TECHNICAL SPECIFICATION

[Organization Name]

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November 2025

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PRODUCT REQUIREMENTS DOCUMENT

Real-Time Collaboration Platform

Product: CollabSpace Enterprise
Version: 3.0
Status: Approved
Owner: Product Team
Date: December 2024

Executive Summary

CollabSpace 3.0 introduces real-time collaborative editing, advanced permission management, and AI-powered content suggestions to compete directly with market leaders while maintaining our focus on developer-friendly workflows.

Business Objectives

OBJECTIVE	TARGET	TIMELINE
Monthly Active Users (MAU)	500K → 1.2M	Q2 2025
Enterprise Accounts	250 → 650	Q3 2025
ARR Growth	$12M → $35M	EOY 2025
User Retention (90-day)	58% → 75%	Q2 2025
NPS Score	42 → 65	Q3 2025

Success Metrics

- **Adoption:** 40% of users collaborate on at least one document weekly
- **Performance:** Real-time sync latency <100ms p99
- **Reliability:** 99.9% uptime SLA for enterprise accounts
- **Revenue:** 30% of users convert from freemium to paid plans

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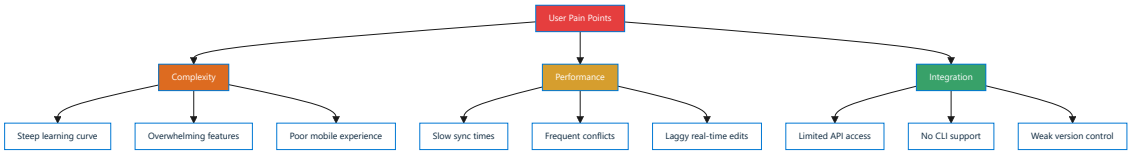
1. Problem Statement

1.1 User Pain Points

Current market research reveals three critical gaps in existing collaboration tools:



Diagram

1.2 Target Users

Primary Persona: "Developer Dana"

ATTRIBUTE	DESCRIPTION
Role	Senior Software Engineer
Age	28-42
Team Size	5-15 engineers
Tools	VS Code, Git, Slack, Jira
Pain Points	Context switching between tools, poor markdown support in existing docs platforms
Goals	Single source of truth for technical docs, seamless Git integration, real-time pair editing

Secondary Persona: "Product Manager Pat"

ATTRIBUTE	DESCRIPTION
Role	Product Manager
Age	30-45
Team Size	Cross-functional 10-20 people
Tools	Confluence, Notion, Miro, Figma
Pain Points	Scattered information, difficulty tracking changes, poor mobile access
Goals	Centralized roadmaps, easy stakeholder updates, beautiful presentations

2. Feature Requirements

2.1 Real-Time Collaborative Editing

User Story

> *As a developer, I want to edit documents simultaneously with teammates so that we can resolve blockers faster during pair programming sessions.*

