PROJECT DESIGN PHASE

Problem Solution Fit

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| **Date** | **25-06-2025** |
| **Team Id** | **LTVIP2025TMID31548** |
| **Project Name** | **Air Line Management System** |
| **College Name** | **field service workorder optimization** |

* **Problem-Solution Fit**

Problem Statement:

Field service organizations face operational inefficiencies due to:

* **Manual work order assignment**, causing delays and technician idle time.
* **Poor visibility** into technician location, skill, and availability.
* **Frequent rescheduling** due to improper resource matching.
* **Lack of real-time communication**, leading to customer dissatisfaction.
* **No centralized system** for tracking performance, progress, or escalations.
* Here is the **Problem-Solution Fit** for the **Field Service Work Order Optimization** module in a clean **table format**:

**❖ SOLUTION REQUIRED**

| **Problem** | **Proposed Solution** |
| --- | --- |
| Manual workorder creation and assignment causing delays | Implement automated workorder generation and smart dispatching based on skills, location, and availability |
| Poor visibility into technician availability and job status | Use a real-time dashboard with GPS tracking and live status updates |
| Inefficient technician routing and high travel time | Integrate route optimization tools with map APIs (e.g., Google Maps, HERE) |
| Lack of mobile tools for field technicians | Deploy a mobile app with offline access, job details, parts tracking, and photo capture |
| Disconnected systems (CRM, ERP, inventory) | Integrate all systems via APIs or middleware (e.g., REST, Kafka, MuleSoft) |
| Inaccurate or delayed inventory usage reporting | Enable live inventory sync with automatic part usage capture from the field |
| Difficulty in meeting SLAs and poor customer communication | Set up automated SLA alerts and customer notifications via email/SMS |
| Limited analytics on technician performance and service quality | Add dashboards with KPI tracking, feedback analysis, and SLA compliance reporting |
| No forecasting or workload balancing | Leverage AI/ML to predict service demand, balance workloads, and schedule preventive maintenance |

**Proposed Solution:**

**🎯 Goal:**

To digitize and optimize the complete lifecycle of field service workorders — from creation to closure — to improve efficiency, technician productivity, SLA compliance, and customer satisfaction.

**🧩 Solution Components**

**1. Automated Workorder Management**

* Centralized digital platform for creating, assigning, tracking, and closing workorders.
* Auto-prioritization based on urgency, SLA, and customer type.

**2. Smart Scheduling & Dispatching**

* AI-powered scheduling engine assigns jobs based on:
  + Technician skill set
  + Geographic proximity
  + Availability
  + Historical performance
* Live dispatch board for supervisors

**3. Mobile App for Technicians**

* Features:
  + Job details, checklists, signature capture
  + Photo upload, barcode scanning
  + Offline mode with auto-sync
  + Navigation with integrated maps

**4. Customer Communication Portal**

* Real-time updates via email/SMS
* Self-service tracking and feedback submission
* Customer ratings post-job

**5. Integrated Inventory Management**

* Live visibility of parts across warehouses and vans
* Auto-deduction of parts used from technician’s stock
* Reorder alerts based on consumption trends

**6. Reporting & Analytics**

* Dashboards for:
  + Technician productivity
  + SLA compliance
  + Parts usage and trends
* Predictive insights for planning and optimization

**7. System Integrations**

* **CRM** (e.g., Salesforce) for customer history
* **ERP** (e.g., SAP/Oracle) for billing and inventory
* **GIS/Map APIs** (e.g., Google Maps) for routing
* **Messaging APIs** (e.g., Twilio) for notifications

**🛠️ Technology Stack**

| **Layer** | **Technology** |
| --- | --- |
| **Frontend** | React.js, Flutter (mobile) |
| **Backend** | Node.js, Spring Boot, .NET Core |
| **Database** | PostgreSQL, MongoDB, Elasticsearch |
| **Integration** | REST/GraphQL APIs, Apache Kafka, MuleSoft |
| **Cloud/DevOps** | AWS/Azure/GCP, Docker, Kubernetes, GitHub Actions, Prometheus |

**🚀 Deployment Plan (Phased)**

1. **Phase 1 – Core Deployment**
   * Launch workorder system, dispatching, and technician app.
2. **Phase 2 – System Integration**
   * Connect CRM, ERP, inventory, and GIS.
3. **Phase 3 – Optimization & Intelligence**
   * Implement analytics dashboards, AI/ML modules, and auto-routing.

**Solution Architecture: Field Service Work Order Optimization**

The **Solution Architecture for Field Service Work Order Optimization** defines the structure and interaction of software modules, data workflows, mobile interfaces, and integration layers. This architecture streamlines how service teams manage, assign, execute, and monitor work orders in the field. Key components include technician scheduling, inventory tracking, mobile workforce enablement, and customer communication modules.

The system is built on a **cloud-based, scalable platform** (such as Salesforce Field Service or equivalent), and integrates with ERP, CRM, and IoT platforms through **APIs and middleware**, enabling real-time visibility, intelligent dispatching, and seamless coordination between departments.

Centralized data storage with role-based access ensures **data security, reliability**, and **compliance** with industry and service-level regulations. AI-powered analytics provide insights for performance monitoring and future planning.

**Goals in this Project Are to:**

**🔧 Optimize Work Order Management**

Automate work order creation from service requests, assign tasks based on technician availability, skills, and location using intelligent routing and scheduling algorithms.

**📱 Empower Field Technicians**

Enable mobile access to job details, customer history, manuals, and parts inventory. Allow technicians to update status, capture photos, and collect digital signatures on-site.

**📈 Improve Operational Efficiency**

Reduce travel time, missed appointments, and inventory mismatches through route optimization, predictive maintenance alerts, and real-time updates from the field.

**🤝 Enhance Customer Experience**

Provide customers with real-time ETA notifications, service updates, and post-service feedback options, leading to higher satisfaction and trust.

**💰 Increase Service Revenue**

Implement upselling workflows, contract tracking, and parts usage monitoring to unlock new revenue opportunities during field visits.

**✅ Ensure Compliance and Safety**

Standardize procedures, automate regulatory reporting, and capture proof of work to ensure adherence to service standards and safety regulations.

