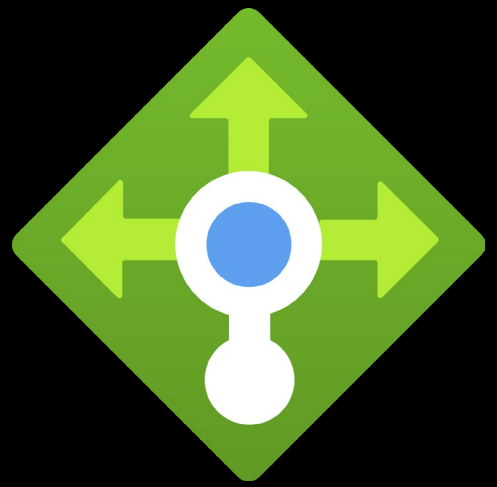
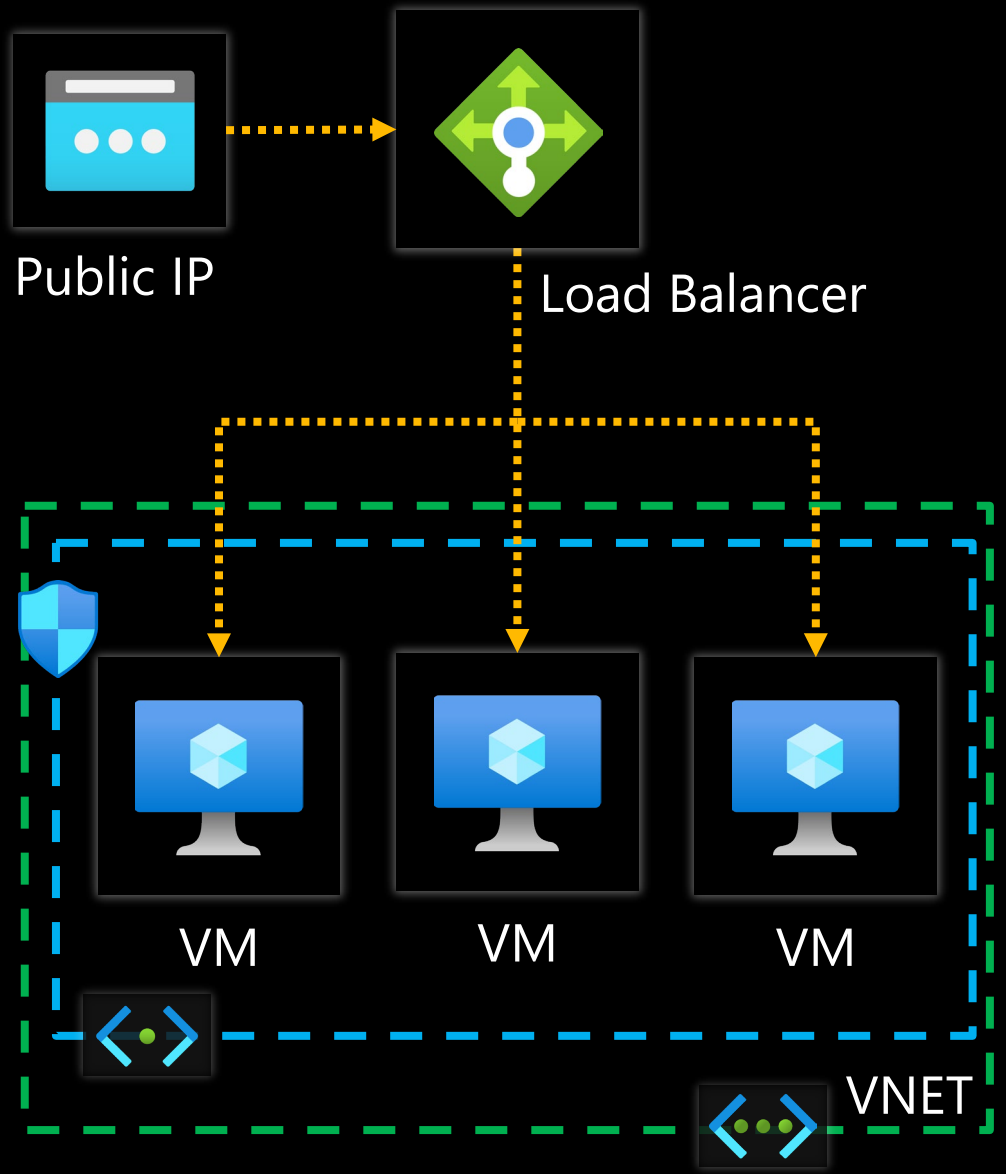
Azure Load Balancer

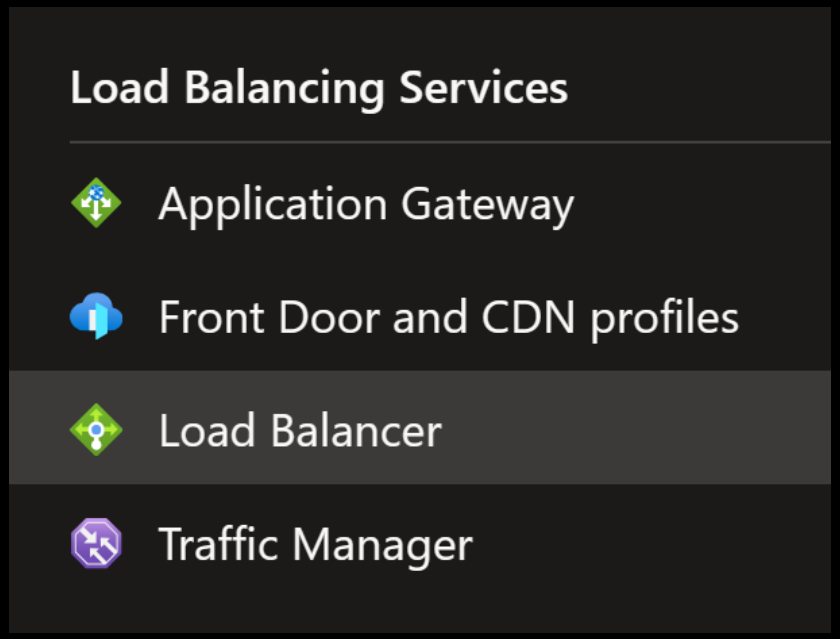


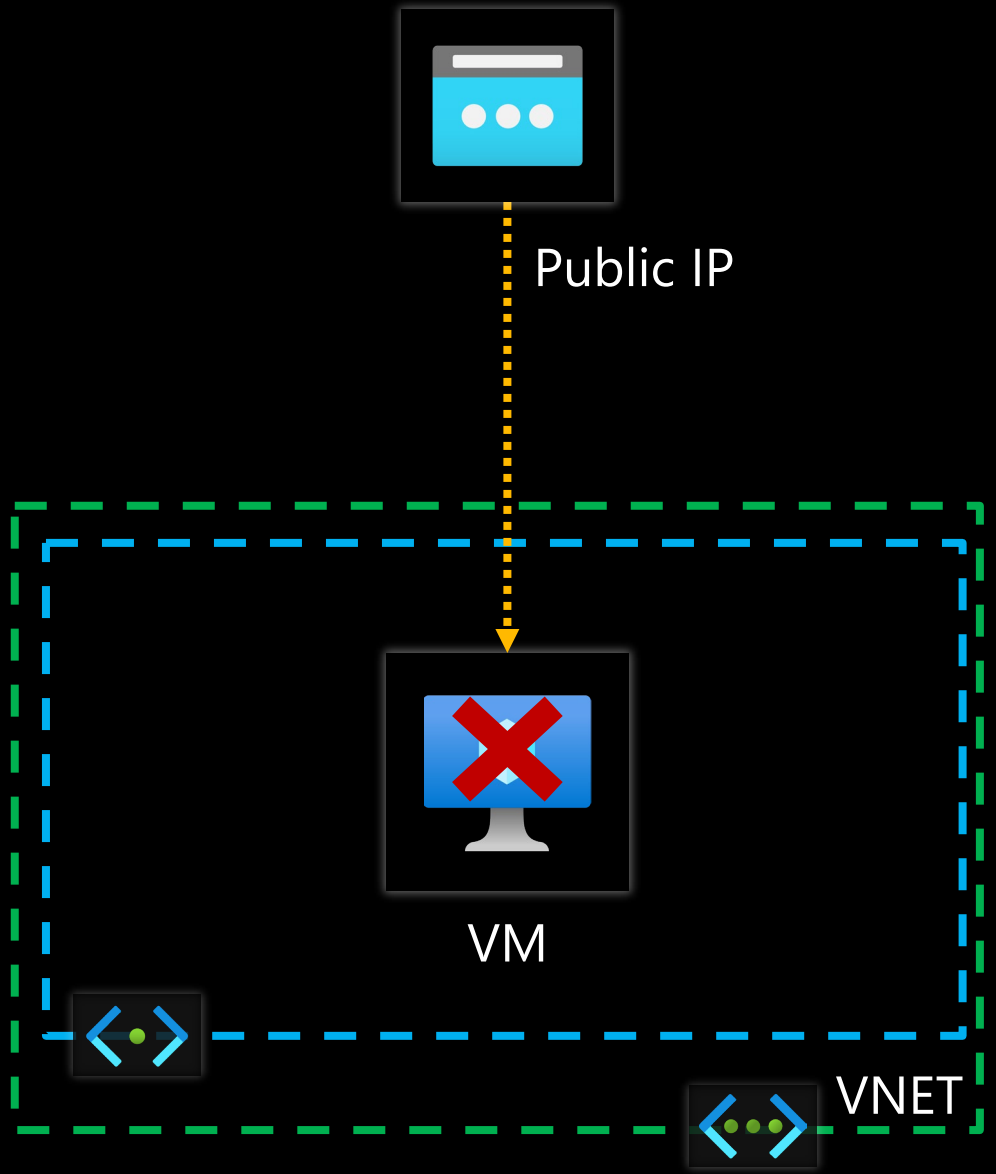


SPOF issue

The VM is Single Point of Failure (SPOF).

