# 9. Load balancing in Azure

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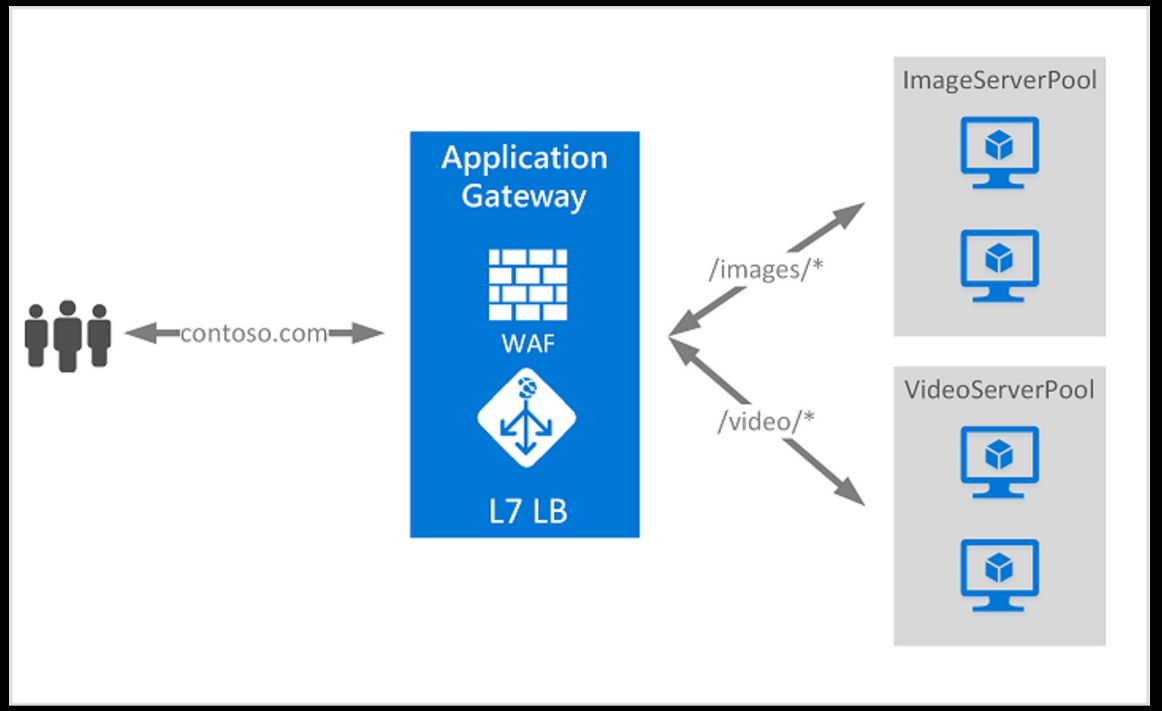
# NAT (Network Address Transition)

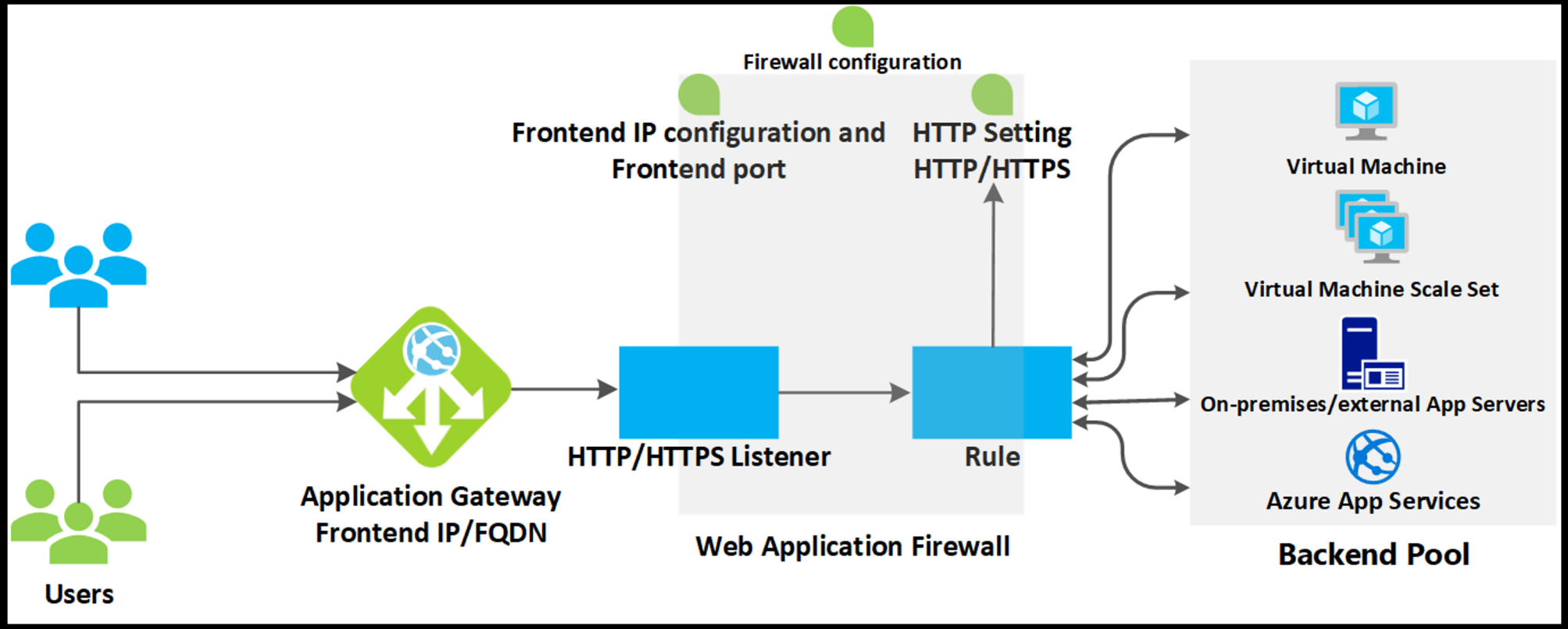
- network의 주소를 다른 네트워크의 주소로 변환
- 보안, 제한된 IPV4 pool 의 단점을 보완

