

# Product Requirements Document

## Real-Time Collaboration Platform

### Executive Summary

Business Objectives

Success Metrics

### 1. Problem Statement

1.1 User Pain Points

1.2 Target Users

### 2. Feature Requirements

2.1 Real-Time Collaborative Editing

2.2 Advanced Permissions System

2.3 AI-Powered Content Suggestions

### 3. User Experience

3.1 User Flows

3.2 Wireframes

### 4. Technical Architecture

4.1 System Components

4.2 Technology Stack

### 5. Success Criteria

5.1 Key Performance Indicators (KPIs)

5.2 User Satisfaction Metrics

5.3 Launch Criteria

### 6. Risks and Mitigation

6.1 Technical Risks

6.2 Business Risks

### 7. Timeline and Milestones

7.1 Development Roadmap

7.2 Resource Allocation

## 8. Appendix

### 8.1 Competitive Analysis

### 8.2 User Research Findings

## 9. Sign-Off

### Approval

# 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  |

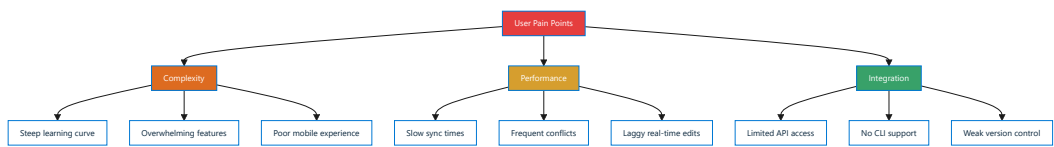
# Success Metrics

- **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

# 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

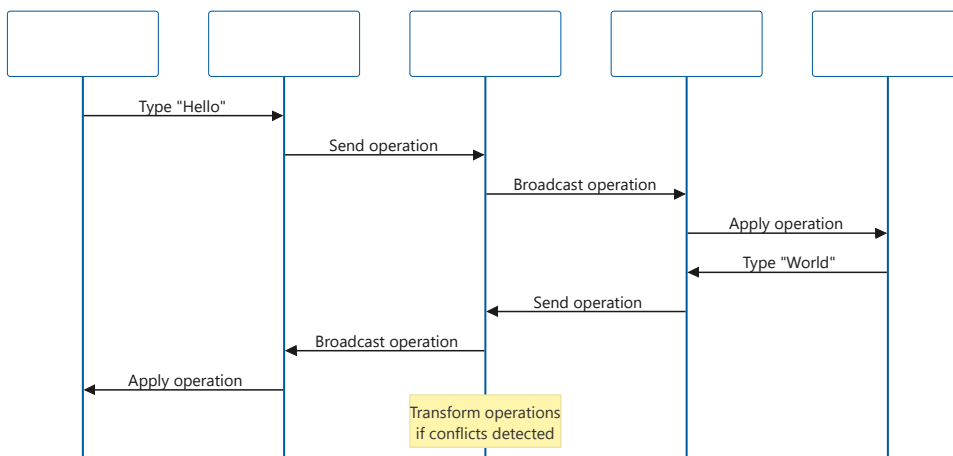
**FR-001: Multi-Cursor Editing** - Display up to 10 concurrent users with distinct cursor colors - Show user avatar and name next to cursor position - Highlight user's current selection with transparent overlay - Support

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

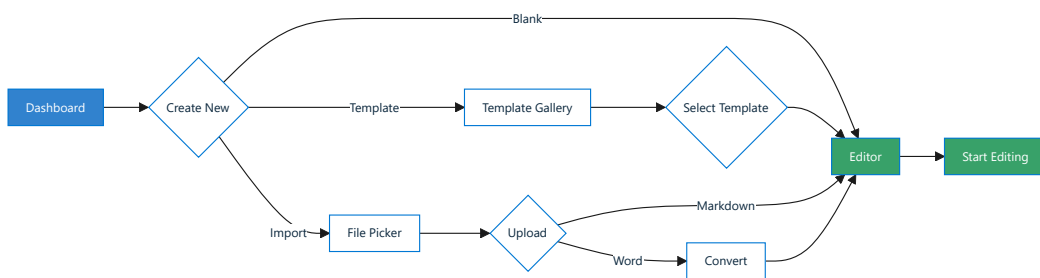
  grammar:
    model: LanguageTool API
    languages: [en, es, fr, de]
    latency_target: <500ms

