

ZERO TO HERO

END USER COMPUTING



27/06/2018 · BY SAADALLAH CHEBARO

Deploying NetScaler HA Template on Microsoft Azure “Ultimate Guide”



Introduction:

Citrix NetScaler on Microsoft Azure has gone a long way from its early beginnings of single IP mode with no High Availability to Multi NIC/IP mode with Advanced High Availability all of which is driven by continuous Microsoft Azure enhancements to their underlying cloud infrastructure and services knowing that NetScaler on Azure is to some extent the same NetScaler we know on-premises.

NetScaler HA on Microsoft Azure has been a controversial subject due to the nature of how NetScaler networking requirements work with Azure infrastructure network architecture thus the many options of deployment and subsequently considerations, requirements, limitations, and prerequisites. I have been trying to document how NetScaler HA can be configured on Azure for some time now through these earlier blog posts:

Citrix NetScaler HA on Microsoft Azure “The Multi NIC/IP Untold Truth ”

Configuring Multiple VIPs for Citrix NetScaler VPX on Microsoft Azure ARM Cloud Guide

Configuring Active-Active Citrix NetScaler Load Balancing on Microsoft Azure Resource Manager

Configuring Multiple IP Addresses for Citrix NetScaler VPX on Microsoft Azure Resource Manager

Citrix NetScaler VM Bandwidth Sizing on Microsoft Azure

NetScaler HA on Microsoft Azure “Planned Maintenance”

As Azure keeps evolving, so are the ways NetScaler can be deployed including in High Availability Active-Active or Active-Passive mode, so in our last UAE Citrix User Group Community meeting, I conducted a hands-on presentation/demonstration on the various ways HA can be configured for NS on Azure including the latest HA Template Active-Passive considerations.



Many found it hard to grasp and so did I until recently, so I have decided to document various ways discussed on top of demonstrate how to configure the HA template end-

end because Citrix documentation/Reference Architecture for some reason cuts off in a critical stage where one needs to understand what are the next steps to establish services on this HA deployment.



Citrix NetScaler on Microsoft Azure Options:

Lets discuss in brief the various ways NetScaler can be configured on Azure with HA options and eventually move on to the hands-on demonstration of the recent published HA template with Active-Passive mode (INC & ALB DSR), kindly go through the previous blog posts mentioned to get a detailed description on some of the options below:

Citrix NetScaler on Microsoft Azure Options

- NetScaler VPX with Single IP Mode
- NetScaler VPX with Single IP Mode HA
- NetScaler VPX with Multi IP/NIC Mode
- NetScaler VPX with Multi IP/NIC Mode HA Active-Active
- NetScaler VPX with Multi IP/NIC Mode HA Active-Passive
- NetScaler VPX with Multi IP/NIC Mode HA Active-Passive (HA Template)
- To HA or NoT to HA , That is the Question !



Before Microsoft Azure supported multi IPs/NICs on a single VM, NetScaler ran in single IP mode which means your subnet IP, NetScaler IP, and VIPs are all using one IP which is the primary IP assigned to the NIC attached to the NetScaler (since only on VM and a single IP could be assigned). In order to host services on the NS, the same IP is used with different ports to distinguish them.

This meant that If my NetScaler IP is 10.0.0.1 and I wanted to add an IIS 80 load balancer for example, I would assign it the same IP address but choose a different port such as 15001 . With Single IP mode, some well known ports are reserved to for NetScaler use so they cannot be assigned like 80 or 443.

1. The NetScaler virtual machine reserves the following ports. You cannot define these as private ports when using the Public IP address for requests from the internet.

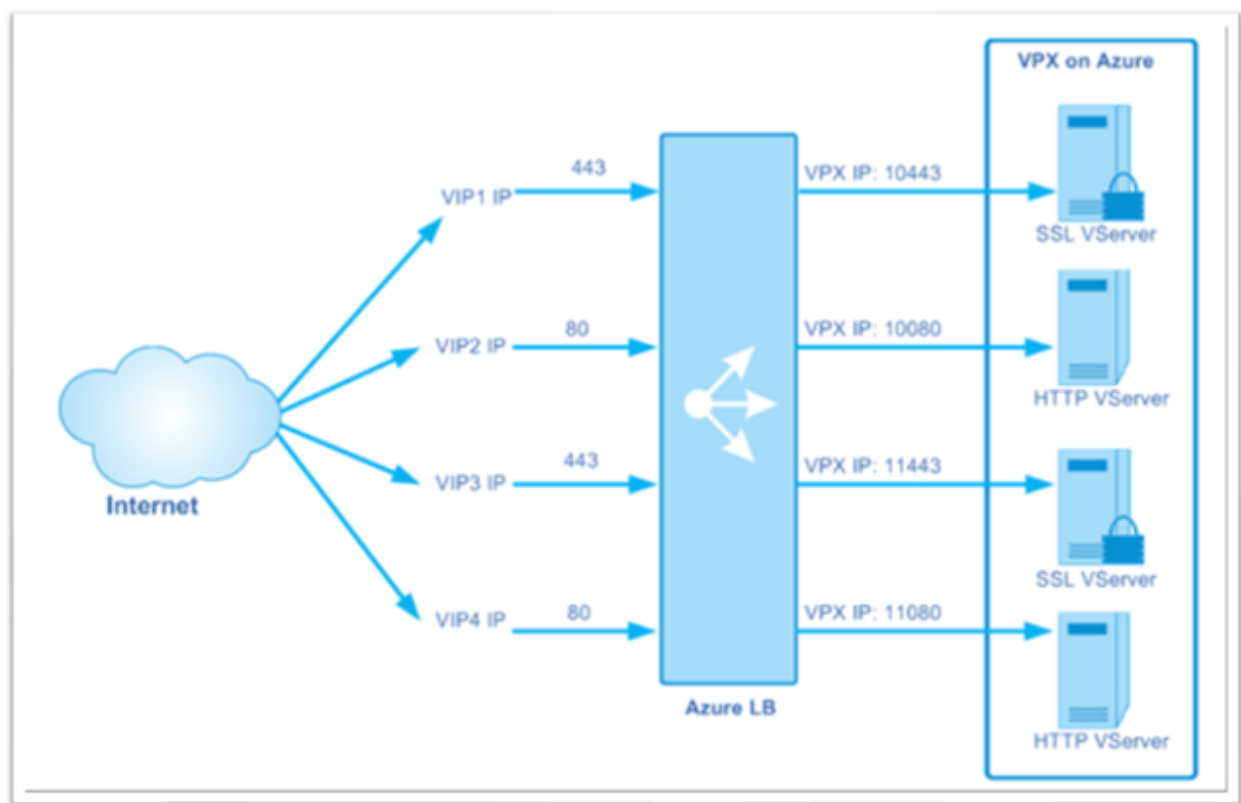
Ports 21, 22, 80, 443, 8080, 67, 161, 179, 500, 520, 3003, 3008, 3009, 3010, 3011, 4001, 5061, 9000, 7000.

2. The Azure architecture does not accommodate support for the following NetScaler features:

- Clustering
- IPv6
- Gratuitous ARP (GARP)
- L2 Mode
- Tagged VLAN
- Dynamic Routing
- Virtual MAC (VMAC)
- USIP
- Jumbo Frames

VPX Model	License Type
VPX10	Standard, Enterprise, Platinum
VPX200	Standard, Enterprise, Platinum
VPX1000	Standard, Enterprise, Platinum
VPX3000	Standard, Enterprise, Platinum

The issue here was that users would have to access these services on their assigned ports such as <http://10.0.0.1:15001> and that was unacceptable so that way around that was to front the NetScaler with an Azure load balancer not because we want load balancing (well we do but more on that later) but because Azure ALB is capable of PAT/NAT while Azure NSG “Network Security Group” is not. The ALB would have an IP and can use a well known port, 80 in our case, and would PAT to port 15001 to access the service.

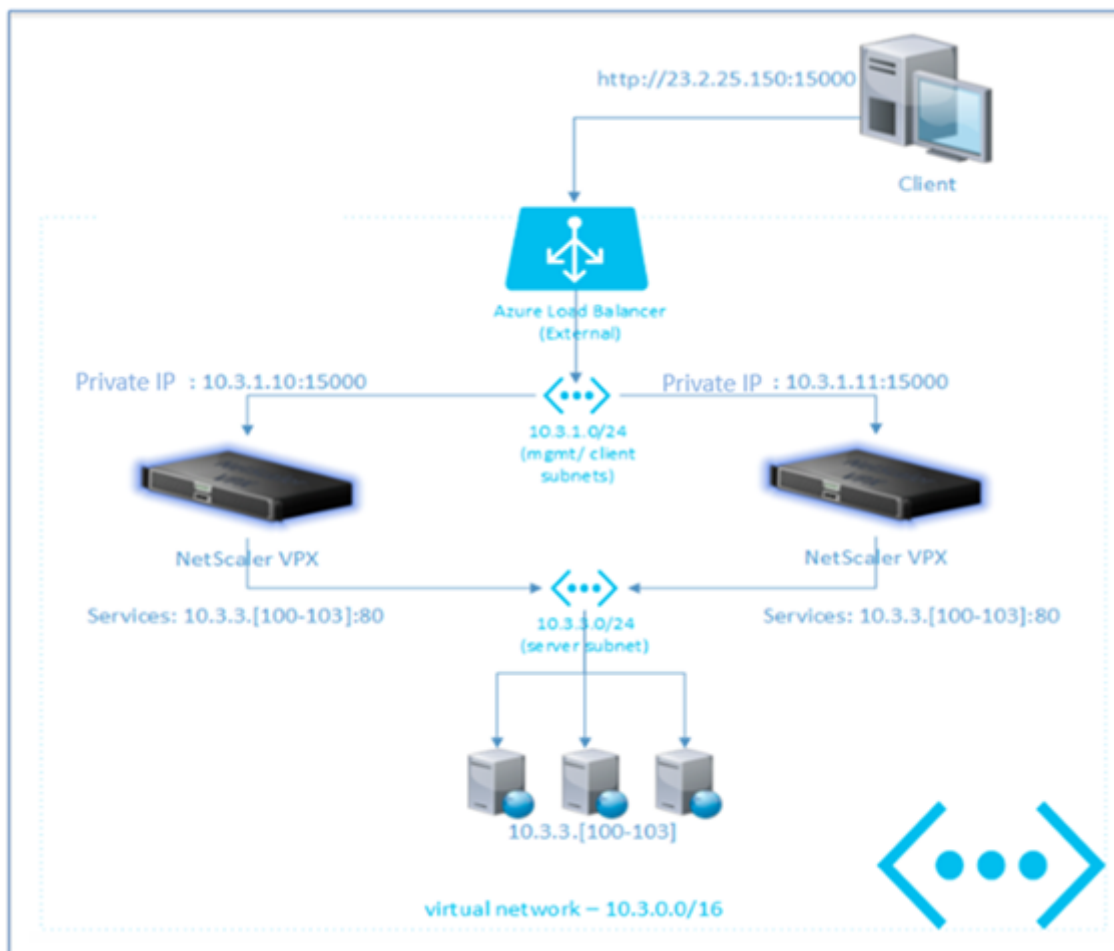


Users are provided with the IP/Hostname of the Azure load balancer frontend IP with port 80 and the ALB will PAT this port to 15001 to the service hosted non NetScaler, which means that for every virtual server that is hosted on NetScaler, you needed an Azure ALB Frontend IP/ Backend Pool / and load balancing rule unless your users are fine with using the custom port assigned to that virtual server directly on NetScaler.

