MS NLB

Špecializované IKT systémy Windows

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NLB cluster

Definícia

Poskytuje distribúciu prichádzajúceho sieťového prenosu medzi jednotlivé nody klástra a zároveň vysokú dostpnosť „stateless" aplikácií

Vysoká dostunosť (UPTIME)

% dostupnosť	DT za rok	DT za mesiac	DT za týždeň
90	36,5 dňa	72 hodín	16,8 hodín
99	3,65 dní	7,2 hodiny	1,68 hodín
99,9	8,76 dní	43,2 minút	10,1 minúť
99,99	52,6 minút	4,32 minút	1,01 minúty
99,999	5,26 minúty	25,9 sekúnd	6,05 sekúnd
99,9999	5,26 minút	25,9 sekúnd	6,05 sekúnd

NLB cluster

NLB obsahuje funkcionality pre:

- Rozpoznanie node failure
- Balance sieťový prenos medzi nodmi (i vprípade node add/removal)
- Obnovenie a rozdistribuovanie workload-u v rámci 10 sec pri failure
- Pridanie (online)a odobratie Nodu (online) v závislosti na záťaži

Prakticko použitie

- Web based aplikácie
  - Web servre
  - VPNs
  - RDS
  - Netscaller

NLB cluster

Requirements

- Windows server 201x
- Cluster name a cluster IP
- Všetky nodes musia byť na rovnakej sieti
- Žiadne obmedzenie na počet NIC
- Jednotlivé Nodes môžu mať rozdielny počet NIC
- Všetky Nodes musia mať NIC nastavene na unicast alebo multicast (nie mix)
  - Pri unicast NIC musia podporovať zmenu MAC
- Iba TCP/IP musia byť povolené na NIC (žiadne ďalšie ako napr IPX)
- IP adresa Nodov musí byť STATICKÁ

NLB cluster

Konfigurácia

- NLB je nainštalovaný ako súčasť windows server sieťového ovládača
- Aplikácia je nainštalovaná na každom node
- Je možné distribuovať prenos na jeden Node (default), alebo balancovať cez všetky
- Max 32 Nodov
- Možeme konfigurovať vCLU na každom Node per NIC alebo viacero vCLU na jednom NIC
- Žiaden špeciálny hw
- Žiaden špeciálna sw konfigurácia
- Je možné konfigurovať host pre pridanie do CLU v prípade výpadku

NLB cluster

Nody môžu bežať s rôznou edíciou OS

Latencia mezi Nodmi nesmie prekročiť 250ms

Best practices

- Nody používajú veľmi podobný HW
- Nody majú rovnakú verziu OS

Inštalácia

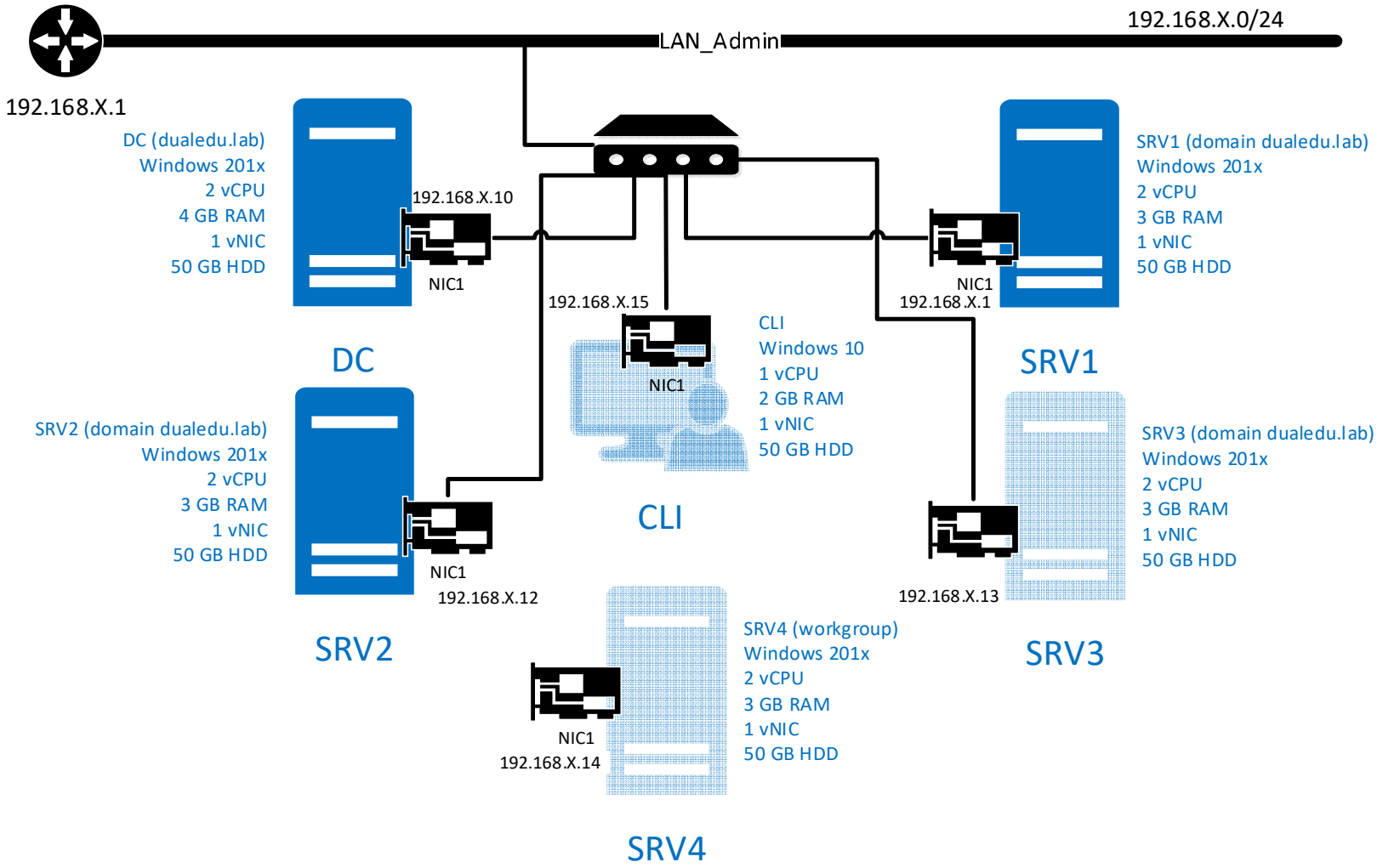
Requirements

- Cluster IP a DNS meno
- Plne nainštalované a customizované servre
- Pridanie A records nlb-cluster.dual.edu do DNS

Postup

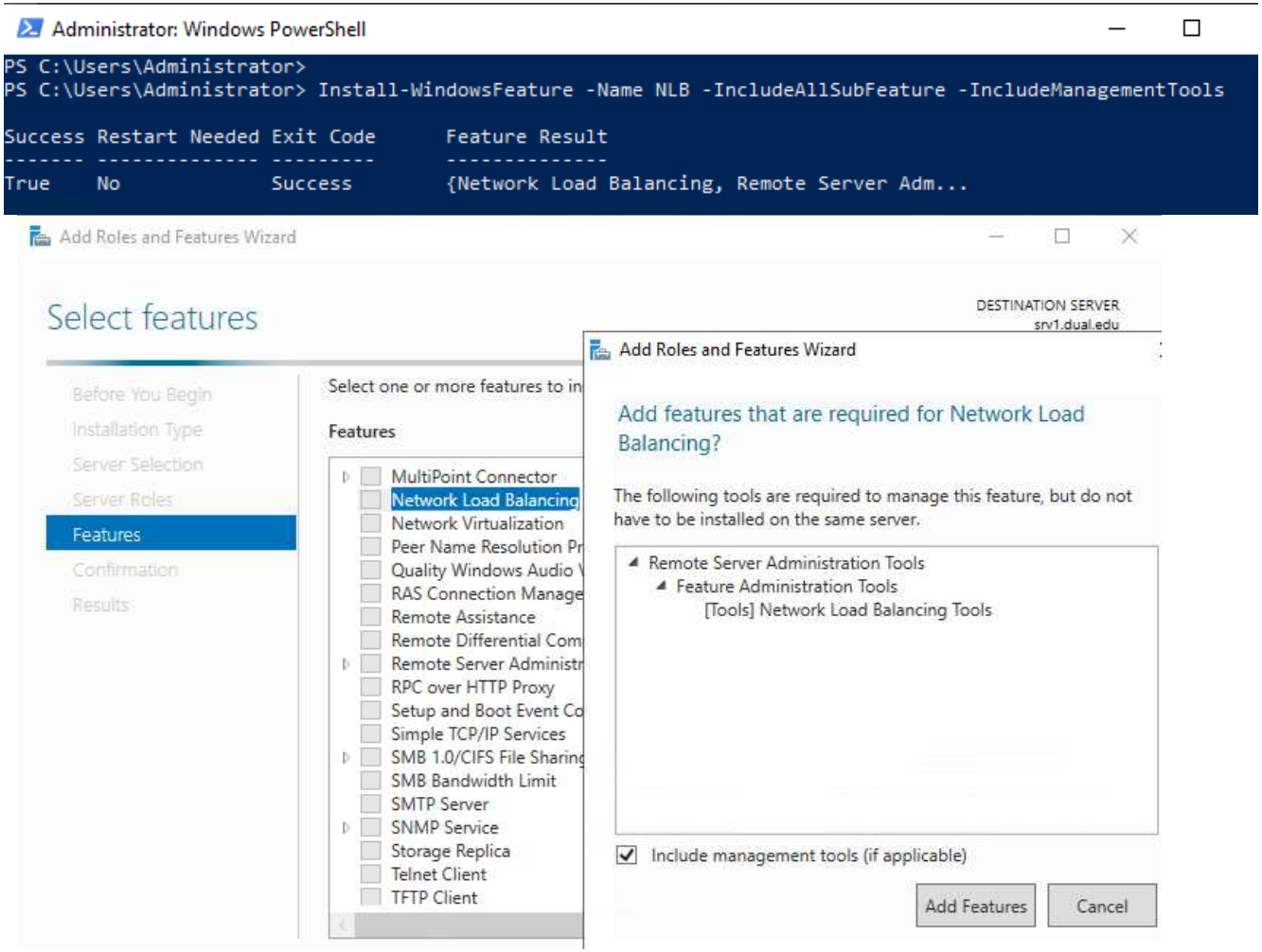
1. Inštalácia Web server role
2. Nainštalovanie NLB Cluster feature na každý node
3. Vytvorenie NLB cluster (Node by Node)
4. Test Web access z DC

