**Project Design Phase**
**Solution Architecture**

| Date | 15 February 2025 |
|---|---|
| Team ID | LTVIP2026TMIDS87694 |
| Project Name | EV Battery Performance and Range Monitoring System |
| Maximum Marks | 4 Marks |

## Solution Architecture:

**Architecture Components Breakdown**

**1. Presentation Layer (User Interface)**

| Component | Technology | Purpose |
|---|---|---|
| Web Dashboard | React + Tailwind | Responsive EV data visualization |
| Mobile PWA | Progressive Web App | Offline charging history |
| Tableau Embeds | Tableau JS API | Your existing EV dashboards |

**2. Application Layer (Business Logic)**

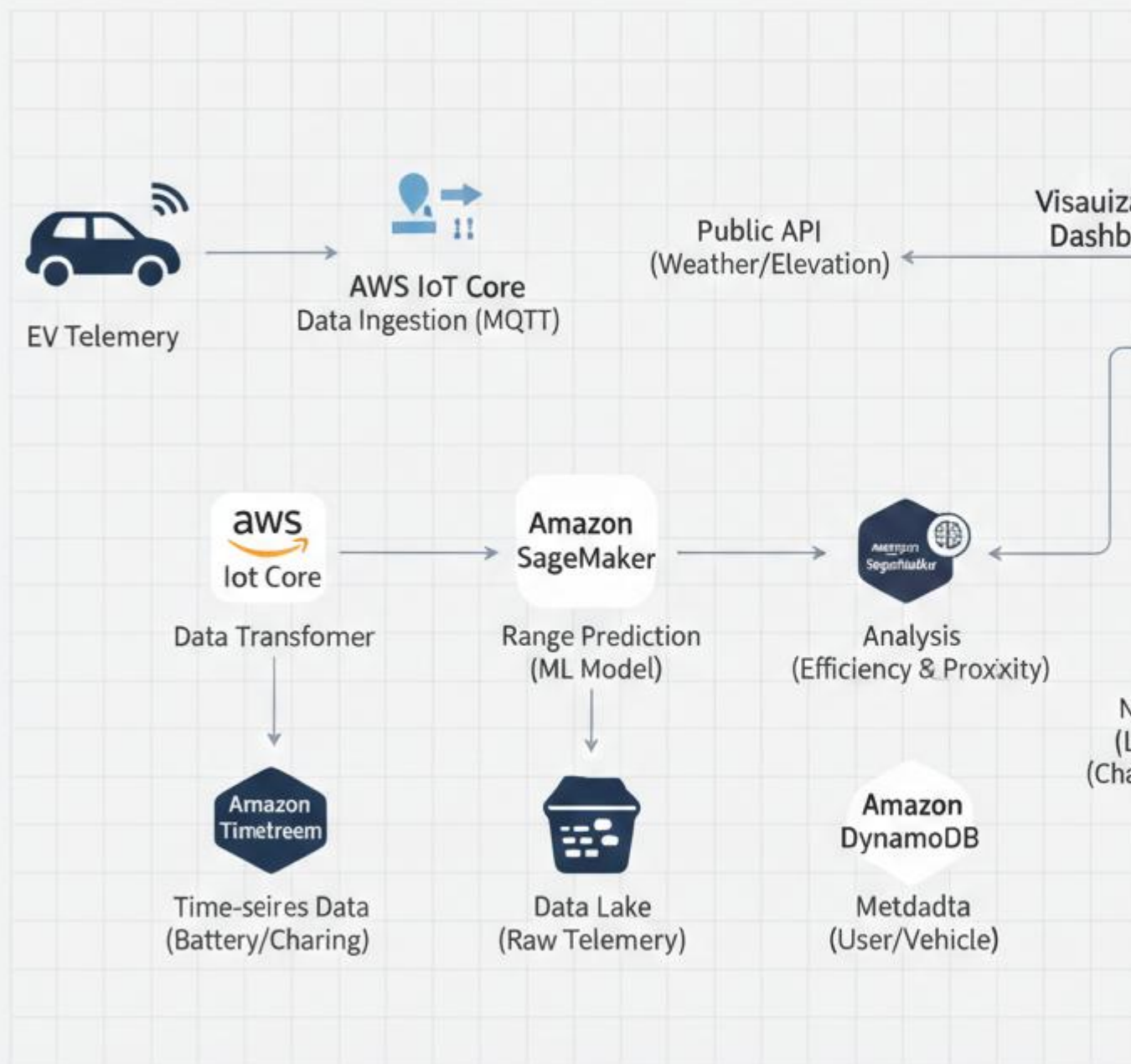| Service | Technology | Input/Output |
|---|---|---|
| Auth Service | Flask + JWT | Login/Register → Tokens |
| Data Processor | Pandas + NumPy | CSV Upload → Clean insights (339km avg) |
| ML Predictor | Scikit-learn | Driving data → Range ±5% |
| Viz Service | Plotly API | Metrics → Interactive charts |

**3. Data Layer**

| Storage | Technology | Data |
|---|---|---|
| Primary DB | PostgreSQL (AWS RDS) | Users, charging sessions |
| File Storage | AWS S3 | Your EV datasets (ElectricCarData.csv, EVIndia.csv) |

| Storage | Technology | Data |
|---------|-----------|------|
| Cache | Redis | Real-time range calculations |

**4. External Integrations**

- **Charger API: PlugShare (Delhi-NCR/Hyderabad stations)**

- **Battery Data: OBD-II Bluetooth via WebBluetooth API**

- **Maps: Google Maps API (route optimization)**


- **Solution Architecture Diagram:**

# Solution Architecture: EV Charge Vehicle Charge & Ranga

**EV Telemery**

**AWS IoT Core**
Data Ingestion (MQTT)

**Public API**
(Weather/Elevation)

Visauiza
Dashb

**aws**
Iot Core

Data Transfomer

**Amazon SageMaker**

Range Prediction
(ML Model)

Analysis
(Efficiency & Proxxity)

N
(L
(Cha

**Amazon Timetreem**

Time-seires Data
(Battery/Charing)

Data Lake
(Raw Telemery)

**Amazon DynamoDB**

Metdadta
(User/Vehicle)

**Reference:** https://aws.amazon.com/blogs/industries/voice-applications-in-clinical-research-powered-by-ai-on-aws-part-1-architecture-and-design-considerations/