
Azure Load Balancing Services – Overview

What is Load Balancing?

Load balancing is the process of distributing incoming network traffic across multiple backend resources—such as Virtual Machines (VMs), containers, or web apps—to ensure **reliability**, **availability**, and **performance**.

Azure offers **several types of load balancers**, each designed for specific use cases and layers of traffic.

Types of Azure Load Balancing Services

| Service | Layer | Scope | Use Case |
|------------------------------------|-------------------------------|-----------------|--|
| Azure Load Balancer | Layer 4 (TCP/UDP) | Regional | Internal or external load balancing for VMs |
| Azure Application Gateway | Layer 7 (HTTP/HTTPS) | Regional | Web application-level routing and WAF |
| Azure Front Door | Layer 7 (HTTP/HTTPS) | Global | Global load balancing with CDN and TLS offload |
| Azure Traffic Manager | DNS (Layer 7 routing via DNS) | Global | Geographic and performance-based routing |
| Azure Gateway Load Balancer | Layer 3/4 | Inline/Regional | Load balancing for network virtual appliances (NVAs) |

1. Azure Load Balancer

- **Layer:** Transport layer (Layer 4 – TCP/UDP)
- **Types:**
 - **Public Load Balancer:** Distributes traffic from internet to Azure VMs

- **Internal Load Balancer (ILB):** Distributes traffic within a VNet
- **Use Cases:**
 - VMSS
 - Internal line-of-business apps
 - High-throughput, low-latency scenarios

🔒 No SSL termination or URL routing—purely protocol level

2. Azure Application Gateway

- **Layer:** Application Layer (Layer 7)
- **Key Features:**
 - SSL/TLS termination
 - URL-based routing
 - Web Application Firewall (WAF)
 - Cookie-based session affinity
- **Use Cases:**
 - Host multiple web apps behind one IP
 - Protect web apps with WAF
 - Route traffic based on URL path or hostname

✅ Best for HTTP/S traffic with advanced routing logic

3. Azure Front Door


- **Layer:** Application Layer (Layer 7, Global)
- **Key Features:**
 - Global HTTP/HTTPS load balancing
 - Content delivery network (CDN) capabilities
 - SSL offloading and acceleration
 - Smart routing: latency-, geo-, and priority-based
- **Use Cases:**
 - Global web apps
 - Redundancy across regions
 - Fast failover for worldwide users

⚡ Combines CDN, security, and smart traffic routing

4. Azure Traffic Manager


- **Layer:** DNS-based routing (Layer 7 via DNS resolution)
- **Key Features:**
 - Routes users to closest or healthiest endpoint
 - Policies: Priority, Weighted, Geographic, Performance
 - Works with endpoints like App Services, VMs, AKS, etc.
- **Use Cases:**
 - Multi-region app failover
 - Global user performance optimization

- DNS-level redundancy

 Doesn't handle traffic directly—works through DNS redirection

5. Azure Gateway Load Balancer

- **Layer:** Network (Layer 3/4)
- **Purpose:** Acts as a bump-in-the-wire for network appliances (e.g., firewalls)
- **Use Cases:**
 - Deploy 3rd-party network virtual appliances (NVAs)
 - Add transparent security layer
 - Secure traffic before reaching internal resources

 Designed for advanced scenarios with custom network inspection

Comparison Table

| Feature / Service | Load Balancer | App Gateway | Front Door | Traffic Manager | Gateway LB |
|--------------------------------|-----------------|----------------|-------------|-----------------|------------------|
| Layer | L4 (TCP/UDP) | L7 (HTTP/S) | L7 | DNS | L3/L4 |
| Global/Regional | Regional | Regional | Global | Global | Regional |
| SSL Termination | ✗ | ✓ | ✓ | ✗ | ✗ |
| Web Application Firewall (WAF) | ✗ | ✓ | ✓ | ✗ | ✗ |
| Routing Type | Port/IP-based | URL/path | Latency/geo | DNS-based | Inline with NVAs |

| | | | | | |
|-----------------|--------------|----------|--------------------|---------------------------|----------------------------|
| Best For | VMs, VMSS | Web apps | Global APIs/Web | Multi-region endpoints | Firewall/NVA deployment |
|-----------------|--------------|----------|--------------------|---------------------------|----------------------------|

Summary

| If you need... | Use... |
|---|---------------------------|
| Basic TCP/UDP load balancing | Azure Load Balancer |
| Intelligent routing for HTTP/S traffic | Azure Application Gateway |
| Global load balancing with CDN + failover | Azure Front Door |
| DNS-based traffic routing | Azure Traffic Manager |
| Inline traffic inspection with NVAs | Gateway Load Balancer |
