

# SMART TRAFFIC MANAGEMENT SYSTEM

<https://github.com/dullah-commits/Smart-traffic-management-system>

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**Course:** Software Construction & Development

**Platform:** Amazon Web Services & React.js

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## Technical Analysis & Writing

### 1. Cloud Infrastructure and Scalability

The system is deployed on a **3-tier AWS architecture** designed for high availability. The **Application Load Balancer (ALB)** serves as the entry point, distributing traffic to an **EC2 instance** located within a private subnet to ensure security. This configuration prevents direct exposure of the application server to the public internet.

### 2. Data Integrity and Security

Data management is handled via **Amazon RDS (MySQL)**. To maintain a "Least Privilege" security model, we implemented **Security Group Chaining**. The database security group (**DatabaseSG**) only accepts inbound traffic from the web server's security group (**WebServerSG**) on port **3306**, effectively creating a secure internal tunnel for traffic metadata.

### 3. Geospatial Visualization

The frontend utilizes **Leaflet.js** to provide a real-time heat map of 26 major junctions in Lahore. By fetching flow rates from the RDS instance, Leaflet dynamically updates circle markers—representing congestion levels—on top of OpenStreetMap tiles.

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## Traceable References

### APA Style (7th Edition)

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