VM down means application unavailable.



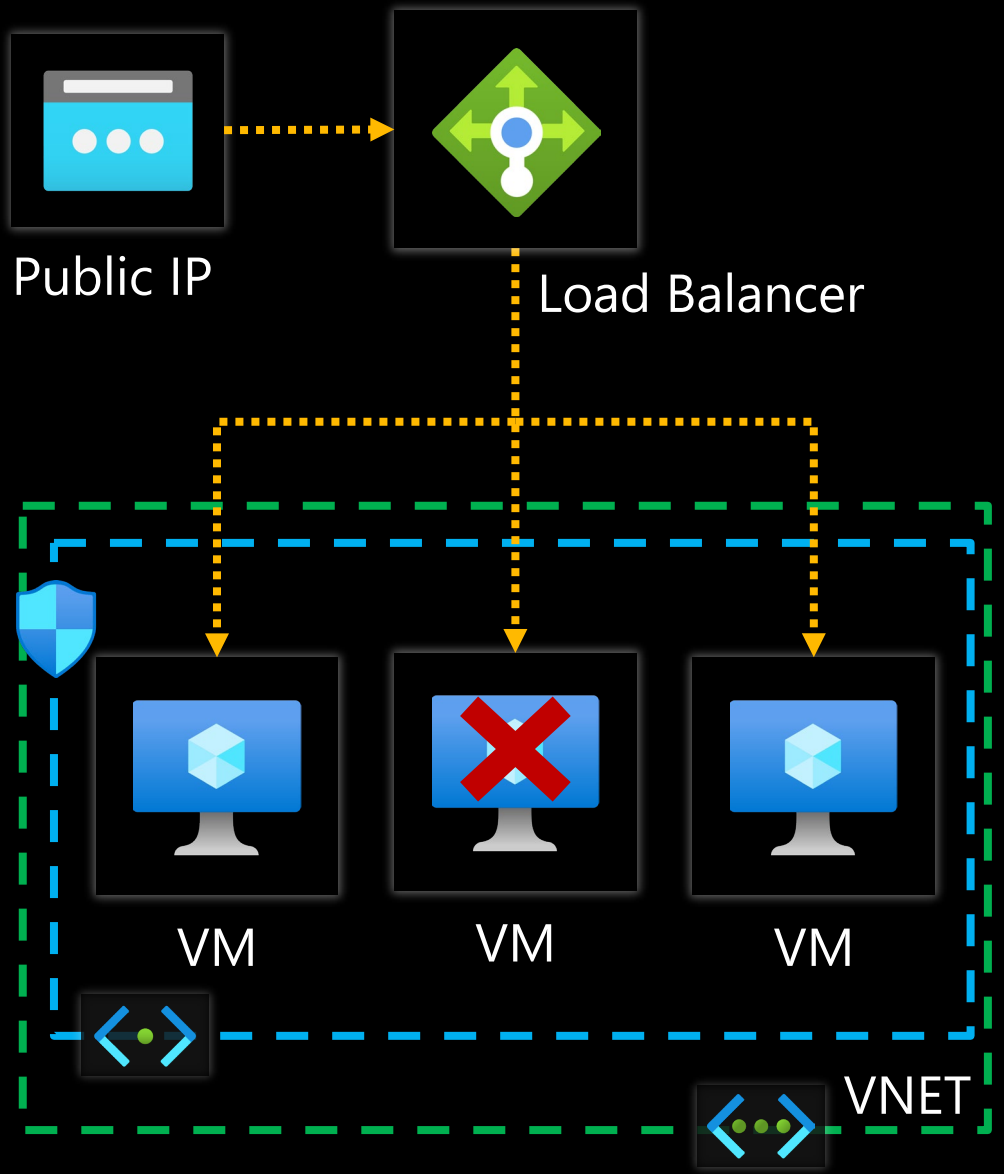


Azure Load Balancer

The VM is Single Point of Failure (SPOF).

What if you can add more VMs ?
High availability and resiliency.

1 or 2 VMs down, application is still available.



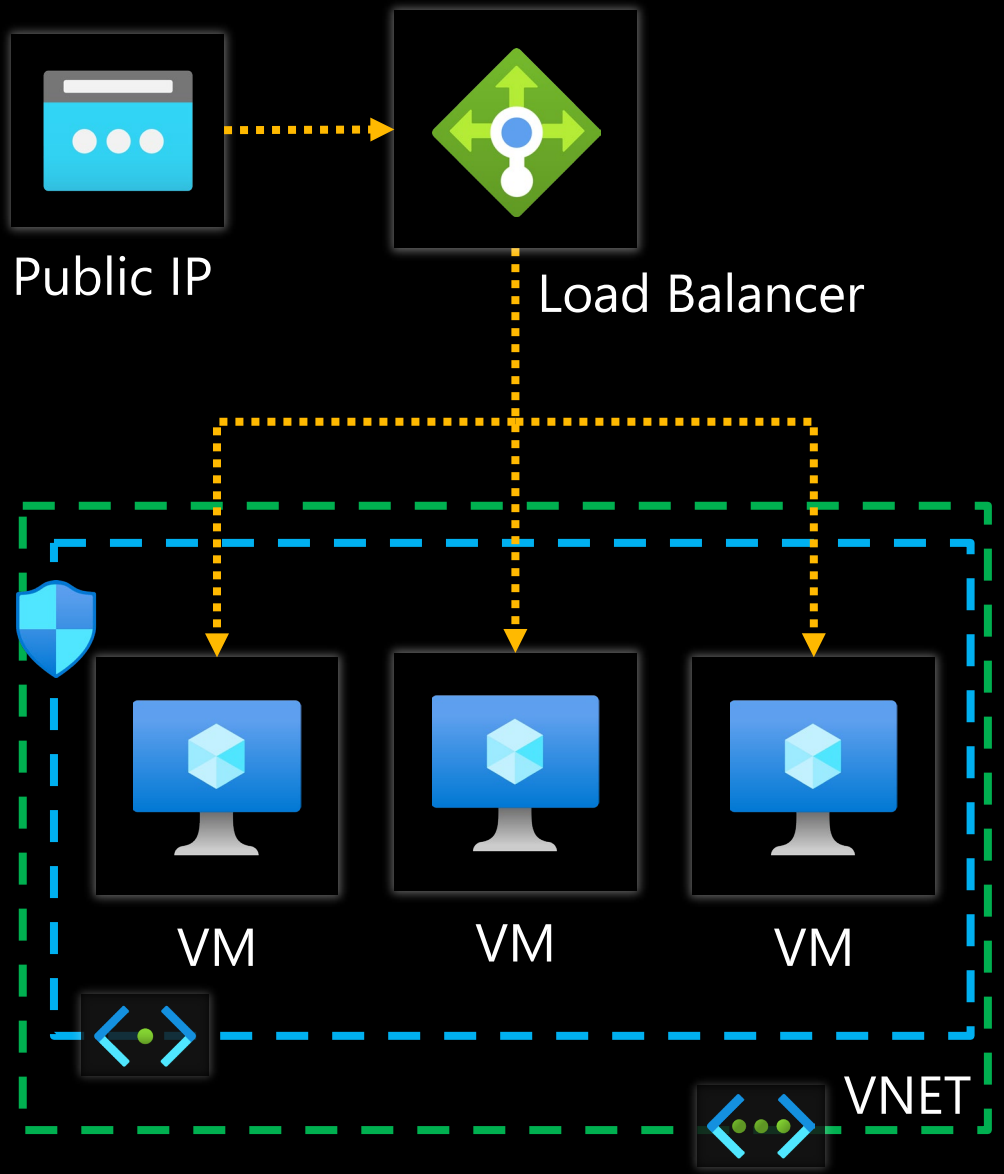
Azure Load Balancer

Distributes traffic across a group of resources like VMs or VMSS.

Operates at Layer 4 and uses the 5 tuple:

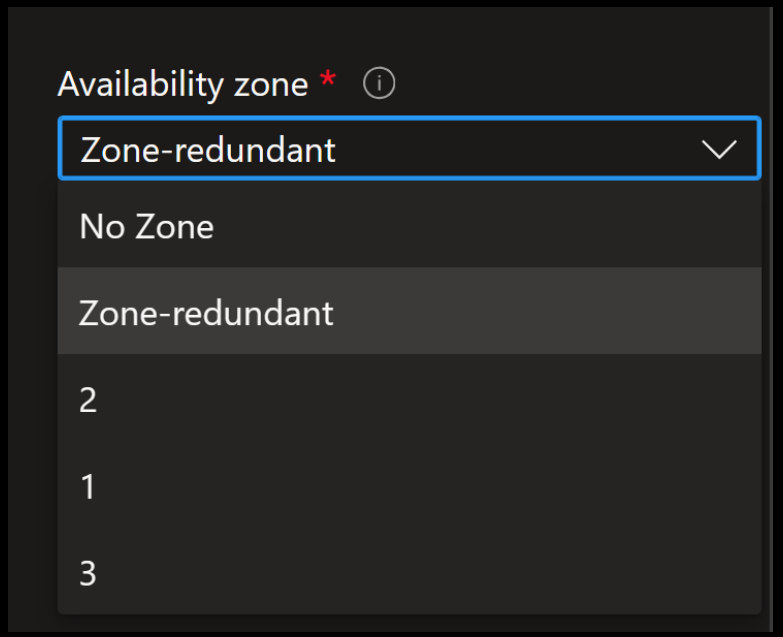
- source IP address & source port
- destination IP address & destination port
- protocol

