

AZURE TRAFFIC MANAGER BY SUBHASH GUNDA

DEEP AZURE @MCKESSON

Problem Statement

Tech survey ecommerce site need a better solution for their application which is deployed geographically in different zones across the world for them performance and uptime are the main key points to keep their site up and running with no single point of failure.

Overview of Technology

Microsoft Azure Traffic manager is the point of discussion here. Briefly about it, Microsoft Azure Traffic Manager allows control the distribution of user traffic for service endpoints in different datacenters. Service endpoints supported by traffic manager include Azure VMs, Web Apps, and cloud services. It can also be used with external , non-Azure endpoints.

- Traffic Manager uses DNS to direct client requests to most appropriate endpoint.
- Endpoints based on traffic-routing method and Health of the endpoints.

Traffic Manager benefits

- Improves the availability of critical applications
- Improves the responsiveness of high-performance applications
- Performs service maintenance without downtime
- Combines on-premises and Cloud-based applications
- Distribute traffic for large, complex deployments

Traffic Manager routing methods

Azure traffic Manager supports four traffic-routing methods to determine how to route network traffic to the various service endpoints. Traffic Manager applies the traffic-routing method to each DNS query it receives. Below are four traffic routing methods.

- Priority
- Weighted
- Performance
- Geographic

High Level Overview of steps

1. Four Azure windows based VMs each with a power shell script
2. Installed Java 1.8 JDK, NetBeans IDE 8.2 along with Glassfish Server 4.1 on all of them
3. Installed Oracle Database 11g Express Edition on one of the VM
4. Ran SQL queries to ingest data on the database
5. Deployed survey and survey admin apps on Glassfish server by changing libraries
6. Updated JDBC connection string to talk to the DB respectively from each GlassFish Server.
7. Ran PowerShell script to Create Azure Traffic Manager Profile 'performance' based
8. Create DNS for the site using DNS Zone and did a CNAME to point to Traffic Manager Profile.

Data Set

Survey URLs:

<http://gsrworld.techsurvey.com/survey/index.xhtml>

Survey Admin URLs:

<http://gsrworld.techsurvey.com/surveyadmin/home.jsp>

Traffic Manager Survey URLs:

<http://gen-unique.trafficmanager.net/survey/index.xhtml>

Traffic Manager Survey Admin URL:

<http://gen-unique.trafficmanager.net/surveyadmin/home.jsp>

- Online-Survey-System-Java-Project - Size: 3..2 MB
- I haven't included other tools as they are big like netbeans, oracle db and java jdk
- Power shell scripts are included

Hardware

- Windows Server 2012 R2
- Azure Traffic Manager

Software:

- NetBeans IDE 8.2
- GlassFish Server 4.1
- Java JDK 1.8
- Oracle Database 11g Express Edition
- JDBC Driver - ojdbc7.jar
- JSF Libraries – 1.2, 2.2
- My PC with Apache 2.4
- MY PC with host entry change

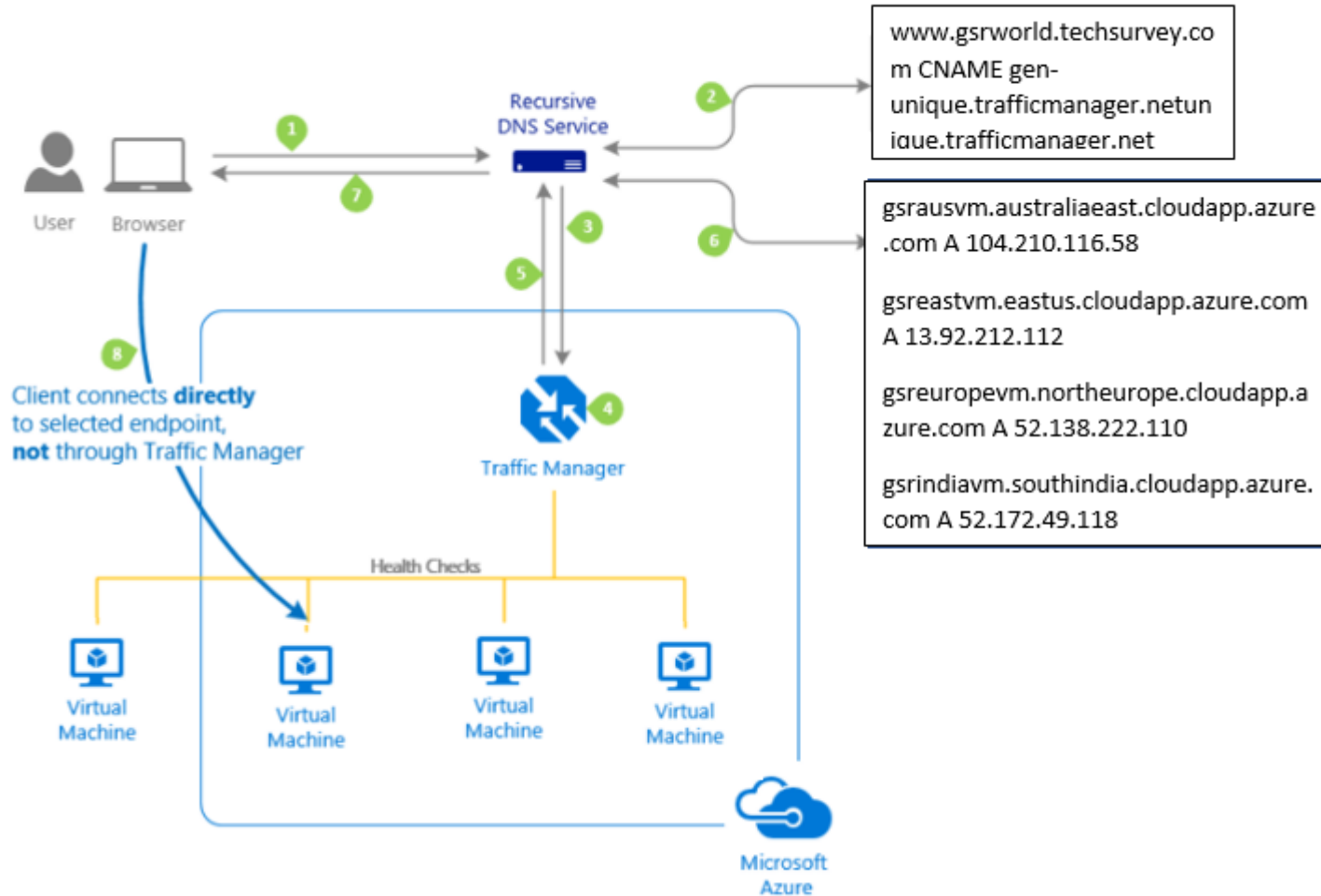
References:

<http://www.codewithc.com/online-survey-system-project-java/>

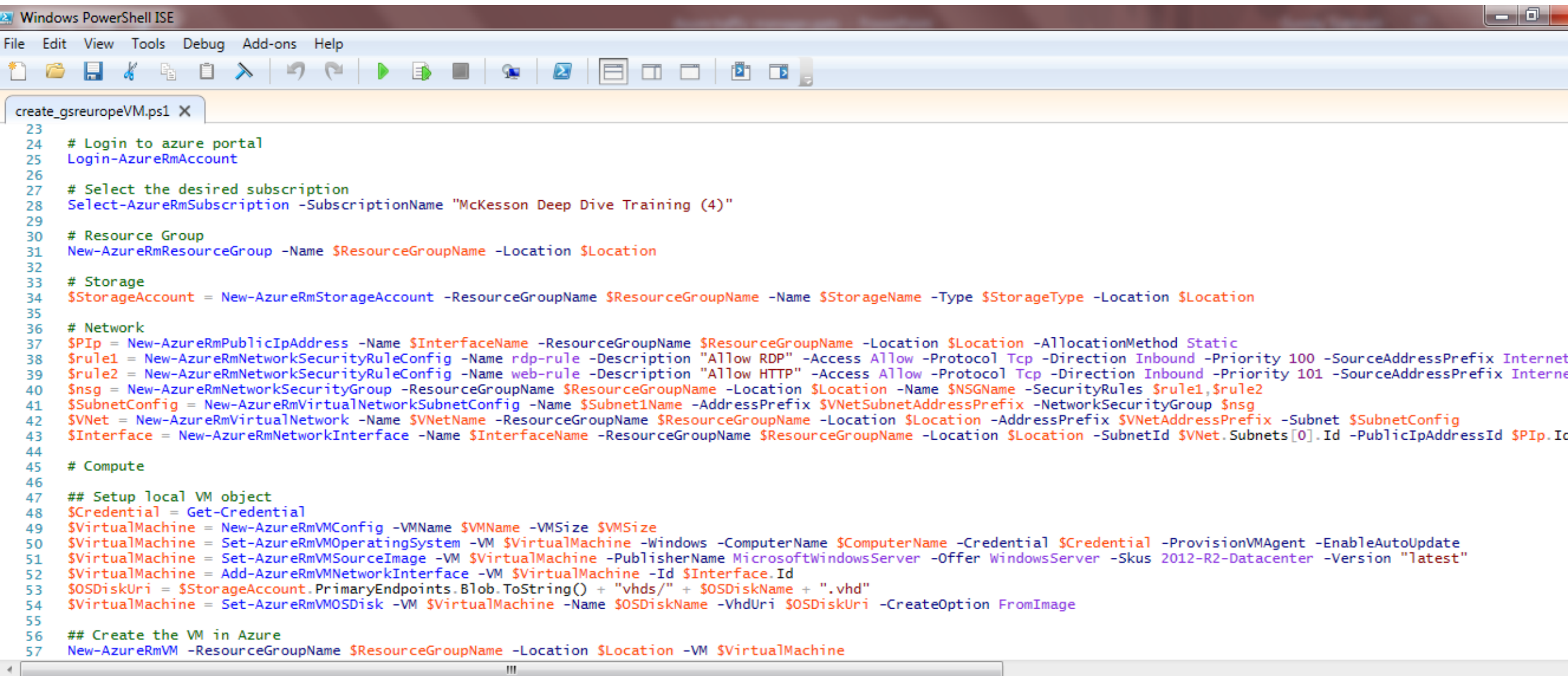
Lessons Learned & Pros/Cons

- Need to disable Windows Firewall which was not allowing incoming traffic
- NSGs can be applied at the network interface level or the subnet level for a VM.
- Not able to submit the survey – may be a code but couldn't figure out.
- DNS zone Site DNS CNAME to Azure Traffic Manager Profile not working so I used my PC with apache as a portal DNS Server

