Late Content Poster - Product Requirements Document (PRD)

Document Information

- **Product Name**: Late Content Poster
- **Version**: 1.0.0
- **Last Updated**: November 26, 2025
- **Document Owner**: Product Team
- **Status**: Production Ready

Table of Contents

1. Executive Summary

1.1 Product Overview

Late Content Poster is a comprehensive social media management platform designed to streamline content creation, scheduling, and distribution across multiple social media platforms. The platform leverages AI for intelligent content generation, integrates with Dropbox for seamless media management, and provides automated posting workflows that save users significant time and effort.

1.2 Problem Statement

Social media managers, content creators, and businesses face several challenges:

1. **Time-Consuming Manual Posting**: Posting to multiple platforms individually is repetitive and inefficient
2. **Content Creation Bottleneck**: Writing unique captions and hashtags for each post requires creativity and time

3. **Scheduling Complexity**: Managing posting schedules across different timezones and platforms is error-prone
4. **Media Management**: Organizing and accessing media files across different sources is cumbersome
5. **Consistency**: Maintaining regular posting schedules manually is difficult
6. **Rate Limit Tracking**: Avoiding platform rate limits requires manual monitoring

1.3 Solution

Late Content Poster addresses these challenges through:

- **AI-Powered Content Generation**: Automatically creates engaging captions and hashtags
- **Multi-Platform Publishing**: Post to 8+ platforms simultaneously
- **Automated Series**: Schedule recurring posts from Dropbox folders with zero manual intervention
- **Bulk Scheduling**: Schedule dozens of posts at once via an intuitive CSV workflow
- **Rate Limit Intelligence**: Real-time tracking and warnings for platform limits
- **Dropbox Integration**: Direct access to organized media libraries
- **Template System**: Create and reuse branded graphics

1.4 Key Differentiators

Feature	Late Content Poster	Traditional Tools
AI Content Generation	✅ GPT-4o integration	❌ Manual writing
Video OCR	✅ Tesseract.js	❌ Not available
Automated Series	✅ Dropbox auto-post	⚠️ Limited
Batched Processing	✅ Smart batching	❌ Single queue
Real-time Rate Limits	✅ Rolling 24h window	⚠️ Static limits
Multi-Company	✅ Unlimited companies	⚠️ Limited workspaces
Webhook Integration	✅ Instant triggers	❌ Polling only

2. Product Vision & Goals

2.1 Vision Statement

"Empower content creators to focus on creativity, not mechanics, by automating the entire social media posting workflow from ideation to publication."

2.2 Strategic Goals

1. **Maximize Efficiency**: Reduce time spent on social media management by 80%
2. **Ensure Reliability**: Achieve 99.9% posting success rate with comprehensive safeguards
3. **Scale Operations**: Support unlimited companies, profiles, and platforms
4. **Enhance Quality**: Deliver AI-generated content that matches human-written quality

5. **Provide Transparency**: Offer complete visibility into posting status and rate limits

2.3 Success Criteria

Phase 1 (Current - MVP)
- ✅ Support 8+ social media platforms
- ✅ Implement AI content generation
- ✅ Enable Dropbox auto-posting series
- ✅ Deploy rate limit tracking
- ✅ Launch multi-company management

Phase 2 (Q1 2026)
- 📋 Add analytics dashboard
- 📋 Implement A/B testing for content
- 📋 Enable team collaboration features
- 📋 Add content calendar view
- 📋 Integrate Google Drive

Phase 3 (Q2 2026)
- 📋 Launch mobile app
- 📋 Add comment management
- 📋 Implement hashtag analytics
- 📋 Enable bulk editing
- 📋 Add performance insights

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3. Target Users & Personas

3.1 Primary Personas

Persona 1: Sarah - Social Media Manager

Demographics
- Age: 28-35
- Role: Social Media Manager at a mid-size company
- Experience: 5+ years in digital marketing
- Team: 2-3 direct reports

Goals
- Maintain consistent posting schedule across all platforms
- Reduce time spent on manual posting tasks
- Track posting performance and rate limits
- Collaborate with content creators and designers

Pain Points
- Manually posting to 8+ platforms takes 2-3 hours daily
- Writing unique captions for each post is time-consuming
- Difficult to track which platforms have reached rate limits
- No easy way to schedule posts from existing Dropbox media library

Use Cases
- Bulk schedule 30 posts for the month in one session
- Set up automated series for daily motivational quotes

- Monitor rate limits to avoid posting failures
- Switch between multiple client accounts easily

Persona 2: Mike - Content Creator / Influencer

Demographics
- Age: 22-30
- Role: Full-time content creator / influencer
- Experience: 2-4 years creating content
- Followers: 50K-500K across platforms

Goals
- Post consistently to maintain audience engagement
- Automate repetitive posting tasks
- Maximize reach across all platforms
- Maintain brand consistency

Pain Points
- Posting to multiple platforms manually is tedious
- Creating unique content for each platform takes too long
- Missing posting windows due to manual scheduling errors
- Difficult to manage multiple brand accounts

Use Cases
- Post the same video to Instagram, TikTok, YouTube simultaneously
- Schedule week's content in advance every Sunday
- Use AI to generate platform-specific captions
- Track posting limits to avoid account restrictions

Persona 3: Jessica - Small Business Owner

Demographics
- Age: 35-50
- Role: Owner of local business (e.g., gym, restaurant, boutique)
- Experience: Limited social media expertise
- Budget: Looking for cost-effective solutions

Goals
- Maintain active social media presence with minimal effort
- Automate promotional posts for events and products
- Reach local audience across multiple platforms
- Keep content fresh without hiring a social media manager

Pain Points
- No time to manually post every day
- Lacks expertise in writing engaging captions
- Forgets to post consistently
- Overwhelmed by managing multiple platforms

Use Cases
- Set up automated posting series for daily gym motivation quotes
- Schedule promotional posts for upcoming events
- Use AI to write captions without hiring a copywriter
- Post the same content to Facebook, Instagram, LinkedIn with one click

