Code Review

> **Source File:** generated-documents\quality-assurance\code-review.md
> **Generated:** 16/07/2025 at 13:58:30
> **Generated by:** Requirements Gathering Agent - PDF Converter

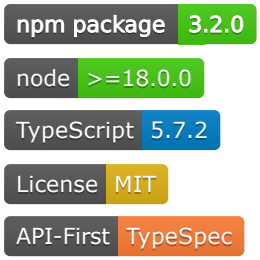
Code Review

Generated by adpa-enterprise-framework-automation v3.2.0
Category: quality-assurance
Generated: 2025-07-14T21:07:53.959Z
Description: Code review processes and standards

Code Review Process and Guidelines

=== PROJECT README ===

ADPA - Advanced Document Processing & Automation Framework



> ***Previously known as Requirements Gathering Agent (RGA)***

ADPA is a modular, standards-compliant enterprise automation framework for AI-powered document generation, project management, and business analysis. Built with TypeScript and Node.js, it provides both CLI and REST API interfaces for generating professional documentation following industry standards including BABOK v3, PMBOK 7th Edition, and DMBOK 2.0.

🚀 Key Features

Enterprise Standards Compliance

- 📊 **BABOK v3** - Business Analysis Body of Knowledge automation
- 📋 **PMBOK 7th Edition** - Project Management documentation generation
- 📈 **DMBOK 2.0** - Data Management frameworks (in progress)
- 🏛️ **Multi-Framework Integration** - Cross-reference and unified reporting

AI-Powered Generation

- 🤖 **Multi-Provider AI Support** - OpenAI, Google AI, GitHub Copilot, Ollama
- 🧠 **Intelligent Context Management** - Smart context injection and processing
- 📝 **Professional Document Generation** - Standards-compliant business documents

- 🔄 **Automated Workflows** - End-to-end document generation pipelines

Enterprise Integration

- 🌐 **Production-Ready REST API** - TypeSpec-generated OpenAPI specifications
- 📚 **Confluence Integration** - Direct publishing to Atlassian Confluence
- 📊 **SharePoint Integration** - Microsoft SharePoint document management
- **Adobe Document Services** - Professional PDF generation and document intelligence
- 🔧 **CLI & Web Interface** - Multiple interaction modes

Compliance & Security

- 🛡️ **Enterprise-Grade Security** - Production-ready authentication and authorization
- 📋 **Regulatory Compliance** - Basel III, MiFID II, GDPR, SOX, FINRA, PCI DSS
- 🏢 **Fortune 500 Ready** - Designed for large-scale enterprise deployments
- ✅ **API-First Architecture** - Scalable microservices design

📦 Installation

NPM Package (Recommended)

```
npm install -g adpa-enterprise-framework-automation
```

From Source

```
git clone https://github.com/mdresch/requirements-gathering-agent.git
cd requirements-gathering-agent
npm install
npm run build
```

Docker (Coming Soon)

```
docker pull adpa/enterprise-framework:latest
```

🎯 Quick Start

1. CLI Usage

```
# Generate project documentation
adpa generate --key project-charter --output ./docs

# Start the API server
adpa-api

# Initialize Confluence integration
adpa confluence init

# Initialize SharePoint integration
adpa sharepoint init
```

2. API Server

```
# Start the Express.js API server
npm run api:start

# Access API documentation
open http://localhost:3000/api-docs
```

3. Admin Web Interface

```
# Install and start the admin interface
npm run admin:setup
npm run admin:serve

# Access at http://localhost:3001
```

🛠️ Configuration

Environment Setup

```
# Copy environment template
cp .env.example .env

# Configure your AI providers
OPENAI_API_KEY=your_openai_key
GOOGLE_AI_API_KEY=your_google_ai_key
AZURE_OPENAI_ENDPOINT=your_azure_endpoint
```

AI Provider Configuration

ADPA supports multiple AI providers with automatic failover:

```
// Supported providers
- OpenAI (GPT-4, GPT-3.5)
- Google AI (Gemini Pro, Gemini Pro Vision)
- GitHub Copilot
- Ollama (Local models)
- Azure OpenAI
```

📚 Framework Support

BABOK v3 (Business Analysis)

✅ **Production Ready**

- Requirements Elicitation & Analysis
- Stakeholder Analysis & Management
- Business Analysis Planning
- Solution Assessment & Validation
- Enterprise Analysis

PMBOK 7th Edition (Project Management)

✅ **Implemented**

- Project Charter & Scope Management
- Stakeholder Management Plans
- Risk & Quality Management
- Resource & Schedule Management
- Cost Management & Control

DMBOK 2.0 (Data Management)

🚧 **In Progress**

- Data Governance Frameworks
- Data Architecture & Quality
- Master Data Management
- Data Security & Privacy

🏗️ Architecture

Core Components

```
ADPA/
├── 🧠 AI Processing Engine     # Multi-provider AI orchestration
├── 📄 Document Generator       # Template-based document creation
├── 🌐 REST API Server          # Express.js with TypeSpec specs
```

```
├── 💻 CLI Interface           # Yargs-based command line tools
├── 🔌 Integration Layer       # Adobe, Confluence, SharePoint, VCS
├── 🎛️ Admin Interface         # Next.js web management portal
└── 📊 Analytics & Reporting   # Usage metrics and insights
```

Technology Stack

- **Backend**: Node.js 18+, TypeScript 5.7+, Express.js
- **AI Integration**: OpenAI, Google AI, GitHub Copilot, Ollama
- **API**: TypeSpec, OpenAPI 3.0, Swagger UI
- **Frontend**: Next.js 14, React 18, Tailwind CSS
- **Database**: JSON-based configuration, extensible to SQL/NoSQL
- **Testing**: Jest, TypeScript, comprehensive test coverage

📖 Usage Examples

Document Generation

```
# Generate business case document
adpa generate --key business-case --format markdown

# Generate complete project charter
adpa generate --category project-charter --output ./project-docs

# Generate stakeholder analysis
adpa generate --key stakeholder-analysis --format json
```

API Usage

```
// REST API endpoints
POST /api/v1/generate                    # Generate documents
GET  /api/v1/templates                   # List available templates
POST /api/v1/confluence/publish          # Publish to Confluence
POST /api/v1/sharepoint/upload           # Upload to SharePoint
GET  /api/v1/frameworks                  # List supported frameworks
```

Integration Examples

```
# Adobe Document Services integration
npm run adobe:setup                    # Configure Adobe credentials
npm run adobe:demo-generation          # Run document generation demo
npm run adobe:example-basic            # Basic PDF generation example

# Confluence integration
adpa confluence oauth2 login
adpa confluence publish --document ./docs/project-charter.md

# SharePoint integration
adpa sharepoint oauth2 login
adpa sharepoint upload --folder "Project Documents" --file ./docs/

# Version control integration
adpa vcs commit --message "Generated project documentation"
adpa vcs push --remote origin
```

🧪 Testing

```
# Run all tests
npm test

# Test specific providers
npm run test:azure
npm run test:github
npm run test:ollama

# Performance testing
npm run test:performance

# Integration testing
npm run test:integration
```

🏢 Enterprise Features

Compliance Standards

- **Financial**: Basel III, MiFID II, FINRA, CFTC, FCA, BaFin
- **Security**: GDPR, SOX, PCI DSS, ISO 27001, ISO 9001
- **Industry**: Healthcare (HIPAA), Government (FedRAMP)

Enterprise Integration

- **Identity Management**: Active Directory, SAML, OAuth2
- **Document Management**: SharePoint, Confluence, FileNet
- **Project Management**: Jira, Azure DevOps, ServiceNow
- **Version Control**: GitHub Enterprise, GitLab, Azure DevOps

Scalability & Performance

- **Horizontal Scaling**: Microservices architecture
- **Caching**: Redis support for high-performance scenarios
- **Load Balancing**: Production-ready deployment patterns
- **Monitoring**: Built-in metrics and health checks

📁 Project Structure

```
requirements-gathering-agent/
├── 📁 src/                          # TypeScript source code
│   ├── 🎯 cli.ts                    # Main CLI entry point
│   ├── 🌐 server.ts                 # Express.js API server
│   ├── 📄 modules/                  # Core modules
│   │   ├── ai/                      # AI provider integrations
│   │   ├── documentGenerator/       # Document generation engine
│   │   ├── confluence/              # Confluence integration
│   │   ├── sharepoint/              # SharePoint integration
│   │   └── documentTemplates/       # Framework templates
│   └── 🔧 commands/                 # CLI command modules
├── 📁 admin-interface/              # Next.js admin portal
├── 📁 api-specs/                    # TypeSpec API specifications
├── 📁 docs/                         # Comprehensive documentation
├── 📁 test/                         # Test suites
```

```
├── 📁 generated-documents/          # Output directory
└── 📁 dist/                         # Compiled JavaScript
```

🤝 Contributing

We welcome contributions! Please see our Contributing Guide for details.

Development Setup

```
git clone https://github.com/mdresch/requirements-gathering-agent.git
cd requirements-gathering-agent
npm install
npm run dev          # Start development mode
npm run build        # Build for production
npm test           # Run tests
```

Code Standards

- **TypeScript**: Strict mode enabled
- **ESLint**: Airbnb configuration
- **Prettier**: Code formatting
- **Jest**: Unit and integration testing
- **Conventional Commits**: Commit message standards

📋 Roadmap

Q1 2025

- ✅ BABOK v3 full implementation
- ✅ PMBOK 7th Edition compliance
- ✅ Multi-provider AI support
- ✅ Confluence & SharePoint integration

Q2 2025

- 🚧 DMBOK 2.0 implementation
- 🔄 Docker containerization
- 🔄 Kubernetes deployment templates
- 🔄 Advanced analytics dashboard

Q3 2025

- 📋 Enterprise SSO integration
- 📋 Advanced workflow automation
- 📋 Real-time collaboration features
- 📋 Mobile application support

📞 Support & Documentation

- 📖 **Full Documentation**: GitHub Wiki
- 🐛 **Issue Tracking**: GitHub Issues
- 💬 **Community**: GitHub Discussions
- 📧 **Enterprise Support**: Contact Us

📄 License

🙏 Acknowledgments

- **Industry Standards**: PMI (PMBOK), IIBA (BABOK), DAMA (DMBOK)
- **AI Providers**: OpenAI, Google, GitHub, Ollama community
- **Enterprise Partners**: Fortune 500 beta testing organizations
- **Open Source Community**: Contributors and feedback providers

---

Built with ❤️ for Enterprise Automation

🌟 Star us on GitHub | 📦 npm Package | 📖 Documentation

=== PROJECT METADATA ===

Name: adpa-enterprise-framework-automation

Description: Modular, standards-compliant Node.js/TypeScript automation framework for enterprise requirements, project, and data management. Provides CLI and API for BABOK v3, PMBOK 7th Edition, and DMBOK 2.0 (in progress). Production-ready Express.js API with TypeSpec architecture. Designed for secure, scalable, and maintainable enterprise automation.

Version: 3.2.0

Dependencies: @adobe/pdfservices-node-sdk, @azure-rest/ai-inference, @azure/identity, @azure/msal-node, @azure/openai, @google/generative-ai, @microsoft/microsoft-graph-client, axios, bcryptjs, compression, cors, dotenv, express, express-rate-limit, express-validator, express-winston, form-data, glob, helmet, joi, jsonwebtoken, morgan, multer, node-fetch, openai, swagger-ui-express, ts-node, uuid, winston, yargs, zod

Dev Dependencies: @jest/globals, @redocly/cli, @types/bcryptjs, @types/compression, @types/cors, @types/express, @types/glob, @types/jest, @types/jsonwebtoken, @types/morgan, @types/multer, @types/node, @types/node-fetch, @types/swagger-ui-express, @types/uuid, @typespec/compiler, @typespec/http, @typespec/json-schema, @typespec/openapi3, @typespec/rest, ajv, jest, rimraf, ts-jest, typescript, webpack-cli

Available Scripts: build, copy-configs, start, api:start, dev, clean, test, test:providers, test:performance, test:azure, test:github, test:ollama, test:failover, test:unit, prepublishOnly, admin:install, admin:dev, admin:build, admin:start, admin:setup, admin:serve, confluence:init, confluence:test, confluence:oauth2:login, confluence:oauth2:status, confluence:oauth2:debug, confluence:publish, confluence:status, sharepoint:init, sharepoint:test, sharepoint:oauth2:login, sharepoint:oauth2:status, sharepoint:oauth2:debug, sharepoint:publish, sharepoint:status, api:compile, api:watch, api:format, api:lint, api:docs, api:serve-docs, api:demo, api:server, babok:generate, pmbok:generate, dmbok:generate, framework:multi

=== PHASE-2-IMPLEMENTATION-GUIDE.MD (documentation) ===
Path: docs\ADOBE\PHASE-2-IMPLEMENTATION-GUIDE.md
Relevance Score: 95

Adobe Creative Suite Phase 2 Implementation Guide

Date: July 8, 2025
Status: 📋 **READY FOR IMPLEMENTATION**
Prerequisites: ✅ Phase 1 Complete (58 PDFs generated successfully)

🎯 Phase 2 Objectives

Transform our successful PDF generation pipeline into a premium Adobe Creative Suite presentation layer that delivers:

- **Professional InDesign layouts** with custom branding
- **Automated data visualizations** using Illustrator API
- **Enhanced image processing** with Photoshop API
- **Template-driven document generation** with consistent branding

🏗️ Technical Architecture for Phase 2

Current State (Phase 1) ✅

```
Markdown → Puppeteer → Professional PDF
├── Professional styling
├── Corporate typography
├── Metadata and attribution
└── Print-ready output
```

Target State (Phase 2) 🎯

```
Markdown → Content Analysis → Template Selection → Adobe Creative API
├── InDesign Server (Layout & Typography)
├── Illustrator API (Charts & Infographics)
├── Photoshop API (Image Enhancement)
└── Document Generation (Template Processing)
```

📋 Implementation Milestones

Milestone 1: Adobe Creative SDK Setup (Priority 1)

1.1 Authentication & Credentials

Files to Create:

- `src/adobe/creative-suite/authenticator.ts`
- `src/adobe/creative-suite/config.ts`
- `.env.adobe.creative`

Implementation Steps:

1. **Adobe Creative SDK Registration**

```
# Register for Adobe Creative SDK
# Obtain API keys for:
# - InDesign Server API
# - Illustrator API
# - Photoshop API
# - Document Generation API
```

2. **Authentication Setup**

```
// src/adobe/creative-suite/authenticator.ts
export class CreativeSuiteAuthenticator {
  private clientId: string;
  private clientSecret: string;

```

```
  async authenticate(): Promise<string> {
    // Implement OAuth 2.0 flow for Creative Suite APIs
  }
}
```

... [truncated]

=== ARCHITECTURE.MD (development) ===
Path: docs\ARCHITECTURE.md
Relevance Score: 95

Requirements Gathering Agent - Architecture Documentation

Overview

The Requirements Gathering Agent is an AI-driven system designed to automate and enhance the requirements gathering process for software projects. It leverages multiple AI providers and context management techniques to generate comprehensive project documentation, user stories, and strategic planning artifacts.