NetScaler VPX Single IP Mode HA

Same requirements apply when deploying NetScaler Single IP in High Availability mode on Azure as discussed above but with different considerations for this scenario. To cut the story short, SNIPs cannot float on Azure network because an IP can be statically assigned to an individual NIC which means that every NetScaler must have its own SNIP, and since these NS appliances are in single IP mode, the only option here is to have one NIC/IP per NS.

Though NetScaler documentation has been updated stating that Active-Passive is supported in this scenario, I do not see how that is possible unless it is Multi IP mode (even if that IP is the LB Frontend IP and INC/DSR is used) but Single NIC which yes would work but also has more considerations than stated (documentation is a disaster). For Single IP mode that being single NIC/IP, only Active-Active is supported. If you want to try Active-Passive, then refer to the NS HA Template description section and apply the same conc here but would have to be done manually and I have not tested it because it makes sense to do that in Single IP mode.



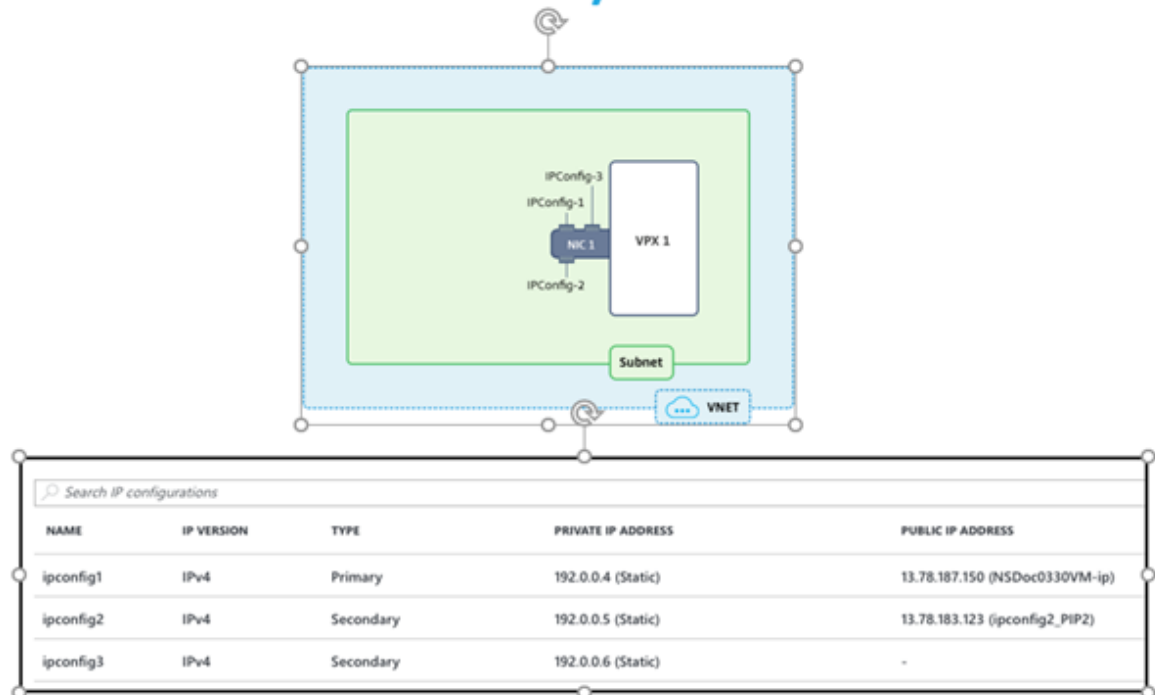
Active-Active HA means that both NetScaler's are configured independently with same exact configuration using different IP obviously and then Azure ALB is used to load balance requests between both NetScaler's. I have documented the configuration required for this in an earlier post and the ALB configuration applies to single and Multi NIC/IP Active-Active NS as long as the backend pools and ports are specified correctly.

There is a mix up in Citrix documentation on the internal and external architecture pictures referenced with its related technical writeup, so to clarify, if a service (LB or AG or ...) is going to be access from the outside using a public IP then an External ALB is required and if a service is going to be accessed from the inside using a private IP then an Internal ALB is required. If a service is required to be access from both outside and inside then the same service will require an external ALB and internal ALB configured independently.

NetScaler VPX Multi NIC/IP Mode

After Azure released official support for Multi NIC/IP support for Azure Virtual Machines, NetScaler would not be limited to single IP mode given that the limitation was not NetScaler related to begin with. Adding multiple IPs on the same NIC can be done directly from GUI and then each IP can be assigned to SNIP and VIPs respectively on NS though always the first primary IP assigned to a NIC is the NetScaler IP NSIP.

NetScaler VPX with Multi IP/NIC Mode



For adding multiple NICs, GUI is not supported specifically for NetScaler VMs so couple of PowerShell commands should be used to add the NIC. After the NIC has been added, IPs can be assigned through Azure GUI same as for primary NIC. For management purposes, the public IP would be assigned on the primary IP since by default it is the NSIP. One note here is that with Multi IP mode (Single NIC) when a port is opened on the NSG, the port would be opened to all IPs associated with that NIC so be careful here when segregation of traffic is required (Multi NIC mode, each NIC has its own NSG).

NetScaler VPX with Multi IP/NIC Mode

```
Login-AzureRmAccount
```

```
Register-AzureRmProviderFeature -FeatureName AllowMultipleIpConfigurationsPerNic -ProviderNamespace Microsoft.Network
```

```
Register-AzureRmProviderFeature -FeatureName AllowLoadBalancingonSecondaryIpConfigs -ProviderNameSpace Microsoft.Network
```

```
Register-AzureRmResourceProvider -ProviderNamespace Microsoft.Network
```

```
$netscalervm=Get-AzureRmVM -Name "VPX-NAME" -ResourceGroup "SUBSCRIPTION-NAME"
```

```
Add-AzureRmVMNetworkInterface -VM $netscalervm -Id "VPX PROPERTIES RESOURCE ID "
```

```
$netscalervm.NetworkProfile.NetworkInterfaces[0].Primary=$true
```

```
$netscalervm.NetworkProfile.NetworkInterfaces
```

```
Update-AzureRmVM -VM $netscalervm -ResourceGroupName "Resource-group-name"
```

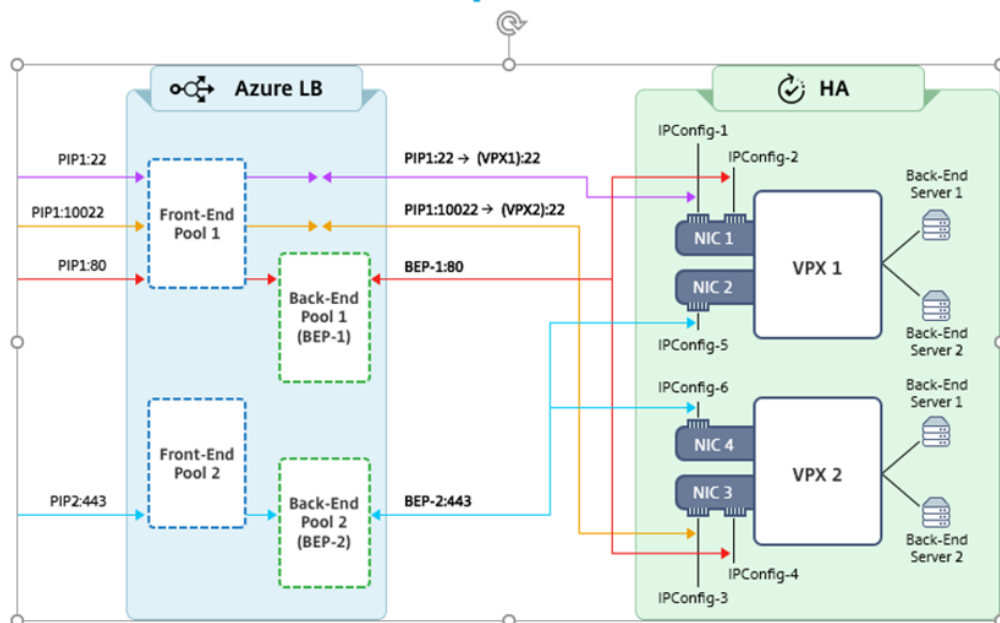
For Services that require external access, a public IP is assigned directly to the VIP that is hosting the service which would be an secondary IP on the NS NIC, after which specified port is opened on the NSG to allow access from external users. Note here that

because we have multiple IPs, the limitation of well known ports that existed with single IP mode does not apply anymore and services can be created on any well known port. Also remember that you need a Subnet IP for every NIC added.

NetScaler VPX Multi NIC/IP HA Active-Active Mode

Active-Active HA for NetScaler VPX Multi NIC/IP is fairly simple as long as Azure Load Balancer Backend Pools are configured accordingly and assigned to the load balancer depending on services required. In this scenario each NetScaler is configured independently with exact same configuration except for different IPs and Azure ALB is used to distribute traffic between NS appliances.

NetScaler VPX with Multi IP/NIC Mode HA Active-Active



Every service that is going to be hosted on NetScaler will require to be fronted by an Azure Load Balancer that being internal or external resources. Backend Pools will vary because each should connect to the IP that is hosting the service for example an load balancer virtual server. A monitor should also be in place with the port assigned to that service. This is required so that Azure LB fails over a service if its stop working while both NetScaler's are still functional.

End result would be configure both NetScaler's with same virtual servers then for each virtual server create an ALB (external or internal depending on type of access) that would front it so users will get the ALB IP/host not the service hosted on NS. I know its a hassle load balancing a load balanced virtual server and creating a specific monitor/backend Pool/Front End Pool/Load Balancing Rule for each.

NetScaler VPX Multi NIC/IP HA Active-Passive

So why do we have an Active-Passive section and another section with Active-Passive (HA Template), well because both work differently and have some varying configuration and requirements. In an legacy Active-Passive deployment, or to make it simpler, an standard on-premises Active-Passive deployment, VIPs vary and SNIPs float between NetScaler's while on NS is active and another is passive.

On Azure we cannot float IPs not VIPs nor SNIPs assigned to Azure VM NICs so if we would just enable HA Active-Passive on Azure NS out of the box, the configuration would be successful but none of the services when Primary NS is failed over would work because those VIPs (that were configured on primary NS and synced to secondary NS) do not actually exist on the NIC assigned to the secondary passive NS.

To overcome this we would have to create two virtual servers from every service we want to configure on NS, one with the primary NS VIP and one with the secondary NS VIP then use Azure Load Balancer to load balance those requests with the required Frontend IP/Back end Pools/LB Rules/Monitor. For example, we want to load balance IIS on port 80 , NS1 Primary has a VIP of 10.0.1 and NS2 Secondary has a VIP of 10.0.1.1.

On NS1 which is primary (syncs the config to NS2 secondary) we configure two load balancer virtual servers for the SAME service, one with IP 10.0.0.1 and one with IP 10.0.1.1 . What happens is that ALB would forward requests to Primary NS1 virtual server 10.0.0.1 (based on ALB backend pool and monitor) and when it fails and secondary NS2 takes over the 10.0.1.1 virtual server is now taking the requests (because this IP actually exists on NS2 NIC then it would work).