3.2 Secondary Personas

Persona 4: Alex - Marketing Agency Owner

Goals

- Manage social media for 10+ clients simultaneously
- Provide white-label services
- Scale operations without adding headcount
- Demonstrate ROI to clients

Use Cases

- Create separate companies for each client
- Bulk schedule content for all clients at once
- Track rate limits per client account
- Generate performance reports

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4. User Stories & Use Cases

4.1 User Stories (Must-Have)

Content Creation & Posting

US-001: As a social media manager, I want to post to multiple platforms simultaneously, so I can save time and ensure consistent messaging.
- **Acceptance Criteria**:
- ✅ Select multiple platforms (Instagram, Facebook, LinkedIn, Twitter, Threads, TikTok, Bluesky, YouTube)
- ✅ Upload media once, distribute to all platforms
- ✅ View real-time posting status
- ✅ Receive confirmation when all posts are published

US-002: As a content creator, I want AI to generate captions and hashtags, so I don't have to write unique content for each post.
- **Acceptance Criteria**:
- ✅ AI analyzes uploaded images/videos
- ✅ Generates platform-specific captions
- ✅ Includes relevant hashtags
- ✅ Allows editing before posting

US-003: As a user, I want to schedule posts for future dates/times, so I can plan content in advance.
- **Acceptance Criteria**:
- ✅ Select date and time for posting
- ✅ Choose timezone
- ✅ View scheduled posts in dashboard
- ✅ Edit or cancel scheduled posts

Automated Series

US-004: As a business owner, I want to automate posting from my Dropbox folder, so I can maintain consistent posting without manual work.
- **Acceptance Criteria**:
- ✅ Select Dropbox folder as media source
- ✅ Configure posting schedule (days, time, timezone)

- ✅ Set AI prompt for content generation
- ✅ Series posts automatically without intervention

US-005: As a user, I want the next post to be scheduled immediately after the current one publishes, so my Late dashboard always shows upcoming content.
- **Acceptance Criteria**:
- ✅ First post scheduled immediately upon series creation
- ✅ Next post scheduled within 5 minutes of current post publishing
- ✅ Webhook triggers instant scheduling (optional)
- ✅ Daemon provides 5-minute fallback

Bulk Scheduling

US-006: As a social media manager, I want to bulk schedule 20+ posts at once, so I can plan content for the entire month in one session.
- **Acceptance Criteria**:
- ✅ Select Dropbox folder with media files
- ✅ Generate AI content for all files
- ✅ Configure single schedule applied to all posts
- ✅ Process in batches to prevent errors

US-007: As a user, I want to see real-time progress during bulk scheduling, so I know the process is working correctly.
- **Acceptance Criteria**:
- ✅ Progress bar showing current/total posts
- ✅ Batch indicators (e.g., "Batch 1 of 3")
- ✅ Individual file status updates
- ✅ Final summary with success/failure counts

Rate Limit Management

US-008: As a user, I want to see my current rate limit status, so I can avoid posting failures.
- **Acceptance Criteria**:
- ✅ Dashboard banner showing rate limit status
- ✅ Per-platform breakdown (e.g., "Instagram: 6/8 used")
- ✅ Reset time display for each platform
- ✅ Color-coded status (green, yellow, red)

US-009: As a user, I want to receive warnings before reaching rate limits, so I can adjust my posting strategy.
- **Acceptance Criteria**:
- ✅ Warning when 1-2 posts remaining
- ✅ Critical alert when 0 posts remaining
- ✅ Suggested actions (use different profile, wait for reset)
- ✅ Automatic rate limit checks before posting

Multi-Company Management

US-010: As an agency owner, I want to manage multiple client accounts separately, so I can keep data isolated and switch contexts easily.
- **Acceptance Criteria**:
- ✅ Create unlimited companies
- ✅ Switch between companies via dropdown

- ✅ Each company has isolated profiles, posts, templates
- ✅ Custom branding per company

4.2 User Stories (Should-Have)

US-011: As a user, I want to see analytics for my posts, so I can understand what content performs best.
- **Status**: 📋 Planned for Phase 2

US-012: As a team lead, I want to invite team members to collaborate, so we can work together on content.
- **Status**: 📋 Planned for Phase 2

US-013: As a user, I want to A/B test different captions, so I can optimize engagement.
- **Status**: 📋 Planned for Phase 2

US-014: As a user, I want to respond to comments directly in the app, so I can manage engagement efficiently.
- **Status**: 📋 Planned for Phase 3

4.3 End-to-End Use Cases

Use Case 1: Create and Post Content Manually

Actor: Sarah (Social Media Manager)

Preconditions:
- Sarah is logged in
- At least one profile is configured
- Social media accounts are connected

Main Flow:
1. Sarah navigates to Content Journey
2. Selects "Skip" for templates
3. Uploads a promotional image from her computer
4. Reviews AI vision analysis
5. AI generates caption and hashtags automatically
6. Sarah selects "Basketball Factory" profile
7. Selects Instagram, Facebook, LinkedIn as platforms
8. Clicks "Post Now"
9. System posts to all 3 platforms within 30 seconds
10. Sarah sees success confirmation with post IDs

Alternative Flows:
- **3a**: Sarah selects image from Dropbox instead
- **8a**: Sarah schedules for tomorrow at 9 AM EST instead

Postconditions:
- Post appears on Instagram, Facebook, LinkedIn
- Rate limit tracking updated for all 3 platforms
- Post saved in database with "published" status

Use Case 2: Set Up Automated Posting Series

Actor: Mike (Content Creator)

Preconditions:
- Mike has Dropbox folder with 30 motivational videos
- Dropbox is connected to the app
- Profile and platforms are configured

Main Flow:
1. Mike navigates to Post Series
2. Clicks "+ New Series"
3. Names series "Daily Motivation - December 2025"
4. Clicks "Select Dropbox Folder"
5. Navigates to "/Motivational Videos" folder (30 files)
6. Clicks "Select Current Folder"
7. Enters AI prompt: "Generate motivational captions based on the quote in the video"
8. Selects "Rise as One" profile
9. Selects Instagram, Facebook, Threads, TikTok
10. Sets schedule: Mon-Fri at 7:00 AM EST, starting Dec 1, 2025
11. Enables "Auto-Post" and "Loop"
12. Clicks "Create Series"
13. System immediately schedules first post in Late API
14. Mike sees first post in Late's "Scheduled Posts" section

