  - ✓ Installation of Hypervisor

- ✓ Creation of virtual machines
- ✓ Installation of guest OS
- **Creation of domain controller**
  - ✓ Description of Server Administrative tools
  - ✓ Installation of Active Directory Domain Services (ADDS)
  - ✓ Promotion of server to a domain controller
- **Installation of server roles and features**
  - ✓ Description of server roles and features
    - DNS (queries, operation, roles, root hints, zones and zone files)
    - DHCP (messages and operation, Fault tolerance implementations, Security considerations, relay agent)
  - ✓ Installation of server roles and features
    - DNS
    - DHCP
- **Configuration of DNS**
  - ✓ Lookup zones
  - ✓ Creation of Alias (CNAME)
  - ✓ DNS records
    - A
    - AAAA
    - CNAME
    - MX
    - PTR
    - NS
    - SOA
- **Configuration of DHCP parameters**
  - ✓ Scope
    - scope name
    - range of IP address
    - Subnet mask
    - Add exclusion

- Add lease time
- start DHCP service
  - ✓ Reservation
  - ✓ Failover
- **Monitoring of Server services**
  - ✓ nslookup command for resolving DNS
  - ✓ Checking IP DHCP configuration on client

Resources required for the learning outcome	
Equipment	- Computer - Server
Materials	Windows Server OS bootable image
Tools	- VMWare workstation - VMWare ESXI - Oracle VirtualBox - VMWare V-Sphere - Browser - Flash disk - CD/DVD Drive - Rufus - PowerISO - ImgBurn
Facilitation techniques	- Demonstration and simulation - Individual and group work - Practical exercise - Individualized - Trainer guided - Group discussion
Formative assessment methods /(CAT)	- Written assessment - Oral presentation - Performance assessment

	▪ Project based assessment

Learning outcome 2: Manage Users	Learning hours: 30

Indicative content

- **Creation of User Accounts**
  - ✓ Define User account policies
  - ✓ Identification of user account level of access
    - Standard
    - Administrator
  - ✓ New Account
  - ✓ Copy Account
- **Management of user accounts**
  - ✓ Changing user account password
  - ✓ Remove account
  - ✓ Activate Account
  - ✓ Deactivate account
  - ✓ Customisation of User Account Parameters
- **Management of user groups**
  - ✓ Creation of group
  - ✓ Adding users in groups
  - ✓ Removing users from group
- **Management of Organization Units (OU)**
  - ✓ Creation of OU
  - ✓ Adding Users in OU
  - ✓ Removing users from Organization unit
- **Assignment of Permission to Users**
  - ✓ Grant and Revoke Users account permissions

- ✓ Change remote access permissions for a user account
- ▪ **Management of client machines**
  - ✓ Joining a client computer to the domain
    - ↓ Setting of the client computer's name
    - ↓ Establishing connectivity between client and server
    - ↓ Changing from Workgroup to domain
  - ✓ Implementation of Delegation of control
  - ✓ Description of Group Policy Object (GPO)
    - ↓ Types (Local, NonLocal, Starter)
    - ↓ Hierarchy (local, Site, Domain, OU)
    - ↓ Group Policy Template (GPT)
  - ✓ Manage GPO settings
    - ↓ Creation of GPO
    - ↓ GPO Editor
    - ↓ Use of GPMC (Group Policy Management Console) to manage users

Resources required for the indicative content	
Equipment	▪ Computer, Server
Materials	▪ Widow Server,Internet
Tools	▪ VMWare workstation, VMWare ESXI, Oracle VirtualBox
Facilitation techniques	▪ Demonstration and simulation ▪ Individual and group work ▪ Practical exercise ▪ Individualized ▪ Trainer guided ▪ Group discussion

Formative assessment methods /(CAT)	▪ Written assessment
	▪ Oral presentation
	▪ Performance assessment
	▪ Project based assessment

Learning outcome 3: Deploy web application	Learning hours: 25

Indicative content

- **Introduction to Web Servers**
    - ✓ Definition of Web server
    - ✓ Types of Web Servers/Web hosting Platform
        - ✦ IIS Web Server
        - ✦ Apache Web Server
        - ✦ Nginx Web Server
        - ✦ Litespeed Web Server
        - ✦ Apache Tomcat
        - ✦ Node.js
        - ✦ Lighttpd
    - ✓ Explain benefits and drawbacks of IIS
- **Configure IIS With Window Server**
    - ✓ Enabling DNS Server
    - ✓ Install IIS Role in selected Server
        - ✦ Enable HTTP Features
        - ✦ Enable ASP.NET
        - ✦ CGI Interface
        - ✦ Add FTP Feature
        - ✦ Enable HTTP Health and Diagnostics
        - ✦ Confirmation of IIS installation
        - ✦ Verify that IIS is installed successfully
- **Management of IIS Web Server**
    - ✓ Explain handler mapping

- ✓ Explain Connection tasks
- ✓ Explain FTP protocol
- ✓ Explain Site binding used by HTTP or HTTPS protocols
- ✓ Configure site binding of HTTP or HTTPS Protocols

- **Setting environment of developed web app**
  - ✓ Explain hosting platforms available
    - Free hosting
    - Paid hosting
  - ✓ Analysis of technical requirements for each hosting platforms:
    - Without backend server side
    - With backend server side
  - ✓ Verification of local web app to be deployed to the server.
  - ✓ Configuration of backend technology in IIS web Server
    - PHP Environment variables
    - Configure WinCache for php web app
    - FastCGI handler mapping for php web app
    - IISNode module for Node.Js web app
    - Configure web app environment security