In this configuration, DSR is not required when configuring the load balancing rules but still a hassle that two virtual servers need to be created for every service. Also note and don't forget that NSG needs to be configured on both NetScaler's no matter if Active-Active or Active-Passive is configured.

To Configure this would require a minimum of 2 NICs on every NetScaler's and 2 subnets with all related Azure Load Balancer config so the best approach would be to configure the HA template which would create all that then start building those services and do not use DSR on the Azure LB. I don't know why someone would go down this path anyhow but it is an available option and I have tested this in the same way described.

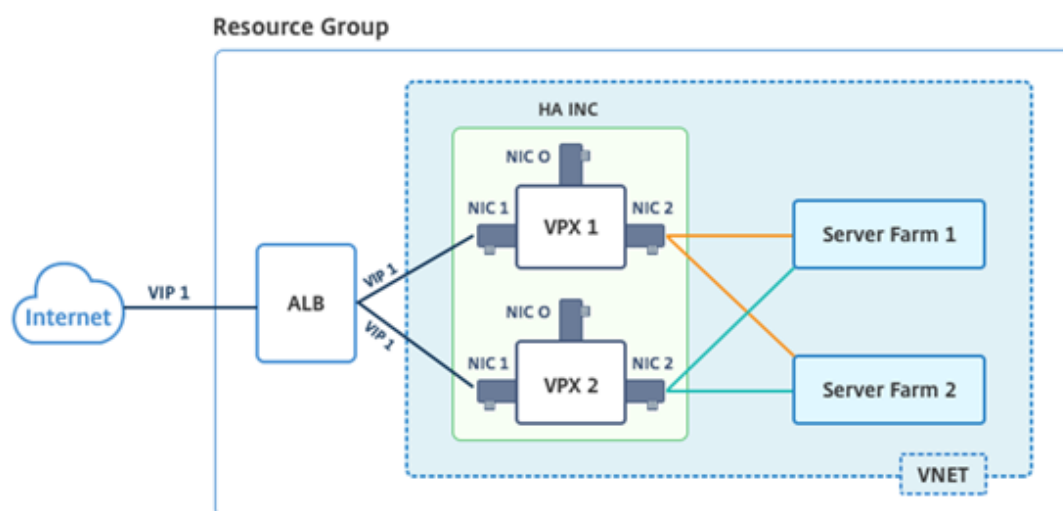
NetScaler VPX Multi NIC/IP HA Active-Passive (HA Template)

The previous Active-Passive approach required additional effort in creating additional virtual servers on NetScaler and additional IPS for VIPs on Azure NS VM so wasn't the best solution out there and this lead us to the HA template recently released by Citrix. I would say this approach to HA is the best amongst all discussed and is the recommended way so I am going to showcase the configuration required to establish the same because of Citrix documentation lacking in that area.

Before we deploy the HA template and test with a load balanced virtual server, lets discuss what does the HA template do and why is it different from previous approaches. The HA template configure two key components that make this all possible which are INC for NS HA and DSR for Azure LB. In a nutshell these 2 options would allow the NetScaler to float the VIP of any virtual server and keep the SNIP static/different for every NS part of the HA.

But we established that VIPs cannot float over Azure network and this still applies, what happens here is that the VIP configured in NetScaler is not an IP assigned to the NIC of one of the NetScaler's but rather the frontend IP of the load balancer that being public or private. To simplify, lets assume we are load balancing an IIS 80 server , this virtual server will require a VIP that is normally assigned to the NS VM NIC then added inside NS, well in this situation NO, the VIP that will be added in NS, is the actual frontend IP of the load balancer (YES even if public IP), that is why it is able to float to the secondary NS and keep working (INC and DSR in action).

NetScaler VPX with Multi IP/NIC Mode HA Template



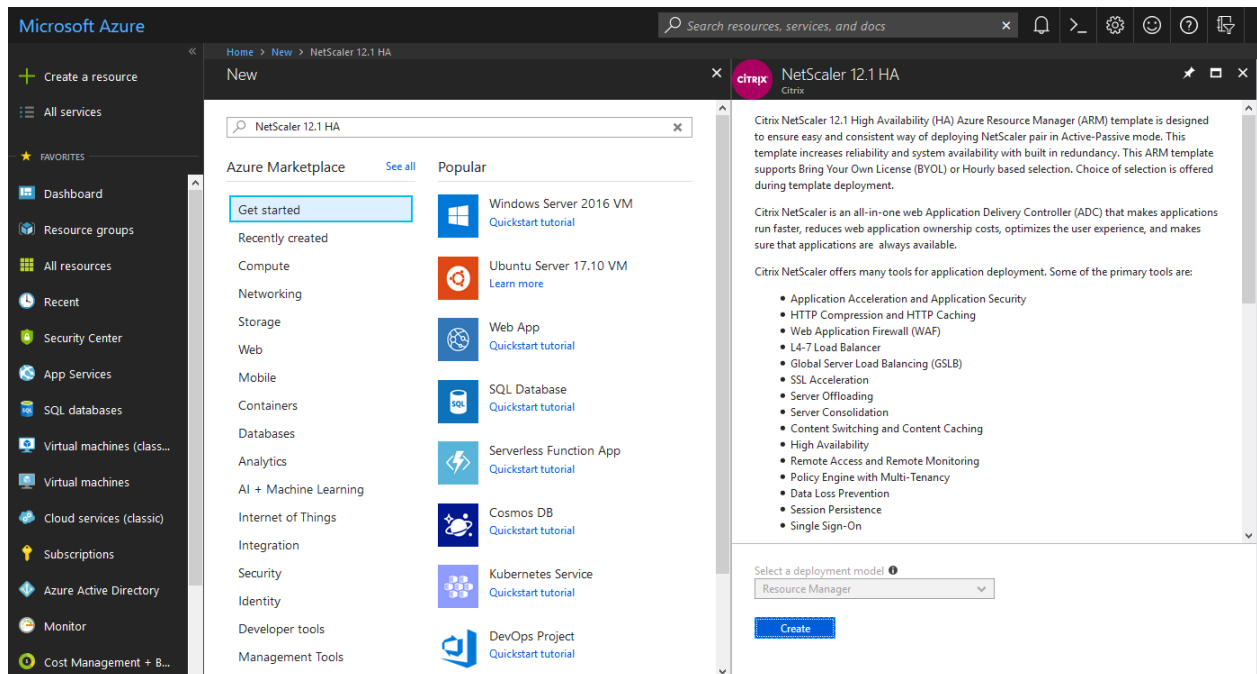
An active-passive deployment requires:

- An HA Independent Network Configuration (INC) configuration
- The Azure Load Balancer (ALB) in Direct Server Return (DSR) mode

Deploy NetScaler HA Azure Template:

Enough chit chat, time to demonstrate this end to end making sure that we have a functional NS HA with a load balancer virtual server that can be accessed on Primary NetScaler and Secondary NetScaler once failed over without double the resources or manual intervention:

Deploy the NetScaler HA 12.1 Template from Microsoft Azure:



Microsoft Azure

Search resources

Create a resource

All services

FAVORITES

Dashboard

Resource groups

All resources

Recent

Security Center

App Services

SQL databases

Virtual machines (class...

Virtual machines

Cloud services (classic)

Subscriptions

Azure Active Directory

Monitor

Cost Management + B...

Home > New > NetScaler 12.1 HA > Create NetScaler 12.1 HA > Basics

Create NetScaler 12.1 HA

Basics

1 Basics
Configure basic settings

2 General Settings
Configure the General settings

3 Network Settings
Configure the Network settings

4 Summary
NetScaler 12.1 HA

5 Buy

Subscription

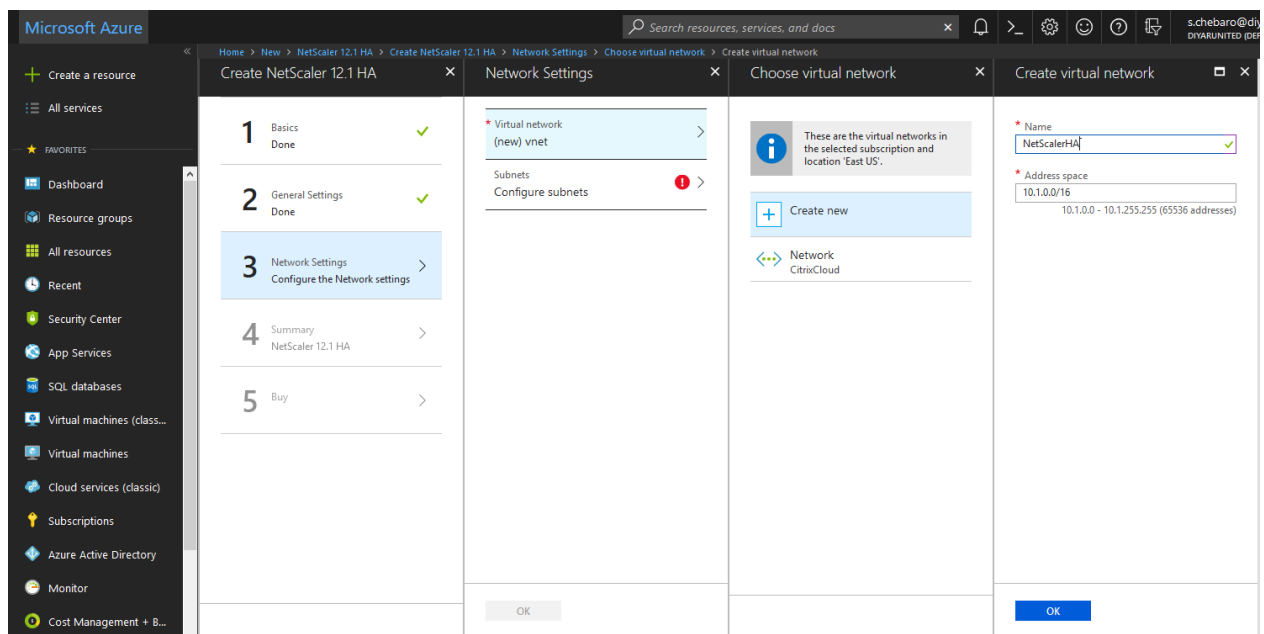
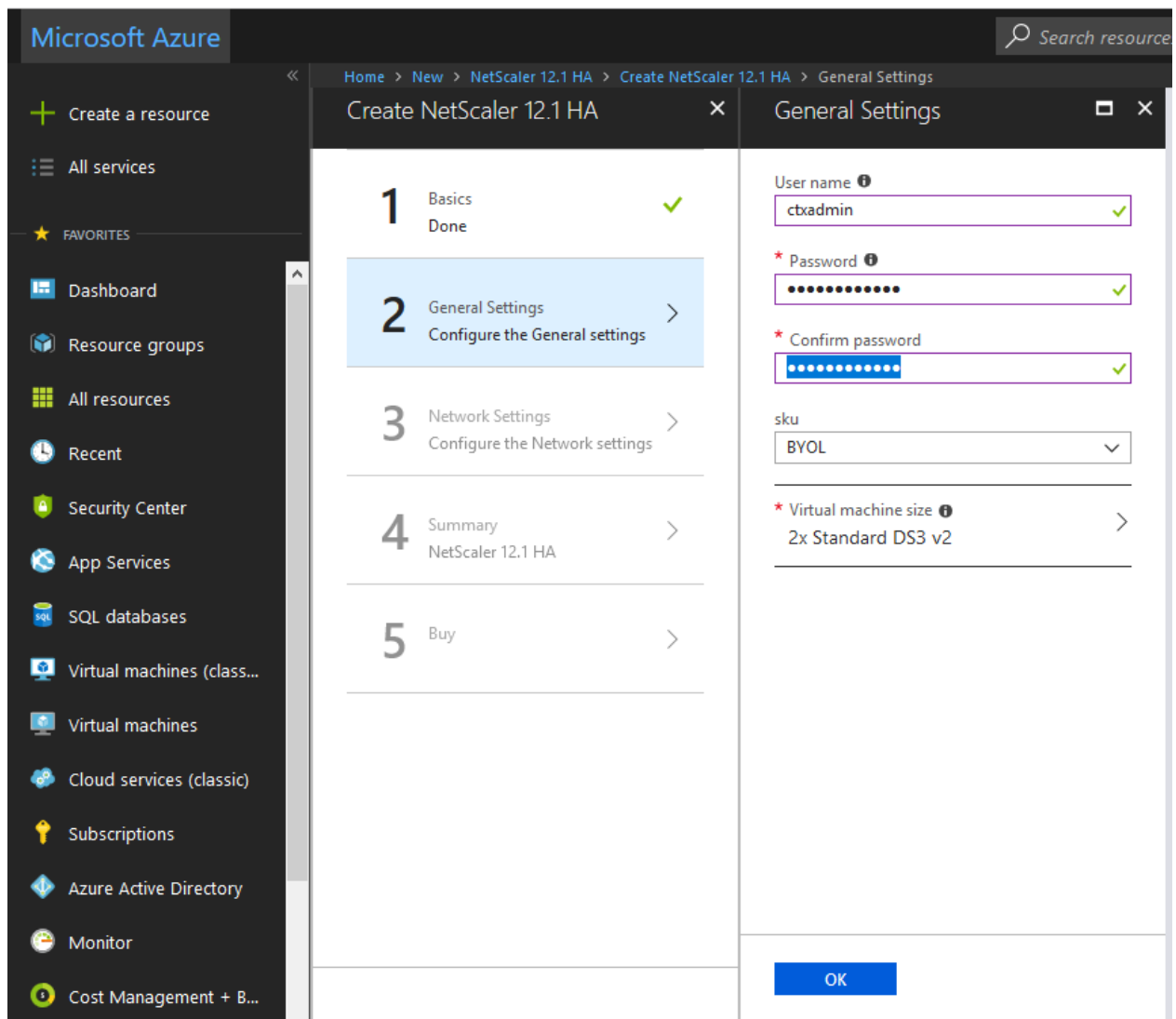
Visual Studio Enterprise with MSDN