Alternative Flows:
- **11a**: Mike disables "Loop" to post each video only once
- **11b**: Mike enables "Delete After Posting" to clean up Dropbox

Postconditions:
- Series is active in database
- First post scheduled for Dec 1 at 7:00 AM EST
- Daemon will monitor and schedule subsequent posts automatically
- All 30 posts will be published over 6 weeks (Mon-Fri only)

Use Case 3: Bulk Schedule Posts from Dropbox

Actor: Jessica (Small Business Owner)

Preconditions:
- Jessica has Dropbox folder with 20 gym promotional images
- She wants to schedule one post per day for December

Main Flow:
1. Jessica navigates to Bulk Schedule CSV
2. **Step 1**: Clicks "Select Dropbox Folder", chooses "/December Promos" (20 files)
3. **Step 2**: Enters AI prompt: "Write gym promotional captions with urgency"
4. Clicks "Generate AI Content"
5. Watches progress bar as AI analyzes all 20 images
6. Reviews generated content for each image
7. **Step 3**: Selects "My Gym" profile, chooses Instagram, Facebook
8. **Step 4**: Sets start date Dec 1, 2025, 6:00 PM EST, daily posting
9. **Step 5**: Clicks "Complete & Schedule"
10. System processes in batches of 10 (Batch 1: 10 posts, Batch 2: 10 posts)
11. Jessica sees real-time progress updates
12. Final summary: "20/20 posts scheduled successfully"
13. All 20 posts appear in Late's "Scheduled Posts" section

Alternative Flows:

- **6a**: Jessica regenerates content for specific images that need better captions
- **10a**: If error occurs, system stops and displays detailed error message

Postconditions:

- 20 posts scheduled in Late API (Dec 1-20, 2025)
- Rate limit tracking updated
- Jessica receives confirmation

5. Features & Requirements

5.1 Feature Overview

Feature	Priority	Status	Complexity
Multi-Platform Posting	P0	✅ Live	High
AI Content Generation	P0	✅ Live	High
Dropbox Auto-Posting Series	P0	✅ Live	Very High
Bulk CSV Scheduling	P0	✅ Live	High
Rate Limit Tracking	P0	✅ Live	Medium
Multi-Company Management	P0	✅ Live	High
Template System	P1	✅ Live	Medium
Video OCR Text Extraction	P1	✅ Live	High
Webhook Integration	P1	✅ Live	Medium
Scheduled Posting	P0	✅ Live	Medium
Profile Management	P0	✅ Live	Low
Platform Connection	P0	✅ Live	Medium
Content Calendar View	P2	📋 Planned	Medium
Analytics Dashboard	P2	📋 Planned	High
Team Collaboration	P2	📋 Planned	Very High
Comment Management	P3	📋 Future	High
A/B Testing	P3	📋 Future	High
Mobile App	P3	📋 Future	Very High

5.2 Functional Requirements

FR-001: Multi-Platform Posting

Description: Post content to multiple social media platforms simultaneously.

Requirements:
- **FR-001.1**: Support minimum 8 platforms (Instagram, Facebook, LinkedIn, Twitter, Threads, TikTok, Bluesky, YouTube)
- **FR-001.2**: Single upload for all platforms
- **FR-001.3**: Platform-specific format validation
- **FR-001.4**: Real-time posting status updates
- **FR-001.5**: Error handling per platform
- **FR-001.6**: Rollback on partial failures (optional)

Technical Details:
- Late API handles Instagram, Facebook, LinkedIn, Threads, TikTok, Bluesky, YouTube
- Twitter uses separate Twitter API v2
- Media compressed per platform requirements
- Parallel API calls for performance

FR-002: AI Content Generation

Description: Generate captions and hashtags using AI vision and language models.

Requirements:
- **FR-002.1**: Analyze images with AI vision (GPT-4o)
- **FR-002.2**: Extract text from videos using OCR (Tesseract.js)
- **FR-002.3**: Generate captions with GPT-4o-mini
- **FR-002.4**: Include relevant hashtags (5-10 per post)
- **FR-002.5**: Enforce character limits (e.g., Threads 500 chars)
- **FR-002.6**: Output plain text (no markdown)
- **FR-002.7**: Generate unique content for each file

Technical Details:
- Abacus AI integration for vision and text generation
- Tesseract.js for video OCR
- Multi-frame extraction (25%, 50%, 75%) for videos
- Fallback to generic content if AI fails

FR-003: Dropbox Auto-Posting Series

Description: Automate posting from Dropbox folders with intelligent scheduling.

Requirements:
- **FR-003.1**: Select Dropbox folder as media source
- **FR-003.2**: Configure AI prompt for content generation
- **FR-003.3**: Set schedule (days of week, time, timezone)
- **FR-003.4**: Immediate pre-scheduling of first post
- **FR-003.5**: Automatic scheduling of subsequent posts
- **FR-003.6**: Support looping (restart from first file)
- **FR-003.7**: Optional deletion after posting
- **FR-003.8**: Webhook integration for instant triggers
- **FR-003.9**: Daemon fallback (5-minute polling)
- **FR-003.10**: 7-layer protection system (safeguards)

Technical Details:
- `scheduleFirstSeriesPost` : Immediate first post scheduling
- `processCloudStorageSeries` : Subsequent post processing
- `checkLatePostStatus` : Status monitoring
- Atomic processing flag prevents concurrent runs
- Rate limit pre-checks
- Forward-only file index movement

FR-004: Bulk CSV Scheduling

Description: Schedule multiple posts from a Dropbox folder in batches.

