



Techno-Commercial Proposal for a Cross-platform Mobile app and a web-based Central Monitoring & Control System (CMCS) for an HVAC service solution

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1. Executive Summary

This proposal outlines the development of a comprehensive **cross-platform mobile application** (for both iOS and Android) and a **web-based Central Monitoring & Control System** (CMCS) designed to streamline and optimize HVAC service management. The goal is to create a user-friendly and efficient platform to manage HVAC service requests, preventive maintenance, service feedback, job assignments, and real-time communication between customers, service engineers, and service managers.

The system will be built in two phases:

- **Phase 1** will include core features like service request management, preventive maintenance scheduling, job assignments, push notifications, and customer feedback mechanisms.
- **Phase 2** will focus on integrating Microsoft Dynamics Business Central with this application.

Note: This proposal does not include the scope or timeline for Phase 2. These elements are intentionally excluded and are not part of this proposal.

By combining cutting-edge mobile and web applications with real-time IoT integration, the solution ensures high operational efficiency, improved service quality, and enhanced customer satisfaction.

Key Objectives:

1. **Optimize HVAC service management** with a digital solution for service engineers, managers, and customers.
2. **Improve communication** through real-time notifications, alerts, and updates on service requests.
3. **Enhance service efficiency** by automating preventive maintenance schedules and task assignments.
4. **Leverage cloud-based communication** for seamless IoT integration and data exchange between HVAC machines, customers, and service teams.

2. Company Overview: iiiQBets

At iiiQBets, we are dedicated to delivering **cutting-edge digital solutions** tailored to the unique needs of each client. With over **20 years of industry experience**, we have built a strong reputation for **excellence in application development, cloud infrastructure, and digital marketing**.

Our team of experts brings **innovative ideas** and a deep passion for technology to every project, ensuring that our clients receive **high-quality, scalable, and reliable solutions**. From **custom software development** to **advanced cloud computing** and **strategic digital marketing services**, iiiQBets is your **trusted partner** in driving business success in the digital world.

At the heart of our success is our **customer-centric approach**. We work closely with each client to understand their **challenges and objectives**, helping them achieve their **business goals with precision and efficiency**.

3. Technology Stack

Website - Central Monitoring & Control System (CMCS)

- **Frontend:** React.js (for building responsive user interfaces)
- **UI Framework:** Material UI / Bootstrap (for responsive and consistent design)
- **Routing:** React Router
- **State Management:** Redux / Context API
- **Charts & Reports:** Chart.js / Recharts for generating visual data reports
- **API Layer:** Django REST Framework (for handling RESTful backend services)
- **Database:** Microsoft SQL (Dynamics ERP integration in Phase 2)
- **Notifications:** Firebase for push notifications and SMTP for email notifications

Mobile Application (Customer, Service Engineer, Service Manager)

- **Framework:** React Native (cross-platform development for iOS and Android)
 - **State Management:** Redux / Context API (for managing app-wide state)
 - **Navigation:** React Navigation
 - **Push Notifications:** Firebase Cloud Messaging (FCM) for real-time alerts
 - **Authentication:** Firebase Authentication / JWT-based Authentication
 - **UI Framework:** Custom design with Material UI / Native Base for mobile-specific components
 - **Real-time Communication:** MQTT/WebSocket for IoT communication with cloud services
 - **Data Syncing:** Firebase Realtime Database for synchronization between devices
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Backend (API Layer)

- **Framework:** Django REST Framework (DRF) for building and handling backend services
 - **Authentication:** Token-based (JWT or Firebase Auth)
 - **Database:** Microsoft SQL (Dynamics ERP integration in Phase 2)
 - **Hosting & Deployment:** AWS / Digital Ocean / Azure (based on client requirements)
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Communication & IoT Integration

- **IoT Hub:** Microsoft Azure IoT Hub for secure and scalable communication between IoT controllers and CMCS
- **Communication Protocol:** MQTT for real-time updates on IoT data from HVAC systems

Deployment & DevOps

- **CI/CD Tools:** GitHub Actions / GitLab CI for automated deployments and testing
 - **Hosting Platforms:** AWS / Azure / Digital Ocean based on infrastructure needs
 - **Backup & Restore:** Cloud storage for backups, both on-premises and in the cloud
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4. User Profiles and Roles