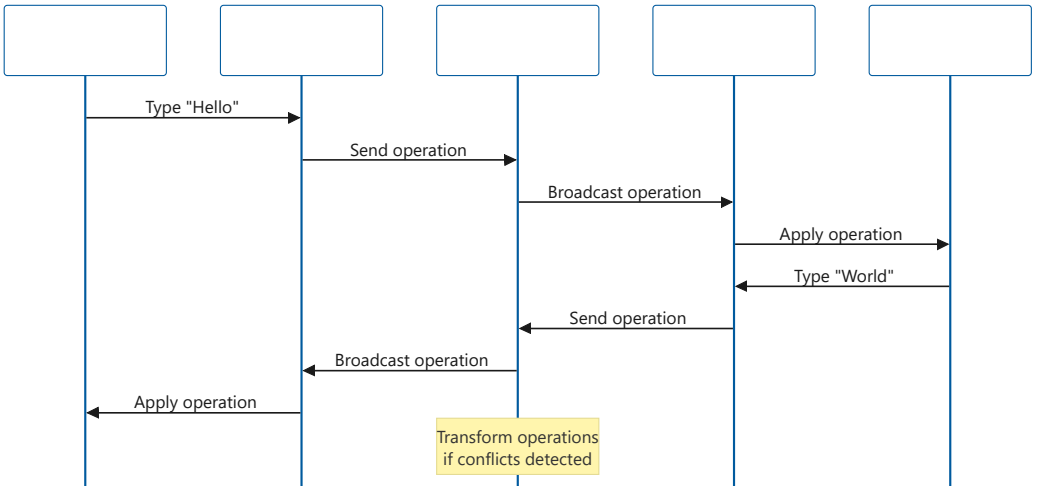
Functional Requirements

FR-001: Multi-Cursor Editing - Display up to 10 concurrent users with distinct cursor colors - Show user avatar and name next to cursor position - Highlight user's current selection with transparent overlay - Support keyboard shortcuts to jump between collaborators

FR-002: Conflict Resolution - Implement Operational Transformation (OT) for text merging - Auto-resolve non-overlapping edits within 50ms - Present merge UI for conflicting simultaneous edits - Maintain complete edit history for rollback

FR-003: Presence Indicators - Show online/offline status for document participants - Display "currently editing" badge with live cursor position - Notify users when collaborators join/leave document - Show typing indicators in comment threads

Technical Specifications



Diagram

Performance Requirements

METRIC	TARGET	MEASUREMENT
Sync Latency	<100ms p99	End-to-end edit to display
Concurrent Users	50 per document	Before degradation
Throughput	10K ops/sec	Per WebSocket server
Conflict Resolution	<200ms	Detection to resolution

2.2 Advanced Permissions System

User Story

> *As a workspace admin, I want granular control over document access so that I can protect sensitive information while enabling collaboration.*

Functional Requirements

FR-004: Role-Based Access Control (RBAC)

ROLE	PERMISSIONS	USE CASE
Owner	Full control, delete, transfer	Document creator
Editor	Read, write, comment, share	Core contributors
Commenter	Read, comment only	Reviewers, stakeholders
Viewer	Read only	External partners, archived access

FR-005: Team-Level Permissions - Inherit permissions from workspace/folder hierarchy - Override inherited permissions at document level - Support groups (e.g., “Engineering”, “Leadership”) - Audit log of all permission changes

FR-006: External Sharing - Generate expiring share links (1 hour to 30 days) - Password-protect shared links - Revoke access instantly across all shared links - Track view/edit analytics for shared documents

2.3 AI-Powered Content Suggestions

User Story

> *As a product manager, I want AI to help me write and improve documents so that I can produce higher-quality content faster.*

Functional Requirements

FR-007: Smart Autocomplete - Context-aware suggestions based on document type - Learn from user's writing style over time - Support for technical terminology and acronyms - Suggest code snippets for technical documents

FR-008: Grammar and Style Checking - Real-time grammar correction (Grammarly-like) - Tone detection (formal, casual, technical) - Readability score (Flesch-Kincaid) - Suggest improvements for passive voice, wordiness

FR-009: Template Recommendations - Detect document type from first 100 words - Suggest relevant templates (PRD, RFC, API docs) - Auto-format according to template structure - Learn from frequently used custom templates

AI Model Requirements

```
ml_models:
  autocomplete:
    model: GPT-3.5-turbo-instruct
    max_tokens: 50
    temperature: 0.7
    latency_target: <200ms

  grammar:
    model: LanguageTool API
    languages: [en, es, fr, de]
    latency_target: <500ms

  classification:
    model: BERT fine-tuned
    confidence_threshold: 0.8
    latency_target: <100ms
```