# Azure Application Gateway (L7 LB, AWS ALB)

- L7 Load Balancer
- HTTP Header 해석 가능
- WAF 지원!
- Round robin 방식
- Multi AZ 구성 가능



# Application Gateway 구성



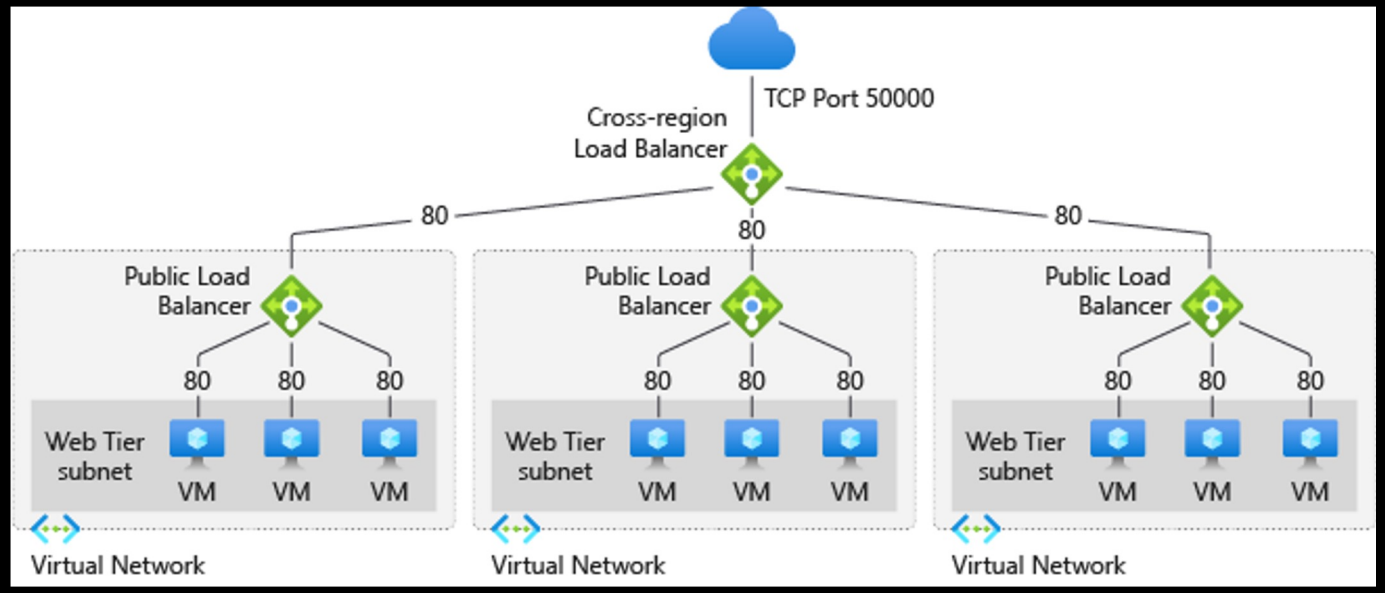
# Application Gateway TIP

- 원할한 auto scaling을 위해 충분한 서브넷 주소 공간 필요
  (The instance counts can range from 0 to 125)