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

## 3. User Experience

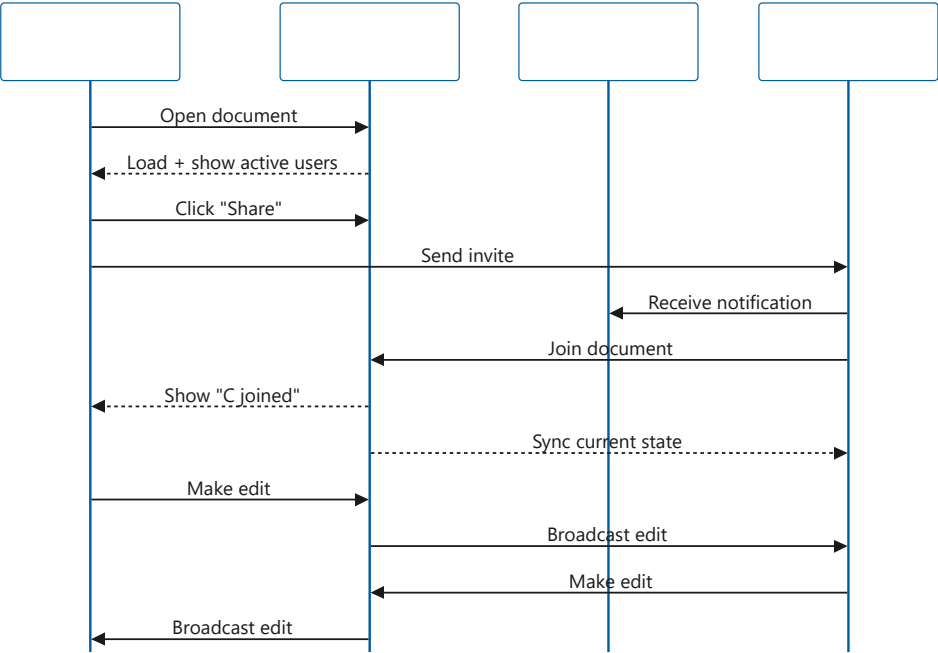
### 3.1 User Flows

#### Document Creation Flow



Diagram

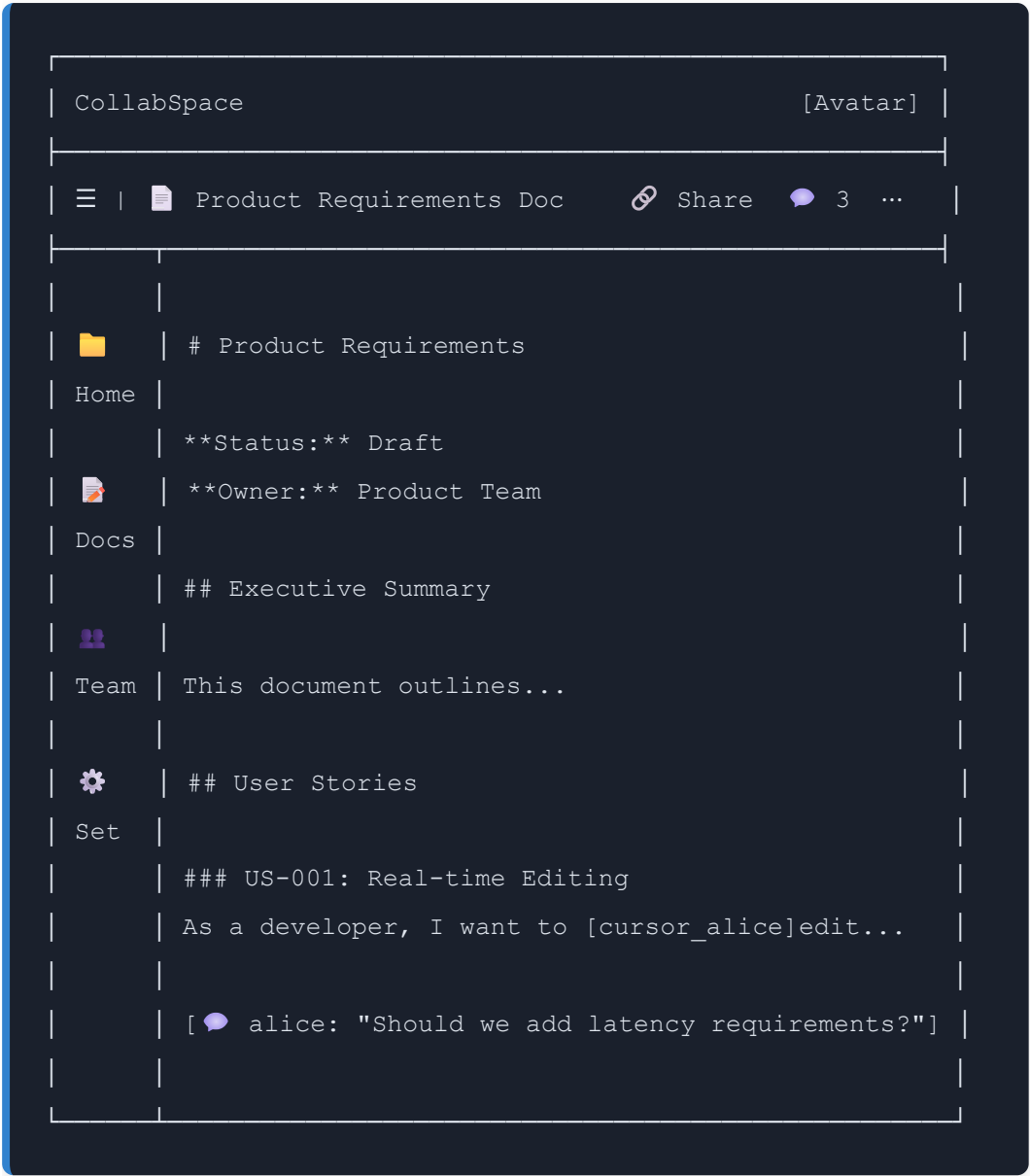
Collaboration Flow



Diagram

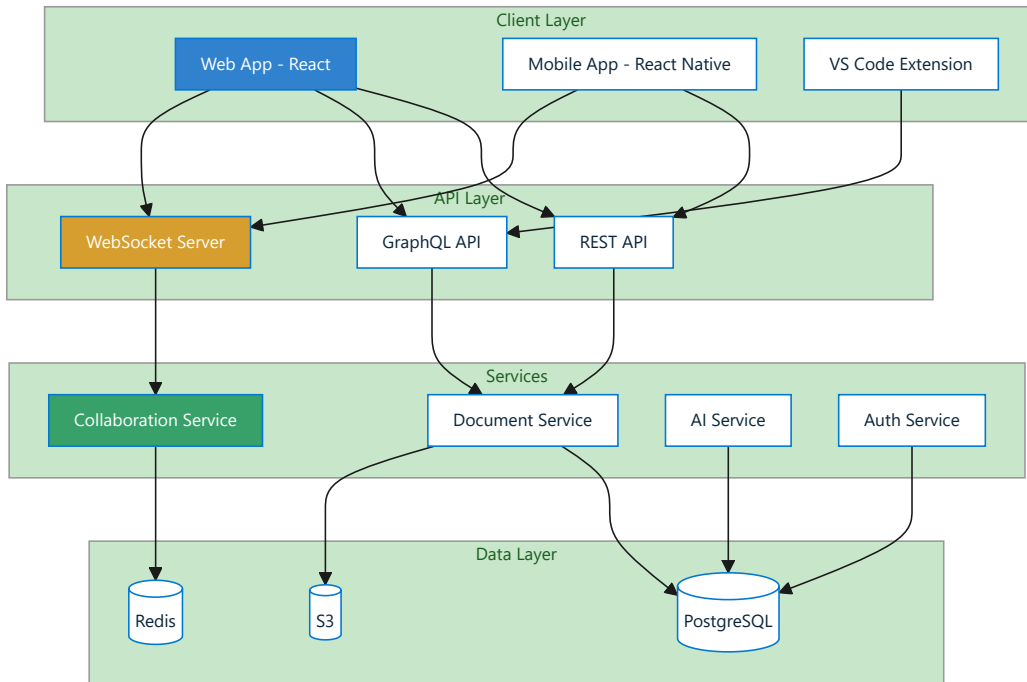
## 3.2 Wireframes

### Editor Interface



## 4. Technical Architecture

### 4.1 System Components



Diagram

## 4.2 Technology Stack

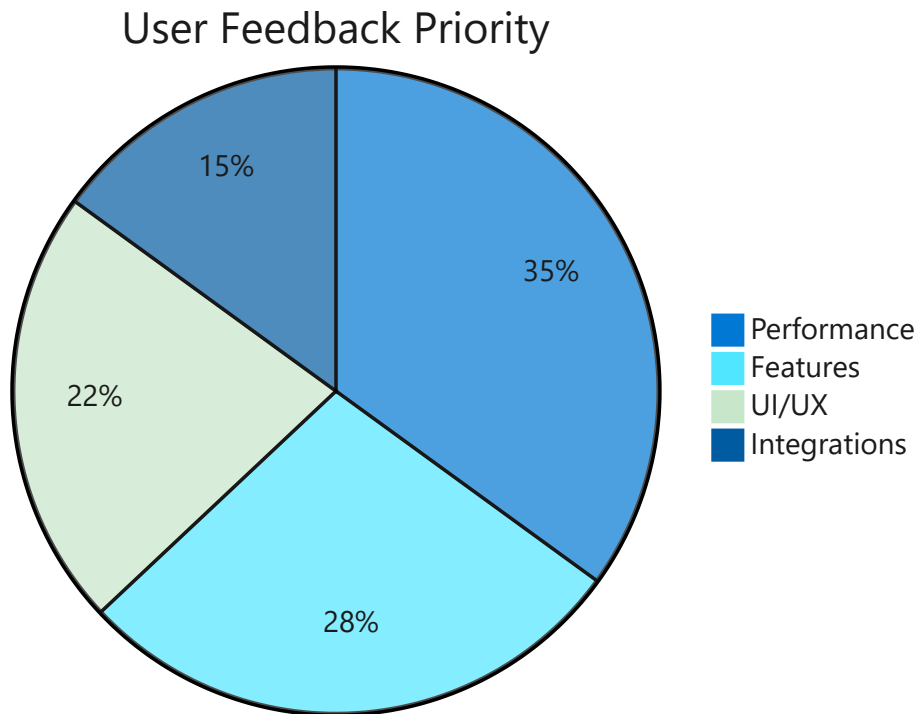