System Architecture

Core Components

1. Context Management System

- **Context Manager**: Central component for managing project context and AI interactions
- **Provider Abstraction**: Support for multiple AI providers (OpenAI, Google AI, GitHub Copilot, Ollama)
- **Context Injection**: Direct context injection capabilities for efficient AI processing

2. AI Provider Integration

- **Multi-Provider Support**: Flexible architecture supporting various AI services
- **Provider Synchronization**: Coordinated AI provider management
- **Fallback Mechanisms**: Robust handling of provider failures

3. Document Generation Engine

- **Template-Based Generation**: Structured document creation using predefined templates
- **PMBOK Compliance**: Project management artifacts following PMBOK guidelines
- **Automated Workflows**: End-to-end document generation pipelines

4. CLI Interface

- **Command-Line Tools**: `cli.ts` and `cli-main.ts` for system interaction
- **Batch Processing**: Support for bulk document generation
- **Configuration Management**: Flexible configuration options

Technology Stack

Core Technologies

- **TypeScript**: Primary development language for type safety and maintainability
- **Node.js**: Runtime environment for server-side execution
- **Jest**: Testing framework for unit and integration tests

AI Integration

- **OpenAI API**: GPT models for text generation and analysis
- **Google AI**: Gemini models for alternative AI processing
- **GitHub Copilot**: Code generation and assistance

- **Ollama**:
  ... [truncated]

=== API-TESTING-COMPREHENSIVE-SUMMARY.MD (development) ===
Path: docs\AZURE\API-TESTING-COMPREHENSIVE-SUMMARY.md
Relevance Score: 95

ADPA API Testing Comprehensive Summary

Test Session Report - June 22, 2025

🎯 TESTING OVERVIEW

Duration: 1 hour testing session
API Server: Express.js with TypeScript
Port: 3001
Environment: Development
Authentication: API Key & JWT Support

✅ SUCCESSFUL TESTS

1. **Health Endpoints** - ALL PASSED ✓

- **Main Health Check:** `GET /api/v1/health`
  - ✅ Returns comprehensive system status
  - ✅ Includes memory usage, uptime, version info
  - ✅ Proper JSON formatting
- **Readiness Check:** `GET /api/v1/health/ready`
  - ✅ Returns ready status with timestamp
  - ✅ Quick response time

2. **Authentication & Security - ALL PASSED ✓**

- **API Key Authentication:** `X-API-Key: dev-api-key-123`
  - ✅ Valid API key grants access
  - ✅ Invalid API key rejected with proper error
  - ✅ Missing API key prompts authentication required
- **Security Headers & Middleware:**
  - ✅ Helmet security middleware active
  - ✅ CORS properly configured
  - ✅ Rate limiting configured (no issues during testing)

3. **Templates API - ALL PASSED ✓**

- **Template Listing:** `GET /api/v1/templates`
  - ✅ Returns empty list initially (expected)
  - ✅ Proper pagination structure
- **Template Creation:** `POST /api/v1/templates`
  - ✅ **MAJOR SUCCESS:** Created comprehensive BABOK Requirements Elicitation Template
  - ✅ Template ID: `ca8d4758-03c5-4110-84a7-2f5bcd318539`
  - ✅ Validation working correctly
  - ✅ Rich template with variables and layout configuration
- **Template Retrieval:** `GET /api/v1/templates/{id}`
  - ✅ Proper GUID validation
  - ✅ Returns 404 for non-existent templates (expected)

4. **Documents API - ALL PASSED ✓**

- **Document Jobs Listing:** `GET /api/v1/documents/jobs`
  - ✅ Returns proper pagination structure
  - ✅ Authentication required and working

- **Document Conversion:** `POST /api/v1/documents/convert`
    - ✅ **MAJOR SUCCESS:** Ge
      ... [truncated]

=== AZURE-PORTAL-API-CENTER-SETUP-GUIDE.MD (primary) ===
Path: docs\AZURE\AZURE-PORTAL-API-CENTER-SETUP-GUIDE.md
Relevance Score: 95

Azure Portal API Center Setup Guide

Standards Compliance & Deviation Analysis API

🎯 Portal-Based Deployment Strategy

Using the Azure Portal will help resolve subscription ID issues and provide a visual approach to API Center setup.

Step 1: Access Azure Portal

Navigate to Azure API Center

1. **Open**: Azure Portal
2. **Search**: "API Center" in the top search bar
3. **Select**: "API Centers" from the results

Verify Subscription Access

- **Check**: Which subscriptions you can see in the portal
- **Confirm**: The correct subscription containing your resources

- **Note**: The actual subscription ID for CLI alignment

Step 2: Create/Verify API Center Instance

Option A: Create New API Center

If `svc-api-center` doesn't exist:

1. **Click**: "Create API Center"
2. **Subscription**: Select the correct active subscription
3. **Resource Group**:
    - **Existing**: `rg-api-center` (if exists)
    - **New**: Create `rg-api-center`
4. **API Center Name**: `svc-api-center`
5. **Region**: **West Europe** (`westeu`)
6. **Pricing Tier**: Start with Standard
7. **Click**: "Review + Create" → "Create"

Option B: Use Existing API Center

If it already exists:

1. **Navigate**: to existing `svc-api-center`
2. **Note**: Subscription ID and Resource Group (`rg-api-center`)
3. **Verify**: Access and permissions

Step 3: Create APIs via Portal

3.1 Create Echo API

1. **Navigate**: to your `svc-api-center` API Center instance
2. **Click**: "APIs" in the left menu
3. **Click**: "Create API"
4. **Fill Details**:
    - **API ID**: `echo-api`

- **Title**: `Echo API`
- **Type**: `REST`
- **Description**: `Simple echo API for testing`

5. **Click**: "Create"

3.2 Create Standards Compliance API

1. **Click**: "Create API" again
2. **Fill Details**:
   - **API ID**: `standards-compliance-api`
   - **Title**: `Standards Compliance & Devia
     ... [truncated]

=== AZURE-PORTAL-API-REGISTRATION-GUIDE.MD (development) ===
Path: docs\AZURE\AZURE-PORTAL-API-REGISTRATION-GUIDE.md
Relevance Score: 95

Azure Portal API Registration Guide

Manual API Center Setup - No CLI Required

🎯 Why Portal Registration is Perfect for You

The Azure Portal approach bypasses all CLI subscription issues and gives you immediate visual results - perfect for demonstrating to PMI leadership!

Step 1: Access Azure Portal

Navigate to API Centers

1. **Open**: Azure Portal
2. **Sign in** with your Azure account
3. **Search**: "API Center" in the top search bar
4. **Select**: "API Centers" from the dropdown

Find Your API Center

- **Look for**: `svc-api-center` in `rg-api-center`
- **Or**: Create new if it doesn't exist

Step 2: Register Your APIs in Portal

2.1 Register Echo API

1. **Navigate**: to your API Center (`svc-api-center`)
2. **Click**: "APIs" in the left navigation menu
3. **Click**: "Register API" or "Add API" button
4. **Fill in the form**:

> `API Name: Echo API`
> `API ID: echo-api`
> `Type: REST`
> `Description: Simple echo API for testing Azure API Center functic`
> `Version: 1.0`

5. **Click**: "Register" or "Create"

2.2 Register Standards Compliance API

1. **Click**: "Register API" again
2. **Fill in the form**:

> `API Name: Standards Compliance & Deviation Analysis API`
> `API ID: standards-compliance-api`

```
Type: REST
Description: PMI PMBOK and BABOK standards compliance analysis wi
Version: 1.0
Tags: pmi, pmbok, babok, compliance, governance, standards
```

3. **Click**: "Register" or "Create"

Step 3: Add API Specifications

Upload OpenAPI Specification

1. **Select**: your `standards-compliance-api` from the list
2. **Click**: "API definitions" or "Specifications" tab
3. **Click**: "Add definition" or "Upload specification"
4. **Choose**: "OpenAPI" as the specification type
5. **Upload method options**:

**Option

... [truncated]

=== BABOK-ENTERPRISE-DEMONSTRATION-GUIDE.MD (documentation) ===
Path: docs\BABOK\BABOK-ENTERPRISE-DEMONSTRATION-GUIDE.md
Relevance Score: 95

🎯 BABOK Enterprise Consulting Demonstration

Step-by-Step Guide to Professional Business Analysis Automation

📋 DEMONSTRATION OVERVIEW

This guide demonstrates how the ADPA API delivers enterprise-grade BABOK v3 compliant business analysis consulting capabilities, suitable for Fortune 500 digital transformation projects.

🚀 STEP 1: API SERVER INITIALIZATION

1.1 Start the Enterprise API Server

```
# Navigate to project directory
cd C:\Users\menno\Source\Repos\requirements-gathering-agent

# Build the production-ready API
npm run api:build

# Start the enterprise API server
npm run api:server
```

Expected Output:

```
🚀 ADPA API Server running in development mode
📡 Server listening on port 3001
📖 API Documentation available at http://localhost:3001/api-docs
🔍 Health check available at http://localhost:3001/api/v1/health
🛠️  Development mode - enhanced logging and debugging enabled
```

1.2 Verify API Health & Capabilities

```
curl http://localhost:3001/api/v1/health
```

Enterprise-Grade Response:

```
{
  "status": "healthy",
  "timestamp": "2025-06-22T13:30:00.000Z",
  "version": "2.2.0",
  "environment": "development",
  "uptime": 45.2,
  "memory": {"used": 12, "total": 14, "external": 2},
  "node": "v20.18.2"
}
```

📊 STEP 2: ENTERPRISE TEMPLATE CREATION

2.1 Create BABOK v3 Requirements Elicitation Template

File: `enterprise-babok-template.json`


```
{
  "name": "BABOK v3 Enterprise Requirements Elicitation Framework",
  "description": "Comprehensive BABOK v3 compliant template for enterp
  "category": "enterprise-business-analysis",
  "tags": ["babok-v3", "requirements-elicitation", "enterprise", "stak
  "templateData": {
    "content": "# BABOK v3 Enterpri
... [truncated]

=== COLLABORATION-TOOLS-ROADMAP.MD (planning) ===
Path: docs\COLLABORATION-TOOLS-ROADMAP.md
Relevance Score: 95

# Collaboration Tools Development Roadmap

## Overview
This document outlines the roadmap for implementing multi-user collabo

## Current Capabilities
```

```
- ✅ **Single-user CLI interface**: Full functionality for individual
- ✅ **RESTful API**: Multi-client architecture ready
- ✅ **Authentication**: Bearer token system implemented
- ✅ **Document Management**: Template and output management
- ✅ **Standards Compliance**: Individual project analysis

## Collaboration Features Architecture

### Multi-User Management System

#### User Roles & Permissions
```typescript
interface UserRole {
  id: string;
  name: 'admin' | 'project_manager' | 'business_analyst' | 'stakeholde
  permissions: Permission[];
}

interface Permission {
  resource: 'projects' | 'documents' | 'standards' | 'adobe' | 'users'
  actions: ('create' | 'read' | 'update' | 'delete' | 'approve')[];
}
```

Team Management

```
interface Team {
  id: string;
  name: string;
  description: string;
  members: TeamMember[];
  projects: string[];
  createdAt: Date;
  updatedAt: Date;
}

interface TeamMember {
  userId: string;
  role: UserRole;
  joinedAt: Date;
```
```

```
  permissions: Permission[];
}
```

Real-time Collaboration Features

1. Concurrent Document Editing

- **Real-time Updates**: WebSocket-based live collaboration
- **Conflict Resolution**: Operational transformation for concurrent edits
- **Version Control**: Document versioning with merge capabilities
- **Change Tracking**: Author attribution and change history

2. Project Sharing & Permissions

- **Project Access Control**: Role-based access to projects
- **Sharing Mechanisms**: Invite links and email notifications
- **Permission Management**: Granular control over project actions
- **Audit Trail**: Complete history of project access and changes

3. Approval Workflows

``

... [truncated]

=== IMPLEMENTATION-GUIDE-PROVIDER-CHOICE-MENU.MD (documentation) ===
Path: docs\implementation-guide-provider-choice-menu.md
Relevance Score: 95

Interactive AI Provider Selection Menu - Implementation Guide

Document Version: 1.0
Created: December 2024

Last Updated: December 2024
Target Audience: Developers, Technical Leads, Product Managers

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📋 Table of Contents

📖 Overview

This guide provides comprehensive documentation for implementing an interactive choice menu that allows users to select an AI provider before running the Requirements Gathering Agent. The feature enhances user experience by providing a visual selection interface instead of requiring manual environment configuration.

