Requirements Traceability Matrix

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Requirements Traceability Matrix (RTM)

Project: ADPA – Advanced Document Processing & Automation Framework
Version: 3.2.0
Prepared by: [Your Name/Team]
Date: [Insert Date]
Reference: GitHub Repository

Purpose

This Requirements Traceability Matrix (RTM) provides a comprehensive mapping of business, functional, non-functional, integration, and compliance requirements to implementation artifacts and validation methods for the ADPA (Advanced Document Processing & Automation Framework) project. It ensures all requirements are addressed throughout the development lifecycle and facilitates impact analysis, audit, and quality assurance.

Legend

- **ID**: Unique identifier for the requirement
- **Requirement Description**: Business or technical requirement
- **Source**: Origin (e.g., BABOK, PMBOK, DMBOK, Stakeholder, Regulatory)
- **Type**: Functional (F), Non-Functional (NF), Compliance (C), Integration (I)
- **Implementation Reference**: Code module, API, or documentation mapping
- **Validation Method**: How requirement fulfillment is verified (test, review, demo, etc.)
- **Status**: Implemented / In Progress / Planned

1. Business and Functional Requirements

ID	Requirement Description	Source	Type	Implementation Reference	Validation Method	Statu
F-01	Generate standards-compliant business analysis documentation per BABOK v3	BABOK v3	F	`modules/documentTemplates/babok/` , CLI/API	Unit/Integration Tests, Demo	Imple
F-02	Generate project management artifacts aligned with PMBOK 7th Edition	PMBOK 7th	F	`modules/documentTemplates/pmbok/` , CLI/API	Unit/Integration Tests	Imple
F-03	Enable data management documentation per DMBOK 2.0	DMBOK 2.0	F	`modules/documentTemplates/dmbok/` , CLI/API	Test Cases, User Review	In Pro
F-04	Provide CLI for document generation, project and workflow management	Stakeholder	F	`src/cli.ts` , `commands/`	CLI Test Scripts	Imple
F-05	Provide REST API for all major functions (document generation, template management, integration)	Stakeholder	F	`src/server.ts` , `api-specs/` , Swagger UI	API Tests, OpenAPI Docs	Imple
F-06	Support professional PDF generation and Adobe Document Services integration	Stakeholder	I	`modules/adobe/` , `@adobe/pdfservices-node-sdk`	Integration Test, Demo	Imple
F-07	Enable direct publishing to	Stakeholder	I	`modules/confluence/` , `confluence:publish` script	Integration Test, Demo	Imple

ID	Requirement Description	Source	Type	Implementation Reference	Validation Method	Statu
	Atlassian Confluence					
F-08	Enable direct document upload to Microsoft SharePoint	Stakeholder	I	`modules/sharepoint/` , `sharepoint:upload` script	Integration Test, Demo	Imple
F-09	Provide template-based document generation with framework selection and customization	Stakeholder	F	`modules/documentTemplates/` , API `/templates`	Unit Test, User Review	Imple
F-10	Support multi-provider AI orchestration (OpenAI, Google AI, GitHub Copilot, Ollama) with failover	Stakeholder	F	`modules/ai/` , `.env` setup	Provider Switch Test	Imple
F-11	Enable automated document generation pipelines and workflow automation	Stakeholder	F	`modules/documentGenerator/` , Workflow CLI	E2E Test, Demo	Imple
F-12	Provide admin web interface (Next.js) for managing templates, jobs, users, and analytics	Stakeholder	F	`admin-interface/`	UI/UX Test, Demo	Imple
F-13	Interactive AI provider selection menu in CLI	Stakeholder	F	`cli.ts` , Provider Selection Module	Manual Test, Demo	Imple

2. Integration Requirements

ID	Requirement Description	Source	Type	Implementation Reference	Validation Method	Status
I-01	Express.js REST API with TypeSpec/OpenAPI 3.0 specs	Stakeholder	I	`src/server.ts`, `api-specs/`	API Lint/Test, OpenAPI	Implemented
I-02	Integration with SharePoint (OAuth2, Graph API)	Stakeholder	I	`modules/sharepoint/`, Azure Setup	Integration Test	Implemented
I-03	Integration with Confluence (OAuth2, REST API)	Stakeholder	I	`modules/confluence/`	Integration Test	Implemented
I-04	Adobe Creative Suite APIs (InDesign, Illustrator, Photoshop, Doc Gen)	Stakeholder	I	`modules/adobe/`, Adobe SDK Integration	Integration Test	In Progress
I-05	Version control integration (GitHub, GitLab, Azure DevOps)	Stakeholder	I	CLI commands, VCS Integration Layer	CLI Test, Demo	Implemented
I-06	Identity Management (Active Directory, SAML, OAuth2)	Stakeholder	I	Auth modules, Config	Security Test	Planned

3. Non-Functional Requirements

ID	Requirement Description	Source	Type	Implementation Reference	Validation Method	Status
NF-01	Node.js 18+, TypeScript 5.7+ codebase	Tech Spec	NF	`package.json`, `tsconfig`	Code Review, Build	Implemented
NF-02	Scalable microservices/API-first architecture	Architecture	NF	`ARCHITECTURE.md`, Codebase	Architecture Review	Implemented
NF-03	Production-ready authentication and	Security	NF	Auth Middleware, JWT, API Key	Penetration Test, Review	Implemented