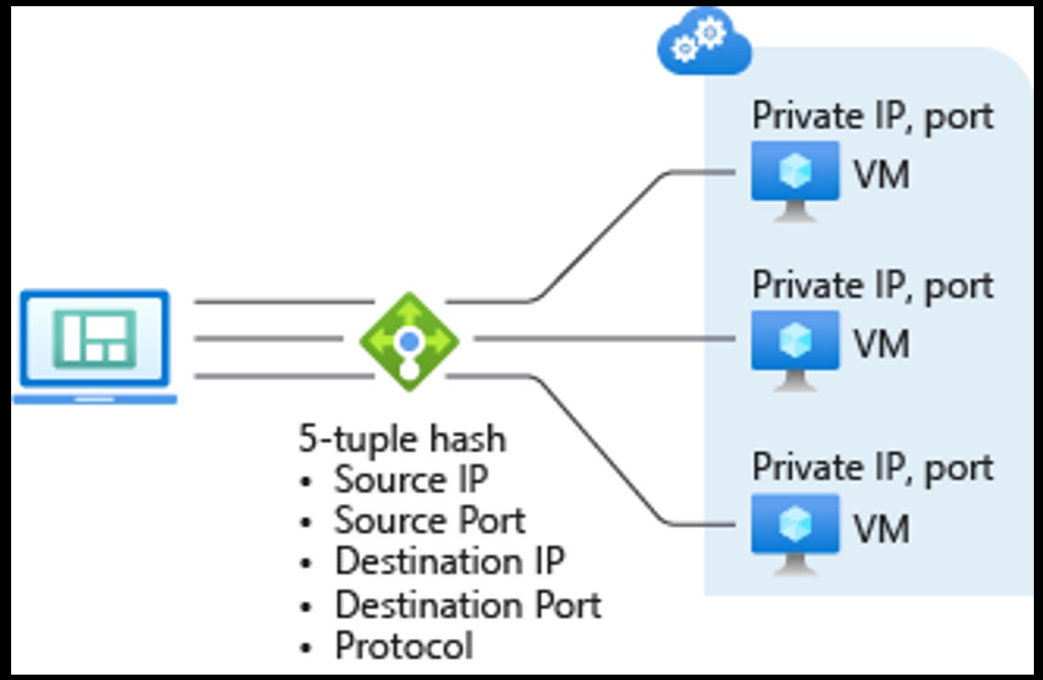
- ~~NSG, source GatewayManager, dest any 65200-65535 port~~

# Azure Load Balancer (L4, AWS NLB)

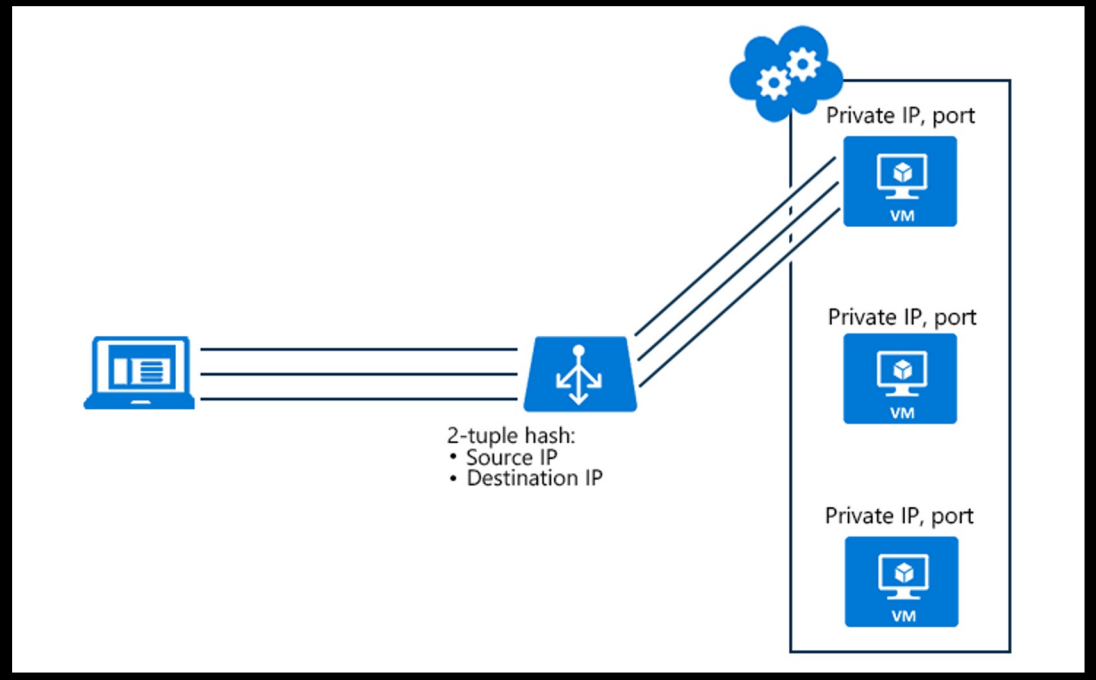
- L4 Load Balancer
- low latency,
  high throughput
- Direct Server Return
- Hash based routing
- Regional full managed