Depiction of flow of Traffic for gsrworld.techsurvey.com Site



Power Shell Script for the Europe VM And its Execution



```
Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help

create_gsreuropeVM.ps1 X
23
24 # Login to azure portal
25 Login-AzureRmAccount
26
27 # Select the desired subscription
28 Select-AzureRmSubscription -SubscriptionName "McKesson Deep Dive Training (4)"
29
30 # Resource Group
31 New-AzureRmResourceGroup -Name $ResourceGroupName -Location $Location
32
33 # Storage
34 $StorageAccount = New-AzureRmStorageAccount -ResourceGroupName $ResourceGroupName -Name $StorageName -Type $StorageType -Location $Location
35
36 # Network
37 $IP = New-AzureRmPublicIpAddress -Name $InterfaceName -ResourceGroupName $ResourceGroupName -Location $Location -AllocationMethod Static
38 $rule1 = New-AzureRmNetworkSecurityRuleConfig -Name rdp-rule -Description "Allow RDP" -Access Allow -Protocol Tcp -Direction Inbound -Priority 100 -SourceAddressPrefix Internet
39 $rule2 = New-AzureRmNetworkSecurityRuleConfig -Name web-rule -Description "Allow HTTP" -Access Allow -Protocol Tcp -Direction Inbound -Priority 101 -SourceAddressPrefix Internet
40 $nsg = New-AzureRmNetworkSecurityGroup -ResourceGroupName $ResourceGroupName -Location $Location -Name $NSGName -SecurityRules $rule1,$rule2
41 $SubnetConfig = New-AzureRmVirtualNetworkSubnetConfig -Name $Subnet1Name -AddressPrefix $VNetSubnetAddressPrefix -NetworkSecurityGroup $nsg
42 $VNet = New-AzureRmVirtualNetwork -Name $VNetName -ResourceGroupName $ResourceGroupName -Location $Location -AddressPrefix $VNetAddressPrefix -Subnet $SubnetConfig
43 $Interface = New-AzureRmNetworkInterface -Name $InterfaceName -ResourceGroupName $ResourceGroupName -Location $Location -SubnetId $VNet.Subnets[0].Id -PublicIpAddressId $IP.Id
44
45 # Compute
46
47 ## Setup local VM object
48 $Credential = Get-Credential
49 $VirtualMachine = New-AzureRmVMConfig -VMName $VMName -VMSize $VMSize
50 $VirtualMachine = Set-AzureRmVMOperatingSystem -VM $VirtualMachine -Windows -ComputerName $ComputerName -Credential $Credential -ProvisionVMAgent -EnableAutoUpdate
51 $VirtualMachine = Set-AzureRmVMSourceImage -VM $VirtualMachine -PublisherName MicrosoftWindowsServer -Offer WindowsServer -Skus 2012-R2-Datacenter -Version "latest"
52 $VirtualMachine = Add-AzureRmVMNetworkInterface -VM $VirtualMachine -Id $Interface.Id
53 $OSDiskUri = $StorageAccount.PrimaryEndpoints.Blob.ToString() + "vhds/" + $OSDiskName + ".vhd"
54 $VirtualMachine = Set-AzureRmVMOSDisk -VM $VirtualMachine -Name $OSDiskName -VhdUri $OSDiskUri -CreateOption FromImage
55
56 ## Create the VM in Azure
57 New-AzureRmVM -ResourceGroupName $ResourceGroupName -Location $Location -VM $VirtualMachine
```

```
Windows PowerShell
Copyright (C) 2012 Microsoft Corporation. All rights reserved.

PS C:\Users\en12bfb> C:\Users\en12bfb\Desktop\DeepAzure\project\create_gsrindiaVM.ps1

Environment      : AzureCloud
Account          : Subhash.Gunda@McKesson.com
TenantId         : da67ef1b-ca59-4db2-9a8c-aa8d94617a16
SubscriptionId   : 3258efe1-d8e7-4e11-aa41-7ece0bcd7d88
SubscriptionName : MMS Shared Services
CurrentStorageAccount :

ResourceGroupName : gsrdeepazureindia
Location          : southcentralus
ProvisioningState : Succeeded
Tags              :
TagsTable         :
ResourceId        : /subscriptions/86d62b86-1ed2-45c1-8f6c-164c9b3db93a/resourceGroups/gsrdeepazureindia

WARNING: The output object type of this cmdlet will be modified in a future release.
WARNING: The output object type of this cmdlet will be modified in a future release.
WARNING: The output object type of this cmdlet will be modified in a future release.
WARNING: The output object type of this cmdlet will be modified in a future release.

cmdlet Get-Credential at command pipeline position 1
Supply values for the following parameters:
Credential

RequestId      :
IsSuccessStatusCode : True
StatusCode     : OK
ReasonPhrase   : OK

PS C:\Users\en12bfb>

Windows PowerShell
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PS C:\Users\en12bfb> C:\Users\en12bfb\Desktop\DeepAzure\project\create_gsrausVM.ps1

Environment      : AzureCloud
Account          : Subhash.Gunda@McKesson.com
TenantId         : da67ef1b-ca59-4db2-9a8c-aa8d94617a16
SubscriptionId   : 3258efe1-d8e7-4e11-aa41-7ece0bcd7d88
SubscriptionName : MMS Shared Services
CurrentStorageAccount :

ResourceGroupName : gsrdeepazureusa
Location          : eastus
ProvisioningState : Succeeded
Tags              :
TagsTable         :
ResourceId        : /subscriptions/86d62b86-1ed2-45c1-8f6c-164c9b3db93a/resourceGroups/gsrdeepazureusa

WARNING: The output object type of this cmdlet will be modified in a future release.
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cmdlet Get-Credential at command pipeline position 1
Supply values for the following parameters:
Credential

RequestId      :
IsSuccessStatusCode : True
StatusCode     : OK
ReasonPhrase   : OK

PS C:\Users\en12bfb>

Windows PowerShell
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PS C:\Users\en12bfb> C:\Users\en12bfb\Desktop\DeepAzure\project\create_gsreastVM.ps1

Environment      : AzureCloud
Account          : Subhash.Gunda@McKesson.com
TenantId         : da67ef1b-ca59-4db2-9a8c-aa8d94617a16
SubscriptionId   : 3258efe1-d8e7-4e11-aa41-7ece0bcd7d88
SubscriptionName : MMS Shared Services
CurrentStorageAccount :

ResourceGroupName : gsrdeepazureeastus
Location          : eastus
ProvisioningState : Succeeded
Tags              :
TagsTable         :
ResourceId        : /subscriptions/86d62b86-1ed2-45c1-8f6c-164c9b3db93a/resourceGroups/gsrdeepazureeastus

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cmdlet Get-Credential at command pipeline position 1
Supply values for the following parameters:
Credential

RequestId      :
IsSuccessStatusCode : True
StatusCode     : OK
ReasonPhrase   : OK

PS C:\Users\en12bfb>

Windows PowerShell
Copyright (C) 2012 Microsoft Corporation. All rights reserved.

PS C:\Users\en12bfb> C:\Users\en12bfb\Desktop\DeepAzure\project\create_gsureuropeVM.ps1

Environment      : AzureCloud
Account          : Subhash.Gunda@McKesson.com
TenantId         : da67ef1b-ca59-4db2-9a8c-aa8d94617a16
SubscriptionId   : 3258efe1-d8e7-4e11-aa41-7ece0bcd7d88
SubscriptionName : MMS Shared Services
CurrentStorageAccount :

ResourceGroupName : gsrdeepazureeurope
Location          : northeurope
ProvisioningState : Succeeded
Tags              :
TagsTable         :
ResourceId        : /subscriptions/86d62b86-1ed2-45c1-8f6c-164c9b3db93a/resourceGroups/gsrdeepazureeurope

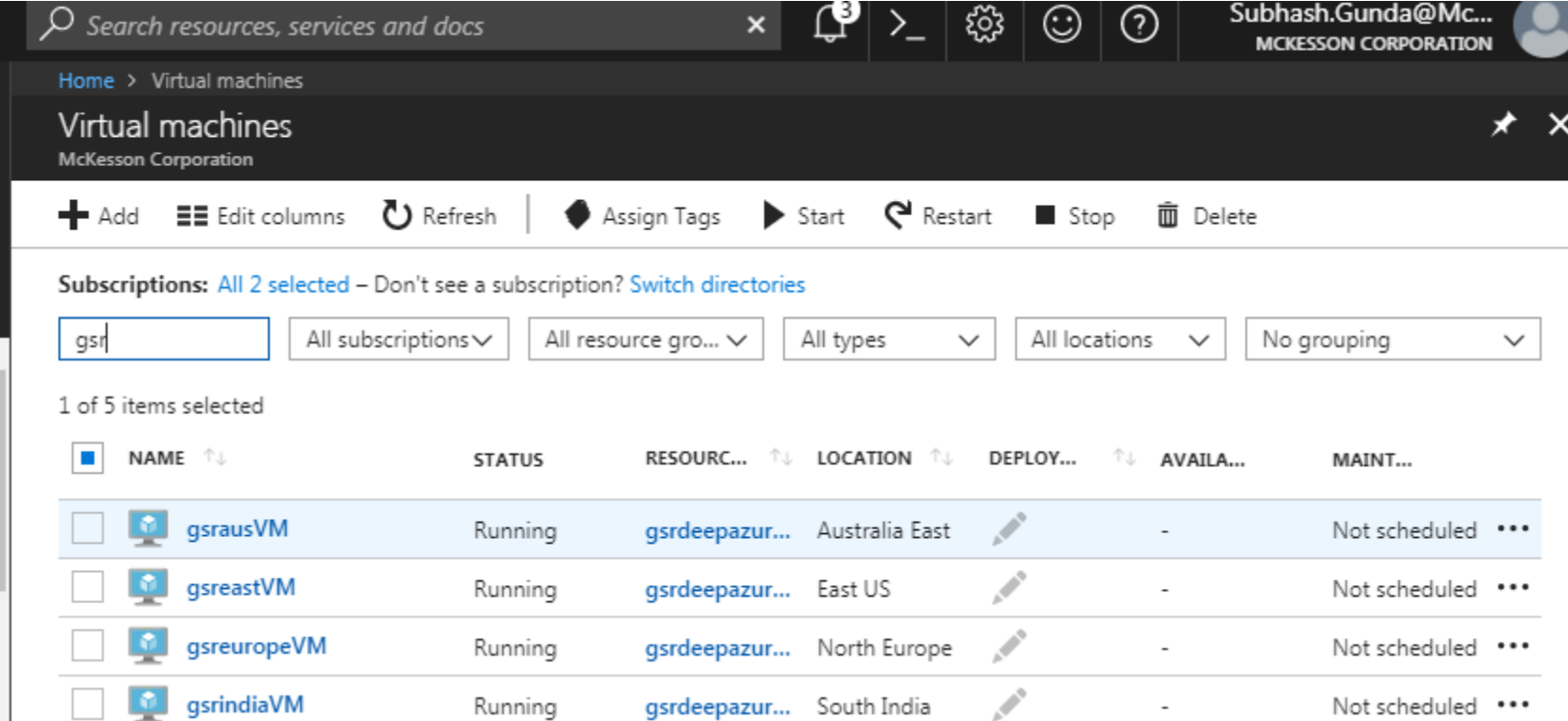
WARNING: The output object type of this cmdlet will be modified in a future release.
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WARNING: The output object type of this cmdlet will be modified in a future release.

cmdlet Get-Credential at command pipeline position 1
Supply values for the following parameters:
Credential

RequestId      :
IsSuccessStatusCode : True
StatusCode     : OK
ReasonPhrase   : OK

PS C:\Users\en12bfb>
```

List of all the VMs on Azure portal after Execution



The screenshot shows the Azure portal interface for 'Virtual machines' under the 'McKesson Corporation' subscription. The top navigation bar includes a search bar, notification bell, and user profile. The main header shows 'Virtual machines' and 'McKesson Corporation'. Below the header is a toolbar with actions: Add, Edit columns, Refresh, Assign Tags, Start, Restart, Stop, and Delete. The 'Subscriptions' section indicates 'All 2 selected' and provides filters for subscriptions, resource groups, types, locations, and grouping. A table lists 5 items, with the first one selected. The table columns are NAME, STATUS, RESOURC..., LOCATION, DEPLOY..., AVAILA..., and MAINT....