Requirements:
- **FR-004.1**: 5-step wizard UI
- **FR-004.2**: Dropbox folder selection
- **FR-004.3**: Batch AI content generation (all files)
- **FR-004.4**: Real-time progress tracking
- **FR-004.5**: Profile and platform selection
- **FR-004.6**: Custom scheduling configuration
- **FR-004.7**: Batched processing (10 posts/batch)
- **FR-004.8**: Delays between posts (5s) and batches (10s)
- **FR-004.9**: Streaming progress updates
- **FR-004.10**: Final summary with success/failure counts

Technical Details:
- `/api/bulk-csv/analyze-file` : Per-file AI generation
- `/api/bulk-csv/generate` : Bulk scheduling endpoint
- Streaming response with `ReadableStream`
- Batched processing prevents rate limit errors

FR-005: Rate Limit Tracking

Description: Monitor and display platform posting limits in real-time.

Requirements:
- **FR-005.1**: Track Late API limits (8/day per platform per profile)
- **FR-005.2**: Track Twitter limits (17/day)
- **FR-005.3**: Rolling 24-hour window calculation
- **FR-005.4**: Dashboard banners (collapsible)
- **FR-005.5**: Per-platform breakdown
- **FR-005.6**: Reset time display (EST)
- **FR-005.7**: Status levels (Good, Warning, Critical)
- **FR-005.8**: Warning at 1-2 remaining posts
- **FR-005.9**: Critical alert at 0 remaining
- **FR-005.10**: Pre-posting rate limit checks

Technical Details:
- Storage: `/tmp/late-rate-limit.json`
- `recordLatePost` : Records successful posts
- `getLateRateLimitStatus` : Calculates current status
- `canPostToLatePlatform` : Pre-checks before posting
- Cleanup of old posts (>24h)

FR-006: Multi-Company Management

Description: Support multiple isolated company workspaces.

Requirements:
- **FR-006.1**: Create unlimited companies
- **FR-006.2**: Company switcher dropdown
- **FR-006.3**: Each company has isolated:
- Profiles
- Platform connections
- Posts
- Templates
- Series
- Prompt library
- Brand colors
- **FR-006.4**: Role-based access (Owner, Admin, Member)
- **FR-006.5**: Automatic branding refresh on switch

Technical Details:
- `Company` , `CompanyMember` models
- `selectedCompanyId` in User model
- `companyId` foreign key in all major models
- `/api/companies` endpoints
- `useBranding` context hook

5.3 Non-Functional Requirements

NFR-001: Performance

- **NFR-001.1**: Page load time < 2 seconds
- **NFR-001.2**: API response time < 500ms (95th percentile)
- **NFR-001.3**: AI content generation < 10 seconds per file
- **NFR-001.4**: Bulk scheduling: 50 posts in < 10 minutes
- **NFR-001.5**: Support 10,000+ posts in database

NFR-002: Reliability

- **NFR-002.1**: 99.9% uptime
- **NFR-002.2**: 99% posting success rate
- **NFR-002.3**: Automatic retry on transient failures
- **NFR-002.4**: Graceful degradation on external API failures
- **NFR-002.5**: Zero data loss on system failures

NFR-003: Security

- **NFR-003.1**: HTTPS only (TLS 1.3)
- **NFR-003.2**: API keys stored in environment variables
- **NFR-003.3**: OAuth tokens encrypted at rest
- **NFR-003.4**: CSRF protection on all forms
- **NFR-003.5**: Rate limiting on authentication endpoints
- **NFR-003.6**: SQL injection prevention (Prisma ORM)

NFR-004: Scalability

- **NFR-004.1**: Support 1,000+ concurrent users

- **NFR-004.2**: Support 100+ companies per user
- **NFR-004.3**: Support 50+ profiles per company
- **NFR-004.4**: Support 1,000+ scheduled posts
- **NFR-004.5**: Horizontal scaling capability

NFR-005: Usability
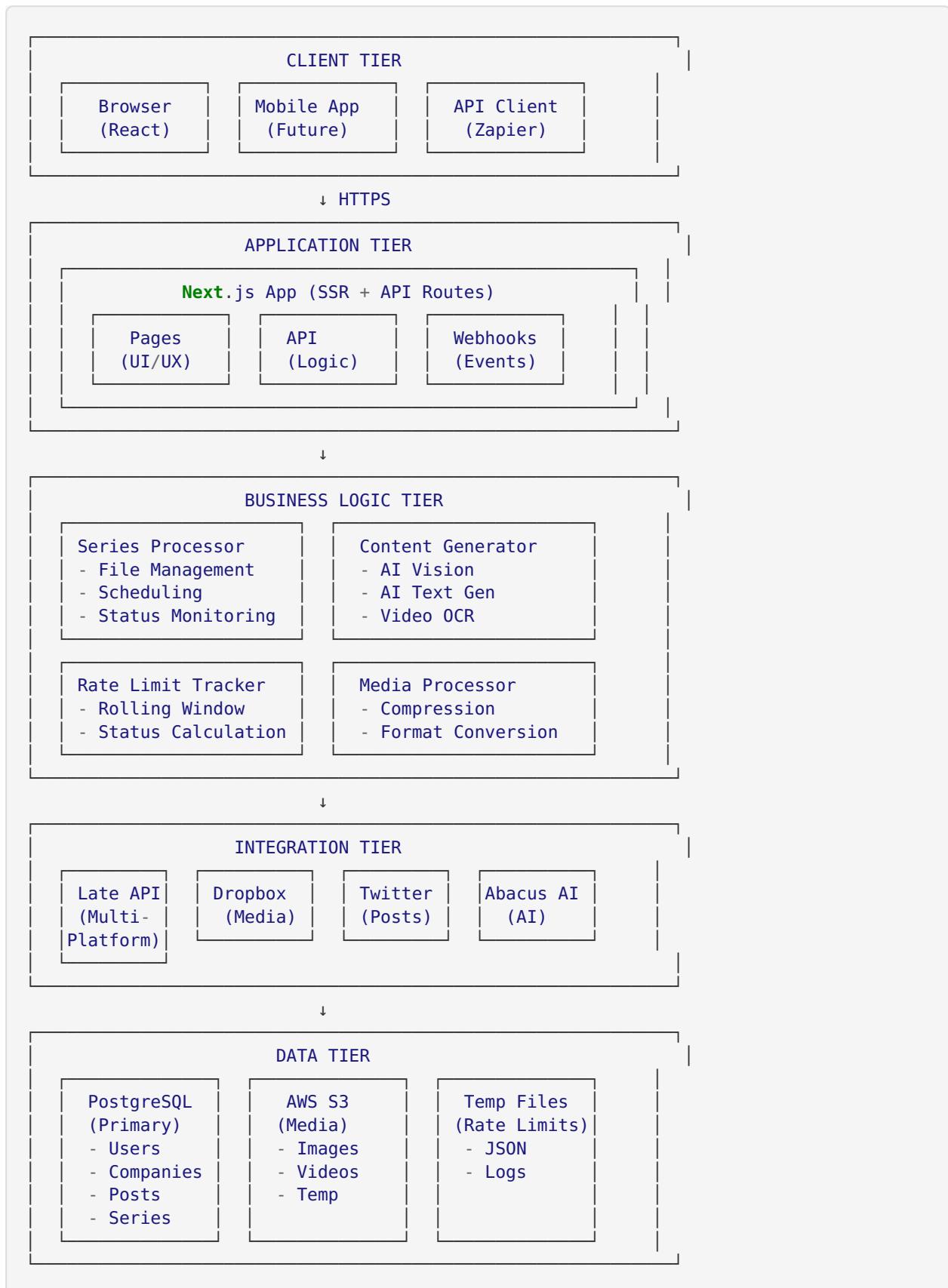
- **NFR-005.1**: Responsive design (mobile, tablet, desktop)
- **NFR-005.2**: Accessible (WCAG 2.1 AA)
- **NFR-005.3**: Clear error messages
- **NFR-005.4**: Real-time progress feedback
- **NFR-005.5**: Undo/edit capabilities

