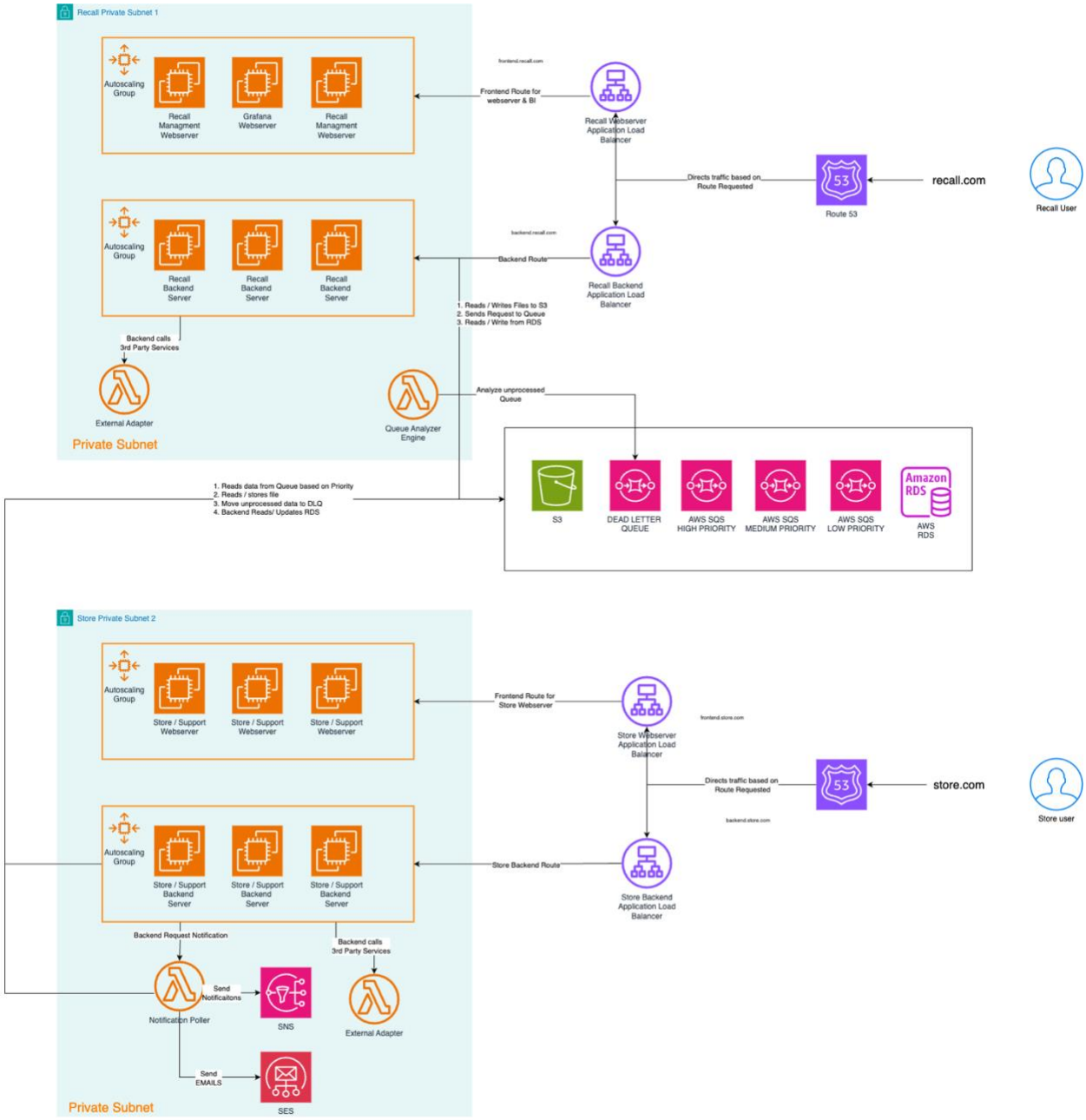
DATA FLOW ARCHITECTURE



1. User Interaction and DNS Resolution:

- Users interact with the system by visiting domain-specific URLs.
- AWS Route 53 handles DNS resolution, directing recall users to **recall.com** and store users to **store.com**.

2. Traffic Distribution through Application Load Balancers (ALBs):

- Route 53 resolves the domain name and directs incoming traffic to the appropriate ALB.
- The **Recall ALB** receives traffic intended for the recall management interface and routes it to the web servers in the Auto Scaling Group within Recall Private Subnet 1.
- The **Store ALB** receives traffic for the store interface and directs it to the web servers in the Auto Scaling Group within Store Private Subnet 2.
- ALBs ensure high availability and distribute incoming application traffic across multiple targets, improving scalability.

3. Web Server Processing in Auto Scaling Groups:

- The web servers, likely EC2 instances, process incoming requests. These instances automatically scale out/in based on demand, thanks to Auto Scaling Groups.
- The recall web servers present the management interface and handle user interactions for recall initiation and tracking.
- The store web servers provide the store-facing interface for acknowledging recalls and managing inventory responses.

4. Backend Services:

- Backend servers in both recall and store subnets handle the application's business logic and communicate with the database for transaction management.
- These services are crucial for processing recall data, user actions, and coordinating the flow of notifications.

5. Database Interactions with Amazon RDS:

- Amazon RDS is used for structured data storage, holding recall information, user data, and transaction logs. RDS ensures data persistence, reliability, and automatic backups.

- The backend services interact with RDS to retrieve and update data as part of the recall process.

6. Message Queuing with Amazon SQS:

- Amazon SQS handles inter-service messaging, decoupling components and enabling asynchronous communication.
- Messages are queued based on priority (high, medium, low) to ensure timely processing of recalls. The backend services enqueue and dequeue messages for processing.
- The DLQ captures messages that fail to be processed multiple times, allowing for troubleshooting without impacting the system's flow.

7. Notification Polling and Delivery:

- The store's backend servers use the Notification Poller Lambda function to check SQS for new messages.
- Retrieved messages trigger the Notification Poller to send out alerts via SES for email notifications and SNS for SMS or push notifications.
- SES and SNS are managed services that provide reliable delivery of notifications to end-users, supporting a variety of communication channels.

8. External Adapters for Third-Party Integrations:

- Both recall and store systems utilize external adapters, potentially Lambda functions, which integrate with third-party services for additional capabilities, such as posting updates to collaboration tools like Microsoft Teams.
- These adapters provide flexibility in extending the system’s functionality and allow for integration with external systems via APIs or webhooks.

9. Monitoring, Logging, and Storage:

- AWS CloudWatch is utilized for monitoring the operational health and performance of the application, setting alarms, and visualizing logs.
- Amazon S3 provides durable object storage for logs and other documents, serving as a centralized repository for audit trails and system backups.
- VPC Flow Logs capture information about the IP traffic going to and from network interfaces within the VPC, offering insights into traffic patterns and potential security issues.

10. Security and Compliance:

- The entire system is designed with security in mind; IAM roles and policies govern access, encryption-at-rest and in-transit protect data, and AWS WAF and Shield offer additional layers of protection against common web exploits and DDoS attacks, respectively.

This comprehensive AWS-based architecture is designed to be highly available, scalable, secure, and resilient, ensuring that the recall notification system can handle variable loads, secure user data, and provide timely notifications in a robust and maintainable environment.