* Resource group ⓘ
☒ Create new ☐ Use existing

NetScalerHA

* Location
East US

OK



Three NICs and Three Subnets are required for this type of deployment. Existing vNET and subnets can be used but I have opted for new ones for the purpose of this demonstration.

Microsoft Azure

Create a resource

All services

FAVORITES

Dashboard

Resource groups

All resources

Recent

Security Center

App Services

SQL databases

Virtual machines (class...

Virtual machines

Cloud services (classic)

Subscriptions

Azure Active Directory

Monitor

Cost Management + B...

Home > New > NetScaler 12.1 HA > Create NetScaler 12.1 HA > Network Settings > Subnets

Create NetScaler 12.1 HA

1 Basics Done

2 General Settings Done

3 Network Settings Configure the Network settings

4 Summary NetScaler 12.1 HA

5 Buy

Network Settings

Virtual network (new) NetScalerHA

Subnets Configure subnets

OK

Subnets

Interface 0/1 Subnet name snet-01

Interface 0/1 Subnet address prefix 10.1.0.0/24

Interface 1/1 Subnet name snet-11

Interface 1/1 Subnet address prefix 10.1.1.0/24

Interface 1/2 Subnet name snet-12

Interface 1/2 Subnet address prefix 10.1.2.0/24

OK

Microsoft Azure

Create a resource

All services

FAVORITES

Dashboard

Resource groups

All resources

Recent

Security Center

App Services

SQL databases

Virtual machines (class...

Virtual machines

Cloud services (classic)

Subscriptions

Azure Active Directory

Monitor

Cost Management + B...

Home > New > NetScaler 12.1 HA > Create NetScaler 12.1 HA > Summary

Create NetScaler 12.1 HA

1 Basics Done

2 General Settings Done

3 Network Settings Done

4 Summary NetScaler 12.1 HA

5 Buy

Summary

Validation passed

Basics

Subscription Visual Studio Enterprise with MSDN

Resource group NetScalerHA

Location East US

General Settings

User name cbadmin

Password *****

sku BYOL

Virtual machine size Standard D53 v2

Network Settings

Virtual network NetScalerHA

Interface 0/1 Subnet snet-01

Interface 0/1 Subnet address pr... 10.1.0.0/24

Interface 1/1 Subnet snet-11

Interface 1/1 Subnet address pr... 10.1.1.0/24

Interface 1/2 Subnet snet-12

Interface 1/2 Subnet address pr... 10.1.2.0/24

OK

Download template and parameters

Microsoft Azure

Search resources, services, and docs

Create a resource

All services

FAVORITES

Dashboard

Resource groups

All resources

Recent

Security Center

App Services

SQL databases

Virtual machines (class...

Virtual machines

Cloud services (classic)

Subscriptions

Azure Active Directory

Monitor

Cost Management + B...

Home > New > NetScaler 12.1 HA > Create NetScaler 12.1 HA > Create

Create NetScaler 12.1 HA

- 1 Basics Done ✓
- 2 General Settings Done ✓
- 3 Network Settings Done ✓
- 4 Summary NetScaler 12.1 HA ✓
- 5 Buy >

NetScaler ADC: Load Balancer, SSL VPN, WAF & SSO by Citrix
[Terms of use](#) | [privacy policy](#)

Deploying this template will result in various actions being performed, which may include the deployment of one or more Azure resources or Marketplace offerings and/or transmission of the information you provided as part of the deployment process to one or more parties, as specified in the template. You are responsible for reviewing the text of the template to determine which actions will be performed and which resources or offerings will be deployed, and for locating and reviewing the pricing and legal terms associated with those resources or offerings.

Current retail prices for Azure resources are set forth [here](#) and may not reflect discounts applicable to your Azure subscription.

Prices for Marketplace offerings are set forth [here](#), and the legal terms associated with any Marketplace offering may be found in the Azure portal; both are subject to change at any time prior to deployment.

Neither subscription credits nor monetary commitment funds may be used to purchase non-Microsoft offerings. These purchases are billed separately. If any Microsoft products are included in a Marketplace offering (e.g., Windows Server or SQL Server), such products are licensed by Microsoft and not by any third party.

Template deployment is intended for advanced users only. If you are uncertain which actions will be performed by this template, which resources or offerings will be deployed, or what prices or legal terms pertain to those resources or offerings, do not deploy this template.

Terms of use

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) provided above as well as the legal terms and privacy statement(s) associated with each Marketplace offering that will be deployed using this template, if any; (b) authorize Microsoft to charge or bill my current payment

Create

Notifications

Dismiss: [Informational](#) [Completed](#) [All](#)

■ ■ ■ Submitting deployment...

Running

Submitting the deployment template for resource group 'NetScalerHA'.

Notifications

Dismiss: [Informational](#) [Completed](#) [All](#)

✓ Deployment succeeded

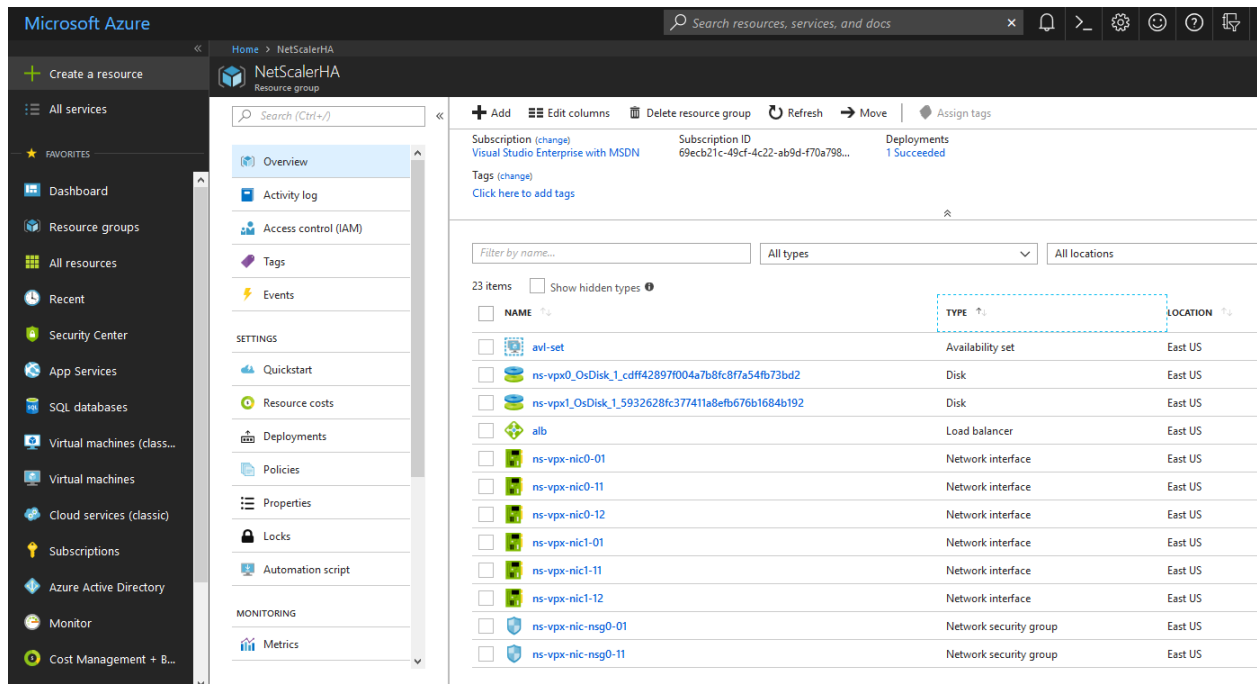
4:09 PM

Deployment 'citrix.netscalervpx121hanetscalervpx121ha-20180627160504' to resource group 'NetScalerHA' was successful.