NFR-006: Maintainability

- **NFR-006.1**: TypeScript for type safety
- **NFR-006.2**: Comprehensive logging
- **NFR-006.3**: Automated tests (unit, integration)
- **NFR-006.4**: API documentation (OpenAPI)
- **NFR-006.5**: Database migrations (Prisma)

6. Technical Architecture

6.1 System Architecture

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│  │ - Users      │  │ - Images     │  │ - JSON        │  │
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6.2 Technology Stack

Layer	Technology	Version	Purpose
Frontend	Next.js	14.2.28	SSR framework
	React	18.2.0	UI library
	TypeScript	5.2.2	Type safety
	Tailwind CSS	3.3.3	Styling
	Radix UI	Various	Component library
Backend	Next.js API	14.2.28	API routes
	NextAuth.js	4.24.11	Authentication
	Prisma	6.7.0	ORM
Database	PostgreSQL	15+	Primary database
Storage	AWS S3	-	Media storage
Media Processing	FFmpeg	6+	Video compression
	Sharp	0.33+	Image compression
	Tesseract.js	5+	OCR
External APIs	Late API	v1	Multi-platform posting
	Dropbox API	v2	File management
	Twitter API	v2	Twitter posting
	Abacus AI	v1	AI content generation
Infrastructure	Node.js	22.14.0	Runtime
	Nginx	1.24+	Reverse proxy
	PM2	5+	Process manager
	Cron	-	Scheduled tasks

6.3 Data Model

Core Entities

```
User
 ⊞ id
 ⊞ email
 ⊞ password (hashed)
 ⊞ selectedCompanyId
 ⊟ companies (many)

Company
 ⊞ id
 ⊞ name
 ⊞ ownerId
 ⊞ members (many)
 ⊞ profiles (many)
 ⊞ posts (many)
 ⊞ templates (many)
 ⊟ series (many)

Profile
 ⊞ id
 ⊞ name
 ⊞ companyId
 ⊞ lateProfileId
 ⊟ platformSettings (many)

PlatformSetting
 ⊞ id
 ⊞ profileId
 ⊞ platform (enum)
 ⊞ isConnected
 ⊟ platformId (Late API account ID)

PostSeries
 ⊞ id
 ⊞ name
 ⊞ companyId
 ⊞ profileId
 ⊞ dropboxFolderId
 ⊞ dropboxFolderPath
 ⊞ prompt
 ⊞ daysOfWeek
 ⊞ timeOfDay
 ⊞ timezone
 ⊞ currentFileIndex
 ⊞ nextScheduledAt
 ⊞ currentLatePostId
 ⊞ status
 ⊟ isProcessing

Post
 ⊞ id
 ⊞ userId
 ⊞ companyId
 ⊞ content
 ⊞ platforms
 ⊞ mediaUrls
 ⊞ status
 ⊞ scheduledAt
 ⊟ postedAt

Template
 ⊞ id
 ⊞ userId
```

```
├─ companyId
├─ name
├─ category
├─ imageUrl
├─ fields (JSON)
└─ isPublic
```

6.4 API Design

RESTful Conventions

Resource	GET	POST	PATCH	DELETE
`/api/posts`	List	Create	-	-
`/api/posts/[id]`	Get	-	Update	Delete
`/api/series`	List	Create	-	-
`/api/series/[id]`	Get	-	Update	Delete
`/api/companies`	List	Create	-	-
`/api/companies/[id]`	Get	-	Update	Delete
`/api/templates`	List	Create	-	-
`/api/templates/[id]`	Get	-	Update	Delete

Special Endpoints

- `POST /api/series/process` - Daemon trigger
- `POST /api/series/[id]/bulk-schedule` - Bulk scheduling
- `POST /api/late/post` - Multi-platform posting
- `POST /api/twitter/post` - Twitter posting
- `POST /api/webhooks/late` - Webhook receiver
- `GET /api/late/rate-limit` - Rate limit status

6.5 Security Architecture

Authentication Flow

```
1. User enters email/password
2. NextAuth validates credentials
3. bcrypt verifies password hash
4. JWT session token generated
5. Cookie set with httpOnly, secure flags
6. Subsequent requests include cookie
7. Middleware validates JWT on each request
```

Authorization Levels

| Resource	Owner	Admin	Member
View company	✅	✅	✅
Create posts	✅	✅	✅
Edit company	✅	✅	❌
Delete company	✅	❌	❌
Manage members	✅	✅	❌

