

Deploying Azure protected Geo-Redundant Solution having path based routing

Write Up:

To ensure high availability and disaster recovery, an Azure-based geo-redundant solution is deployed across multiple regions. The architecture leverages Azure Traffic Manager for global load balancing, directing traffic to the nearest available region based on performance and priority settings.

Within each region, an Azure Application Gateway is configured with path-based routing, ensuring efficient traffic distribution to different backend services. This allows requests to be routed dynamically based on URL paths, optimizing performance and scalability.

For data redundancy, Azure Storage with geo-replication ensures continuous data availability, while Azure Site Recovery (ASR) is implemented for failover support. Network security is enforced using Network Security Groups (NSGs) and Azure Firewall, securing inbound and outbound traffic.

The deployment is validated through load testing and failover simulations, ensuring seamless performance and resilience against regional failures. This setup guarantees a robust, scalable, and secure cloud infrastructure.

All services > Resource groups >

Create a resource group

×

Basics Tags Review + create

Resource group - A container that holds related resources for an Azure solution. The resource group can include all the resources for the solution, or only those resources that you want to manage as a group. You decide how you want to allocate resources to resource groups based on what makes the most sense for your organization. [Learn more](#)

Project details

Subscription * ⓘ

Resource group * ⓘ

Resource details

Region * ⓘ

[Review + create](#) [< Previous](#) [Next : Tags >](#)

Home > Create a resource >

Create Traffic Manager profile

×

Name * [Home](#) > [TyrellCrop](#)

TyrellCrop | Configuration ☆ ...

×

Routing

Subscri

Resource

Resource

Settings

Configuration

Real user measurements

Traffic view

Endpoints

Properties

Locks

Monitoring

Alerts

Metrics

Diagnostic settings

Logs

[Save](#) [Discard](#)

Routing method ⓘ

DNS time to live (TTL) * ⓘ seconds

Endpoint monitor settings ⓘ

Protocol

Port *

Path * ⓘ

Custom Header settings ⓘ

⚠ Do NOT input sensitive customer data in this field (i.e. APIKeys, Secrets, and Auth tokens etc.).

Expected Status Code Ranges (default: 200) ⓘ

Fast endpoint failover settings

Probing interval ⓘ

Create application gateway



⚠ Changes you make on this tab may affect any configuration you've done on other tabs. Review all options prior to creating the application gateway.

✓ Basics ✓ Frontends ✓ Backends ✓ Configuration ✓ Tags ⌚ Review & create

An application gateway is a web traffic load balancer that enables you to manage traffic to your web application. [Learn about creating application gateway](#) ⓘ

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources. ⓘ

Subscription * ⓘ	<input type="text" value="Free Trial"/>
Resource group * ⓘ	<input type="text" value="TyrellCropRG"/>

[Create new](#)

Instance details

Application gateway name *	<input type="text" value="TyrellCrop"/>
Region *	<input type="text" value="East US"/>
Tier ⓘ	<input type="text" value="Standard V2"/>
Enable autoscaling	<input checked="" type="radio"/> Yes <input type="radio"/> No

[Previous](#)

[Next : Frontends >](#)

Home > Create a resource >

Create application gateway

✓ Validation passed

✓ Basics ✓ Frontends ✓ Backends ✓ Configuration ✓ Tags **Review + create**

Basics

Subscription	Free Trial
Resource group	TyrellCropRG
Name	TyrellCrop
Region	East US
Tier	Standard_v2
Enable autoscaling	Enabled
Minimum instance count	2
Maximum instance count	10
Availability zone	Zones 1, 2, 3
HTTP2	Enabled
Virtual network	(new) TyrellCrop
Subnet	(new) default (10.0.0.0/24)
Subnet address space	10.0.0.0/24

Frontends

Create

Previous

Next

Download a template for automation

Home >

Microsoft.ApplicationGateway-20240320153055 | Overview

Deployment

Search Delete Cancel Redeploy Download Refresh

Overview

Inputs

Outputs

Template

✓ Your deployment is complete

Deployment name : Microsoft.ApplicationGateway-20240320153055
Subscription : Free Trial
Resource group : TyrellCropRG

Start time : 3/20/2024, 3:45:20 PM
Correlation ID : e2424c11-a016-4f39-84c6-e44cbb77a06f

> Deployment details

✓ Next steps

Go to resource group

Give feedback

Tell us about your experience with deployment



Cost management

Get notified to stay within your budget and prevent unexpected charges on your bill.

