

DEPARTMENT OF COMPUTER SCIENCE

DCIT 208 - SOFTWARE ENGINEERING

DCIT 208 | SEMESTER II | 2024/25 ACADEMIC YEAR | COURSE PROJECT

SYSTEM REQUIREMENTS SPECIFICATION (SRS)

eBuildify Platform - Building Materials Delivery System

Team: BuildTech Solution

Client: Sol Little By Little Enterprises

Document Version: 1.0

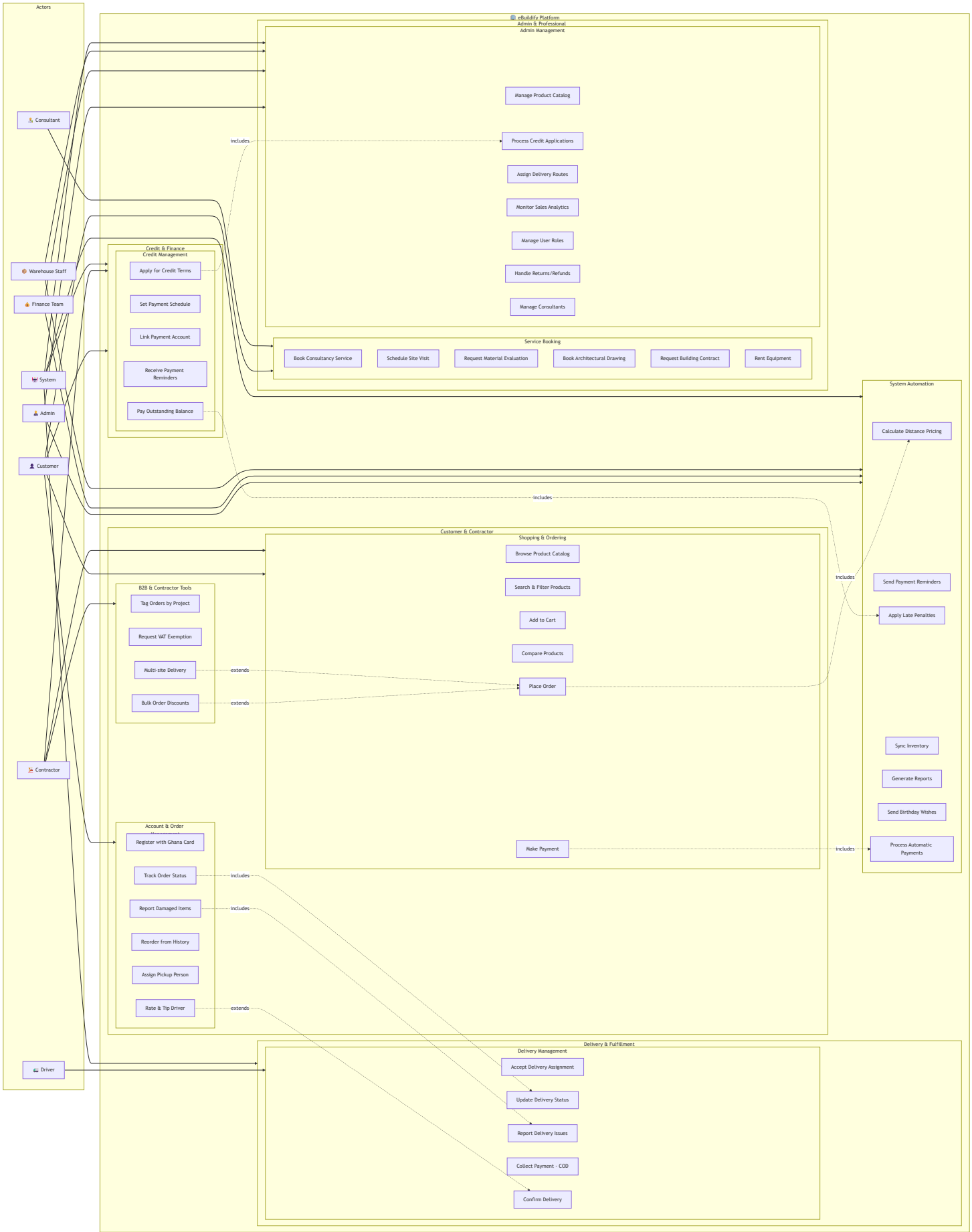
Date: July 30, 2025

1. Functional Overview & Use-Case Model

Problem Recap

Sol Little By Little Enterprises currently processes orders manually through calls and WhatsApp, causing errors, delays, and inventory discrepancies. The eBuildify platform will automate order processing, provide real-time inventory management, enable multiple payment methods including credit facilities, and optimize delivery logistics. The system targets both B2B contractors and B2C customers, aiming to increase sales by 30% and reduce order fulfillment time by 40% within six months.