# Hash based routing

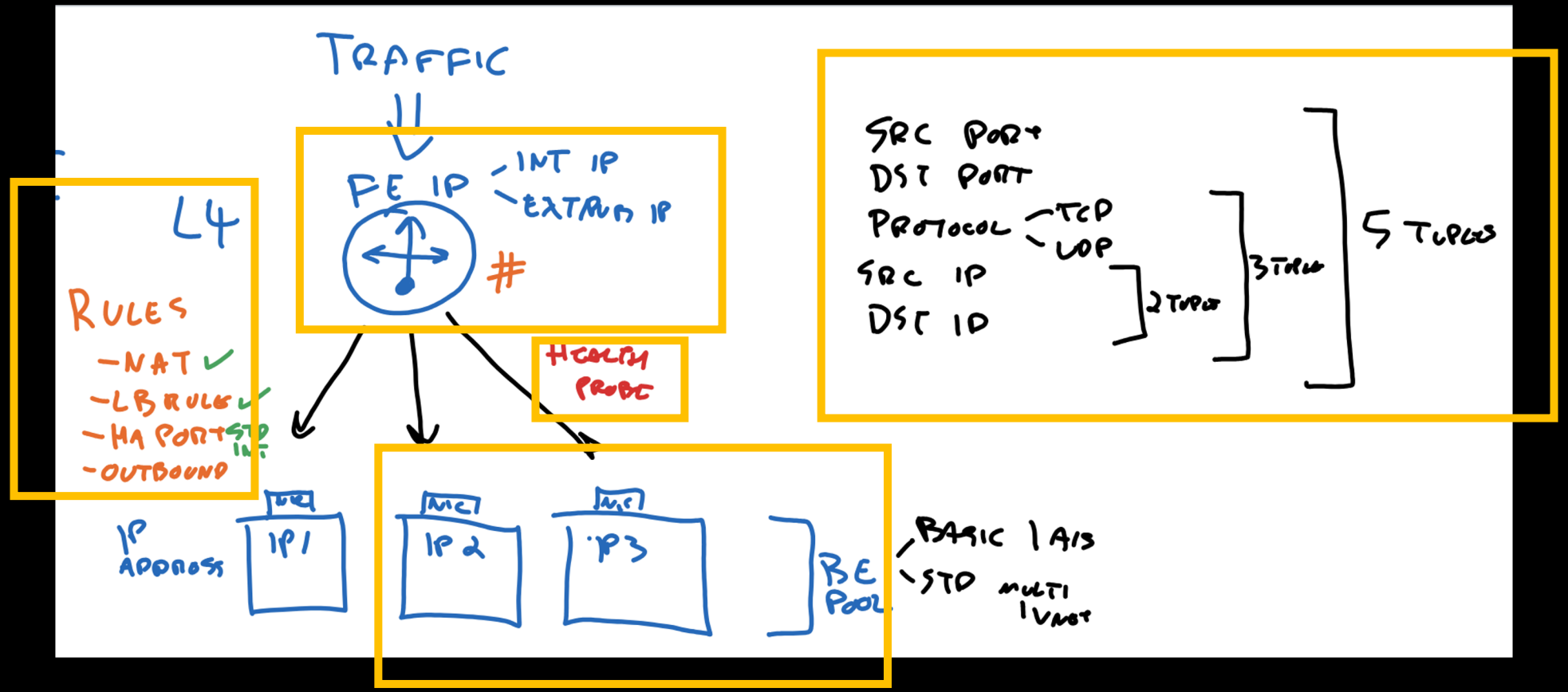



5-tuple hash
(**default**)



