# MyCVBuilder.co.uk

## Comprehensive Project Technical Report

**Project Name:** MyCVBuilder  
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**Technical Architecture Review**

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## 1. Executive Summary

**MyCVBuilder** is a comprehensive SaaS platform designed to revolutionize CV creation and optimization through AI-powered analysis. The platform combines modern web technologies with advanced artificial intelligence to provide users with professional CV templates, intelligent feedback, and career guidance.

### Key Achievements

* **Live Production Platform:** Successfully deployed at mycvbuilder.co.uk
* **Modern Architecture:** React frontend + Node.js backend + PostgreSQL database
* **AI Integration:** Multi-model AI analysis using Claude 3.5 Sonnet and GPT-4
* **Subscription Model:** Stripe-powered recurring billing system
* **Enterprise Security:** JWT authentication, 2FA, encryption at rest/transit
* **Real-time Analytics:** Google Analytics 4 with custom business intelligence

### Business Metrics

* **Technology Stack:** React 18.2, Node.js, PostgreSQL, Prisma ORM
* **Deployment:** Vercel (frontend) + Render (backend) + AWS RDS (database)
* **Security:** GDPR compliant, PCI DSS through Stripe, SOC 2 infrastructure
* **Performance:** Sub-3s page loads, 99.9% uptime target

## 2. Project Overview

### 2.1 Platform Purpose

MyCVBuilder addresses the critical challenge of CV optimization in today’s competitive job market. The platform provides:

* **AI-Powered Analysis:** Advanced CV scoring using multiple AI models
* **ATS Optimization:** Applicant Tracking System compatibility checking
* **Industry-Specific Insights:** Tailored recommendations by role and sector
* **Professional Templates:** Modern, recruiter-approved CV designs
* **Career Guidance:** Personalized improvement recommendations

### 2.2 Target Market

* **Primary:** Job seekers requiring professional CV optimization
* **Secondary:** Career changers needing industry transition guidance
* **Tertiary:** Students and graduates entering the job market

### 2.3 Competitive Advantages

* **Multi-Model AI Analysis:** Combines Claude 3.5 Sonnet + GPT-4 for superior accuracy
* **Real-time Processing:** Instant CV analysis with progress tracking
* **Industry Intelligence:** 50+ role-specific analysis templates
* **Privacy-First:** GDPR compliant with data minimization principles
* **Freemium Model:** Accessible entry point with premium value-add features

## 3. System Architecture

### 3.1 High-Level Architecture

Internet → Cloudflare DNS → Vercel Frontend → Render Backend → AWS RDS  
 ↓  
 Google Analytics 4  
 ↓  
 Stripe Payment Processing

### 3.2 Component Architecture

**Frontend (React SPA)** - **Framework:** React 18.2 with Vite build system - **Routing:** React Router v6 with lazy loading - **State Management:** Context API with provider pattern - **Styling:** Tailwind CSS with dark mode support - **Analytics:** Google Analytics 4 with custom events

**Backend (Node.js API)** - **Framework:** Express.js with middleware architecture - **Authentication:** JWT with refresh tokens, 2FA support - **Database:** Prisma ORM with PostgreSQL - **AI Services:** OpenAI GPT-4 + Anthropic Claude integration - **Payments:** Stripe API v2023-10-16

**Database (PostgreSQL)** - **Provider:** AWS RDS with encryption at rest - **ORM:** Prisma with type safety - **Migrations:** Automated schema management - **Backup:** Automated daily backups with point-in-time recovery

### 3.3 Communication Patterns

* **REST API:** JSON-based HTTP communication
* **WebSocket:** Real-time analysis progress updates
* **Event Streaming:** Server-sent events for notifications
* **Webhook Integration:** Stripe payment status updates

## 4. Technology Stack

### 4.1 Frontend Technologies

| Technology | Version | Purpose |
| --- | --- | --- |
| React | 18.2.0 | UI framework |
| Vite | 6.3.5 | Build tool |
| React Router | 6.11.1 | Client-side routing |
| Tailwind CSS | 3.3.2 | Utility-first styling |
| Axios | 1.9.0 | HTTP client |
| React Hook Form | 7.43.9 | Form management |
| Chart.js | 4.3.0 | Data visualization |
| React Hot Toast | 2.5.2 | Notifications |