Use-Case Diagram



Use-Case Descriptions

UC1 - Register with Ghana Card

- **Actor:** Customer
- **Trigger:** New user accesses registration page
- **Normal Flow:** User provides personal details, uploads Ghana Card image, system validates card details, creates verified account

UC2 - Browse Product Catalog

- **Actor:** Customer, Contractor
- **Trigger:** User navigates to products section
- **Normal Flow:** System displays categorized products with filtering options, shows availability and pricing

UC6 - Place Order

- **Actor:** Customer, Contractor
- **Trigger:** User proceeds to checkout from cart
- **Normal Flow:** System calculates delivery fees, applies bulk discounts if applicable, processes order with chosen payment method

UC13 - Apply for Credit Terms

- **Actor:** Customer, Contractor
- **Trigger:** B2B user requests credit facility
- **Normal Flow:** User submits credit application with required documents, admin reviews and approves/rejects

UC18 - Book Consultancy Service

- **Actor:** Customer
- **Trigger:** User selects service booking option
- **Normal Flow:** User selects service type, provides project details, system matches with available consultant, generates quote

UC35 - Calculate Distance Pricing

- **Actor:** System
- **Trigger:** User enters delivery address during checkout

- **Normal Flow:** System calculates distance from warehouse, applies distance-based pricing formula, displays delivery cost

2. User Stories

EPIC 1: Order Management System (Must Have)

US-001: As a customer, I want to browse products by category with filters so I can find materials fast.

- **Acceptance Criteria:** Filter by ≥ 3 attributes, intuitive UI (Jumia-style)
- **Priority:** Must
- **Traceability:** UC2

US-002: As a contractor, I want tiered bulk pricing applied automatically so I get volume discounts.

- **Acceptance Criteria:** 1.5% discount triggers for ≥ 100 units of cement/iron rods/quarter rods
- **Priority:** Must
- **Traceability:** UC27

US-003: As any user, I want my cart saved offline so I can continue ordering in low-connectivity areas.

- **Acceptance Criteria:** Cart persists after refresh, stores locally when offline
- **Priority:** Must
- **Traceability:** UC4

US-004: As a customer, I want to search materials by brand or type so I don't scroll endlessly.

- **Acceptance Criteria:** Search bar + auto-suggestions with keywords
- **Priority:** Should
- **Traceability:** UC3

US-005: As a user, I want product comparison (e.g., cement A vs B) so I can choose wisely.

- **Acceptance Criteria:** Compare at least 3 items with side-by-side specs
- **Priority:** Should
- **Traceability:** UC5

US-006: As a user, I want one-click reordering from order history so I save time.

- **Acceptance Criteria:** Reorder replicates previous cart in ≤ 3 clicks

- **Priority:** Must
- **Traceability:** UC10

US-007: As a customer, I want to assign someone else to pick up my order so I don't have to be physically present.

- **Acceptance Criteria:** Pickup person details captured, ID verification required, SMS notification to both parties
- **Priority:** Should
- **Traceability:** UC11

EPIC 2: Payment & Checkout (Must Have)

US-008: As a user, I want to pay via MTN MoMo/Vodafone/Telecel Cash so I can use my preferred method.

- **Acceptance Criteria:** Flutterwave integration for MTN, Vodafone, Telecel; success/failure callback
- **Priority:** Must
- **Traceability:** UC7

US-009: As a B2B client, I want to request credit terms at checkout so I can delay payment.

- **Acceptance Criteria:** "Request Credit" opens flow requiring admin approval + account details
- **Priority:** Must
- **Traceability:** UC13

US-010: As a credit customer, I want to set up automatic payment from my account so I don't miss due dates.

- **Acceptance Criteria:** Account linking (bank/MoMo/Telecel/virtual card), payment schedule setup, reminder notifications 3 days before due
- **Priority:** Must
- **Traceability:** UC14, UC15

US-011: As a COD customer, I want to input cash amount before delivery so I prepare exact change.

