



Prifysgol Cymru

Y Drindod Dewi Sant

University of Wales

Trinity Saint David

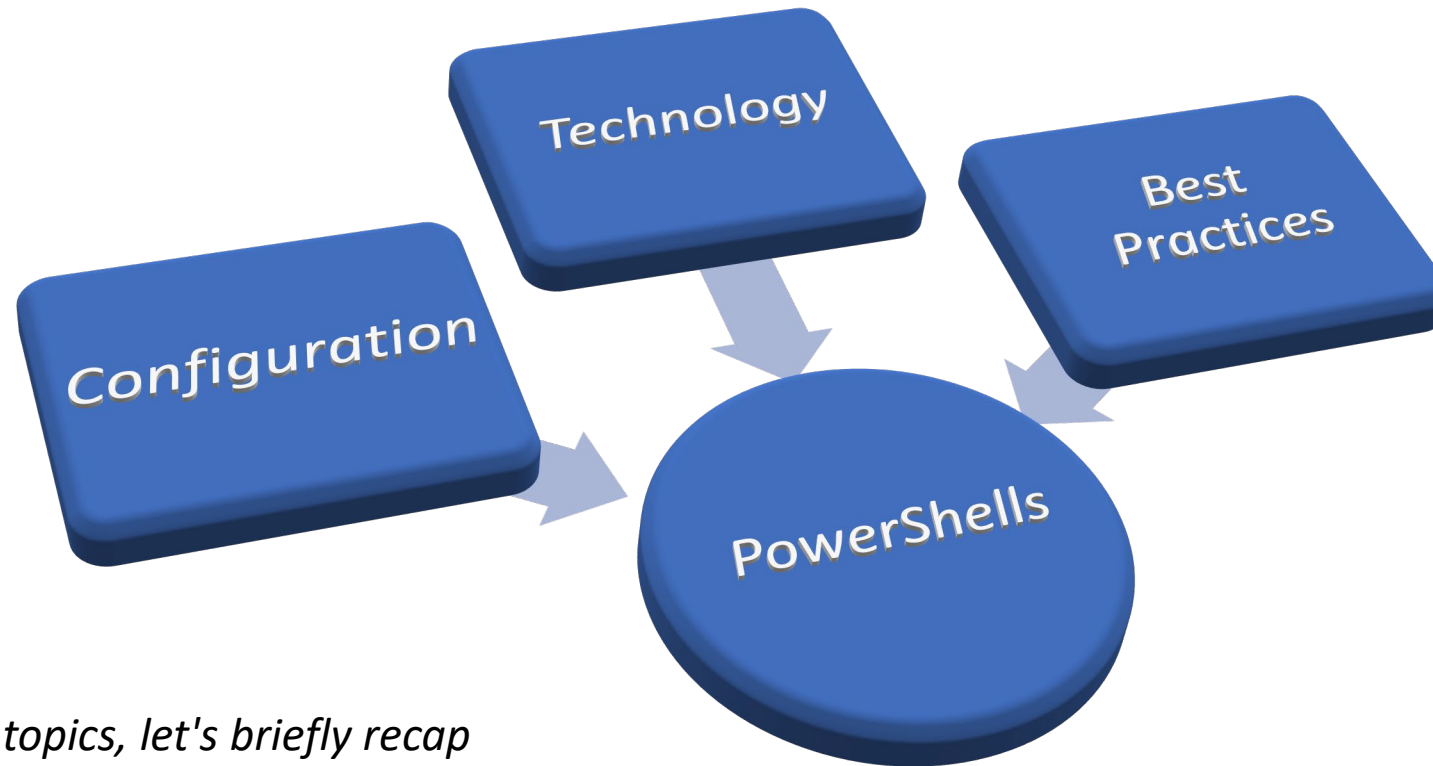
Trawsnewid Addysg, Trawsnewid Bywydau
Transforming Education, Transforming Lives

PowerShell's & Scripts

Network Operating Systems and Services
ACCA5023

Today's Discussion

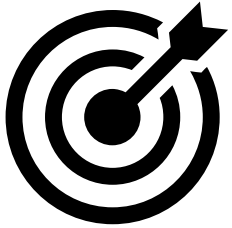
In our Network Operating Systems module, we've explored a plethora of services offered by Network Operating Systems, particularly focusing Windows Server 2022 environment. From IP Addressing to Active Directories, DNS, DHCP, VPN, and beyond, we've laid a solid foundation.