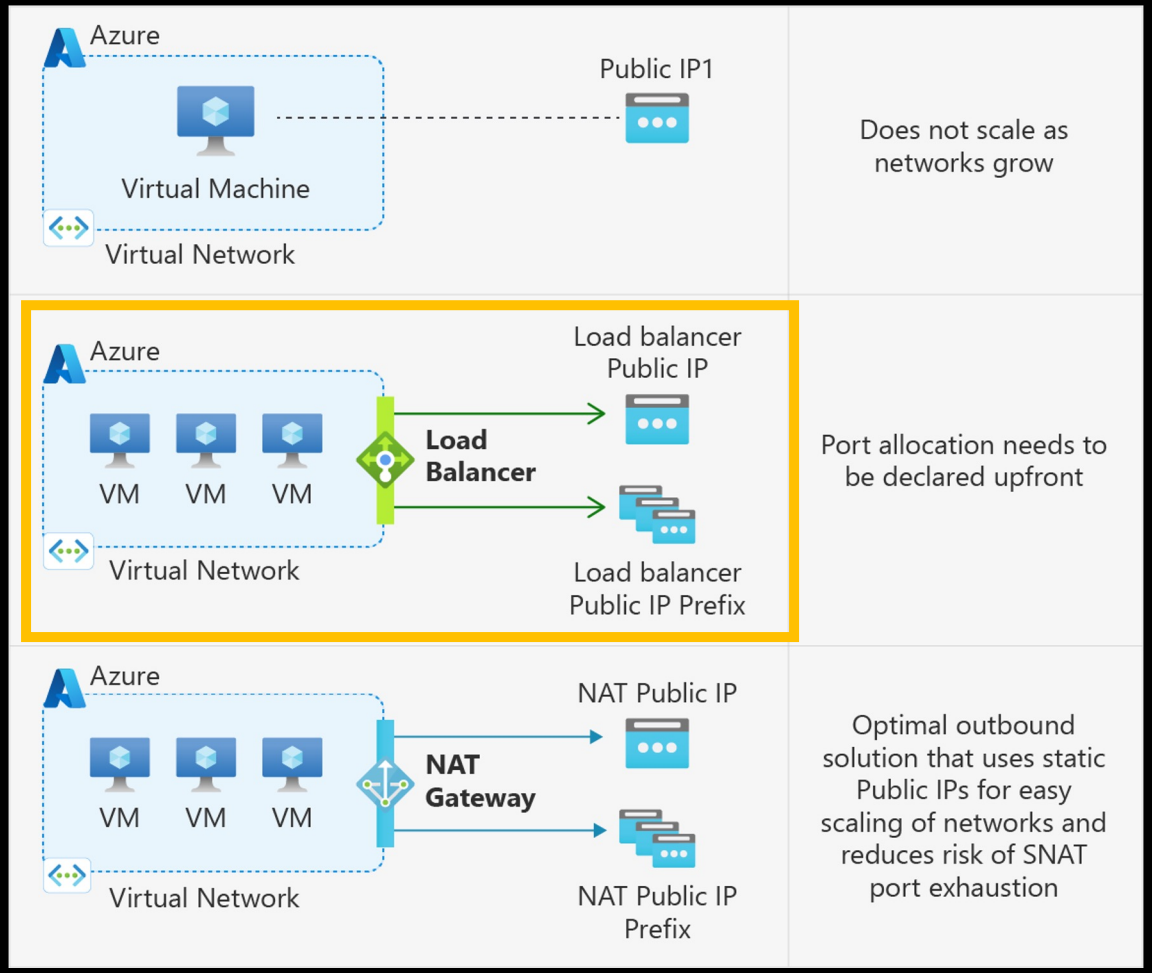

2-tuple hash (sticky)