- **Acceptance Criteria:** Amount field editable on checkout → visible to assigned driver
- **Priority:** Should
- **Traceability:** UC7

US-012: As the system, I must apply 50% additional fee to defaulted credit purchases to recover costs.

- **Acceptance Criteria:** Automatic fee calculation, client notification, updated invoice generation
- **Priority:** Must
- **Traceability:** UC37

US-013: As the system, I must apply 2% penalty for late credit payments after multiple notifications.

- **Acceptance Criteria:** Penalty calculation after 3 SMS/email reminders, automatic account deduction
- **Priority:** Must
- **Traceability:** UC37

EPIC 3: Customer Registration & Verification (Must Have)

US-014: As a new customer, I must provide Ghana Card details during registration so the company can verify my identity.

- **Acceptance Criteria:** Ghana Card number validation, photo upload, address verification, secure data storage
- **Priority:** Must
- **Traceability:** UC1

US-015: As a verified customer, I want to receive birthday and holiday greetings with special offers so I feel valued.

- **Acceptance Criteria:** Automated birthday/holiday detection, personalized messages, promotional code generation
- **Priority:** Should
- **Traceability:** UC40

US-016: As one of the first 20 customers, I want special incentive packages so I'm rewarded for early adoption.

- **Acceptance Criteria:** Customer counter, special discount codes, exclusive offers, priority support access
- **Priority:** Must
- **Traceability:** UC1

EPIC 4: Delivery Logistics & Pricing (Should Have)

US-017: As a customer, I want to know delivery costs upfront based on my location so I can budget accurately.

- **Acceptance Criteria:** Distance calculator integration, transparent pricing display at checkout, cost breakdown
- **Priority:** Must
- **Traceability:** UC35

US-018: As a customer, I want to tip delivery drivers for exceptional service so I can show appreciation.

- **Acceptance Criteria:** Tip option at delivery confirmation, direct payment to driver account, rating system
- **Priority:** Should
- **Traceability:** UC12

US-019: As a customer, I must report damaged goods within 1-2 hours of delivery to be eligible for replacement.

- **Acceptance Criteria:** Time-stamped delivery confirmation, countdown timer for damage reports, automatic rejection after window
- **Priority:** Must
- **Traceability:** UC9

US-020: As a dispatch manager, I want to assign orders to drivers by zone to reduce travel times.

- **Acceptance Criteria:** Drag-and-drop order assignment on map or dropdown
- **Priority:** Should
- **Traceability:** UC30

EPIC 5: B2B Contractor Portal & Services (Must Have)

US-021: As a contractor, I want to tag orders by project (e.g., Site A, Site B) so I track budgets.

- **Acceptance Criteria:** Add project label to order form → searchable in history
- **Priority:** Must
- **Traceability:** UC24

US-022: As an admin, I need to process VAT-exemption approvals so compliant contractors get tax relief.

- **Acceptance Criteria:** Document upload + verification → approval dashboard for finance
- **Priority:** Must
- **Traceability:** UC25

US-023: As a customer, I want to book consultancy services (architectural drawings, quantity surveying, supervision) so I get professional support.

- **Acceptance Criteria:** Service booking interface, consultant calendar, project requirements form, quote generation
- **Priority:** Must
- **Traceability:** UC18, UC21

US-024: As a contractor, I want full building contract services so I can outsource entire projects.

- **Acceptance Criteria:** Contract service request form, project scope definition, timeline and cost estimation
- **Priority:** Should
- **Traceability:** UC22

3. Preconditions & Postconditions

US-001: Browse Products by Category

Preconditions:

1. Product database contains categorized items
2. Filter service is operational
3. User has internet connectivity

Postconditions:

1. Products are displayed according to selected filters
2. Filter selections are saved in user session
3. Product availability status is accurate

US-002: Bulk Pricing Application

Preconditions:

1. User cart contains ≥ 100 units of eligible products (cement/iron rods/quarter rods)
2. Product pricing rules are configured in system
3. User is authenticated

Postconditions:

1. 1.5% discount is automatically applied to cart total
2. Discount details are visible to user
3. Order record contains bulk discount information

US-008: Mobile Money Payment

Preconditions:

1. User has selected payment method as MTN MoMo/Vodafone/Telecel
2. Flutterwave gateway is operational
3. User has sufficient mobile money balance
4. Order total is within payment limits