Set up cost alerts >



Microsoft Defender for Cloud

Secure your apps and infrastructure
Go to Microsoft Defender for Cloud >

Free Microsoft tutorials

Start learning today >

Work with an expert

Azure experts are service provider

TyrellCropListen ...

TyrellCrop

Listener name ⓘ

TyrellCropListen

Frontend IP * ⓘ

Public

Protocol ⓘ

☒ HTTP ☐ HTTPS

Port * ⓘ

8080

Associated rule

[Route](#)

Listener type ⓘ

☒ Basic ☐ Multi site

Custom error pages

Show customized error pages for different response codes generated by Application Gateway. This section lets you configure Listener-specific error pages. [Learn more](#) ⓘ

Bad Gateway - 502

Enter Html file URL

Save

Cancel

Edit backend pool



A backend pool is a collection of resources to which your application gateway can send traffic. A backend pool can contain virtual machines, virtual machines scale sets, IP addresses, domain names, or an App Service.

Name

Add backend pool without targets

☐ Yes ☒ No

Backend targets

0 items

Target type	Target
<input type="text" value="IP address or FQDN"/>	<input type="text"/>

Associated rule

Route

TyrellCrop | Rules

Application gateway



[+ Routing rule](#) [❤ Backend health](#) [🗨 Feedback](#)

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

Search rules			
Name	Type	Listener	Priority
Route	Basic	TyrellCropListen	500
...			

Home > Microsoft.ApplicationGateway-20240320153055 | Overview > TyrellCropRG > TyrellCrop

TyrellCrop | Rules

Application gateway

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Private link

SSL settings

Listeners

Rules

Rewrites

Health probes

Properties

Locks

Monitoring

Routing rule

Backend health

Feedback

Search rules

Name

Route

Add a routing rule

TyrellCrop

Configure a routing rule to send traffic from a given frontend IP address to one or more backend targets. A routing rule must contain a listener and at least one backend target.

Rule name *

RouteRule

Priority *

50

* Listener

Backend targets

A listener "listens" on a specified port and IP address for traffic that uses a specified protocol. If the listener criteria are met, the application gateway will apply this routing rule. ⓘ

Listener *

TyrellCropListener

Add

Cancel

Home > Microsoft.ApplicationGateway-20240320153055 | Overview > TyrellCropRG > TyrellCrop

TyrellCrop | Rules

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+ Routing rule

Backend health

Feedback

Search rules

Name

Route

Add a routing rule

TyrellCrop

Configure a routing rule to send traffic from a given frontend IP address to one or more backend targets. A routing rule must contain a listener and at least one backend target.

Rule name *
RouteRule

Priority *
50

* Listener

* Backend targets

Choose a backend pool to which this routing rule will send traffic. You will also need to specify a set of Backend settings that define the behavior of the routing rule.

Target type
☒ Backend pool ☐ Redirection

Backend target *
Backend

Backend settings *
backendsettings

Path-based routing

You can route traffic from this rule's listener to different backend targets based on the URL path of the request. You can also apply a different set of Backend settings based on the URL path.

Path based rules

Path	Target name	Backend setting name	Backend pool
/image/*	IMG	backendsettings	Backend

Add a path-based rule

Add Cancel

Home > Microsoft.ApplicationGateway-20240320153055 | Overview > TyrellCropRG > TyrellCrop

TyrellCrop | Rules

Application gateway

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Tags

Diagnose and solve problems

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Backend settings

Frontend IP configurations

Private link

SSL settings

Listeners

Rules

Rewrites

Health probes

Properties

+ Routing rule

Backend health

Feedback

Search rules

Name

Route

Add a routing rule

TyrellCrop

Discard changes and go back to routing rules

Target type
☒ Backend pool ☐ Redirection

Path *
/image/*

Target name *
IMG

Backend settings *
backendsettings

Backend target *
Backend

TyrellCrop | Subnets

Virtual network

- Overview
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- Access control (IAM)
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- Diagnose and solve problems
- Settings
 - Address space
 - Connected devices
 - Subnets
 - Bastion
 - DDoS protection
 - Firewall
 - Microsoft Defender for Cloud
 - Network manager
 - DNS servers
 - Peerings
 - Service endpoints

+ Subnet + Gateway subnet Refresh Manage users Delete

Search subnets						
Name ↑↓	IPv4 ↑↓	IPv6 ↑↓	Available IPs ↑↓	Delegated to ↑↓	Security group ↑↓	Route table ↑↓
default	10.0.0.0/24	-	availability dependent on dy...	-	-	...