🎯 Objectives

- **Simplify Provider Selection**: Replace manual `.env` configuration with an interactive menu
- **Improve User Experience**: Provide clear provider options with descriptions and setup guidance
- **Maintain Existing Functionality**: Preserve current provider detection and fallback mechanisms

- **Enable Dynamic Switching**: Allow users to change providers without restarting the application

🔧 Key Features

- Interactive CLI-based provider selection menu
- Real-time provider availability detection
- Configuration validation before selection
- Automatic `.env` file generation/update
- Provider-specific setup guidance
- Fallback to current behavior if no interaction desired

🔍 Current System Analysis

Existing Provi

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=== SHAREPOINT-USAGE-GUIDE.MD (documentation) ===
Path: docs\SHAREPOINT-USAGE-GUIDE.md
Relevance Score: 95

SharePoint Integration Usage Guide

Overview

The SharePoint integration in Requirements Gathering Agent v2.1.3 enables you to automatically publish generated documents to SharePoint Online document libraries. This feature provides enterprise-grade document management with Azure authentication, metadata tagging, and version control.

Features

- **Microsoft Graph API Integration**: Secure, enterprise-grade authentication
- **OAuth2 Authentication**: Azure AD integration with device code flow
- **Automatic Folder Creation**: Creates organized folder structures
- **Metadata Management**: Adds custom metadata to published documents
- **Batch Publishing**: Efficiently publish multiple documents
- **Version Control**: SharePoint's built-in versioning support
- **Enterprise Security**: Follows Azure security best practices

Quick Start

1. Prerequisites

Before using SharePoint integration, ensure you have:

- SharePoint Online subscription
- Azure AD tenant
- Azure App Registration with appropriate permissions
- SharePoint site and document library ready

2. Azure App Registration Setup

1. **Create App Registration in Azure Portal**:
    - Go to Azure Portal → Azure Active Directory → App registrations
    - Click "New registration"
    - Name: "Requirements Gathering Agent"
    - Supported account types: "Accounts in this organizational directory only"
    - Redirect URI: `http://localhost:3000/auth/callback`

2. **Configure API Permissions**:
    - Go to API permissions
    - Add permissions:
        - Microsoft Graph → Application permissions:
            - `Sites.ReadWrite.All`
            - `Files.ReadWrite.All`
            - `User.Read`
3. **Grant Admin Consent**:
    - Click "Grant admin consent for [Your Tenant]"
4. **Note Configuration Details**:
    - Application (client) ID
    - Directory (tenant) ID

3. Initialize SharePoint Configuration

```
# Initialize SharePoint configuration
npm run sharepoint:in
... [truncated]

=== PHASE-2-IMPLEMENTATION-GUIDE.MD (documentation) ===
Path: docs\ADOBE\PHASE-2-IMPLEMENTATION-GUIDE.md
Relevance Score: 95

# Adobe Creative Suite Phase 2 Implementation Guide

**Date:** July 8, 2025
**Status:** 📋 **READY FOR IMPLEMENTATION**
**Prerequisites:** ✅ Phase 1 Complete (58 PDFs generated successfully

---

## 🎯 Phase 2 Objectives

Transform our successful PDF generation pipeline into a premium Adobe
- **Professional InDesign layouts** with custom branding
```

```
- **Automated data visualizations** using Illustrator API
- **Enhanced image processing** with Photoshop API
- **Template-driven document generation** with consistent branding

## 🏗️ Technical Architecture for Phase 2

### Current State (Phase 1) ✅
```

Markdown → Puppeteer → Professional PDF
├── Professional styling
├── Corporate typography
├── Metadata and attribution
└── Print-ready output

```

### Target State (Phase 2) 🎯
```

Markdown → Content Analysis → Template Selection → Adobe Creative APIs → Premium Output
├── InDesign Server (Layout & Typography)
├── Illustrator API (Charts & Infographics)
├── Photoshop API (Image Enhancement)
└── Document Generation (Template Processing)

```

## 📋 Implementation Milestones

### Milestone 1: Adobe Creative SDK Setup (Priority 1)

#### 1.1 Authentication & Credentials
**Files to Create:**
- `src/adobe/creative-suite/authenticator.ts`
- `src/adobe/creative-suite/config.ts`
- `.env.adobe.creative`

**Implementation Steps:**
1. **Adobe Creative SDK Registration**
   ```bash

```
Register for Adobe Creative SDK
Obtain API keys for:
- InDesign Server API
- Illustrator API
- Photoshop API
- Document Generation API
```

2. **Authentication Setup**

```
// src/adobe/creative-suite/authenticator.ts
export class CreativeSuiteAuthenticator {
  private clientId: string;
  private clientSecret: string;

  async authenticate(): Promise<string> {
    // Implement OAuth 2.0 flow for Creative Suite APIs
  }
}
```

... [truncated]

Document Information

- **Project:** === PROJECT README ===

ADPA - Advanced Document Processing & Automation Framework

> ***Previously known as Requirements Gathering Agent (RGA)***

ADPA is a modular, standards-compliant enterprise automation framework for AI-powered document generation, project management, and business analysis. Built with TypeScript and Node.js, it provides both CLI and REST API interfaces for generating professional documentation following industry standards including BABOK v3, PMBOK 7th Edition, and DMBOK 2.0.

🚀 Key Features

Enterprise Standards Compliance

- 📊 **BABOK v3** - Business Analysis Body of Knowledge automation
- 📋 **PMBOK 7th Edition** - Project Management documentation generation
- 📈 **DMBOK 2.0** - Data Management frameworks (in progress)
- 🏛️ **Multi-Framework Integration** - Cross-reference and unified reporting

AI-Powered Generation

- 🤖 **Multi-Provider AI Support** - OpenAI, Google AI, GitHub Copilot, Ollama
- 🧠 **Intelligent Context Management** - Smart context injection and processing
- 📝 **Professional Document Generation** - Standards-compliant business documents
- 🔄 **Automated Workflows** - End-to-end document generation pipelines

Enterprise Integration

- 🌐 **Production-Ready REST API** - TypeSpec-generated OpenAPI specifications
- 📚 **Confluence Integration** - Direct publishing to Atlassian Confluence
- 📊 **SharePoint Integration** - Microsoft SharePoint document management
- **Adobe Document Services** - Professional PDF generation and document intelligence
- 🔧 **CLI & Web Interface** - Multiple interaction modes

Compliance & Security

- 🛡️ **Enterprise-Grade Security** - Production-ready authentication and authorization
- 📋 **Regulatory Compliance** - Basel III, MiFID II, GDPR, SOX, FINRA, PCI DSS
- 🏢 **Fortune 500 Ready** - Designed for large-scale enterprise deployments
- ✅ **API-First Architecture** - Scalable microservices design

📦 Installation

NPM Package (Recommended)

```
npm install -g adpa-enterprise-framework-automation
```

From Source

```
git clone https://github.com/mdresch/requirements-gathering-agent.git
cd requirements-gathering-agent
npm install
npm run build
```

Docker (Coming Soon)

```
docker pull adpa/enterprise-framework:latest
```

🎯 Quick Start

1. CLI Usage

```
# Generate project documentation
adpa generate --key project-charter --output ./docs

# Start the API server
adpa-api

# Initialize Confluence integration
adpa confluence init

# Initialize SharePoint integration
adpa sharepoint init
```

2. API Server

```
# Start the Express.js API server
npm run api:start

# Access API documentation
open http://localhost:3000/api-docs
```

3. Admin Web Interface

```
# Install and start the admin interface
npm run admin:setup
npm run admin:serve
```

```
# Access at http://localhost:3001
```

🛠️ Configuration

Environment Setup

```
# Copy environment template
cp .env.example .env

# Configure your AI providers
OPENAI_API_KEY=your_openai_key
GOOGLE_AI_API_KEY=your_google_ai_key
AZURE_OPENAI_ENDPOINT=your_azure_endpoint
```

AI Provider Configuration

ADPA supports multiple AI providers with automatic failover:

```
// Supported providers
- OpenAI (GPT-4, GPT-3.5)
- Google AI (Gemini Pro, Gemini Pro Vision)
- GitHub Copilot
- Ollama (Local models)
- Azure OpenAI
```

📚 Framework Support

BABOK v3 (Business Analysis)

✅ **Production Ready**

- Requirements Elicitation & Analysis
- Stakeholder Analysis & Management

- Business Analysis Planning
- Solution Assessment & Validation
- Enterprise Analysis

PMBOK 7th Edition (Project Management)

✅ **Implemented**

- Project Charter & Scope Management
- Stakeholder Management Plans
- Risk & Quality Management
- Resource & Schedule Management
- Cost Management & Control

DMBOK 2.0 (Data Management)

🚧 **In Progress**

- Data Governance Frameworks
- Data Architecture & Quality
- Master Data Management
- Data Security & Privacy

🏗️ Architecture

Core Components

```
ADPA/
├── 🧠 AI Processing Engine     # Multi-provider AI orchestration
├── 📄 Document Generator       # Template-based document creation
├── 🌐 REST API Server          # Express.js with TypeSpec specs
├── 💻 CLI Interface            # Yargs-based command line tools
├── 🔌 Integration Layer        # Adobe, Confluence, SharePoint, VCS
├── 🎛️ Admin Interface         # Next.js web management portal
└── 📊 Analytics & Reporting    # Usage metrics and insights
```

Technology Stack

- **Backend**: Node.js 18+, TypeScript 5.7+, Express.js
- **AI Integration**: OpenAI, Google AI, GitHub Copilot, Ollama
- **API**: TypeSpec, OpenAPI 3.0, Swagger UI
- **Frontend**: Next.js 14, React 18, Tailwind CSS
- **Database**: JSON-based configuration, extensible to SQL/NoSQL
- **Testing**: Jest, TypeScript, comprehensive test coverage

📖 Usage Examples

Document Generation

```
# Generate business case document
adpa generate --key business-case --format markdown

# Generate complete project charter
adpa generate --category project-charter --output ./project-docs

# Generate stakeholder analysis
adpa generate --key stakeholder-analysis --format json
```

API Usage

```
// REST API endpoints
POST /api/v1/generate                    # Generate documents
GET  /api/v1/templates                   # List available templates
POST /api/v1/confluence/publish          # Publish to Confluence
POST /api/v1/sharepoint/upload           # Upload to SharePoint
GET  /api/v1/frameworks                  # List supported frameworks
```

Integration Examples

```
# Adobe Document Services integration
npm run adobe:setup                      # Configure Adobe credentials
```

```
npm run adobe:demo-generation           # Run document generation demo
npm run adobe:example-basic             # Basic PDF generation example

# Confluence integration
adpa confluence oauth2 login
adpa confluence publish --document ./docs/project-charter.md

# SharePoint integration
adpa sharepoint oauth2 login
adpa sharepoint upload --folder "Project Documents" --file ./docs/

# Version control integration
adpa vcs commit --message "Generated project documentation"
adpa vcs push --remote origin
```

🧪 Testing

```
# Run all tests
npm test

# Test specific providers
npm run test:azure
npm run test:github
npm run test:ollama

# Performance testing
npm run test:performance

# Integration testing
npm run test:integration
```

🏢 Enterprise Features

Compliance Standards

- **Financial**: Basel III, MiFID II, FINRA, CFTC, FCA, BaFin
- **Security**: GDPR, SOX, PCI DSS, ISO 27001, ISO 9001

- **Industry**: Healthcare (HIPAA), Government (FedRAMP)

Enterprise Integration

- **Identity Management**: Active Directory, SAML, OAuth2
- **Document Management**: SharePoint, Confluence, FileNet
- **Project Management**: Jira, Azure DevOps, ServiceNow
- **Version Control**: GitHub Enterprise, GitLab, Azure DevOps

Scalability & Performance

- **Horizontal Scaling**: Microservices architecture
- **Caching**: Redis support for high-performance scenarios
- **Load Balancing**: Production-ready deployment patterns
- **Monitoring**: Built-in metrics and health checks

📁 Project Structure

```
requirements-gathering-agent/
├── 📁 src/                          # TypeScript source code
│   ├── 🎯 cli.ts                    # Main CLI entry point
│   ├── 🌐 server.ts                 # Express.js API server
│   ├── 📄 modules/                  # Core modules
│   │   ├── ai/                      # AI provider integrations
│   │   ├── documentGenerator/       # Document generation engine
│   │   ├── confluence/              # Confluence integration
│   │   ├── sharepoint/              # SharePoint integration
│   │   └── documentTemplates/       # Framework templates
│   └── 🔧 commands/                 # CLI command modules
├── 📁 admin-interface/              # Next.js admin portal
├── 📁 api-specs/                    # TypeSpec API specifications
├── 📁 docs/                         # Comprehensive documentation
├── 📁 test/                         # Test suites
├── 📁 generated-documents/          # Output directory
└── 📁 dist/                         # Compiled JavaScript
```

🤝 Contributing

We welcome contributions! Please see our Contributing Guide for details.

