Week 5 – Networking Fundamentals
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This week focuses on learning basic networking concepts such as the OSI model, IP addressing, DNS, DHCP, and connectivity testing using PowerShell. These are essential skills for System Engineers to understand how systems communicate over networks.

OSI Model Diagram

Below is the OSI Model diagram showing all 7 layers, their functions, and examples.

PowerShell Commands and Screenshots

Command 1: Get-NetIPAddress

Code:

```
Get-NetIPAddress
```

Purpose:
Displays all network adapters and their IP addresses.

Explanation:
This command retrieves a list of all network interfaces on your computer, including their IP addresses, interface aliases, and address families (IPv4 or IPv6). It helps System Engineers quickly check if the system has valid IP configurations and multiple interfaces (e.g., Wi-Fi, Ethernet, Loopback).

Command 2: Test-Connection

Code:

```
Test-Connection google.com
```

Purpose:
Tests network connectivity (similar to the ping command).

Explanation:
This command sends ICMP packets to google.com and displays the response time for each ping. Successful replies indicate that the system can reach the internet. This is a common troubleshooting command to test connectivity to external or internal servers.

Command 3: nslookup

Code:

nslookup microsoft.com

Purpose:
Shows DNS resolution for a website.

Explanation:
This command queries the Domain Name System (DNS) to find the IP address associated with the domain name microsoft.com. It also shows which DNS server was used for the query. This helps verify that DNS resolution is working properly.

Summary

In this week, I learned about:

- The 7 layers of the OSI model and their key functions.
- How to view and understand system IP configurations using Get-NetIPAddress.
- How to test network connectivity using Test-Connection.
- How to verify DNS resolution using nslookup.

These commands and concepts are foundational for every System Engineer to monitor and troubleshoot network connectivity, ensuring systems communicate efficiently across local and external networks.