| Component | Technology         | Justification                                       |
|-----------|--------------------|---|
| Frontend  | React + TypeScript | Type safety, large ecosystem, developer familiarity |
| Mobile    | React Native       | Code sharing with web, fast iteration           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



## 6. Risks and Mitigation

### 6.1 Technical Risks

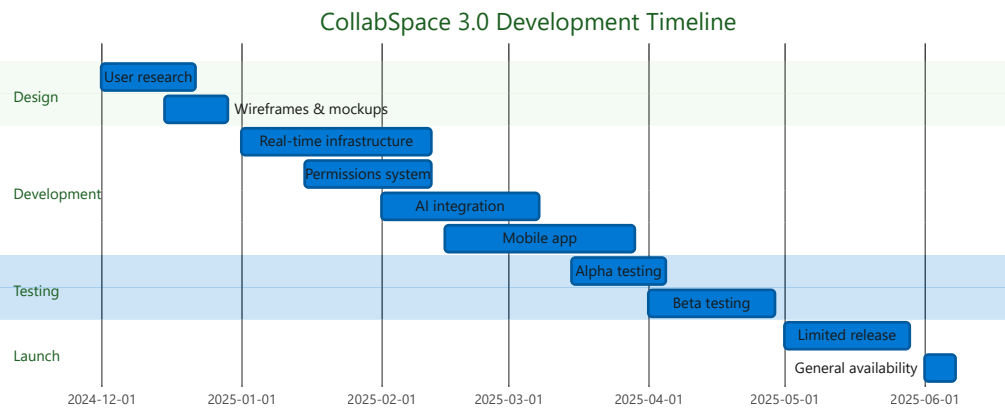
| Risk                       | Probability | Impact   | Mitigation  |
|----------------------------|-------------|----------|---|
| Real-time scaling issues   | Medium      | High     | Load testing with 100+ users, horizontal scaling architecture |
| Data loss during conflicts | Low         | Critical | 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 |
| 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