Search resources, services and docs

Home > Virtual machines

Virtual machines









McKesson Corporation

+ Add Edit columns Refresh Assign Tags Start Restart Stop Delete

Subscriptions: All 2 selected – Don't see a subscription? Switch directories

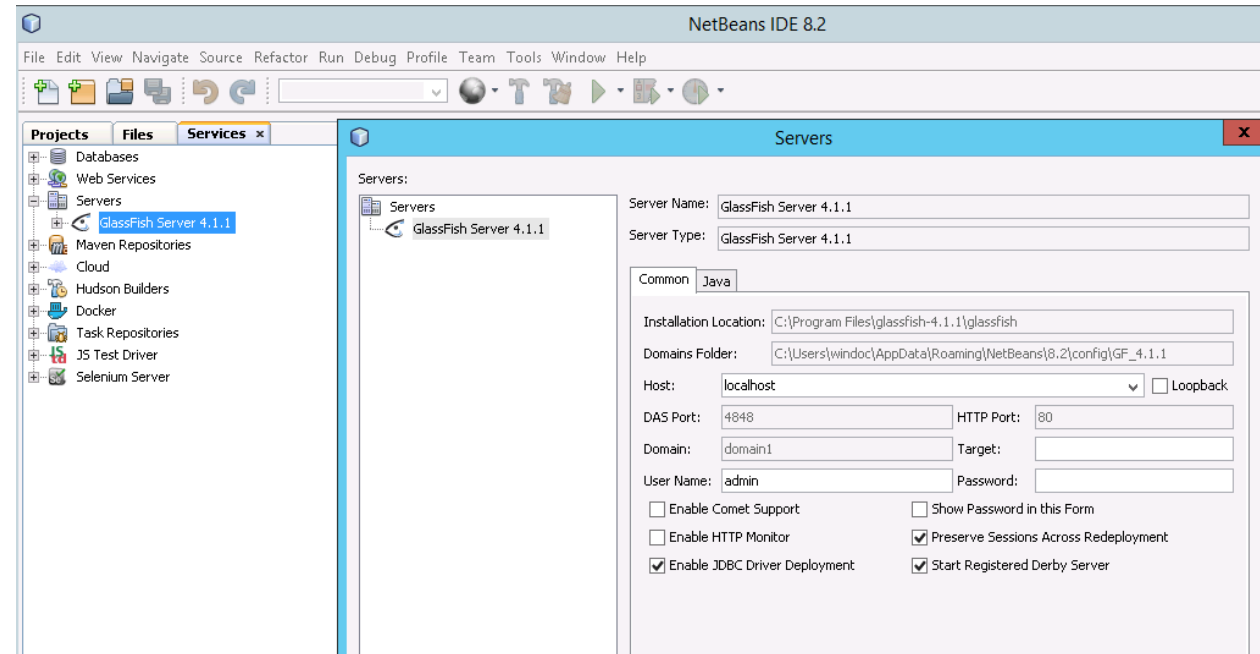
gsr All subscriptions All resource gro... All types All locations No grouping

1 of 5 items selected

<input checked="" type="checkbox"/>	NAME ↑↓	STATUS	RESOURC... ↑↓	LOCATION ↑↓	DEPLOY... ↑↓	AVAILA...	MAINT...
<input checked="" type="checkbox"/>	 gsrausVM	Running	gsrdeepazur...	Australia East		-	Not scheduled ...
<input type="checkbox"/>	 gsreastVM	Running	gsrdeepazur...	East US		-	Not scheduled ...
<input type="checkbox"/>	 gsreuropeVM	Running	gsrdeepazur...	North Europe		-	Not scheduled ...
<input type="checkbox"/>	 gsrindiaVM	Running	gsrdeepazur...	South India		-	Not scheduled ...

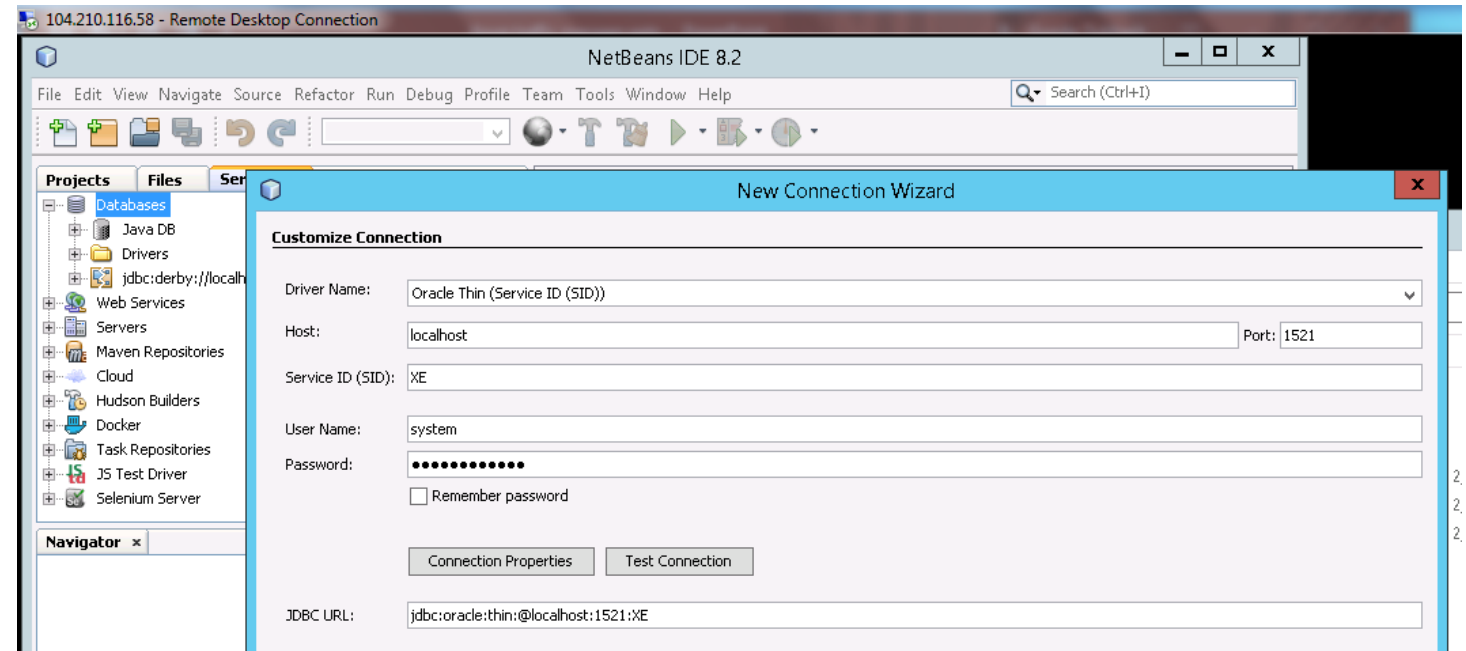
Software Installation

- RDP to the VMS
- Install Java 1.8 JDK
- Install NetBeans 8.2 along with GlassFish Server
- Update port for GlassFish Server to be 80