Before we dive into today's topics, let's briefly recap what we covered so far.



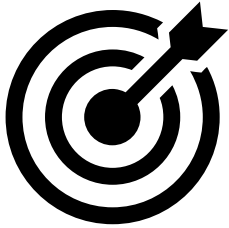
Milestone



Coursework 1:

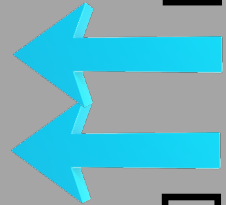
- ✍ Choose your Hypervisor based on your research (Q.2.1)
- ✍ Download (use Evaluation Copy) and Setup your Virtual Machines – as per the topology (Q. 2.2)
- ✍ Research on IP Address (Based on the Group Discussion earlier)
- ✍ Download Debian Linux
- ✍ Configure IP Address for Windows Server and Client – Successful Ping
- ✍ Install Debian Server and Client
- ✍ Configure IP Address for Debian Server and Client – Successful Ping
- ✍ Test and Troubleshoot (if required) your network.
- ✍ Research on Routing and Network Services.
- ✍ Submit your Coursework 1 – **03/03/2026**





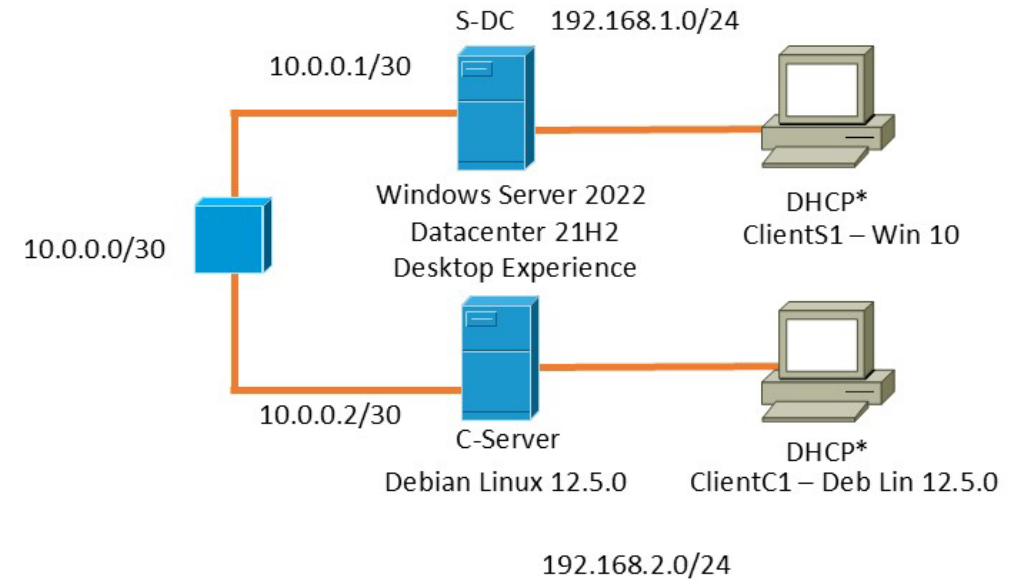
Coursework 2:

- ✍ Coursework 2 – Walkthrough
- ✍ Plan to work on your Topology – Gantt Chart !!! (Reading Week)
- ✍ Continue with your Topology – Firewall Rules/ Policies
- ✍ Installing RRAS Services, AD-DC, DNS, S2S VPN
- ✍ Configuring DHCP, Mount Second Disk, Export/ Create User Accounts
- ✍ Work on other Aspects (Sharing Disk Drive, IIS Server, RDS)
- ✍ Troubleshoot if necessary
- ✍ Submit your Coursework 2 – **11/05/2026** (Submission: 1500)



