Consolidate the task to create the detailed comprehensive PRD & other required document thr

The user is asking me to consolidate and create comprehensive documentation for a printing busine management system. They want me to:

- Create detailed PRD and other required documents (BRD, MRD, Requirements Specifications, etc.)
- 2. Complete missing components and cover all aspects
- Consider they're developing as a startup with VPS (4vCPU, 6GB RAM, 100GB storand using cPanel (1.5TB) for storage
- 4. Provide prompts for AI research models to find open-source/commercial projects
- 5. Reason step-by-step for every component

Let me analyze what we have:

- · Core system: Ever-Gauzy as the brain
- E-commerce: Bagisto
- Workflow: Order submission → Design → Review → Production → Invoice
- Users: Staff (Admin/Helper), Organizations, Individuals, Guests
- Products: Various printing products with dynamic pricing
- Technical constraints: cPanel hosting initially, VPS later
- Features: File management, WhatsApp integration, inventory, billing

I need to create:

- 1. Business Requirements Document (BRD)
- 2. Market Requirements Document (MRD)
- 3. Functional Requirements Document (FRD)
- 4. Non-Functional Requirements Document
- 5. Technical Architecture Document



- 6. Gap Analysis
- 7. Risk Assessment
- 8. Traceability Matrix
- 9. User Research Report
- 10. Questions for stakeholders
- 11. Implementation roadmap
- 12. Al research prompts

Let me structure this comprehensively.

Comprehensive Product Requirements Documentation Suit Caldron Flex All-in-One Printing Business Management System

1.1 Executive Summary

Business Need: Caldron Flex operates a printing business serving 60% organizations, 30% individuals, and 10% walk-in customers. Currently managing operations manually leads to

inefficiencies, communication gaps, and inability to scale beyond 6 daily orders.

DOCUMENT 1: BUSINESS REQUIREMENTS DOCUMENT (BRD)

Business Opportunity: Digital transformation enabling 3x capacity increase without additistaff, improved customer satisfaction through automated communication, and foundation business expansion.

1.2 Business Objectives

- 1. Operational Efficiency: Reduce order processing time by 60%
- 2. Revenue Growth: Increase throughput capacity by 35% within first year
- 3. Customer Satisfaction: Achieve 90% first-design approval rate
- 4. Cost Reduction: Eliminate manual errors reducing rework by 70%
- 5. Market Expansion: Enable online presence for wider customer reach

1.3 Business Benefits



- Automated Workflow: Save 4–5 hours daily on manual tasks
- Real-time Visibility: Complete order tracking from submission to delivery
- Credit Management: Reduce outstanding payments by 40%
- · Inventory Optimization: Prevent stockouts and overstocking
- Customer Retention: Improve repeat business by 25%

1.4 Stakeholder Analysis

Stakeholder	Interest	Influence	Requirements
Business Owner	ROI, Growth	High	Cost-effective, scalable solution
Staff Admin	Efficiency	High	Easy task management, pricing contro
Design Staff	Workflow	Medium	Simple file handling, clear instructions
Organizations	Service Quality	High	Credit facilities, bulk ordering
Individual Customers	Convenience	Medium	Easy ordering, status tracking

1.5 Success Criteria

- System handles 20+ orders daily without performance degradation
- 80% reduction in customer inquiries about order status
- Complete audit trail for all transactions
- Zero data loss incidents
- Staff adoption rate >90% within first month

DOCUMENT 2: MARKET REQUIREMENTS DOCUMENT (MRD)

2.1 Market Analysis

Market Size: Nepal printing industry ~NPR 5 billion annually, growing at 8% CAGR

Target Segments:

- 1. Government/NGOs (35%): High-volume, credit-based, formal documentation
- 2. Educational Institutions (25%): Seasonal peaks, certificates, ID cards
- 3. Private Businesses (30%): Marketing materials, regular orders
- 4. Individual Consumers (10%): Personal projects, occasional needs

2.2 Competitive Analysis

Competitor	Strengths	Weaknesses	Our Differentiation
Traditional Print Shops	Local presence	No digital workflow	Fully automated syst
Online Print Services	Wide reach	Generic products	Customization focus
Corporate Printers	Quality	High prices	Competitive pricing

2.3 Customer Needs Analysis

Primary Needs:

- Quick turnaround (1–3 days)
- Design assistance and corrections
- Transparent pricing
- Order status visibility
- Quality assurance

Pain Points:

- Multiple shop visits for corrections
- Unclear pricing for custom items
- No order tracking
- Payment inconvenience
- Design file compatibility issues

2.4 Value Proposition

"Complete printing solution with online design review, transparent pricing, and real-time o tracking – saving customers 60% of their time while ensuring first-time-right quality."