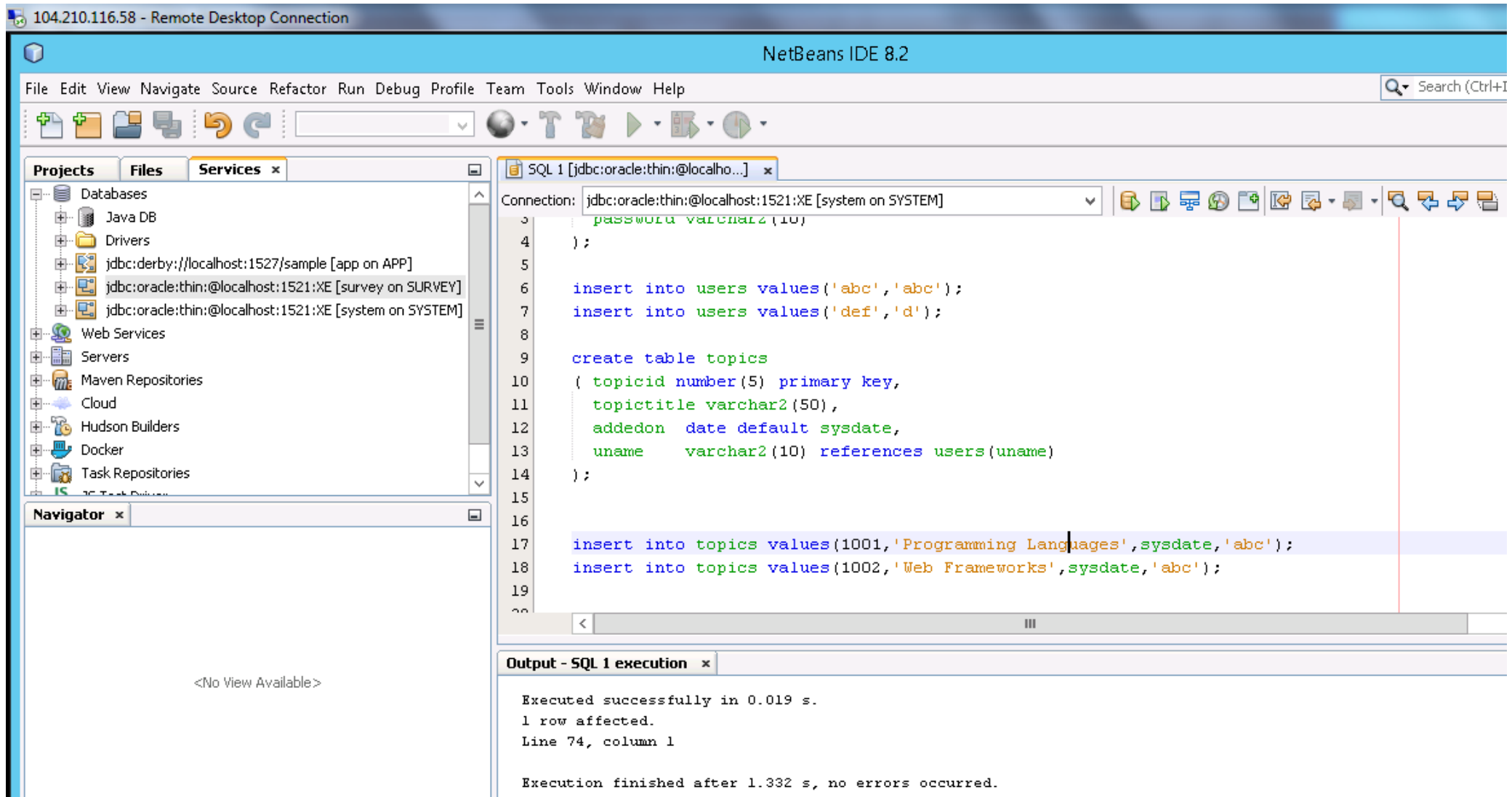


Oracle Database 11g Express Edition Steps

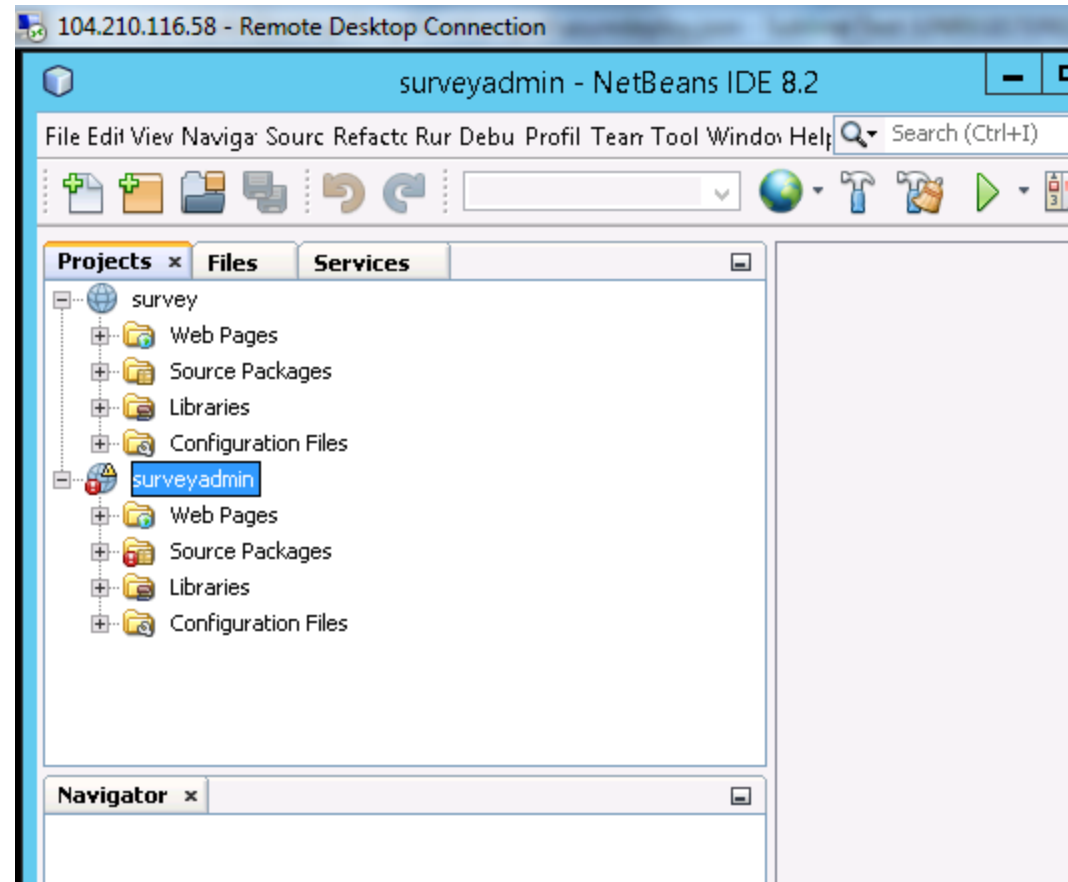
- Install Oracle Database 11g Express Edition on one of the VM in this case Australia VM
- Connect to the DB with IDS and ingest data from web app folder



