TOPIC: IMPLEMENTING NETWORK LOAD BALANCING

Objective:

To provide practical experience in configuring, managing, and validating high availability and load balancing for web servers using Windows Server 2016 Network Load Balancing (NLB).20740A-LAB.pdf

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Pre-requisites:

- **Your Lab Environment:**
    - VMware Workstation running 6 VMs:
        - LON-DC1: Windows Server 2016 Datacenter GUI (Domain Controller, DNS, main server)
        - LON-SVR1: Windows Server 2016 Standard GUI
        - LON-SVR2: Windows Server 2016 Standard GUI
        - LON-CORE: Windows Server 2016 Datacenter CLI
        - LON-CL1: Windows 10 Pro (client for web validation)
        - LON-RHEL: Red Hat Enterprise Linux 10 (not joined to domain)
- All Windows machines except LON-RHEL are joined to **RPSLAB.COM** using Active Directory.
- Administrative credentials on all involved servers.
- Both LON-SVR1 and LON-SVR2 have IIS installed and a functioning website.
- All VMs have network connectivity.
- Screenshots to be taken at each wizard/dialog/procedure step.

Procedure:

Exercise 1: Implementing a Network Load Balancing (NLB) cluster

Task 1: Verify Website Functionality for Standalone Servers

- On **LON-SVR1**:
    - Open c:\inetpub\wwwroot\iisstart.png in Paint, draw a circle around the IIS logo, save changes.

- Confirm unique change.

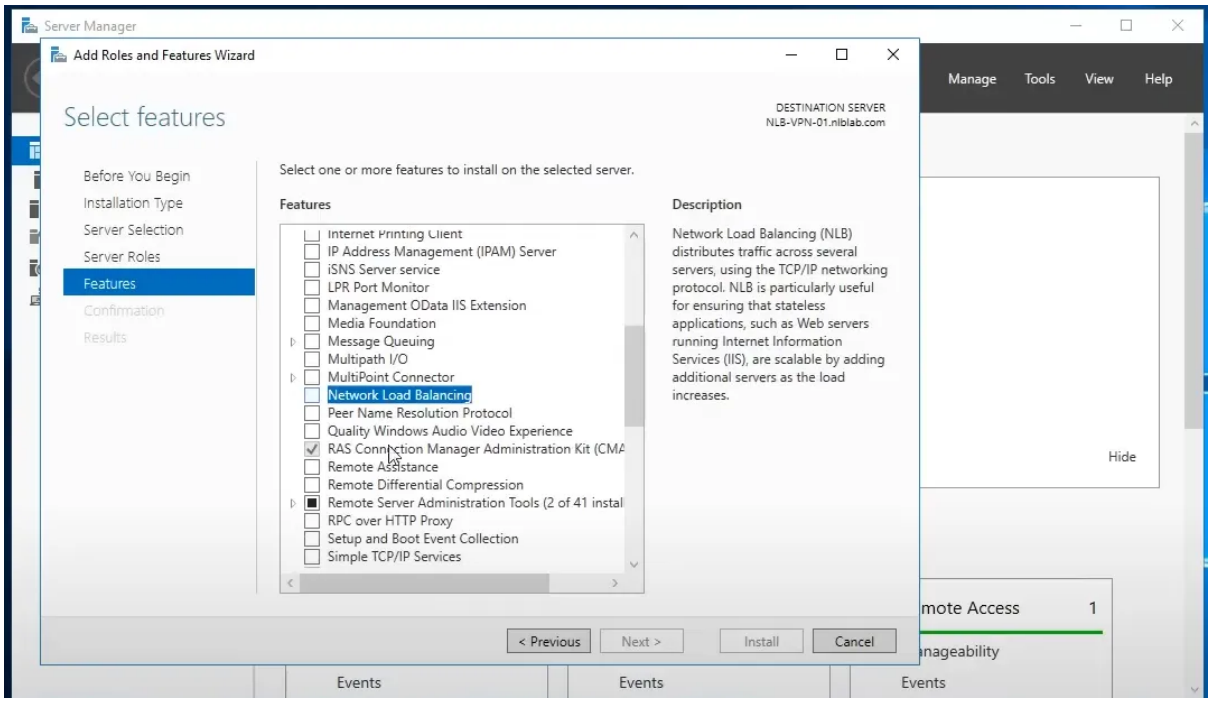
- On **LON-DC1** (or LON-CL1):
  - Open Internet Explorer, browse to http://LON-SVR1 (should display IIS logo with the circle).
  - Open http://LON-SVR2 (should display the original IIS logo without circle).