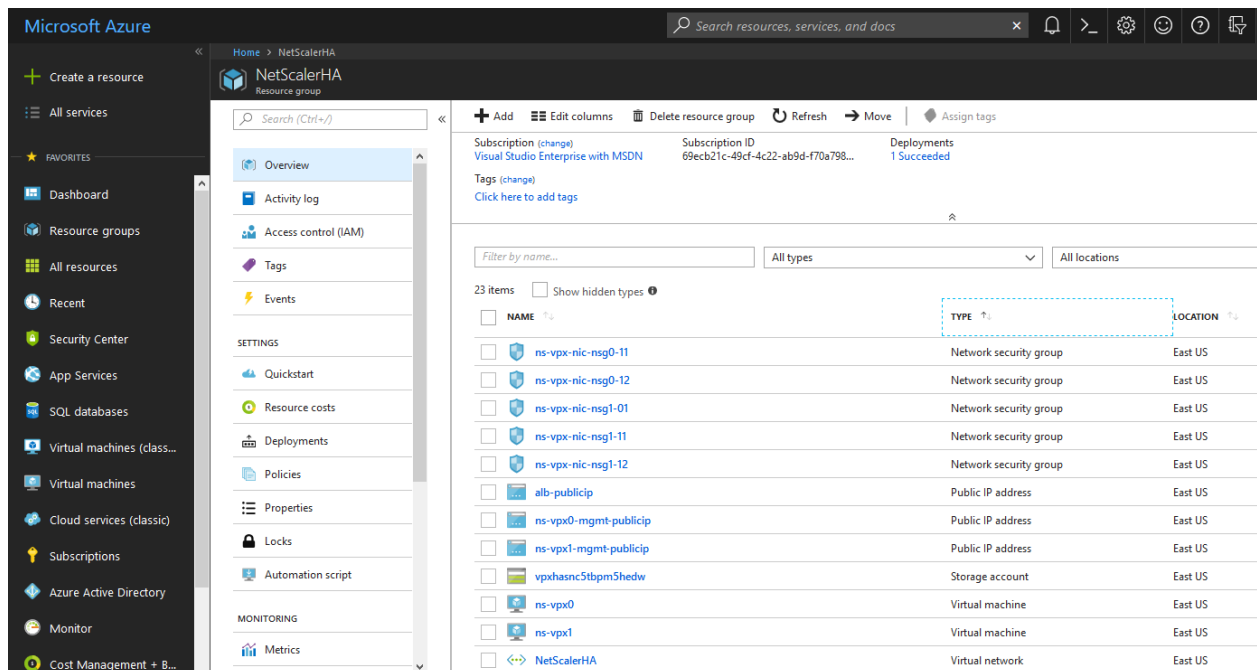
[Go to resource group](#)

[★ Pin to dashboard](#)

These are the resources configured automatically when the HA template is deployed.

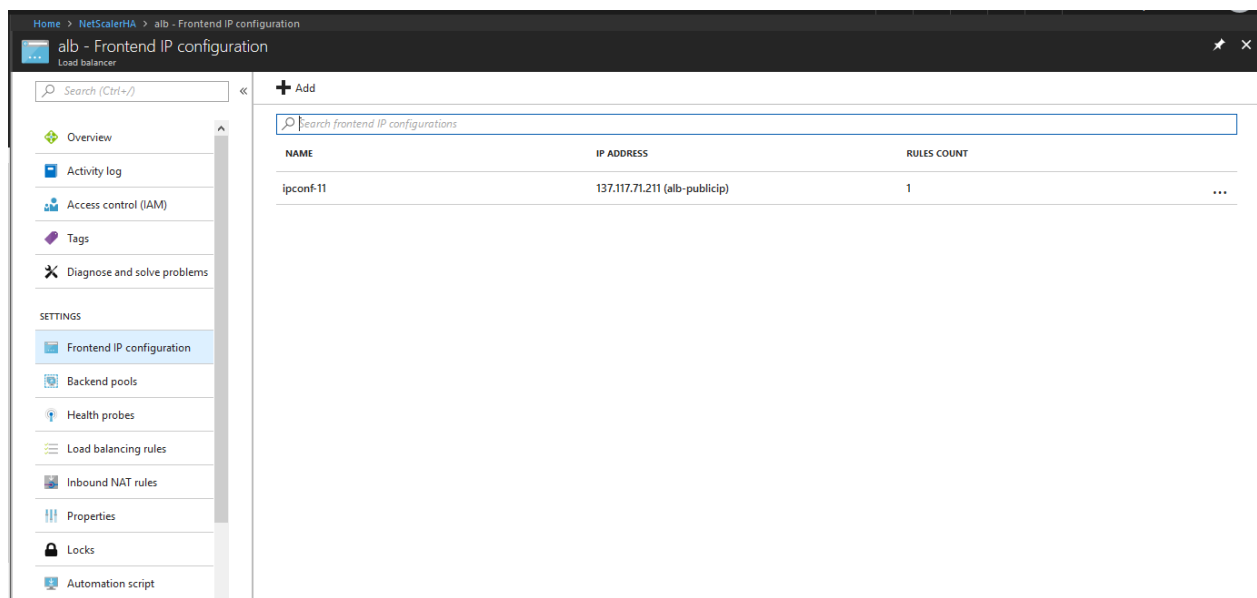


NAME	TYPE	LOCATION
avl-set	Availability set	East US
ns-vpx0_OsDisk_1_cdf42897f004a7b8fc87a54fb73bd2	Disk	East US
ns-vpx1_OsDisk_1_5932628fc377411a8efb676b1684b192	Disk	East US
alb	Load balancer	East US
ns-vpx-nic0-01	Network interface	East US
ns-vpx-nic0-11	Network interface	East US
ns-vpx-nic0-12	Network interface	East US
ns-vpx-nic1-01	Network interface	East US
ns-vpx-nic1-11	Network interface	East US
ns-vpx-nic1-12	Network interface	East US
ns-vpx-nic-nsg0-01	Network security group	East US
ns-vpx-nic-nsg0-11	Network security group	East US

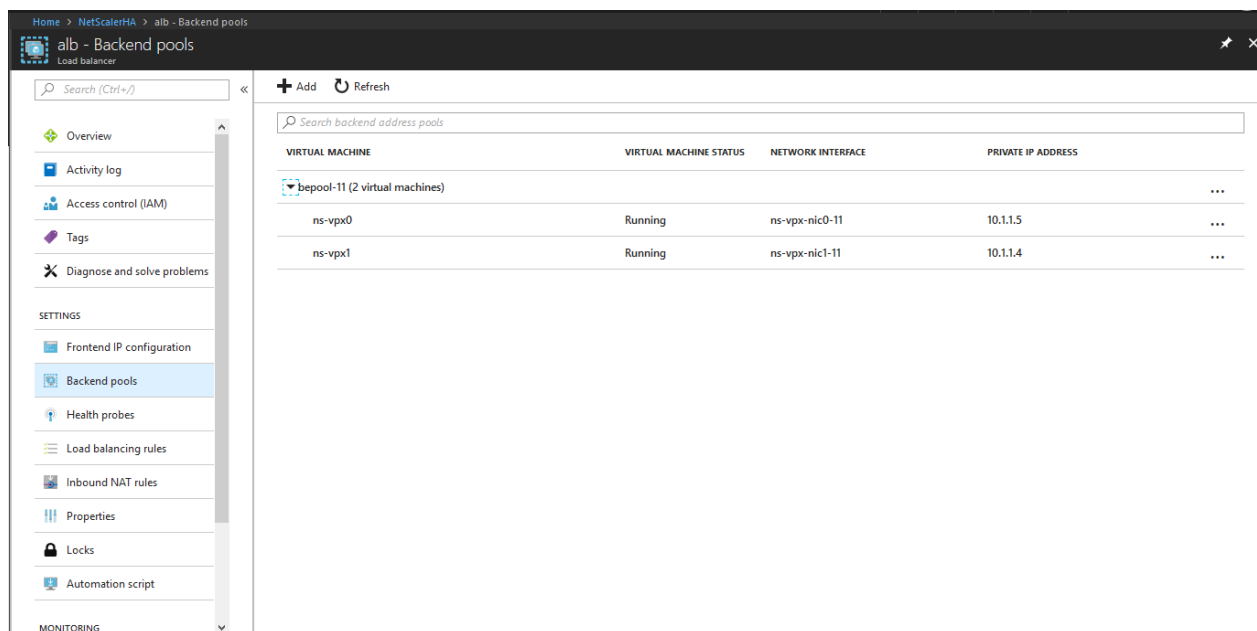


NAME	TYPE	LOCATION
ns-vpx-nic-nsg0-11	Network security group	East US
ns-vpx-nic-nsg0-12	Network security group	East US
ns-vpx-nic-nsg1-01	Network security group	East US
ns-vpx-nic-nsg1-11	Network security group	East US
ns-vpx-nic-nsg1-12	Network security group	East US
alb-publicip	Public IP address	East US
ns-vpx0-mgmt-publicip	Public IP address	East US
ns-vpx1-mgmt-publicip	Public IP address	East US
vpxhasnc5tbpms5hedw	Storage account	East US
ns-vpx0	Virtual machine	East US
ns-vpx1	Virtual machine	East US
NetScalerHA	Virtual network	East US

By default, one public Frontend IP is added, which can be used for any service that will be hosted and publicly accessible from NetScaler. Every service with the same port will require a different Frontend IP that will later be added as the service VIP on NetScaler.



Azure Load Balancer for NetScaler will communicate with the following SNIPs assigned on each NS to determine which NS is primary and active. The reason you need to note this is that later on, any service to be published, the port will need to be opened on the NSGs assigned to the NICs hosting those IP addresses.



Azure Load Balancer will use TCP 9000 to communicate with both NetScaler's and determine the status of each in order to load balance requests accordingly.

Home > NetScalerHA > alb - Health probes

alb - Health probes
Load balancer

Search (Ctrl+/)

+ Add

Search probes

NAME	PROTOCOL	PORT	USED BY
probe-11	TCP	9000	lbRule1

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

SETTINGS

Frontend IP configuration

Backend pools

Health probes

Load balancing rules

Inbound NAT rules

Properties

Locks

Automation script

MONITORING

This is the load balancing rule that determines the public IP, port, and service that is going to be accessible and load balanced. Note that each future service will need a new load balancing rule and make sure that DSR is enabled.

Home > NetScalerHA > alb - Load balancing rules

alb - Load balancing rules
Load balancer

Search (Ctrl+/)

+ Add

Search load balancing rules

NAME	LOAD BALANCING RULE	BACKEND POOL	HEALTH PROBE
lbRule1	lbRule1 (TCP/80)	bepool-11	probe-11

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

SETTINGS

Frontend IP configuration

Backend pools

Health probes

Load balancing rules

Inbound NAT rules

Properties

Locks

Automation script

MONITORING

Home > NetScalerHA > alb - Load balancing rules > lbRule1

lbRule1

alb

Save Discard Delete

Name
lbRule1

* IP Version
☒ IPv4 ☐ IPv6

* Frontend IP address ⓘ
137.117.71.211 (ipconf-11) ▼

Protocol
☒ TCP ☐ UDP

* Port
80

* Backend port ⓘ
80

Backend pool ⓘ
bepool-11 (2 virtual machines) ▼

Health probe ⓘ
probe-11 (TCP:9000) ▼

Session persistence ⓘ
None ▼

Idle timeout (minutes) ⓘ
 4

Floating IP (direct server return) ⓘ
Enabled

Every NS VM will have three NICs attached, each on a different subnet. The first NIC is the NSIP (mgmt.) and the other two, each will have a SNIP from its subnet configured in NetScaler. The second NIC is the one that Azure ALB is using to determine health and status of services and third can be used for backend services.

ns-vpx-nic0-01 ns-vpx-nic0-11 ns-vpx-nic0-12

Network Interface: ns-vpx-nic0-01

Effective security rules

Topology

Virtual network/subnet: NetScalerHA/snet-01
Disabled

Public IP: 137.117.68.94

Private IP: 10.1.0.5

Accelerated networking:

INBOUND PORT RULES

Network security group ns-vpx-nic-nsg0-01 (attached to network interface: ns-vpx-nic0-01)
Impacts 0 subnets, 1 network interfaces

Add inbound port

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION	
1000	default-allow-ssh	22	TCP	Any	Any	Allow	...
1001	autoscale-daemon	9001	TCP	Any	Any	Allow	...
1011	mgmt_443	443	Any	Any	Any	Allow	...
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow	...
65001	AllowAzureLoadBalancerI...	Any	Any	AzureLoadBa...	Any	Allow	...
65500	DenyAllInBound	Any	Any	Any	Any	Deny	...