Ingesting Data in to the Oracle DataBase

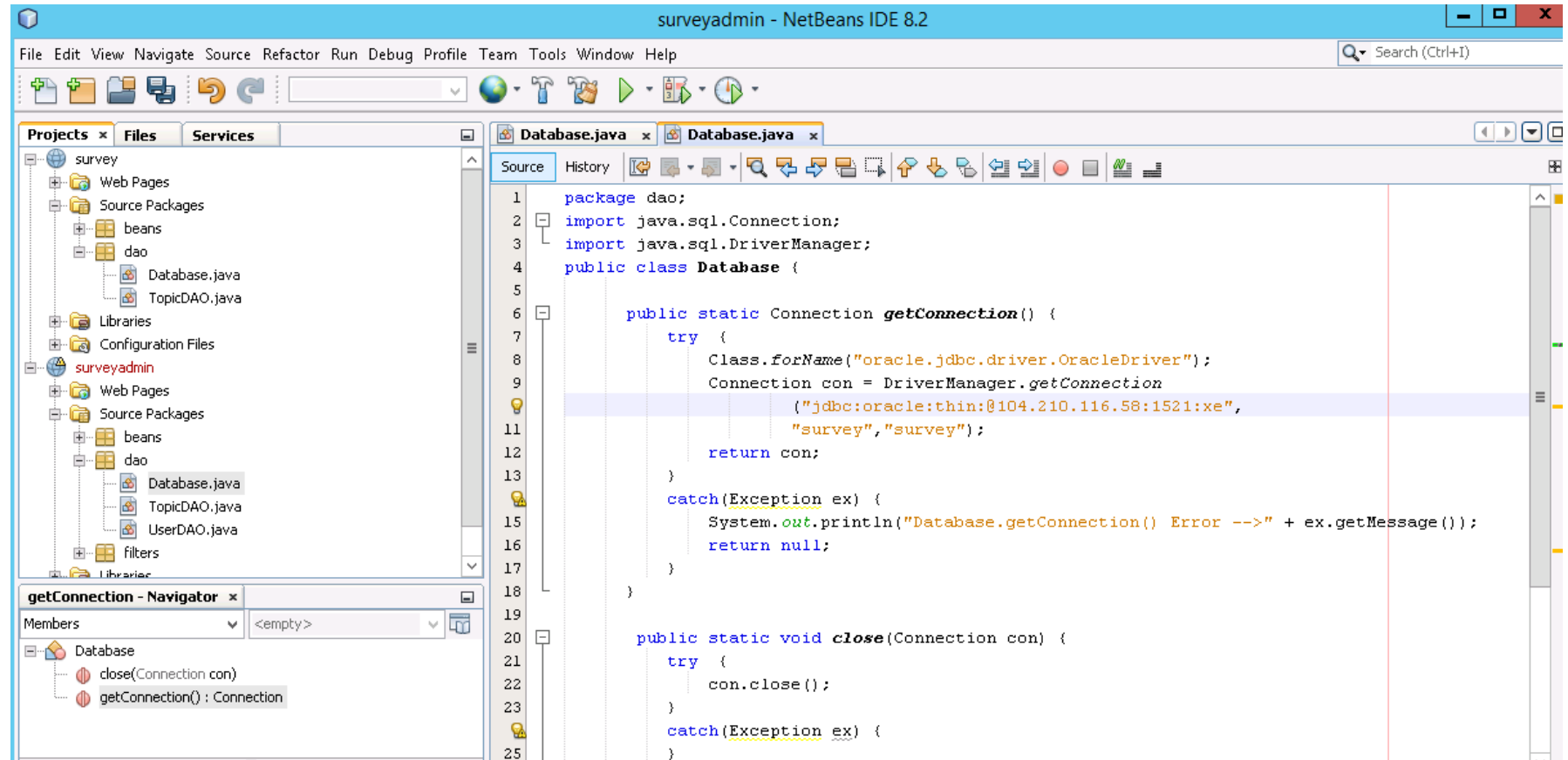


Import two Java Projects into IDE

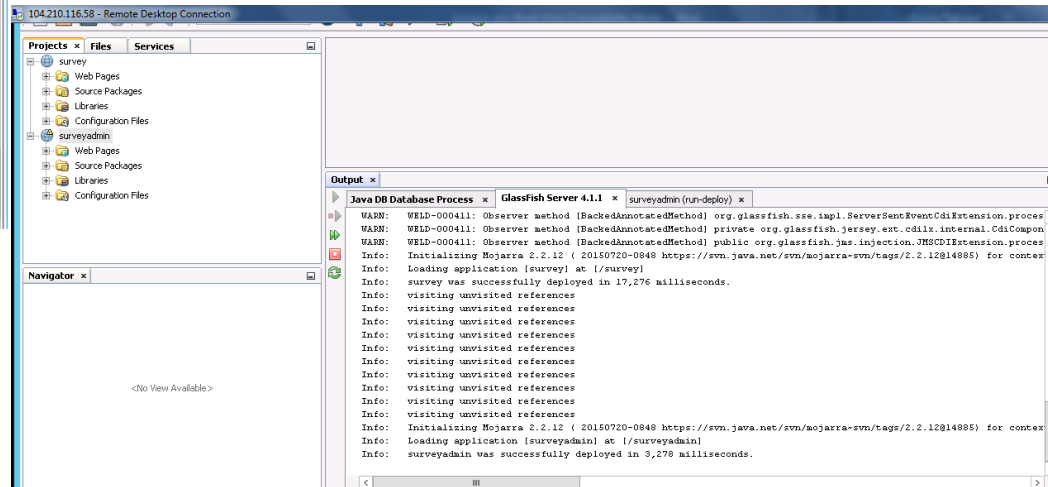
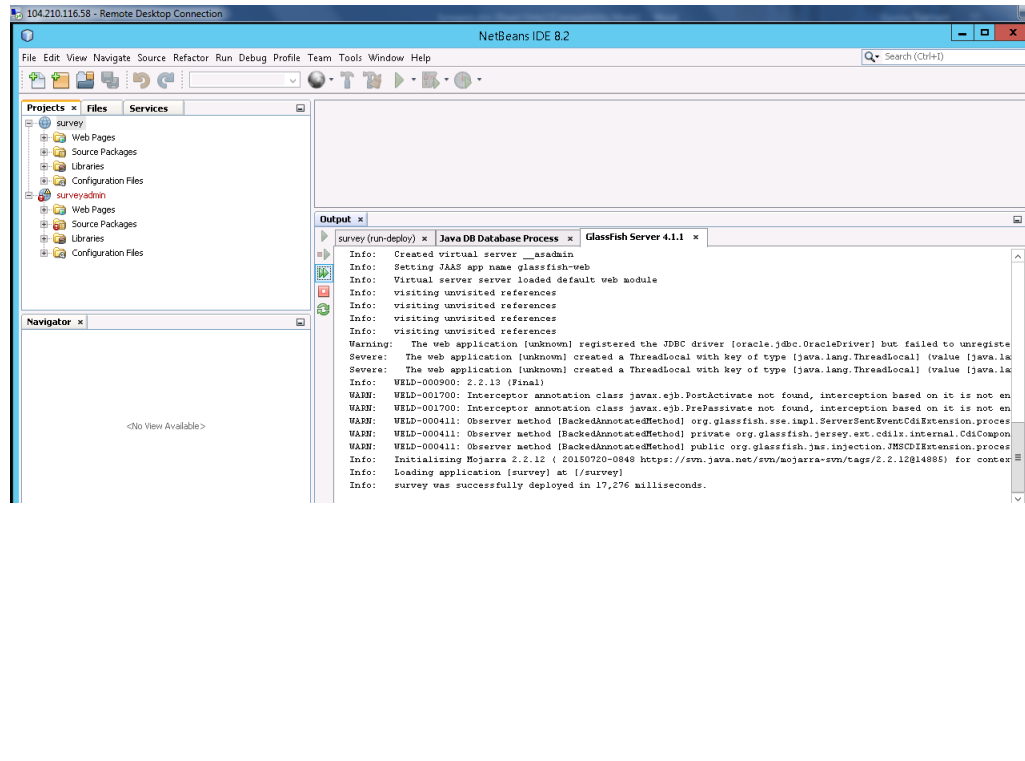


Java Program Changes

- Import surveyy and surveyadmin projects in to the IDE
- Make changes to Database.java file on eastus, india, Europe VMs to point to the public IP of Australia VM database instance

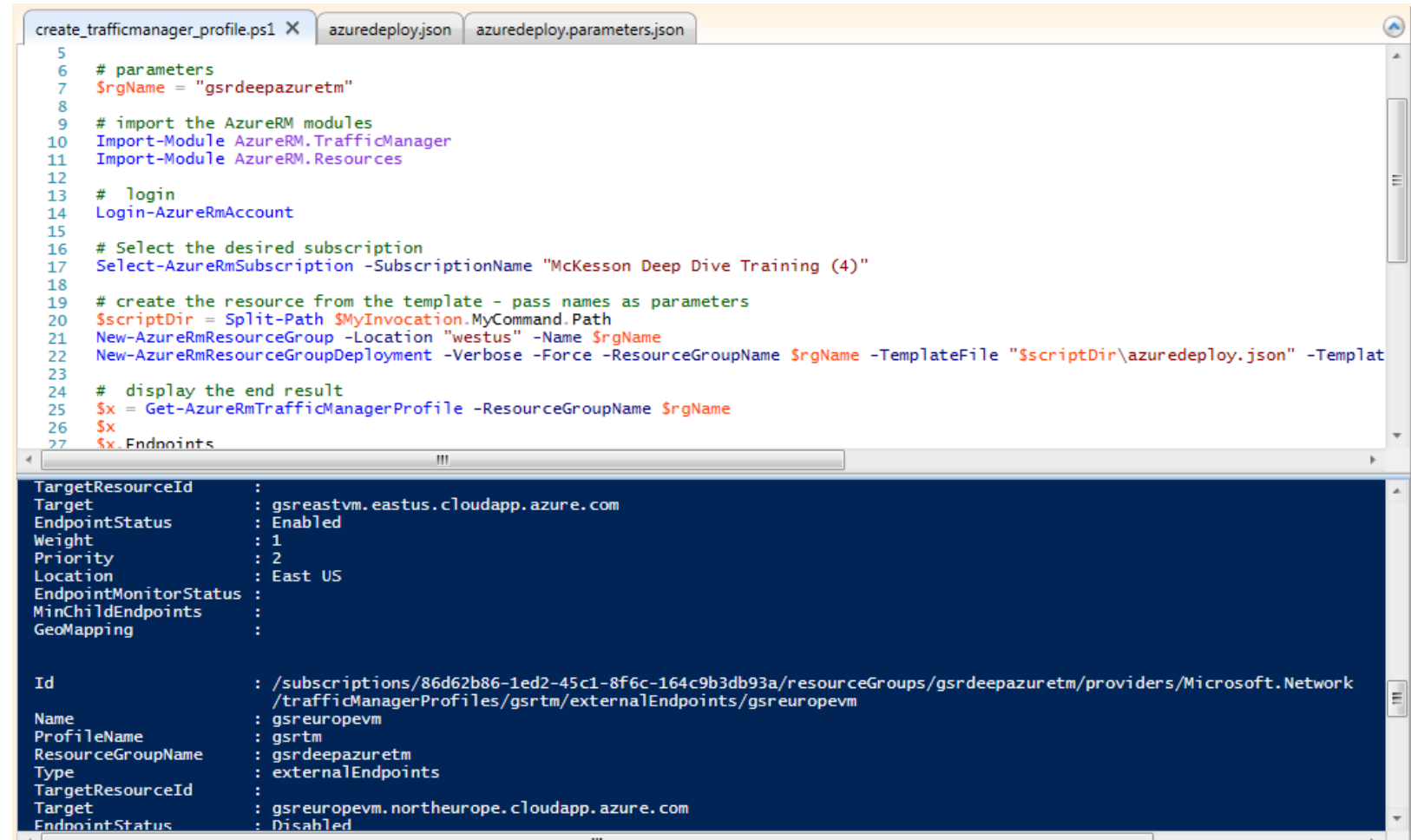


Deploy the Final Changes to Glassfish Server



Create Azure Traffic Manager Profile

- File updated to include the end points
- Run the power shell Script
- create_trafficmanager_profile.ps1
- Azuredeploy
- azuredeploy.parameters



The screenshot shows a PowerShell script named `create_trafficmanager_profile.ps1` being executed. The script defines a parameter `$rgName` with the value "gsrdeepazuretm", imports the `AzureRM.TrafficManager` and `AzureRM.Resources` modules, logs in to the Azure account, selects the subscription "McKesson Deep Dive Training (4)", creates a resource group in the "westus" location, and then creates a Traffic Manager profile named "gsreuropevm" with the type "externalEndpoints". The output shows the details of the created profile, including its ID, name, resource group, and target endpoint.

```
5  
6 # parameters  
7 $rgName = "gsrdeepazuretm"  
8  
9 # import the AzureRM modules  
10 Import-Module AzureRM.TrafficManager  
11 Import-Module AzureRM.Resources  
12  
13 # login  
14 Login-AzureRmAccount  
15  
16 # Select the desired subscription  
17 Select-AzureRmSubscription -SubscriptionName "McKesson Deep Dive Training (4)"  
18  
19 # create the resource from the template - pass names as parameters  
20 $scriptDir = Split-Path $MyInvocation.MyCommand.Path  
21 New-AzureRmResourceGroup -Location "westus" -Name $rgName  
22 New-AzureRmResourceGroupDeployment -Verbose -Force -ResourceGroupName $rgName -TemplateFile "$scriptDir\azuredeploy.json" -TemplateParameters @{rgName=$rgName}  
23  
24 # display the end result  
25 $x = Get-AzureRmTrafficManagerProfile -ResourceGroupName $rgName  
26 $x  
27 $x.Endpoints
```

```
TargetResourceId : gsreastvm.eastus.cloudapp.azure.com  
Target          : gsreastvm.eastus.cloudapp.azure.com  
EndpointStatus  : Enabled  
Weight          : 1  
Priority        : 2  
Location        : East US  
EndpointMonitorStatus :  
MinChildEndpoints :  
GeoMapping      :  
  
Id              : /subscriptions/86d62b86-1ed2-45c1-8f6c-164c9b3db93a/resourceGroups/gsrdeepazuretm/providers/Microsoft.Network/trafficManagerProfiles/gstrtm/externalEndpoints/gsreuropevm  
Name            : gsreuropevm  
ProfileName     : gstrtm  
ResourceGroupName : gsrdeepazuretm  
Type            : externalEndpoints  
TargetResourceId :  
Target          : gsreuropevm.northeurope.cloudapp.azure.com  
EndpointStatus  : Disabled
```

Configuration of Traffic Manager Profile

Home > Resource groups > gsrdeepazuretm > gsrtm

gsrtm
Traffic Manager profile

Search (Ctrl+ /)

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

SETTINGS

- Configuration
- Real user measurements
- Traffic view
- Endpoints
- Properties
- Locks

Enable profile ■ Disable profile ↻ Refresh → Move 🗑 Delete profile

Essentials ^

Resource group (change)
[gsrdeepazuretm](#)

Status
Enabled

Subscription name (change)
[McKesson Deep Dive Training \(4\)](#)