Postconditions:

1. Payment transaction is initiated with gateway
2. User receives SMS confirmation
3. Order status is updated to "Payment Processing"
4. Payment callback is received and processed

US-014: Ghana Card Registration

Preconditions:

1. User provides valid Ghana Card number
2. Ghana Card image is clear and readable
3. Ghana Card verification service is available

Postconditions:

1. User account is created with verified status
2. Ghana Card data is encrypted and stored securely
3. User receives email/SMS verification
4. Account is eligible for credit applications

US-017: Distance-Based Delivery Pricing

Preconditions:

1. User has entered valid delivery address
2. Google Maps API is operational
3. Delivery zones and pricing rules are configured
4. Cart contains items with weight/size data

Postconditions:

1. Delivery fee is calculated and displayed
2. Estimated delivery time is shown
3. User can proceed with calculated delivery cost
4. Delivery information is saved with order

US-019: Damage Reporting

Preconditions:

1. Order has been marked as delivered
2. Current time is within 1-2 hours of delivery timestamp
3. User is authenticated and owns the order
4. Delivery confirmation exists in system

Postconditions:

1. Damage report is recorded with timestamp
2. Report status is set to "Pending Review"
3. Admin notification is triggered
4. Report deadline timer is stopped

4. Story Sizing & Epics

Epic Scale Stories (>2 days effort)

Epic E1: Complete Order Management System

- **Decomposition:** US-001, US-002, US-003, US-006, US-007

- **Estimated Effort:** 15 days
- **Priority:** Must Have

Epic E2: Payment & Credit Management System

- **Decomposition:** US-008, US-009, US-010, US-012, US-013
- **Estimated Effort:** 12 days
- **Priority:** Must Have

Epic E3: Customer Registration & Verification

- **Decomposition:** US-014, US-015, US-016
- **Estimated Effort:** 8 days
- **Priority:** Must Have

Epic E4: Service Booking & Consultancy Platform

- **Decomposition:** US-023, US-024
- **Estimated Effort:** 10 days
- **Priority:** Must Have

Epic E5: Advanced Delivery & Logistics

- **Decomposition:** US-017, US-018, US-019, US-020
- **Estimated Effort:** 8 days
- **Priority:** Should Have

Individual User Stories (<2 days effort)

- **US-004:** Search & Filter Products - 1.5 days
- **US-005:** Product Comparison - 1 day
- **US-011:** COD Cash Amount Input - 0.5 days
- **US-021:** Project Tagging - 1 day
- **US-022:** VAT Exemption Processing - 1.5 days

5. Non-Functional Requirements

ID	Quality Attribute	Requirement	Rationale	Measurement/Test
NFR-PERF-01	Performance	Product & checkout pages load in ❤️ seconds on 3G	Poor connectivity in Ghana requires optimized performance	Load testing with 3G simulation
NFR-PERF-02	Performance	Support 500+ concurrent users during peak times	Monthly promotions and rainy season create traffic spikes	Load testing with 500 concurrent users
NFR-SEC-01	Security	PCI-DSS compliant payment processing	Legal requirement for card payment handling	Third-party security audit
NFR-SEC-02	Security	Ghana Card data encrypted at rest and in transit	Personal data protection compliance	Encryption verification testing
NFR-SEC-03	Security	Role-based access control with audit trails	Prevent unauthorized admin actions	Access control testing
NFR-AVAIL-01	Availability	99.9% uptime excluding scheduled maintenance	Business operations depend on platform availability	Uptime monitoring over 30 days
NFR-AVAIL-02	Availability	Offline cart functionality in poor connectivity areas	Users in remote areas have unreliable internet	Offline functionality testing
NFR-USAB-01	Usability	Mobile-first responsive design	80%+ users access via mobile devices	Cross-device testing