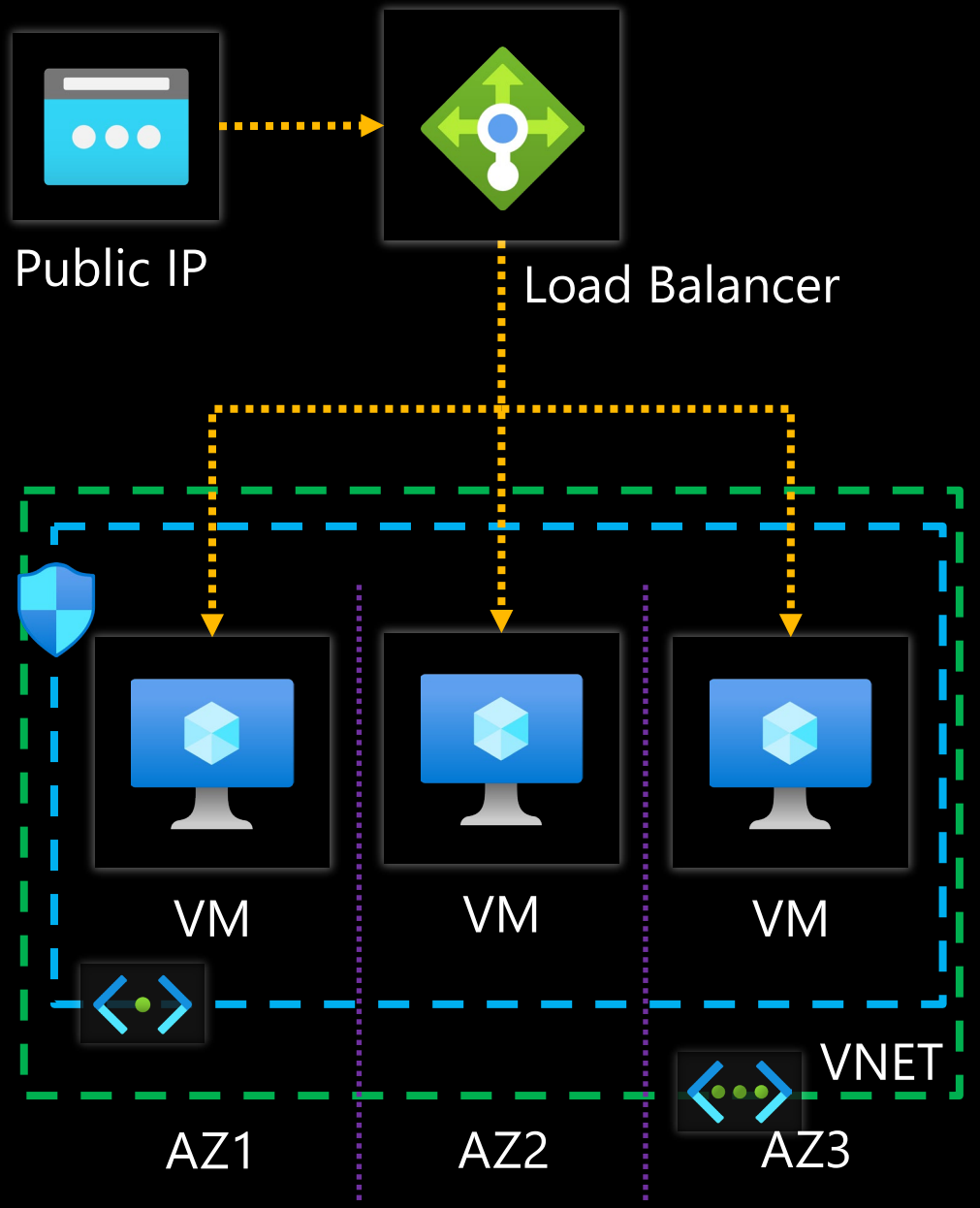
Traffic is denied by default with respect to Zero Trust network access.
Allowed by using NSG and Outbound Rules.



Azure Load Balancer & availability zones

Standard (not Basic) Load Balancer supports availability zones.





Azure Load Balancer SKU

	Basic	Standard
Backend type	NIC based	NIC based, IP based
Health probes	TCP, HTTP	TCP, HTTP, HTTPS
Availability zones	Not available	Zone-redundant
NAT Gateway	Not supported	Supported
Private Link	Not supported	Supported
SLA	Not available	99.99 %
Secure by default	Open by default. Network security group optional.	Closed to inbound flows unless allowed by an NSG. Internal traffic from the VNET to the internal load balancer is allowed.

learn.microsoft.com/en-us/azure/load-balancer/skus

Azure Load Balancer - pricing

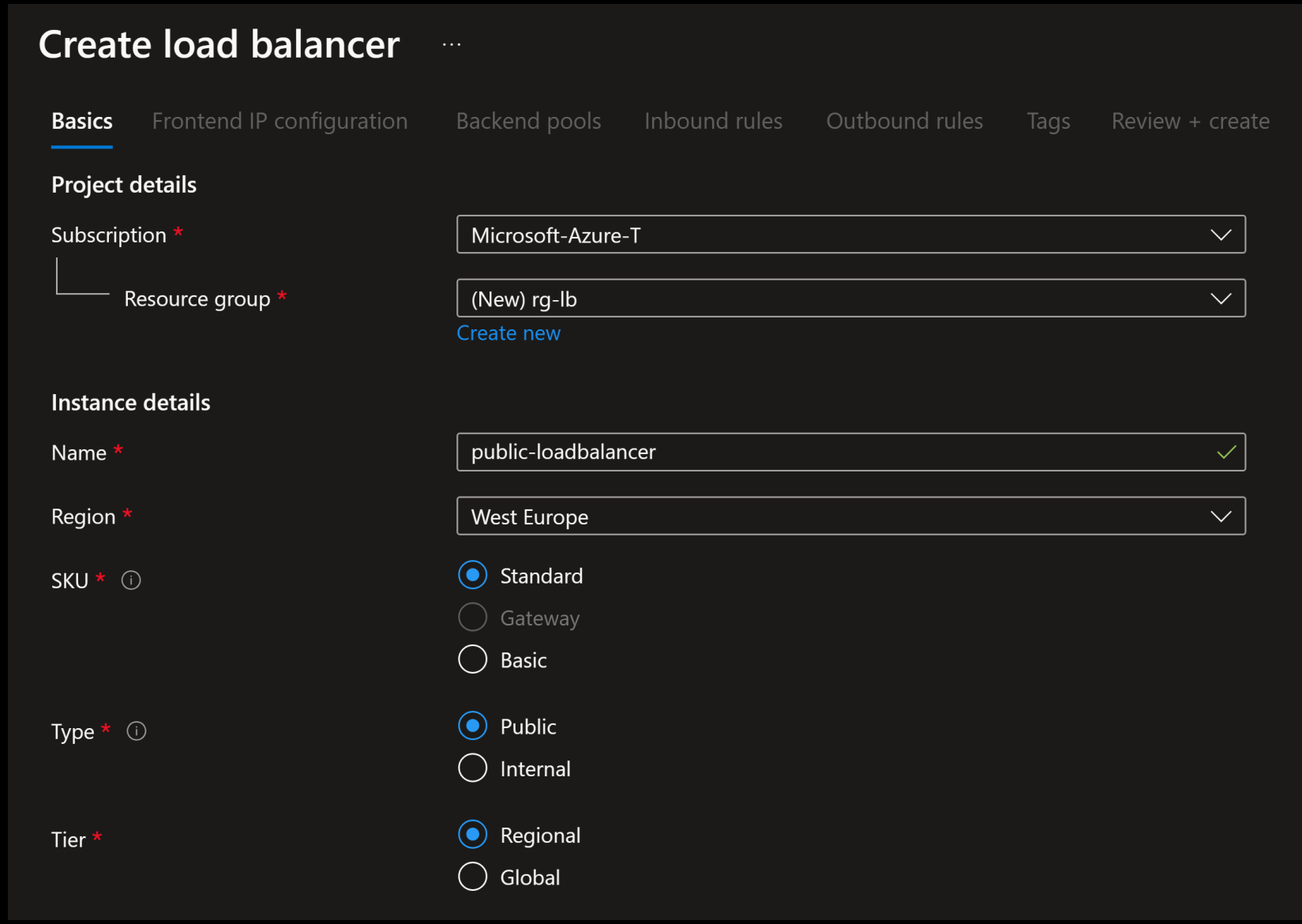
azure.microsoft.com/en-us/pricing/details/load-balancer

Standard Load Balancer	Regional Tier Price	Global Tier Price
First 5 rules	**$0.025**/hour	**$0.025**/hour
Additional rules	**$0.01**/rule/hour	**$0.01**/rule/hour
Inbound NAT rules	Free	Free
Data processed (GB)	**$0.005** per GB	No additional charge*

Creating Azure Load Balancer

Should specify:

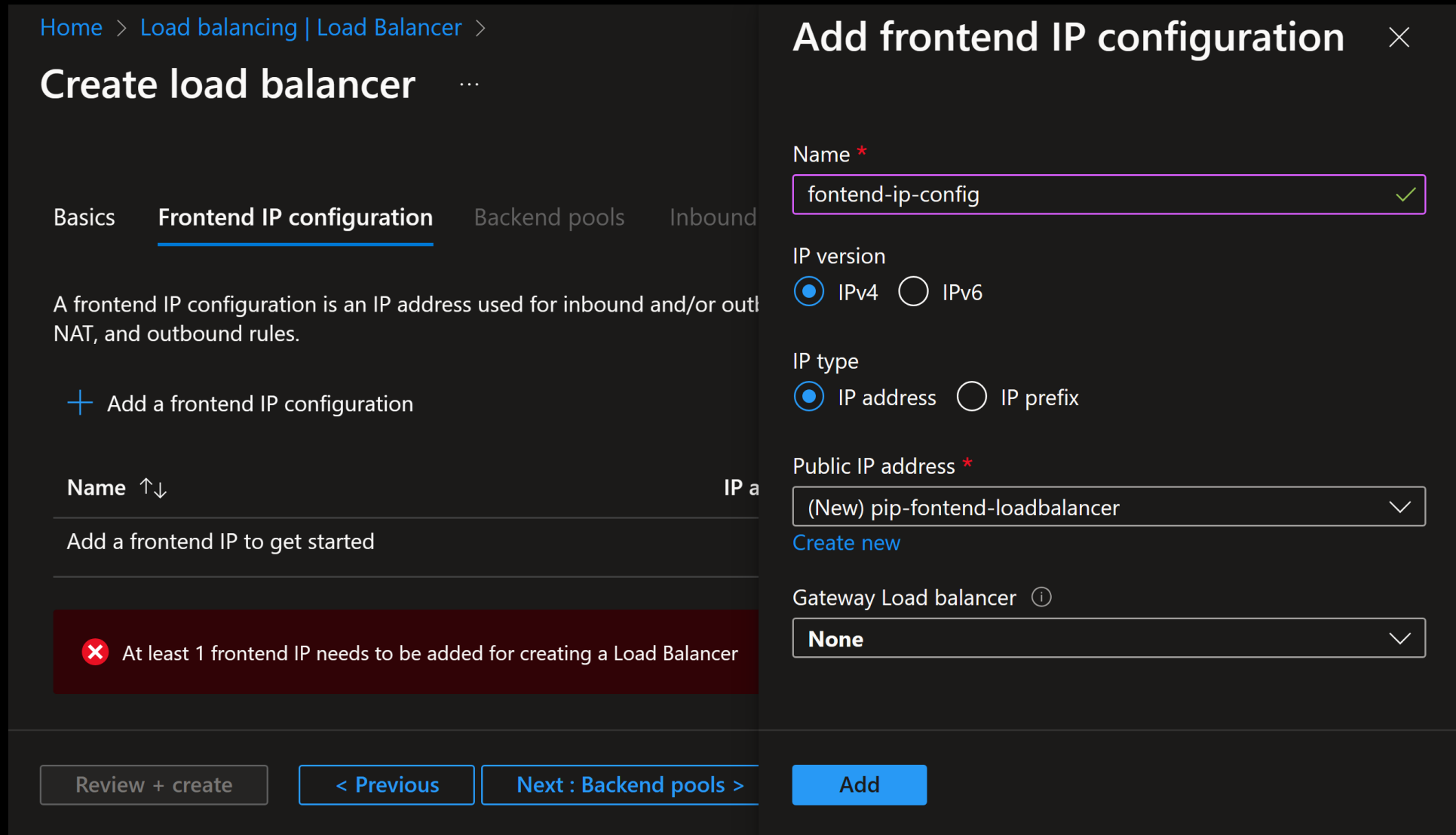
- Name & RG
- Region
- SKU
- Type
- Tier



Creating Load Balancer and Public IP

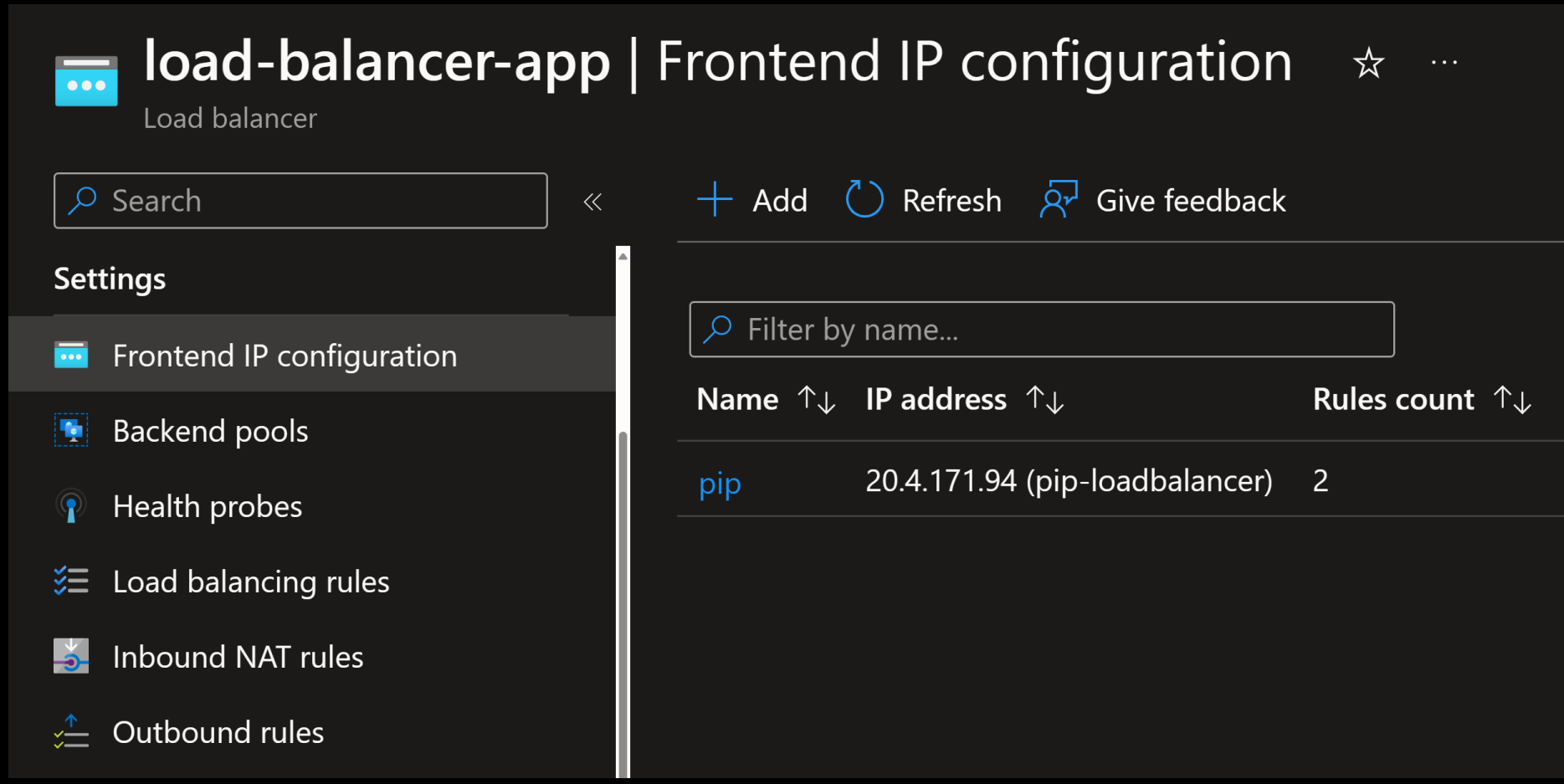
Public Load Balancer needs Public IP address.

PIP will be used for frontend configuration.



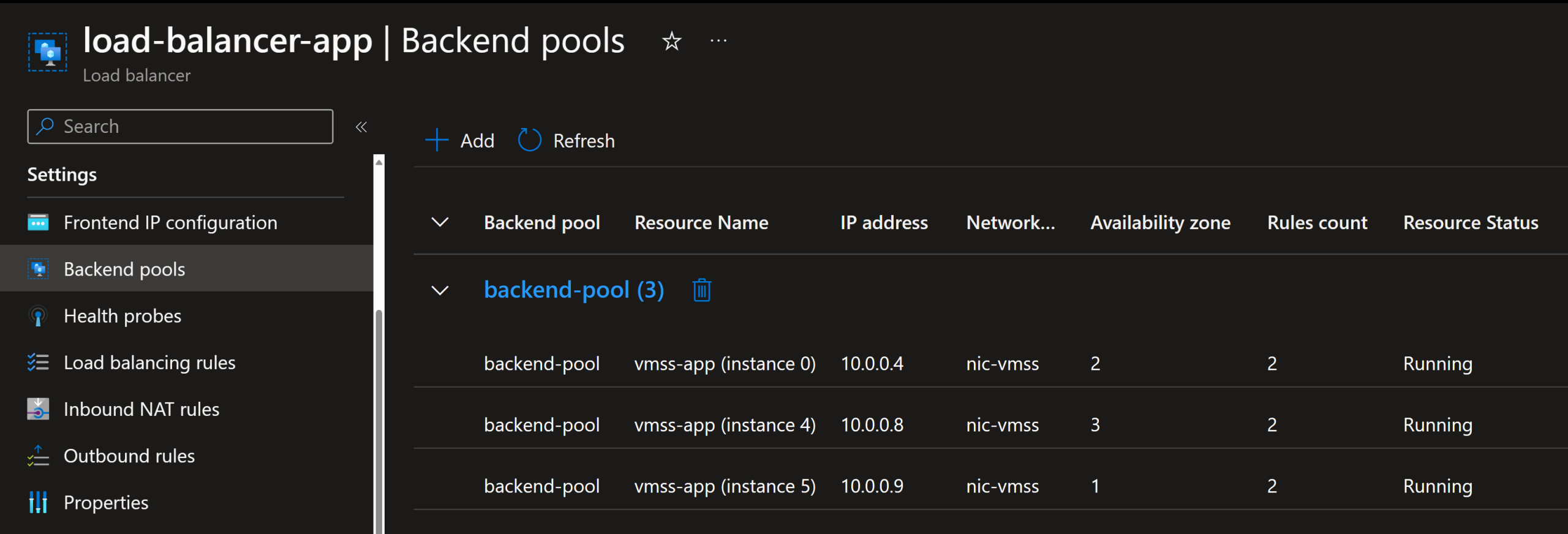
Configuring Load Balancer Frontend IP

Can use one or multiple frontend IPs to get incoming network traffic.



Configuring Load Balancer Backend Pool

The group of virtual machines or instances in a virtual machine scale set that is serving the incoming request.