Subscription ID
86d62b86-1ed2-45c1-8f6c-164c9b3db93a

DNS name
<http://gen-unique.trafficmanager.net>

Monitor status
Online

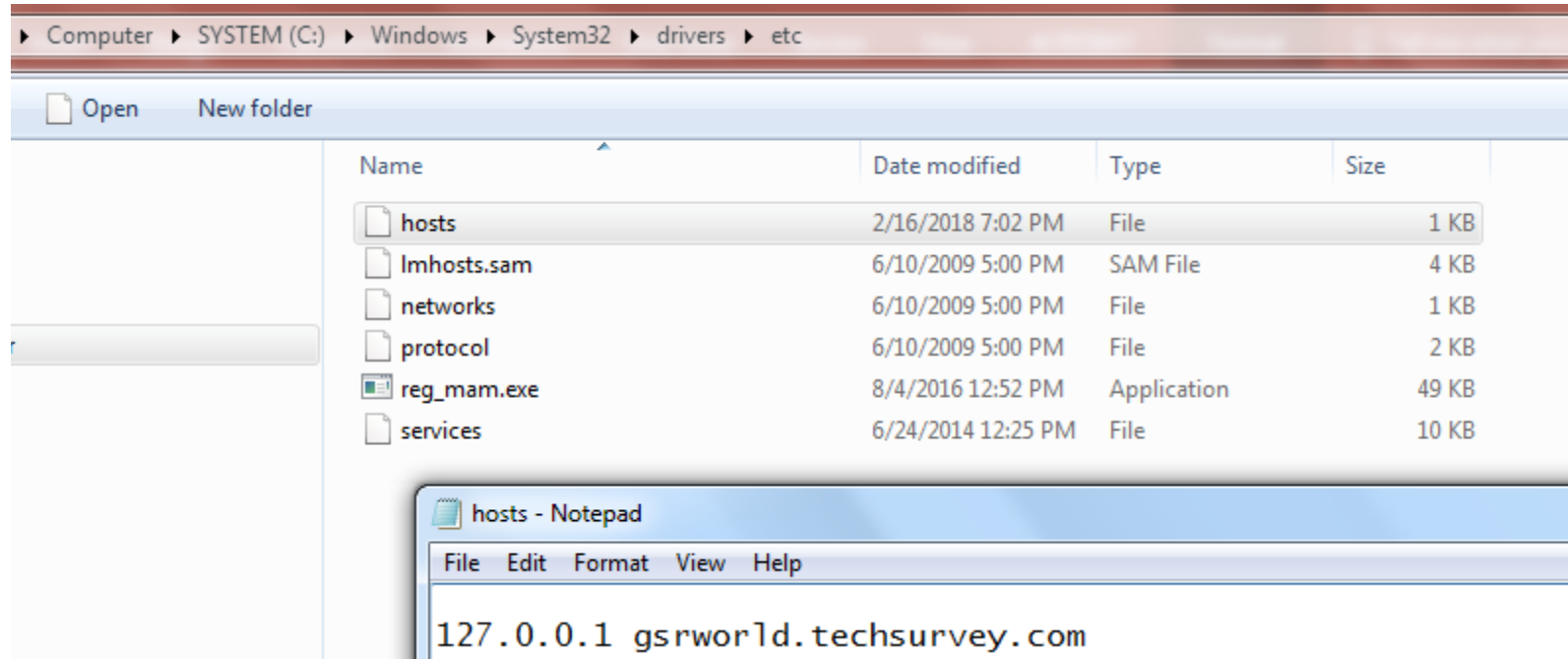
Routing method
Performance

Search endpoints

NAME	STATUS	MONITOR STATUS	TYPE	LOCATION
gsrausvm	Enabled	Online	External endpoint	Australia East
gsreastvm	Enabled	Checking endpoint	External endpoint	East US
gsreuropevm	Disabled	Disabled	External endpoint	East US
gsrindiavm	Enabled	Checking endpoint	External endpoint	South India

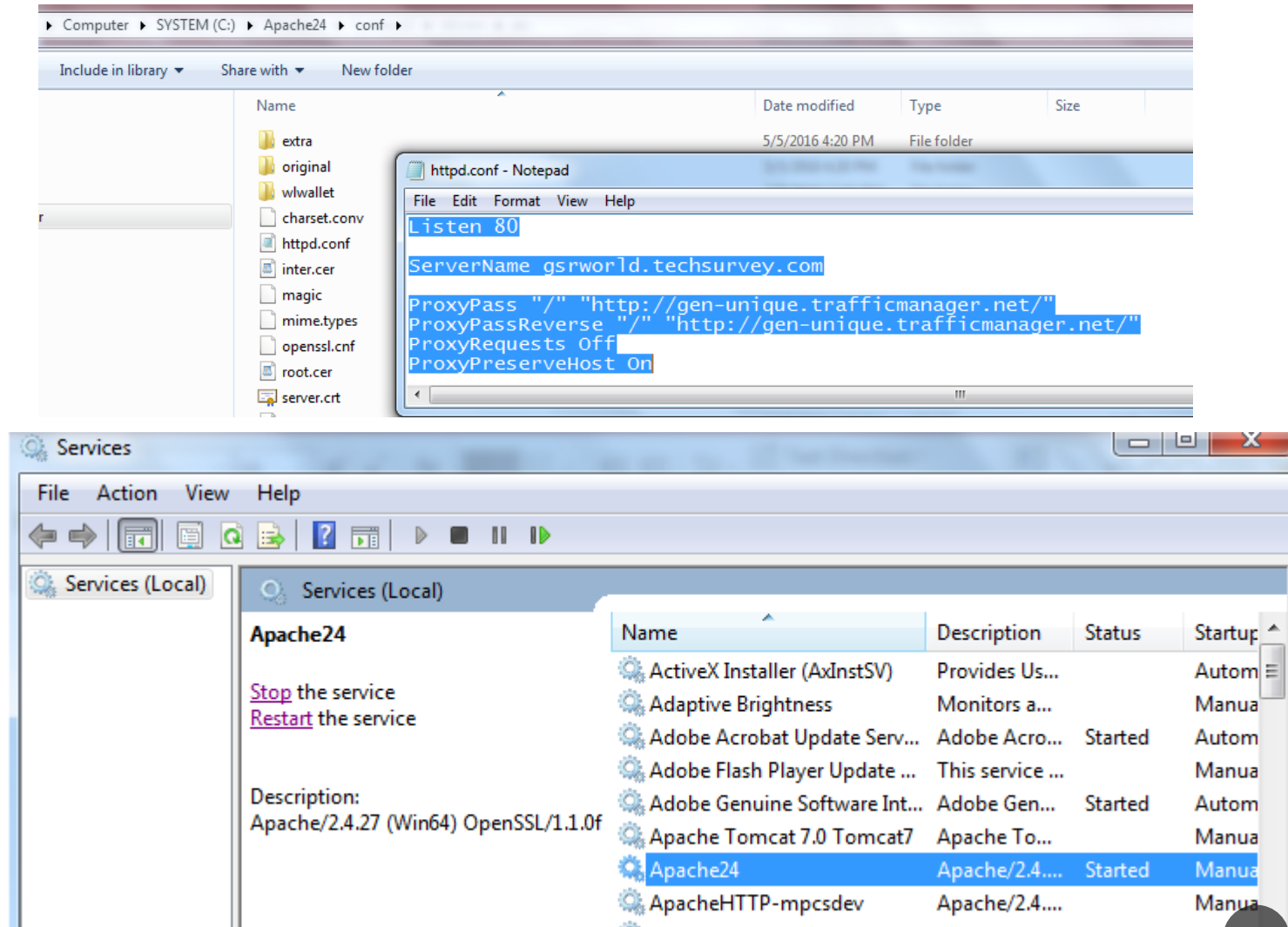
Hosts Entry Change on a workstation

As really don't have a DNS to play with I am using my pc with hosts entry change to mimic the demo.



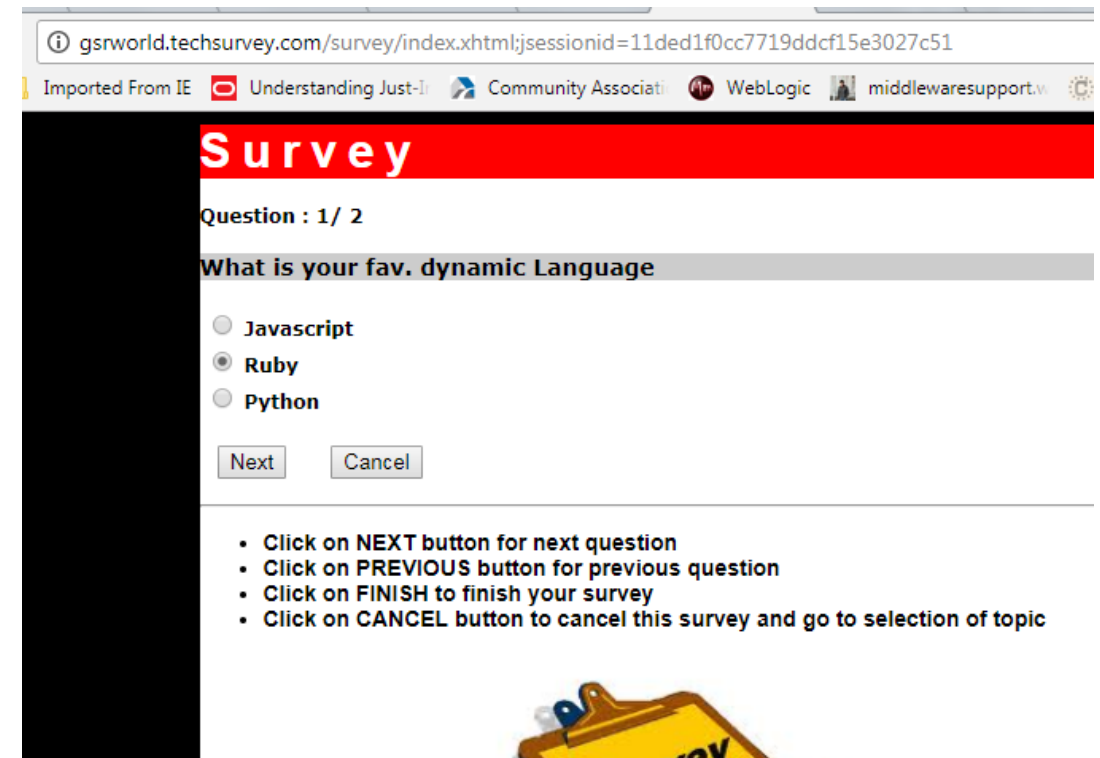
Install Apache and Configure on Workstation

- Install Apache 2.4
- Configure to include the server name
- Use reverse proxy to route traffic to Traffic Manager
- Start Apache 2.4 service



Access Site to Submit Survey

- Open URL on the workstation <http://gsrworld.techsurvey.com/survey/index.xhtml>
- To submit the survey proceed further



Access Survey Admin Site to View the entries

- Access surveyadmin site here to view the survey content.
- New topic can be added for the survey

← → ↻ ⓘ Not secure | gsrworld.techsurvey.com/surveyadmin/faces/login.jsp 🔑 ☆ 📱 🖨️ 📄

📱 Apps 📁 Imported From IE 📺 Understanding Just-It 🌐 Community Associati 🔴 WebLogic

Survey Admin

Login

Username:

Password :

Login

← → ↻ ⓘ gsrworld.techsurvey.com/surveyadmin/faces/home.jsp 🔑 ☆ 📱 🖨️ 📄 🔑 🔴 middlewaresupport.w

📱 Apps 📁 Imported From IE 📺 Understanding Just-It 🌐 Community Associati 🔴 WebLogic 🔴 middlewaresupport.w

Survey Admin

User : abc

[Logout](#)

[Home](#)