LAB setup


LAN_Admin
192.168.X.0/24
192.168.X.1
DC (dualedu.lab)
Windows 201x
2 vCPU
4 GB RAM
1 vNIC
50 GB HDD
192.168.X.10
NIC1
DC
192.168.X.15
NIC1
CLI
Windows 10
1 vCPU
2 GB RAM
1 vNIC
50 GB HDD
CLI
SRV1 (domain dualedu.lab)
Windows 201x
2 vCPU
3 GB RAM
1 vNIC
50 GB HDD
NIC1
192.168.X.1
SRV1
SRV2 (domain dualedu.lab)
Windows 201x
2 vCPU
3 GB RAM
1 vNIC
50 GB HDD
NIC1
192.168.X.12
SRV2
SRV3 (domain dualedu.lab)
Windows 201x
2 vCPU
3 GB RAM
1 vNIC
50 GB HDD
192.168.X.13
SRV3
SRV4 (workgroup)
Windows 201x
2 vCPU
3 GB RAM
1 vNIC
50 GB HDD
NIC1
192.168.X.14
SRV4

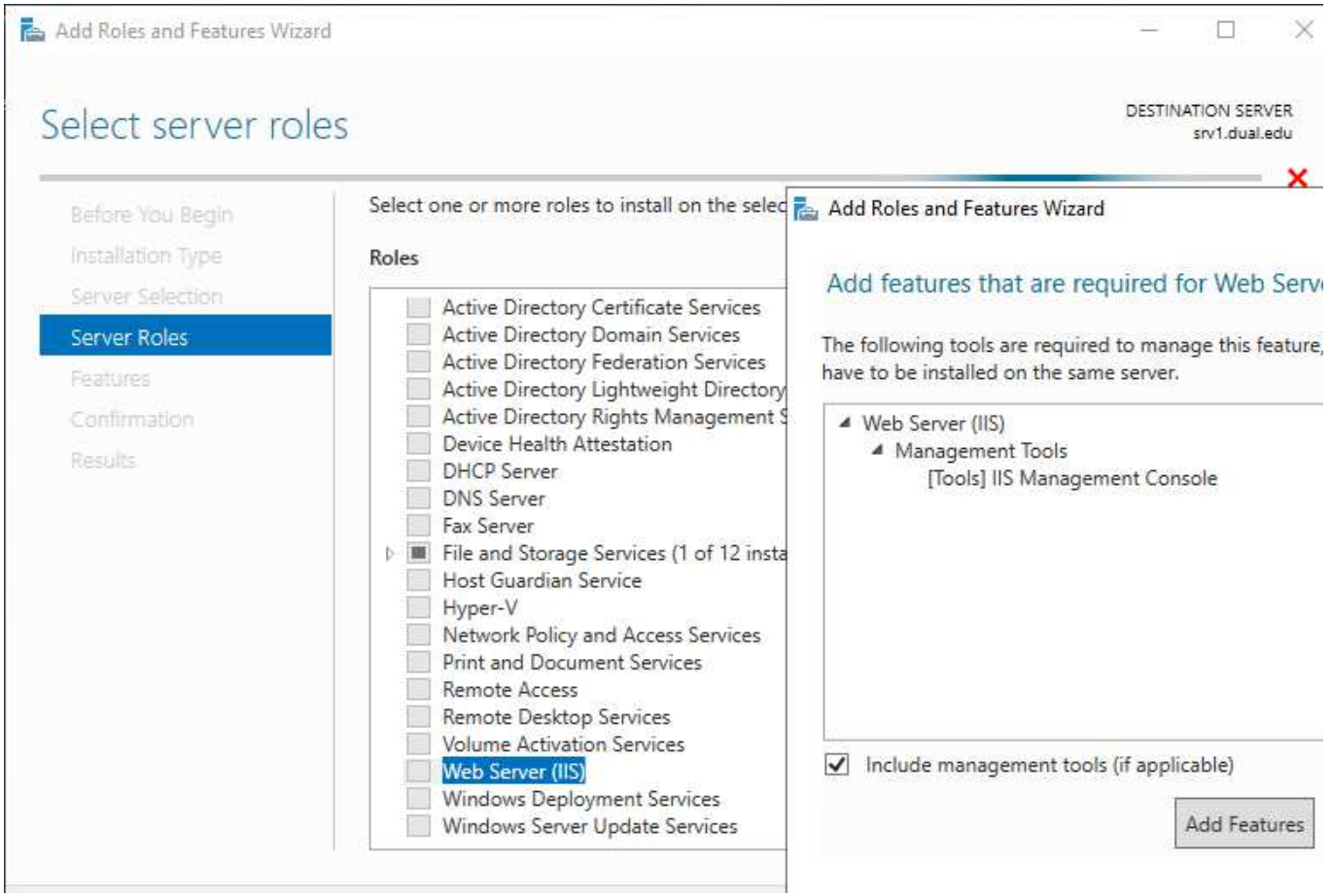
Inštalácia NLB

::1. Inštalácia NLB role na SRV1/SRV2



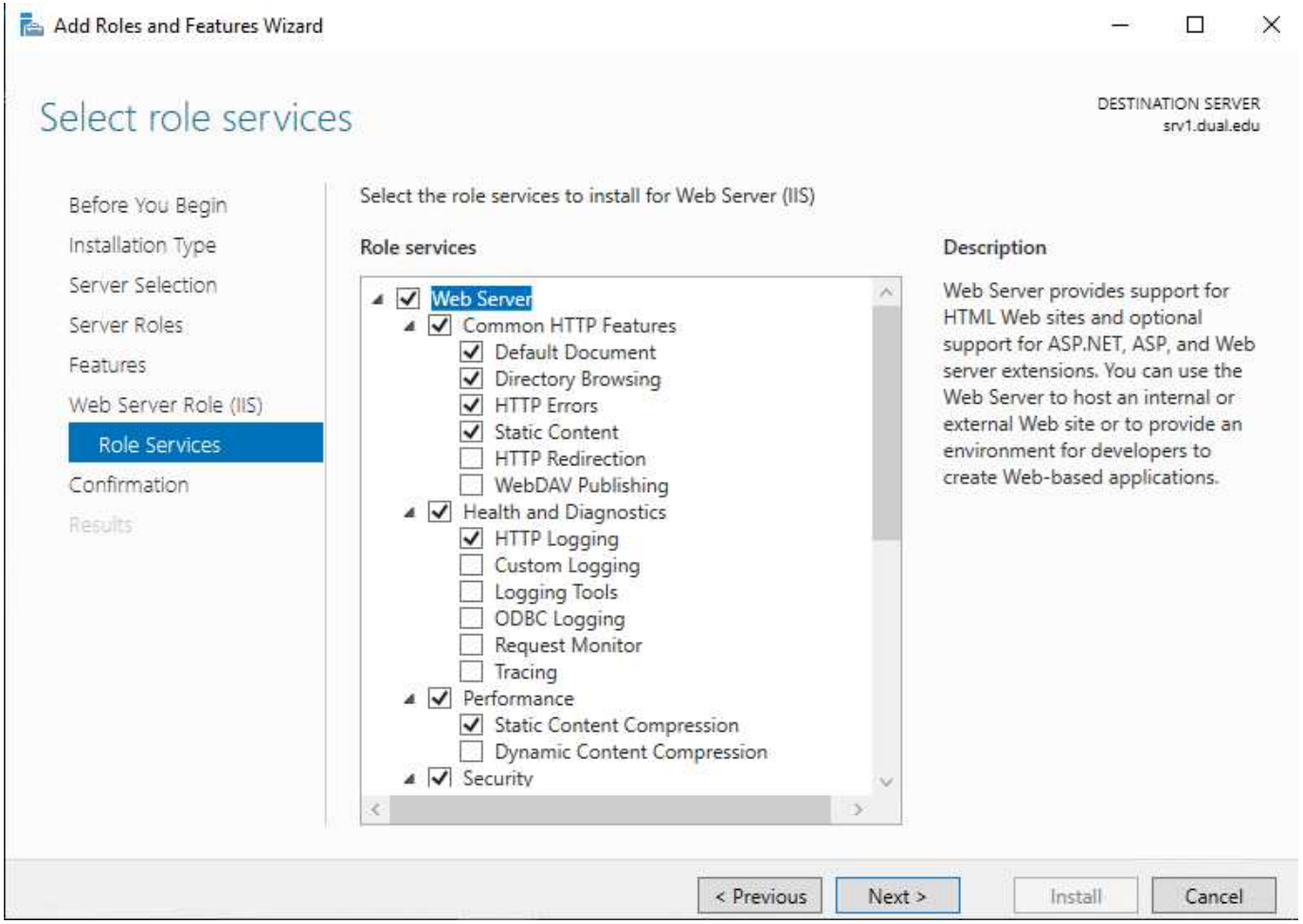
Inštalácia NLB

::2. Inštalácia Web role na oboch SRV1/SRV2



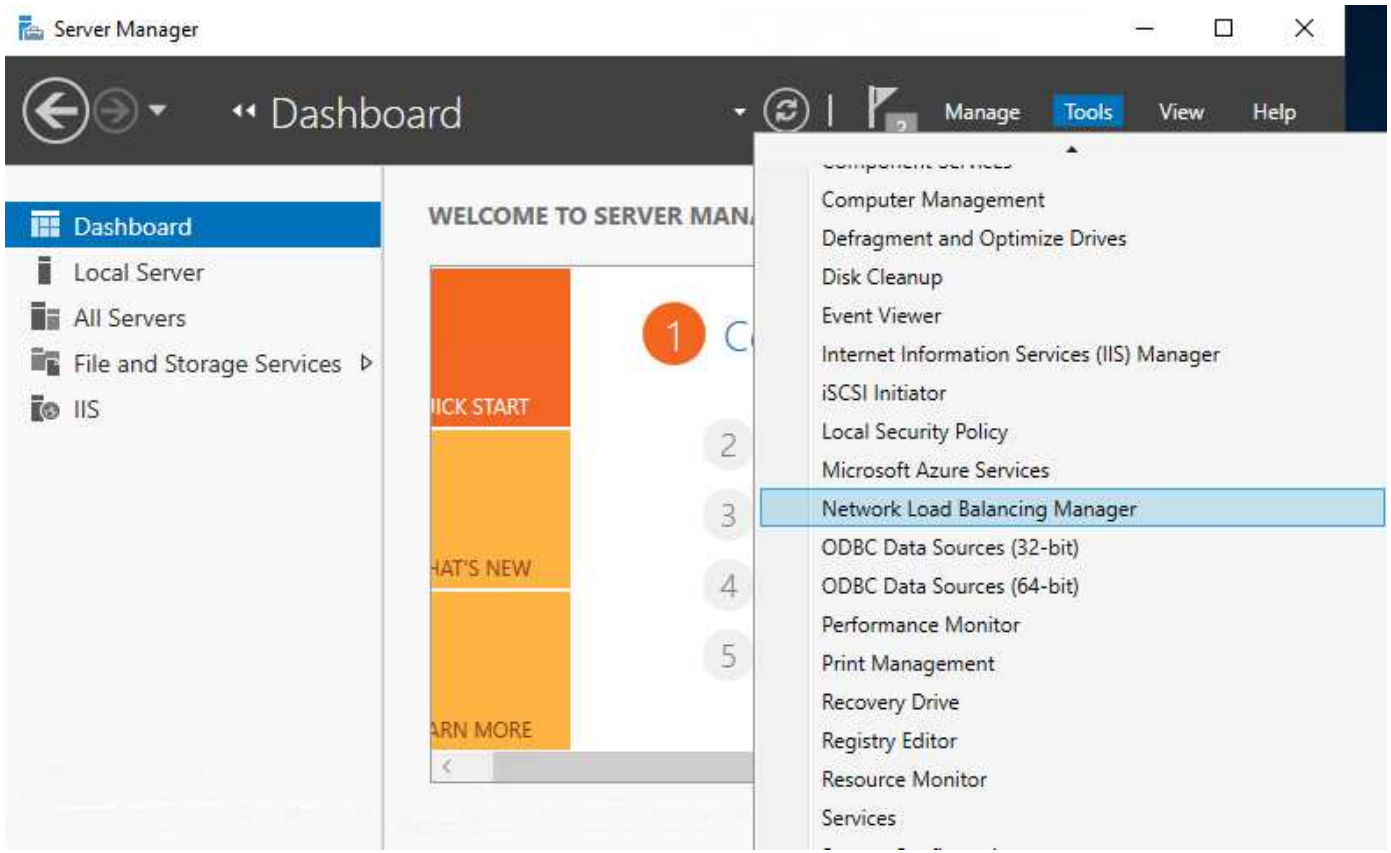
Inštalácia NLB

::2. Ponechanie default komponentov Web role



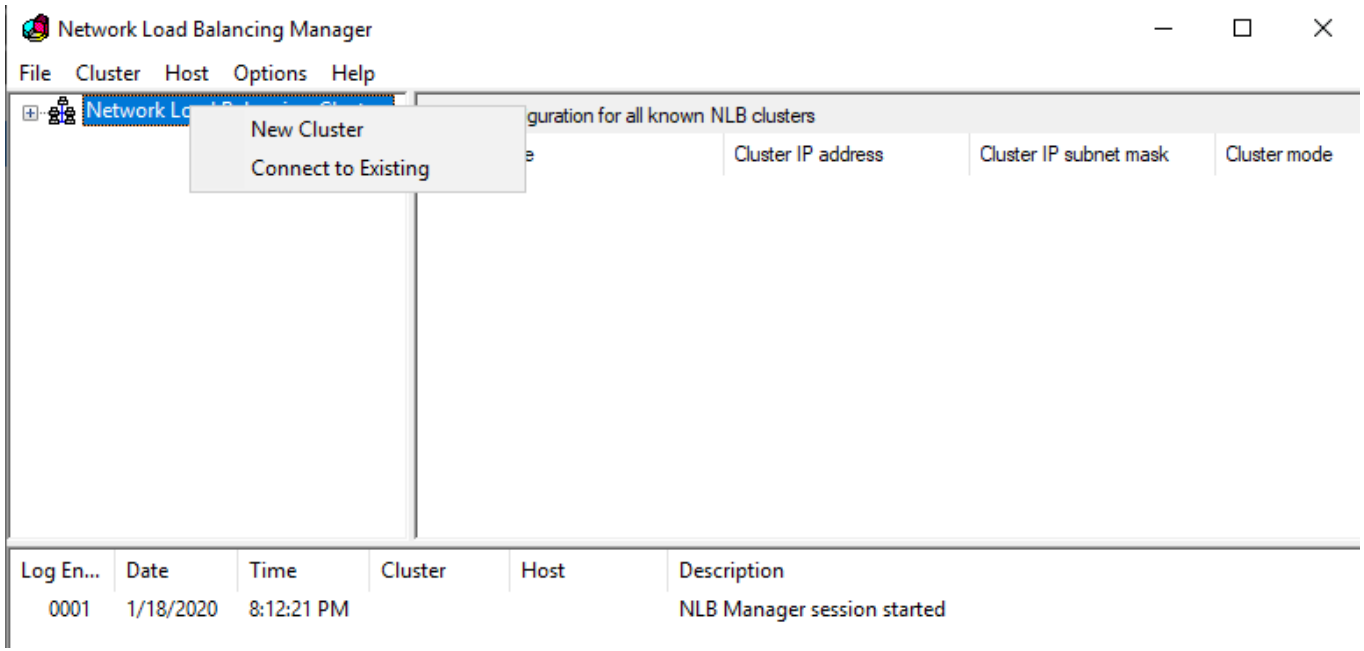
Inštalácia NLB

::3. Spustenie NLB konzole



Inštalácia NLB

::4. Spustenie NLB konzole a New Cluster wizard



Inštalácia NLB

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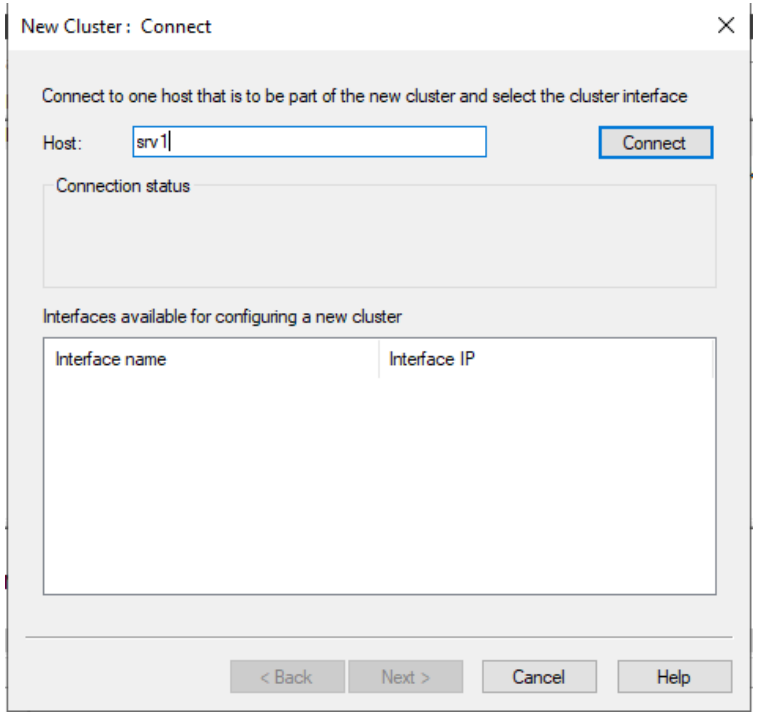