- **Verify Server environment requirement**
  - ✓ Testing on local/remote computer/Server
    - Network
    - Security
    - Files
    - Visibility
  - ✓ Verify Local URL accessibility
    - Accessibility
    - Browsers
    - Website speed
    - Website size

- **Hosting Web app**
  - ✓ Upload Web app to window Server

- ✓ Specify the physical path
- ✓ Select the protocols
- ✓ Specify the Ip Address
- ✓ Configure Web app DNS
- ✓ Configure port number
- ✓ Handle discovered errors
- ▪ **Verification of successfully hosted Web app**
  - ✓ Testing accessibility within a local Network
  - ✓ Testing online accessibility
  - ✓ Testing online website speed
  - ✓ Verify size of online web app

Resources required for the indicative content	
Equipment	▪ Computer ▪ Server
Materials	▪ Widow Server ▪ Internet ▪ Browser
Tools	▪ VMWare workstation ▪ VMWare ESXI ▪ Oracle VirtualBox
Facilitation techniques	▪ Demonstration and simulation ▪ Individual and group work ▪ Practical exercise ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods /(CAT)	▪ Written assessment ▪ Oral presentation ▪ Performance assessment ▪ Project based assessment

Integrated/Summative assessment

B-Tech Ltd is a business incubation company that trains people on how to grow their business. It is located in Kigali, Gasabo district, Kimironko Sector. B-Tech Ltd has a problem that there no way to manage their users' activities hence, they need to centralize the access to their system they have recently developed so that all users in the company will be able to access it from the server in order to manage their roles and other activities.

As an IT technician, you are hired by B-Tech ltd to install and configure a server that will manage the company network and allow company users to have limited activities based on their role levels.

Tasks:

- To setup a server system with Full Qualified Domain Name (FQDN) of server.btech.site.
- To configure the server so that it will assign IP addresses to client computers dynamically, act as a domain controller in the network and should provide DNS, Web and FTP services.

Instructions:

- The system should have two Organizational Units which are for HR and Trainers
- There should be a user called Peter who will be working under HR and this user will have ability to change his own password
- In Trainers, there will be a group of two users Alice and Aline, its name is GROUP_USERS.
- There are two computers named HR_PC and TRAINER_PC.
- The network ID is 192.168.100.0 /24 and clients valid IP addresses will range from 21-200 and first 20 addresses will only be assigned to servers and other specific network devices. The server has to reserve 192.168.100.25 /24 Address for HR_PC
- All client computers must be joined to the domain
- The system will have a website called btech.site and accessible to client computers.
- User Peter will be assigned tasks of creating and managing user accounts and resetting users' passwords.
- Anyone who will login under user Aline, will be revoked access to control panel
- Domain users will be able to upload and download files from a folder called ServerFiles which is located on the server.
- The work must be performed within four hours (4).

Note: The environment must be setup if not available

All required equipment, tools and materials are provided.

Resources

Tools	- VMWare workstation - VMWare ESXI - Oracle VirtualBox - Rufus, PowerISO - Img burn - ISO Disc - Remote Server Administration Tool (RSAT)
Equipment	2 Computers - Server
Materials/ Consumables	- Windows Server OS bootable image - Flash disk - CD/DVD drive

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	**No**	
Learning Outcome1:Manage Server Services (30%)	1.Windows Server OS environment is appropriately prepared based OS Platform	Ind.1:Hypervisor is installed			1
		Ind.2:Virtual machine(s) is/are created			2
		Ind.3:Guest OS is installed			2
	2.Active directory is properly installed based on required services.	Ind.1:Static IP Address is assigned to the server			1
		Ind.2:ADDS is installed			2

		Ind.3:Server is promoted to the domain controller			1
	3.Services and features are properly installed based on task to be performed.	Ind.1:DNS is installed			1
		Ind.2:DHCP is installed			1
	4.Services and features are properly configured based on task to be performed.	Ind.1:DNS zones are created			2
		Ind.2:DHCP Scope is created			1
		Ind.3:DHCP reservation is performed			1
Learning Outcome 2:Manage Users **(40%)**	1. User accounts are properly created based on user's privileges.	Ind.1:User accounts are created			2
	2. User accounts are properly managed based on user's roles.	Ind.1:OU are created			1
		Ind.2:User groups are Created			1
		Ind.3:Users are added in OU			1
		Ind.4:Users are added in group			1
	3. Permissions are clearly assigned based on user account control.	Ind.1:Permissions are assigned			2

	4. Client machines are effectively managed based on ICT policies.	Ind.1:Client machines are joined to the domain			3
		Ind.2:Delegation of Control is implemented			4
		Ind.3:Group Policy Object is created			2
		Ind.4:Groups Policy settings are configured			3
Learning Outcome 3: Deploy web application (30%)	1. IIS is properly configured in line with its protocols.	Ind.1:IIS services are installed			3
		Ind.2:IIS is configured			2
	2. web app is properly hosted based on environment requirements	Ind.1:FTP service is configured			4
		Ind.2:Web service is configured			4
	3. Deployed web app is properly managed based on environment requirements.	Ind.1:Web app is accessible			2
Total marks					**50**
Percentage Weightage					**100%**
Minimum Passing line % (Aggregate): 70%					

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