AppEnd

TyrellCrop



Name

AppEnd

Copy to clipboard



Subnet address range * ⓘ

10.0.1.0/24

10.0.1.0 - 10.0.1.255 (251 + 5 Azure reserved addresses)

☐ Add IPv6 address space ⓘ

NAT gateway ⓘ

None



Network security group

None



Route table

None



SERVICE ENDPOINTS

Create service endpoint policies to allow traffic to specific azure resources from your virtual network over service endpoints. [Learn more](#)

Services ⓘ

0 selected



Save

Cancel

Give feedback

Home > TyrellCropRG > TyrellCrop

TyrellCrop | Subnets

Virtual network

Search Subnet Gateway subnet Refresh Manage users Delete

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Address space

Connected devices

Subnets

Bastion

DDoS protection

Firewall

Microsoft Defender for Cloud

Network manager

DNS servers

Peerings

Service endpoints

Search subnets

Name ↑↓	IPv4 ↑↓	IPv6 ↑↓	Available IPs ↑↓
default	10.0.0.0/24	-	availability dependent on dy...
AppEnd	10.0.1.0/24	-	251

Add subnet

Name *

IMGEnd

Subnet address range *

10.0.2.0/24

10.0.2.0 - 10.0.2.255 (251 + 5 Azure reserved addresses)

☐ Add IPv6 address space

NAT gateway

None

Network security group

None

Route table

None

SERVICE ENDPOINTS

Create service endpoint policies to allow traffic to specific Azure resources from your virtual network over service endpoints. [Learn more](#)

Services

0 selected

Save

Cancel

[Give feedback](#)

Home > Create a resource > Marketplace > Availability Set

Create availability set

i We recommend that new customers choose virtual machine scale sets with flexible orchestration mode for high availability with the widest range of features. Virtual machine scale sets allow VM instances to be centrally managed, configured, and updated, and will automatically increase or decrease the number of VM instances in response to demand or a defined schedule. Availability sets only offer high availability.

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *

Free Trial

Resource group *

TyrellCropRG

[Create new](#)

Instance details

Name *

TyrellApp-AS

Region *

(US) East US

Fault domains

2

Update domains

5

Use managed disks

No (Classic)

Yes (Aligned)

[Review + create](#)

[< Previous](#)

[Next: Advanced >](#)

Create availability set

• • • • •

✓ Validation passed

Basics Advanced Tags Review + create

Basics

Subscription	Free Trial
Resource group	TyrellCropRG
Region	East US
Name	TyrellIMG-AS
Fault domain count	2
Update domain count	5
Use managed disks	No (Classic)

Advanced

Proximity placement group	None
---------------------------	------

Tags

(none)

*** Submitting deployment...

Submitting the deployment template for resource group 'TyrellCropRG'.

Create

< Previous

Next >

Download a template for automation

Create a virtual machine



Click here to try out the Azure Copilot for additional recommendations while creating a virtual machine →

11/19/2023, 1:45:09 PM: Select the details tab to review & create or provision a virtual machine with various parameters or review details tab for full customization. [Learn more](#)

This subscription may not be eligible to deploy VMs of certain sizes in certain regions.

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *	Free Trial
Resource group *	TyrellCropRG
	Create new

Instance details

Virtual machine name *	TyrellAppVM01
Region *	(US) East US
Availability options	Availability set

Create a virtual machine



Click here to try out the Azure Copilot for additional recommendations while creating a virtual machine →

You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. [Learn more](#)

Size * Standard_DS1_v2 - 1 vcpu, 3.5 GiB memory (¥7,652.25/month)
 See all sizes

Enable Hibernation (preview)
 To enable Hibernation, you must register your subscription. [Learn more](#)

Administrator account

Username * sysadmin
 Password *
 Confirm password *

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

< Previous Next: Disks > Review + create

Give feedback

Create a virtual machine



Basics Disks Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

VM disk encryption

Azure disk storage encryption automatically encrypts your data stored on Azure managed disks (OS and data disks) at rest by default when persisting it to the cloud.