# Azure Load Balancer 구성



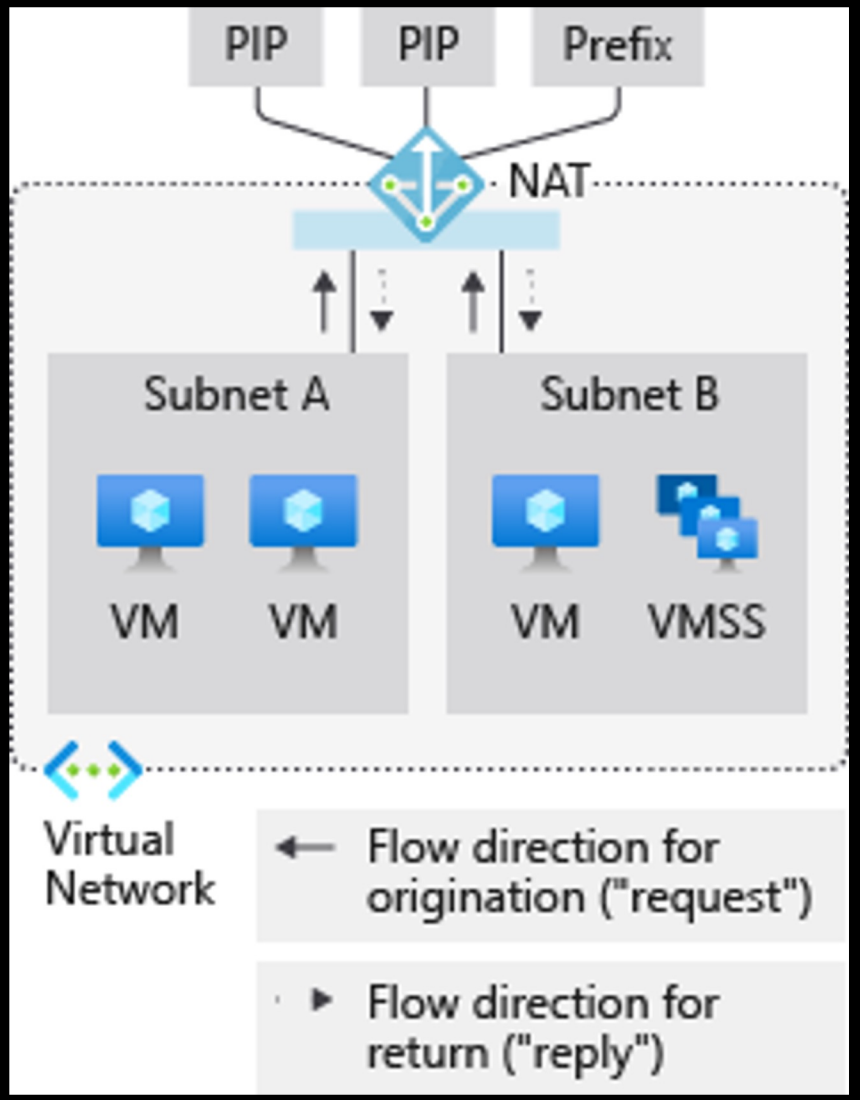

반드시 같은 virtual network의 vm들로 구성

# Azure LB의 OutBound 통신 기능

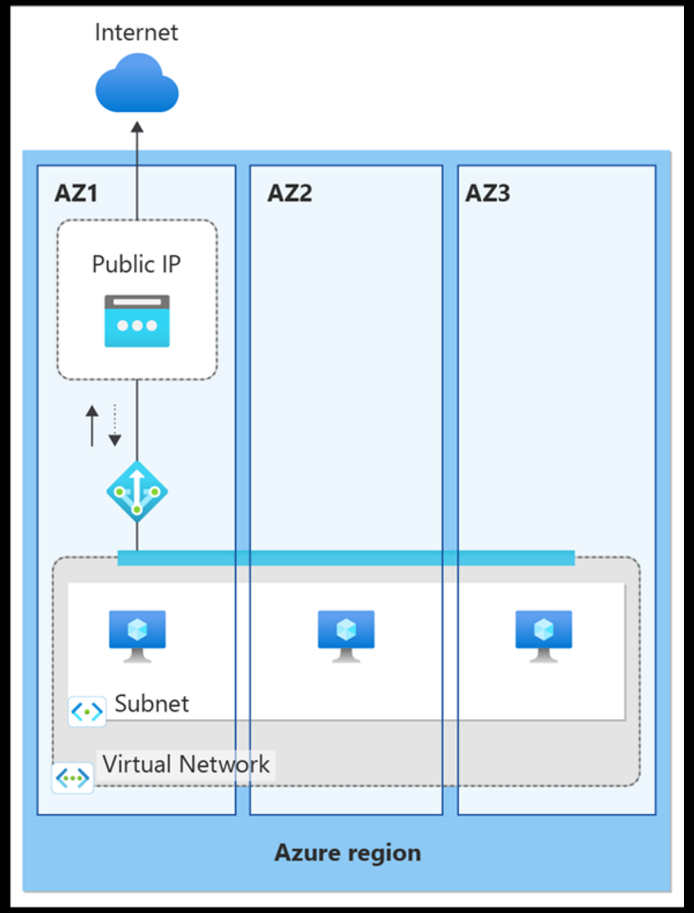


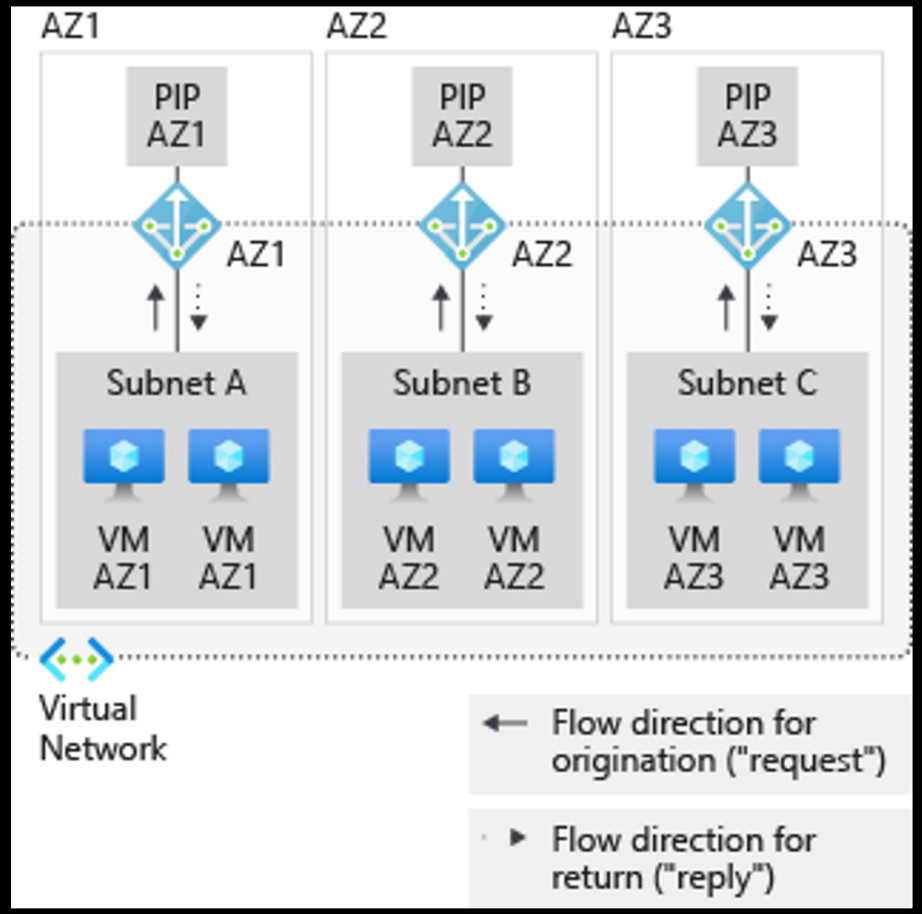
# Azure NAT Gateway

- multi fault domain managed NAT
- Zonal resource



# NAT gateway Architecture Example



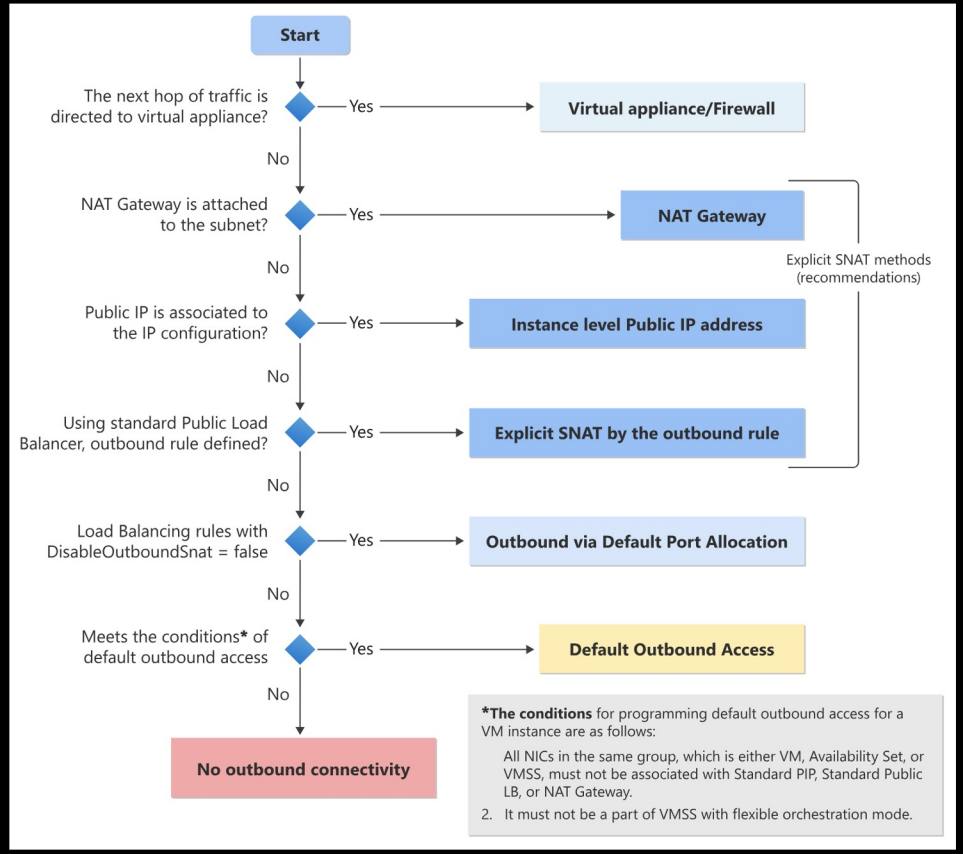



# NAT gateway TIP

- 여러 공인 IP 할당 가능 (한 IP당 64000대의 인스턴스 동시 통신)
- 하나의 서브넷에는 하나의 NAT만 할당
- 서브넷에 NAT가 할당되는 순간 0.0.0.0/0 에 대한 rule 반영