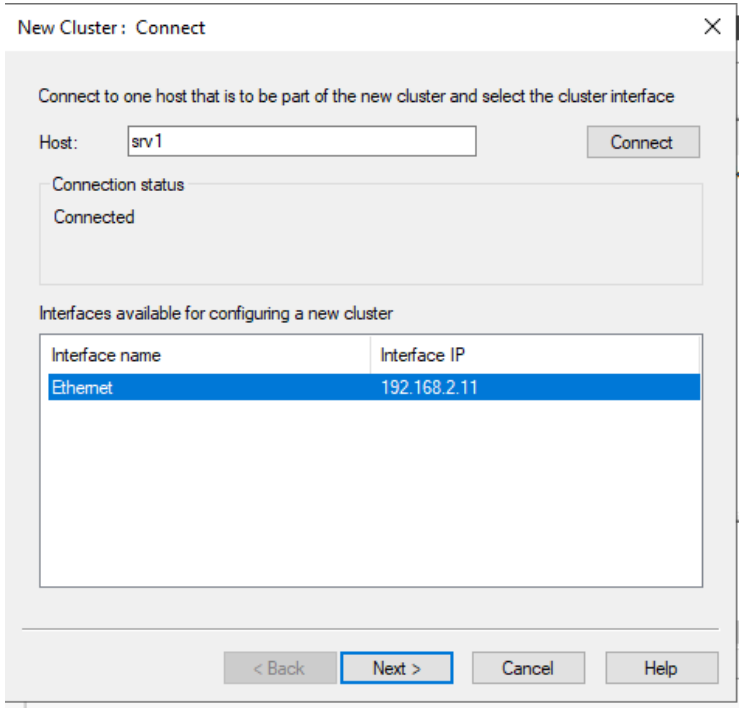

Inštalácia NLB

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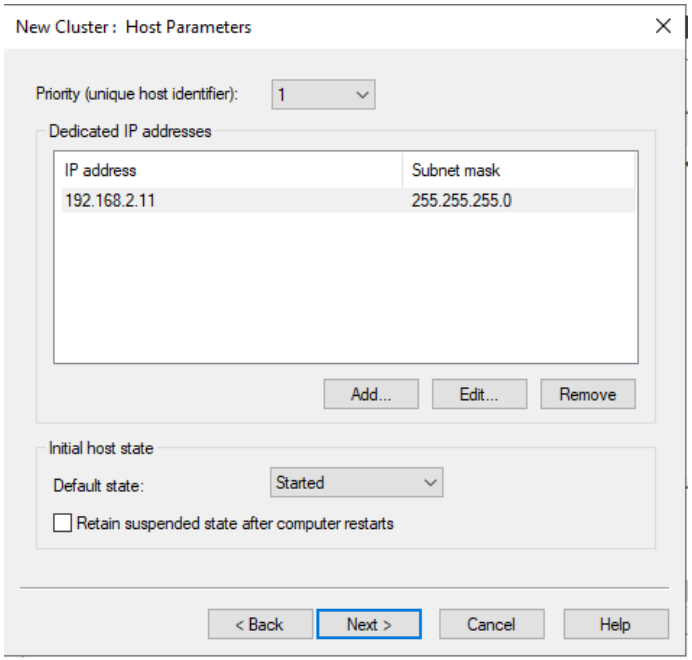

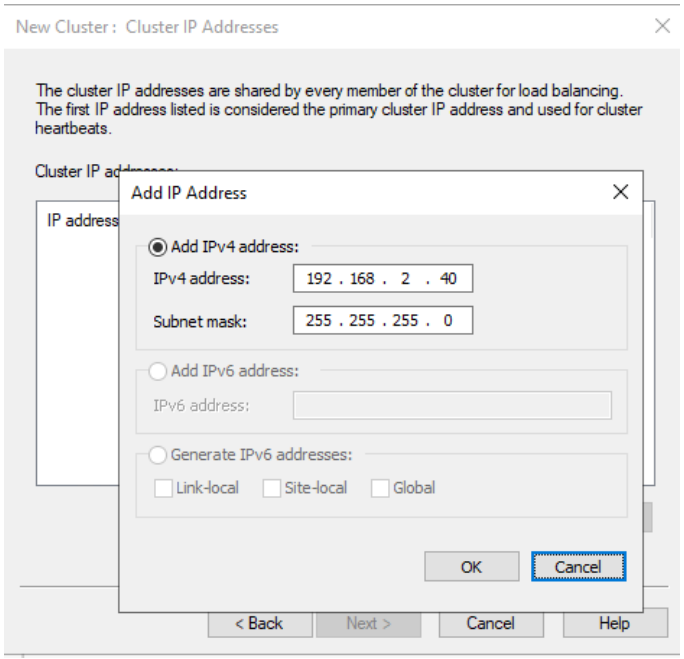

Inštalácia NLB

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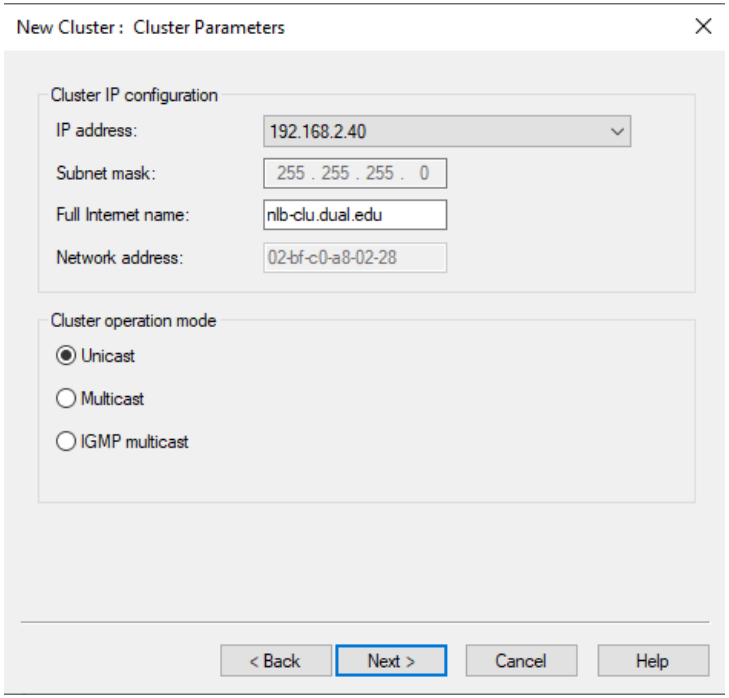
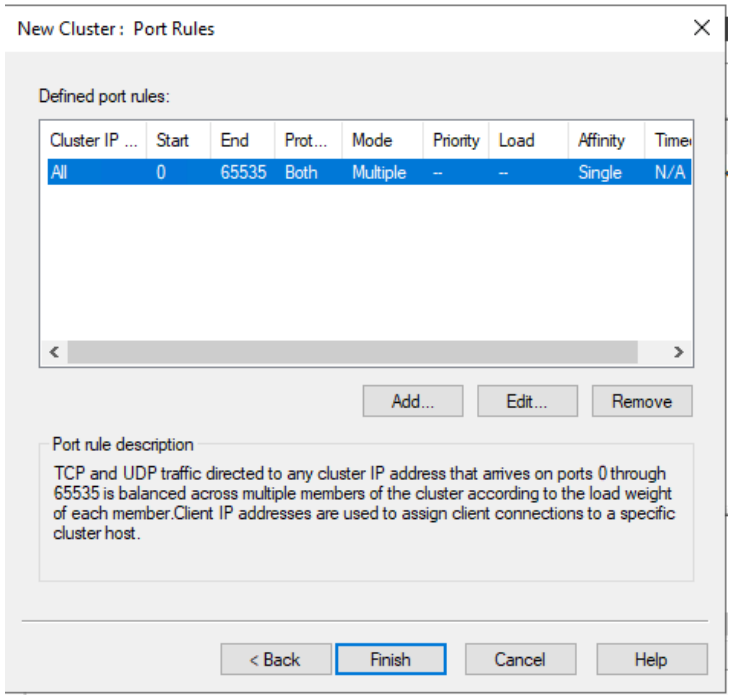
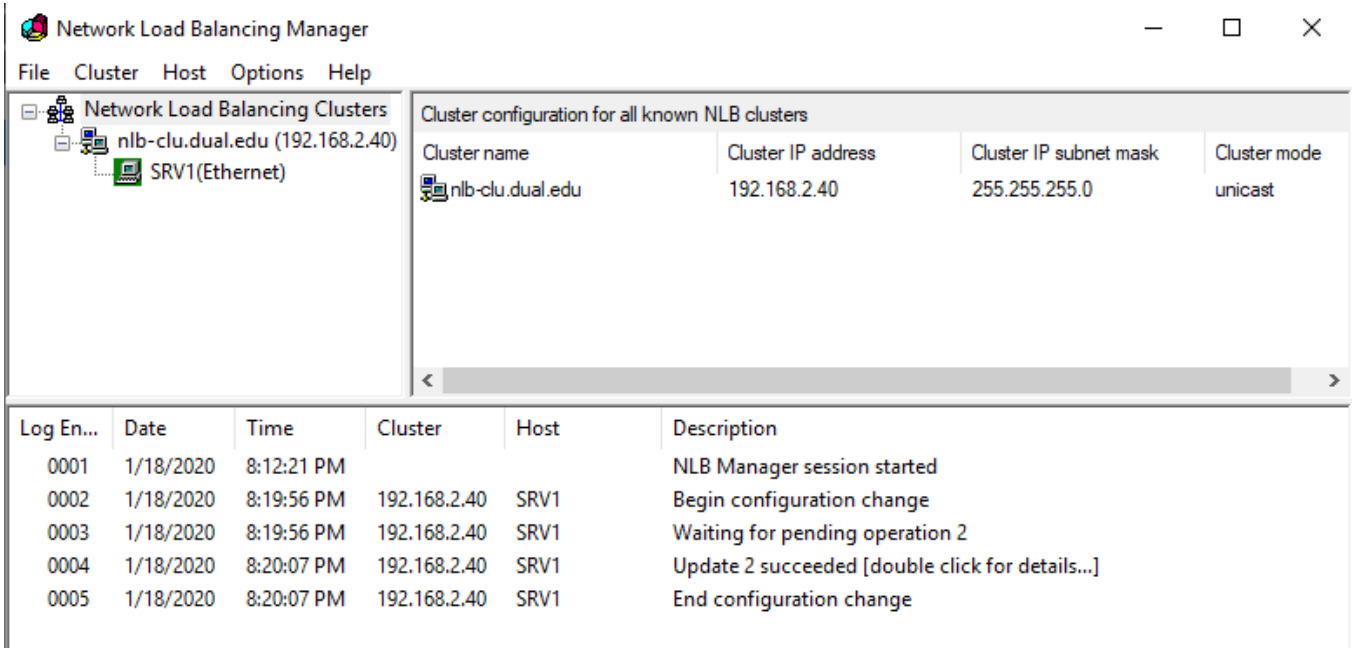