OUTBOUND PORT RULES

ns-vpx-nic0-01 ns-vpx-nic0-11 ns-vpx-nic0-12

Network Interface: ns-vpx-nic0-11

Effective security rules

Topology

Virtual network/subnet: NetScalerHA/snet-11

Public IP: None

Private IP: 10.1.1.5

Accelerated networking: Disabled

INBOUND PORT RULES

Network security group ns-vpx-nic-nsg0-11 (attached to network interface: ns-vpx-nic0-11)
Impacts 0 subnets, 1 network interfaces

Add inbound port

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION	
1000	default-allow-ssh	22	TCP	Any	Any	Allow	...
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow	...
65001	AllowAzureLoadBalancerI...	Any	Any	AzureLoadBa...	Any	Allow	...
65500	DenyAllInBound	Any	Any	Any	Any	Deny	...

OUTBOUND PORT RULES

Network security group ns-vpx-nic-nsg0-11 (attached to network interface: ns-vpx-nic0-11)
Impacts 0 subnets, 1 network interfaces

Add outbound port

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
----------	------	------	----------	--------	-------------	--------

Attach network interface
Detach network interface

ns-vpx-nic0-01
ns-vpx-nic0-11
ns-vpx-nic0-12

Network Interface: ns-vpx-nic0-12
Effective security rules
Topology ⓘ

Virtual network/subnet: NetScalerHA/snet-12
Public IP: None
Private IP: 10.1.2.4
Accelerated networking: Disabled

INBOUND PORT RULES ⓘ

Network security group ns-vpx-nic-nsg0-12 (attached to network interface: ns-vpx-nic0-12)
Impacts 0 subnets, 1 network interfaces

Add inbound port

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
1000	default-allow-ssh	22	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerI...	Any	Any	AzureLoadBa...	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

OUTBOUND PORT RULES ⓘ

Network security group ns-vpx-nic-nsg0-12 (attached to network interface: ns-vpx-nic0-12)
Impacts 0 subnets, 1 network interfaces

Add outbound port

If you have a bastion host to connect to your Azure environment and use that for management then you don't need to open 443 for the public IP assigned to mgmt. NIC in order to gain GUI access to NetScaler. If not, we need to open the port to manage NetScaler accordingly. These public IPs are only for mgmt. and can be removed with no impact to NS config.

Home > Virtual machines > ns-vpx0 - Networking

Virtual machines
ns-vpx0 - Networking

+ Add
Edit columns
More

Filter by name...

NAME

ctx-connector
DC
netScaler
ns-vpx0
ns-vpx1
Server2016
Win10

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

SETTINGS
Networking
Disks
Size
Security
Extensions
Continuous delivery (Preview)
Availability set
Configuration
Properties

Search (Ctrl+F)

Attach network interface
Detach network interface

ns-vpx-nic0-01
ns-vpx-nic0-11
ns-vpx-nic0-12

Network Interface: ns-vpx-nic0-01
Effective security rules
Topology ⓘ

Virtual network/subnet: NetScalerHA/snet-01
Public IP: 137.117.68.94
Private IP: 10.1.0.5
Accelerated networking: Disabled

INBOUND PORT RULES ⓘ

Network security group ns-vpx-nic-nsg0-01 (attached to network interface: ns-vpx-nic0-01)
Impacts 0 subnets, 1 network interfaces

Add inbound port

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
1000	default-allow-ssh	22	TCP	Any	Any	Allow
1001	autoscale-daemon	9001	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerI...	Any	Any	AzureLoadBa...	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

OUTBOUND PORT RULES ⓘ

Network security group ns-vpx-nic-nsg0-01 (attached to network interface: ns-vpx-nic0-01)
Impacts 0 subnets, 1 network interfaces

Add outbound port

Add inbound security rule

ns-vpx-nic-nsg0-01

Basic

* Source
Any

* Source port ranges
*

* Destination
Any

* Destination port ranges
443

* Protocol
Any
TCP
UDP

* Action
Allow
Deny

* Priority
1011

* Name
mgmt_443

Description

Add

On all NetScaler NICs, that being both NS that have a total of 6 NICs, change the IPs to static or else you might lose your IP when you restart the VM.

Home
> Virtual machines
> ns-vpx0 - Networking

Virtual machines

ns-vpx0 - Networking

+ Add
Edit columns
More

Filter by name...

NAME

cti-connector
DC
netcaler
ns-vpx0
ns-vpx1
Server2016
Win10

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

SETTINGS

Networking
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Continuous delivery (Preview)
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Properties

Attach network interface
Detach network interface

ns-vpx-nic0-01
ns-vpx-nic0-11
ns-vpx-nic0-12

Network interface
ns-vpx-nic0-01

Effective security rules
Topology

Virtual network/subnet: NetScalerNSA/vnet-01
Public IP: 137.117.68.94
Private IP: 10.1.0.5
Accelerated networking: Disabled

INBOUND PORT RULES

Network security group ns-vpx-nic-nsg0-01 (attached to network interface: ns-vpx-nic0-01)
Add inbound port

Impacts 0 subnets, 1 network interfaces

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
1000	default-allow-ssh	22	TCP	Any	Any	Allow
1001	autoscale-daemon	9001	TCP	Any	Any	Allow
1011	mgmt_443	443	Any	Any	Any	Allow
65000	AllowVnetInbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancer...	Any	Any	AzureLoadBa...	Any	Allow
65500	DenyAllInbound	Any	Any	Any	Any	Deny

OUTBOUND PORT RULES

Privacy - Terms

1 - IP configurations

Save ✕ Discard

settings

Disabled Enabled

NetScalerHA

ons

snet-01 (10.1.0.0/24)

configurations

IP VERSION	TYPE	PRIVATE IP ADDRESS
IPv4	Primary	10.1.0.5 (Dynamic)

Home > Virtual machines > ns-vpx0 - Networking > ns-vpx-nic0-01 - IP configurations > ipconfig1

ipconfig1

ns-vpx-nic0-01

Save Discard

Public IP address settings

Public IP address

* IP address

ns-vpx0-mgmt-publicip (137.117.68.94) >

Private IP address settings

Virtual network/subnet

NetScalerHA/snet-01

Assignment

* IP address

10.1.0.5

Now that I have opened mgmt. port 443 for public IP assigned to NS, lets login and double check existing configuration and deploy a virtual server that will load balance my IIS server on port 80 to test NS HA:

Networking - Microsoft Azure Citrix Login

https://137.117.68.94

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Citrix NetScaler

User Name

Password

Citrix NetScaler VPX AZURE BYOL

HA Status

Primary

Partition

default

ctadmin

Dashboard

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Search in Menu

System / Network / IPs / IPv4s

AZURE

System

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NTP Servers

Reports

Profiles

Partition Administration

User Administration

Authentication

Auditing

SNMP

AppFlow

Cluster

Network

IPs

IPs

IPv4s 3 IPv6s 1

Add

Edit

Delete

Statistics

Select Action

	IP Address	State	Type	Mode	ARP	ICMP	Virtual Server	Traffic Domain
<input type="checkbox"/>	10.1.0.5	ENABLED	NetScaler IP	Active	ENABLED	ENABLED	-N/A-	0
<input type="checkbox"/>	10.1.1.5	ENABLED	Subnet IP	Active	ENABLED	ENABLED	-N/A-	0
<input type="checkbox"/>	10.1.2.4	ENABLED	Subnet IP	Active	ENABLED	ENABLED	-N/A-	0

Citrix NetScaler VPX AZURE BYOL

HA Status

Primary

Partition

default

ctadmin

Dashboard

Configuration

Reporting

Documentation

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Search in Menu

System / High Availability / Nodes

AZURE

System

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Settings

Diagnostics

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Partition Administration

User Administration

Authentication

Auditing

SNMP

AppFlow

Cluster

High Availability

Nodes 2 Route Monitors 0 Failover Interface Set 0

Add

Edit

Delete

Statistics

Select Action

	ID	IP Address	Host Name	Master State	Node State	INC	Synchronization State
<input type="checkbox"/>	0	10.1.0.5	ns-vpx0	Primary	UP	ENABLED	ENABLED
<input type="checkbox"/>	1	10.1.0.4		Secondary	UP	ENABLED	SUCCESS

Citrix NetScaler VPX AZURE BYOL

Dashboard

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View Node Details

ID

1

Enabled Interfaces

0/1.1/1.1/2

IP Address

10.1.0.4

Disabled Interfaces

NONE

Node State

UP

Interfaces Monitored for Health Status

NONE

Interfaces on which HA Heartbeat is off

NONE

Master State

Secondary

Interfaces on which heartbeats are not seen

1/1.1/2

Fail-Safe Mode

OFF

Sync VLAN

Interfaces causing partial failure

NONE

SSL Card Status

NOT PRESENT

System Warning Message

INC State

ENABLED

Synchronization State

SUCCESS

Route Monitors

Route Monitors6

FIS

Close

For testing purposes, I will add a service that points to my IIS service on port 80 and add a virtual server to load balance this service.

Citrix NetScaler VPX AZURE BYOL

DashboardConfigurationReportingDocumentationDownloads

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AZURE >

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AppExpert >

Traffic Management >

Load Balancing >

Virtual Servers >

☆ Services

Service Groups

Monitors

Metric Tables

Servers

Persistence Groups

Priority Load Balancing >

Content Switching >

Traffic Management / Load Balancing / Services / Services

Services

Services 1Auto Detected Services 0Internal Services 6

AddEditDeleteRenameStatisticsNo action

	Name	State	IP Address/Domain Name
<input type="checkbox"/>	azurelbdnsservice0	UP	168.63.129.16

Citrix NetScaler VPX AZURE BYOL

DashboardConfigurationReportingDocumentation

← Load Balancing Service

Basic Settings

Service Name*

AD-IIS?

☒ New Server☐ Existing Server

IP Address*

10 . 0 . 1 . 4

Protocol*

HTTP

Port*

80

► More

OKCancel

Citrix NetScaler VPX AZURE BYOL

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Search in Menu

AZURE >
System >
AppExpert >

Traffic Management >
Load Balancing >
Virtual Servers

Virtual Servers

Add Edit Delete Enable Disable Rename Statistics Select Action

	Name	State	Effective State	IP Address	Port
<input type="checkbox"/>	azurelbdnsrvserver	UP	UP	0.0.0.0	0

I am using the Frontend IP created by default with the HA template that has this IP address, I will add that directly on NetScaler. Every new service will require a new frontend IP as detailed below as long as the new service port is the same or else the same can be used but a new load balancer rule will be required under any case.

Citrix NetScaler VPX AZURE BYOL

Dashboard Configuration Reporting Documentation Downloads

← **Load Balancing Virtual Server**

Basic Settings

Create a virtual server by specifying a name, an IP address, a port, and a protocol type. If an application is accessible from the local area network (LAN) or wide area network (WAN), the VIP is usually a private (ICANN non-routable) IP address. You can configure multiple virtual servers to receive client requests, thereby increasing the availability of resources to process

Name*
AD-IIS ?