[List Topics](#)

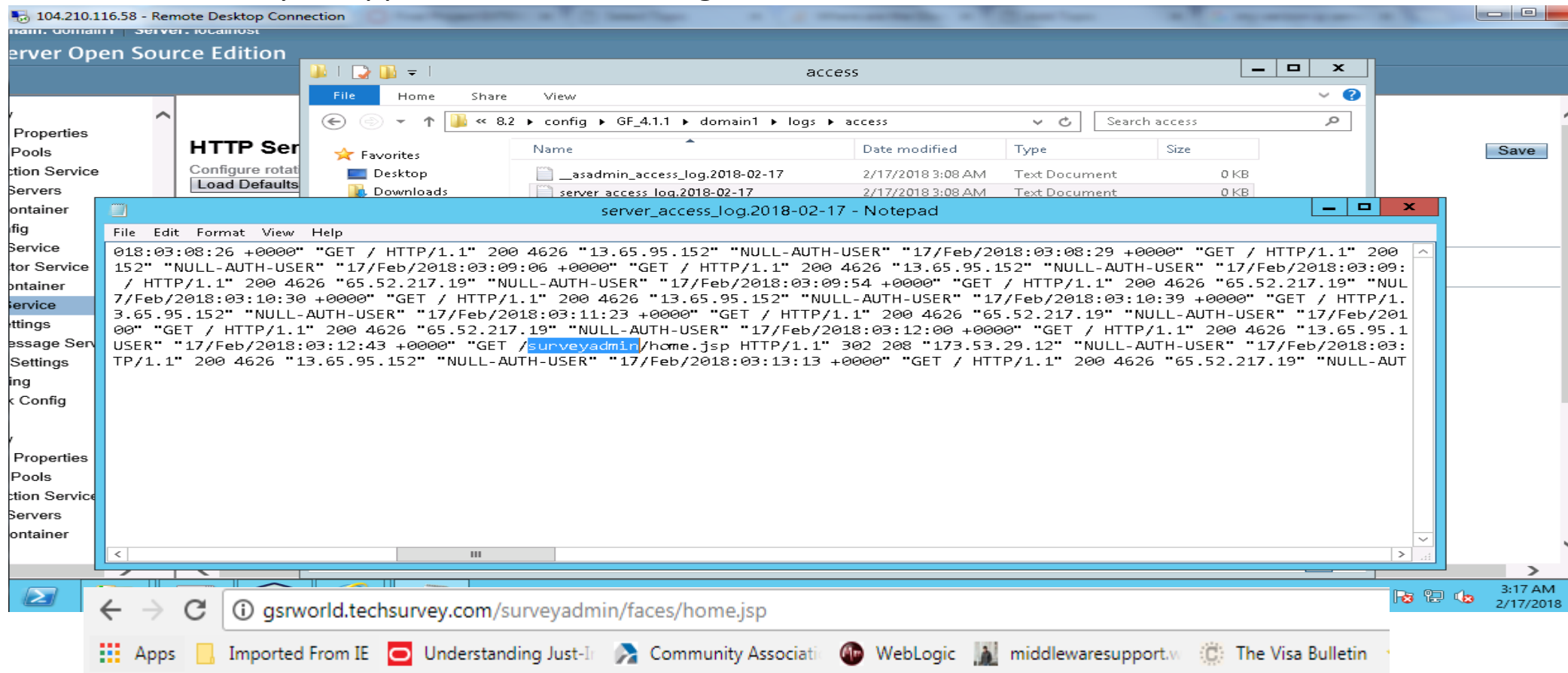
[Add New Topic](#)

Topics

Title	Added On	Added By	
Programming Languages	2018-02-16 11:42:03.0	abc	Delete Add Question Questions Survey Results
Web Frameworks	2018-02-16 11:42:03.0	abc	Delete Add Question Questions Survey Results

Testing Site with Traffic Manager

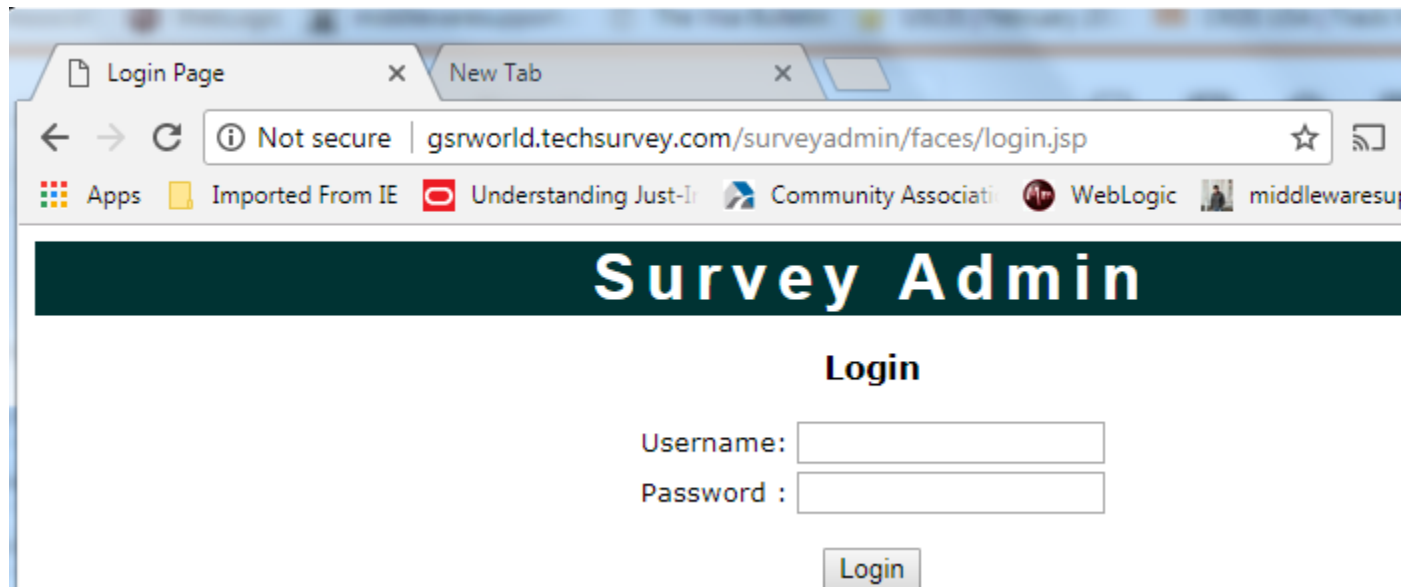
- While I accessing the above pages I found from the server logs where session landed.
- I disabled that endpoint from TM profile but the client still go to the same error even when that end point is removed TM routed my traffic to a second node.
- So finally I stopped the service and I get the service unavailable error as shown below



Service Unavailable

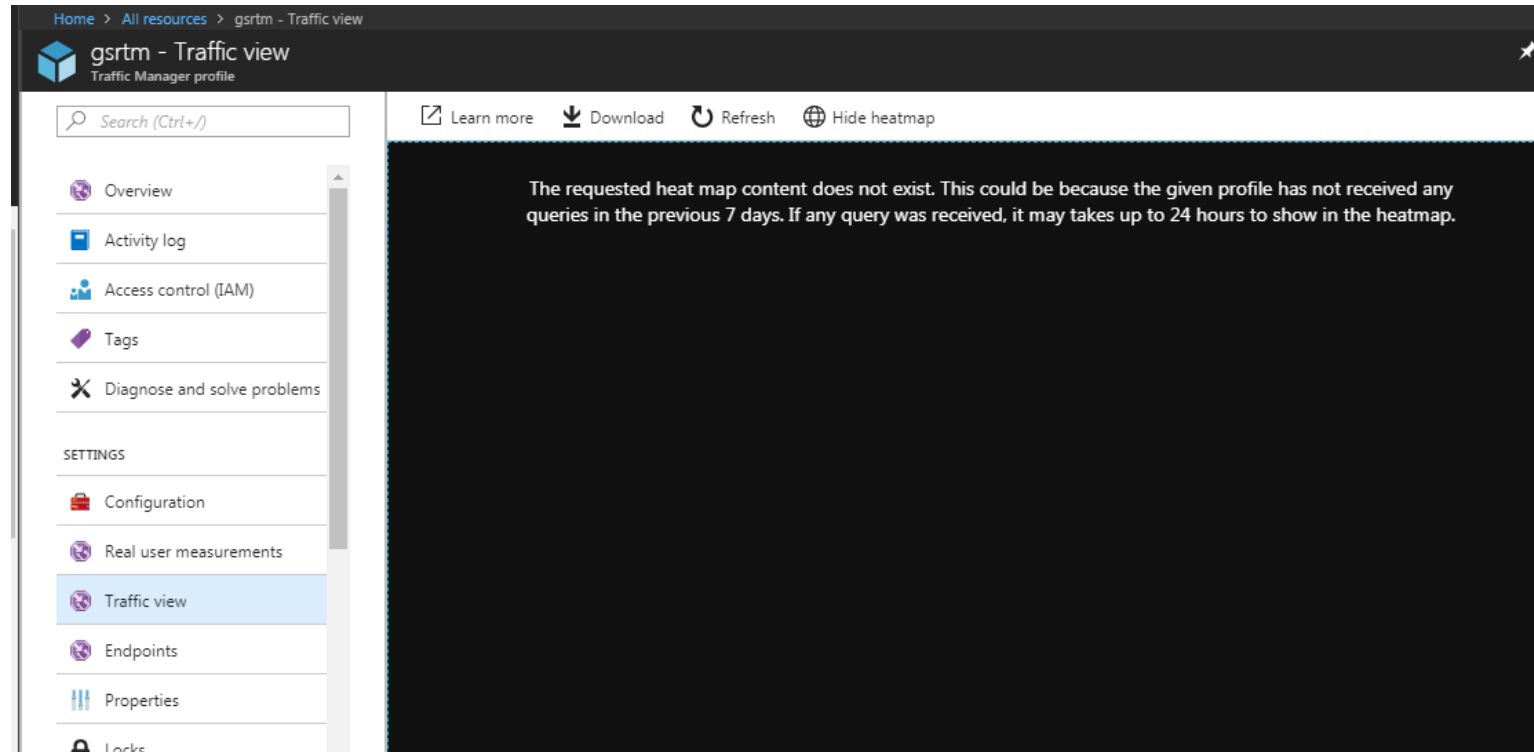
The server is temporarily unable to service your request due to maintenance downtime or capacity problems. Please try again later.