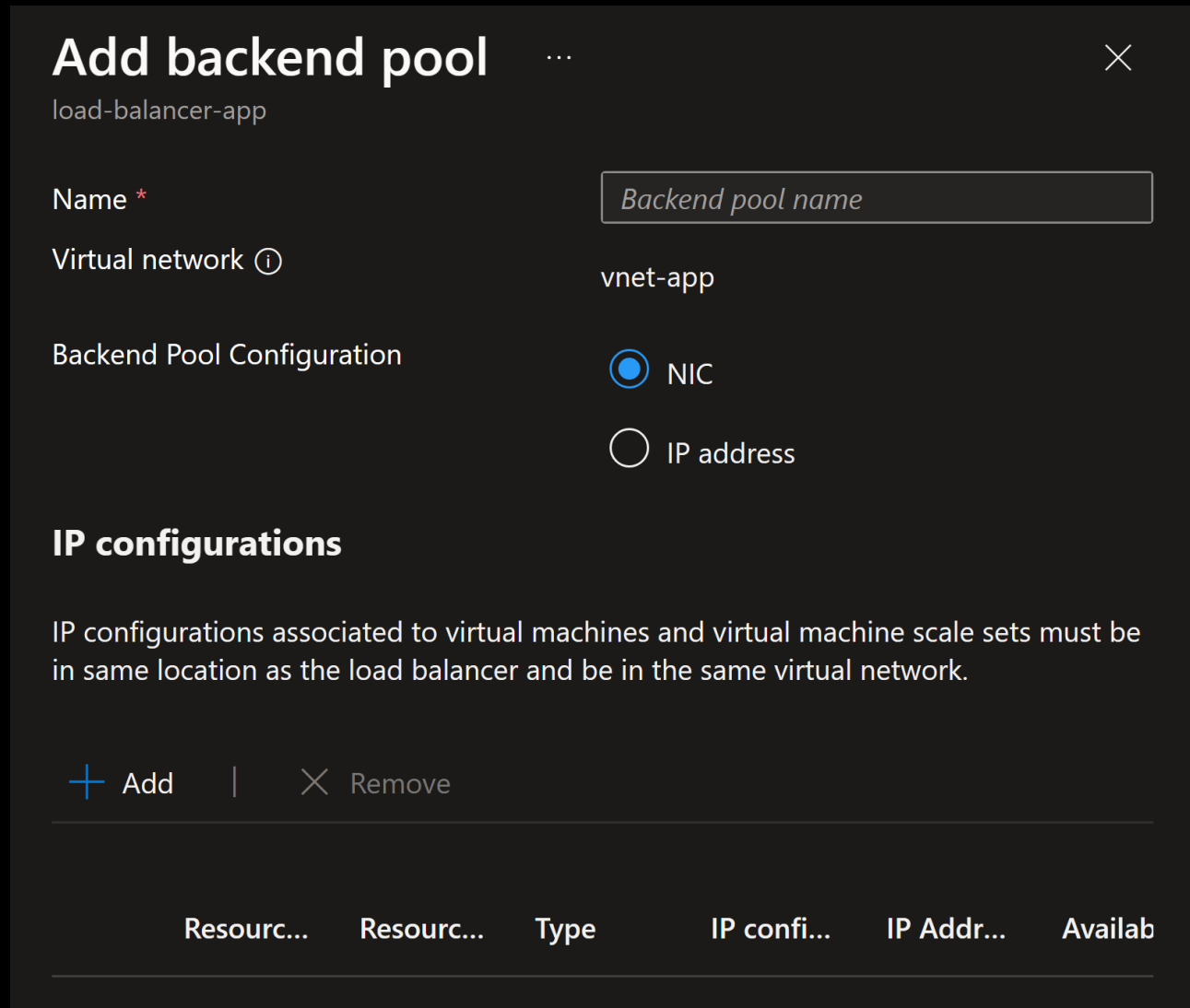


Configuring Load Balancer Backend Pool

Backend Pool could be added by using:

- Network Interface Card (NIC)
- IP address

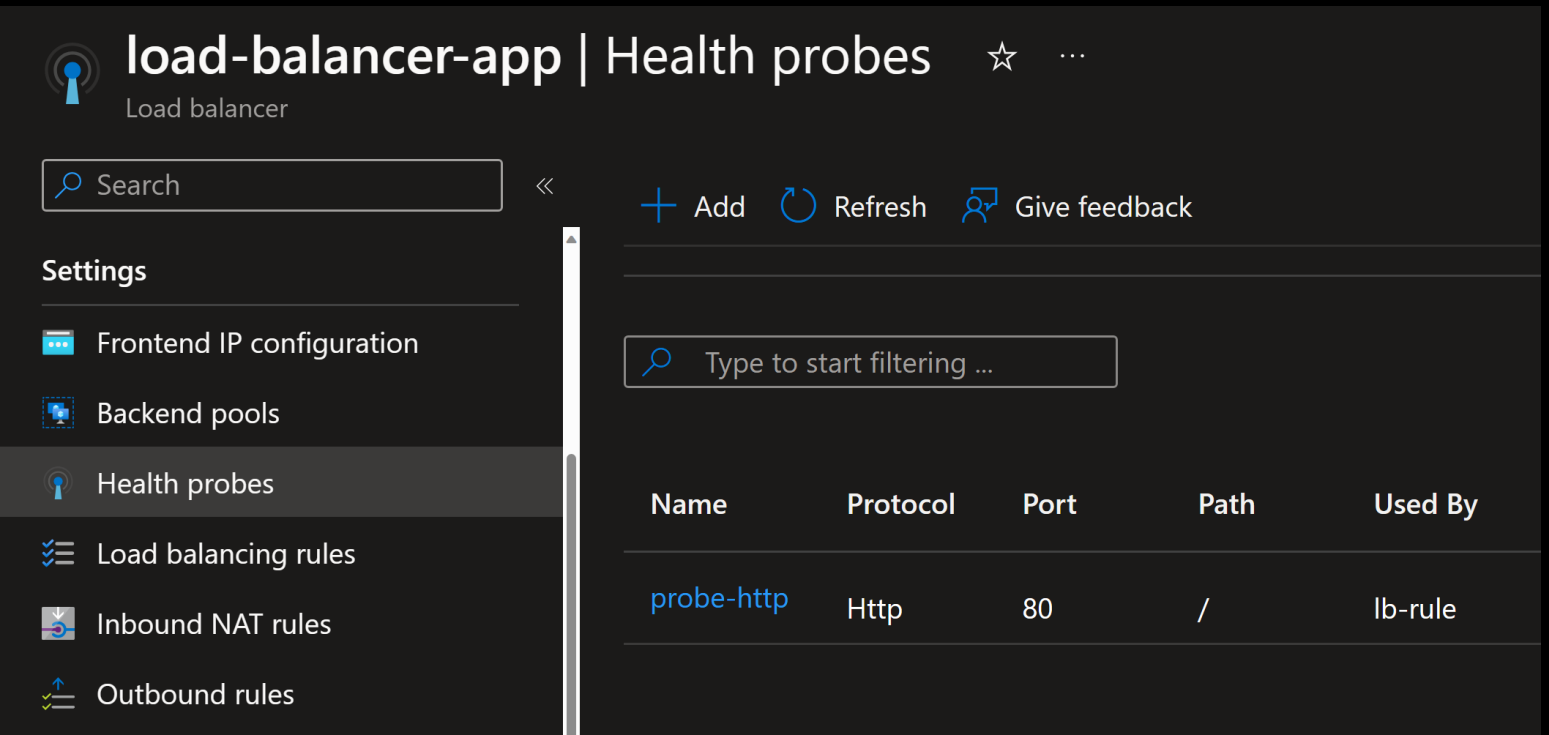
NIC is recommended.

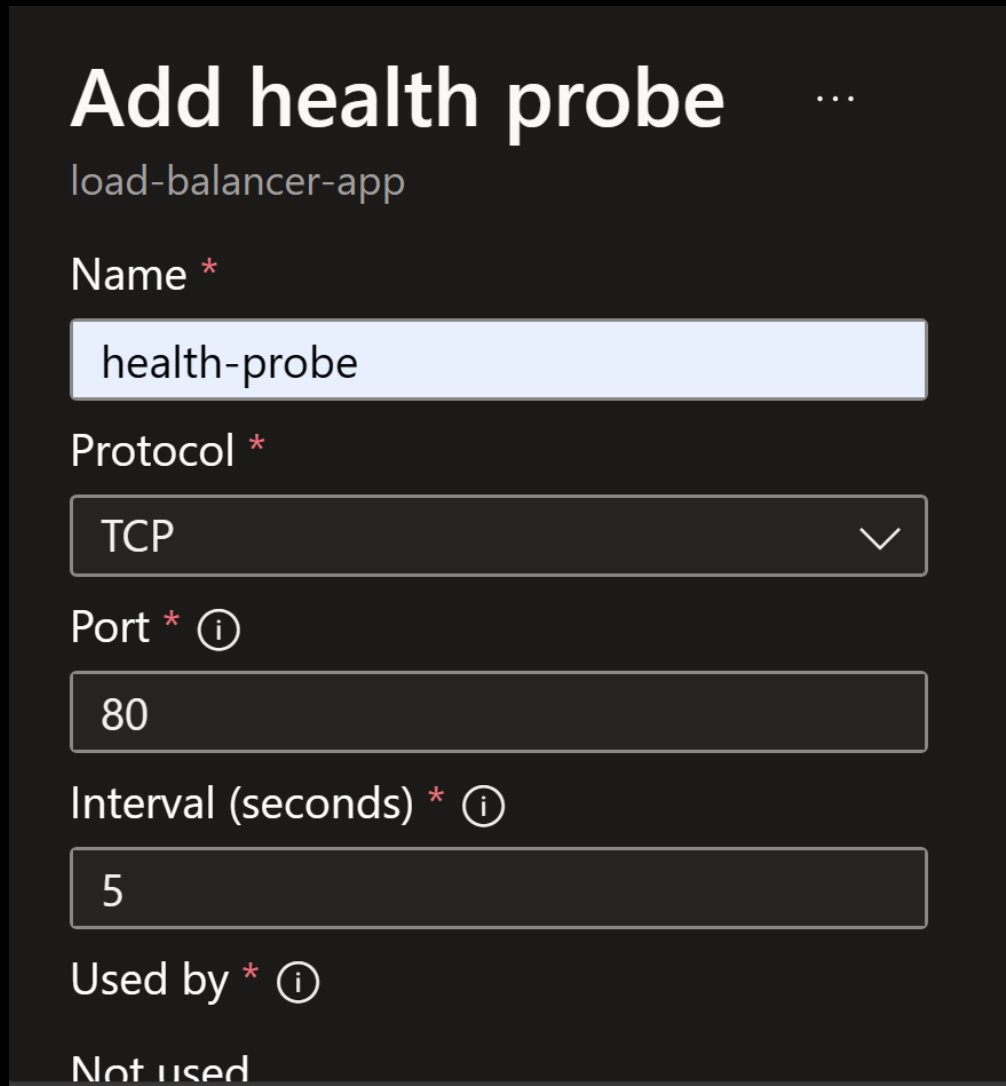


Configuring Load Balancer Health probe

Health probe determines if an instance is healthy and can receive traffic.