Protocol*
HTTP

IP Address Type*
IP Address

IP Address*
137 . 117 . 71 . 211 ?

Port*
80

► More

OK Cancel

Citrix NetScaler VPX AZURE BYOL

HA Status: Primary Partition: default ctkadmon

Dashboard Configuration Reporting Documentation Downloads

Load Balancing Virtual Servers

Load Balancing Virtual Server | Export as a Template

Basic Settings

Name: AD-85
Protocol: HTTP
State: DOWN
IP Address: 137.137.71.211
Port: 80
Traffic Domain: 0

Services and Service Groups

A service is a logical representation of an application running on a server. A service group enables you to manage a group of services as a single entity. Note: Bind at least one service or service group to the virtual server. Click Continue to display the advanced settings and select this.

Service Binding / Service

Service

Select Add Edit

Name	State	IP Address/Domain Name	Traffic Domain	Port	Protocol	Max Clients	Max Requests	Cache Type
azurebdrservice0	UP	168.63.129.36	0	33	DNS	0	0	SERVER
AD-85	UP	10.0.1.4	0	80	HTTP	0	0	SERVER

Citrix NetScaler VPX AZURE BYOL

HA Status: Primary Partition: default ctkadmon

Dashboard Configuration Reporting Documentation Downloads

Search in Menu

Virtual Servers

Add Edit Delete Enable Disable Rename Statistics Select Action

Name	State	Effective State	IP Address	Port	Protocol	Method	Persistence	% Health	Traffic Domain
azurebdrserver	UP	UP	0.0.0.0	0	DNS	ROUNDROBIN	NONE	100.00% 1 UP/0 DOWN	0
AD-85	UP	UP	137.137.71.211	80	HTTP	LEASTCONNECTION	NONE	100.00% 1 UP/0 DOWN	0

The port required to be published should be opened on the 2nd NIC attached to all NetScaler's because those are the NICs that Azure ALB is trying to reach.

Microsoft Azure

Home > Virtual machines > ns-vpx0 - Networking

Virtual machines

ns-vpx0 - Networking

Attach network interface Detach network interface

ns-vpx-nic0-01 ns-vpx-nic0-11 ns-vpx-nic0-12

Network Interface: ns-vpx-nic0-11 Effective security rules: Topology

Virtual network/subnet: NetScalerNS/10.0.0.0/24 Public IP: None Private IP: 10.0.0.11 Accelerated networking: Disabled

INBOUND PORT RULES

Network security group ns-vpx-nic-nsg0-11 (attached to network interface: ns-vpx-nic0-11) Impacts 0 subnets, 1 network interfaces

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
1000	default-allow-ssh	22	TCP	Any	Any	Allow
65000	AllowVNetInbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInbound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInbound	Any	Any	Any	Any	Deny

OUTBOUND PORT RULES

Network security group ns-vpx-nic-nsg0-11 (attached to network interface: ns-vpx-nic0-11) Impacts 0 subnets, 1 network interfaces

Add inbound security rule

ns-vpx-nic-nsg0-11

Basic

* Source [?]

Any

* Source port ranges [?]

*

* Destination [?]

Any

* Destination port ranges [?]

80

* Protocol

Any TCP UDP

* Action

Allow Deny

* Priority [?]

1010

* Name

IIS-DC-80

Description

Add

Microsoft Azure

Home > Virtual machines > ns-vpx1 - Networking

Virtual machines

ns-vpx1 - Networking

Attach network interface Detach network interface

ns-vpx-nic1-01 ns-vpx-nic1-11 ns-vpx-nic1-12

Network Interface: ns-vpx-nic1-11 Effective security rules Topology

Virtual network/subnet: NetScaleHA/subnet-11 Public IP: None Private IP: 10.1.1.4 Accelerated networking: Disabled

INBOUND PORT RULES

Network security group ns-vpx-nic-nsg1-11 (attached to network interface: ns-vpx-nic1-11)

Impacts 0 subnets, 1 network interfaces

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
1000	default-allow-ssh	22	TCP	Any	Any	Allow
65000	AllowVnetInbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInbound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInbound	Any	Any	Any	Any	Deny

OUTBOUND PORT RULES

Network security group ns-vpx-nic-nsg1-11 (attached to network interface: ns-vpx-nic1-11)

Impacts 0 subnets, 1 network interfaces

Add inbound security rule
✕

ns-vpx-nic-nsg0-11

Basic

* Source ⓘ

Any

* Source port ranges ⓘ

*

* Destination ⓘ

Any

* Destination port ranges ⓘ

80

* Protocol

Any
TCP
UDP

* Action

Allow
Deny

* Priority ⓘ

1010

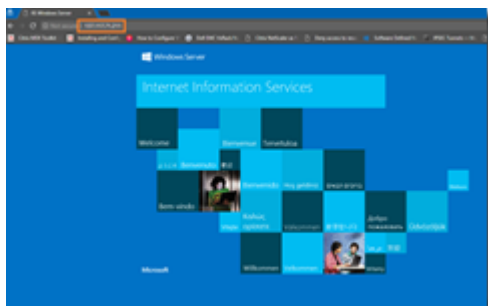
* Name

IIS-DC-80

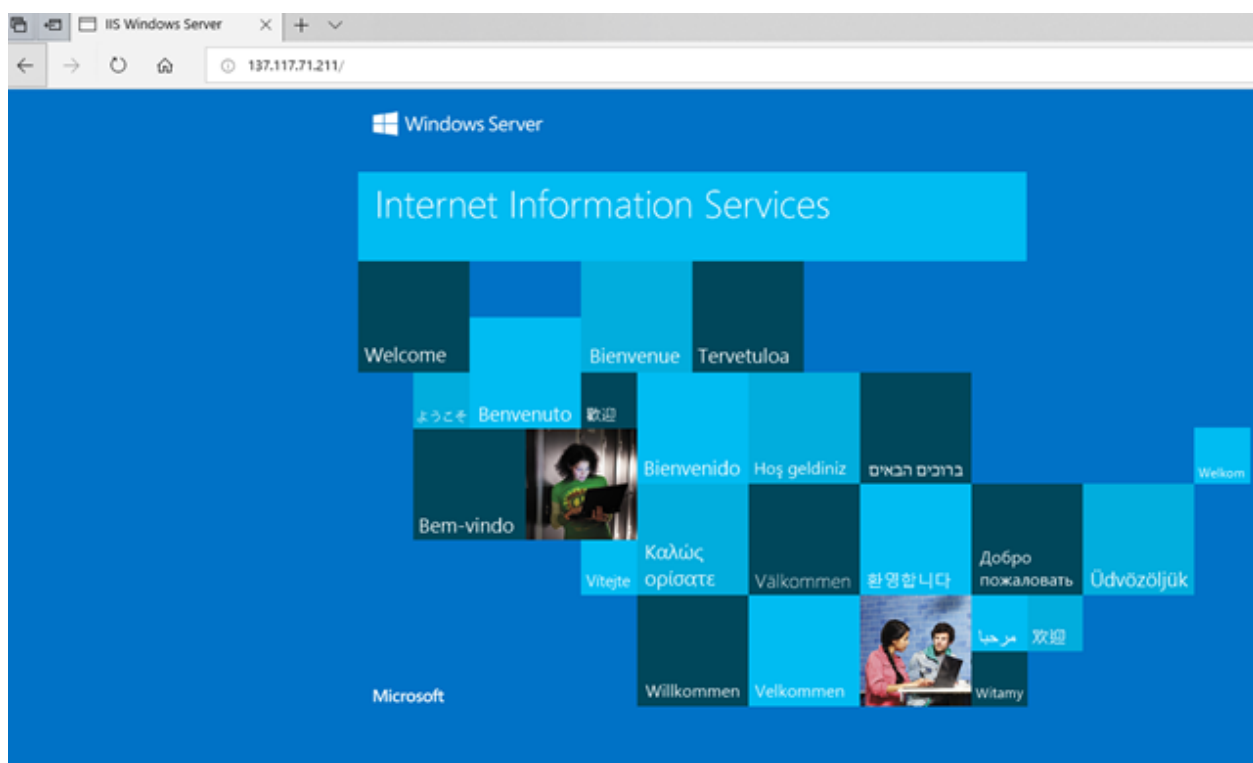
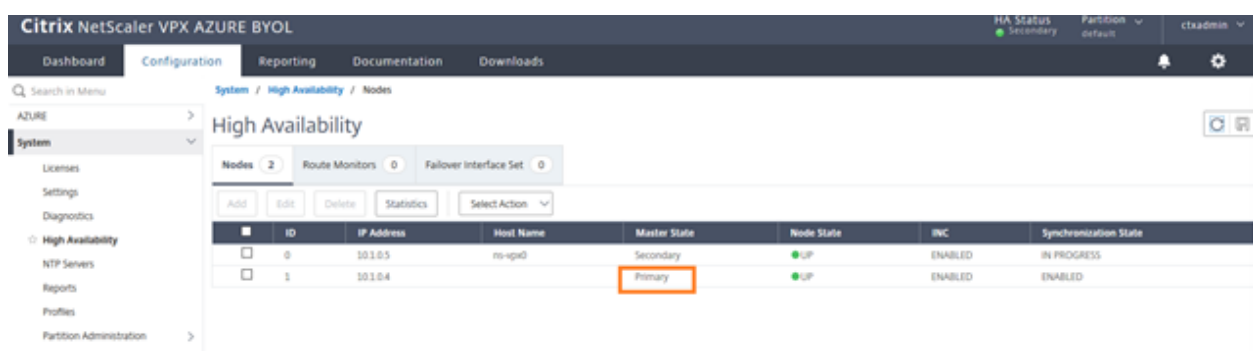
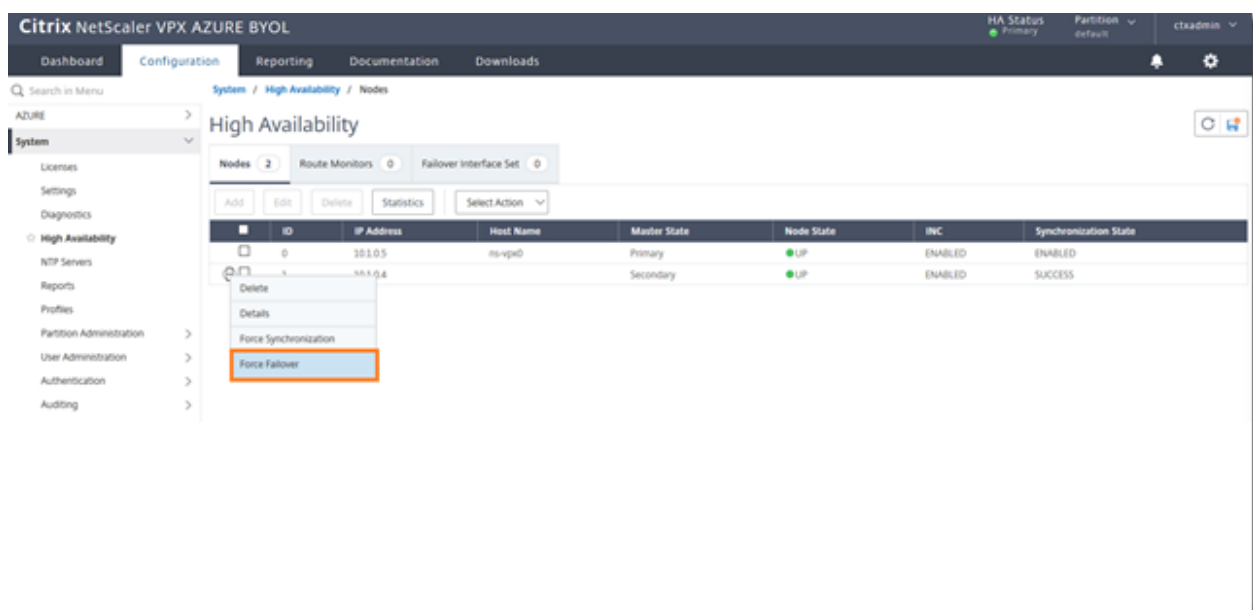
Description

Add

Accessing Frontend IP on port 80 is now successful and based on load balancing rule that was created by default using the HA template for port 80 and that specific frontend IP, we are able to access the service hosted on NetScaler.