50 M

1. Routing: **10 M**
 - a) **Modify Firewalls**
 - b) **Install Routing and Remote Access**
 - c) **Persistent IP Forwarding**
2. Domain Server (Swansea) **10 M**
 - a) **Promote Domain Controller**
 - b) **DNS A Records, Reverse Lookups**
3. Domain Membership **5 M**
 - a) **Domain Membership CS1**, LCD, CL1
4. Encrypted Connection between Swansea and London **5 M**
 - a) **VPN – Persistent Connection**
5. Users **5 M**
 - a) **PowerShell Scripts/ Manual Addition**
6. DHCP Server **10 M**
 - a) **DHCP Server and Relay**
7. Test and Troubleshoot **5 M**
 - a) **All Machines Ping Successfully**

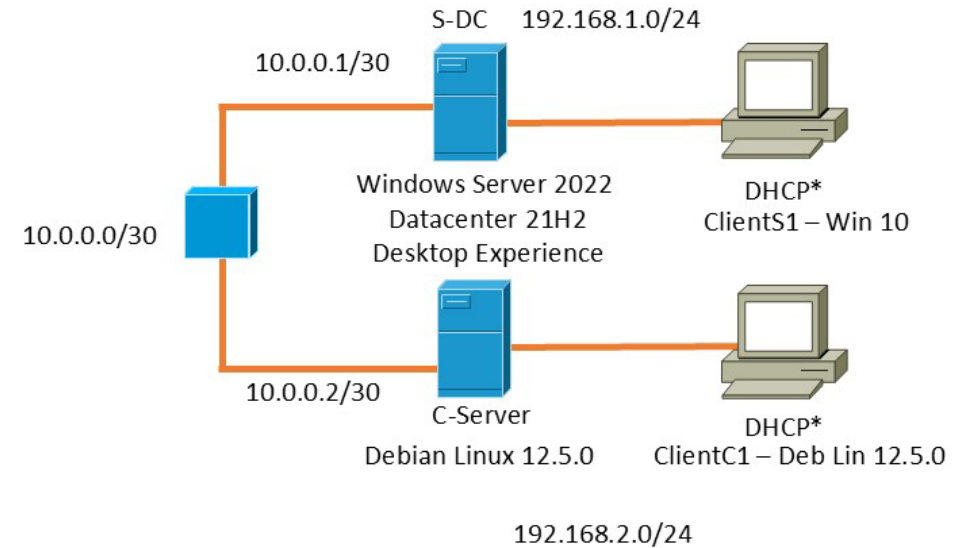


* Will do when DHCP Services are installed

3 Weeks Before Easter Break

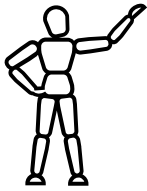
35 M

1. Disk Drive: **15 M**
 - a) Mount E:\ SwanseaFiles **5 M**
 - b) Sharing Disk Drive in both Swansea and London **5 M**
 - c) Full Control Permission **5 M**
2. IIS Server **10 M**
 - a) Create a Website with Internal Authentication **5 M**
 - b) All Users Authenticated **2 M**
 - c) Presented with “Welcome Message” **3 M**
3. Remote Desktop Services **10 M**
 - a) Successful remote desktop access **5 M**
 - b) Create a Login page (HTTP/HTTPS) **1 M**
 - c) Functional [HTTPS://rds.yourname.acca](https://rds.yourname.acca) **2 M**
 - d) Fully Functional [HTTPS://rds.yourname.acca](https://rds.yourname.acca) with Certificates **2 M**



* Will do when DHCP Services are installed

Action



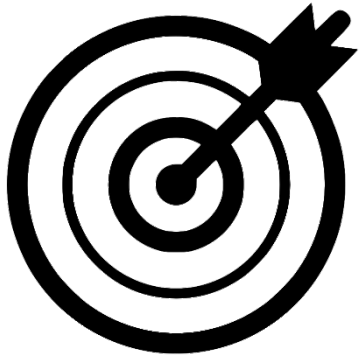
As we conclude today's lecture with PowerShell Scripts. This will help you in ensuring efficient network configuration, management and troubleshooting. I would strongly recommend you start using PowerShell Scripts in your Coursework to gain more or comprehensive understanding.