### 4.2 Backend Technologies

| Technology | Version | Purpose |
| --- | --- | --- |
| Node.js | 18+ | Runtime environment |
| Express.js | 5.1.0 | Web framework |
| Prisma | 6.10.1 | Database ORM |
| PostgreSQL | 14+ | Primary database |
| JWT | 9.0.2 | Authentication |
| Stripe | 14.25.0 | Payment processing |
| Winston | 3.11.0 | Logging |
| Helmet | 7.1.0 | Security headers |

### 4.3 AI & Analytics

| Service | Purpose | Integration |
| --- | --- | --- |
| OpenAI GPT-4 | CV analysis | REST API |
| Anthropic Claude 3.5 | Content enhancement | REST API |
| Google Analytics 4 | User tracking | gtag.js |
| Sentry | Error monitoring | SDK integration |

## 5. Database Design

### 5.1 Core Data Models

**User Model**

User {  
 id: String (CUID)  
 email: String (unique)  
 password: String (bcrypt hashed)  
 name: String  
 role: String (user/admin/superuser)  
 twoFactorEnabled: Boolean  
 marketingConsent: Boolean  
 createdAt: DateTime  
 lastLogin: DateTime  
}

**CV Model**

CV {  
 id: String (CUID)  
 title: String  
 content: String (JSON)  
 userId: String (foreign key)  
 atsScore: Integer  
 createdAt: DateTime  
 updatedAt: DateTime  
}

**Subscription Model**

Subscription {  
 id: String (CUID)  
 userId: String (foreign key)  
 status: String  
 stripeSubscriptionId: String (unique)  
 currentPeriodStart: DateTime  
 currentPeriodEnd: DateTime  
 cancelAtPeriodEnd: Boolean  
}

### 5.2 Analysis System Models

**CVAnalysis Model**

CVAnalysis {  
 id: String (CUID)  
 userId: String  
 cvId: String (optional)  
 overallScore: Integer  
 atsScore: Integer  
 contentScore: Integer  
 strengths: String[]  
 weaknesses: String[]  
 recommendedImprovements: String[]  
 aiModel: String  
 processingTime: Integer  
}

### 5.3 Relationship Mapping

* **User → CV:** One-to-many (user can have multiple CVs)
* **User → Subscription:** One-to-many (subscription history)
* **CV → CVAnalysis:** One-to-many (analysis history)
* **User → TemporaryAccess:** One-to-many (pay-per-use tracking)

## 6. Security Implementation

### 6.1 Authentication & Authorization

**JWT Implementation** - **Access Tokens:** 15-minute expiration - **Refresh Tokens:** 7-day expiration with rotation - **Token Storage:** HttpOnly cookies for security - **Signature Algorithm:** RS256 with rotating secrets

**Two-Factor Authentication** - **TOTP Implementation:** 30-second time windows - **Backup Codes:** 8-digit recovery codes - **QR Code Generation:** Secure key provisioning - **Rate Limiting:** Brute force protection

### 6.2 Data Protection

**Encryption Standards** - **In Transit:** TLS 1.3 for all communications - **At Rest:** AES-256 encryption via AWS RDS - **Password Hashing:** bcrypt with 12 salt rounds - **Sensitive Data:** Environment variable isolation

**Access Controls** - **User Isolation:** Mandatory userId filtering in all queries - **Admin Endpoints:** Role-based access control - **CV Ownership:** Strict ownership validation - **API Rate Limiting:** Request throttling by endpoint

### 6.3 Compliance Framework

**GDPR Compliance** - **Data Minimization:** Collect only necessary information - **Right to Deletion:** Complete data removal capability - **Consent Management:** Explicit opt-in for marketing - **Data Portability:** Export user data in JSON format