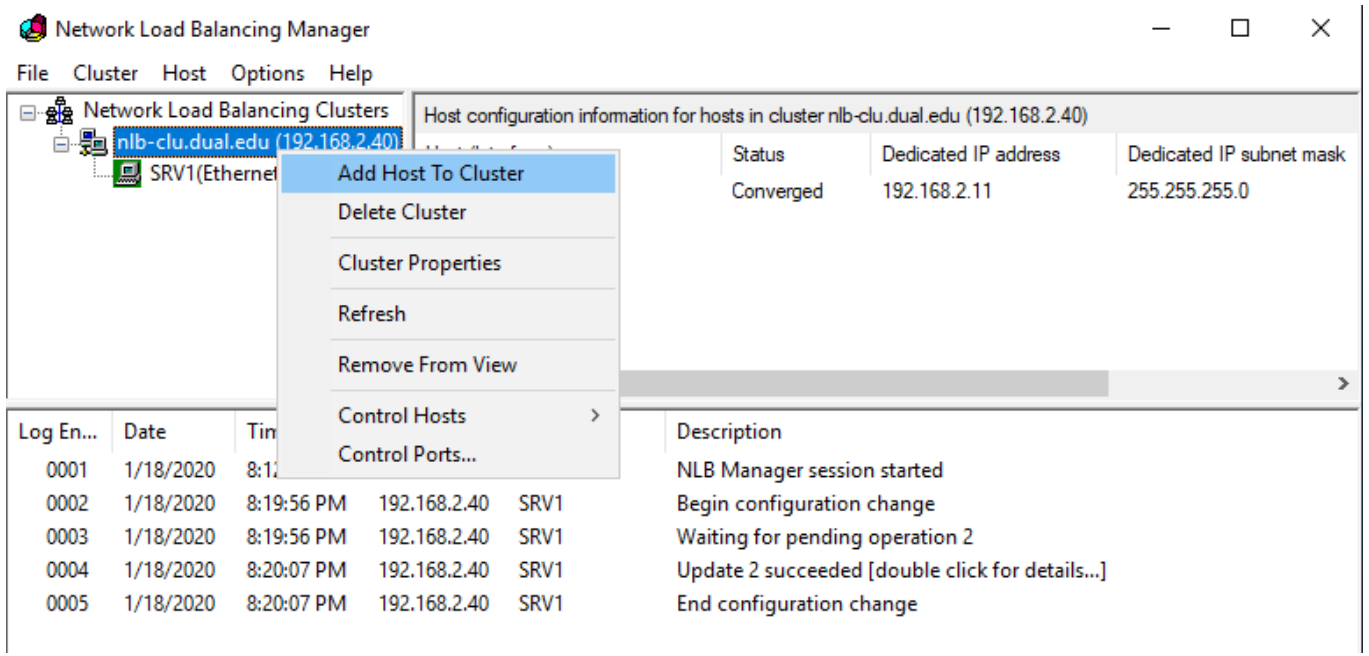
NLB operation mode	Special requirements	Advantages	Disadvantages
Unicast	NLB must be able to change the MAC adapter address	Easy to configure Appropriate for simple environments	May flood other systems with network traffic, causing performance issues (you may have to use additional hardware to resolve those issues) Not appropriate for more complex environments
Multicast	The network infrastructure must use a static ARP entry and a static MAC address table entry.	More efficient use of bandwidth and lower risk of performance impacts than unicast mode Each adapter uses its built-in MAC address	More complex to configure than unicast
Multicast with IGMP	The network switches must be capable of IGMP snooping	Same advantages as multicast Additional advantage of automatic configuration	Requires that the network hardware have specific capabilities that the other modes do not need