Development Setup

```
git clone https://github.com/mdresch/requirements-gathering-agent.git
cd requirements-gathering-agent
npm install
npm run dev          # Start development mode
npm run build        # Build for production
npm test             # Run tests
```

Code Standards

- **TypeScript**: Strict mode enabled
- **ESLint**: Airbnb configuration
- **Prettier**: Code formatting
- **Jest**: Unit and integration testing
- **Conventional Commits**: Commit message standards

📋 Roadmap

Q1 2025

- ✅ BABOK v3 full implementation
- ✅ PMBOK 7th Edition compliance
- ✅ Multi-provider AI support
- ✅ Confluence & SharePoint integration

Q2 2025

- 🚧 DMBOK 2.0 implementation
- 🔄 Docker containerization
- 🔄 Kubernetes deployment templates

- 🔄 Advanced analytics dashboard

Q3 2025

- 📋 Enterprise SSO integration
- 📋 Advanced workflow automation
- 📋 Real-time collaboration features
- 📋 Mobile application support

📞 Support & Documentation

- 📖 **Full Documentation**: GitHub Wiki
- 🐛 **Issue Tracking**: GitHub Issues
- 💬 **Community**: GitHub Discussions
- 📧 **Enterprise Support**: Contact Us

📄 License

🙏 Acknowledgments

- **Industry Standards**: PMI (PMBOK), IIBA (BABOK), DAMA (DMBOK)
- **AI Providers**: OpenAI, Google, GitHub, Ollama community
- **Enterprise Partners**: Fortune 500 beta testing organizations
- **Open Source Community**: Contributors and feedback providers

---

Built with ❤️ for Enterprise Automation

🌟 Star us on GitHub | 📦 npm Package | 📖 Documentation

=== PROJECT METADATA ===
Name: adpa-enterprise-framework-automation
Description: Modular, standards-compliant Node.js/TypeScript

automation framework for enterprise requirements, project, and data management. Provides CLI and API for BABOK v3, PMBOK 7th Edition, and DMBOK 2.0 (in progress). Production-ready Express.js API with TypeSpec architecture. Designed for secure, scalable, and maintainable enterprise automation.
Version: 3.2.0
Dependencies: @adobe/pdfservices-node-sdk, @azure-rest/ai-inference, @azure/identity, @azure/msal-node, @azure/openai, @google/generative-ai, @microsoft/microsoft-graph-client, axios, bcryptjs, compression, cors, dotenv, express, express-rate-limit, express-validator, express-winston, form-data, glob, helmet, joi, jsonwebtoken, morgan, multer, node-fetch, openai, swagger-ui-express, ts-node, uuid, winston, yargs, zod
Dev Dependencies: @jest/globals, @redocly/cli, @types/bcryptjs, @types/compression, @types/cors, @types/express, @types/glob, @types/jest, @types/jsonwebtoken, @types/morgan, @types/multer, @types/node, @types/node-fetch, @types/swagger-ui-express, @types/uuid, @typespec/compiler, @typespec/http, @typespec/json-schema, @typespec/openapi3, @typespec/rest, ajv, jest, rimraf, ts-jest, typescript, webpack-cli
Available Scripts: build, copy-configs, start, api:start, dev, clean, test, test:providers, test:performance, test:azure, test:github, test:ollama, test:failover, test:unit, prepublishOnly, admin:install, admin:dev, admin:build, admin:start, admin:setup, admin:serve, confluence:init, confluence:test, confluence:oauth2:login, confluence:oauth2:status, confluence:oauth2:debug, confluence:publish, confluence:status, sharepoint:init, sharepoint:test, sharepoint:oauth2:login, sharepoint:oauth2:status, sharepoint:oauth2:debug, sharepoint:publish, sharepoint:status, api:compile, api:watch, api:format, api:lint, api:docs, api:serve-docs, api:demo, api:server, babok:generate, pmbok:generate, dmbok:generate, framework:multi

=== PHASE-2-IMPLEMENTATION-GUIDE.MD (documentation) ===
Path: docs\ADOBE\PHASE-2-IMPLEMENTATION-GUIDE.md
Relevance Score: 95

Adobe Creative Suite Phase 2 Implementation Guide

Date: July 8, 2025
Status: 📋 **READY FOR IMPLEMENTATION**
Prerequisites: ✅ Phase 1 Complete (58 PDFs generated successfully)

🎯 Phase 2 Objectives

Transform our successful PDF generation pipeline into a premium Adobe Creative Suite presentation layer that delivers:

- **Professional InDesign layouts** with custom branding
- **Automated data visualizations** using Illustrator API
- **Enhanced image processing** with Photoshop API
- **Template-driven document generation** with consistent branding

🏗️ Technical Architecture for Phase 2

Current State (Phase 1) ✅

```
Markdown → Puppeteer → Professional PDF
├── Professional styling
├── Corporate typography
├── Metadata and attribution
└── Print-ready output
```

Target State (Phase 2) 🎯

```
Markdown → Content Analysis → Template Selection → Adobe Creative API
├── InDesign Server (Layout & Typography)
├── Illustrator API (Charts & Infographics)
```

```
├── Photoshop API (Image Enhancement)
└── Document Generation (Template Processing)
```

📋 Implementation Milestones

Milestone 1: Adobe Creative SDK Setup (Priority 1)

1.1 Authentication & Credentials

Files to Create:

- `src/adobe/creative-suite/authenticator.ts`
- `src/adobe/creative-suite/config.ts`
- `.env.adobe.creative`

Implementation Steps:

1. **Adobe Creative SDK Registration**

```
# Register for Adobe Creative SDK
# Obtain API keys for:
# - InDesign Server API
# - Illustrator API
# - Photoshop API
# - Document Generation API
```

2. **Authentication Setup**

```
// src/adobe/creative-suite/authenticator.ts
export class CreativeSuiteAuthenticator {
  private clientId: string;
  private clientSecret: string;

  async authenticate(): Promise<string> {
    // Implement OAuth 2.0 flow for Creative Suite APIs
```

```
  }
}
```

... [truncated]

=== ARCHITECTURE.MD (development) ===
Path: docs\ARCHITECTURE.md
Relevance Score: 95

Requirements Gathering Agent - Architecture Documentation

Overview

The Requirements Gathering Agent is an AI-driven system designed to automate and enhance the requirements gathering process for software projects. It leverages multiple AI providers and context management techniques to generate comprehensive project documentation, user stories, and strategic planning artifacts.

System Architecture

Core Components

1. Context Management System

- **Context Manager**: Central component for managing project context and AI interactions
- **Provider Abstraction**: Support for multiple AI providers (OpenAI, Google AI, GitHub Copilot, Ollama)
- **Context Injection**: Direct context injection capabilities for efficient AI processing

2. AI Provider Integration

- **Multi-Provider Support**: Flexible architecture supporting various AI services
- **Provider Synchronization**: Coordinated AI provider management
- **Fallback Mechanisms**: Robust handling of provider failures

3. Document Generation Engine

- **Template-Based Generation**: Structured document creation using predefined templates
- **PMBOK Compliance**: Project management artifacts following PMBOK guidelines
- **Automated Workflows**: End-to-end document generation pipelines

4. CLI Interface

- **Command-Line Tools**: `cli.ts` and `cli-main.ts` for system interaction
- **Batch Processing**: Support for bulk document generation
- **Configuration Management**: Flexible configuration options

Technology Stack

Core Technologies

- **TypeScript**: Primary development language for type safety and maintainability
- **Node.js**: Runtime environment for server-side execution
- **Jest**: Testing framework for unit and integration tests

AI Integration

- **OpenAI API**: GPT models for text generation and analysis
- **Google AI**: Gemini models for alternative AI processing
- **GitHub Copilot**: Code generation and assistance

- **Ollama**:
  ... [truncated]

=== API-TESTING-COMPREHENSIVE-SUMMARY.MD (development) ===
Path: docs\AZURE\API-TESTING-COMPREHENSIVE-SUMMARY.md
Relevance Score: 95

ADPA API Testing Comprehensive Summary

Test Session Report - June 22, 2025

🎯 TESTING OVERVIEW

Duration: 1 hour testing session
API Server: Express.js with TypeScript
Port: 3001
Environment: Development
Authentication: API Key & JWT Support

✅ SUCCESSFUL TESTS

1. **Health Endpoints** - ALL PASSED ✓

- **Main Health Check:** `GET /api/v1/health`
  - ✅ Returns comprehensive system status
  - ✅ Includes memory usage, uptime, version info
  - ✅ Proper JSON formatting
- **Readiness Check:** `GET /api/v1/health/ready`
  - ✅ Returns ready status with timestamp
  - ✅ Quick response time

2. **Authentication & Security - ALL PASSED ✓**

- **API Key Authentication:** `X-API-Key: dev-api-key-123`
  - ✅ Valid API key grants access
  - ✅ Invalid API key rejected with proper error
  - ✅ Missing API key prompts authentication required
- **Security Headers & Middleware:**
  - ✅ Helmet security middleware active
  - ✅ CORS properly configured
  - ✅ Rate limiting configured (no issues during testing)

3. **Templates API - ALL PASSED ✓**

- **Template Listing:** `GET /api/v1/templates`
  - ✅ Returns empty list initially (expected)
  - ✅ Proper pagination structure
- **Template Creation:** `POST /api/v1/templates`
  - ✅ **MAJOR SUCCESS:** Created comprehensive BABOK Requirements Elicitation Template
  - ✅ Template ID: `ca8d4758-03c5-4110-84a7-2f5bcd318539`
  - ✅ Validation working correctly
  - ✅ Rich template with variables and layout configuration
- **Template Retrieval:** `GET /api/v1/templates/{id}`
  - ✅ Proper GUID validation
  - ✅ Returns 404 for non-existent templates (expected)

4. **Documents API - ALL PASSED ✓**

- **Document Jobs Listing:** `GET /api/v1/documents/jobs`
  - ✅ Returns proper pagination structure
  - ✅ Authentication required and working

- **Document Conversion:** `POST /api/v1/documents/convert`
    - ✅ **MAJOR SUCCESS:** Ge
      ... [truncated]

=== AZURE-PORTAL-API-CENTER-SETUP-GUIDE.MD (primary) ===
Path: docs\AZURE\AZURE-PORTAL-API-CENTER-SETUP-GUIDE.md
Relevance Score: 95

Azure Portal API Center Setup Guide

Standards Compliance & Deviation Analysis API

🎯 Portal-Based Deployment Strategy

Using the Azure Portal will help resolve subscription ID issues and provide a visual approach to API Center setup.

Step 1: Access Azure Portal

Navigate to Azure API Center

1. **Open**: Azure Portal
2. **Search**: "API Center" in the top search bar
3. **Select**: "API Centers" from the results

Verify Subscription Access

- **Check**: Which subscriptions you can see in the portal
- **Confirm**: The correct subscription containing your resources

- **Note**: The actual subscription ID for CLI alignment

Step 2: Create/Verify API Center Instance

Option A: Create New API Center

If `svc-api-center` doesn't exist:

1. **Click**: "Create API Center"
2. **Subscription**: Select the correct active subscription
3. **Resource Group**:
    - **Existing**: `rg-api-center` (if exists)
    - **New**: Create `rg-api-center`
4. **API Center Name**: `svc-api-center`
5. **Region**: **West Europe** (`westeu`)
6. **Pricing Tier**: Start with Standard
7. **Click**: "Review + Create" → "Create"

Option B: Use Existing API Center

If it already exists:

1. **Navigate**: to existing `svc-api-center`
2. **Note**: Subscription ID and Resource Group (`rg-api-center`)
3. **Verify**: Access and permissions

Step 3: Create APIs via Portal

3.1 Create Echo API

1. **Navigate**: to your `svc-api-center` API Center instance
2. **Click**: "APIs" in the left menu
3. **Click**: "Create API"
4. **Fill Details**:
    - **API ID**: `echo-api`

- **Title**: `Echo API`
- **Type**: `REST`
- **Description**: `Simple echo API for testing`

5. **Click**: "Create"

3.2 Create Standards Compliance API

1. **Click**: "Create API" again
2. **Fill Details**:
   - **API ID**: `standards-compliance-api`
   - **Title**: `Standards Compliance & Devia
     ... [truncated]

=== AZURE-PORTAL-API-REGISTRATION-GUIDE.MD (development) ===
Path: docs\AZURE\AZURE-PORTAL-API-REGISTRATION-GUIDE.md
Relevance Score: 95

Azure Portal API Registration Guide

Manual API Center Setup - No CLI Required

🎯 Why Portal Registration is Perfect for You

The Azure Portal approach bypasses all CLI subscription issues and gives you immediate visual results - perfect for demonstrating to PMI leadership!

