

# **RoboTrack – Smart Equipment Monitoring & Maintenance Automation**

## **Phase 1: Problem Understanding & Industry Analysis**

### **1. Requirement Gathering**

The manufacturing industry faces challenges in efficiently monitoring mechatronic equipment such as CNC machines, robotic arms, and conveyors. Traditional systems rely on manual logs or siloed factory software, leading to:

- Unplanned equipment downtime due to late issue detection.
- High maintenance costs from reactive servicing instead of predictive maintenance.
- Lack of real-time visibility into machine health.
- Spare parts not stocked on time, delaying repairs.

Key requirements identified:

- Centralized system to manage Equipment, Sensor Data, Maintenance Tickets, and Spare Parts.
- Integration with IoT sensor data for temperature, vibration, and usage hours.
- Automated service ticket creation based on threshold breaches.
- Automatic assignment of tickets to service engineers.
- Spare part inventory management with alerts for low stock.
- Dashboards and reports for downtime trends, maintenance costs, and engineer productivity.

### **2. Stakeholder Analysis**

Primary stakeholders:

- Factory Manager oversees equipment health, tracks downtime, and reviews performance reports.
- Service Engineers receive and resolve maintenance tickets, update issue status.
- Vendors/Suppliers supply spare parts and receive automated restocking requests.
- System Administrator manages Salesforce configurations, profiles, and security.

Secondary stakeholders:

- Operations Management needs dashboards for strategic decision making.
- IT Team ensures IoT integration, API limits, and data security.

### **3. Business Process Mapping**

Current (manual) process:

- Engineers check machines periodically and log readings in Excel/registers.
- Breakdowns are reported manually to managers.
- Service engineers are called individually and assigned tasks without tracking.
- Spare parts are ordered reactively after failures.

Proposed (Salesforce CRM) process:

- IoT sensor data automatically flows into Salesforce (Sensor Data object).
- If thresholds are exceeded, a Maintenance Ticket is auto generated.
- Tickets are auto assigned to available engineers using Queueable Apex.
- Spare part stock is updated, and low-stock alerts are triggered.
- Managers access dashboards for machine health, downtime, and cost savings.

### **4. Industry-Specific Use Case Analysis**

- Manufacturing Plants: Monitor CNC machines, conveyors, and robotic arms.
- Automotive Factories: Track robotic welding/assembly equipment.
- Electronics Industry: Monitor precision machinery to avoid costly defects.
- Industrial Automation Providers: Offer predictive maintenance services to clients.

This project addresses downtime reduction, predictive maintenance, and cost efficiency, which are critical in Industry 4.0.

### **5. AppExchange Exploration**

Explored similar apps on Salesforce AppExchange for industry benchmarking:

- Salesforce Field Service Lightning (FSL): Enterprise-grade service solution, but complex and costly for smaller factories.
- IoT Cloud: Good for IoT integration but requires advanced setup and licensing.
- Custom App Approach: Chosen for simplicity, cost-effectiveness, and flexibility, tailored specifically for mechatronics equipment monitoring.