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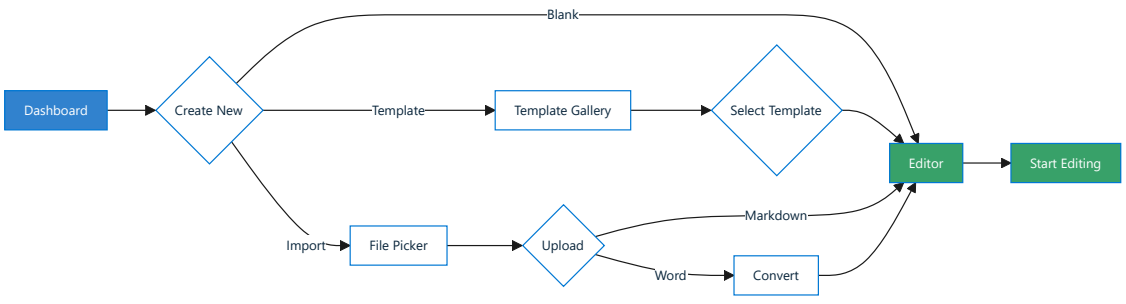
3. User Experience

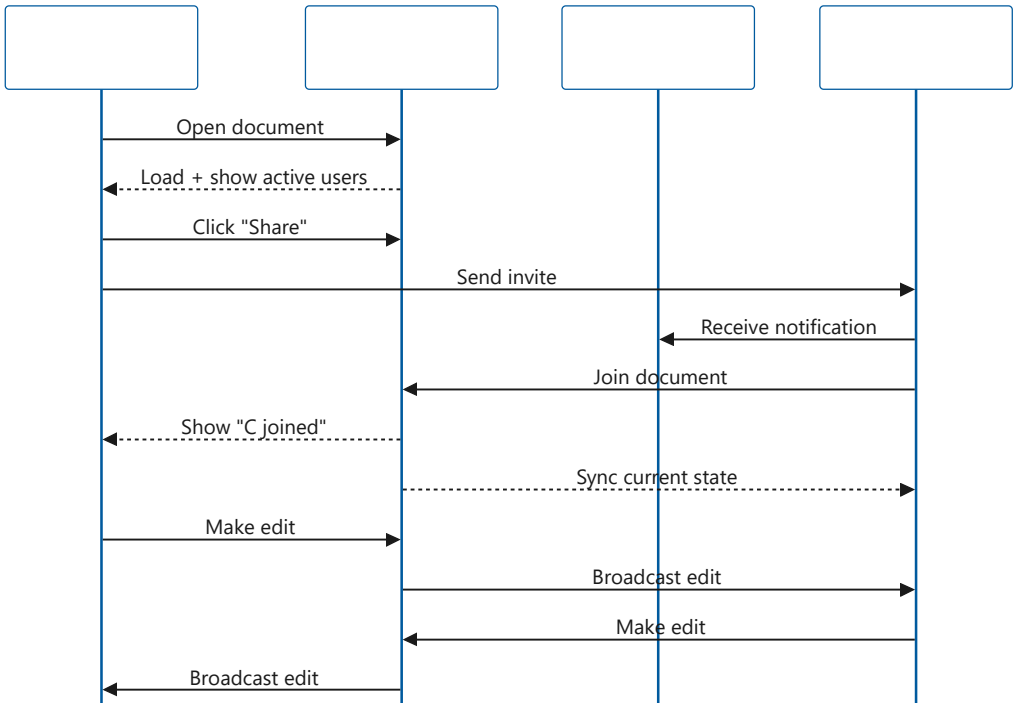
3.1 User Flows

Document Creation Flow



Diagram

Collaboration Flow



Diagram

3.2 Wireframes

Editor Interface

```
┌──────────────────────────────────────────────────────┐
│ CollabSpace                                [Avatar] │
├──────────────────────────────────────────────────────┤
│ ☰ | 📄 Product Requirements Doc   🔗 Share  💬 3  ⋯  |
├──────┬───────────────────────────────────────────────┤
│      │                                               │
│ 📁   │ # Product Requirements                        │
│ Home │                                               │
│      │ **Status:** Draft                             │
│ 📝   │ **Owner:** Product Team                       │
│ Docs │                                               │
│      │ ## Executive Summary                          │
│ 👥   │                                               │
│ Team │ This document outlines...                     │
│      │                                               │
```

```
| ⚙️    | ## User Stories                                        |
| Set  |                                                        |
|      | ### US-001: Real-time Editing                          |
|      | As a developer, I want to [cursor_alice]edit...        |