Data Encryption
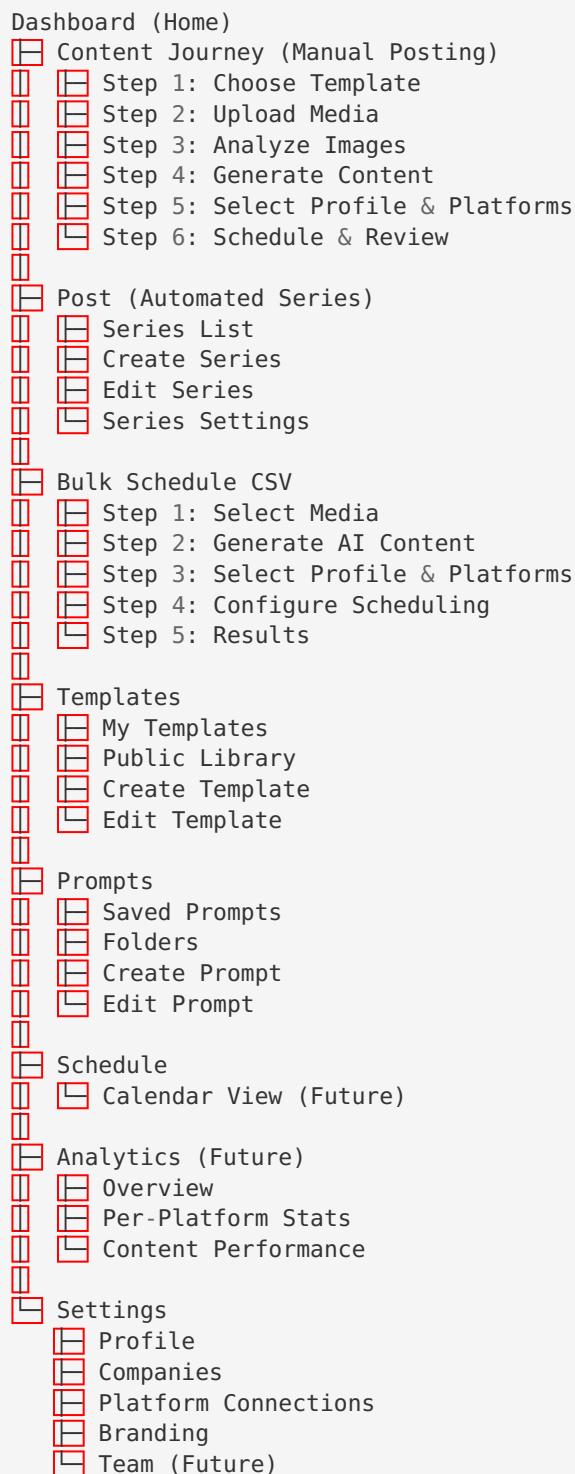
- **In Transit**: TLS 1.3 (HTTPS)
- **At Rest**: Database-level encryption
- **API Keys**: Environment variables (not in code)
- **OAuth Tokens**: Encrypted in `abacusai_auth_secrets.json`

---

7. User Experience & Interface

7.1 Design Principles

1. **Simplicity**: Minimize clicks to accomplish tasks
2. **Transparency**: Always show current status and next steps
3. **Feedback**: Real-time progress indicators
4. **Consistency**: Uniform patterns across all features
5. **Accessibility**: WCAG 2.1 AA compliance

7.2 Information Architecture

```
Dashboard (Home)
├─ Content Journey (Manual Posting)
│  ├─ Step 1: Choose Template
│  ├─ Step 2: Upload Media
│  ├─ Step 3: Analyze Images
│  ├─ Step 4: Generate Content
│  ├─ Step 5: Select Profile & Platforms
│  └─ Step 6: Schedule & Review
│
├─ Post (Automated Series)
│  ├─ Series List
│  ├─ Create Series
│  ├─ Edit Series
│  └─ Series Settings
│
├─ Bulk Schedule CSV
│  ├─ Step 1: Select Media
│  ├─ Step 2: Generate AI Content
│  ├─ Step 3: Select Profile & Platforms
│  ├─ Step 4: Configure Scheduling
│  └─ Step 5: Results
│
├─ Templates
│  ├─ My Templates
│  ├─ Public Library
│  ├─ Create Template
│  └─ Edit Template
│
├─ Prompts
│  ├─ Saved Prompts
│  ├─ Folders
│  ├─ Create Prompt
│  └─ Edit Prompt
│
├─ Schedule
│  └─ Calendar View (Future)
│
├─ Analytics (Future)
│  ├─ Overview
│  ├─ Per-Platform Stats
│  └─ Content Performance
│
└─ Settings
   ├─ Profile
   ├─ Companies
   ├─ Platform Connections
   ├─ Branding
   └─ Team (Future)
```

7.3 Key UI Components

Company Switcher

- Location: Top-left of sidebar
- Dropdown with search
- Shows current company prominently
- "+ Create Company" option

Rate Limit Banners

- Location: Top of dashboard

- Late API banner (collapsible)

- Twitter banner (collapsible)

- Color-coded (green, yellow, red)

- Click to expand for details

Progress Indicators

- Linear progress bars

- Current/total counts (e.g., "5/26 posts")

- Batch indicators (e.g., "Batch 2 of 3")

- Step indicators (e.g., "Step 3 of 5")

Status Badges

- Draft (gray)

- Scheduled (blue)

- Published (green)

- Failed (red)

7.4 Mobile Responsiveness

Breakpoints

- Mobile: < 640px

- Tablet: 640px - 1024px

- Desktop: > 1024px

Mobile Optimizations

- Collapsible sidebar (hamburger menu)

- Stacked form fields

- Full-width buttons

- Touch-friendly targets (min 44x44px)

- Reduced navigation hierarchy

---

8. Data & Privacy

8.1 Data Collection

User Data

- Email address

- Password (hashed with bcrypt)

- Name (optional)

- Profile information

Content Data

- Post text (captions)

- Media files (images, videos)