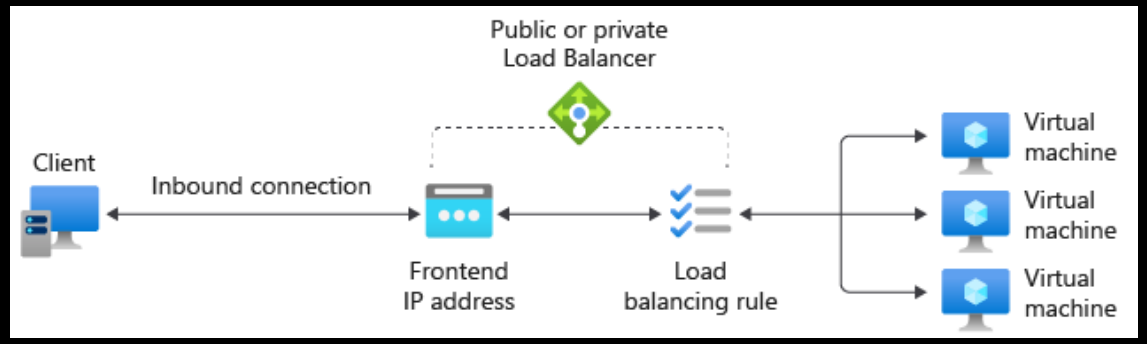
Supports TCP, HTTP, and HTTPS.





Configuring Load Balancer Rules

Rule defines how incoming traffic is distributed to all the instances within the backend pool.



load-balancer-app | Load balancing rules

Load balancer

Search

Settings

- Frontend IP configuration
- Backend pools
- Health probes
- Load balancing rules

Add | Refresh | Delete

Name	Protocol	Backend pool	Health probe
lb-rule	TCP/80	backend-pool	probe-http

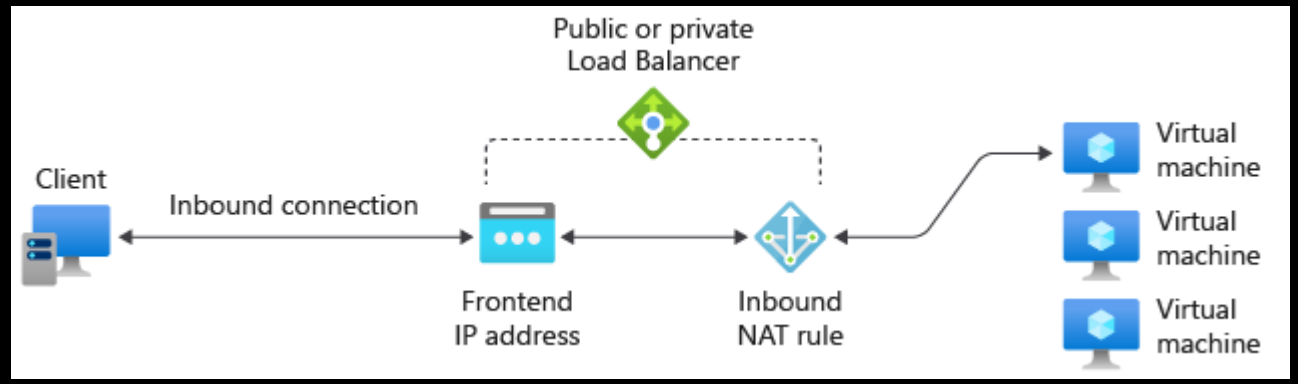
Add load balancing rule

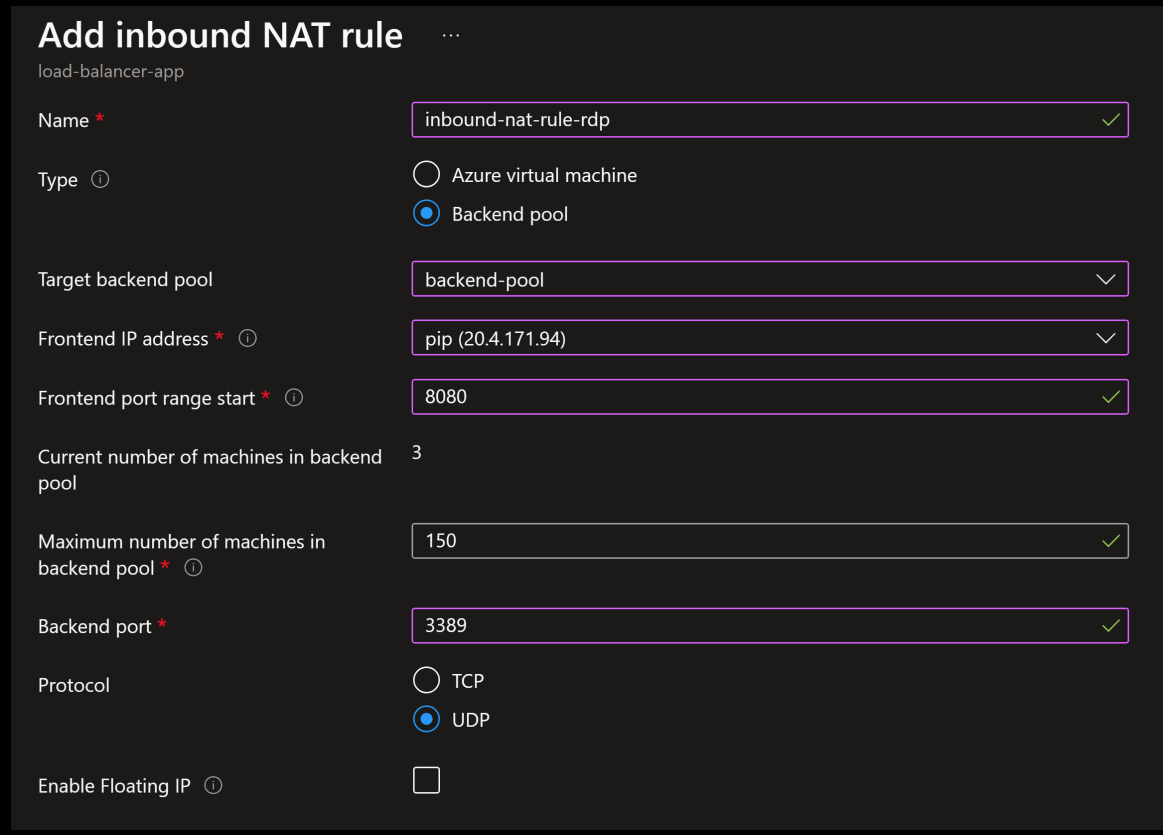
load-balancer-app

Name *	lb-rule-01
IP Version *	IPv4 / IPv6
Frontend IP address *	pip (20.4.171.94)
Backend pool *	backend-pool
Protocol	TCP / UDP
Port *	80
Backend port *	80
Health probe *	probe-http (HTTP:80)
	Create new
Session persistence	None
Idle timeout (minutes) *	4
Enable TCP Reset	☐
Enable Floating IP	☐
Outbound source network address translation (SNAT)	(Recommended) Use outbound rules to provide backend pool members access to the internet. Learn more. / Use default port allocation to provide backend pool members with a minimal set of SNAT ports. This is not recommended because it can cause SNAT port exhaustion. Learn more.

Load Balancer Inbound NAT Rules

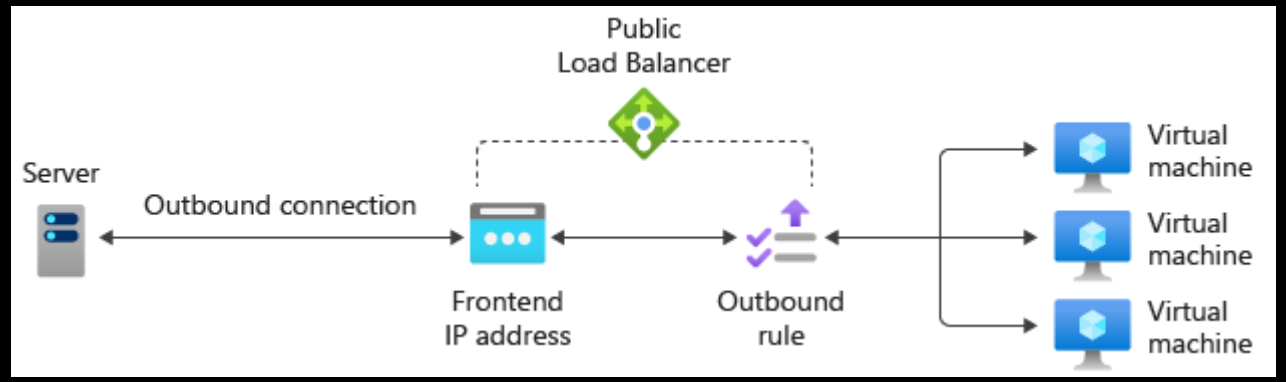
An inbound NAT rule forwards incoming traffic to a specific virtual machine.