Failover Primary NetScaler to Secondary NetScaler and test again to make sure that the assigned frontend IP has floated to the 2nd NetScaler and service is still accessible on the same public IP.



For every publicly accessible virtual server to be hosted on NetScaler, the following needs to be created, if an internal accessible virtual server is required then just create an internal load balancer and do the same (only difference is the ALB IP is private not public):

Home > Load balancers > alb - Frontend IP configuration

Load balancers

ajunurrit (Default Directory)

+ Add Edit columns ... More

Filter by name...

NAME

- alb

Search (Ctrl+F)

+ Add

Search frontend IP configurations

NAME	IP ADDRESS	RULES COUNT
lbpool-11	137.117.21.211 (alb-public-ig)	1

Overview

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

SETTINGS

- Frontend IP configuration
- Backend pools
- Health probes
- Load balancing rules
- Inbound NAT rules
- Properties
- Locks
- Automation script

MONITORING

Home > Load balancers > alb - Load balancing rules

Load balancers

ajunurrit (Default Directory)

+ Add Edit columns ... More

Filter by name...

NAME

- alb

Search (Ctrl+F)

+ Add

Search load balancing rules

NAME	LOAD BALANCING RULE	BACKEND POOL	HEALTH PROBE
lbRule1	lbRule1 (TCP/80)	bepool-11	probe-11

Overview

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

SETTINGS

- Frontend IP configuration
- Backend pools
- Health probes
- Load balancing rules
- Inbound NAT rules
- Properties
- Locks
- Automation script

MONITORING

Home > Resource groups > NetScalerHA > NewService

NewService

Public IP address

Search (Ctrl+ /)

Associate Dissociate Move Delete

Essentials

Resource group (change)	SKU
NetScalerHA	Basic
Location	IP address
East US	40.76.36.153
Subscription name (change)	DNS name
Visual Studio Enterprise with MSDN	-
Subscription ID	Associated to
69ecb21c-49cf-4c22-ab9d-f70a7985251d	alb

Overview

Activity log

Access control (IAM)

Tags

SETTINGS

Configuration

Properties

Locks

Automation script

SUPPORT + TROUBLESHOOTING

New support request

Home > Load balancers > alb - Load balancing rules > Add load balancing rule

Add load balancing rule

alb

* IP Version

☒ IPv4 ☐ IPv6

* Frontend IP address ⓘ

NewService

Protocol

☒ TCP ☐ UDP

* Port

80

* Backend port ⓘ

80

Backend pool ⓘ

bepool-11 (2 virtual machines)

Health probe ⓘ

probe-11 (TCP:9000)

Session persistence ⓘ

None

Idle timeout (minutes) ⓘ

4

Floating IP (direct server return) ⓘ

Disabled Enabled

OK

← Load Balancing Virtual Server

Basic Settings

Create a virtual server by specifying a name, an IP address, a port, and a protocol type. If an application is accessible from the local area network (LAN) or wide area network (WAN), the VIP is usually a private (ICANN non-routable) IP address. You can configure multiple virtual servers to receive client requests, thereby increasing the availability of resources to process requests.

Name*

Protocol*

IP Address Type*

IP Address*

Port*

► More

Conclusion:

The HA template approach with INC and DSR is the optimal way of doing Active-Passive HA for NetScaler on Microsoft Azure. Let me know if the above is not clear or any help is required for the same in the comments below.

Salam 😊 .

0

POSTED IN CITRIX, MICROSOFT • TAGGED ACTIVE ACTIVE NETSCALER, ACTIVE LOAD BALANCING NETSCALER, AZURE, AZURE HA TEMPLATE, AZURE LOAD BALANCER, AZURE VPX, CITRIX, CONFIGURE MULTIPLE IP ADDRESSES FOR NETSCALER VPX NIC ON MICROSOFT AZURE ARM, CONFIGURE NETSCALER LOAD BALANCING, CONFIGURING AZURE NETSCALER HIGH AVAILABILITY, CONFIGURING MULTIPLE AZURE NICs AND IP ADDRESSES FOR NETSCALER VPX INSTANCES IN HA MODE, CONFIGURING MULTIPLE IP ADDRESSES FOR A NETSCALER VPX INSTANCE IN STANDALONE MODE, CONFIGURING MULTIPLE IP FOR CITRIX NETSCALER VPX ON MICROSOFT AZURE, CONFIGURING MULTIPLE IPS FOR A NETSCALER VPX APPLIANCE IN AZURE RESOURCE MANAGER, CONFIGURING MULTIPLE IPS FOR CITRIX NETSCALER VPX ON MICROSOFT AZURE, CONFIGURING MULTIPLE VIPs FOR CITRIX NETSCALER VPX ON MICROSOFT AZURE ARM CLOUD GUIDE, CONFIGURING NETSCALER HA TEMPLATE, CONFIGURING NETSCALER VPX IN HIGH AVAILABILITY MODE IN AZURE, CONFIGURING NETSCALER VPX IN HIGH AVAILABILITY MODE IN AZURE RESOURCE MANAGER, DEPLOY NETSCALER HA TEMPLATE, DEPLOY NETSCALER LOAD BALANCING, DEPLOYING CITRIX NETSCALER VPX ON MICROSOFT AZURE, LOAD BALANCING AZURE NETSCALER, MICROSOFT, MULTIPLE IP, MULTIPLE VIPs,

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PREV

Configure Citrix XenMobile Certificate Based Authentication with SecureMail SSO, APNS & Microsoft CA

NEXT

Publish Citrix XenApp & XenDesktop Resources Using VMware Identity Manager Workspace ONE

8 THOUGHTS



Farhan

25/04/2019 at 8:43 AM

Very good explanation. Thanks a lot

REPLY



Saadallah Chebaro

25/04/2019 at 7:46 PM

Thank you.

REPLY



Arun Ramalingam

30/05/2019 at 7:36 AM

Thank you so much for the details but am still stuck.

Could you mail me please, So I could explain the issue?

REPLY



Saadallah Chebaro

30/05/2019 at 1:47 PM

Send me a message through the contact us form with your issue and I will look into it. Thanks.

REPLY



Ralph

07/08/2019 at 5:46 PM

This is outstanding work, many thanks! Really fills in the missing links to understand what's going on in between Azure and the NetScalers.

REPLY



Saadallah Chebaro

07/08/2019 at 8:37 PM

Thank you Ralph .

REPLY



Ram Prasad

21/10/2019 at 6:49 PM

Excellent Valuable Information

REPLY



Saadallah Chebaro

22/10/2019 at 9:44 AM

Thank you .

REPLY

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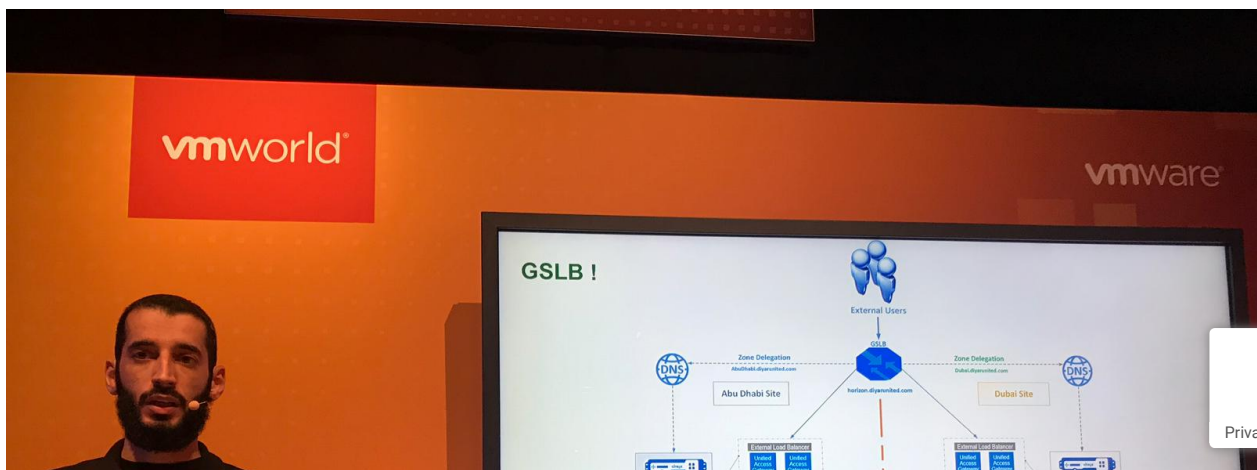
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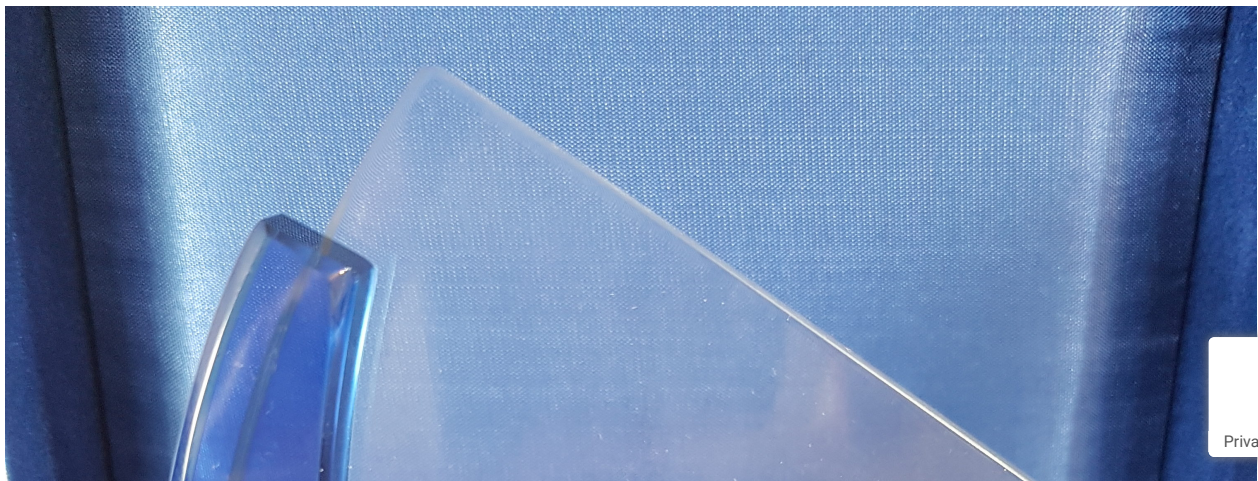
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