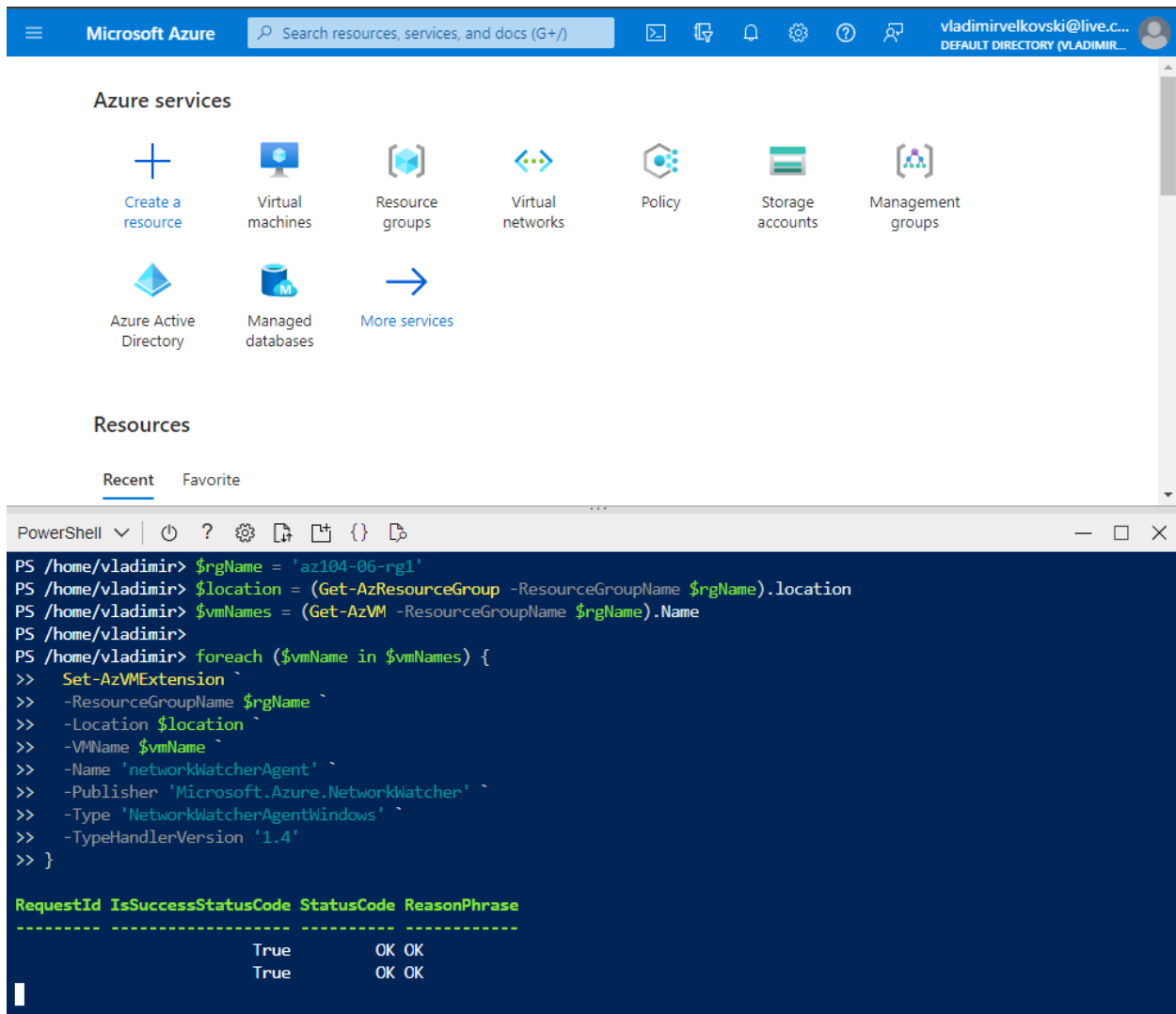


Lab 06 - Implement Traffic Management

We were tasked with testing managing network traffic targeting Azure virtual machines in the hub and spoke network topology, which Contoso considers implementing in its Azure environment. This testing needs to include implementing connectivity between spokes by relying on user defined routes that force traffic to flow via the hub, as well as traffic distribution across virtual machines by using layer 4 and layer 7 load balancers. For this purpose, we intend to use Azure Load Balancer (layer 4) and Azure Application Gateway (layer 7).