I trust you equip yourselves with the knowledge and skills necessary to effectively implement the concepts required in your coursework, fostering a deeper comprehension of their configuration and operation within network environments.

By actively working in writing scripts and executing them, you will solidify your understanding of theoretical concepts and cultivate practical skills essential for implementing your network effectively in real-world scenarios. With this foundational knowledge in place, I encourage you to

✍ Continue to work on your coursework and complete all the tasks as per the plan above

Objectives



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- ✍ Understand PowerShell Scripts
- ✍ Continue with your Coursework 2
- ✍ Submit your report – **11th May 2026 @ 1500**
- ✍ Demonstration – **12th May 2026**

PowerShell: Introduction

What is PowerShell Scripting?

- Automation of tasks.
- Storing frequently performed steps in files.
- Writing statements in PowerShell language.
- Storing statements in a text file (.ps1).
- Aimed at automating repetitive tasks.

Benefits of PowerShell Scripting

- Time-saving: Execute scripts to save time.
- Reusability: Easily reuse existing solutions.
- Efficiency: Focus on more valuable tasks.
- Handle various system modifications and side effects.
- Allows for easy reuse of scripts.

PowerShell: Introduction

Features of PowerShell Scripting Language

- Variables
 - Store values for reuse.
 - Can be used as arguments for commands.
- Functions
 - Named lists of statements.
 - Produce output in the console.
 - Can be used as input for other commands.
- Flow Control
 - Control execution paths with constructs like If, Elseif, Else.
- Loops
 - Operate on arrays, inspect each item, perform operations.
 - Includes conditional looping with Do-While loops.

PowerShell: Introduction

Features of PowerShell Scripting Language

- Error Handling
 - Write robust scripts to handle errors.
 - Differentiate between terminating and nonterminating errors.
 - Use constructs like Try and Catch for error handling.
- Expressions
 - Used frequently in scripts for custom columns, sorting, etc.
 - Represent values in PowerShell syntax.
- .NET and .NET Core Integration
 - PowerShell provides integration with .NET and .NET Core.
 - Enables powerful functionalities beyond the scope of this module.

PowerShell: Introduction

Caution: Not all scripts found on the internet are safe to run.

Running a Script

- Understand the script's functionality before execution.
- Script Safety Measures in PowerShell

Requirement for Script Paths

- Always provide the full or relative path when running a script.
- Ensures you know exactly what script is being executed.
- Prevents unintentional execution of similarly named commands or aliases.

Execution Policy

- Acts as a safety feature to prevent unintentional actions.
- Can be set at various levels: local computer, current user, session.
- Group Policy setting allows for setting execution policies for computers and users.

Limitations of Safety Mechanisms

- Opening a file, copying its contents, and running them is still possible.
- Running code via the console is not restricted.
- Safety measures aim to prevent unintentional actions, not a complete security system.

Best Practices

- Understand the script's functionality and potential impact.
- Review and validate scripts before running them.
- Use appropriate execution policies to mitigate risks.
- Regularly review and update execution policies as needed.

PowerShell: Introduction

Note: Execution policy is a safety feature, not a security mechanism.

Get-ExecutionPolicy Cmdlet

- Returns the current execution policy.
- On Linux and macOS, the value returned is "Unrestricted".

Set-ExecutionPolicy Cmdlet

- Allows changing the execution policy on Windows computers.
- Takes an -ExecutionPolicy parameter with various values.

Recommended value: Default.

- Sets policy to "Restricted" on Windows clients.
- Sets policy to "RemoteSigned" on Windows Server.

PowerShell: Introduction

Understanding Execution Policies

Restricted:

- Prevents running scripts, only commands are allowed.
- Suitable for client environments where scripts are restricted.

RemoteSigned:

- Allows running locally created scripts without signature.
- Requires scripts from the internet to be signed by a trusted publisher.

Note: By managing execution policies using PowerShell cmdlets, administrators can control the level of script execution and enhance security across Windows environments.

Diolch/Thank You Any Questions?

Books Referred: *Dauti, Bekim. Windows Server 2019 Administration Fundamentals: A beginner's guide to managing and administering Windows Server environments, 2nd Edition . Packt Publishing.*

Links referred in this presentation:

- Microsoft Virtual Academy