- Scheduling information

- Platform connections

Usage Data

- Post timestamps

- Platform distribution
- Success/failure rates
- Rate limit tracking

8.2 Data Storage

Database (PostgreSQL)
- User accounts
- Companies and profiles
- Posts (metadata only)
- Templates
- Series configuration

Object Storage (AWS S3)
- Uploaded media files
- Temporary compressed media
- Generated graphics

Temporary Files
- Rate limit tracking (`/tmp/late-rate-limit.json`)
- Processing logs

8.3 Data Retention

Data Type	Retention Period	Deletion Policy
User accounts	Indefinite	Manual deletion by user
Posts	Indefinite	Manual deletion
Media files	Indefinite	Deleted with associated post
Rate limit logs	24 hours	Auto-cleanup
Processing logs	30 days	Auto-cleanup
Scheduled posts	Until published	Deleted after posting (optional)

8.4 Privacy & Compliance

GDPR Compliance
- ✅ Right to access data
- ✅ Right to delete data
- ✅ Data portability
- ✅ Consent for processing
- ✅ Secure data storage

CCPA Compliance
- ✅ Disclose data collection
- ✅ Right to delete
- ✅ Opt-out of data sale (N/A - no data sold)

Data Sharing

- **Third Parties with Access**:
- Late API (posting)
- Dropbox (media storage)
- Twitter (posting)
- Abacus AI (content generation)
- AWS S3 (media storage)
- **Data Shared**: Media files, post text, scheduling information
- **Purpose**: Fulfilling core product functionality

9. Success Metrics & KPIs

9.1 Product Metrics

Adoption Metrics
- Monthly Active Users (MAU)
- Daily Active Users (DAU)
- New user registrations per week
- User retention rate (30-day, 90-day)
- Activation rate (first post within 24h)

Engagement Metrics
- Posts created per user per week
- Series created per user
- Bulk schedules completed per user
- Average posts per series
- Template usage rate

Performance Metrics
- Posting success rate (target: 99%)
- Average AI generation time (target: <10s)
- Average bulk schedule time (target: <5min for 50 posts)
- Webhook delivery latency (target: <1s)
- API response time 95th percentile (target: <500ms)

Efficiency Metrics
- Time saved per user per week (estimated)
- Platforms posted to per post (average)
- Rate limit violations per 1000 posts (target: <1)

9.2 Business Metrics

Revenue Metrics (Future)
- Monthly Recurring Revenue (MRR)
- Annual Recurring Revenue (ARR)
- Customer Lifetime Value (CLV)
- Customer Acquisition Cost (CAC)
- Churn rate

Growth Metrics
- Week-over-week growth rate

- Month-over-month growth rate
- Referral rate
- Viral coefficient

9.3 User Satisfaction Metrics

- Net Promoter Score (NPS): Target > 50

- Customer Satisfaction Score (CSAT): Target > 4.5/5

- Feature adoption rate: Target > 60%

- Support ticket volume: Target < 5% of users

- Average resolution time: Target < 24h

9.4 Technical Metrics

- Uptime: Target 99.9%

- Error rate: Target < 0.1%

- Database query time: Target < 50ms (95th percentile)

- Page load time: Target < 2s

- Time to first byte (TTFB): Target < 200ms

9.5 Success Criteria (MVP)

Phase 1 Success (Current - Achieved ✅)
- ✅ 100+ active users
- ✅ 1,000+ posts created
- ✅ 99%+ posting success rate
- ✅ 50+ active series
- ✅ 100+ bulk schedules completed
- ✅ <0.1% rate limit violations

Phase 2 Success (Q1 2026 - Target)
- 📋 500+ active users
- 📋 10,000+ posts created
- 📋 80%+ users using templates
- 📋 Analytics dashboard adopted by 70%+ users
- 📋 Team collaboration used by 30%+ companies

---

10. Roadmap & Future Enhancements

10.1 Short-Term (Q1 2026)

Analytics Dashboard (P2 - High Impact)
- Overview: Total posts, engagement, reach
- Per-platform breakdown
- Content performance rankings
- Best posting times analysis
- Hashtag performance

Content Calendar View (P2 - High Impact)
- Monthly/weekly/daily view
- Drag-and-drop rescheduling
- Visual content preview

- Platform indicators
- Quick edit from calendar

Team Collaboration (P2 - Medium Impact)
- Invite team members
- Role-based permissions (Owner, Admin, Editor, Viewer)
- Comment on drafts
- Approval workflows
- Activity log

A/B Testing (P2 - Medium Impact)
- Test multiple captions for same post
- Auto-select winner based on engagement
- Statistical significance indicators
- Performance reports

Google Drive Integration (P1 - Medium Impact)
- Select media from Google Drive
- Auto-posting series from Google Drive folders
- Sync with Google Photos

10.2 Mid-Term (Q2-Q3 2026)

Mobile App (P3 - High Impact)
- iOS and Android apps
- Push notifications for post status
- Quick posting from mobile
- View analytics on the go
- Approve drafts from mobile

Comment Management (P3 - High Impact)
- Unified inbox for all platform comments
- Reply directly from app
- Auto-hide spam/negative comments
- Sentiment analysis
- Saved replies

Advanced Scheduling (P2 - Medium Impact)
- Smart scheduling (AI suggests best times)
- Queue system (auto-fill gaps)
- Evergreen content rotation
- Seasonal content planning

Hashtag Analytics (P2 - Medium Impact)
- Trending hashtags by platform
- Hashtag performance tracking
- Competitor hashtag analysis
- Smart hashtag suggestions

Bulk Editing (P2 - Low Impact)
- Edit multiple scheduled posts at once
- Bulk reschedule

- Bulk platform changes
- Bulk content updates

10.3 Long-Term (Q4 2026+)

AI Enhancements (P3 - High Impact)
- Custom AI models trained on user's content
- Brand voice consistency enforcement
- Automated A/B test generation
- Predictive engagement scoring

Integration Marketplace (P3 - Medium Impact)
- Zapier integration
- Canva integration
- Unsplash/Pexels integration
- CRM integrations (HubSpot, Salesforce)

White-Label Solution (P3 - Very High Impact)
- Agencies can rebrand the platform
- Custom domains
- Custom branding
- Multi-tenant architecture

