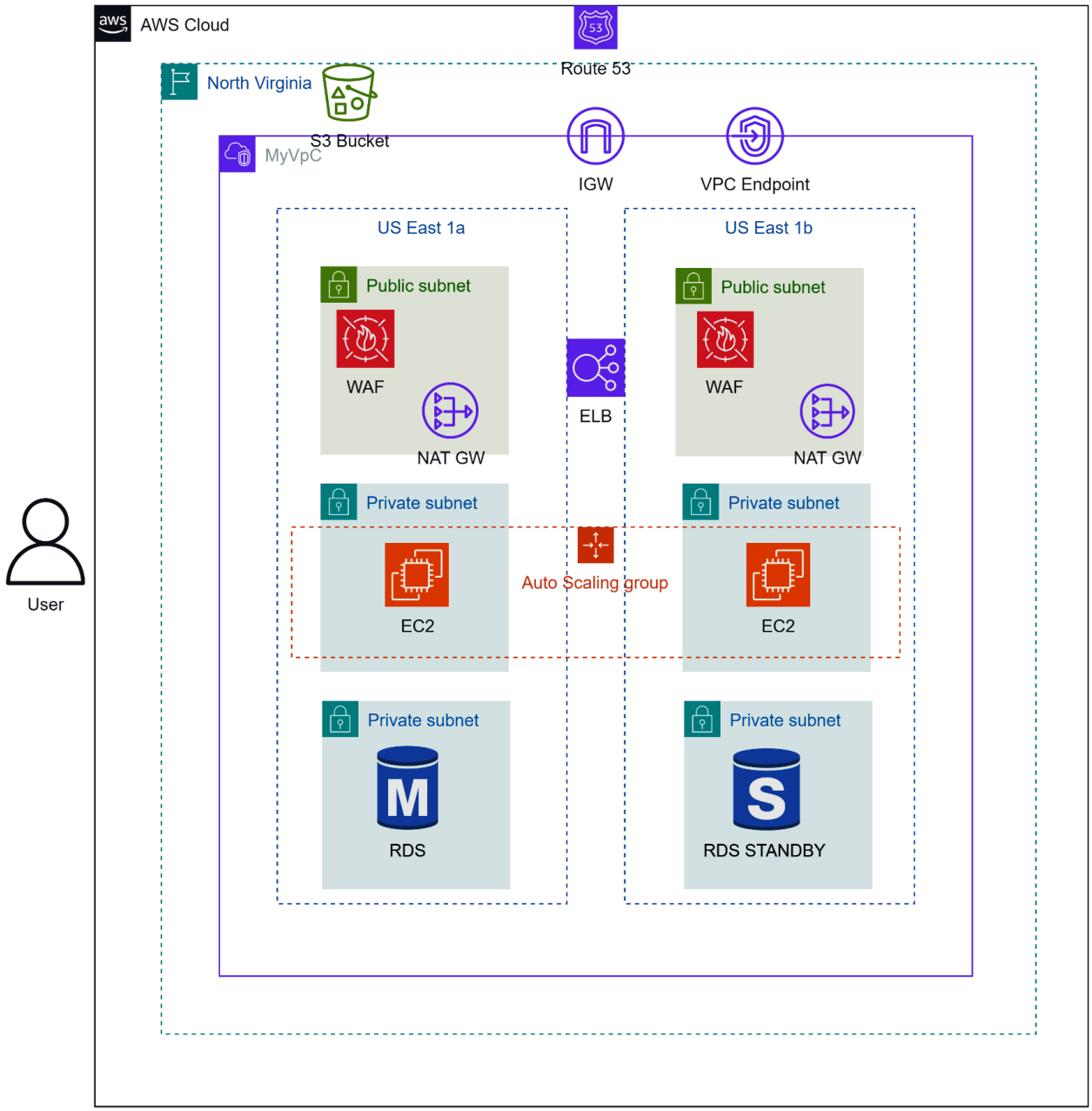
THREE – TIER ARCHITECTURE

INTRODUCTION

The AWS 3-tier architecture consists of a Presentation layer hosted in public subnets for routing and frontend delivery, an application layer in private subnets running business logic, and a Data layer also in private subnets for secure storage and database access — all orchestrated across multiple Availability Zones for high availability and fault tolerance.



ARCHITECTURE OVERVIEW

1. **Route 53.**
   - AWS-managed DNS service that routes domain names to AWS resources.
   - Can route traffic globally based on latency, geolocation, or failover.
   - Often points to CloudFront or ALB.
2. **Internet Gateway (IGW).**
   - Connects our VPC to the internet by allowing our public subnets to send and receive internet traffic.
3. **VPC Endpoint.**
   - Creates a private connection between our VPC and S3 bypassing the public internet.
4. **Elastic Load Balancer.**
   - Distributes incoming traffic across EC2 instances in multiple AZ's thus improving fault tolerance. It also scales with demand.
5. **EC2 Auto Scaling Group.**
   - Automatically adjust the number of EC2 instances based on demand.
   - Ensure high availability and cost efficiency.
6. **Web Application Firewall.**
   - Protects our applications from common attacks such as SQL injection and XSS.
   - It adds an additional security layer to our environment.
7. **NAT Gateway.**
   - Enables instances in our private subnet to access the internet for updates or patches or to communicate with third party or external services.
   - It is placed in a public subnet, and routes via route tables.
8. **EC2.**
   - This compute service hosts our applications or backend logic.
   - It is deployed in a private subnet for security.
   - We attach it to an auto scaling group for high availability.
9. **RDS.**
   - Managed relational database instance (e.g., MySQL, PostgreSQL).
   - Deployed in a private subnet for backend data storage.
   - Used by the app tier for structured data.
10. **RDS Standby.**
    - This is a synchronous replica of our primary RDS in another AZ.
    - It is used for automatic failover in case of outages.
    - It increases database availability and disaster recovery.
11. **S3 Bucket.**
    - Object storage for static files, backups, logs, and media assets.
    - Accessible privately via VPC endpoint or via CloudFront if public.
    - Highly durable and scalable.

This architecture demonstrates a resilient, scalable, and secure design by leveraging AWS-native services across multiple Availability Zones. It ensures high availability through load balancing and auto scaling, enforces strong security at both the network and application layers, and supports private, cost-efficient connectivity to backend services like RDS and S3.

Together, these components embody cloud architecture best practices for performance, fault tolerance, and operational excellence.