# Default outbound access in Azure (부록)

- Explicit outbound access가 없는 경우 default outbound rule 이 적용
- 동적 ip가 부여되며, 대형 워크로드에선 권장하지 않음
- Explicit 하게 만들거나 private subnet 기능 사용 (아직 SLA 보장 안됨)
- 2025년 폐기될 예정!!



# Subnet 기본 라우팅 규칙 (부록)

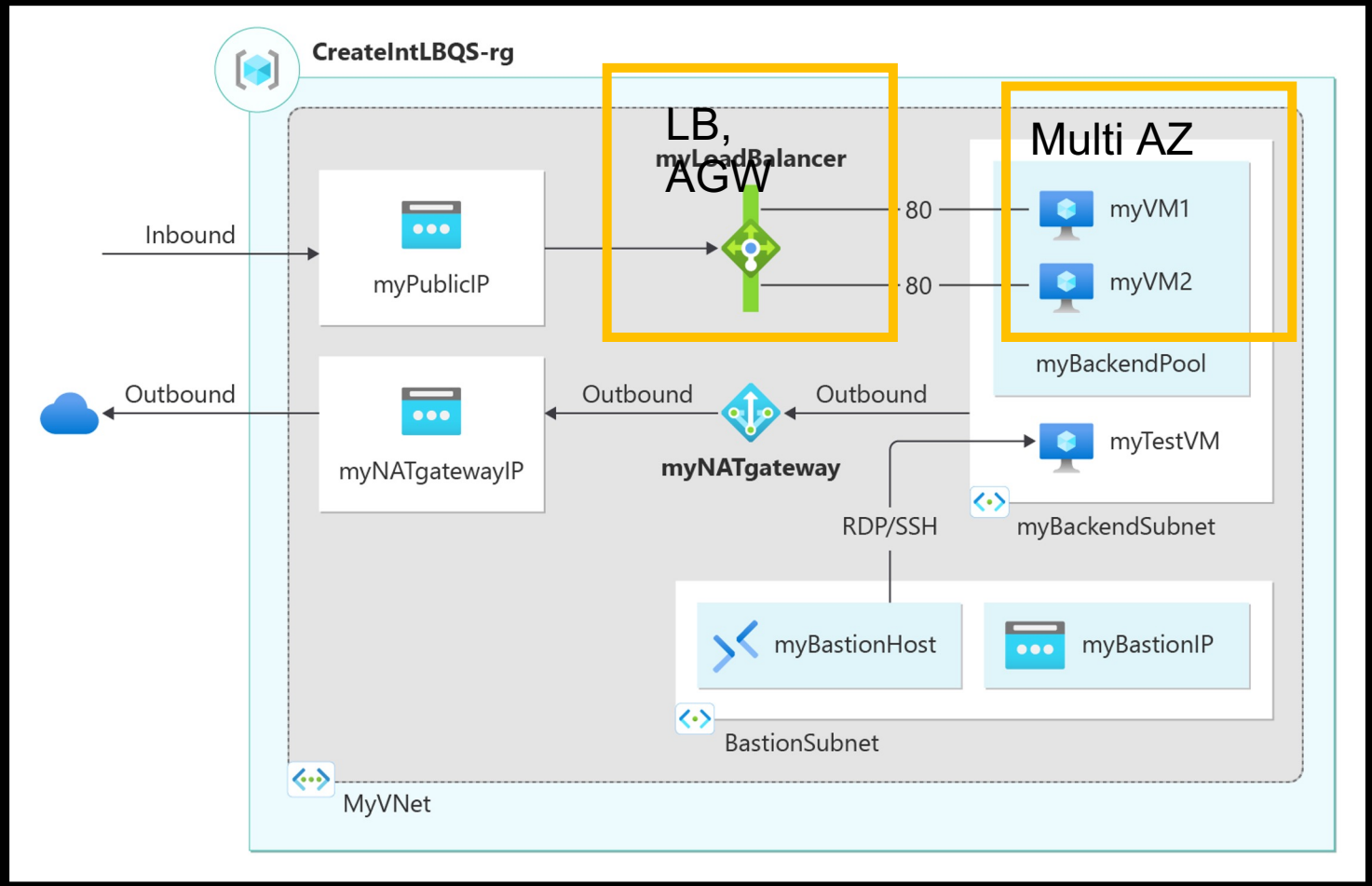
| 원본 | 주소 접두사 | 다음 홉 유형 |
| --- | --- | --- |
| 기본값 | Virtual Network 에서 고유한 접두사 | Virtual Network |
| 기본값 | 0.0.0.0/0 | 인터넷 |
| 기본값 | 10.0.0.0/8 | 없음 |
| 기본값 | 172.16.0.0/12 | 없음 |
| 기본값 | 192.168.0.0/16 | 없음 |
| 기본값 | 100.64.0.0/10 | 없음 |