Validácia konfigurácie #1



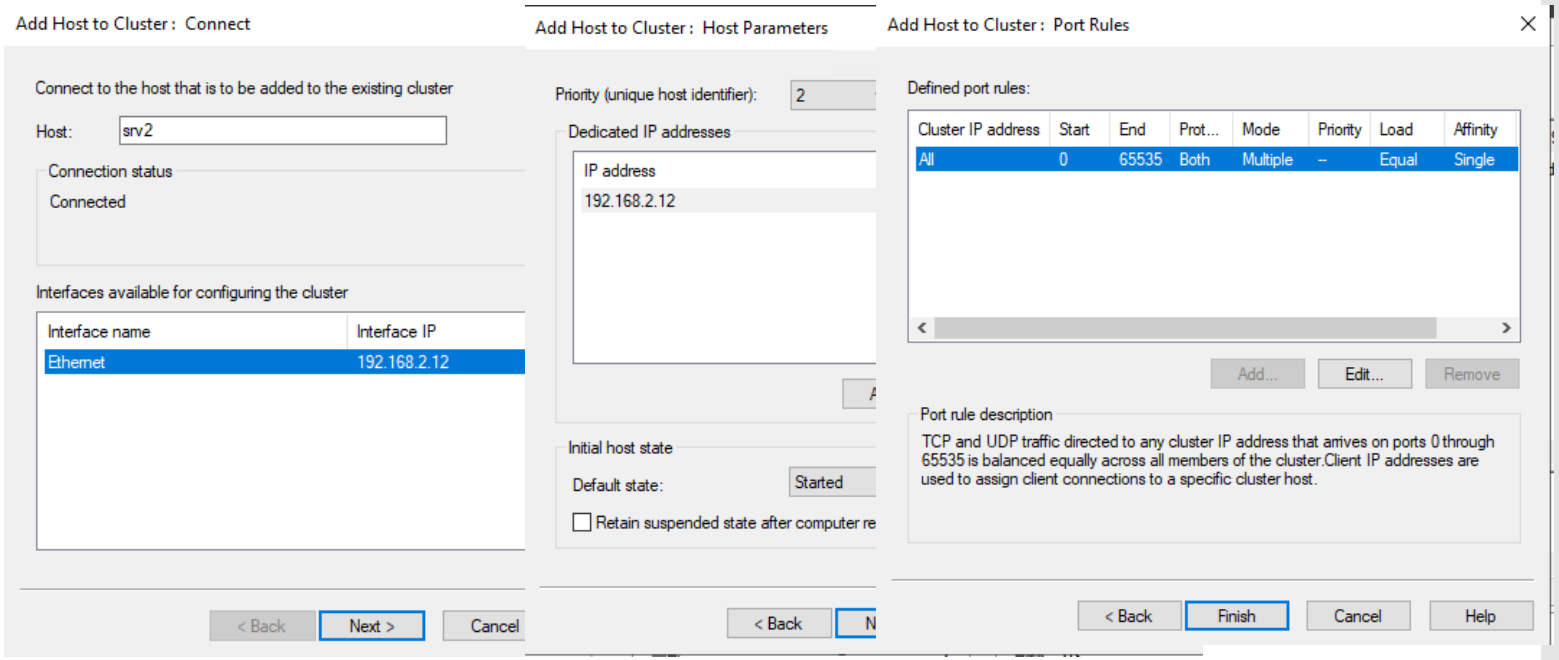
Inštalácia NLB

::5. Pripojenie druhého Nodu do cluster-a

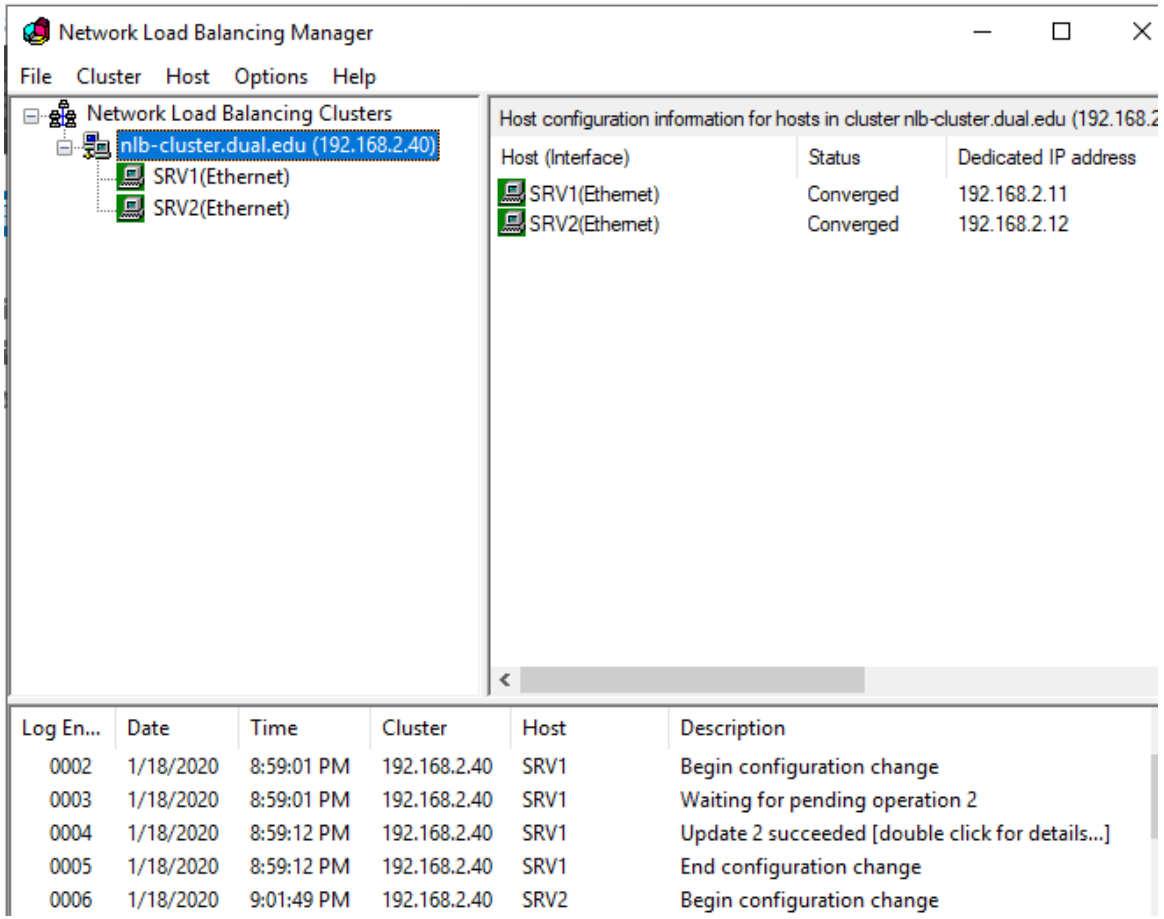


Inštalácia NLB

::5. Pripojenie druhého Nodu do cluster-a



Validácia konfigurácie #2

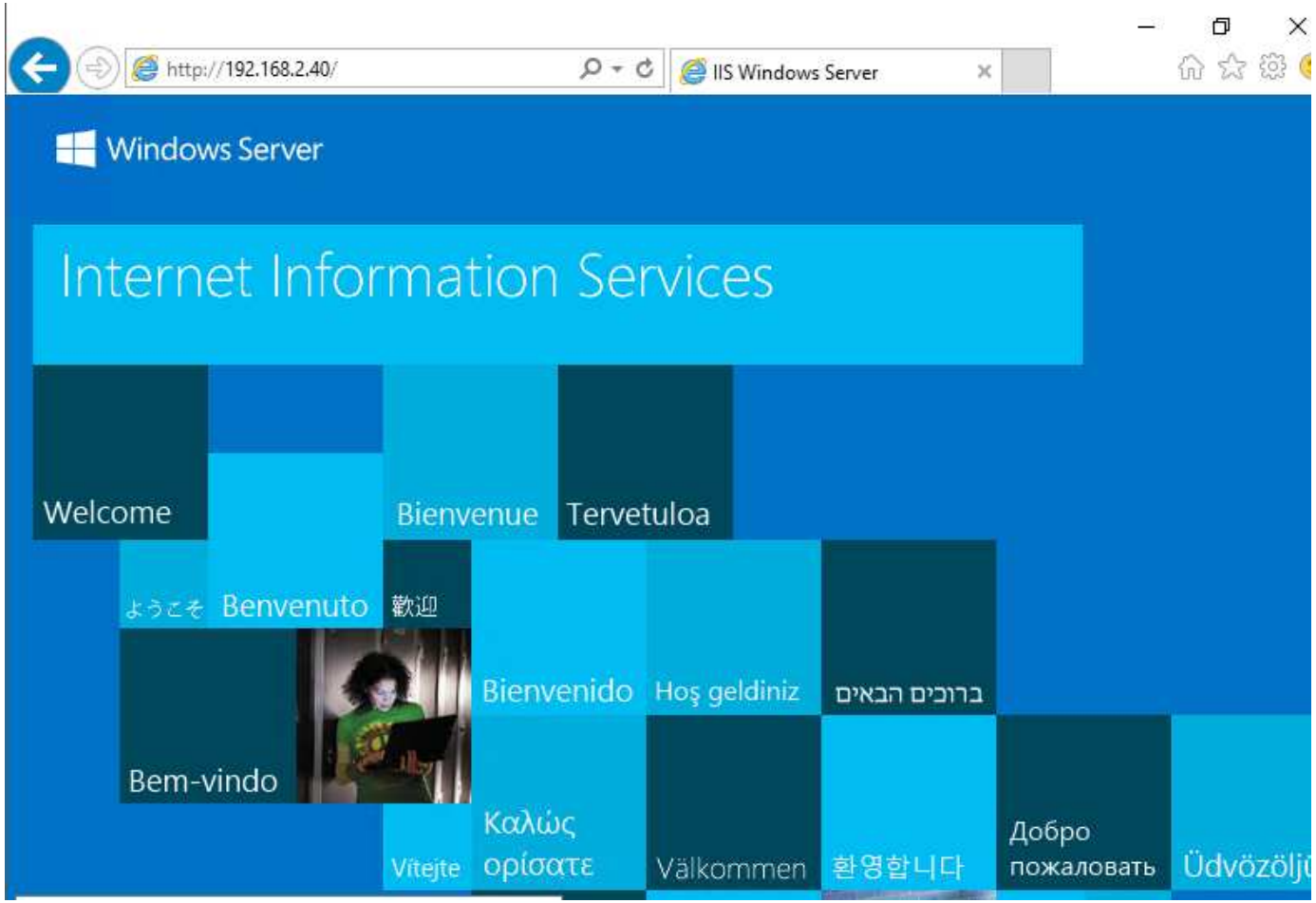


You can configure and manage Networking Loading Balancing using the following cmdlets:

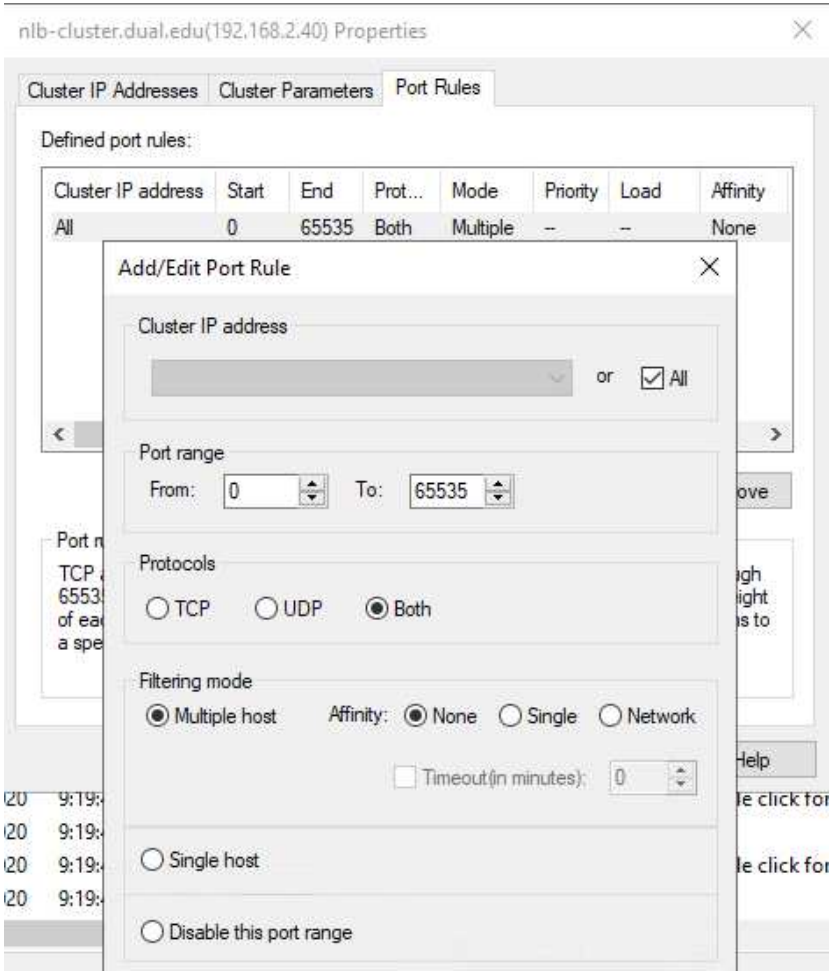
- `Add-NlbClusterNode`: Adds a new node to the NLB cluster.
- `Add-NlbClusterNodeDip`: Adds a dedicated IP address to an NLB cluster.
- `Add-NlbClusterPortRule`: Adds a new port rule to an NLB cluster.
- `Add-NlbClusterVip`: Adds a virtual IP address to an NLB cluster.
- `Disable-NlbClusterPortRule`: Disables a port rule on an NLB cluster or on a specific host in the cluster.
- `Enable-NlbClusterPortRule`: Enables a port rule on an NLB cluster or on a specific node in the cluster.
- `Get-NlbCluster`: Retrieves information about the NLB cluster object that is queried by the caller.
- `Get-NlbClusterDriverInfo`: Retrieves information about the NLB driver on the local machine.
- `Get-NlbClusterNode`: Retrieves information about the NLB cluster object that is queried by the caller.
- `Get-NlbClusterNodeDip`: Retrieves the dedicated IP address that is queried by the caller.
- `Get-NlbClusterNodeNetworkInterface`: Retrieves information about interfaces, including information about the NLB driver, on a host.
- `Get-NlbClusterPortRule`: Retrieves the port rule objects that are queried by the caller.
- `Get-NlbClusterVip`: Retrieves virtual IP addresses that are queried by the caller.
- `New-NlbCluster`: Creates an NLB cluster on the specified interface that is defined by the node and network adapter name.
- `New-NlbClusterIpv6Address`: Generates IPv6 addresses to create cluster virtual IP addresses or node dedicated IP addresses.
- `Remove-NlbCluster`: Deletes an NLB cluster.
- `Remove-NlbClusterNode`: Removes a node from the NLB cluster.
- `Remove-NlbClusterNodeDip`: Removes a dedicated IP address from an NLB cluster.
- `Remove-NlbClusterPortRule`: Removes a port rule from an NLB cluster.
- `Remove-NlbClusterVip`: Removes a virtual IP address from an NLB cluster.
- `Resume-NlbCluster`: Resumes all nodes in an NLB cluster.
- `Resume-NlbClusterNode`: Resumes the node in an NLB cluster that was suspended.
- `Set-NlbCluster`: Edits the configuration of an NLB cluster.
- `Set-NlbClusterNode`: Edits the NLB cluster node settings.
- `Set-NlbClusterNodeDip`: Edits the dedicated IP address of an NLB cluster.
- `Set-NlbClusterPortRule`: Edits the port rules for an NLB cluster.
- `Set-NlbClusterPortRuleNodeHandlingPriority`: Sets the host priority of a port rule for a specific NLB node.
- `Set-NlbClusterPortRuleNodeWeight`: Sets the load weight of a port rule for a specific NLB node.
- `Set-NlbClusterVip`: Edits the virtual IP address of an NLB cluster.
- `Start-NlbCluster`: Starts all nodes in an NLB cluster.
- `Start-NlbClusterNode`: Starts an NLB cluster node.
- `Stop-NlbCluster`: Stops all nodes of an NLB cluster.
- `Stop-NlbClusterNode`: Stops a node in an NLB cluster.
- `Suspend-NlbCluster`: Suspends all nodes of an NLB cluster.
- `Suspend-NlbClusterNode`: Suspends a specific node in an NLB cluster.

Validácia konfigurácie #3

:: Z DC otvor web http://192.168.2.40



::Konfigurácia Filtering mode a Affinity

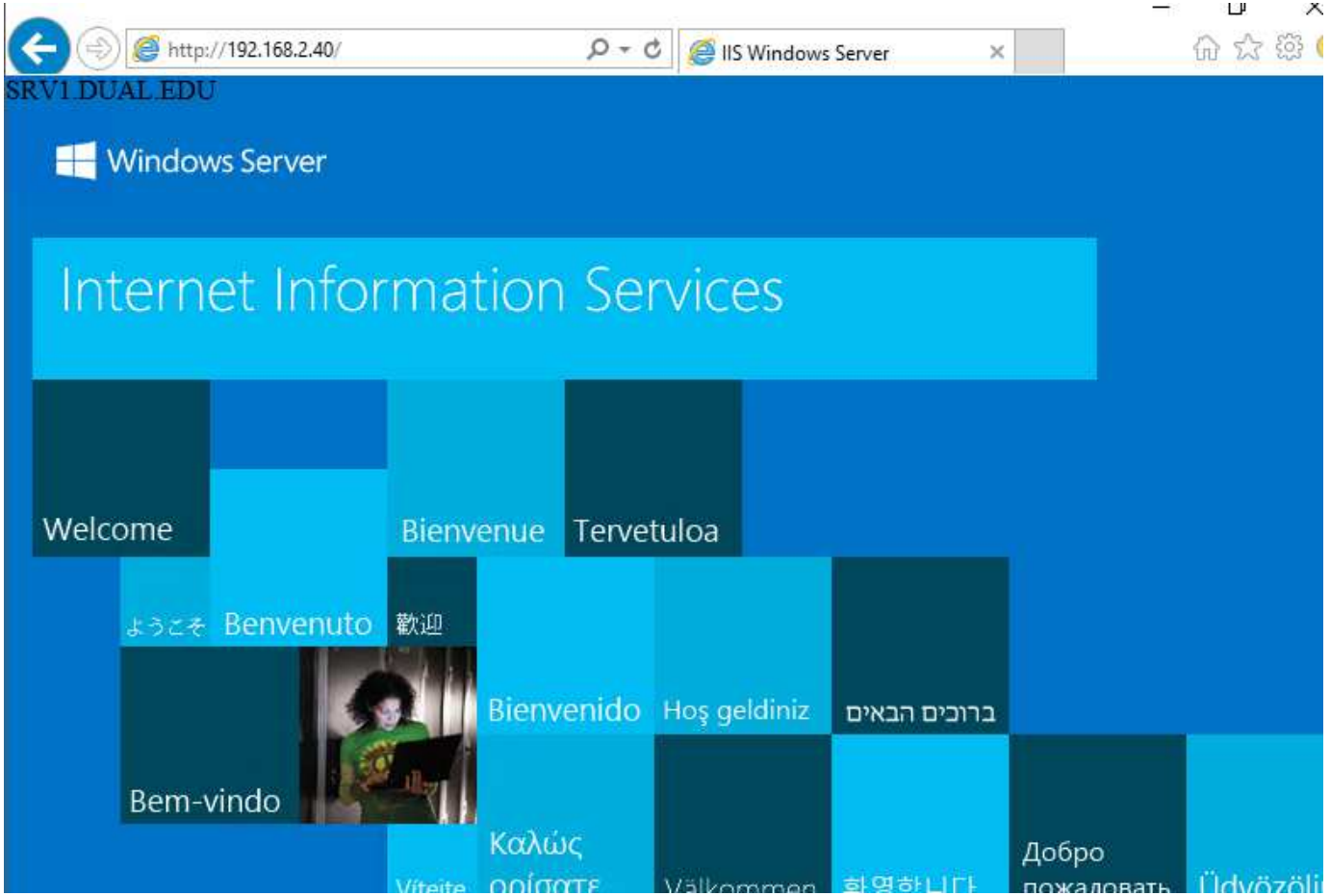


- **Multiple hosts:** Permits all cluster hosts to actively respond to client requests. NLB nodes respond according to the weight assigned to each node. Because this allows the customizing of the affinity and load balancing, it is the most common mode used. Multiple host filtering increases availability and scalability, because you can increase capacity by adding nodes, and the cluster continues to function in the event of node failure.
- **Single host:** Allows only one cluster host (the host with the highest priority) in the cluster to actively respond to client requests. If the host fails, the host with the next highest priority takes over for the failed host. It is usually used to configure one host as the primary server and other hosts as backup servers. Single host rules increase availability, but do not increase scalability.
- **Disable:** Prevents the cluster from responding to a specific type of client traffic.