Mobile Application Profiles

1. Customer Profile

- **Roles & Responsibilities:**
 - **View & Manage HVAC Service Units:** View all the HVAC units under their care and manage them (including add, edit, and delete).
 - **Raise Service Requests:** Initiate service requests based on the maintenance alerts or when issues arise.
 - **Track Service Progress:** Monitor the progress of service requests and receive updates.
 - **View Service History:** Access historical records of past services.
 - **Submit Feedback & Complaints:** Provide feedback on the services rendered and log any complaints.
 - **Receive Notifications:** Get alerts about service status, upcoming preventive maintenance, or renewal reminders

2. Service Engineer Profile

- **Roles & Responsibilities:**
 - **View Assigned Service Jobs:** View service tasks assigned by the Service Manager.

- **Accept/Decline Service Requests:** Accept or decline job requests based on availability or expertise.
- **Update Job Status:** Mark jobs as **Pending, On-site, or Completed.**
- **Submit Service Reports:** Provide service completion details, upload images, and add notes after finishing the task.
- **View Schedule:** View and manage upcoming job assignments and schedules.
- **Receive Notifications:** Get real-time notifications on job updates, new assignments, or cancellations.

3. Service Manager Profile

- **Roles & Responsibilities:**

- **Manage Service Orders:** Create, assign, and track service orders for engineers.
- **Monitor Job Status:** Track the status of all service jobs in real-time.
- **Create & Manage Preventive Maintenance Schedules:** Create and manage recurring maintenance tasks for customers.
- **Assign Service Engineers:** Assign jobs to engineers based on availability, location, and expertise.
- **Receive Feedback & Complaints:** Address any complaints from customers or engineers.
- **Generate Reports:** Access reports on service performance, engineer productivity, and customer feedback.
- **Send Notifications:** Send notifications about job updates, service schedules, and feedback requests.
- **View Service History:** Access service history records and track service delivery against SLAs

Web Application Profiles

1. Super Admin Profile

- **Roles & Responsibilities:**
 - **Manage Company Settings:** Set up and configure company-specific details such as company name, VAT number, currency, etc.
 - **User Management:** Create, update, or delete user profiles across all roles (Admin, Service Manager, Service Engineer).
 - **Monitor System Logs:** Track user activity logs, system events, and audit trails.
 - **Cloud Backup & Data Restore:** Handle system-wide data backup, restore functionality, and clear logs.
 - **Export Reports:** Export detailed reports from the CMCS database, such as customer logs, service histories, and engineer performance.

2. Admin Profile

- **Roles & Responsibilities:**
 - **Manage Users & Roles:** Administer user roles for service engineers, service managers, and other admin profiles.
 - **Create Resource Cards for Engineers:** Create, update, and maintain resource cards for all engineers in the system.
 - **Manage Products & Components:** Manage and update product catalogues, components, and preventive maintenance groups.
 - **Create Service Orders:** Generate service orders from alerts, maintenance schedules, or customer requests.
 - **Track Service Orders:** Monitor job assignments and engineer performance.
 - **Send Notifications:** Send email/SMS notifications to service engineers and customers about job updates and assignments.

3. Service Manager Profile

- **Roles & Responsibilities:**

- **Create & Assign Service Orders:** Create new service orders based on alerts or preventive maintenance schedules and assign them to engineers.
 - **Manage Preventive Maintenance:** Create and track preventive maintenance schedules and alerts.
 - **Assign Engineers to Jobs:** Assign engineers to service tasks, and manage job reassignments if necessary.
 - **Track Service Performance:** Monitor job status, ensure SLAs are met, and track engineer productivity.
 - **Manage Customer Feedback:** Address customer feedback and complaints related to service quality.
 - **Generate Service Reports:** Create and export service performance reports, including SLA compliance, job completion rates, and customer ratings.
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5. Modules

