



VyOS
Networks



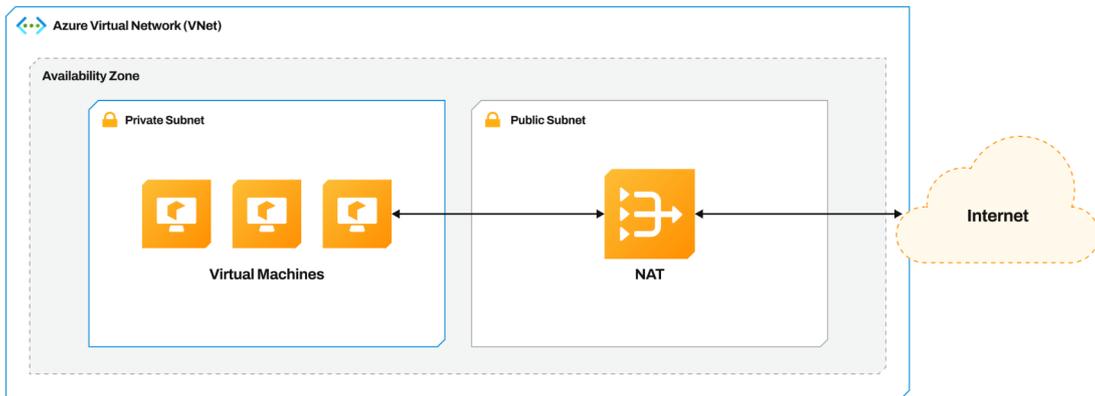
Whitepaper

AZURE NAT GATEWAY AND NAT VM

July 2025

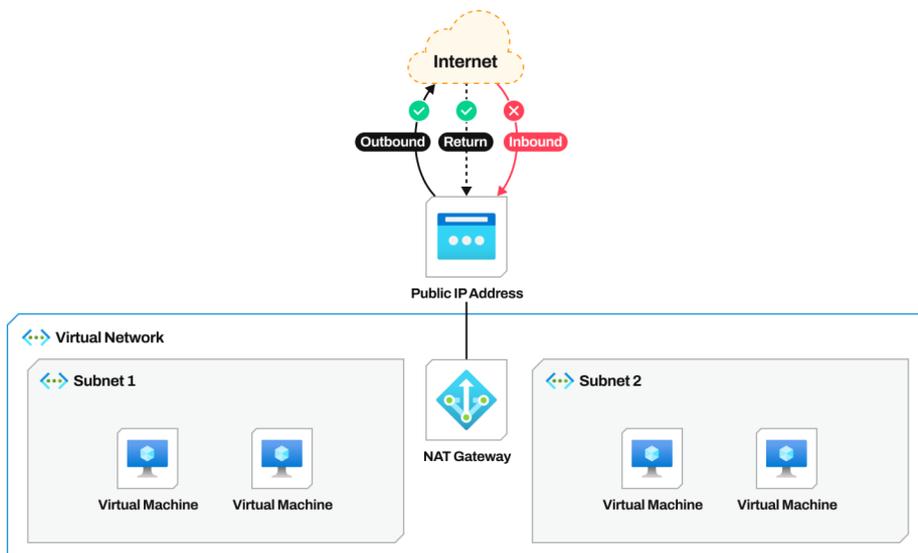
Azure NAT Gateway and NAT VM

In Azure cloud environments, it's common to deploy resources in private subnets that should not be directly exposed to the internet. However, many of these resources still require outbound internet access—for software updates, external APIs, or data uploads. To enable this in a secure and controlled manner, Azure provides solutions such as the **NAT Gateway** and **custom-configured virtual machines** acting as NAT devices. These options serve the same fundamental purpose—enabling outbound connectivity while blocking unsolicited inbound traffic—but differ in terms of scalability, automation, cost-efficiency, and operational overhead. Choosing the right approach depends on your specific networking needs, security requirements, and budget constraints.



Azure NAT Gateway

Azure NAT Gateway is a fully managed network address translation (NAT) service that enables outbound internet connectivity for resources in private subnets within an Azure Virtual Network (VNet). It allows these resources to access the internet without exposing them to unsolicited inbound traffic. It supports thousands of concurrent connections and is designed for high throughput with minimal configuration.



Each NAT gateway can provide up to a total of 50 Gbps of throughput. Data throughput rate limiting is split between outbound and inbound data. Data throughput is rate limited at 25 Gbps for outbound and 25 Gbps for inbound data per NAT gateway resource.