Task 1: Provision the lab environment.



The screenshot displays the Microsoft Azure portal interface. The top navigation bar includes the 'Microsoft Azure' logo, a search bar, and user information for 'vladimirvelkovski@live.c...'. The main content area is divided into 'Azure services' and 'Resources' sections. The 'Azure services' section features a grid of icons for various services: 'Create a resource', 'Virtual machines', 'Resource groups', 'Virtual networks', 'Policy', 'Storage accounts', 'Management groups', 'Azure Active Directory', and 'Managed databases'. The 'Resources' section has tabs for 'Recent' and 'Favorite'. Below the 'Resources' section is a PowerShell terminal window. The terminal shows a series of commands to provision a NetworkWatcherAgent extension on VMs within a specific resource group. The commands are as follows:

```
PS /home/vladimir> $rgName = 'az104-06-rg1'
PS /home/vladimir> $location = (Get-AzResourceGroup -ResourceGroupName $rgName).location
PS /home/vladimir> $vmNames = (Get-AzVM -ResourceGroupName $rgName).Name
PS /home/vladimir> foreach ($vmName in $vmNames) {
>> Set-AzVMExtension `
>> -ResourceGroupName $rgName `
>> -Location $location `
>> -VMName $vmName `
>> -Name 'networkWatcherAgent' `
>> -Publisher 'Microsoft.Azure.NetworkWatcher' `
>> -Type 'NetworkWatcherAgentWindows' `
>> -TypeHandlerVersion '1.4'
>> }
```

The terminal output shows the results of the commands, indicating that the extension was successfully installed on all VMs in the resource group.

RequestId	IsSuccess	StatusCode	Status	ReasonPhrase
	True	OK	OK	
	True	OK	OK	

Task 2: Configure the hub and spoke network topology.

The screenshot shows the 'Peerings' page for virtual network 'az104-06-vnet01'. The left sidebar contains navigation links: Overview, Activity log, Access control (IAM), Tags, and Diagnose and solve problems. The main content area has a search bar and a table of peerings. The table has columns: Name, Peering status, Peer, and Gateway transit. Two peerings are listed, both with a status of 'Connected' and a gateway transit of 'Disabled'.

Name	Peering status	Peer	Gateway transit
az104-06-vnet01_to_az104-06-vnet2	Connected	az104-06-vnet2	Disabled
az104-06-vnet01_to_az104-06-vnet3	Connected	az104-06-vnet3	Disabled

Task 3: Test transitivity of virtual network peering.

The screenshot shows the 'Network Watcher | Connection troubleshoot' page. The left sidebar contains navigation links: Overview, Get started, Monitoring (Topology, Connection monitor (classic), Connection monitor, Network Performance Monitor), Network diagnostic tools (IP flow verify, NSG diagnostics, Next hop, Effective security rules, VPN troubleshoot, Packet capture, Connection troubleshoot), Metrics (Usage + quotas), and Logs. The main content area shows diagnostic details for a connection from 'az104-06-vm0' to '10.62.0.4'. It includes a table of diagnostic tests and a hop-by-hop details table.

Diagnostic tests

Test	Status	Details	Suggestions
Connectivity Test	Success	Probes Sent: 66, Probes Failed: 0 Avg Latency: 1 ms Min Latency: 1 ms Min Latency: 2 ms	None
NSG Outbound (from s...	Success	Outbound communication from source is allowed	None
Next Hop (from source)	Success	Next Hop Type: VirtualNetworkPeering Route Table Id: System Route	None

Hop by hop details

Name	Status	IP address	Next hop	RTT	Errors
az104-06-vm0	Success	10.60.0.4	10.62.0.4	2	-
az104-06-nic2	Success	10.62.0.4	-	-	-

Microsoft Azure

Search resources, services, and docs (G+)

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Home > Network Watcher

Network Watcher | Connection troubleshoot

Microsoft

Search

Diagnostic tests * ⓘ

4 selected

Overview

Get started

Monitoring

Topology

Connection monitor (classic)