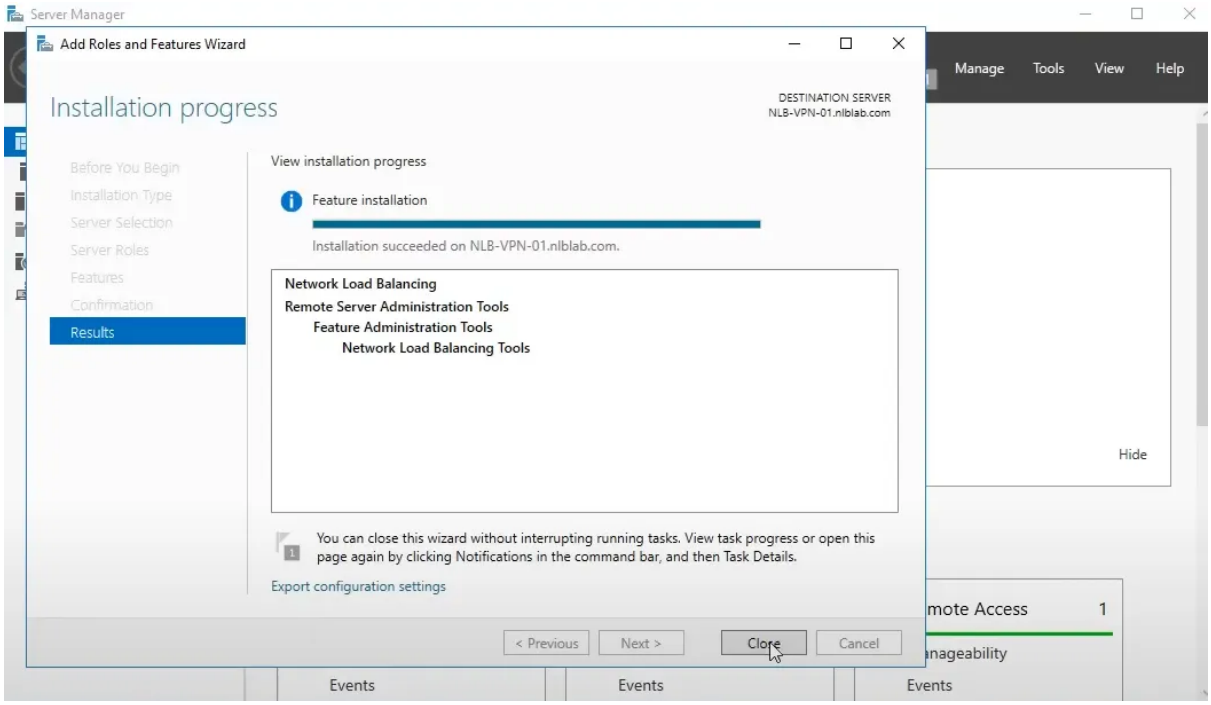
Task 2: Install NLB

- On **LON-SVR1**:
  - Open **Server Manager > Tools > Windows PowerShell ISE**.
  - Run:

```
 Invoke-Command -Computername LON-SVR1,LON-SVR2 -command {Install-
WindowsFeature NLB,RSAT-NLB}
```

  - Ignore network warnings if any.