Modules for Mobile Application

1. Customer App Modules

1. **User Registration & Authentication**
 - Secure registration and login via email/phone.
 - Password reset using OTP or email-based verification.
 2. **Service Request Management**
 - Create new service requests and view their status.
 - Option to cancel or reschedule service appointments.
 3. **Service Tracking**
 - Real-time tracking of service status.
 - Notifications for job acceptance, delays, or completion.
 4. **Preventive Maintenance Alerts**
 - Receive notifications for scheduled maintenance and contract renewals.
 5. **Service History & Feedback**
 - Access service history records and submit feedback and ratings for engineers.
 - Log complaints directly from the app.
 6. **Notifications**
 - Receive alerts for new service requests, maintenance reminders, service completion, and feedback surveys.
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2. Service Engineer App Modules

1. **User Registration & Authentication**
 - Registration via a provided ID by the CMCS admin.
 - Secure login with password and multi-factor authentication.
2. **Service Request Management**
 - View assigned service jobs.
 - Accept or decline jobs based on availability or expertise.

3. Job Status Updates

- Update job status (Pending, On-site, Completed).
- Submit service completion details with images and notes.

4. Notifications

- Receive notifications about new tasks, status updates, and feedback reminders.

5. Service History

- View past service jobs and their ratings.

6. Tracking Service Performance

- Monitor personal performance based on job completion rates and customer feedback.

3. Service Manager App Modules

1. User Registration & Authentication

- Service Manager logs in via the user ID and password set by the CMCS admin.
- Secure access with multi-factor authentication.

2. Service Order Creation & Management

- Create new service orders based on machine alerts, preventive maintenance schedules, or customer requests.
- Assign jobs to engineers and track progress.

3. Preventive Maintenance Scheduling

- Create, view, and track preventive maintenance tasks for HVAC systems.

4. Notifications

- Send notifications about job assignments, maintenance alerts, and service updates to engineers and customers.

5. Feedback & Complaints Management

- Address complaints from customers and manage service feedback.

6. Job Assignment & Tracking

- Assign engineers to service tasks and reassign jobs if necessary.
- Track the status of service requests and monitor service completion.

Modules for Web Application

1. Super Admin Modules

1. Company Setup

- Manage company-related details (e.g., VAT, currency, timezone).

2. User & Role Management

- Create, update, or delete users with specific roles (Admin, Service Manager, Service Engineer).

3. Backup & Restore

- System-wide backup and data restoration for cloud and local storage.

4. Export Reports

- Export service, customer, and engineer data for reporting or auditing purposes.

5. System Monitoring & Logs

- Monitor system activity, logs, and events. View and manage cloud logs.
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2. Admin Modules

1. User Management

- Create, update, and manage service engineers and service managers.
- Set roles (Admin, Service Manager, Service Engineer) and status (Active/Inactive/Blocked).

2. Resource Management (Service Engineers)

- Create and update resource cards for service engineers with contact details, status, and role.

3. Service Order Management

- Create service orders from customer requests, machine alerts, or maintenance schedules.
- Track service orders and job progress.

4. Product & Component Management

- Add and update products and components used in the HVAC systems.

5. Export Reports

- Export service, customer, and performance reports in PDF or CSV formats.

3. Service Manager Modules

1. Service Order Creation & Assignment

- Create new service orders from alerts, maintenance schedules, or customer requests.
- Assign tasks to engineers based on location and availability.

2. Preventive Maintenance Management

- Create and monitor preventive maintenance schedules for HVAC systems.

3. Job Tracking & Status Updates

- Track the status of all assigned jobs, from initiation to completion.
- Reassign service jobs if needed.

4. Feedback & Complaints Management

- Track and address feedback or complaints raised by customers.

5. Generate Reports

- Create performance and SLA compliance reports.
- Export reports based on service history, performance, and customer satisfaction.

6. Service Pool Management

- Populate service requests into the pool for engineers to view and accept.
 - Manage job statuses (e.g., **Under process**, **Waiting for parts**, **Completed**).
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6. Features

Features for Mobile Application

1. Service Manager App (Mobile)

User Registration & Authentication

- **Registration:** Registers with details provided by the CMCS admin (service manager ID, name, password, and security questions).
- **Authentication:** Login via Firebase Authentication or JWT for secure access.
- **Password Reset:** Service manager can reset their password using the security questions stored in the cloud.