Connection monitor

Network Performance Monitor

Network diagnostic tools

IP flow verify

NSG diagnostics

Next hop

Effective security rules

VPN troubleshoot

Packet capture

Connection troubleshoot

Metrics

Usage + quotas

Logs

Run diagnostic tests

Diagnostic details

Source
az104-06-vm0

Destination
10.63.0.4

Diagnostic tests

Test	Status	Details	Suggestions
Connectivity Test	Success	Probes Sent: 66 ,Probes Failed: 0 Avg Latency: 1 ms Min Latency: 1 ms Min Latency: 2 ms	None
NSG Outbound (from s...	Success	Outbound communication from source is allowed	None
Next Hop (from source)	Success	Next Hop Type: VirtualNetworkPeering Route Table Id: System Route	None

Hop by hop details

Name	Status	IP address	Next hop	RTT	Errors
az104-06-vm0	Success	10.60.0.4	10.63.0.4	2	-
az104-06-nic3	Success	10.63.0.4	-	-	-

Topology view

Microsoft Azure

Search resources, services, and docs (G+)

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Home > Network Watcher

Network Watcher | Connection troubleshoot

Microsoft

Search

Diagnostic details

Source
az104-06-vm2

Destination
10.63.0.4

Diagnostic tests

Test	Status	Details	Suggestions
Connectivity Test	Fail	Probes Sent: 0 ,Probes Failed: 0	-
NSG Outbound (from source)	Fail	There are failed tests in the following NSGs: • az104-06-nsg2	Go to VM > Update the networking rule Read docs
Next Hop (from source)	Success	Next Hop Type: None Route Table Id: System Route	None

Hop by hop details

Name	Status	IP address	Next hop	RTT	Errors
az104-06-vm2	Fail	10.62.0.4	10.63.0.4	-	Router for the destination are missing in the virtual network gateway.
Destination (10.63.0.4)	Info	10.63.0.4	-	-	-

Task 4: Configure routing in the hub and spoke topology. *The connectivity test fails despite everything being configured properly. I tried to start and stop az104-06-vm0 as it says in the manual and tried with two different regions, but again it fails.*

Microsoft Azure | Search resources, services, and docs (G+)

Home > Network Watcher

Network Watcher | Connection troubleshoot

Microsoft

Search

Diagnostic details

Source: az104-06-vm2, Destination: 10.63.0.4

Diagnostic tests

Test	Status	Details	Suggestions
Connectivity Test	Fail	Probes Sent: 0 , Probes Failed: 0	-

Hop by hop details

Name	Status	IP address	Next hop	RTT
az104-06-vm2	Info	10.62.0.4	10.60.0.4	-
az104-06-nic0	Info	10.60.0.4	10.63.0.4	-
az104-06-nic3	Info	10.63.0.4	-	-

Topology view

Task 5: Implement Azure Load Balancer – *Connection with the public IP cannot be established despite everything being configured properly.*

Search resources, services, and docs (G+)

az104-06-lb4 | Load balancer

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Frontend IP configuration

Essentials

Resource group (move): az104-06-rg4

Location: North Europe

Subscription (move): Azure Pass - Sponsorship

Subscription ID: c031718c-8f31-4c8d-ae56-634904ec50f9

SKU: Standard

Tags (edit): Click here to add tags

Backend pool: az104-06-lb4-be1 (2 virtual machines)

Load balancing rule: -

Health probe: -

NAT rules: 0 inbound

Tier: Regional

JSON View

Task 6: Implement Azure Application Gateway - *Connection with the public IP cannot be established despite everything being configured properly.*

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az104-06-appgw5

Application gateway

Search

Delete Refresh

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems

Settings

- Configuration
- Web application firewall

Updating

Essentials

Resource group (move)	: az104-06-rg5	Virtual network/subnet	: az104-06-vnet01/subnet-appgw
Location	: North Europe	Frontend public IP address	: 20.238.97.222 (az104-06-pip5)
Subscription (move)	: Azure Pass - Sponsorship	Frontend private IP addr...	: -
Subscription ID	: c031718c-8f31-4c8d-ae56-634904ec50f9	Tier	: Standard V2
Tags (edit)	: Click here to add tags	Availability zone	: -

JSON View