|      |                                                        |
|      | [💬 alice: "Should we add latency requirements?"]      |
|      |                                                        |
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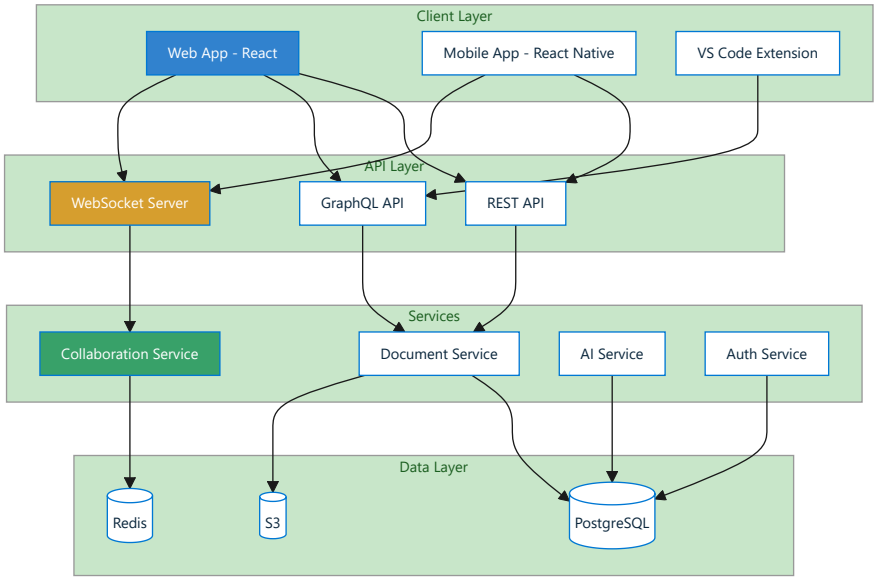
4. Technical Architecture

4.1 System Components



Diagram

4.2 Technology Stack

COMPONENT	TECHNOLOGY	JUSTIFICATION
Frontend	React + TypeScript	Type safety, large ecosystem, developer familiarity
Mobile	React Native	Code sharing with web, fast iteration
API	Node.js + Express	Real-time capabilities, JavaScript full-stack

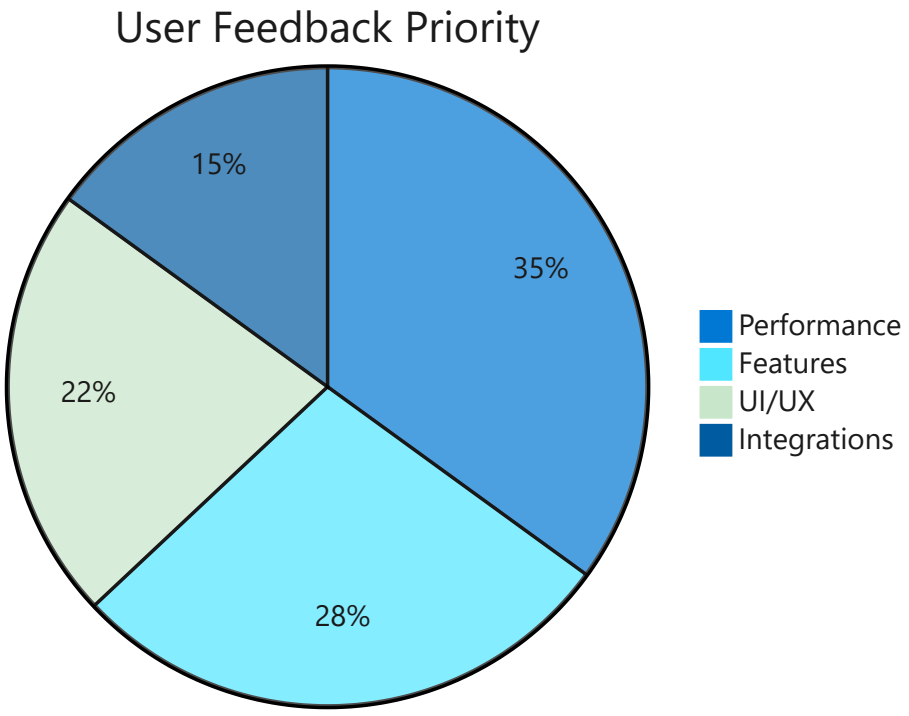
COMPONENT	TECHNOLOGY	JUSTIFICATION
WebSocket	Socket.io	Reliable real-time, fallback support
Database	PostgreSQL	ACID compliance, JSON support, mature
Cache	Redis	Session management, real-time presence
Storage	AWS S3	Scalable, cost-effective, CDN integration
AI	OpenAI API	Best-in-class models, rapid integration

5. Success Criteria

5.1 Key Performance Indicators (KPIs)

KPI	BASELINE	TARGET	TIMELINE
User Adoption	0%	40% weekly collaboration	Q2 2025
Session Duration	8.5 min	15 min	Q2 2025
Documents Created	12K/week	35K/week	Q3 2025
Collaboration Sessions	2K/week	15K/week	Q3 2025
Mobile Usage	15%	35%	Q3 2025

5.2 User Satisfaction Metrics



Diagram

5.3 Launch Criteria

Phase 1: Beta (Q1 2025) - ✅ Real-time editing for 10 concurrent users - ✅ Basic RBAC (4 roles) - ✅ Web app + mobile app - ✅ 50 beta testers recruited