Service Request & Tracking

- **View & Manage Service Requests:** Service manager can see a list of service requests, including customer details and service request status.
- **Service Assignment:** Assign service requests to engineers based on their availability, location, or expertise.
- **Track Service Status:** Monitor job status in real-time (Pending, On-site, Completed).
- **Notifications:** Receive real-time notifications for job updates, service acceptance, or rejections by service engineers.

Preventive Maintenance Scheduling & Alerts

- **Create Maintenance Schedules:** Create preventive maintenance schedules for HVAC units.
- **Alerts & Reminders:** Set up alerts and reminders for upcoming scheduled maintenance and contract renewals.
- **Monitoring:** Track the completion of preventive maintenance tasks by service engineers.

Push Notifications

- **Job Assignment Notification:** Receive notifications when new service requests are assigned to service engineers.

- **Status Updates:** Real-time notifications for status changes on jobs assigned (e.g., "On-site", "Completed").
- **Feedback Notifications:** Notifications when customers submit feedback or complaints about services.

Service Feedback & Complaints Management

- **View & Respond to Feedback:** Receive customer feedback on services and take appropriate action.
- **Manage Complaints:** Address customer complaints efficiently, track the status of complaints, and resolve them in real-time.
- **Monitor Service Ratings:** Track service engineer performance based on customer ratings and feedback.

Service History & Reports

- **Service Records:** Access historical data for all services performed, including job details, service ratings, and feedback.
- **Performance Reports:** Generate service performance reports, analyse SLA adherence, and monitor service engineer productivity.
- **Export Reports:** Download and export service reports in formats like CSV/PDF.

Job Assignment & Tracking

- **Assign Service Engineers:** Assign engineers to specific tasks based on their skills, location, or availability.
 - **Track Progress:** Track the progress of each job in real-time to ensure timely completion.
 - **Reassign Jobs:** Reassign jobs if engineers are unavailable or if new issues arise during service.
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2. Service Engineer App (Mobile)

User Registration & Authentication

- **Registration:** Registers using the service ID and username provided by CMCS admin.
- **Authentication:** Login via Firebase Authentication or JWT for secure access.
- **Password Reset:** Reset password by answering two security questions.

Service Request & Tracking

- **Accept/Decline Jobs:** Service engineers can accept or decline job assignments based on availability and expertise.
- **Track Service Requests:** View assigned service jobs, including location, task details, and estimated service time.
- **Real-Time Status Updates:** Update job status as "Pending", "On-site", or "Completed" based on job progression.

Preventive Maintenance Scheduling & Alerts

- **View Preventive Maintenance Alerts:** Receive alerts for preventive maintenance due for specific customers.
- **Schedule Confirmation:** Confirm or reschedule maintenance appointments based on customer availability and engineer schedules.

Push Notifications

- **Job Notification:** Receive notifications when a new job is assigned or when there's an update regarding the job status.
- **Service Completion Notification:** Send notifications after completing service tasks and submitting reports.
- **Maintenance Alerts:** Get notified for preventive maintenance tasks assigned or due for completion.

Service Feedback & Complaints Management

- **View & Address Feedback:** Receive customer feedback on services and address complaints or issues raised during the service.
- **Track Ratings:** Monitor customer satisfaction and ratings received for each completed service task.

Service Job Info

- **Job Info Overview:** View service task details, including customer information, product ID, and service description.
- **Service Duration:** Track the estimated time of completion and adjust the service schedule based on task requirements.

Service Status Update

- **Update Status:** Update the service status based on job progress, such as "Waiting for spare parts", "Completed", or "Under process".
- **Job Closure:** Mark jobs as completed after finishing the service and submitting the required reports.

3. Customer App (Mobile)

User Registration & Authentication

- **Registration:** Customers register with basic details such as name, phone number, email, and service address.
- **Login:** Secure login using a password or PIN.
- **Password Reset:** Customers can reset passwords by receiving a link to their email or using a verification code sent to their phone.

Service Request & Tracking

- **Service Request Creation:** Customers can create new service requests for their HVAC units and track the status.
- **Track Job Status:** View real-time updates on service progress (assigned, in-progress, completed).
- **Request Updates:** Request updates or reschedule appointments based on availability.