ID	Quality Attribute	Requirement	Rationale	Measurement/Test
NFR-USAB-02	Usability	Large font toggle for accessibility	Inclusive design requirement	Accessibility audit
NFR-SCALE-01	Scalability	Support expansion to other regions within 12 months	Business growth plans	Architecture review
NFR-SCALE-02	Scalability	Database designed for 10x current data volume	Anticipate rapid business growth	Database performance testing
NFR-INTEG-01	Integration	Real-time inventory sync with Google Sheets	Existing inventory management system	Integration testing
NFR-INTEG-02	Integration	Multiple payment gateway support	Redundancy and user preference	Payment gateway testing
NFR-COMP-01	Compliance	VAT calculation per Ghana tax regulations	Legal tax compliance requirement	Tax calculation validation
NFR-COMP-02	Compliance	Cement batch number traceability	Safety and regulatory compliance	Batch tracking verification
NFR-RELI-01	Reliability	Data backup every 4 hours	Prevent data loss from system failures	Backup and recovery testing
NFR-RELI-02	Reliability	Automatic failover for payment processing	Ensure payment reliability	Failover testing

6. Glossary & References

Glossary

B2B (Business-to-Business): Commercial transactions between businesses, specifically contractors and construction companies.

B2C (Business-to-Consumer): Commercial transactions between business and individual consumers.

Bulk Discount: Automatic price reduction applied when purchasing ≥ 100 units of eligible products.

COD (Cash on Delivery): Payment method where customer pays upon receipt of goods.

Credit Facility: Business arrangement allowing approved customers to purchase goods and pay later.

Distance-Based Pricing: Delivery fee calculation method using geographic distance from warehouse.

Ghana Card: National identification card required for customer verification and registration.

Mobile Money (MoMo): Digital payment service using mobile phone accounts for transactions.

PCI-DSS: Payment Card Industry Data Security Standard for secure payment processing.

PWA (Progressive Web App): Web application with native app-like functionality and offline capabilities.

Stock Reservation: Temporary hold on inventory during checkout process to prevent overselling.

Telecel Cash: Mobile money service provided by Telecel Ghana telecommunications company.

VAT Exemption: Tax relief for qualified contractors with valid certificates.

References

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Pressman, R. S., & Maxim, B. R. (2019). *Software Engineering: A Practitioner's Approach* (9th ed.). McGraw-Hill Education.

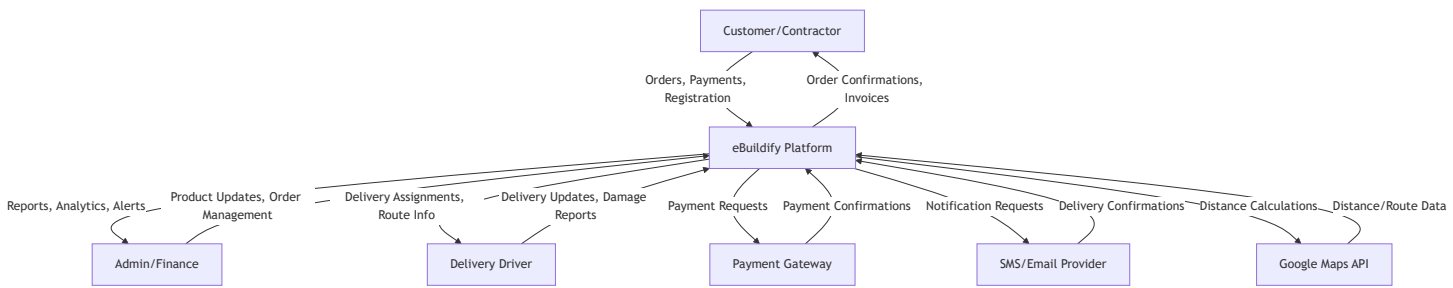
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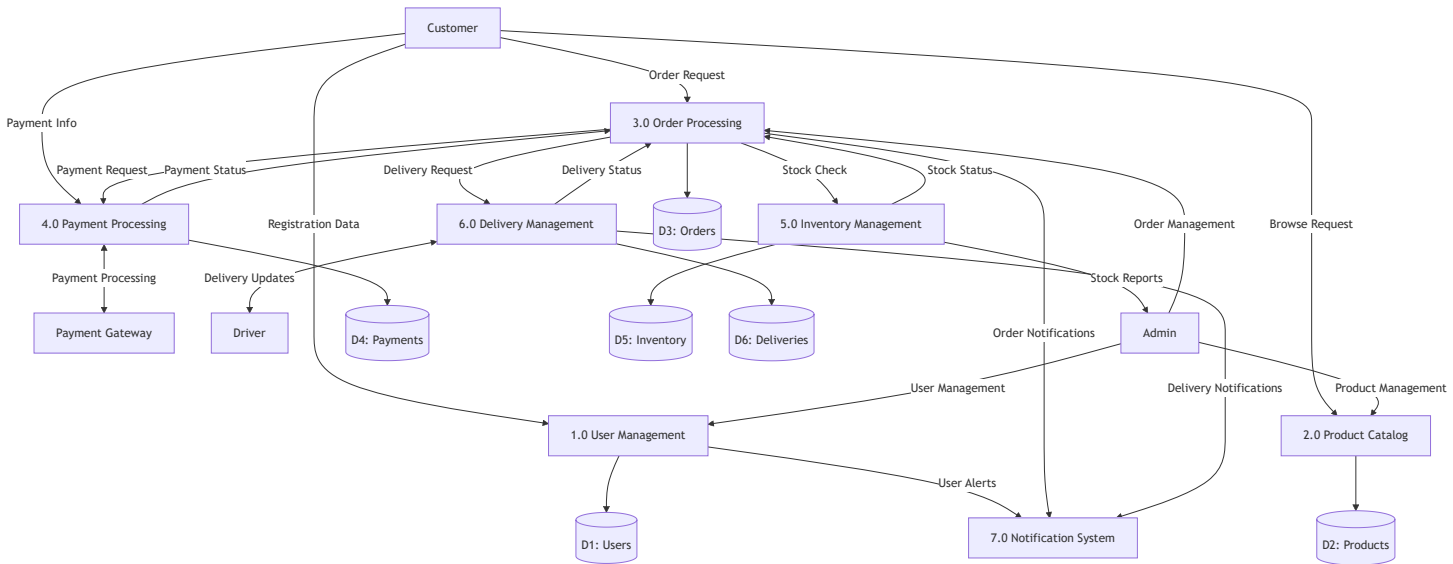
BuildTech Solutions. (2024). *eBuildify API Specification & Documentation v2.0*. Technical Specification.