Encryption at host
 Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

OS disk

OS disk size Image default (127 GiB)
 OS disk type * Standard HDD (locally-redundant storage)
 The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.
 Delete with VM
 Key management Platform-managed key

< Previous Next: Networking > Review + create

Give feedback

Create a virtual machine

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution. [Learn more](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network *	<div>ynetCloud</div> <div>Create new</div>
Subnet *	<div>ApplNet (10.0.1.0/24)</div> <div>Manage subnet configuration</div>
Public IP *	<div>ipnet ThriftAppVMD-ip</div> <div>Create new</div>
NIC network security group *	<div><input type="radio"/> None</div> <div><input checked="" type="radio"/> Iamc</div> <div><input type="radio"/> Iamc-ud</div>
Public inbound ports *	<div><input type="radio"/> None</div> <div><input checked="" type="radio"/> Allow selected ports</div>
Select inbound ports *	<div>RDP (3389)</div>

This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

Delete public IP and NIC when VM is deleted

Enable accelerated networking

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#)

Load balancing options	<div><input checked="" type="radio"/> None</div> <div><input type="radio"/> Azure load balancer</div> <div><input type="radio"/> Application gateway</div>
------------------------	--

Manages all TCP/UDP network traffic, port forwarding, and outbound flow.

Manages traffic load balancing for HTTP/HTTPS with (or without) cookies, SSL...

Validation passed

[< Previous](#)
[Next >](#)
[Create](#)
[Download a template for automation](#)
[Give feedback](#)

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Network

Network settings

Load balancing

Application security groups

Network manager

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Configuration

Advisor recommendations

Properties

Locks

Availability > scale

Size

Availability > scaling

Security

Identity

Microsoft Defender for Cloud

Backup > disaster recovery

Essentials

Resource group [Open Cloud](#)

Status: Running

Location: East US

Subscription [Open](#): [Free Trial](#)

Subscription ID: P58d71A-1b65-42D5-8628-89758769C3

Tags [Add](#): [Add more](#)

Properties

Monitoring

Capacities [3](#)

Recommendations

Tutorials

Virtual machine

Computer name

Operating system

Image publisher

Image offer

Image plan

VM generation

VM architecture

Agent status

Agent version

Information

Host group

Host

Proximity placement group

Creation status

Capacity reservation group

Disk controller type

Thr1Agp1001

Windows (Windows Server 2016 Datacenter)

MicrosoftWindowsServer

WindowsServer

2016-datacenter-gen2standard

V2

x64

Ready

2.741481.1095

Disabled

-

-

-

N/A

SCI

Availability > scaling

Availability zone: 3093

Availability set: THB1LAPR-AS

Scale Set

Fault domain

Security type

Antivirus

Antimalware

Windows Defender

Operating system

Size

Public IP address

Virtual network/subnet

DNS name

Health state

Windows (Windows Server 2016 Datacenter)

Standard DS1 v2 (1 vcpu, 3.5 GB memory)

[62.181.74.77](#)

[TypeConfigured](#)

[GetConfigured](#)

-

Networking

Public IP address

Public IP address (IPv6)

Private IP address

Private IP address (IPv6)

Virtual network/subnet

DNS name

62.181.74.77 (Network interface type=api-vnet1001)

-

10.0.1.4

-

TypeConfigApplied

Configure

Size

Size

vCPUs

RAM

Standard DS1 v2

1

3.5 GB

Disk

OS disk

Encryption at host

Secure disk encryption

Spherical CSI disk

Data disks

Thr1Agp1VMDiskDataL_135681872912368564570226a476179

Disabled

Not enabled

N/A

0

Auto-shutdown

Auto-shutdown

Scheduled shutdown

Not enabled

-

Secure Spot

Secure Spot



-



JSON view

[Click here to try out the Azure Copilot for additional recommendations while creating a virtual machine](#) →

Project details



Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.