Preventive Maintenance Scheduling & Alerts

- **Preventive Maintenance Alerts:** Receive timely alerts for upcoming preventive maintenance tasks.
- **Service Contract Renewal Alerts:** Receive notifications for service contract renewals, avoiding any service interruptions.

Push Notifications

- **Service Visit Notifications:** Receive notifications for service engineer visits, including date and time.
- **Job Completion Updates:** Get notified when a service job is completed and a feedback survey is available.
- **Feedback Reminders:** Receive reminders to submit feedback on the completed service.

Service Feedback & Complaints Management

- **Submit Service Feedback:** Provide feedback and ratings for the service engineer after task completion.
- **Log Complaints:** Submit complaints regarding service quality or any unresolved issues directly through the app.

Service History & Reports

- **View Service History:** Customers can access historical data on all past service requests, including details like date, service performed, and feedback.
- **Maintenance Records:** View the maintenance history of HVAC units and related repairs or replacements.

Service Item Card Master

- **View Unit Details:** Access HVAC unit data, including product ID, warranty dates, location, and components.
- **Monitor Warranty:** Get reminders when warranty periods for units or components are about to expire.

Other Features

- **Approve a Second User:** Approve another person to operate the app and manage the HVAC system remotely.
- **Manual & Automatic Service Requests:** Customers can initiate requests either manually or based on automated service reminders.

Features for Web Application

1. Super Admin Features

Key Features for Super Admin:

- **Company Setup & Configuration**
 - **Manage Company Details:** Set up the company details such as **Company Name, C.R No., VAT No., Currency, Service Email, GM Email,** and **Time Zone.**
 - **Configure Settings:** Set system-wide settings that apply across all users (Admin, Service Manager, etc.).
- **User & Role Management**
 - **Create/Manage Users:** Create, update, and delete user accounts (Admin, Service Manager, Service Engineer) within the system.
 - **Assign User Roles:** Assign or update roles for each user (e.g., Admin, Service Manager, Service Engineer).
 - **User Access Control:** Manage user access rights (active/inactive/blocked) and track their login status.
- **Backup & Restore**
 - **Cloud Backup:** Backup system data to cloud storage and restore from backup as required.
 - **Local Backup:** Option to store backups on local machines as well.
 - **Export Logs:** Export logs and data for auditing and record-keeping purposes.
- **System Monitoring & Logs**
 - **View Activity Logs:** Track system activity, including login attempts, user actions, and any changes made to system settings.
 - **Error/Alert Logs:** Monitor system alerts and error logs to ensure smooth functioning.
- **Export Customer & Service Data**
 - **Export Customer Data:** Export detailed customer data, service records, and service history in CSV or PDF formats for analysis or reporting.

- **Manage Cloud Logs**
 - **Clear Logs:** Clear the cloud logs that have already been backed up locally.
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2. Admin Features

Key Features for Admin:

- **User Management**
 - **Create/Update Users:** Admin can create and update users, including assigning roles (Admin, Service Manager, Service Engineer).
 - **User Role & Status Management:** Manage user roles (Admin, Service Manager, Service Engineer) and set user status (active/inactive/blocked).
 - **Password Management:** Admin can reset passwords and update user credentials.
- **Resource Management (Service Engineers)**
 - **Create/Update Resource Cards:** Create and update resource cards for service engineers, including details such as **Resource ID, Full Name, Mobile Number, Email, and Status** (active/inactive/blocked).
- **Product & Component Management**
 - **Product Management:** Create and manage product details such as **Product ID, Description, and Preventive Maintenance Group**.
 - **Component Management:** Create and manage component details for each HVAC system, including **Component ID, Description, and Warranty Dates**.
- **Service Order Management**
 - **Create Service Orders:** Admin can create service orders based on machine alerts, preventive maintenance charts, or customer requests.
 - **Monitor Service Orders:** Track the status of service orders and ensure timely completion by the service engineers.
 - **Service Task Assignment:** Admin can assign service tasks to engineers based on their expertise and availability.