Azure NAT Gateway Pricing

The cost of using **Azure NAT Gateway** is based on **two main components**:

1. NAT Gateway Resource (Hourly Charge)

- Price: **Approximately \$0.045 USD per hour per NAT Gateway resource.**
- Equivalent to: **~\$32.40 USD per month (assuming 24/7 usage).**

This charge applies **per gateway**, regardless of the amount of traffic processed.

2. Data Processed (Outbound Traffic)

- Price: **Approximately \$0.045 USD per GB of data egressed to the internet through the NAT Gateway.**
- Only **outbound internet traffic** is billed—intra-VNet traffic or **peered traffic** is not charged under this rate.

For more information, see [Azure Pricing Calculator](#)

In addition to the Data Processed charges, Bandwidth charges are also applicable.

[Learn more about Bandwidth pricing.](#)

Explanation of Charges

- **NAT Gateway Resource Fee:**
Fixed hourly cost just for having the NAT Gateway deployed.
- **NAT Data Processing Fee:**
Charged per GB processed through the NAT Gateway.
- **Bandwidth (Egress):**
Standard Azure charge for traffic going from Azure to the public internet.
- **Public IP Address:**
Static IP attached to the NAT Gateway (required).



Example Monthly Cost Estimate

Let's assume the following scenario:

- One NAT Gateway deployed in a single Azure region.
- 500 GB of outbound internet traffic per month.
- Using one **Standard Public IP address**.
- NAT Gateway is running 24/7 (730 hours/month).

Component	Unit Price (USD)	Quantity	Estimated Cost
NAT Gateway Resource	\$0.045/hour	730 hours	\$32.85
Data Processed (NAT fee)	\$0.045/GB	500 GB	\$22.50
Outbound Bandwidth	\$0.087/GB (typical egress price)*	500 GB	\$43.50
Public IP (Standard SKU)	\$0.0036/hour	730 hours	\$2.63
Total:			~\$101.48 USD/month

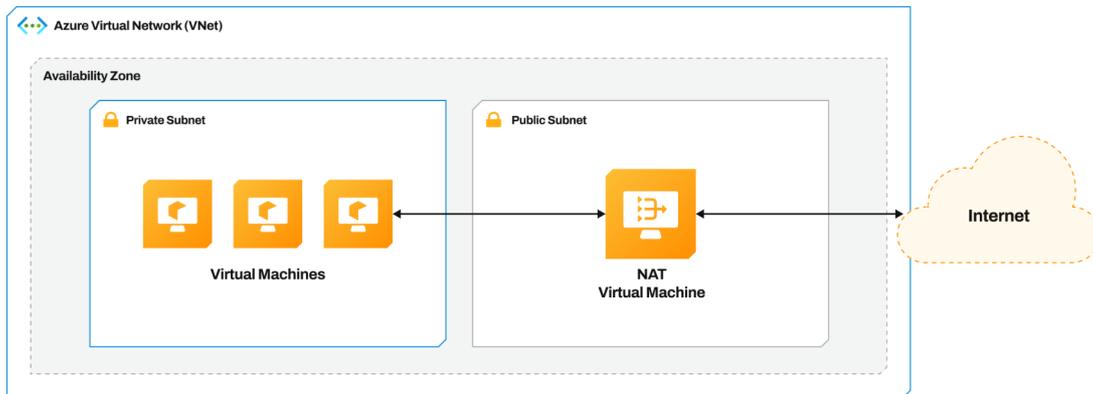
* Note: Bandwidth pricing varies slightly by Azure region. \$0.087/GB is common for data going to the internet from most regions.



Azure NAT VM

An Azure NAT VM refers to a self-managed virtual machine in Azure that is manually configured to perform network address translation (NAT). It acts as a custom NAT device to provide outbound internet access for resources in a private subnet.

It enables these resources to initiate outbound connections to the internet or other Azure services, while blocking unsolicited inbound traffic. Unlike the managed Azure NAT Gateway, a NAT VM requires manual setup, configuration, maintenance, and scaling, but offers greater flexibility for implementing custom NAT rules, advanced routing logic, or traffic inspection.



Pricing for Azure NAT VM

Unlike **Azure NAT Gateway**, which has a fixed pricing model, a **NAT VM** involves multiple cost components because you're managing the infrastructure yourself.