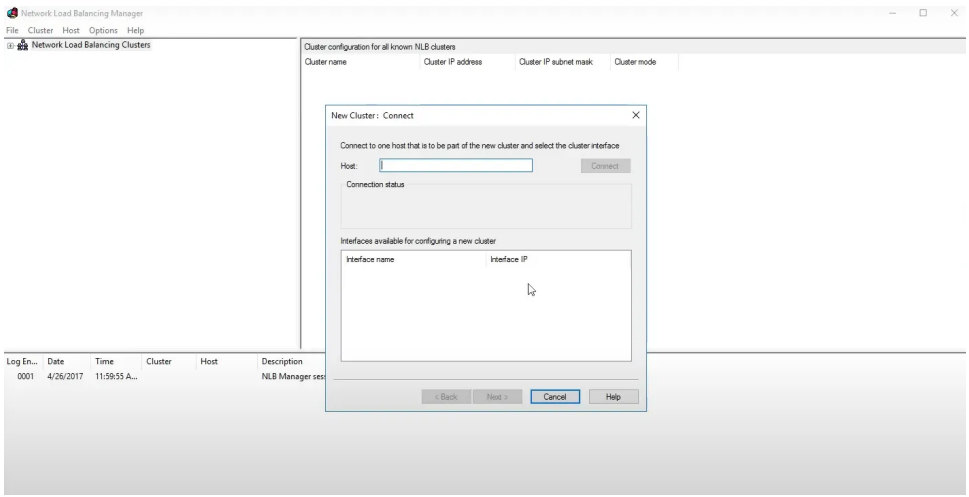
Task 3: Create a New Windows Server 2016 NLB Cluster

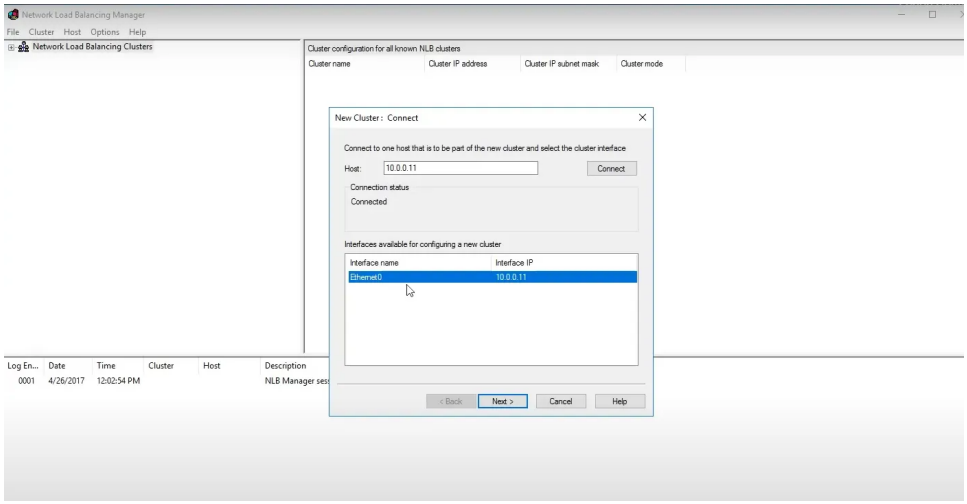
- On **LON-SVR1** (**PowerShell ISE**):
    - Create a cluster:

```
New-NlbCluster -InterfaceName "Ethernet" -OperationMode Multicast -ClusterPrimaryIP 172.16.0.42 -ClusterName LON-NLB
```

    - Add NLB record to DNS:

```
Invoke-Command -Computername LON-DC1 -command {Add-DNSServerResourceRecordA -zonename rpslab.com -name LON-NLB -Ipv4Address 172.16.0.42}
```





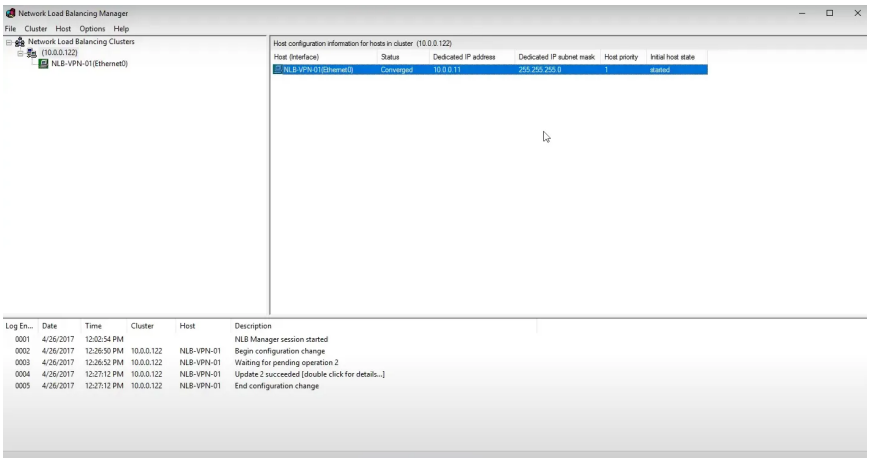
Task 4: Add a Second Host to the Cluster