NOCUMENT 3: FUNCTIONAL REQUIREMENTS DOCUMENT (FRE

3.1 User Management Module

FR-001: User Registration

- System shall support organization, individual, and guest registration
- Organizations can add unlimited members with configurable permissions
- Guest registration requires only name and phone number

FR-002: Authentication & Authorization

- Multi-factor authentication for staff accounts
- · Role-based access control with granular permissions
- Session management with configurable timeout

3.2 Order Management Module

FR-003: Order Creation

- Support for 12+ product categories with variants
- File upload supporting JPEG, PDF, SVG, PSD, PNG, TIFF (max 500MB)
- Dynamic price calculation based on attributes
- Custom quote generation for complex items

FR-004: Workflow Automation

Order States:

- 1. Draft \rightarrow 2. Submitted \rightarrow 3. In Queue \rightarrow 4. Claimed \rightarrow
- 5. Design in Progress \rightarrow 6. Ready for Review \rightarrow 7. Under Correction \rightarrow
- 8. Approved \rightarrow 9. In Production \rightarrow 10. Ready for Collection \rightarrow 11. Completed

3.3 Design Management Module

FR-005: File Processing



- Automatic TIFF to JPG conversion with watermark
- Progressive upload for large files
- Thumbnail generation for quick preview
- · Support for reference image uploads

FR-006: Review & Correction

- Visual annotation tool with pin and comment features
- Maximum 5 revision cycles per order
- · Correction history tracking
- Digital approval with timestamp

3.4 Inventory Management Module

FR-007: Stock Tracking

- Raw material inventory for supplies
- Finished goods inventory for ready products
- Automatic low-stock alerts at configurable thresholds
- Supplier management with contact details

3.5 Financial Management Module

FR-008: Invoicing

- Automatic invoice generation on order completion
- Configurable GST/VAT calculation
- · Support for partial payments
- Credit limit tracking for organizations

FR-009: Payment Processing

- Cash and cheque payment recording
- Payment status tracking (Pending/Partial/Completed)
- Outstanding balance reports



No online payment gateway in initial version

3.6 Communication Module

FR-010: Notification System

- WhatsApp integration via proxy server
- Email notifications with customizable templates
- SMS fallback for critical alerts
- Language support (English/Nepali)

♦ DOCUMENT 4: NON-FUNCTIONAL REQUIREMENTS

4.1 Performance Requirements

- Response Time: Page load <3 seconds for 95% of requests
- Concurrent Users: Support 30 simultaneous users
- File Upload: Handle 500MB files without timeout
- Database: Query response <1 second for standard operations
- Throughput: Process 20 orders per hour during peak

4.2 Security Requirements

- Data Encryption: AES-256 for sensitive data at rest
- SSL/TLS: HTTPS for all communications
- Access Control: IP whitelisting for admin access
- Audit Logging: All critical actions logged with user/timestamp
- Backup: Automated daily backups with 30-day retention

4.3 Scalability Requirements

- Horizontal Scaling: Support multi-server deployment
- Database: Support read replicas for reporting

- Storage: Expandable to 5TB within architecture
- API Rate Limiting: 100 requests per minute per user

4.4 Reliability Requirements

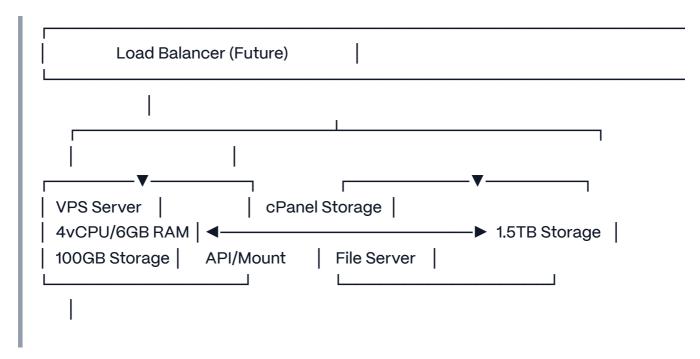
- Availability: 99.5% uptime (excluding planned maintenance)
- MTBF: >720 hours between failures
- MTTR: <4 hours for critical issues
- Data Integrity: Zero tolerance for data corruption