1. Virtual Machine Cost

- Depends on the **VM size** (CPU, memory) and pricing tier (e.g., B-series for low cost).
- Example:
 - **Standard B2s** (2 vCPU, 4 GB RAM) = **~\$0.04/hour**
 - **Monthly cost** (24x7): **~\$29–30 USD**

2. Public IP Address

- Required to provide outbound internet access.
- Standard SKU static public IP: **\$0.0036/hour (\$2.60/month)**



3. Operating System Disk

- Basic managed disk (e.g., 30 GB Standard HDD): **~\$1.50–\$2/month**

4. Outbound Data Transfer (Egress)

- Same as with NAT Gateway: **~\$0.087/GB** for data transferred from Azure to the internet (price varies by region).

For more information, see [Azure Pricing Calculator](#)

Example Monthly Cost Estimate

For a basic NAT VM setup:

- **1 self-managed VM** acting as a NAT device.
- VM: **Standard B2s** (2 vCPU, 4 GB RAM).
- OS disk: **30 GB Standard HDD**.
- **1 Standard Public IP** assigned to the VM.
- **500 GB** of outbound internet traffic per month.
- **VM running 24/7** (730 hours/month).

Component	Unit Price (USD)	Quantity	Estimated Cost
Virtual Machine (B2s)	~\$0.04/hour	730 hours	~\$28.47
OS Disk (30 GB HDD)	~\$0.05/GB/month	30 GB	~\$1.50
Public IP (Standard SKU)	\$0.0036/hour	730 hours	~\$2.63
Outbound Bandwidth	~\$0.087/GB (to internet)*	500 GB	~\$43.50
Total Estimated Cost			~\$76.10 USD/month

* Note: Azure outbound data transfer prices can vary slightly by region. \$0.087/GB is a typical value in most regions.



Azure NAT Gateway vs NAT VM

When to Use Each Option

- **Use NAT Gateway** when you need high availability, minimal maintenance, and scalable outbound internet access for private subnets in production environments.
- **Use NAT VM** when you require custom routing or firewall rules, tight budget constraints, or you're operating in a development/test environment where high throughput and availability are less critical.

Summary Table

Criteria	Best for NAT Gateway	Best for NAT VM
Simplicity	✓	
Custom Logic / Control		✓
Low traffic & Cost-saving		✓
Auto-scaling	✓	
Manual Tuning / Debugging		✓

Benefits of Using VyOS as a NAT VM in Azure

VyOS is a lightweight, open-source network operating system that can be deployed as a virtual machine in Azure to perform **Network Address Translation (NAT)**. It provides a powerful and flexible alternative to Azure's managed NAT Gateway, giving full control over NAT behavior within a self-managed, customizable VM.

- **Full NAT control:** Customize SNAT, DNAT, and port forwarding with flexible CLI.
- **Advanced routing:** Supports BGP, OSPF, VRFs, and policy-based routing.
- **Integrated firewall:** Secure traffic with built-in filtering and zones.
- **Cost-effective:** Runs efficiently on small VM sizes.
- **Automation-friendly:** Works with cloud-init, Ansible, and Terraform.
- **High availability:** Supports VRRP and route tracking for failover.
- **Consistent operations:** Same image and config across cloud and on-prem.



Cost comparison

VyOS pricing is based on actual usage, with charges varying according to how much you consume. Subscriptions have no end date and may be canceled any time.

For more information, see [VyOS Universal Router for Microsoft Azure](#)

Here's a detailed **cost comparison** between using a **VyOS NAT VM** versus the **Azure NAT Gateway**.

Example: Monthly Cost Estimate (10 TB Outbound Traffic)

Component	NAT Gateway	 VyOS NAT VM
Base Cost (Resource)	\$32.40	\$29.00 (Standard B2s VM)
Public IP	\$2.60	\$2.60
NAT Data Processing Fee	\$450 (10000 GB × \$0.045)	\$0 (included in VM)
Outbound Bandwidth	\$870 (10000 GB × \$0.087)	\$870
VyOS Subscription		\$0.15 × 730h = \$109.5
Total Estimated Cost	~\$1355.00 USD/month	~\$1011.10 USD/month

✔ Savings with VyOS: **~\$343,9/month (~25,4%) in this scenario.**

When VyOS NAT Instance Makes Sense

- You handle **significant outbound data volumes** (5 TB/month or more).
- You want **extra features** (firewalling, VPN, routing protocols).
- You can manage the **instance yourself** (updates, failover, etc.).
- You aim to **reduce costs** without losing flexibility.