Phase 2: Limited Release (Q2 2025) - ✅ Real-time editing for 50 concurrent users - ✅ Full permissions system - ✅ AI autocomplete MVP - ✅ 500 early access users

Phase 3: General Availability (Q3 2025) - ✅ All features complete - ✅ 99.9% uptime achieved - ✅ Security audit passed - ✅ Public launch marketing campaign

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6. Risks and Mitigation

6.1 Technical Risks

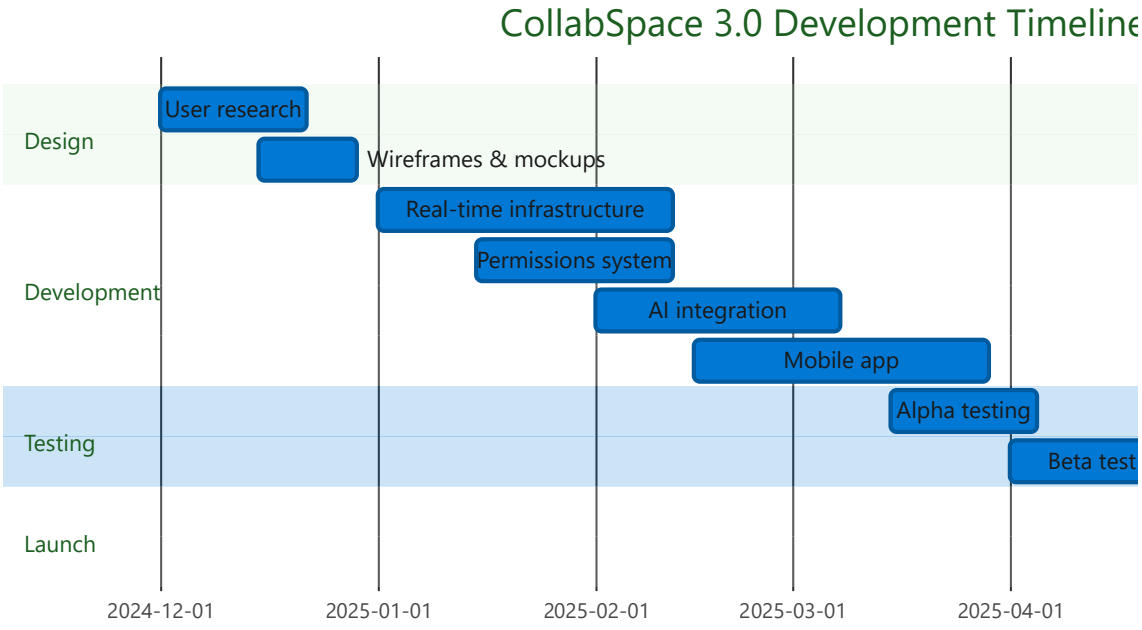
RISK	PROBABILITY	IMPACT	MITIGATION
Real-time scaling issues	Medium	High	Load testing with 100+ users, horizontal scaling architecture
Data loss during conflicts	Low	Critical	Comprehensive testing, automatic backups every 5 minutes
AI API cost overruns	High	Medium	Rate limiting, caching, fallback to local models
Mobile performance	Medium	Medium	Native modules for critical paths, performance monitoring

6.2 Business Risks

RISK	PROBABILITY	IMPACT	MITIGATION
Slow user adoption	Medium	High	Beta program, referral incentives, targeted marketing
Competitive response	High	Medium	Fast iteration, unique developer focus, aggressive pricing
Enterprise sales cycle	High	Medium	Start with SMB, build case studies, hire sales team

7. Timeline and Milestones

7.1 Development Roadmap



Diagram

7.2 Resource Allocation

TEAM	HEADCOUNT	KEY RESPONSIBILITIES
Engineering	8 FTE	Backend (3), Frontend (3), Mobile (2)