7. Supplementary Diagrams

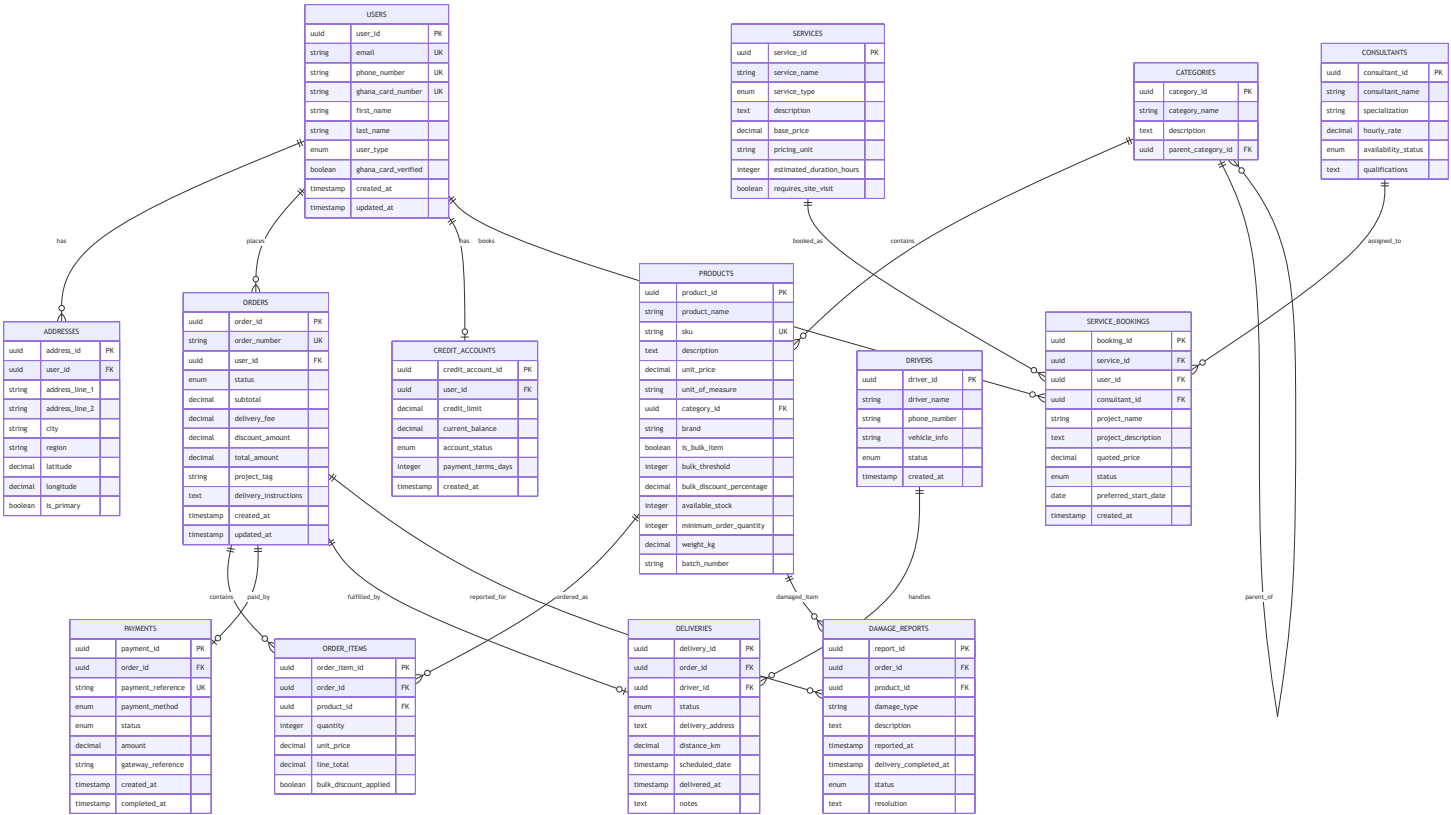
Data Flow Diagram (DFD) - Level 0 (Context Diagram)