- Service restored after a while



Traffic View and Real user measurements

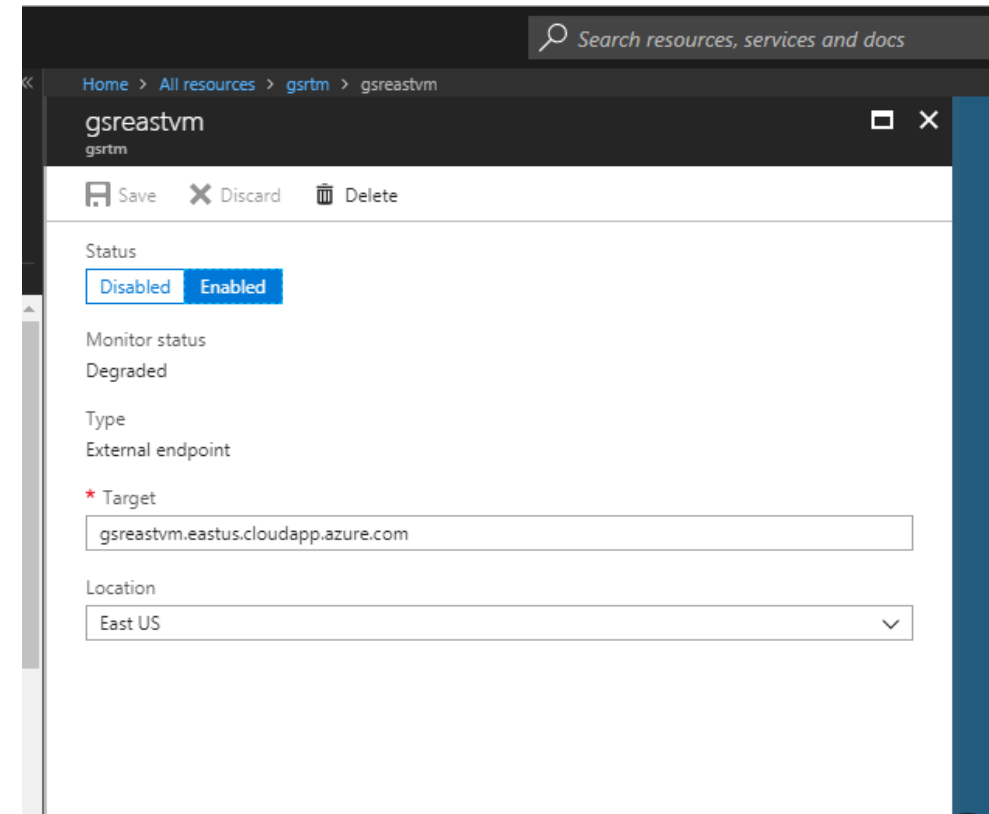
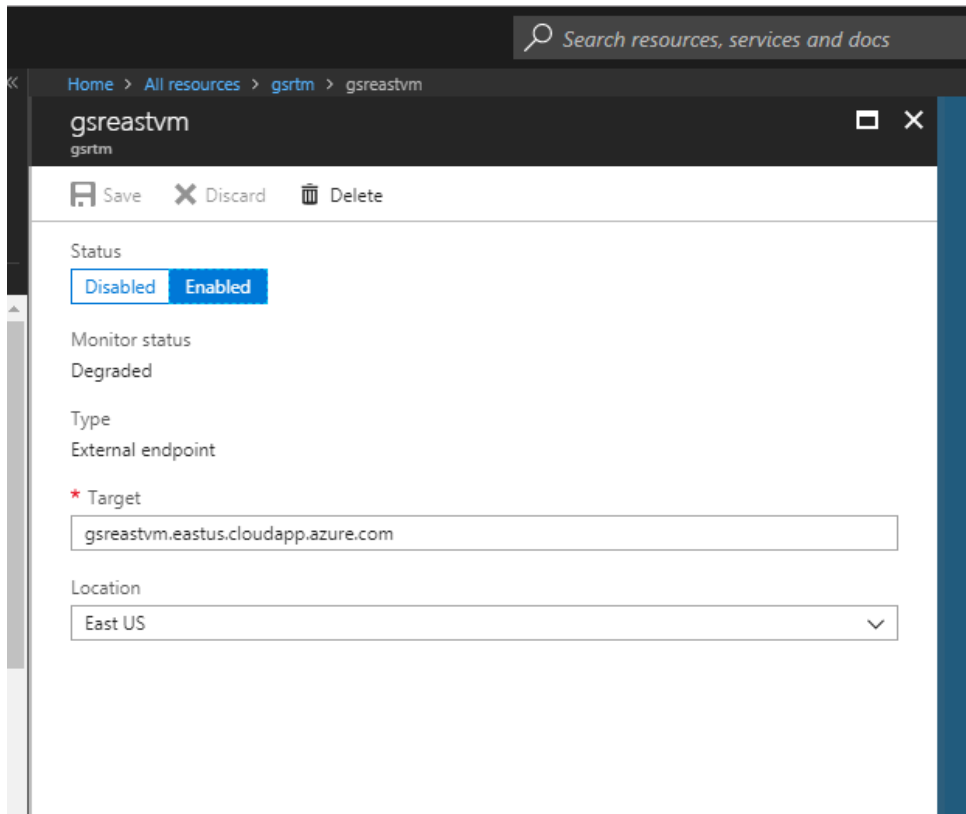
- For some reason I couldn't see the traffic view



Enable/Disable/Remove endpoint on Traffic Manager for maintenance

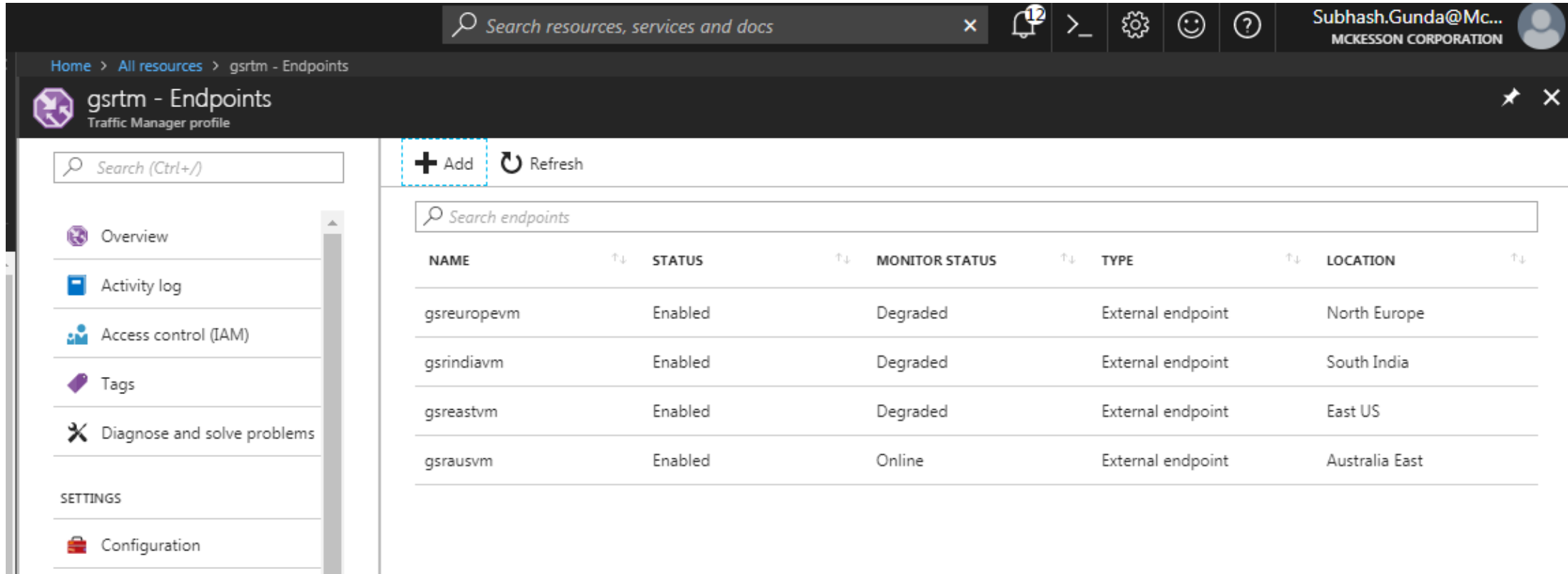
- We can enable or disable the nodes according to maintenance

- Remove endpoint by clicking the delete option



Suggestion For Later

Below the end points are showing degraded we need to include a proper probe with the path or have the glassfish server have a home page to serve.



The screenshot shows the Azure Traffic Manager console for a profile named 'gsrtm - Endpoints'. The left sidebar contains navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, and SETTINGS (Configuration). The main area displays a table of endpoints. The 'Add' button is highlighted with a dashed blue box. The table shows four endpoints, all of which are 'Degraded' except for 'gsrausvm' which is 'Online'.

NAME	STATUS	MONITOR STATUS	TYPE	LOCATION
gsreuropevm	Enabled	Degraded	External endpoint	North Europe
gsrindiavm	Enabled	Degraded	External endpoint	South India
gsreastvm	Enabled	Degraded	External endpoint	East US
gsrausvm	Enabled	Online	External endpoint	Australia East

```
PS C:\Users\en12bfb> Invoke-WebRequest 'http://gsreuropevm.northeurope.cloudapp.azure.com/Probe' -MaximumRedirection 0 -
ErrorAction SilentlyContinue | Select-Object StatusCode,StatusDescription
Invoke-WebRequest : HTTP Status 404 - Not Found
type Status report
messageNot Found
descriptionThe requested resource is not available.
GlassFish Server Open Source Edition 4.1.1
At line:1 char:1
+ Invoke-WebRequest 'http://gsreuropevm.northeurope.cloudapp.azure.com/Probe' -Max ...
+ ~~~~~
+ CategoryInfo          : InvalidOperation: (System.Net.HttpWebRequest:HttpWebRequest) [Invoke-WebRequest], WebExc
  eption
+ FullyQualifiedErrorId : WebCmdletWebResponseException,Microsoft.PowerShell.Commands.InvokeWebRequestCommand
```

We can also change end points to be of type 'Azure endpoint' by selecting the respective public IP address.

Search resources, services and docs

Subhash.Gunda@Mc...
MCKESSON CORPORATION

Home > All resources > gstrtm - Endpoints > Add endpoint > Resource

Add endpoint

Type

Azure endpoint

* Name

gsrausvm

Target resource type

Public IP address

* Target resource

Choose a public IP address

☐ Add as disabled

Resource

	gsreastServerInterface gsrdeepazureeast	East L
	skkvm-ip skkresgrp	East L
	gsreuropeServerInterface gsrdeepazureeurope	North Euro
	sbweb1-ip SB11LB	South Central L
	gsrausServerInterface gsrdeepazureaus	Australia Ea
	gsrindiaServerInterface gsrdeepazureindia	South Ind
	buntu-ip buntu	West L