Product	2 FTE	Requirements, prioritization, launches
Design	2 FTE	UX research, UI design, prototyping
QA	2 FTE	Test automation, beta coordination
DevOps	1 FTE	Infrastructure, deployments, monitoring

8. Appendix

8.1 Competitive Analysis

FEATURE	COLLABSPACE	NOTION	CONFLUENCE	GOOGLE DOCS
Real-time collab	✅ 50 users	✅ Unlimited	⚠️ 12 users	✅ 100 users
Markdown support	✅ Native	⚠️ Limited	❌ No	❌ No
Git integration	✅ Native	❌ No	⚠️ Plugin	❌ No
CLI access	✅ Yes	❌ No	❌ No	❌ No
Offline mode	✅ Full	⚠️ Limited	❌ No	⚠️ Limited
Pricing (per user/mo)	$12	$10	$5	$12

8.2 User Research Findings

Key Insights from 50 Developer Interviews (November 2024):

> *"I spend 40% of my time context-switching between tools. I just want my docs where my code is." - Senior Engineer, Series B Startup*

> *"Real-time editing is table stakes now. But most tools lag when more than 5 people are in the same doc." - Tech Lead, Enterprise*

> *"We tried Notion but markdown support is terrible. We went back to GitHub wikis." - Engineering Manager, Open Source Project*

9. Sign-Off

Approval

ROLE	NAME	SIGNATURE	DATE
Product Owner	Sarah Chen	✓ Approved	2024-12-01
Engineering Lead	David Kumar	✓ Approved	2024-12-01

ROLE	NAME	SIGNATURE	DATE
Design Lead	Maria Rodriguez	✓ Approved	2024-12-01
VP Product	James Wilson	✓ Approved	2024-12-02

Document Version: 1.0
Last Updated: December 1, 2024
Next Review: January 15, 2025
Classification: Internal Use Only