Subscription *  Free Trial 



Resource group *  SynapseRG 



[Create new](#)



Instance details

Virtual machine name *  SynapseVM01 



Region *  US East US 

Availability options  Availability set 




 Based on your input, you might want to consider creating this resource as a virtual machine scale set, which allows you to manage, configure and scale load balanced virtual machines. [Configure VMSS](#) 

Availability set *  SynapseAS 


[Create new](#)

Security type  Trusted launch virtual machines 


[Configure security features](#)


Image *   Windows Server 2019 Datacenter - x64 Gen2 (free services engine) 



[See all images](#) | [Configure VM generation](#)



VM architecture  ☐ ARM64

☒ x64

 ARM64 is not supported with the selected image.

Run with Azure Spot discount  ☐

 You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. [Learn more](#) 

Size *  Standard_DS1_v2 - 1 vcpu, 3.5 GB memory (RT652.2L/month) 

[< Previous](#) [Next: Disk >](#) [Review & create](#)

Create a virtual machine

Validation passed

Basics

Subscription

Free Trial

Resource group

Type1000001

Virtual machine name

Type1000001

Region

East US

Availability options

Availability set

Availability set

Type1000001

Security type

Trusted launch virtual machines

Enable secure boot

Yes

Enable vTPM

Yes

Integrity monitoring

Yes

Image

Windows Server 2019 Datacenter - Gen2

VM architecture

x64

Size

Standard D5-1v2 (1 vcpu, 3.5 GB memory)

Username

system

Public inbound ports

RDP

Already have a Windows license?

No

Azure Spot

No

Disks

OS disk size

Image default

OS disk type

Standard HDD LRS

Use managed disks

Yes

Detach OS disk with VM

Enabled

Ephemeral OS disk

No

Networking

Virtual network

Type1000001

Subnet

AppNet (10.1.0.0/24)

Public IP

(new) Type1000001-ip

Accelerated networking

Off

Place this virtual machine behind an existing load balancing solution?

No

Disable public IP and NIC when VM is deleted

Disabled

Management

<https://portal.azure.com/#>

[Download a template for automation](#) [Give feedback](#)

TyrellMGVM01

Virtual machine

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Availability + scale

Size

Availability + scaling

Security

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Microsoft Defender for Cloud

Backup + disaster recovery

Connect > Start > Stop > Help > Helpmate (preview) > Capture > Delete > Refresh > Open in mobile > Feedback > CUI / PS

TyrellMGVM01 virtual machine agent status is not ready. Troubleshoot the issue >

Essentials

Resource group [local](#) > [TyrrellCloud](#)

Status

Location

Subscription [local](#) > [Free Trial](#)

Subscription ID : F56874-d9d1-4201-8629-6975875d51

Tags [Add](#)

[Add tags](#)

Operating system

Size

Public IP address

Virtual network/subnet

DNS name

Health state

JSON View

Properties > Monitoring > Capabilities > Recommendations > Tutorials

Virtual machine

Computer name	TyrellMGVM01
Operating system	Windows
Image publisher	MicrosoftWindowsServer
Image offer	WindowsServer
Image plan	2019-datacenter-gen2second
VM generation	V2
VM architecture	x64
Agent status	Not ready
Agent version	Unknown
Hyper-V	Disabled
Host group	-
Host	-
Proximity placement group	-
Creation status	N/A
Capacity reservation group	-
Disk controller type	SCSI

Availability + scaling

Availability zone (AZs)

Availability set

Scale set

Fault domain

Networking

Public IP address

Public IP address (IPv6)

Private IP address

Private IP address (IPv6)

Virtual network/subnet

DNS name

Size

Size

vCPUs

RAM

OS disk

Encryption at rest

Secure boot

OS disk

OS disk

Auto-shutdown

Auto-shutdown

Scheduled shutdown

Edit backend pool

X

A backend pool is a collection of resources to which your application gateway can send traffic. A backend pool can contain virtual machines, virtual machines scale sets, IP addresses, domain names, or an App Service.

Name

Backend

Add backend pool without targets

Yes No

Backend targets

2 items

Target type	Target	
Virtual machine	tyrellapp001550	+
Virtual machine	tyrelling001483 (10.0.1.5)	+
IP address or FQDN		

Associated rule

Route

RouteRule

Save Cancel

Edit backend pool

X

A backend pool is a collection of resources to which your application gateway can send traffic. A backend pool can contain virtual machines, virtual machines scale sets, IP addresses, domain names, or an App Service.