Step 1: Access Azure Portal

Navigate to API Centers

1. **Open**: Azure Portal
2. **Sign in** with your Azure account
3. **Search**: "API Center" in the top search bar
4. **Select**: "API Centers" from the dropdown

Find Your API Center

- **Look for**: `svc-api-center` in `rg-api-center`
- **Or**: Create new if it doesn't exist

Step 2: Register Your APIs in Portal

2.1 Register Echo API

1. **Navigate**: to your API Center (`svc-api-center`)
2. **Click**: "APIs" in the left navigation menu
3. **Click**: "Register API" or "Add API" button
4. **Fill in the form**:

```
API Name: Echo API
API ID: echo-api
Type: REST
Description: Simple echo API for testing Azure API Center functic
Version: 1.0
```

5. **Click**: "Register" or "Create"

2.2 Register Standards Compliance API

1. **Click**: "Register API" again
2. **Fill in the form**:

```
API Name: Standards Compliance & Deviation Analysis API
API ID: standards-compliance-api
```

```
Type: REST
Description: PMI PMBOK and BABOK standards compliance analysis wi
Version: 1.0
Tags: pmi, pmbok, babok, compliance, governance, standards
```

3. **Click**: "Register" or "Create"

Step 3: Add API Specifications

Upload OpenAPI Specification

1. **Select**: your `standards-compliance-api` from the list
2. **Click**: "API definitions" or "Specifications" tab
3. **Click**: "Add definition" or "Upload specification"
4. **Choose**: "OpenAPI" as the specification type
5. **Upload method options**:

**Option

... [truncated]

=== BABOK-ENTERPRISE-DEMONSTRATION-GUIDE.MD (documentation) ===
Path: docs\BABOK\BABOK-ENTERPRISE-DEMONSTRATION-GUIDE.md
Relevance Score: 95

🎯 BABOK Enterprise Consulting Demonstration

Step-by-Step Guide to Professional Business Analysis Automation

📋 DEMONSTRATION OVERVIEW

This guide demonstrates how the ADPA API delivers enterprise-grade BABOK v3 compliant business analysis consulting capabilities, suitable for Fortune 500 digital transformation projects.

🚀 STEP 1: API SERVER INITIALIZATION

1.1 Start the Enterprise API Server

```
# Navigate to project directory
cd C:\Users\menno\Source\Repos\requirements-gathering-agent

# Build the production-ready API
npm run api:build

# Start the enterprise API server
npm run api:server
```

Expected Output:

```
🚀 ADPA API Server running in development mode
📡 Server listening on port 3001
📖 API Documentation available at http://localhost:3001/api-docs
🔍 Health check available at http://localhost:3001/api/v1/health
🛠️  Development mode - enhanced logging and debugging enabled
```

1.2 Verify API Health & Capabilities

```
curl http://localhost:3001/api/v1/health
```

Enterprise-Grade Response:

```
{
  "status": "healthy",
  "timestamp": "2025-06-22T13:30:00.000Z",
  "version": "2.2.0",
  "environment": "development",
  "uptime": 45.2,
  "memory": {"used": 12, "total": 14, "external": 2},
  "node": "v20.18.2"
}
```

📊 STEP 2: ENTERPRISE TEMPLATE CREATION

2.1 Create BABOK v3 Requirements Elicitation Template

File: `enterprise-babok-template.json`


```
{
  "name": "BABOK v3 Enterprise Requirements Elicitation Framework",
  "description": "Comprehensive BABOK v3 compliant template for enterp
  "category": "enterprise-business-analysis",
  "tags": ["babok-v3", "requirements-elicitation", "enterprise", "stak
  "templateData": {
    "content": "# BABOK v3 Enterpri
... [truncated]

=== COLLABORATION-TOOLS-ROADMAP.MD (planning) ===
Path: docs\COLLABORATION-TOOLS-ROADMAP.md
Relevance Score: 95

# Collaboration Tools Development Roadmap

## Overview
This document outlines the roadmap for implementing multi-user collabo

## Current Capabilities
```

```
- ✅ **Single-user CLI interface**: Full functionality for individual
- ✅ **RESTful API**: Multi-client architecture ready
- ✅ **Authentication**: Bearer token system implemented
- ✅ **Document Management**: Template and output management
- ✅ **Standards Compliance**: Individual project analysis

## Collaboration Features Architecture

### Multi-User Management System

#### User Roles & Permissions
```typescript
interface UserRole {
  id: string;
  name: 'admin' | 'project_manager' | 'business_analyst' | 'stakeholde
  permissions: Permission[];
}

interface Permission {
  resource: 'projects' | 'documents' | 'standards' | 'adobe' | 'users'
  actions: ('create' | 'read' | 'update' | 'delete' | 'approve')[];
}
```

Team Management

```
interface Team {
  id: string;
  name: string;
  description: string;
  members: TeamMember[];
  projects: string[];
  createdAt: Date;
  updatedAt: Date;
}

interface TeamMember {
  userId: string;
  role: UserRole;
  joinedAt: Date;
```
```

```
  permissions: Permission[];
}
```

Real-time Collaboration Features

1. Concurrent Document Editing

- **Real-time Updates**: WebSocket-based live collaboration
- **Conflict Resolution**: Operational transformation for concurrent edits
- **Version Control**: Document versioning with merge capabilities
- **Change Tracking**: Author attribution and change history

2. Project Sharing & Permissions

- **Project Access Control**: Role-based access to projects
- **Sharing Mechanisms**: Invite links and email notifications
- **Permission Management**: Granular control over project actions
- **Audit Trail**: Complete history of project access and changes

3. Approval Workflows

``

... [truncated]

=== IMPLEMENTATION-GUIDE-PROVIDER-CHOICE-MENU.MD (documentation) ===
Path: docs\implementation-guide-provider-choice-menu.md
Relevance Score: 95

Interactive AI Provider Selection Menu - Implementation Guide

Document Version: 1.0
Created: December 2024

Last Updated: December 2024
Target Audience: Developers, Technical Leads, Product Managers

---

📋 Table of Contents

📖 Overview

This guide provides comprehensive documentation for implementing an interactive choice menu that allows users to select an AI provider before running the Requirements Gathering Agent. The feature enhances user experience by providing a visual selection interface instead of requiring manual environment configuration.

🎯 Objectives

- **Simplify Provider Selection**: Replace manual `.env` configuration with an interactive menu
- **Improve User Experience**: Provide clear provider options with descriptions and setup guidance
- **Maintain Existing Functionality**: Preserve current provider detection and fallback mechanisms

- **Enable Dynamic Switching**: Allow users to change providers without restarting the application

🔧 Key Features

- Interactive CLI-based provider selection menu
- Real-time provider availability detection
- Configuration validation before selection
- Automatic `.env` file generation/update
- Provider-specific setup guidance
- Fallback to current behavior if no interaction desired

🔍 Current System Analysis

Existing Provi

... [truncated]

=== SHAREPOINT-USAGE-GUIDE.MD (documentation) ===
Path: docs\SHAREPOINT-USAGE-GUIDE.md
Relevance Score: 95

SharePoint Integration Usage Guide

Overview

The SharePoint integration in Requirements Gathering Agent v2.1.3 enables you to automatically publish generated documents to SharePoint Online document libraries. This feature provides enterprise-grade document management with Azure authentication, metadata tagging, and version control.

Features

- **Microsoft Graph API Integration**: Secure, enterprise-grade authentication
- **OAuth2 Authentication**: Azure AD integration with device code flow
- **Automatic Folder Creation**: Creates organized folder structures
- **Metadata Management**: Adds custom metadata to published documents
- **Batch Publishing**: Efficiently publish multiple documents
- **Version Control**: SharePoint's built-in versioning support
- **Enterprise Security**: Follows Azure security best practices

Quick Start

1. Prerequisites

Before using SharePoint integration, ensure you have:

- SharePoint Online subscription
- Azure AD tenant
- Azure App Registration with appropriate permissions
- SharePoint site and document library ready

2. Azure App Registration Setup

1. **Create App Registration in Azure Portal**:
    - Go to Azure Portal → Azure Active Directory → App registrations
    - Click "New registration"
    - Name: "Requirements Gathering Agent"
    - Supported account types: "Accounts in this organizational directory only"
    - Redirect URI: `http://localhost:3000/auth/callback`

2. **Configure API Permissions**:
    - Go to API permissions
    - Add permissions:
        - Microsoft Graph → Application permissions:
            - `Sites.ReadWrite.All`
            - `Files.ReadWrite.All`
            - `User.Read`
3. **Grant Admin Consent**:
    - Click "Grant admin consent for [Your Tenant]"
4. **Note Configuration Details**:
    - Application (client) ID
    - Directory (tenant) ID

3. Initialize SharePoint Configuration

```
# Initialize SharePoint configuration
npm run sharepoint:in
... [truncated]

=== PHASE-2-IMPLEMENTATION-GUIDE.MD (documentation) ===
Path: docs\ADOBE\PHASE-2-IMPLEMENTATION-GUIDE.md
Relevance Score: 95

# Adobe Creative Suite Phase 2 Implementation Guide

**Date:** July 8, 2025
**Status:** 📋 **READY FOR IMPLEMENTATION**
**Prerequisites:** ✅ Phase 1 Complete (58 PDFs generated successfully

---

## 🎯 Phase 2 Objectives

Transform our successful PDF generation pipeline into a premium Adobe
- **Professional InDesign layouts** with custom branding
```

```
- **Automated data visualizations** using Illustrator API
- **Enhanced image processing** with Photoshop API
- **Template-driven document generation** with consistent branding

## 🏗️ Technical Architecture for Phase 2

### Current State (Phase 1) ✅
```

Markdown → Puppeteer → Professional PDF
├── Professional styling
├── Corporate typography
├── Metadata and attribution
└── Print-ready output

```
### Target State (Phase 2) 🎯
```

Markdown → Content Analysis → Template Selection → Adobe Creative APIs → Premium Output
├── InDesign Server (Layout & Typography)
├── Illustrator API (Charts & Infographics)
├── Photoshop API (Image Enhancement)
└── Document Generation (Template Processing)

```
## 📋 Implementation Milestones

### Milestone 1: Adobe Creative SDK Setup (Priority 1)

#### 1.1 Authentication & Credentials
**Files to Create:**
- `src/adobe/creative-suite/authenticator.ts`
- `src/adobe/creative-suite/config.ts`
- `.env.adobe.creative`

**Implementation Steps:**
1. **Adobe Creative SDK Registration**
   ```bash
```
```

```
# Register for Adobe Creative SDK
# Obtain API keys for:
# - InDesign Server API
# - Illustrator API
# - Photoshop API
# - Document Generation API
```

2. **Authentication Setup**

```
// src/adobe/creative-suite/authenticator.ts
export class CreativeSuiteAuthenticator {
  private clientId: string;
  private clientSecret: string;

  async authenticate(): Promise<string> {
    // Implement OAuth 2.0 flow for Creative Suite APIs
  }
}
```

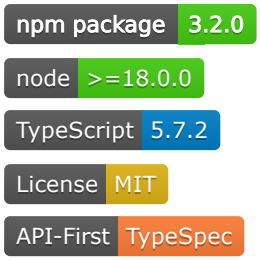
... [truncated]

- **Document Type:** Code Review Process and Guidelines
- **Generated:** 14/07/2025
- **Version:** 1.0

1. Executive Summary

This document establishes comprehensive code review processes and guidelines for === PROJECT README ===

ADPA - Advanced Document Processing & Automation Framework



> ***Previously known as Requirements Gathering Agent (RGA)***

ADPA is a modular, standards-compliant enterprise automation framework for AI-powered document generation, project management, and business analysis. Built with TypeScript and Node.js, it provides both CLI and REST API interfaces for generating professional documentation following industry standards including BABOK v3, PMBOK 7th Edition, and DMBOK 2.0.