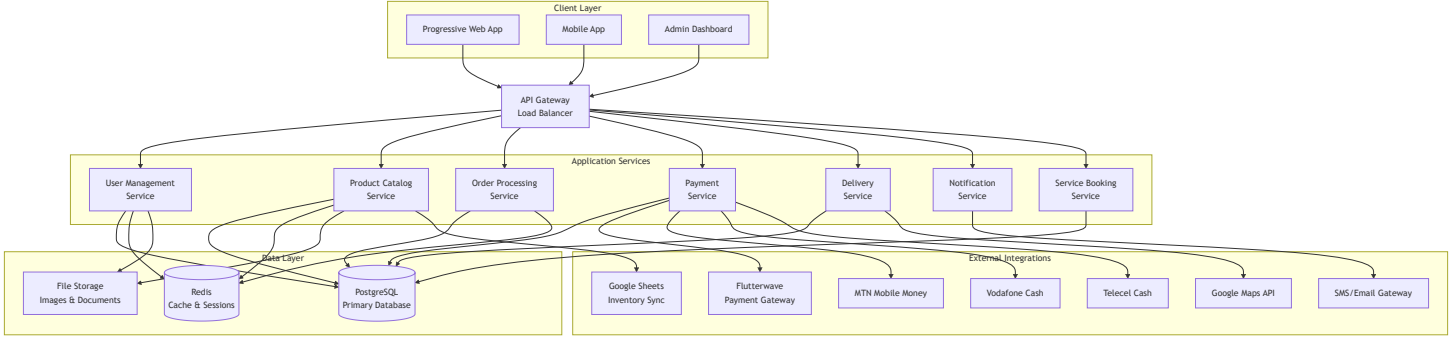
Data Flow Diagram - Level 1 (System Decomposition)