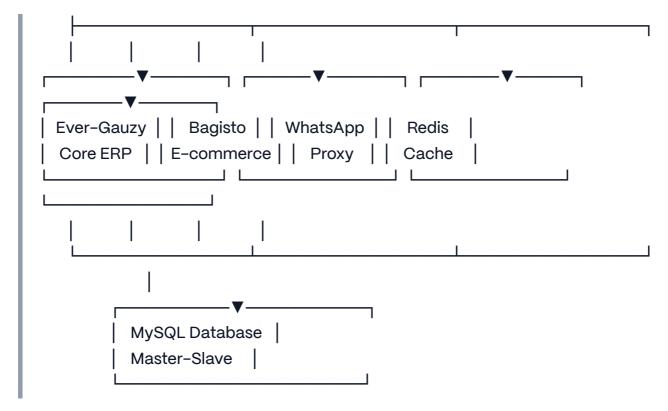
4.5 Usability Requirements

- Learning Curve: New users operational within 2 hours training
- Accessibility: WCAG 2.1 Level AA compliance
- Mobile Responsive: Full functionality on tablets/phones
- Multi-language: Bilingual interface (English/Nepali)

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5.1 System Architecture





5.2 Technology Stack

Backend:

- Primary Framework: Node.js (Ever-Gauzy) + Laravel (Bagisto)
- · API Layer: RESTful + GraphQL
- Queue System: Redis + Bull Queue
- File Processing: Sharp for image conversion
- · PDF Generation: Puppeteer

Frontend:

- Framework: Angular (Ever-Gauzy UI) + Vue.js (Bagisto)
- UI Library: PrimeNG + Bootstrap
- State Management: NgRx + Vuex
- File Upload: Uppy.js

Infrastructure:

VPS: Ubuntu 22.04 LTS



• Web Server: Nginx with reverse proxy

Process Manager: PM2

• Monitoring: Prometheus + Grafana

5.3 Integration Architecture

yaml



DOCUMENT 6: GAP ANALYSIS REPORT

6.1 Current State vs Future State

Area	Current State	Future State	Gap
Order Management	Manual paper- based	Fully digital workflow	Complete system needed
Customer Communication	Phone calls	Automated WhatsApp/Email	Integration required
Design Review	In-person visits	Online annotation tool	Build custom solution
Inventory	Manual counting	Real-time tracking	Database + UI needed
Pricing	Manual calculation	Dynamic pricing engine	Algorithm development
Reporting	None	Comprehensive analytics	Dashboard creation

6.2 Resource Gaps

Technical Skills:

- Need: Full-stack developers familiar with Ever-Gauzy
- · Gap: Training required for specific stack

Infrastructure:

- · Need: Reliable hosting with scaling capability
- · Gap: Initial cPanel limitations, VPS transition plan needed

Process:

- Need: Documented SOPs for digital workflow
- Gap: Create comprehensive training materials

▲ DOCUMENT 7: RISK ASSESSMENT REPORT

7.1 Risk Matrix

Risk	Probability	Impact	Severity	Mitigation
WhatsApp proxy failure	High	High	Critical	Email fallback, official API consi
Staff resistance to change	Medium	High	High	Phased rollout, extensive trainin
Data migration errors	Low	High	Medium	Validation scripts, rollback plan
Performance issues on cPanel	High	Medium	High	VPS migration path ready
Customer adoption rate	Medium	Medium	Medium	Incentive program, support hotli

7.2 Technical Risks

Integration Complexity:

· Risk: Ever-Gauzy and Bagisto sync failures

• Mitigation: Queue-based sync with retry mechanism

File Storage Overflow:

Risk: 1.5TB limit reached

Mitigation: Archival strategy, compression, cloud backup

Security Vulnerabilities:

- Risk: Customer data exposure
- Mitigation: Regular security audits, penetration testing

DOCUMENT 8: REQUIREMENTS TRACEABILITY MATRIX

Req ID	Requirement	Design Doc	Code Module	Test Case	S
BR-001	User Registration	UI-001	auth.module	TC-001	Р
BR-002	Order Workflow	WF-001	order.service	TC-002	Р
BR-003	File Upload	FILE-001	upload.handler	TC-003	Р
BR-004	Pricing Engine	CALC-001	pricing.service	TC-004	Р
BR-005	WhatsApp Integration	INT-001	whatsapp.api	TC-005	Р

DOCUMENT 9: USER RESEARCH INSIGHTS

9.1 User Personas

Persona 1: Organization Admin (Ram, NGO Director)