ID	Requirement Description	Source	Type	Implementation Reference	Validation Method	Status
	authorization					
NF-04	Regulatory compliance (Basel III, MiFID II, GDPR, SOX, FINRA, PCI DSS, etc.)	Compliance	C	Data Handling, Audit Trails	Compliance Audit	Implemented
NF-05	Horizontal scaling and load balancing support	Architecture	NF	Infrastructure, Docker/K8s	Load Test, Infra Review	Planned
NF-06	Configurable caching for high performance (Redis)	Performance	NF	Redis Integration	Performance Test	Planned
NF-07	Robust error handling and logging (Winston, Morgan)	Tech Spec	NF	Logging Middleware	Log Review, Test Failures	Implemented
NF-08	Comprehensive automated testing (Jest, integration, performance)	QA	NF	`test/`, Scripts	Test Coverage Report	Implemented
NF-09	Code quality enforced (ESLint, Prettier, Conventional Commits)	QA	NF	Linting/Formatting Config	CI/CD Build, Review	Implemented
NF-10	Documentation and usage examples provided	Stakeholder	NF	`docs/`, Wiki, API Docs	Doc Review, User Survey	Implemented
NF-11	Admin interface UX meets accessibility standards	Stakeholder	NF	`admin-interface/`	Accessibility Audit	In Progress

4. Compliance & Security Requirements

ID	Requirement Description	Source	Type	Implementation Reference	Validation Method	Status
C-01	Adhere to GDPR, SOX, PCI DSS, ISO 27001, HIPAA, FedRAMP as required	Regulatory	C	Data Security Policy, API Config	Compliance Audit	Implemented
C-02	Secure authentication (OAuth2, JWT, API Key), rate limiting, CORS, helmet	Security Best Pr	C	Middleware, Auth Modules	PenTest, Code Review	Implemented
C-03	Role-based access control (RBAC) for users and teams	Stakeholder	C	User/Team Management	Unit/Integration Test	In Progress
C-04	Audit logging and traceability of document actions	Audit/Stakeholder	C	Logging, Analytics Module	Log Review	Implemented
C-05	Support for enterprise SSO integrations	Stakeholder	C	Identity Provider Integration	User Acceptance Test	Planned

5. Roadmap & Future Enhancements

ID	Requirement Description	Source	Type	Implementation Reference	Validation Method	Status
R-01	Docker containerization and Kubernetes deployment	Roadmap Q2 2025	NF	Dockerfile, K8s Templates	Deployment Test	Planned
R-02	Advanced analytics dashboard and reporting	Roadmap Q2 2025	F	Analytics Module, Admin Interface	Demo, User Testing	Planned
R-03	Real-time collaboration and concurrent editing	Roadmap Q3 2025	F	Collaboration Module	Demo, E2E Test	Planned

ID	Requirement Description	Source	Type	Implementation Reference	Validation Method	Status
R-04	Mobile application support	Roadmap Q3 2025	F	Mobile Client	Beta Test	Planned
R-05	Enhanced workflow automation and approval workflows	Roadmap Q3 2025	F	Workflow Engine	Demo, User Testing	Planned

6. Mapping to Implementation Artifacts

Requirement ID	Main Code/Module(s)	Documentation Reference	Test Reference
F-01, F-02, F-03	`modules/documentTemplates/`, CLI, API	BABOK/PMBOK/DMBOK Guides, API Docs	Jest Unit/Integration, Demo Guides
F-04, F-05	`src/cli.ts`, `src/server.ts`, `api-specs/`	Quick Start, Usage Examples	CLI/API Tests
F-06, F-07, F-08	`modules/adobe/`, `modules/confluence/`, `modules/sharepoint/`	Integration Usage Guides, Phase 2 Adobe Guide	Integration Tests, Demo Scenarios
F-09, F-10	`modules/ai/`, Template Modules	AI Provider Guide, Implementation Guide	Provider Switch/Failover Test
F-11, F-12	`documentGenerator/`, `admin-interface/`	Workflow Automation Docs, Admin Interface Docs	E2E Test, UI Test
C-01, C-02	Auth Middleware, Security Modules	Compliance & Security Docs	PenTest, Security Test
NF-01, NF-02	Full Codebase, Infrastructure	Architecture.md, package.json	Build/Test Scripts
R-01, R-02, R-03	Docker/K8s, Analytics, Collaboration Modules	Roadmap, Collaboration Tools Roadmap	Deployment/Feature Test

7. Validation & Verification Summary

- **Unit Testing:** Automated with Jest for all modules and API endpoints.
- **Integration Testing:** CLI/API command flows, provider integration, document pipelines.
- **Manual Testing:** Admin interface UX, CLI/Provider selection, real-time features.
- **Security & Compliance:** Regular pen testing, security header verification, compliance audits.
- **User Acceptance:** Beta testing with Fortune 500 partners, feedback cycle via GitHub Issues/Discussions.

8. Unique Project Considerations

- **Multi-Framework Standards Compliance:** Simultaneous support for BABOK, PMBOK, DMBOK.
- **Pluggable AI Orchestration:** Multi-provider, failover, and context injection.
- **Enterprise-Grade Integrations:** Confluence, SharePoint, Adobe, SSO, VCS.
- **Admin Web Portal:** Next.js-based, management and analytics.
- **Extensible Architecture:** Microservices, TypeSpec API-first, scalable integrations.

9. RTM Maintenance

- RTM is updated with each release and major feature.
- All changes to requirements or implementation must be reflected in the RTM.
- Traceability to code, tests, and documentation is mandatory for audit and compliance.

End of Document