# 네트워크 보안 그룹 규칙 (부록)

- NSG가 없으면, 인터넷 인바운드는 차단, 모든 아웃바운드 허용
- NSG가 없어도 Virtual network 안에서의 통신은 허용

# 신나는 실습

# 실습 요약도


CreateIntLBQS-rg
LB,
AGW
myLoadBalancer
Multi AZ
Inbound
myPublicIP
80
80
myVM1
myVM2
myBackendPool
Outbound
Outbound
Outbound
myNATgatewayIP
myNATgateway
myTestVM
RDP/SSH
myBackendSubnet
myBastionHost
myBastionIP
BastionSubnet
MyVNet

# 실습 2

- NAT Gateway 실습
- Application Gateway
- Load balancer (nsg 필요, inbound NAT, outbound )

# 실습 참고사항 (~~컨닝노트~~)

- 가용성 집합 실습시, 도메인 나눠지는거 블레이드로 확인해보기
- 가용성 HA 구축하면서 nginx 설치하기
- 최악의 상황에는 bastion host 기능으로 접속하기 (아이디/비밀번호 방식으로 로그인하도록 유도)
- Nat 게이트웨이 설치전에 인스턴스로 아웃바운드 접근되는지 체크해보기
- Nat 게이트 설치후 ipconfig.me 접근해서 공용ip가 바꼈는지 체크하기
- 인스턴스는 standard-b1s (az1, 3) 권장
- Load balancer의 경우 nsg 필요

# Questions

- https://learn.microsoft.com/ko-kr/training/modules/configure-azure-application-gateway/5-knowledge-check?ns-enrollment-type=learningpath&ns-enrollment-id=learn.az-104-manage-virtual-networks
- https://learn.microsoft.com/ko-kr/training/modules/configure-azure-load-balancer/10-knowledge-check?ns-enrollment-type=learningpath&ns-enrollment-id=learn.az-104-manage-virtual-networks
- https://www.examtopics.com/discussions/microsoft/view/56448-exam-az-104-topic-5-question-4-discussion/
- https://learn.microsoft.com/ko-kr/training/modules/configure-virtual-machines/9-knowledge-check?ns-enrollment-type=learningpath&ns-enrollment-id=learn.az-104-manage-compute-resources

# THANKS!

- https://en.wikipedia.org/wiki/File:NAT_Concept-en.svg
- https://en.wikipedia.org/wiki/Load_balancing_(computing)#/media/File:Elasticsearch_Cluster_August_2014.png
- https://learn.microsoft.com/en-us/azure/application-gateway/overview

# THANKS!

- https://learn.microsoft.com/en-us/azure/application-gateway/how-application-gateway-works
- https://learn.microsoft.com/ko-kr/azure/architecture/networking/guide/well-architected-network-address-translation-gateway
- https://learn.microsoft.com/ko-kr/azure/load-balancer/load-balancer-outbound-connections

# THANKS!

- https://learn.microsoft.com/ko-kr/azure/load-balancer/components
- https://learn.microsoft.com/ko-kr/azure/load-balancer/quickstart-load-balancer-standard-public-portal
- https://learn.microsoft.com/en-us/azure/virtual-network/ip-services/default-outbound-access#utilize-the-private-subnet-parameter

# THANKS!

- https://github.com/johnthebrit/RandomStuff/blob/master/Whiteboards/alb%20live.svg
- https://learn.microsoft.com/en-us/azure/load-balancer/load-balancer-multivip-overview
- https://www.youtube.com/watch?v=wJvmXM81tEI
- https://www.youtube.com/watch?v=flCoRc1uv9o