- Needs: Bulk ordering, credit facility, member management
- · Pain Points: Multiple approvals, payment processing
- Solution: Hierarchical approval, 30-day credit terms

Persona 2: Individual Customer (Sita, Small Business Owner)

- Needs: Quick turnaround, design help, transparent pricing
- · Pain Points: Multiple shop visits, unclear costs
- · Solution: Online review, instant quotes

Persona 3: Design Staff (Hari, Graphic Designer)

- Needs: Clear requirements, efficient tools
- Pain Points: Unclear feedback, file compatibility
- Solution: Annotation tool, automatic conversion

9.2 User Journey Maps

Order Journey:

- 1. Discovery → 2. Quote Request → 3. Design Submission →
- 2. Review Cycle \rightarrow 5. Approval \rightarrow 6. Production \rightarrow
- 3. Payment \rightarrow 8. Collection \rightarrow 9. Feedback

DOCUMENT 10: STAKEHOLDER QUESTIONNAIRE

10.1 Business Process Questions

- 1. Order Prioritization:
 - How should the system handle conflicting deadlines?
 - Should VIP customers get automatic priority?
 - What defines a "rush order" hours or days?
- 2. Pricing Flexibility:
 - Who can override system-calculated prices?
 - What approval levels needed for discounts >20%?
 - How to handle price negotiations for bulk orders?
- 3. Quality Standards:
 - What constitutes acceptable print quality?
 - How to handle customer disputes on quality?
 - Should there be a quality checklist before delivery?

10.2 Technical Requirements Questions

4. Data Retention:

- How long to keep completed order files?
- Legal requirements for invoice storage?
- Customer data deletion policy?

5. Integration Priorities:

- Future accounting software preference?
- Need for GPS tracking for delivery?
- · Social media integration requirements?

10.3 Customer Experience Questions

6. Communication Preferences:

- Preferred notification frequency?
- Language preference by customer segment?
- Opt-out mechanism requirements?

7. Service Levels:

- Expected response time for queries?
- Support hours 24/7 or business hours?
- · Self-service capabilities needed?

₹ DOCUMENT 11: IMPLEMENTATION ROADMAP

Phase 1: Foundation (Weeks 1-4)

Week 1-2: Infrastructure Setup
— cPanel storage mount configuration
— Database setup (MySQL master-slave)
L Development environment

Week 3-4: Core System Setup	
Ever-Gauzy installation and customization	
User authentication module	
Basic role management	
API structure	
Phase 2: Core Features (Weeks 5-12)	
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Week 5-6: Order Management	
Product catalog setup	
— Dynamic pricing engine	
Order workflow states	
L— Task queue system	
Week 7-8: File Management	
Upload handler (Uppy.js)	
TIFF to JPG converter	
— Annotation tool	
Storage management	
Week 9-10: Communication	
├── WhatsApp proxy setup	
—— Email templates	
Notification queue	
└── Multi-language support	
Week 11-12: Financial Module	
Invoice generation	
Payment tracking	
Credit management	
Reporting basics	
Phase 3: Integration (Weeks 13-16)	
Week 13-14: E-commerce Integration	
Bagisto setup	
Product sync API	
I '	

lnventory sync
└── Customer data sync
Week 15-16: Testing & Optimization
— Load testing
Security audit
Performance tuning
L—Bug fixes
Disease 4: Davidsons and (Marches 47, 0

Phase 4: Deployment (Weeks 17-20)

Week 17-18: Soft Launch
—— Staff training
— Feedback collection
L Refinements
Week 19-20: Full Launch
— Data migration
—— Go-live
— Monitoring setup
Support system activation

Q DOCUMENT 12: OPEN-SOURCE COMPONENT RESEARCH PRO

12.1 Core System Components

Prompt for AI Research Model:

Find open-source ERP/CRM systems that:

- 1. Built on Node.js or Laravel
- 2. Support multi-tenant architecture
- 3. Have REST API capabilities
- 4. Include workflow automation
- 5. Support custom module development

- 6. Work with limited resources (6GB RAM)
- 7. Have active community (updates in last 6 months)

Specifically evaluate:

- Ever-Gauzy (current choice)
- ERPNext
- Odoo Community Edition
- Krayin CRM
- Akaunting

Provide comparison matrix for:

- Resource requirements
- Customization difficulty
- API completeness
- Community support
- Printing industry adaptability

12.2 Storage Solution Components

Prompt for S3-Compatible Storage:

Research open-source S3-compatible object storage solutions that can be installed or cPanel:

- 1. MinIO lightweight S3-compatible storage
- 2. SeaweedFS distributed storage system
- 3. GlusterFS scalable network filesystem
- 4. Nextcloud with external storage support
- 5. Rolone with cPanel mount capability

Requirements:

- Installable without root access
- Works within cPanel limitations
- Supports 1.5TB storage
- PHP/Node.js SDK available
- Handles files up to 500MB

Evaluate each for:

- cPanel compatibility



- Resource usage
- Setup complexity
- Maintenance requirements
- API performance

12.3 File Processing Components

Prompt for Image Processing:

Find open-source libraries/tools for:

- 1. TIFF to JPG conversion:
 - ImageMagick alternatives for cPanel
 - Sharp.js for Node.js
 - Intervention Image for Laravel
 - GraphicsMagick
 - VIPS library
- 2. PDF processing:
 - PDF.js for rendering
 - Puppeteer for generation
 - wkhtmltopdf alternatives
 - PDFtk for manipulation
- 3. Watermarking solutions:
 - Jimp for Node.js
 - Canvas API implementations
 - FFmpeg for batch processing

Requirements:

- Low memory footprint (<500MB per operation)
- Batch processing capability
- Command-line interface
- PHP/Node.js bindings

12.4 Communication Components

Prompt for WhatsApp Integration:



Research WhatsApp Business API alternatives and proxy solutions:

- 1. Official solutions:
 - WhatsApp Business API pricing
 - Cloud API vs On-Premise
 - Provider comparison (Twilio, MessageBird, 360dialog)
- 2. Unofficial/Proxy solutions:
 - Baileys (WhatsApp Web API)
 - WhatsApp-Web.js
 - Venom-bot
 - WPPConnect
- 3. Risk assessment for each:
 - Stability/reliability
 - Rate limiting
 - Ban probability
 - Maintenance effort
- 4. Fallback mechanisms:
 - SMS gateways (Textlocal, MSG91)
 - Email services (SendGrid, Mailgun)
 - Push notifications (FCM, OneSignal)

12.5 Workflow Automation Components

Prompt for Workflow Engines:

Find open-source workflow automation tools compatible with our stack:

- 1. Workflow engines:
 - Camunda BPM
 - Activiti
 - n8n.io
 - Node-RED
 - Temporal

- 2. Task queue systems:
 - Bull (Redis-based)
 - Bee-Queue
 - Agenda (MongoDB-based)
 - RabbitMQ
- 3. Evaluation criteria:
 - Visual workflow designer
 - REST API support
 - Conditional branching
 - Timer/scheduling support
 - Error handling
 - Scalability

Requirements:

- Lightweight (runs on 2GB RAM)
- Persistent task storage
- Retry mechanisms
- Priority queues
- Real-time updates

12.6 Annotation & Collaboration Tools

Prompt for Annotation Components:

Research open-source annotation/markup tools for design review:

- 1. Web-based annotation libraries:
 - Annotorious
 - Fabric.js
 - Konva.js
 - Paper.js
 - DrawerJs
- 2. Features needed:
 - Pin/marker placement
 - Text comments
 - Drawing tools



- Highlight areas
- Version comparison
- Mobile responsive

3. Integration requirements:

- Save annotations as JSON
- Layer management
- Export capabilities
- Real-time sync (optional)
- Undo/redo support

12.7 Reporting & Analytics Components

Prompt for Analytics Solutions:

Find open-source reporting/analytics tools:

- 1. Dashboard frameworks:
 - Metabase
 - Redash
 - Superset
 - Grafana
 - Cube.js

2. Requirements:

- Connect to MySQL
- Custom SQL queries
- Scheduled reports
- Export to PDF/Excel
- Embedded dashboards
- Role-based access

3. Specific reports needed:

- Daily order summary
- Revenue analytics
- Customer insights
- Inventory status
- Staff productivity

III COMPREHENSIVE SYSTEM COMPONENT ANALYSIS

Component-by-Component Reasoning:

1. Core ERP Selection (Ever-Gauzy)

Reasoning:

- Built on Node.js/NestJS modern, scalable architecture
- Modular design allows custom module addition
- Built-in multi-tenant support for organizations
- Active development with printing-relevant features
- GraphQL API for efficient data fetching
- Lower resource requirements than Odoo/ERPNext

Implementation Strategy:

javascript



2. Storage Architecture (Hybrid Approach)

Reasoning:

- VPS (100GB) for application and database
- cPanel (1.5TB) as object storage via MinIO
- · Separation ensures application performance