- On **LON-SVR1** (**PowerShell ISE**):

```
 Add-NlbClusterNode -InterfaceName "Ethernet" -NewNodeName "LON-SVR2" -
NewNodeInterface "Ethernet"
```

Task 5: Validate the NLB Cluster

- On **LON-SVR1**:
    - Open **Server Manager > Tools > Network Load Balancing Manager**.
    - Confirm **LON-NLB (172.16.0.42)** shows both nodes (LON-SVR1, LON-SVR2) as **Converged**.
    - Check cluster properties, Cluster Parameters tab: verify Multicast is enabled.
    - In Port Rules tab: There should be one rule for all TCP/UDP, port 0-65535, Single affinity.



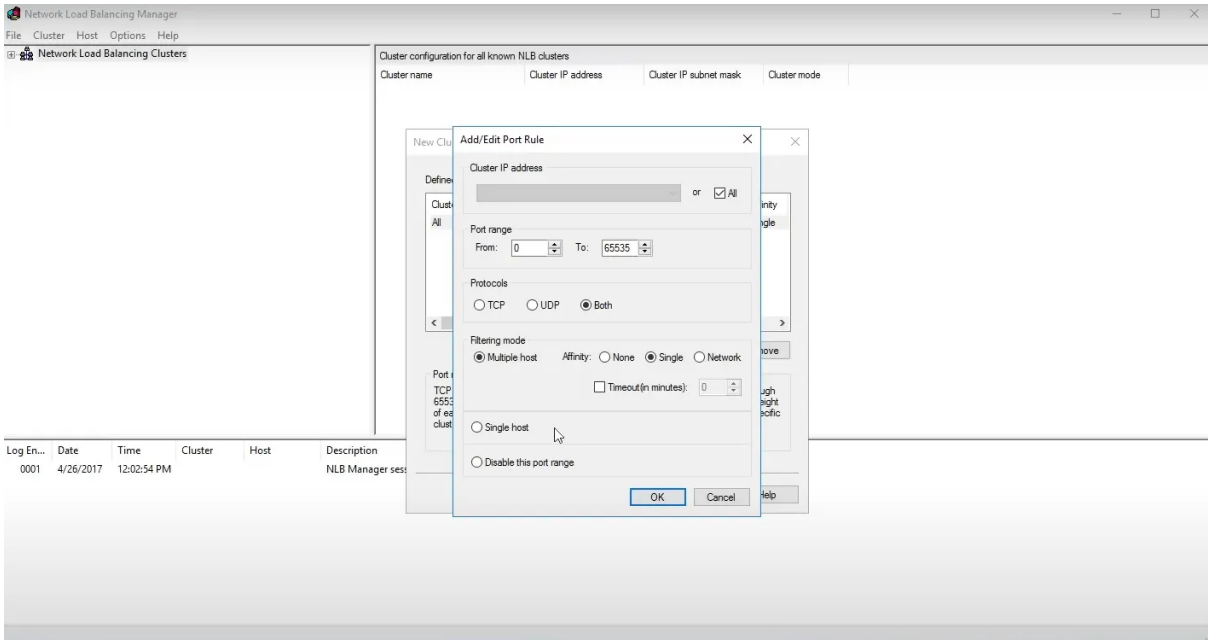
Exercise 2: Configuring and Managing the NLB Cluster

Task 1: Configure Port Rules and Affinity

- On **LON-SVR2**:
    - Open PowerShell, create a port test website:

