

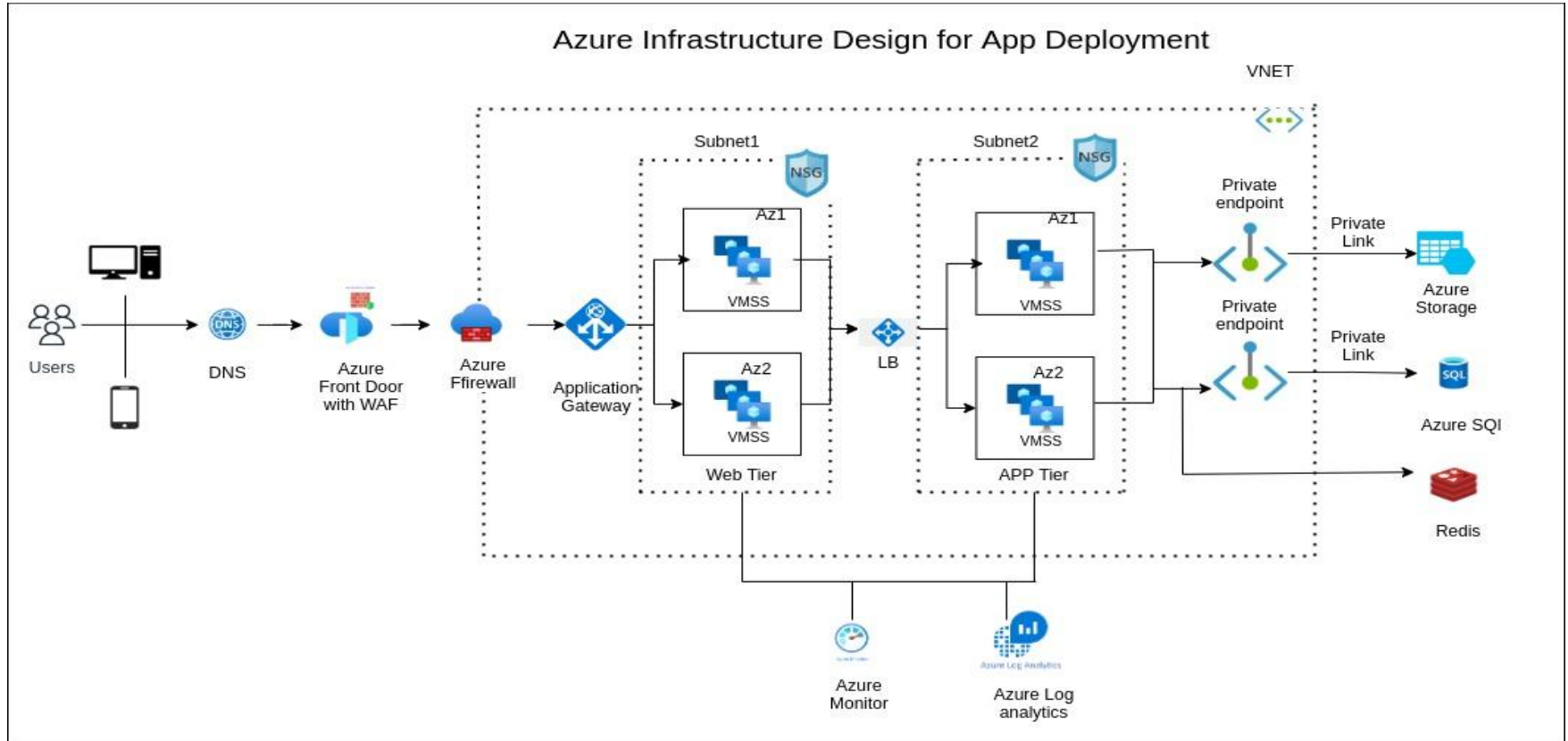


WEB APPLICATION DEPLOYMENT DESIGN

OVERVIEW

- ❖ Deployment of a 3-tier application in Azure with a strong emphasis on security, high availability, scalability, and automated deployment using CI/CD.
- ❖ Major Components:
 - Web Tier and App Tier: Azure Virtual Machine Scale Sets (VMSS)
 - Database: Azure SQL Database
 - Load Balancer: Azure Application Gateway and Internal Load Balancer
 - Caching: Azure Cache for Redis
 - Monitoring and Logging: Azure Monitor and Log Analytics
 - Content Delivery: Azure Front Door
 - Security: Azure Firewall & NSG

DEPLOYMENT ARCHITECTURE



TECHNOLOGY STACKS

Web and APP Tier: Deployed using **Virtual Machine Scale Sets (VMSS)**

- **Auto Scaling:** Automatically scales VM instances based on demand.
- **High Availability:** Deployed across different Availability Zones for resilience.
- **Security:** Protected using **Azure Network Security Groups (NSG)**
- **Load Balancing for Web Tier:** Configured with **Azure Application Gateway**
 - a. **Path-Based Routing:** Directs traffic based on URL paths to different backend pools.
 - b. **SSL Termination:** Terminates SSL/TLS connections at the gateway for improved performance and security.
- **Load Balancing for APP Tier:** Configured with **Azure Internal Load Balancer (ILB)**
 - a. **Internal Load Balancing:** Distributes traffic within a virtual network (VNet) or between VNets in the same region.

Database Tier:

- **Azure SQL Database:** Managed relational database for structured data.
- **Security:** Connected via Private Endpoint and Private Link for secure, private connectivity.
- **Scalability:** Elastic scaling and high availability with automated backups.

Cache Tier:

- **Azure Cache for Redis:** In-memory data store for caching.
- **Performance:** Improves application speed by storing frequently accessed data.
- **Scalability:** Horizontal scaling to handle varying cache demands efficiently.

Media Upload with Storage Account:

- The Storage Account is utilized for uploading media, with the application tier securely connected via a private endpoint.

Security Measures:

- The Web and App tier subnets are secured using Network Security Groups (NSGs), while the entire Virtual Network (VNet) benefits from enhanced protection provided by Azure Firewall.
- Private endpoints are established for secure connectivity to both Storage and the Database from the App tier.
- integrated a Web Application Firewall (WAF) with Azure Front Door to protect applications from threats.

Scalability:

- The application is hosted in Virtual Machine Scale Sets (VMSS) with auto scaling, allowing the node count to increase or decrease based on traffic demands.

Availability & Disaster Recovery:

- The applications are hosted in different availability zones to ensure disaster recovery readiness.

Performance:

- Azure Front Door and Web Application Firewall (WAF) are configured to enhance application performance, reduce latency, and protect against threats.

Logging and Monitoring:

- Azure Monitor is configured to collect metrics from the App tier, Web tier, and SQL service, providing comprehensive insights into application performance.
- Additionally, a Log Analytics workspace is set up to gather application logs specifically from the App and Web tiers.

CICD Process

CI/CD Automation Process:

- When developers commit code changes, it automatically triggers the build pipeline. The build pipeline performs static code analysis, builds the application, and runs tests to ensure quality.
- Subsequently, the CD pipeline deploys the application into the deployment infrastructure.