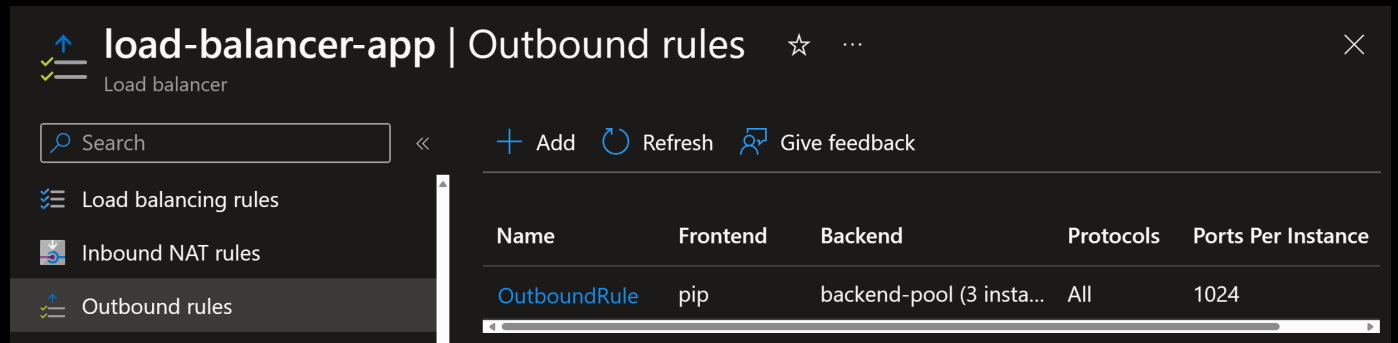


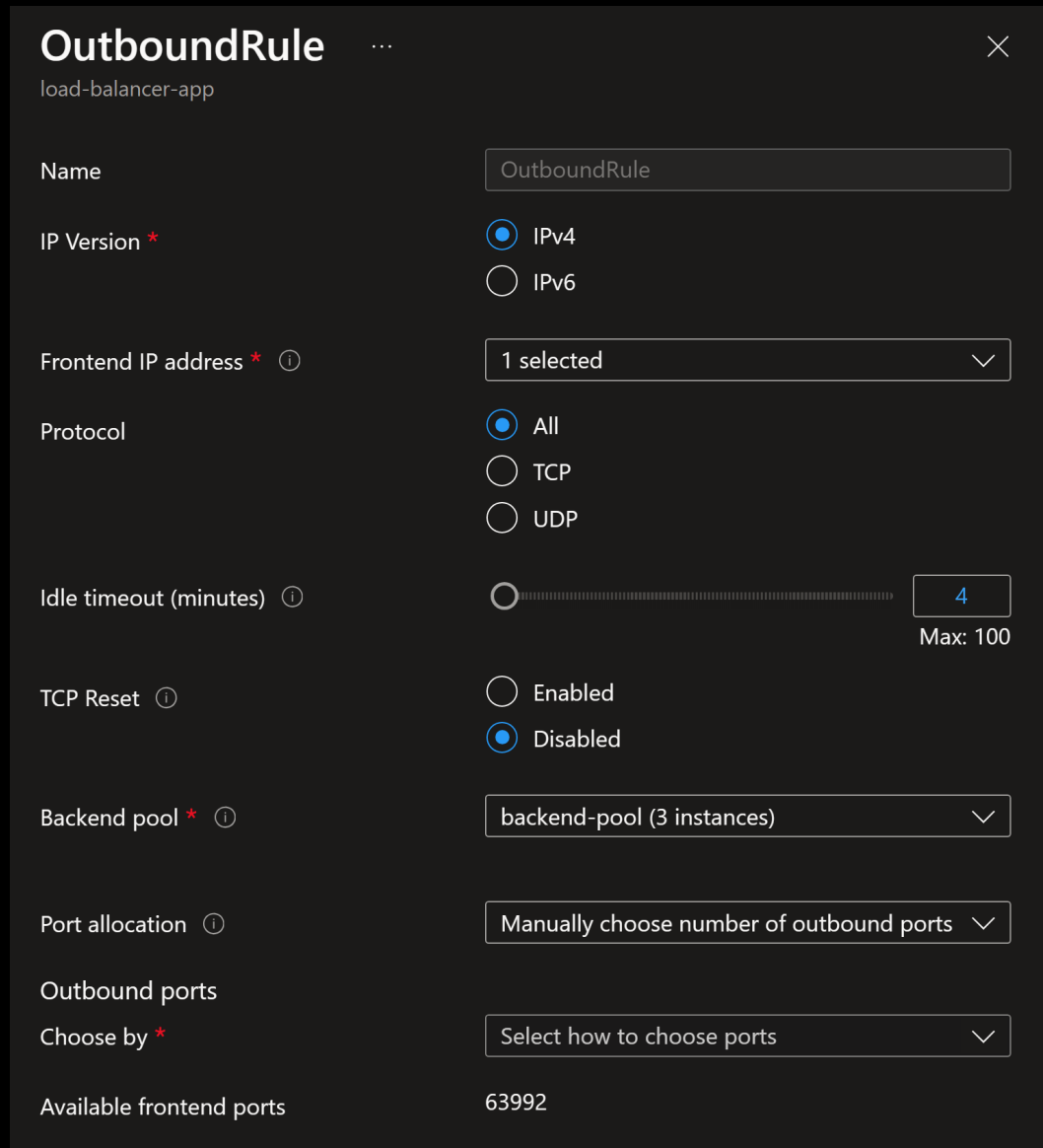


Load Balancer Outbound Rules

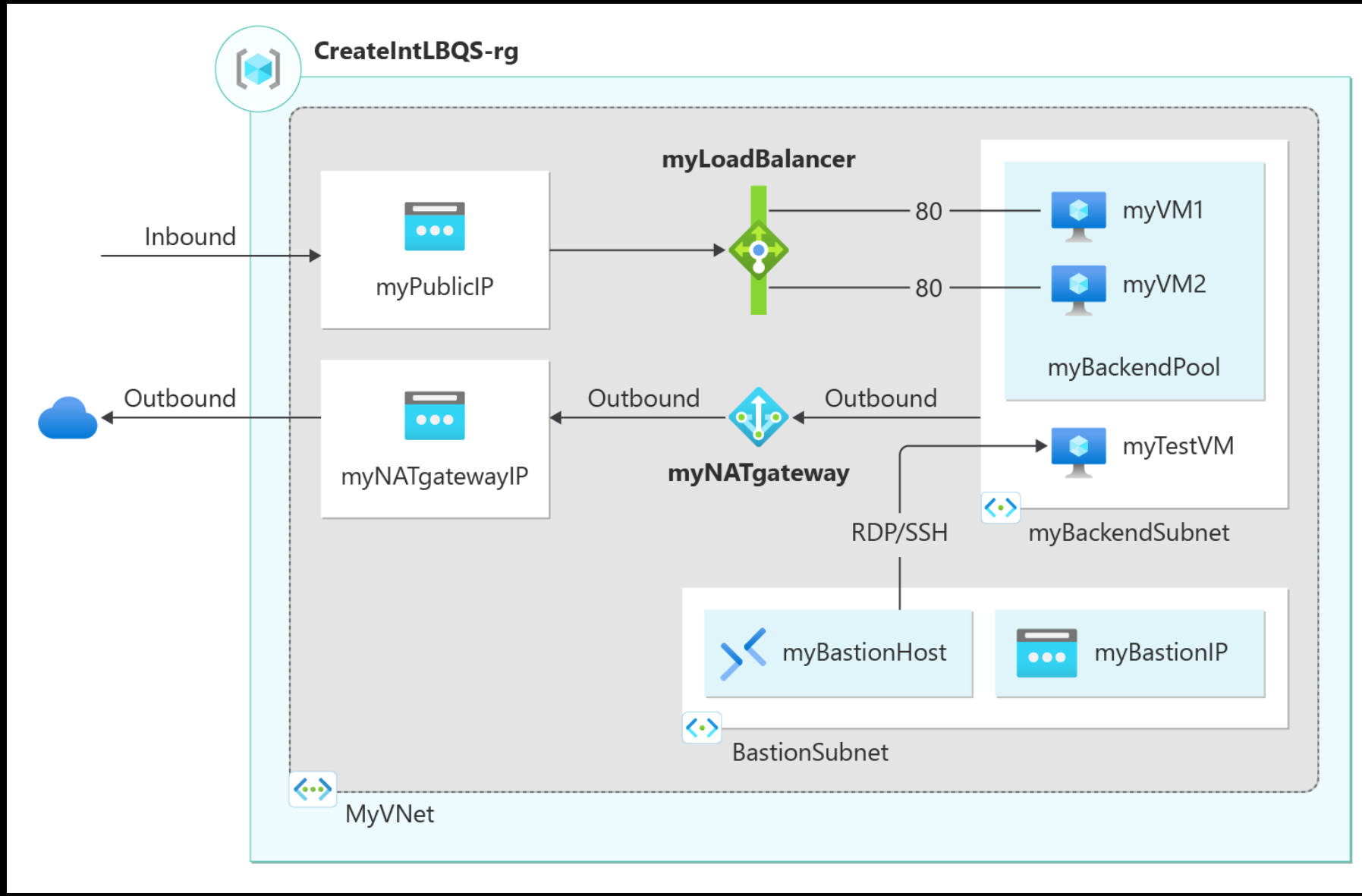
Outbound traffic is disabled by default.
Configures outbound Network Address Translation (NAT) for all VMs in the backend pool.
Enables instances in the backend to communicate (outbound) to the internet or other endpoints.
Can reuse the same Public IP for inbound and outbound.