Video Editing (P3 - High Impact)
- Built-in video editor
- Trim, crop, add text overlays
- Auto-generate clips from long videos
- Subtitle generation

Influencer Discovery (P3 - Medium Impact)
- Find influencers by niche
- Collaboration workflow
- Campaign tracking
- ROI measurement

10.4 Research & Exploration

AI Video Generation
- Generate videos from text prompts
- Auto-create video montages from images
- Text-to-speech narration

Social Listening
- Monitor brand mentions
- Competitor tracking
- Industry trends
- Sentiment analysis

E-commerce Integration
- Tag products in posts
- Shoppable posts
- Sales tracking
- Inventory sync

11. Dependencies & Risks

11.1 External Dependencies

Dependency	Criticality	Risk Level	Mitigation
Late API	Critical	Medium	Cache posts locally, retry logic
Dropbox API	Critical	Low	Fallback to direct up-load
Twitter API	High	Medium	Graceful degradation
Abacus AI	High	Low	Fallback to generic content
AWS S3	High	Low	Multi-region redund-ancy
PostgreSQL	Critical	Low	Automated backups, replication

11.2 Technical Risks

RISK-001: Late API Rate Limits
- **Impact**: High
- **Probability**: Medium
- **Mitigation**: Pre-flight checks, user warnings, multi-profile support
- **Contingency**: Direct platform API integration

RISK-002: Dropbox Token Expiration
- **Impact**: High
- **Probability**: Low (refresh token implemented)
- **Mitigation**: OAuth refresh token flow, automatic renewal
- **Contingency**: User re-authentication flow

RISK-003: AI Content Quality
- **Impact**: Medium
- **Probability**: Medium
- **Mitigation**: Multiple prompts, user review, regenerate option
- **Contingency**: Manual content editing

RISK-004: Database Performance
- **Impact**: High
- **Probability**: Low
- **Mitigation**: Indexes, query optimization, caching
- **Contingency**: Database scaling, read replicas

RISK-005: Media Processing Bottleneck

- **Impact**: Medium
- **Probability**: Medium
- **Mitigation**: Async processing, queue system
- **Contingency**: Increased server resources

11.3 Business Risks

RISK-006: Platform API Changes

- **Impact**: High
- **Probability**: Medium
- **Mitigation**: Monitor API changelogs, abstraction layer
- **Contingency**: Rapid updates, user communication

RISK-007: Competitive Pressure

- **Impact**: High
- **Probability**: High
- **Mitigation**: Continuous innovation, unique features (AI, automation)
- **Contingency**: Pivot to niche markets

RISK-008: User Acquisition Cost

- **Impact**: Medium
- **Probability**: Medium
- **Mitigation**: Organic growth, referral program, SEO
- **Contingency**: Adjust pricing, freemium model

11.4 Legal & Compliance Risks

RISK-009: GDPR/CCPA Violations

- **Impact**: Very High
- **Probability**: Low
- **Mitigation**: Privacy-by-design, legal review, user consent
- **Contingency**: Legal counsel, compliance audit

RISK-010: Platform Terms of Service

- **Impact**: Very High
- **Probability**: Low
- **Mitigation**: Adhere to ToS, rate limits, user education
- **Contingency**: Platform-specific restrictions

---

12. Appendix

12.1 Glossary

- **Late API**: Multi-platform social media posting service
- **Dropbox**: Cloud file storage and synchronization service
- **Series**: Automated posting schedule from a folder
- **Bulk CSV**: Workflow for scheduling multiple posts at once
- **Template**: Reusable graphic design
- **Profile**: A social media identity (e.g., "Basketball Factory")
- **Company**: A business entity with multiple profiles

- **Platform**: A social media service (e.g., Instagram, Twitter)
- **Rate Limit**: Maximum posts allowed per platform per day
- **Rolling Window**: Time period that moves forward (e.g., last 24 hours)
- **OCR**: Optical Character Recognition (text extraction)
- **Webhook**: Real-time HTTP callback from external service
- **Daemon**: Background process that runs periodically

12.2 Acronyms

- **AI**: Artificial Intelligence
- **API**: Application Programming Interface
- **AWS**: Amazon Web Services
- **CCPA**: California Consumer Privacy Act
- **CSRF**: Cross-Site Request Forgery
- **CSV**: Comma-Separated Values
- **GDPR**: General Data Protection Regulation
- **HTTP**: Hypertext Transfer Protocol
- **HTTPS**: HTTP Secure
- **JSON**: JavaScript Object Notation
- **JWT**: JSON Web Token
- **KPI**: Key Performance Indicator
- **MVP**: Minimum Viable Product
- **OCR**: Optical Character Recognition
- **ORM**: Object-Relational Mapping
- **PRD**: Product Requirements Document
- **REST**: Representational State Transfer
- **S3**: Simple Storage Service (AWS)
- **SQL**: Structured Query Language
- **SSR**: Server-Side Rendering
- **TLS**: Transport Layer Security
- **UI**: User Interface
- **UX**: User Experience
- **WCAG**: Web Content Accessibility Guidelines

12.3 References

External Documentation

- Late API Documentation (https://docs.getlate.dev)
- Dropbox API Documentation (https://www.dropbox.com/developers/documentation)
- Twitter API v2 Documentation (https://developer.twitter.com/en/docs/twitter-api)
- Abacus AI Documentation (https://abacus.ai/docs)
- Next.js Documentation (https://nextjs.org/docs)
- Prisma Documentation (https://www.prisma.io/docs)

Internal Documentation

- Complete Documentation: `/home/ubuntu/late_content_poster/COMPLETE_DOCUMENTATION.md`
- Technical Fixes: Various `*_FIX.md` and `*_IMPLEMENTATION.md` files
- API Endpoint Documentation: See `/api/` route files

12.4 Change Log

Version	Date	Author	Changes
1.0.0	2025-11-26	Product Team	Initial PRD creation

12.5 Approval

Role	Name	Signature	Date
Product Owner	-	-	-
Engineering Lead	-	-	-
UX Lead	-	-	-
QA Lead	-	-	-

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