**Security Headers**

{  
 'X-Frame-Options': 'SAMEORIGIN',  
 'X-XSS-Protection': '1; mode=block',  
 'X-Content-Type-Options': 'nosniff',  
 'Referrer-Policy': 'strict-origin-when-cross-origin',  
 'Content-Security-Policy': 'strict-dynamic'  
}

## 7. Business Model & Analytics

### 7.1 Revenue Streams

**Subscription Tiers** - **Free Tier:** Basic CV templates, 1 analysis per month - **Professional ($9.99/month):** Unlimited analyses, premium templates - **Enterprise ($29.99/month):** Team features, API access, custom branding

**Pay-Per-Use Options** - **Single Analysis:** $2.99 per comprehensive CV review - **30-Day Access:** $14.99 for temporary premium access

### 7.2 Analytics Implementation

**Google Analytics 4 Events**

// Business Intelligence Tracking  
trackCVUpload(fileType, fileSize, uploadMethod)  
trackCVAnalysis(analysisType, duration, score)  
trackSubscriptionEvent(action, plan, value)  
trackFeatureUsage(feature, engagement\_level)

**Key Performance Indicators** - **Conversion Funnel:** Landing → Upload → Analysis → Subscription - **User Engagement:** Session duration, feature adoption, return visits - **Revenue Metrics:** MRR, CAC, LTV, churn rate - **Product Analytics:** Analysis accuracy, completion rates, user satisfaction

### 7.3 Business Intelligence Dashboard

**Real-time Metrics** - Active users and session data - Conversion events and revenue tracking - Feature usage and engagement patterns - Geographic user distribution

**Strategic Insights** - Customer acquisition cost by channel - Product-market fit indicators - Feature adoption and retention correlation - Competitive positioning analysis

## 8. Deployment Infrastructure

### 8.1 Production Architecture

**Vercel Frontend Deployment** - **Platform:** Vercel edge network - **Domain:** mycvbuilder.co.uk via Cloudflare DNS - **Build Process:** Vite production build with tree shaking - **CDN:** Global edge locations for static assets - **SSL:** Automatic certificate provisioning

**Render Backend Deployment** - **Platform:** Render cloud hosting - **Auto-scaling:** Horizontal scaling based on demand - **Health Checks:** Automated uptime monitoring - **Environment:** Production-grade Node.js runtime - **Logging:** Centralized log aggregation

**AWS RDS Database** - **Engine:** PostgreSQL 14 with encryption at rest - **Backup Strategy:** Automated daily backups with 7-day retention - **High Availability:** Multi-AZ deployment for failover - **Monitoring:** CloudWatch metrics and alerting - **Security:** VPC isolation with security groups

### 8.2 CI/CD Pipeline

**GitHub Actions Workflow**

Trigger: Push to main branch  
Steps:  
1. Run test suite  
2. Build production assets  
3. Deploy to staging environment  
4. Run integration tests  
5. Deploy to production  
6. Notify team of deployment status

**Environment Management** - **Development:** Local development with mock services - **Staging:** Production-like environment for testing - **Production:** Live environment with monitoring - **Environment Variables:** Secure secret management

### 8.3 Monitoring & Alerting

**Application Monitoring** - **Uptime Monitoring:** 99.9% availability target - **Performance Metrics:** Response time tracking - **Error Tracking:** Sentry integration for bug reporting - **Resource Usage:** CPU, memory, and database performance

**Business Monitoring** - **Revenue Tracking:** Stripe webhook integration - **User Activity:** Real-time analytics dashboard - **Conversion Tracking:** Funnel analysis and optimization - **Customer Support:** Integrated help desk system

## 9. AI Integration

### 9.1 Multi-Model Analysis System

**Primary AI Models** - **Claude 3.5 Sonnet:** Primary analysis engine for content evaluation - **GPT-4:** Secondary analysis for validation and enhancement suggestions - **Confidence Scoring:** Cross-model agreement analysis for accuracy

**Analysis Capabilities** - **ATS Optimization:** Keyword matching and formatting analysis - **Content Quality:** Writing style, clarity, and impact assessment - **Industry Alignment:** Role-specific requirement matching - **Career Transition:** Skill transferability analysis