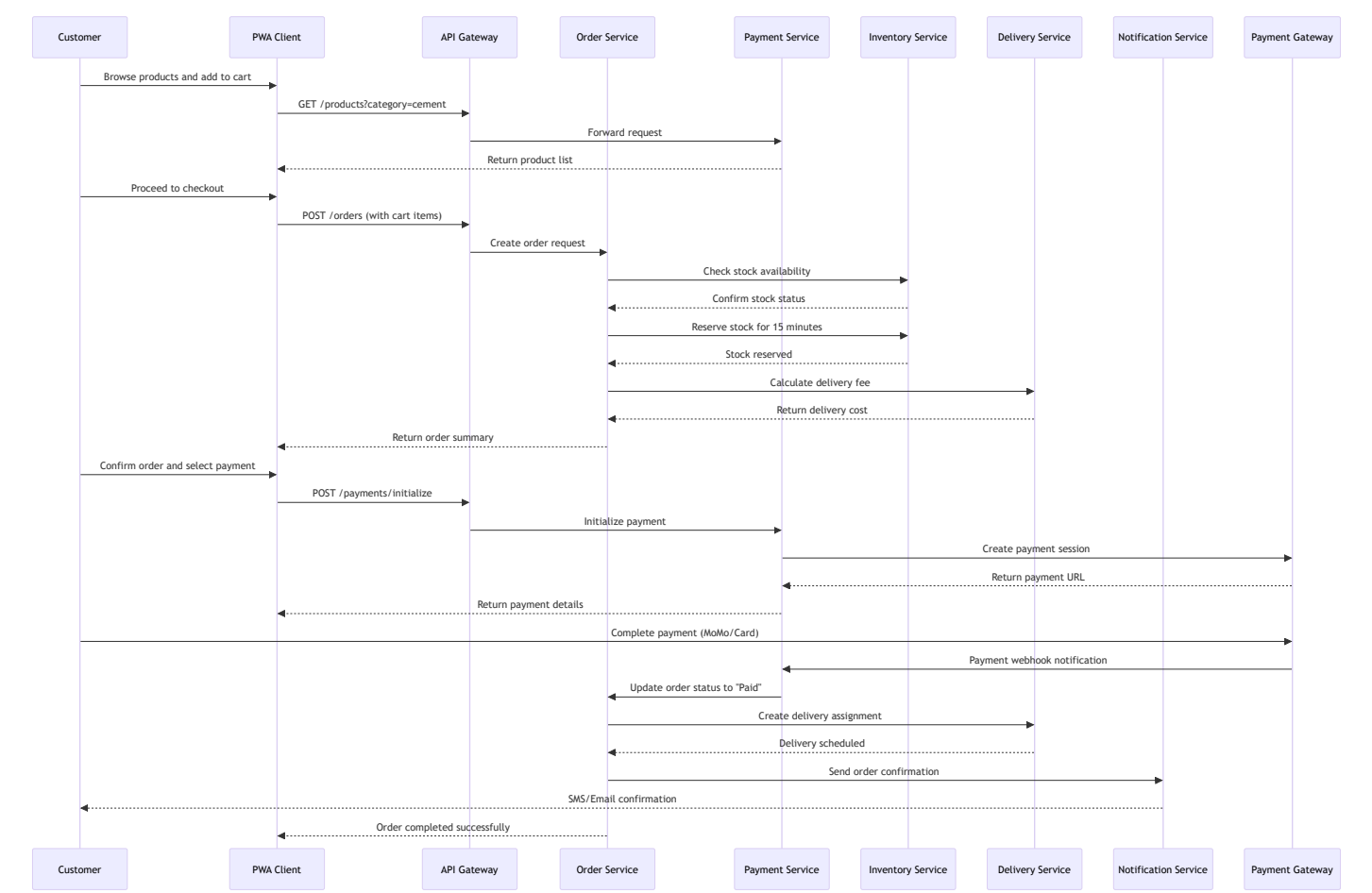
Entity Relationship Diagram (ERD)



System Architecture Diagram



Sequence Diagram - Order Processing Flow



Summary

This Software Requirements Specification document provides comprehensive coverage of the eBuildify platform requirements following the DCIT 208 framework. The system addresses the client's core business needs:

Key Features Covered:

- **Complete order management** with bulk pricing and offline cart functionality
- **Advanced payment system** supporting multiple Ghanaian payment methods and credit facilities
- **Customer verification** using Ghana Card integration for regulatory compliance
- **Professional service booking** for consultancy and construction services
- **Sophisticated delivery management** with distance-based pricing and damage reporting
- **Administrative controls** with role-based access and comprehensive analytics

Technical Architecture:

- **Microservices-based** design for scalability and maintainability
- **Progressive Web App** frontend for mobile-first experience with offline capabilities
- **RESTful API** design with comprehensive endpoint coverage
- **Secure data handling** with PCI-DSS compliance and encrypted Ghana Card storage

Compliance & Quality:

- **Non-functional requirements** addressing performance, security, and scalability needs
- **Comprehensive traceability** linking use cases to user stories and acceptance criteria
- **Detailed data modeling** with proper normalization and relationship management
- **Integration specifications** for external services and payment gateways

The specification provides a solid foundation for the development team to implement the eBuildify platform according to client requirements while maintaining technical excellence and regulatory compliance.

Document Status: Complete and ready for development implementation

Next Steps: Development team review, technical architecture validation, and sprint planning