**Question 3: How do health probes work in Azure Load Balancer? Explain in detail?**

**Answer:**

Health probes in Azure Load Balancer are the guardians of wer high availability setup. They constantly monitor the health of wer backend VMs (Virtual Machines) in the backend pool, ensuring only healthy VMs receive incoming traffic. Here's how they work:

**Types of Health Probes:**

Azure Load Balancer offers different probe types to suit our application:

* **TCP:** This basic probe checks if a specific TCP port on the VM is open and responding. Ideal for simple applications that expose a service on a port.
* **HTTP/HTTPS:** These probes send an HTTP GET request to a specific path (URL) on the VM. The probe succeeds if the VM responds with a specific HTTP status code indicating a healthy application. Useful for web applications with a dedicated health check endpoint.

**Probe Configuration:**

When creating a health probe, we define several parameters:

* **Protocol:** Choose TCP, HTTP, or HTTPS based on our application.
* **Port:** Specify the port on the VM to check (relevant for TCP and HTTP/HTTPS probes).
* **Path:** Define the specific URL path for HTTP/HTTPS probes (e.g., "/healthcheck").
* **Interval:** Set the frequency (e.g., every 5 seconds) at which the probe checks the VM health.
* **Timeout:** Define the maximum time the probe waits for a response from the VM before considering it unhealthy.

**Health Check Process:**

1. The load balancer periodically sends a probe request (based on the interval) to the configured port/path on each VM in the backend pool.
2. The VM should respond appropriately:

* TCP: The VM simply needs to have the port open and responding.
* HTTP/HTTPS: The VM should return the configured HTTP status code within the timeout period.

1. The load balancer evaluates the response:

* Success: If the probe receives the expected response within the timeout, the VM is considered healthy and continues receiving traffic.
* Failure: If the probe receives no response or an unexpected response code, the VM is marked unhealthy. The load balancer stops sending new traffic to this VM.

**Impact on Load Distribution:**

When a VM in the backend pool is marked unhealthy due to failing health probes, the load balancer removes it from the traffic distribution. Incoming traffic is only routed to healthy VMs, ensuring service continuity for our web application.

**Benefits of Health Probes:**

* **Early Detection of Issues:** Health probes proactively identify failing VMs before they impact user experience.
* **Improved Application Uptime**: By removing unhealthy VMs from traffic flow, health probes contribute to high availability of our web application.
* **Automated Traffic Management:** The load balancer automatically adjusts traffic distribution based on VM health, reducing manual intervention.

By effectively utilizing health probes, we can ensure our Azure Load Balancer efficiently directs traffic to healthy VMs, creating a resilient and highly available web application deployment.