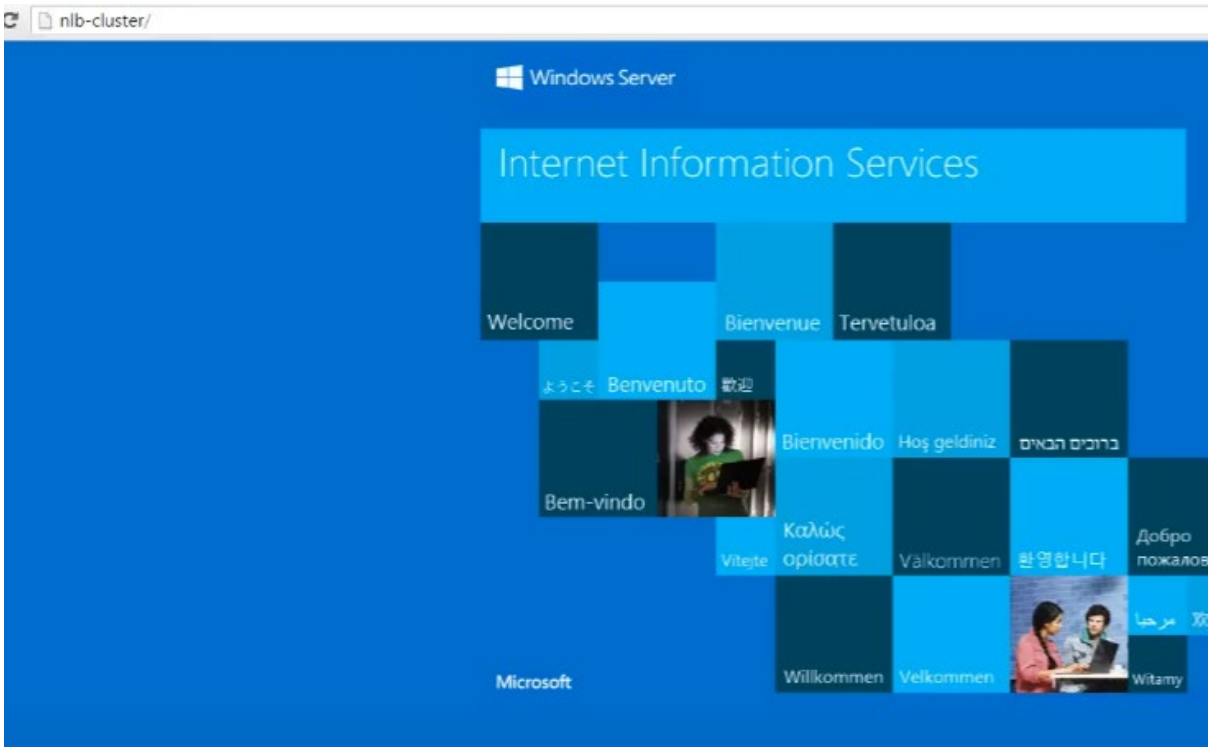
```
mkdir c:\porttest
Xcopy /s c:\inetpub\wwwroot c:\porttest
New-Website -Name PortTest -PhysicalPath "C:\porttest" -Port 5678
New-NetFirewallRule -DisplayName PortTest -Protocol TCP -LocalPort 5678
```

    - Edit c:\porttest\iisstart.png in Paint: draw a line across the IIS logo, save.
- On **LON-DC1/LON-CL1**:
    - In Internet Explorer, verify http://LON-SVR2:5678 shows the site with the line.
- On **LON-SVR1**:
    - Open **NLB Manager**.
    - Edit cluster properties:
        - Remove default "All" port rule.
        - Add:
            - Port 80-80, Both Protocols, Multiple Host, Affinity: None
            - Port 5678-5678, Both Protocols, Single Host
        - On Host Properties (for LON-SVR1), edit the 5678 rule, set Handling priority to 10.
    - Take screenshots for each step/dialog as appropriate.



Task 2: Validate Port Rules

- On **LON-DC1**:
    - Browse to http://lon-nlb and hit refresh 20+ times: Should alternate between servers, showing both IIS logos (with and without circle).
    - Browse to http://LON-NLB:5678: Only the unique logo (with line) from LON-SVR2 should show.
    - Take screenshots to confirm correct distribution.