- **None:** Any cluster node responds to any client request, even if the client is reconnecting after an interruption. This option is suitable for stateless application, where the server that is servicing the request does not have to remember the previous events to complete the request. As a result, the client can jump from one server to another within the cluster without problem.
- **Single:** A single cluster node handles all requests from a single client. This option is useful for stateful applications where the status of a process or transaction is maintained through the entire connection including when using SSL and e-commerce shopping cart applications.
- **Class C:** A single node responds to all requests from a class C network (a network with a subnet of 255.255.255.0), often found when used with multiple proxy servers. This type of server is often used with cookie-based affinity or when a common database or session state server is used.

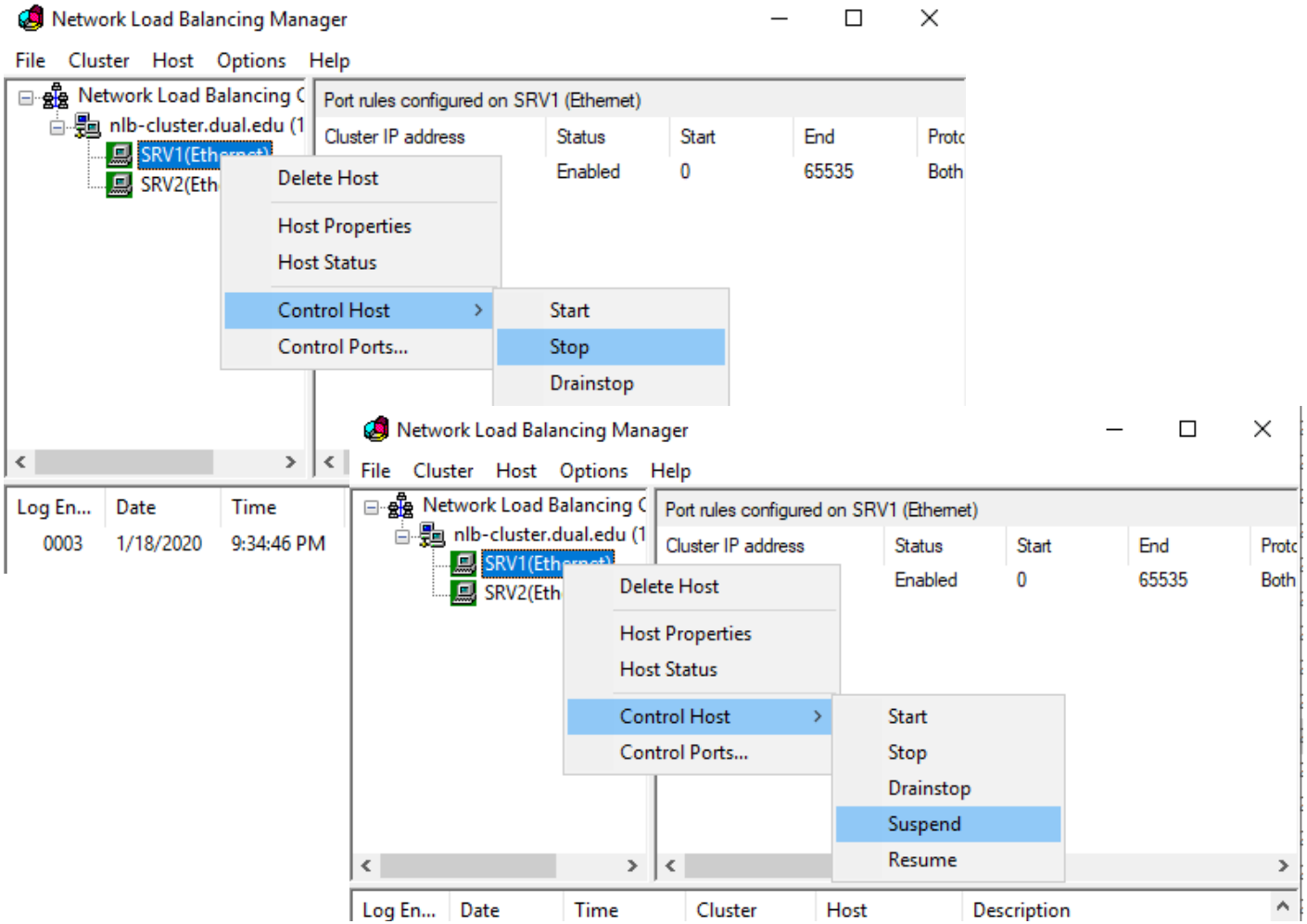
Failover / HA test

::1. Connect to IP http://192.168.2.40 z DC



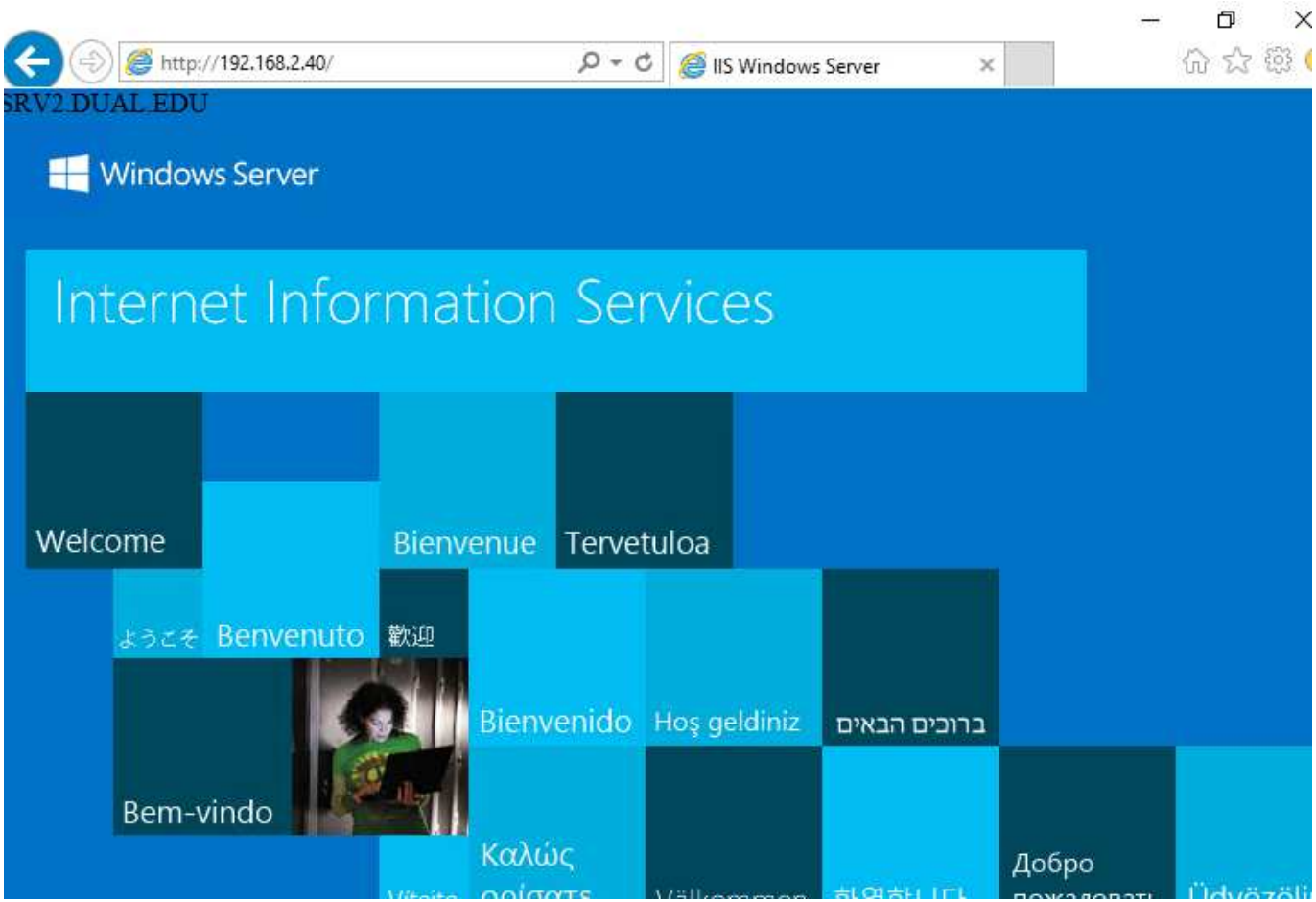
Failover / HA test

::2. Disable active node z NLB konzoly



Failover / HA test

::3. Refresh stránky z NLB konzoly



NEXT

::NLB cluster

https://docs.microsoft.com/en-us/windows-server/networking/technologies/network-load-balancing