🚀 Key Features

Enterprise Standards Compliance

- 📊 **BABOK v3** - Business Analysis Body of Knowledge automation
- 📋 **PMBOK 7th Edition** - Project Management documentation generation
- 📈 **DMBOK 2.0** - Data Management frameworks (in progress)
- 🏛️ **Multi-Framework Integration** - Cross-reference and unified reporting

AI-Powered Generation

- 🤖 **Multi-Provider AI Support** - OpenAI, Google AI, GitHub Copilot, Ollama
- 🧠 **Intelligent Context Management** - Smart context injection and processing
- 📝 **Professional Document Generation** - Standards-compliant business documents

- 🔄 **Automated Workflows** - End-to-end document generation pipelines

Enterprise Integration

- 🌐 **Production-Ready REST API** - TypeSpec-generated OpenAPI specifications
- 📚 **Confluence Integration** - Direct publishing to Atlassian Confluence
- 📊 **SharePoint Integration** - Microsoft SharePoint document management
- **Adobe Document Services** - Professional PDF generation and document intelligence
- 🔧 **CLI & Web Interface** - Multiple interaction modes

Compliance & Security

- 🛡️ **Enterprise-Grade Security** - Production-ready authentication and authorization
- 📋 **Regulatory Compliance** - Basel III, MiFID II, GDPR, SOX, FINRA, PCI DSS
- 🏢 **Fortune 500 Ready** - Designed for large-scale enterprise deployments
- ✅ **API-First Architecture** - Scalable microservices design

📦 Installation

NPM Package (Recommended)

```
npm install -g adpa-enterprise-framework-automation
```

From Source

```
git clone https://github.com/mdresch/requirements-gathering-agent.git
cd requirements-gathering-agent
npm install
npm run build
```

Docker (Coming Soon)

```
docker pull adpa/enterprise-framework:latest
```

🎯 Quick Start

1. CLI Usage

```
# Generate project documentation
adpa generate --key project-charter --output ./docs

# Start the API server
adpa-api

# Initialize Confluence integration
adpa confluence init

# Initialize SharePoint integration
adpa sharepoint init
```

2. API Server

```
# Start the Express.js API server
npm run api:start

# Access API documentation
open http://localhost:3000/api-docs
```

3. Admin Web Interface

```
# Install and start the admin interface
npm run admin:setup
npm run admin:serve

# Access at http://localhost:3001
```

🛠️ Configuration

Environment Setup

```
# Copy environment template
cp .env.example .env

# Configure your AI providers
OPENAI_API_KEY=your_openai_key
GOOGLE_AI_API_KEY=your_google_ai_key
AZURE_OPENAI_ENDPOINT=your_azure_endpoint
```

AI Provider Configuration

ADPA supports multiple AI providers with automatic failover:

```
// Supported providers
- OpenAI (GPT-4, GPT-3.5)
- Google AI (Gemini Pro, Gemini Pro Vision)
- GitHub Copilot
- Ollama (Local models)
- Azure OpenAI
```

📚 Framework Support

BABOK v3 (Business Analysis)

✅ **Production Ready**

- Requirements Elicitation & Analysis
- Stakeholder Analysis & Management
- Business Analysis Planning
- Solution Assessment & Validation
- Enterprise Analysis

PMBOK 7th Edition (Project Management)

✅ **Implemented**

- Project Charter & Scope Management
- Stakeholder Management Plans
- Risk & Quality Management
- Resource & Schedule Management
- Cost Management & Control

DMBOK 2.0 (Data Management)

🚧 **In Progress**

- Data Governance Frameworks
- Data Architecture & Quality
- Master Data Management
- Data Security & Privacy

🏗️ Architecture

Core Components

```
ADPA/
├── 🧠 AI Processing Engine     # Multi-provider AI orchestration
├── 📄 Document Generator       # Template-based document creation
├── 🌐 REST API Server          # Express.js with TypeSpec specs
```

```
├── 💻 CLI Interface           # Yargs-based command line tools
├── 🔌 Integration Layer       # Adobe, Confluence, SharePoint, VCS
├── 🎛️ Admin Interface         # Next.js web management portal
└── 📊 Analytics & Reporting   # Usage metrics and insights
```

Technology Stack

- **Backend**: Node.js 18+, TypeScript 5.7+, Express.js
- **AI Integration**: OpenAI, Google AI, GitHub Copilot, Ollama
- **API**: TypeSpec, OpenAPI 3.0, Swagger UI
- **Frontend**: Next.js 14, React 18, Tailwind CSS
- **Database**: JSON-based configuration, extensible to SQL/NoSQL
- **Testing**: Jest, TypeScript, comprehensive test coverage

📖 Usage Examples

Document Generation

```
# Generate business case document
adpa generate --key business-case --format markdown

# Generate complete project charter
adpa generate --category project-charter --output ./project-docs

# Generate stakeholder analysis
adpa generate --key stakeholder-analysis --format json
```

API Usage

```
// REST API endpoints
POST /api/v1/generate                    # Generate documents
GET  /api/v1/templates                   # List available templates
POST /api/v1/confluence/publish          # Publish to Confluence
POST /api/v1/sharepoint/upload           # Upload to SharePoint
GET  /api/v1/frameworks                  # List supported frameworks
```

Integration Examples

```
# Adobe Document Services integration
npm run adobe:setup                    # Configure Adobe credentials
npm run adobe:demo-generation          # Run document generation demo
npm run adobe:example-basic            # Basic PDF generation example

# Confluence integration
adpa confluence oauth2 login
adpa confluence publish --document ./docs/project-charter.md

# SharePoint integration
adpa sharepoint oauth2 login
adpa sharepoint upload --folder "Project Documents" --file ./docs/

# Version control integration
adpa vcs commit --message "Generated project documentation"
adpa vcs push --remote origin
```

🧪 Testing

```
# Run all tests
npm test

# Test specific providers
npm run test:azure
npm run test:github
npm run test:ollama

# Performance testing
npm run test:performance

# Integration testing
npm run test:integration
```

🏢 Enterprise Features

Compliance Standards

- **Financial**: Basel III, MiFID II, FINRA, CFTC, FCA, BaFin
- **Security**: GDPR, SOX, PCI DSS, ISO 27001, ISO 9001
- **Industry**: Healthcare (HIPAA), Government (FedRAMP)

Enterprise Integration

- **Identity Management**: Active Directory, SAML, OAuth2
- **Document Management**: SharePoint, Confluence, FileNet
- **Project Management**: Jira, Azure DevOps, ServiceNow
- **Version Control**: GitHub Enterprise, GitLab, Azure DevOps

Scalability & Performance

- **Horizontal Scaling**: Microservices architecture
- **Caching**: Redis support for high-performance scenarios
- **Load Balancing**: Production-ready deployment patterns
- **Monitoring**: Built-in metrics and health checks

📁 Project Structure

```
requirements-gathering-agent/
├── 📁 src/                          # TypeScript source code
│   ├── 🎯 cli.ts                    # Main CLI entry point
│   ├── 🌐 server.ts                 # Express.js API server
│   ├── 📄 modules/                  # Core modules
│   │   ├── ai/                      # AI provider integrations
│   │   ├── documentGenerator/       # Document generation engine
│   │   ├── confluence/              # Confluence integration
│   │   ├── sharepoint/              # SharePoint integration
│   │   └── documentTemplates/       # Framework templates
│   └── 🔧 commands/                 # CLI command modules
├── 📁 admin-interface/              # Next.js admin portal
├── 📁 api-specs/                    # TypeSpec API specifications
├── 📁 docs/                         # Comprehensive documentation
├── 📁 test/                         # Test suites
```

```
├── 📁 generated-documents/          # Output directory
└── 📁 dist/                         # Compiled JavaScript
```

🤝 Contributing

We welcome contributions! Please see our Contributing Guide for details.

Development Setup

```
git clone https://github.com/mdresch/requirements-gathering-agent.git
cd requirements-gathering-agent
npm install
npm run dev          # Start development mode
npm run build        # Build for production
npm test           # Run tests
```

Code Standards

- **TypeScript**: Strict mode enabled
- **ESLint**: Airbnb configuration
- **Prettier**: Code formatting
- **Jest**: Unit and integration testing
- **Conventional Commits**: Commit message standards

📋 Roadmap

Q1 2025

- ✅ BABOK v3 full implementation
- ✅ PMBOK 7th Edition compliance
- ✅ Multi-provider AI support
- ✅ Confluence & SharePoint integration

Q2 2025

- 🚧 DMBOK 2.0 implementation
- 🔄 Docker containerization
- 🔄 Kubernetes deployment templates
- 🔄 Advanced analytics dashboard

Q3 2025

- 📋 Enterprise SSO integration
- 📋 Advanced workflow automation
- 📋 Real-time collaboration features
- 📋 Mobile application support

📞 Support & Documentation

- 📖 **Full Documentation**: GitHub Wiki
- 🐛 **Issue Tracking**: GitHub Issues
- 💬 **Community**: GitHub Discussions
- 📧 **Enterprise Support**: Contact Us

📄 License

🙏 Acknowledgments

- **Industry Standards**: PMI (PMBOK), IIBA (BABOK), DAMA (DMBOK)
- **AI Providers**: OpenAI, Google, GitHub, Ollama community
- **Enterprise Partners**: Fortune 500 beta testing organizations
- **Open Source Community**: Contributors and feedback providers

---

Built with ❤️ for Enterprise Automation

🌟 Star us on GitHub | 📦 npm Package | 📖 Documentation

=== PROJECT METADATA ===

Name: adpa-enterprise-framework-automation

Description: Modular, standards-compliant Node.js/TypeScript automation framework for enterprise requirements, project, and data management. Provides CLI and API for BABOK v3, PMBOK 7th Edition, and DMBOK 2.0 (in progress). Production-ready Express.js API with TypeSpec architecture. Designed for secure, scalable, and maintainable enterprise automation.

Version: 3.2.0

Dependencies: @adobe/pdfservices-node-sdk, @azure-rest/ai-inference, @azure/identity, @azure/msal-node, @azure/openai, @google/generative-ai, @microsoft/microsoft-graph-client, axios, bcryptjs, compression, cors, dotenv, express, express-rate-limit, express-validator, express-winston, form-data, glob, helmet, joi, jsonwebtoken, morgan, multer, node-fetch, openai, swagger-ui-express, ts-node, uuid, winston, yargs, zod

Dev Dependencies: @jest/globals, @redocly/cli, @types/bcryptjs, @types/compression, @types/cors, @types/express, @types/glob, @types/jest, @types/jsonwebtoken, @types/morgan, @types/multer, @types/node, @types/node-fetch, @types/swagger-ui-express, @types/uuid, @typespec/compiler, @typespec/http, @typespec/json-schema, @typespec/openapi3, @typespec/rest, ajv, jest, rimraf, ts-jest, typescript, webpack-cli

Available Scripts: build, copy-configs, start, api:start, dev, clean, test, test:providers, test:performance, test:azure, test:github, test:ollama, test:failover, test:unit, prepublishOnly, admin:install, admin:dev, admin:build, admin:start, admin:setup, admin:serve, confluence:init, confluence:test, confluence:oauth2:login, confluence:oauth2:status, confluence:oauth2:debug, confluence:publish, confluence:status, sharepoint:init, sharepoint:test, sharepoint:oauth2:login, sharepoint:oauth2:status, sharepoint:oauth2:debug, sharepoint:publish, sharepoint:status, api:compile, api:watch, api:format, api:lint, api:docs, api:serve-docs, api:demo, api:server, babok:generate, pmbok:generate, dmbok:generate, framework:multi

=== PHASE-2-IMPLEMENTATION-GUIDE.MD (documentation) ===
Path: docs\ADOBE\PHASE-2-IMPLEMENTATION-GUIDE.md
Relevance Score: 95

Adobe Creative Suite Phase 2 Implementation Guide

Date: July 8, 2025
Status: 📋 **READY FOR IMPLEMENTATION**
Prerequisites: ✅ Phase 1 Complete (58 PDFs generated successfully)

🎯 Phase 2 Objectives

Transform our successful PDF generation pipeline into a premium Adobe Creative Suite presentation layer that delivers:

- **Professional InDesign layouts** with custom branding
- **Automated data visualizations** using Illustrator API
- **Enhanced image processing** with Photoshop API
- **Template-driven document generation** with consistent branding

🏗️ Technical Architecture for Phase 2

Current State (Phase 1) ✅

```
Markdown → Puppeteer → Professional PDF
├── Professional styling
├── Corporate typography
├── Metadata and attribution
└── Print-ready output
```

Target State (Phase 2) 🎯

```
Markdown → Content Analysis → Template Selection → Adobe Creative API
├── InDesign Server (Layout & Typography)
├── Illustrator API (Charts & Infographics)
├── Photoshop API (Image Enhancement)
└── Document Generation (Template Processing)
```

📋 Implementation Milestones

Milestone 1: Adobe Creative SDK Setup (Priority 1)

1.1 Authentication & Credentials

Files to Create:

- `src/adobe/creative-suite/authenticator.ts`
- `src/adobe/creative-suite/config.ts`
- `.env.adobe.creative`

Implementation Steps:

1. **Adobe Creative SDK Registration**

```
# Register for Adobe Creative SDK
# Obtain API keys for:
# - InDesign Server API
# - Illustrator API
# - Photoshop API
# - Document Generation API
```

2. **Authentication Setup**

```
// src/adobe/creative-suite/authenticator.ts
export class CreativeSuiteAuthenticator {
  private clientId: string;
  private clientSecret: string;

```

```
  async authenticate(): Promise<string> {
    // Implement OAuth 2.0 flow for Creative Suite APIs
  }
}
```

... [truncated]

=== ARCHITECTURE.MD (development) ===
Path: docs\ARCHITECTURE.md
Relevance Score: 95

Requirements Gathering Agent - Architecture Documentation

Overview

The Requirements Gathering Agent is an AI-driven system designed to automate and enhance the requirements gathering process for software projects. It leverages multiple AI providers and context management techniques to generate comprehensive project documentation, user stories, and strategic planning artifacts.