- **Notification & Alerts**
 - **Service Notification Management:** Admin can send notifications to both service engineers and customers regarding service job assignments, schedule changes, and other important updates.
 - **Export Reports**
 - **Export Service Reports:** Admin can export detailed service reports including **service history**, **performance reports**, and **SLA compliance** in CSV or PDF formats.
 - **Export Resource Reports:** Export service engineer performance reports, including service completion rates and customer ratings.
 - **View Real-Time Dashboards**
 - **Service Performance Dashboard:** View real-time dashboards for service performance, monitoring KPIs like response times, job completion rates, and SLA compliance.
 - **SLA Compliance Tracking:** Track service level agreements and ensure they are being adhered to by service engineers.
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3. Service Manager Features

Key Features for Service Manager:

- **Service Order Management**
 - **Create Service Orders:** Service Manager can create service orders based on alerts from IoT devices, preventive maintenance schedules, or customer requests.
 - **Assign Service Engineers:** Assign service tasks to engineers based on their availability, expertise, and location.
 - **Reassign Tasks:** Reassign service tasks if engineers are unavailable or if issues arise during service.
 - **Service Order Tracking:** Track the status of each service order in real-time, including **pending**, **in-progress**, and **completed** statuses.

- **Preventive Maintenance Scheduling**
 - **Create Preventive Maintenance Groups:** Service Manager can create maintenance schedules for all customers, including defining **Frequency, Alert Days Counter**, and the **Type** (Replace/Clean).
 - **Monitor Preventive Maintenance:** View and track the completion of preventive maintenance tasks assigned to engineers.
 - **Maintenance Alerts:** Set up alerts for upcoming maintenance due for each customer.
- **Job Assignment & Tracking**
 - **Track Engineer Jobs:** View all service jobs assigned to engineers and track their progress in real-time.
 - **Job Status Updates:** Monitor the status updates from engineers (e.g., **waiting for parts, in-progress, completed**).
 - **Service History:** View past service records for each customer or machine, including job details, feedback, and service ratings.
- **Service Pool Management**
 - **Manage Service Pool:** Service Manager can populate and manage a service request pool for engineers, including details such as **service engineer name, estimated service duration**, and **service cost**.
 - **Service Pool Status:** Monitor the status of each service job in the pool (e.g., **waiting for parts, pending approval**).
- **Service Feedback & Complaints**
 - **Track Customer Feedback:** View feedback from customers, including service ratings and comments.
 - **Address Complaints:** Service Manager can address any issues raised by customers, ensuring that complaints are resolved in a timely manner.
 - **Monitor Engineer Performance:** Track and manage service engineer performance based on customer ratings and feedback.

- **Push Notification Management**
 - **Service Engineer Notification:** Service Manager can send notifications to engineers regarding job assignments, status updates, or issues related to their tasks.
 - **Customer Notification:** Send notifications to customers regarding service initiation, the status of the service engineer's visit, and feedback requests after service completion.
- **Service Completion & Re-Opening**
 - **Track Service Completion:** Service Manager can monitor the completion of service jobs, confirm service reports, and address any incomplete services.
 - **Re-open Service Orders:** If a service was not performed properly or the customer requires additional work, the service manager can re-open the service order.
- **View Reports & Analytics**
 - **Service Performance Reports:** View service performance metrics, including **completion rates**, **response times**, and **SLA compliance**.
 - **Engineer Performance Reports:** View reports on the performance of engineers based on customer feedback and service completion metrics.

7. Project Milestones and Timeline (24-26Weeks)

Section 1: CMCS Web Application Development (Weeks 1-16)

Week 1-2: Planning & Setup

- Finalize project requirements and workflows with the client for the CMCS Web Application.
- Define technical architecture for the web app (React.js, Django REST, MySQL, Azure IoT).
- Set up development environments for the web application (React.js, Django, MySQL).
- Create repositories and project management tools (e.g., GitHub, Jira).
- Finalize database schema and API contracts for CMCS Web Application.

Week 3: Authentication & User Management

- Implement **user registration** and login functionality for Super Admin, Admin, and Service Manager.
- Enable password reset functionality with security questions for service managers.
- Implement **role-based access control** for CMCS users.
- Integrate the backend with Django REST for user management and user profile handling.

Week 4: Service Request Management & Asset Management

- **Admin Profile:** Allow the creation of service requests, management of assets, and assignment of engineers.
- **Customer Profile:** Add/manage service units (HVAC systems).
- **Engineer/Admin:** Allow viewing of assigned service units and asset details.
- Backend APIs for unit CRUD operations (Create, Read, Update, Delete).
- Develop web UI for viewing assets and service units.