Name

Backend

Add backend pool without targets

Yes No

Backend targets

2 items

Target type	Target	
Virtual machine	tyrellapp001550	+
Virtual machine	tyrelling001483	+
IP address or FQDN		

Associated rule

Route

RouteRule

Save Cancel

TyrellCrop | Endpoints

Traffic Manager profile

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+ Add Refresh

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Export templates

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Resource health

Support • Troubleshooting

Search endpoints

Name

Status

Monitor status

Type

No results

Add endpoint

TyrellCrop

Type *

Search endpoints

Name *

Enable Endpoint

Target resource type

Cloud service

Target resource *

Choose a cloud service

Custom header settings

Configure in this format: `header: value`

Do NOT input sensitive customer data in this field (e.g. APIKeys, Secrets and Auth tokens etc.)

Submit IPv6 routing settings

Health Checks

Enable

Health check will determine if traffic can be served to the endpoint.

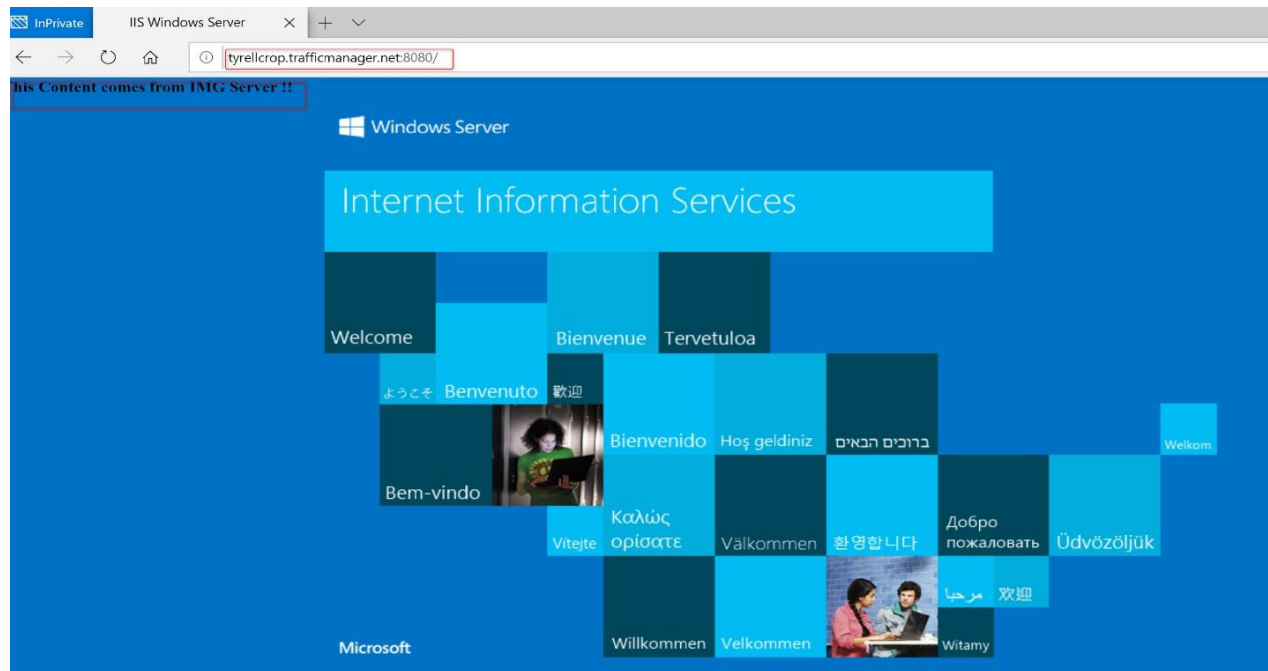
Always serve traffic

No health check will run. Traffic will be always served to the endpoint.

Add

Test the Functionality

<http://tyrellcrop.trafficmanager.net:8080/> (response from TYrellAppVm01)



<http://tyrellcrop.trafficmanager.net> (response from TYrellIMGVm01)