Azure Public Load Balancer

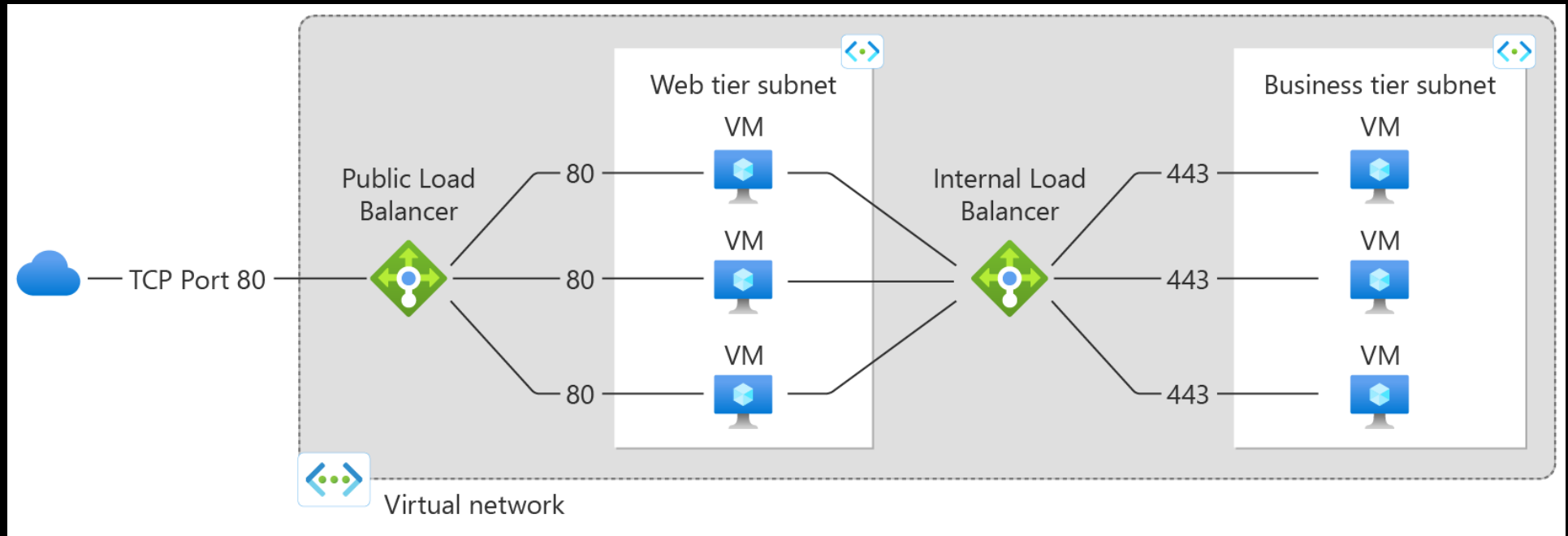


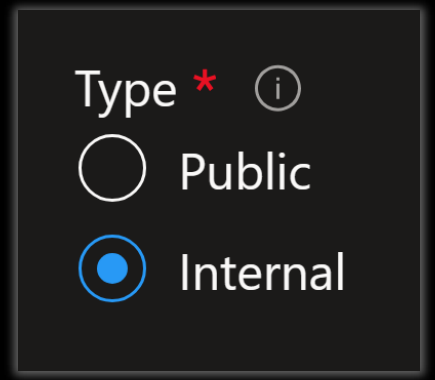
github.com/HoussemDellai/azure-network-course

Public and internal Load Balancer

Public Load Balancers are used to load balance internet traffic to your VMs.
They have a public IP address(es).

Internal load balancers are used to load balance traffic inside a virtual network.
They have a private IP address within a subnet.



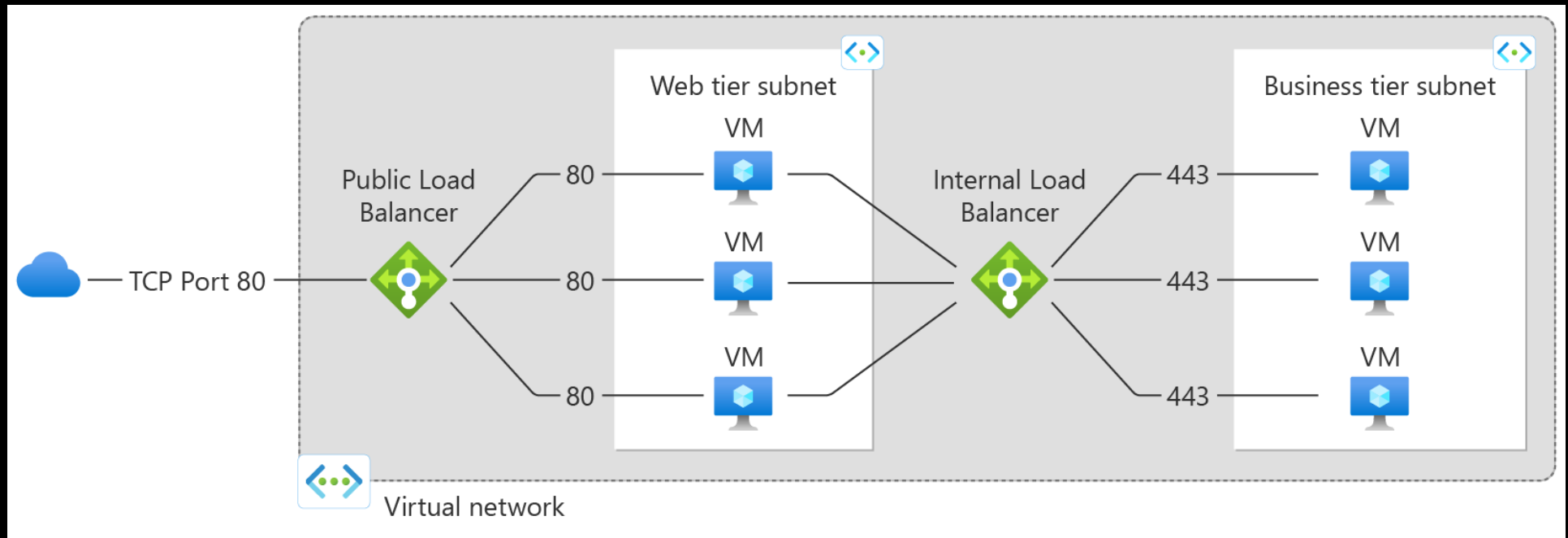


Internal (private) Load Balancer (ILB)

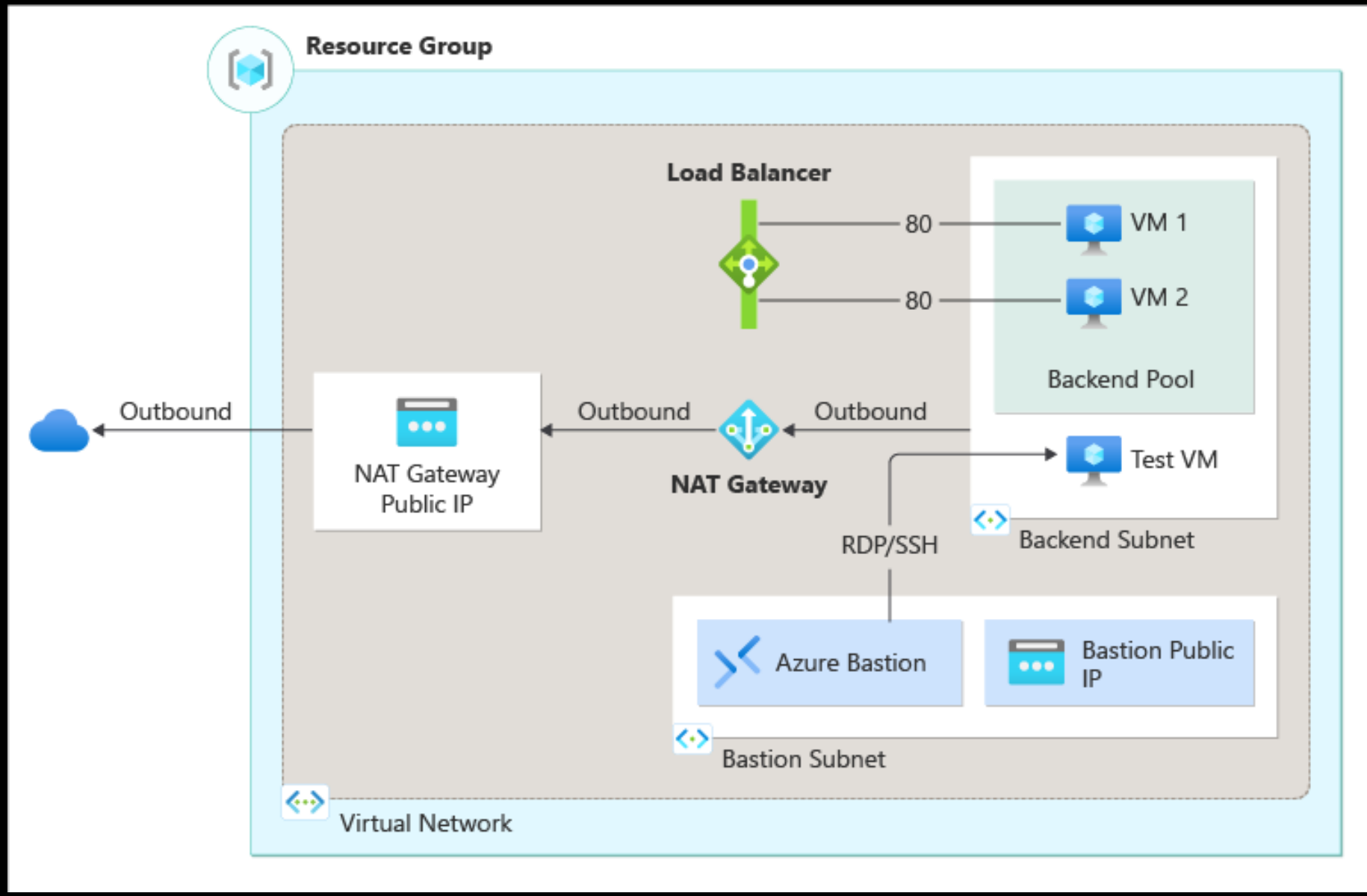
Exposed with private IP address within the virtual network. Doesn't use Public IP.

It couldn't provide outbound access to its backend resources.
=> Need to use Nat Gateway.

Could be accessed by resources within the same or peered network and on-premises.



Azure Internal Load Balancer



github.com/HoussemDellai/azure-network-course