Week 5: Service Requests & Preventive Maintenance

- **Customer Profile:** Raise service requests and view their status.
- **Admin Profile:** Admins can create and manage preventive maintenance schedules.
- **Engineer Profile:** Engineers can view assigned service jobs.
- Develop notification system for service requests (email and push notifications).
- Implement preventive maintenance alerts for customers.
- **Focus on testing database integration** and the backend API for preventive maintenance data.

Week 6: Job Assignment & Tracking

- **Admin Profile:** Allow admins to assign and reassign service jobs to engineers based on availability.
- **Engineer Profile:** Engineers can accept or decline service requests and update job statuses.
- Capture service details, images, and notes from engineers after task completion.
- Implement **real-time job tracking** via web UI.
- **Focus on optimizing communication with backend and IoT components.**

Week 7: Feedback, Complaints & Notifications

- **Customer Profile:** Enable customers to submit feedback and log complaints.
- **Admin Profile:** Admins can view and manage complaints.
- Implement **push/email notifications** for feedback reminders and service completion.
- Finalize notification triggers for job status updates and feedback requests.
- **Focus on notification synchronization** between mobile/web apps and the backend.

Week 8-9: IoT Integration Setup (Initial Focus)

- **Azure IoT Integration:** Begin configuring Microsoft Azure IoT Hub for communication with HVAC systems.
- Set up basic IoT communication using **MQTT** protocol for receiving data from HVAC units.
- **Backend Setup:** Implement APIs for storing and processing incoming IoT data.
- Establish initial test connections between the IoT devices and the CMCS backend.
- **Extended testing period** to ensure stability in communication between IoT devices and CMCS.

Week 10-11: Dashboard & Reports (Web CMCS)

- **Admin Profile:** Develop a real-time **dashboard** for monitoring service jobs, performance, and SLA compliance.
- Implement **summary views:** service history, performance, and SLA tracking.
- Create **exportable reports** (CSV/PDF) for service history, engineer performance, and customer feedback.
- Finalize **web admin panel styling** and ensure responsiveness.
- **Test with IoT data** to visualize and monitor real-time machine status, temperature, humidity, and more.

Week 12: Service Pool Management & Job Assignment Automation

- Implement **service pool management** to allow service managers to populate a pool with service requests.
- Engineers can pick and accept tasks from the service pool.
- Automate **job assignments** based on availability, expertise, and location.
- **Notifications:** Service managers and engineers receive real-time notifications about new tasks.
- **Focus on optimizing job assignment workflows** and system response times.

Week 13: Final Testing for CMCS Web Application

- Complete **system testing** for the CMCS Web Application with integrated IoT features.
- **Bug fixing** based on previous testing phases.
- **Client User Acceptance Testing (UAT)** for web application.
- Collect **feedback** and adjust the system based on the results.

Week 14-15: Finalizing IoT Integration

- Complete **IoT integration** with Microsoft Azure and **MQTT communication**.
- Test the stability of **IoT data** communication with the CMCS web backend.
- Finalize **data visualization** of IoT sensor data (e.g., temperature, humidity) in the CMCS web dashboard.
- **Data storage optimization** for real-time IoT data processing and handling large data loads.

Week 16: Web Application Deployment

- **Finalize deployment** process for the CMCS Web Application to the cloud (AWS, Azure, or Digital Ocean).
 - Conduct **final testing** for deployment and ensure all features are working.
 - Deploy the **web application** and provide basic **post-deployment support**.
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Section 2: Mobile Application Development for Service Manager, Service Engineer & Customer (Weeks 17-22)

Week 17: Mobile App Setup & Authentication

- Set up the development environment for **React Native** (cross-platform).
- Implement **user registration** and login functionality for **Customer**, **Service Engineer**, and **Service Manager** mobile apps.
- Enable **password reset functionality** for service managers and engineers (security questions).
- Integrate **Firebase Authentication** for secure login and user management.