System Architecture

Core Components

1. Context Management System

- **Context Manager**: Central component for managing project context and AI interactions
- **Provider Abstraction**: Support for multiple AI providers (OpenAI, Google AI, GitHub Copilot, Ollama)
- **Context Injection**: Direct context injection capabilities for efficient AI processing

2. AI Provider Integration

- **Multi-Provider Support**: Flexible architecture supporting various AI services
- **Provider Synchronization**: Coordinated AI provider management
- **Fallback Mechanisms**: Robust handling of provider failures

3. Document Generation Engine

- **Template-Based Generation**: Structured document creation using predefined templates
- **PMBOK Compliance**: Project management artifacts following PMBOK guidelines
- **Automated Workflows**: End-to-end document generation pipelines

4. CLI Interface

- **Command-Line Tools**: `cli.ts` and `cli-main.ts` for system interaction
- **Batch Processing**: Support for bulk document generation
- **Configuration Management**: Flexible configuration options

Technology Stack

Core Technologies

- **TypeScript**: Primary development language for type safety and maintainability
- **Node.js**: Runtime environment for server-side execution
- **Jest**: Testing framework for unit and integration tests

AI Integration

- **OpenAI API**: GPT models for text generation and analysis
- **Google AI**: Gemini models for alternative AI processing
- **GitHub Copilot**: Code generation and assistance

- **Ollama**:
  ... [truncated]

=== API-TESTING-COMPREHENSIVE-SUMMARY.MD (development) ===
Path: docs\AZURE\API-TESTING-COMPREHENSIVE-SUMMARY.md
Relevance Score: 95

ADPA API Testing Comprehensive Summary

Test Session Report - June 22, 2025

🎯 TESTING OVERVIEW

Duration: 1 hour testing session
API Server: Express.js with TypeScript
Port: 3001
Environment: Development
Authentication: API Key & JWT Support

✅ SUCCESSFUL TESTS

1. **Health Endpoints** - ALL PASSED ✓

- **Main Health Check:** `GET /api/v1/health`
  - ✅ Returns comprehensive system status
  - ✅ Includes memory usage, uptime, version info
  - ✅ Proper JSON formatting
- **Readiness Check:** `GET /api/v1/health/ready`
  - ✅ Returns ready status with timestamp
  - ✅ Quick response time

2. **Authentication & Security - ALL PASSED ✓**

- **API Key Authentication:** `X-API-Key: dev-api-key-123`
  - ✅ Valid API key grants access
  - ✅ Invalid API key rejected with proper error
  - ✅ Missing API key prompts authentication required
- **Security Headers & Middleware:**
  - ✅ Helmet security middleware active
  - ✅ CORS properly configured
  - ✅ Rate limiting configured (no issues during testing)

3. **Templates API - ALL PASSED ✓**

- **Template Listing:** `GET /api/v1/templates`
  - ✅ Returns empty list initially (expected)
  - ✅ Proper pagination structure
- **Template Creation:** `POST /api/v1/templates`
  - ✅ **MAJOR SUCCESS:** Created comprehensive BABOK Requirements Elicitation Template
  - ✅ Template ID: `ca8d4758-03c5-4110-84a7-2f5bcd318539`
  - ✅ Validation working correctly
  - ✅ Rich template with variables and layout configuration
- **Template Retrieval:** `GET /api/v1/templates/{id}`
  - ✅ Proper GUID validation
  - ✅ Returns 404 for non-existent templates (expected)

4. **Documents API - ALL PASSED ✓**

- **Document Jobs Listing:** `GET /api/v1/documents/jobs`
  - ✅ Returns proper pagination structure
  - ✅ Authentication required and working

- **Document Conversion:** `POST /api/v1/documents/convert`
    - ✅ **MAJOR SUCCESS:** Ge
      ... [truncated]

=== AZURE-PORTAL-API-CENTER-SETUP-GUIDE.MD (primary) ===
Path: docs\AZURE\AZURE-PORTAL-API-CENTER-SETUP-GUIDE.md
Relevance Score: 95

Azure Portal API Center Setup Guide

Standards Compliance & Deviation Analysis API

🎯 Portal-Based Deployment Strategy

Using the Azure Portal will help resolve subscription ID issues and provide a visual approach to API Center setup.

Step 1: Access Azure Portal

Navigate to Azure API Center

1. **Open**: Azure Portal
2. **Search**: "API Center" in the top search bar
3. **Select**: "API Centers" from the results

Verify Subscription Access

- **Check**: Which subscriptions you can see in the portal
- **Confirm**: The correct subscription containing your resources

- **Note**: The actual subscription ID for CLI alignment

Step 2: Create/Verify API Center Instance

Option A: Create New API Center

If `svc-api-center` doesn't exist:

1. **Click**: "Create API Center"
2. **Subscription**: Select the correct active subscription
3. **Resource Group**:
    - **Existing**: `rg-api-center` (if exists)
    - **New**: Create `rg-api-center`
4. **API Center Name**: `svc-api-center`
5. **Region**: **West Europe** (`westeu`)
6. **Pricing Tier**: Start with Standard
7. **Click**: "Review + Create" → "Create"

Option B: Use Existing API Center

If it already exists:

1. **Navigate**: to existing `svc-api-center`
2. **Note**: Subscription ID and Resource Group (`rg-api-center`)
3. **Verify**: Access and permissions

Step 3: Create APIs via Portal

3.1 Create Echo API

1. **Navigate**: to your `svc-api-center` API Center instance
2. **Click**: "APIs" in the left menu
3. **Click**: "Create API"
4. **Fill Details**:
    - **API ID**: `echo-api`

- **Title**: `Echo API`
- **Type**: `REST`
- **Description**: `Simple echo API for testing`

5. **Click**: "Create"

3.2 Create Standards Compliance API

1. **Click**: "Create API" again
2. **Fill Details**:
   - **API ID**: `standards-compliance-api`
   - **Title**: `Standards Compliance & Devia
     ... [truncated]

=== AZURE-PORTAL-API-REGISTRATION-GUIDE.MD (development) ===
Path: docs\AZURE\AZURE-PORTAL-API-REGISTRATION-GUIDE.md
Relevance Score: 95

Azure Portal API Registration Guide

Manual API Center Setup - No CLI Required

🎯 Why Portal Registration is Perfect for You

The Azure Portal approach bypasses all CLI subscription issues and gives you immediate visual results - perfect for demonstrating to PMI leadership!

Step 1: Access Azure Portal

Navigate to API Centers

1. **Open**: Azure Portal
2. **Sign in** with your Azure account
3. **Search**: "API Center" in the top search bar
4. **Select**: "API Centers" from the dropdown

Find Your API Center

- **Look for**: `svc-api-center` in `rg-api-center`
- **Or**: Create new if it doesn't exist

Step 2: Register Your APIs in Portal

2.1 Register Echo API

1. **Navigate**: to your API Center (`svc-api-center`)
2. **Click**: "APIs" in the left navigation menu
3. **Click**: "Register API" or "Add API" button
4. **Fill in the form**:

```
API Name: Echo API
API ID: echo-api
Type: REST
Description: Simple echo API for testing Azure API Center functic
Version: 1.0
```

5. **Click**: "Register" or "Create"

2.2 Register Standards Compliance API

1. **Click**: "Register API" again
2. **Fill in the form**:

```
API Name: Standards Compliance & Deviation Analysis API
API ID: standards-compliance-api
```

```
Type: REST
Description: PMI PMBOK and BABOK standards compliance analysis wi
Version: 1.0
Tags: pmi, pmbok, babok, compliance, governance, standards
```

3. **Click**: "Register" or "Create"

Step 3: Add API Specifications

Upload OpenAPI Specification

1. **Select**: your `standards-compliance-api` from the list
2. **Click**: "API definitions" or "Specifications" tab
3. **Click**: "Add definition" or "Upload specification"
4. **Choose**: "OpenAPI" as the specification type
5. **Upload method options**:

**Option

... [truncated]

=== BABOK-ENTERPRISE-DEMONSTRATION-GUIDE.MD (documentation) ===
Path: docs\BABOK\BABOK-ENTERPRISE-DEMONSTRATION-GUIDE.md
Relevance Score: 95

🎯 BABOK Enterprise Consulting Demonstration

Step-by-Step Guide to Professional Business Analysis Automation

📋 DEMONSTRATION OVERVIEW

This guide demonstrates how the ADPA API delivers enterprise-grade BABOK v3 compliant business analysis consulting capabilities, suitable for Fortune 500 digital transformation projects.

🚀 STEP 1: API SERVER INITIALIZATION

1.1 Start the Enterprise API Server

```
# Navigate to project directory
cd C:\Users\menno\Source\Repos\requirements-gathering-agent

# Build the production-ready API
npm run api:build

# Start the enterprise API server
npm run api:server
```

Expected Output:

```
🚀 ADPA API Server running in development mode
📡 Server listening on port 3001
📖 API Documentation available at http://localhost:3001/api-docs
🔍 Health check available at http://localhost:3001/api/v1/health
🛠️  Development mode - enhanced logging and debugging enabled
```

1.2 Verify API Health & Capabilities

```
curl http://localhost:3001/api/v1/health
```

Enterprise-Grade Response:

```
{
  "status": "healthy",
  "timestamp": "2025-06-22T13:30:00.000Z",
  "version": "2.2.0",
  "environment": "development",
  "uptime": 45.2,
  "memory": {"used": 12, "total": 14, "external": 2},
  "node": "v20.18.2"
}
```

📊 STEP 2: ENTERPRISE TEMPLATE CREATION

2.1 Create BABOK v3 Requirements Elicitation Template

File: `enterprise-babok-template.json`


```
{
  "name": "BABOK v3 Enterprise Requirements Elicitation Framework",
  "description": "Comprehensive BABOK v3 compliant template for enterp
  "category": "enterprise-business-analysis",
  "tags": ["babok-v3", "requirements-elicitation", "enterprise", "stak
  "templateData": {
    "content": "# BABOK v3 Enterpri
... [truncated]

=== COLLABORATION-TOOLS-ROADMAP.MD (planning) ===
Path: docs\COLLABORATION-TOOLS-ROADMAP.md
Relevance Score: 95

# Collaboration Tools Development Roadmap

## Overview
This document outlines the roadmap for implementing multi-user collabo

## Current Capabilities
```

```
- ✅ **Single-user CLI interface**: Full functionality for individual
- ✅ **RESTful API**: Multi-client architecture ready
- ✅ **Authentication**: Bearer token system implemented
- ✅ **Document Management**: Template and output management
- ✅ **Standards Compliance**: Individual project analysis

## Collaboration Features Architecture

### Multi-User Management System

#### User Roles & Permissions
```typescript
interface UserRole {
  id: string;
  name: 'admin' | 'project_manager' | 'business_analyst' | 'stakeholde
  permissions: Permission[];
}

interface Permission {
  resource: 'projects' | 'documents' | 'standards' | 'adobe' | 'users'
  actions: ('create' | 'read' | 'update' | 'delete' | 'approve')[];
}
```

Team Management

```
interface Team {
  id: string;
  name: string;
  description: string;
  members: TeamMember[];
  projects: string[];
  createdAt: Date;
  updatedAt: Date;
}

interface TeamMember {
  userId: string;
  role: UserRole;
  joinedAt: Date;
```
```

```
  permissions: Permission[];
}
```

Real-time Collaboration Features

1. Concurrent Document Editing

- **Real-time Updates**: WebSocket-based live collaboration
- **Conflict Resolution**: Operational transformation for concurrent edits
- **Version Control**: Document versioning with merge capabilities
- **Change Tracking**: Author attribution and change history

2. Project Sharing & Permissions

- **Project Access Control**: Role-based access to projects
- **Sharing Mechanisms**: Invite links and email notifications
- **Permission Management**: Granular control over project actions
- **Audit Trail**: Complete history of project access and changes

3. Approval Workflows

``

... [truncated]

=== IMPLEMENTATION-GUIDE-PROVIDER-CHOICE-MENU.MD (documentation) ===
Path: docs\implementation-guide-provider-choice-menu.md
Relevance Score: 95

Interactive AI Provider Selection Menu - Implementation Guide

Document Version: 1.0
Created: December 2024

Last Updated: December 2024
Target Audience: Developers, Technical Leads, Product Managers

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📋 Table of Contents

📖 Overview

This guide provides comprehensive documentation for implementing an interactive choice menu that allows users to select an AI provider before running the Requirements Gathering Agent. The feature enhances user experience by providing a visual selection interface instead of requiring manual environment configuration.

🎯 Objectives

- **Simplify Provider Selection**: Replace manual `.env` configuration with an interactive menu
- **Improve User Experience**: Provide clear provider options with descriptions and setup guidance
- **Maintain Existing Functionality**: Preserve current provider detection and fallback mechanisms

- **Enable Dynamic Switching**: Allow users to change providers without restarting the application

🔧 Key Features

- Interactive CLI-based provider selection menu
- Real-time provider availability detection
- Configuration validation before selection
- Automatic `.env` file generation/update
- Provider-specific setup guidance
- Fallback to current behavior if no interaction desired

🔍 Current System Analysis

Existing Provi

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=== SHAREPOINT-USAGE-GUIDE.MD (documentation) ===
Path: docs\SHAREPOINT-USAGE-GUIDE.md
Relevance Score: 95

SharePoint Integration Usage Guide

Overview

The SharePoint integration in Requirements Gathering Agent v2.1.3 enables you to automatically publish generated documents to SharePoint Online document libraries. This feature provides enterprise-grade document management with Azure authentication, metadata tagging, and version control.