### 9.2 AI Processing Pipeline

**Stage 1: Content Extraction**

PDF/DOCX → Text Extraction → Structure Analysis → Data Normalization

**Stage 2: Multi-Model Analysis**

Parallel Processing:  
- Claude 3.5: Content analysis + scoring  
- GPT-4: Enhancement suggestions + validation  
- Confidence Calculation: Model agreement analysis

**Stage 3: Results Synthesis**

Score Aggregation → Recommendation Generation → Action Plan Creation

### 9.3 AI Quality Assurance

**Outlier Detection** - Automatic removal of unrealistic scores - Cross-validation between models - Hard limits based on industry standards

**Fallback Mechanisms** - Enhanced mock analysis when AI services unavailable - Graceful degradation with reduced features - Error recovery and retry logic

## 10. User Experience Flow

### 10.1 User Journey Mapping

**Phase 1: Discovery** 1. Landing page visit with value proposition 2. Feature showcase and social proof 3. Free analysis offer to reduce friction

**Phase 2: Engagement** 1. CV upload with progress indication 2. Real-time analysis with animated progress tracker 3. Comprehensive results with actionable insights

**Phase 3: Conversion** 1. Freemium limitation discovery 2. Premium feature preview 3. Subscription flow with secure payment

**Phase 4: Retention** 1. Regular feature updates and improvements 2. Personalized recommendations and tips 3. Career progression tracking and insights

### 10.2 Interface Design Principles

**Accessibility** - WCAG 2.1 AA compliance - Screen reader compatibility - Keyboard navigation support - High contrast mode availability

**Responsive Design** - Mobile-first approach - Progressive enhancement - Touch-friendly interfaces - Cross-browser compatibility

**Performance Optimization** - Lazy loading for components - Image optimization and compression - Code splitting and tree shaking - Service worker for offline functionality

## 11. Payment Processing

### 11.1 Stripe Integration

**Payment Security** - **PCI DSS Compliance:** Level 1 through Stripe - **Secure Tokenization:** No card data stored locally - **3D Secure Support:** Enhanced fraud protection - **Webhook Verification:** Cryptographic signature validation

**Subscription Management**

Subscription Lifecycle:  
1. Checkout session creation  
2. Customer portal access  
3. Automatic renewal handling  
4. Proration and upgrades  
5. Cancellation and refunds

### 11.2 Revenue Operations

**Billing Automation** - Automated invoice generation - Failed payment retry logic - Dunning management for recovery - Tax calculation and compliance

**Financial Reporting** - Real-time revenue tracking - Monthly recurring revenue (MRR) analysis - Customer lifetime value calculation - Churn prediction and prevention

## 12. Performance & Monitoring

### 12.1 Performance Metrics

**Frontend Performance** - **Page Load Speed:** Target < 3 seconds - **First Contentful Paint:** Target < 1.5 seconds - **Largest Contentful Paint:** Target < 2.5 seconds - **Cumulative Layout Shift:** Target < 0.1

**Backend Performance** - **API Response Time:** Average < 200ms - **Database Query Time:** Average < 50ms - **Error Rate:** Target < 1% - **Uptime:** Target 99.9%

### 12.2 Monitoring Stack

**Application Monitoring** - **Sentry:** Error tracking and performance monitoring - **Winston Logging:** Structured logging with log levels - **Health Checks:** Automated endpoint monitoring - **Database Monitoring:** Query performance analysis

**Business Monitoring** - **Google Analytics 4:** User behavior and conversion tracking - **Stripe Dashboard:** Revenue and payment analytics - **Custom Dashboards:** Business KPI visualization - **Alert System:** Automated notification for critical issues

## 13. Recent Improvements

### 13.1 Google Analytics Implementation (January 2025)

* **Problem:** Duplicate tracking causing inaccurate data
* **Solution:** Consolidated GA4 implementation with custom business events
* **Result:** Accurate real-time tracking and business intelligence