Week 18: Service Request & Tracking (Mobile)

- **Customer Profile:** Implement **service request creation** and **tracking** on mobile.
- **Service Manager Profile:** Allow service managers to assign and manage jobs from mobile.
- **Service Engineer Profile:** Enable engineers to accept/decline jobs and track service requests.
- Implement **real-time updates** on job status and service progress through push notifications.

Week 19: Preventive Maintenance & Alerts (Mobile)

- **Customer Profile:** Implement preventive maintenance alerts and contract renewal reminders.
- **Service Engineer Profile:** Engineers can view preventive maintenance alerts for customers.
- **Service Manager Profile:** Service managers can schedule and track preventive maintenance tasks.
- **Push Notifications** for maintenance alerts and job updates.

Week 20: Feedback & Complaints Management (Mobile)

- **Customer Profile:** Enable customers to submit feedback and complaints via mobile.
- **Service Manager Profile:** Service managers can address complaints and monitor feedback.
- **Push Notifications** for feedback reminders and customer complaint responses.

Week 21: Job Assignment & Service Task Management (Mobile)

- **Service Manager Profile:** Enable mobile **job assignment** and tracking for service engineers.
- **Service Engineer Profile:** Engineers can update job statuses (Pending, On-site, Completed) and submit service reports.
- **Push Notifications** for job assignments, status updates, and service completions.

Week 22: QA, Bug Fixing & UAT for Mobile Application

- Complete full system testing for **Mobile Apps** (iOS and Android).
 - **Bug fixing** based on identified issues from earlier testing phases.
 - Perform **User Acceptance Testing (UAT)** with the client for mobile apps.
 - Collect **client feedback** and adjust the system based on feedback.
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Section 3: Mobile Application Deployment (Weeks 23-24)

Week 23: Final Testing & Deployment Preparation

- Finalize the mobile app for **deployment** to the **App Store** (iOS) and **Google Play Store** (Android).
- Conduct **final performance testing** for mobile apps to ensure stability and responsiveness.
- Conduct any final **bug fixing** and optimizations for the mobile app.

Week 24: App Deployment & Post-Deployment Support

- Deploy mobile applications to **App Store** (iOS) and **Google Play Store** (Android).
 - Provide basic **post-deployment support** to address initial feedback from end users.
 - Monitor app performance and address any **critical issues**.
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Section 4: Post-Deployment Support & Final Adjustments (Weeks 25-26)

Week 25: Post-Deployment Support

- Provide **post-deployment support** for both web and mobile applications.
- Address any critical issues, bugs, or improvements that arise after launch.
- Collect **user feedback** and analyse system performance.

Week 26: Final Adjustments & Review

- Conduct a final review of the entire project.
- Gather feedback from users and stakeholders.
- Finalize any remaining tasks and close out the project.

Conclusion

This **HVAC Service Solution** represents a comprehensive and forward-thinking approach to managing service operations, leveraging **real-time IoT data** and modern service management practices. The solution is designed to seamlessly integrate both **mobile** and **web applications**, enhancing the overall service workflow for all stakeholders — **customers**, **service engineers**, and **service managers**. This integration will lead to significant improvements in **service efficiency**, **customer satisfaction**, and **operational transparency**.

The key elements of this solution are its **real-time capabilities**, **customizability**, and **ease of use**, ensuring that service requests, maintenance schedules, feedback, and service engineer tasks are handled smoothly and effectively. The use of **IoT sensors** will allow for automatic service alerts and machine monitoring, reducing response times, increasing the predictability of maintenance needs, and ensuring that service issues are addressed proactively.

The system will utilize **cutting-edge technologies**, such as:

- **React Native** for a **cross-platform mobile application** (iOS and Android), ensuring consistent user experiences across devices.
- **Django REST Framework (DRF)** for a robust and scalable **backend API layer**, offering secure user authentication, efficient data handling, and smooth integration with mobile and web apps.
- **Firebase Cloud Messaging (FCM)** for **push notifications**, enabling real-time communication between the service engineers, service managers, and customers.
- **Microsoft Azure** as a secure, scalable cloud platform to manage IoT communication, store data, and enable the real-time interaction between various system components (mobile app, web app, and IoT devices).
- **Microsoft SQL Database** for reliable and secure data storage, ensuring the application can handle large datasets related to service orders, customer feedback, and machine data without performance degradation.

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