Task 3: Manage Host Availability in the NLB Cluster

- On **LON-SVR1**:
    - In NLB Manager, right-click LON-SVR1 (Ethernet), Control Host > Suspend.
    - Verify LON-SVR1 is Suspended, LON-SVR2 is Converged.
    - Resume LON-SVR1, verify both nodes return to Converged.

Exercise 3: Validating High Availability for the NLB Cluster

Task 1: Validate Website Availability When a Host is Unavailable

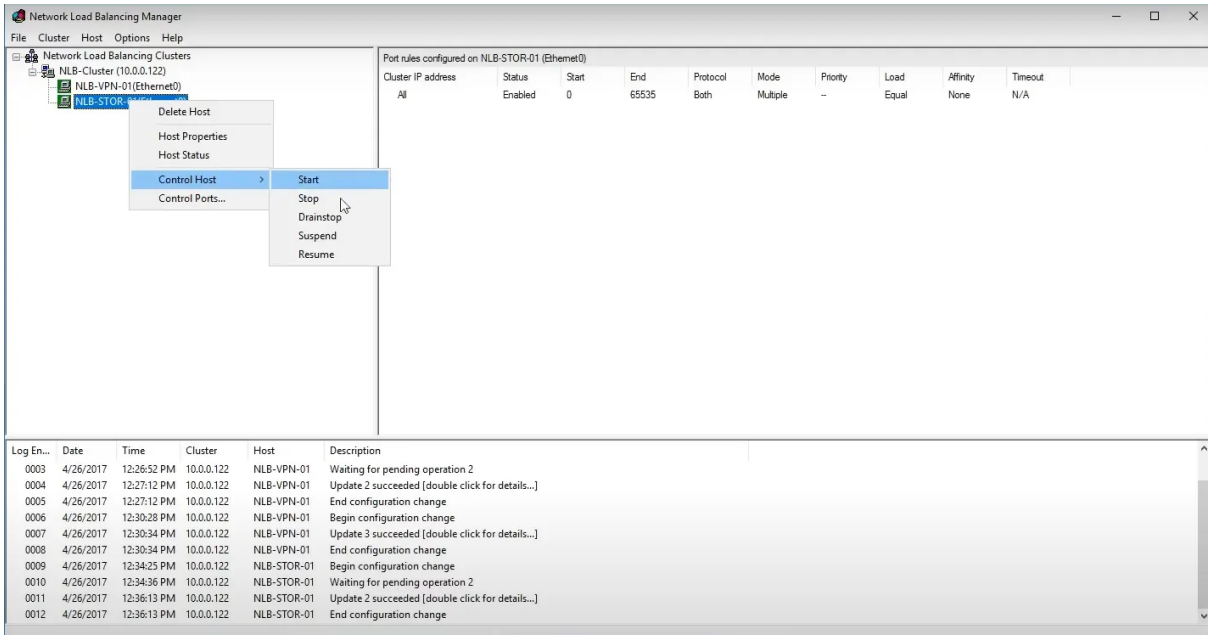
- On **LON-SVR1**:
    - In PowerShell, restart computer:

```
restart-computer
```

- On **LON-DC1**:
    - Browse to http://LON-NLB, refresh 20 times: Site should remain available, but only the logo from LON-SVR2 appears until LON-SVR1 comes back online.

Task 2: Configure and Validate Drainstop

- On **LON-SVR1** (after restart):
    - Open NLB Manager, right-click LON-SVR2 (Ethernet), Control Host > Drainstop.
- On **LON-DC1**:
    - Refresh http://lon-nlb—once draining is complete, only LON-SVR1 serves requests (logo with the circle).



Task 3: Prepare for the Next Module

- Revert or shut down VMs to initial state as needed.

Conclusion:

After completing Module 10, you will have:

- Configured and deployed a functional NLB cluster using Windows Server 2016.
- Demonstrated website load balancing and high availability using virtual web servers in your lab.
- Configured custom port rules, tested affinity and host priorities, and managed NLB node operations (active, suspend, drainstop).
- Validated that client websites remain accessible even if one node is offline or draining.
- Gained practical experience in using NLB Manager and PowerShell for advanced cluster management.
- Documented all steps with clear screenshots to support your lab report.20740A-LAB.pdf