Features

- **Microsoft Graph API Integration**: Secure, enterprise-grade authentication
- **OAuth2 Authentication**: Azure AD integration with device code flow
- **Automatic Folder Creation**: Creates organized folder structures
- **Metadata Management**: Adds custom metadata to published documents
- **Batch Publishing**: Efficiently publish multiple documents
- **Version Control**: SharePoint's built-in versioning support
- **Enterprise Security**: Follows Azure security best practices

Quick Start

1. Prerequisites

Before using SharePoint integration, ensure you have:

- SharePoint Online subscription
- Azure AD tenant
- Azure App Registration with appropriate permissions
- SharePoint site and document library ready

2. Azure App Registration Setup

1. **Create App Registration in Azure Portal**:
    - Go to Azure Portal → Azure Active Directory → App registrations
    - Click "New registration"
    - Name: "Requirements Gathering Agent"
    - Supported account types: "Accounts in this organizational directory only"
    - Redirect URI: `http://localhost:3000/auth/callback`

2. **Configure API Permissions**:
    - Go to API permissions
    - Add permissions:
        - Microsoft Graph → Application permissions:
            - `Sites.ReadWrite.All`
            - `Files.ReadWrite.All`
            - `User.Read`
3. **Grant Admin Consent**:
    - Click "Grant admin consent for [Your Tenant]"
4. **Note Configuration Details**:
    - Application (client) ID
    - Directory (tenant) ID

3. Initialize SharePoint Configuration

```
# Initialize SharePoint configuration
npm run sharepoint:in
... [truncated]

=== PHASE-2-IMPLEMENTATION-GUIDE.MD (documentation) ===
Path: docs\ADOBE\PHASE-2-IMPLEMENTATION-GUIDE.md
Relevance Score: 95

# Adobe Creative Suite Phase 2 Implementation Guide

**Date:** July 8, 2025
**Status:** 📋 **READY FOR IMPLEMENTATION**
**Prerequisites:** ✅ Phase 1 Complete (58 PDFs generated successfully

---

## 🎯 Phase 2 Objectives

Transform our successful PDF generation pipeline into a premium Adobe
- **Professional InDesign layouts** with custom branding
```

```
- **Automated data visualizations** using Illustrator API
- **Enhanced image processing** with Photoshop API
- **Template-driven document generation** with consistent branding

## 🏗️ Technical Architecture for Phase 2

### Current State (Phase 1) ✅
```

Markdown → Puppeteer → Professional PDF
├── Professional styling
├── Corporate typography
├── Metadata and attribution
└── Print-ready output

```
### Target State (Phase 2) 🎯
```

Markdown → Content Analysis → Template Selection → Adobe Creative APIs → Premium Output
├── InDesign Server (Layout & Typography)
├── Illustrator API (Charts & Infographics)
├── Photoshop API (Image Enhancement)
└── Document Generation (Template Processing)

```
## 📋 Implementation Milestones

### Milestone 1: Adobe Creative SDK Setup (Priority 1)

#### 1.1 Authentication & Credentials
**Files to Create:**
- `src/adobe/creative-suite/authenticator.ts`
- `src/adobe/creative-suite/config.ts`
- `.env.adobe.creative`

**Implementation Steps:**
1. **Adobe Creative SDK Registration**
   ```bash
```
```

```
# Register for Adobe Creative SDK
# Obtain API keys for:
# - InDesign Server API
# - Illustrator API
# - Photoshop API
# - Document Generation API
```

2. **Authentication Setup**

```
// src/adobe/creative-suite/authenticator.ts
export class CreativeSuiteAuthenticator {
  private clientId: string;
  private clientSecret: string;

  async authenticate(): Promise<string> {
    // Implement OAuth 2.0 flow for Creative Suite APIs
  }
}
```

... [truncated]

.

A systematic approach to ensure code quality, consistency, and adherence to best practices through structured peer review processes.

2. Code Review Objectives

Primary Objectives

- Ensure code quality and maintainability
- Identify bugs and potential issues early
- Enforce coding standards and best practices
- Share knowledge and promote learning
- Improve system design and architecture
- Maintain security and performance standards

Success Criteria

- All code changes reviewed before merge
- Review completion within defined SLA
- Consistent application of coding standards
- Reduction in post-deployment defects
- Improved team knowledge sharing

3. Code Review Process

3.1 Pre-Review Requirements

- **Code Completion:** All functionality implemented and unit tested
- **Self Review:** Developer performs initial self-review
- **Documentation:** Code properly documented and commented
- **Testing:** All tests pass successfully
- **Standards Compliance:** Code follows established coding standards

3.2 Review Initiation

1. **Pull Request Creation**
    - Clear title describing the change
    - Detailed description of modifications
    - Reference to related issues/tickets
    - Test results and coverage information
2. **Reviewer Assignment**
    - Primary reviewer (technical lead/senior developer)
    - Secondary reviewer (peer developer)
    - Domain expert (if specialized knowledge required)
3. **Review Timeline**
    - Small changes (< 100 lines): 24 hours
    - Medium changes (100-500 lines): 48 hours
    - Large changes (> 500 lines): 72 hours
    - Critical/hotfix changes: 4 hours

3.3 Review Execution

1. **Code Analysis**
    - Functional correctness
    - Logic and algorithm efficiency
    - Error handling and edge cases
    - Code readability and maintainability
2. **Standards Verification**
    - Coding style consistency
    - Naming conventions
    - Documentation completeness
    - Test coverage adequacy
3. **Architecture Review**
    - Design pattern adherence
    - System integration impact
    - Performance implications
    - Security considerations

4. Review Criteria and Standards

4.1 Code Quality Criteria

General Quality Standards

- **Readability:** Code is clear and self-documenting
- **Simplicity:** Solutions are elegant and not over-engineered
- **Consistency:** Follows established patterns and conventions
- **Modularity:** Proper separation of concerns and loose coupling
- **Reusability:** Components designed for reuse where appropriate

4.2 Functional Criteria

- **Correctness:** Code implements requirements accurately

- **Completeness:** All edge cases and error conditions handled
- **Performance:** Efficient algorithms and resource usage
- **Scalability:** Solution supports expected growth
- **Reliability:** Robust error handling and recovery

4.3 Security Criteria

- **Input Validation:** All inputs properly validated and sanitized
- **Authentication:** Proper user authentication mechanisms
- **Authorization:** Appropriate access controls implemented
- **Data Protection:** Sensitive data properly protected
- **Vulnerability Prevention:** Common security issues addressed

5. Code Review Checklist

5.1 General Review Checklist

- [ ] **Functionality**
  - [ ] Code implements requirements correctly
  - [ ] All edge cases handled appropriately
  - [ ] Error conditions properly managed
  - [ ] Business logic is accurate
- [ ] **Code Quality**
  - [ ] Code is readable and well-structured
  - [ ] Appropriate comments and documentation
  - [ ] Consistent naming conventions
  - [ ] No code duplication
  - [ ] Proper error handling
- [ ] **Performance**
  - [ ] Efficient algorithms used
  - [ ] No unnecessary computations
  - [ ] Appropriate data structures

    - [ ] Memory usage optimized
    - [ ] Database queries optimized

- [ ] **Security**
    - [ ] Input validation implemented
    - [ ] No hardcoded secrets or credentials
    - [ ] Appropriate access controls
    - [ ] SQL injection prevention
    - [ ] XSS prevention measures

5.2 Testing Checklist

- [ ] **Unit Tests**
    - [ ] All new code covered by tests
    - [ ] Test cases cover edge conditions
    - [ ] Tests are maintainable and clear
    - [ ] Mocking used appropriately
    - [ ] Test data is realistic

- [ ] **Integration Tests**
    - [ ] Integration points tested
    - [ ] End-to-end scenarios covered
    - [ ] API contracts validated
    - [ ] Database interactions tested

5.3 Documentation Checklist

- [ ] **Code Documentation**
    - [ ] Complex logic explained
    - [ ] API methods documented
    - [ ] Configuration parameters documented
    - [ ] Dependencies clearly stated

- [ ] **User Documentation**

    - [ ] README updated if needed
    - [ ] API documentation current
    - [ ] Installation guide updated
    - [ ] User guide reflects changes

6. Review Types

6.1 Standard Review

- **Scope:** Regular feature development and bug fixes
- **Timeline:** Standard SLA applies
- **Reviewers:** 1-2 developers
- **Approval:** Simple majority required

6.2 Security Review

- **Scope:** Security-related changes or sensitive areas
- **Timeline:** Extended timeline for thorough analysis
- **Reviewers:** Security specialist required
- **Approval:** Security team sign-off mandatory

6.3 Architecture Review

- **Scope:** Major architectural changes or new components
- **Timeline:** Extended timeline with design discussion
- **Reviewers:** Technical architect and senior developers
- **Approval:** Architecture team consensus required

6.4 Hotfix Review

- **Scope:** Critical production fixes
- **Timeline:** Expedited 4-hour SLA
- **Reviewers:** Senior developer and technical lead
- **Approval:** Accelerated approval process

7. Roles and Responsibilities

7.1 Code Author

- **Before Review:**
  - Perform self-review of code
  - Ensure all tests pass
  - Write clear pull request description
  - Address automated tool findings
- **During Review:**
  - Respond to reviewer comments promptly
  - Explain design decisions when needed
  - Make requested changes efficiently
  - Engage in constructive discussion

7.2 Primary Reviewer

- **Responsibilities:**
  - Thorough technical review of code
  - Verify compliance with standards
  - Provide constructive feedback
  - Approve or request changes
  - Mentor junior developers
- **Timeline:**
  - Complete review within SLA
  - Provide timely feedback
  - Follow up on requested changes

7.3 Secondary Reviewer

- **Responsibilities:**
  - Independent perspective on changes

    - Focus on different aspects than primary reviewer
    - Provide additional feedback
    - Learn from code review process

7.4 Technical Lead

- **Responsibilities:**
    - Define review standards and processes
    - Handle escalations and conflicts
    - Ensure consistency across team
    - Monitor review metrics and quality

8. Tools and Technology

8.1 Code Review Platform

- **Primary Tool:** [GitHub/GitLab/Azure DevOps]
- **Features:**
    - Pull request management
    - Inline commenting
    - Approval workflows
    - Integration with CI/CD

8.2 Automated Code Analysis

- **Static Analysis:** [SonarQube/CodeClimate]
- **Security Scanning:** [SAST tools specific to technology stack]
- **Code Coverage:** [Coverage tools integrated with build]
- **Linting:** [Language-specific linters]

8.3 Documentation Tools

- **API Documentation:** [Swagger/OpenAPI]
- **Code Documentation:** [Built-in language documentation tools]
- **Wiki/Confluence:** Team knowledge base
- **Markdown:** README and documentation files

9. Best Practices

9.1 For Code Authors

- **Keep Changes Small:** Smaller pull requests are easier to review
- **Single Responsibility:** One logical change per pull request
- **Clear Communication:** Write descriptive commit messages and PR descriptions
- **Self Review First:** Review your own code before requesting review
- **Be Responsive:** Address feedback promptly and professionally

9.2 For Reviewers

- **Be Constructive:** Provide helpful feedback, not just criticism
- **Be Specific:** Point out exact issues and suggest solutions
- **Be Timely:** Complete reviews within established SLA
- **Be Thorough:** Don't rush through reviews
- **Be Educational:** Help teammates learn and grow

9.3 Team Best Practices

- **Consistent Standards:** Apply standards consistently across all reviews
- **Knowledge Sharing:** Use reviews as learning opportunities
- **Continuous Improvement:** Regularly update processes and standards
- **Metrics Tracking:** Monitor review effectiveness and efficiency
- **Tool Optimization:** Leverage automation to focus on important issues

10. Common Review Issues

10.1 Code Quality Issues

- **Poor Naming:** Unclear variable, function, or class names

- **Code Duplication:** Repeated logic that should be abstracted
- **Large Functions:** Functions trying to do too much
- **Deep Nesting:** Overly complex conditional structures
- **Magic Numbers:** Hardcoded values without explanation

10.2 Logic Issues

- **Edge Cases:** Unhandled boundary conditions
- **Error Handling:** Missing or inadequate error handling
- **Race Conditions:** Concurrency issues in multi-threaded code
- **Memory Leaks:** Resources not properly released
- **Performance Issues:** Inefficient algorithms or queries

10.3 Security Issues

- **Input Validation:** Unvalidated user input
- **Authentication:** Weak or missing authentication
- **Authorization:** Improper access controls
- **Data Exposure:** Sensitive information in logs or responses
- **Injection Vulnerabilities:** SQL, XSS, or command injection risks

11. Review Metrics and KPIs

11.1 Process Metrics

- **Review Completion Time:** Average time to complete reviews
- **Review Coverage:** Percentage of code changes reviewed
- **Reviewer Participation:** Distribution of review load
- **Revision Cycles:** Number of review iterations per change

11.2 Quality Metrics

- **Defect Detection Rate:** Issues found in review vs. production
- **Post-Review Defects:** Bugs found after code review approval
- **Standards Compliance:** Adherence to coding standards
- **Test Coverage:** Code coverage maintained or improved

11.3 Team Metrics

- **Knowledge Sharing:** Cross-team review participation
- **Learning Velocity:** Skill improvement through reviews
- **Code Quality Trend:** Improvement in code quality over time
- **Review Satisfaction:** Team satisfaction with review process

12. Continuous Improvement

12.1 Process Refinement

- **Regular Retrospectives:** Monthly review of process effectiveness
- **Feedback Collection:** Gather team input on process improvements
- **Tool Evaluation:** Assess and upgrade review tools
- **Training Updates:** Keep team updated on best practices

12.2 Standards Evolution

- **Technology Updates:** Adapt standards for new technologies
- **Industry Best Practices:** Incorporate emerging best practices
- **Lessons Learned:** Update standards based on production issues
- **Team Growth:** Adjust processes as team expertise evolves

13. Escalation Process

13.1 Review Conflicts

1. **Discussion:** Attempt to resolve through discussion
2. **Technical Lead:** Escalate to technical lead for guidance
3. **Architecture Review:** Involve architecture team if needed
4. **Final Decision:** Technical lead makes final decision

13.2 Timeline Issues

1. **Notification:** Alert stakeholders of potential delays

2. **Priority Assessment:** Evaluate urgency and impact
3. **Resource Allocation:** Assign additional reviewers if needed
4. **Management Escalation:** Involve management for critical delays

---

This Code Review Process and Guidelines document should be regularly updated to reflect evolving best practices and team needs.