### 13.2 Backend Log Optimization (January 2025)

* **Problem:** JWT signature warnings flooding production logs
* **Solution:** Reduced log levels for routine token rotation events
* **Result:** Cleaner logs focused on actual issues

### 13.3 Multi-Model AI Upgrade (December 2024)

* **Enhancement:** Parallel processing with Claude 3.5 + GPT-4
* **Benefit:** 95% confidence scoring when models agree
* **Impact:** Significantly improved analysis accuracy

### 13.4 Security Enhancements (November 2024)

* **Two-Factor Authentication:** TOTP implementation with backup codes
* **Superuser Role System:** Enhanced admin controls
* **Rate Limiting:** Advanced protection against abuse

## 14. Future Roadmap

### 14.1 Short-term Enhancements (Q1 2025)

* **Mobile App Development:** Native iOS/Android applications
* **Advanced Templates:** Industry-specific CV designs
* **API Expansion:** Public API for third-party integrations
* **Collaboration Features:** Team CV review and feedback

### 14.2 Medium-term Developments (Q2-Q3 2025)

* **Machine Learning Pipeline:** Custom CV scoring models
* **Video CV Analysis:** AI-powered video interview preparation
* **Career Coaching:** Personalized career development plans
* **Integration Marketplace:** Job board and ATS connections

### 14.3 Long-term Vision (Q4 2025+)

* **AI Career Assistant:** Comprehensive career guidance platform
* **Enterprise Solutions:** Large organization CV management
* **Global Expansion:** Multi-language support and localization
* **Blockchain Verification:** Decentralized credential verification

## 15. Technical Specifications

### 15.1 System Requirements

**Frontend Requirements** - Modern web browser with ES2020 support - JavaScript enabled - Minimum 1MB available memory - Internet connection for real-time features

**Backend Requirements** - Node.js 18+ runtime environment - PostgreSQL 14+ database - Minimum 512MB RAM - 10GB storage for application files

### 15.2 API Specifications

**Authentication Endpoints**

POST /api/auth/register - User registration  
POST /api/auth/login - User authentication  
POST /api/auth/refresh - Token refresh  
POST /api/auth/logout - Session termination

**CV Management Endpoints**

GET /api/cv - List user CVs  
POST /api/cv - Create new CV  
PUT /api/cv/:id - Update CV  
DELETE /api/cv/:id - Delete CV  
POST /api/cv/analyze - Analyze CV content

**Subscription Endpoints**

GET /api/subscription/plans - Available plans  
POST /api/subscription/checkout - Create checkout session  
GET /api/subscription/status - Current subscription status  
POST /api/subscription/cancel - Cancel subscription

### 15.3 Environment Configuration

**Required Environment Variables**

# Database  
DATABASE\_URL=postgresql://user:pass@host:port/db  
  
# Authentication  
JWT\_SECRET=your-secure-secret  
JWT\_REFRESH\_SECRET=your-refresh-secret  
  
# External Services  
STRIPE\_SECRET\_KEY=sk\_live\_...  
OPENAI\_API\_KEY=sk-...  
ANTHROPIC\_API\_KEY=sk-...  
  
# Application  
FRONTEND\_URL=https://mycvbuilder.co.uk  
NODE\_ENV=production

## Conclusion

MyCVBuilder represents a comprehensive, production-ready SaaS platform that successfully combines modern web technologies with advanced AI capabilities. The system demonstrates enterprise-level architecture, security, and scalability while maintaining user-friendly design and robust business analytics.

The platform’s multi-model AI approach, secure payment processing, and comprehensive monitoring make it a competitive solution in the CV optimization market. With its solid technical foundation and clear roadmap for enhancement, MyCVBuilder is positioned for sustained growth and market expansion.

**Key Success Factors:** - **Technical Excellence:** Modern, scalable architecture - **Security Focus:** GDPR compliance and enterprise security - **User Experience:** Intuitive design with powerful features - **Business Intelligence:** Data-driven decision making - **AI Innovation:** Cutting-edge analysis capabilities

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