

# Universal DMS for ERP Integration

## Complete Requirements Document

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## 1) Application

**Introduction:** The application is designed as a modern, universal Document Management System that seamlessly integrates with any ERP platform. The system acts as a centralized document hub where organizations can store, manage, process, and collaborate on documents while maintaining tight integration with their existing ERP workflows. It provides intelligent document processing, automated workflows, and comprehensive audit trails while ensuring scalability and security.

## 2) Application About

The application is a secure, cloud-native document management platform designed to integrate with any ERP system through standardized APIs and connectors. It provides end-to-end document lifecycle management including capture, storage, processing, workflow automation, collaboration, and archival, all while maintaining real-time synchronization with ERP business processes.

## 3) Objective & Aim

**Objective:** Create a universal, scalable DMS that integrates seamlessly with any ERP system to streamline document-centric business processes.

**Aims:**

- Reduce document processing time by 60-70% through automation
- Achieve 99.9% document availability and zero data loss
- Enable real-time ERP-DMS synchronization for all business processes
- Provide universal API connectivity for 50+ ERP platforms
- Ensure 100% audit compliance with immutable document trails

- Reduce manual document handling by 80% through intelligent automation
- Support unlimited scalability from SME to enterprise level

## 4) Full Details

### 4.1 Core Users & Roles

- **System Administrator** (Platform management, integrations, security)
- **ERP Integration Specialist** (Connector configuration, data mapping)
- **Document Administrator** (Document policies, retention, compliance)
- **Business Process Owner** (Workflow design, approval chains)
- **End User** (Document creation, collaboration, consumption)
- **Auditor** (Compliance monitoring, audit trail review)
- **IT Operations** (Monitoring, maintenance, backup management)

### 4.2 High-Level Features (MVP)

#### 4.2.1 Document Management Core

##### 1. Document Storage & Organization

- a. Hierarchical folder structures with unlimited depth
- b. Metadata-driven organization with custom fields
- c. Version control with complete revision history
- d. Document templates and standardized forms
- e. Bulk import/export capabilities

##### 2. Document Capture & Processing

- a. Multi-channel capture (email, scanner, mobile, API)
- b. OCR with 99%+ accuracy for text extraction
- c. Intelligent document classification using ML
- d. Automated data extraction from structured documents
- e. Barcode and QR code recognition

##### 3. Search & Discovery

- a. Full-text search across all document content

- b. Advanced filtering by metadata, date, type, source
- c. Semantic search with natural language queries
- d. Saved searches and alerts
- e. Document recommendation engine

#### **4.2.2 ERP Integration Engine**

##### **4. Universal Connector Framework**

- a. Pre-built connectors for major ERPs (SAP, Oracle, Dynamics, etc.)
- b. RESTful API for custom ERP integrations
- c. Real-time bidirectional data synchronization
- d. Event-driven integration with webhooks
- e. Batch processing for large data volumes

##### **5. Business Process Integration**

- a. Automatic document-transaction linking
- b. ERP-triggered document workflows
- c. Master data synchronization (customers, vendors, products)
- d. Financial document processing (invoices, POs, contracts)
- e. Supply chain document management

#### **4.2.3 Workflow & Automation**

##### **6. Intelligent Workflows**

- a. Visual workflow designer with drag-drop interface
- b. Multi-level approval hierarchies
- c. Parallel and sequential routing
- d. Business rule engine for complex decisions
- e. Exception handling and escalation

##### **7. Process Automation**

- a. Automated document routing based on content/metadata
- b. Digital signature integration
- c. Notification system (email, SMS, in-app)
- d. Task management and assignment
- e. SLA monitoring and compliance

#### **4.2.4 Collaboration & Communication**

##### **8. Real-time Collaboration**

- a. Multi-user document editing
- b. Comment and annotation systems
- c. Review and approval cycles
- d. Discussion threads and communication logs
- e. Mobile-first collaboration tools

## 9. External Collaboration

- a. Secure external sharing with access controls
- b. Guest user management
- c. Client/vendor portals
- d. Digital signature collection
- e. Audit trails for external access

## 4.3 Non-Functional Requirements

- **Availability:** 99.9% uptime with <4 hours monthly downtime
- **Performance:** <2s document retrieval, <5s search results, <30s large file uploads
- **Scalability:** Support 10K+ concurrent users, 100M+ documents, auto-scaling
- **Security:** SOC 2 Type II, ISO 27001, zero-trust architecture
- **Compliance:** GDPR, HIPAA, SOX ready with configurable retention policies
- **Integration:** <24 hours for standard ERP connector deployment
- **Disaster Recovery:** RPO <1 hour, RTO <4 hours
- **Mobile Support:** Native iOS/Android apps with offline capabilities

## 5) ERP Integration Specifications

### 5.1 Supported ERP Platforms

- **SAP:** S/4HANA, ECC, Business One
- **Oracle:** ERP Cloud, E-Business Suite, NetSuite
- **Microsoft:** Dynamics 365, Business Central, NAV
- **Infor:** CloudSuite, LN, XA

- **Epicor:** ERP, Prophet 21
- **IQMS:** EnterpriselQ
- **Generic:** Any REST/SOAP API enabled system

## 5.2 Integration Patterns

- **Real-time Sync:** Webhook-based event processing
- **Batch Processing:** Scheduled data synchronization
- **API-First:** RESTful APIs with OpenAPI 3.0 specification
- **Message Queue:** Asynchronous processing with dead letter queues
- **Data Mapping:** Visual mapper for field transformations
- **Error Handling:** Retry mechanisms with exponential backoff

## 5.3 Document-ERP Linking

- **Transaction Documents:** Invoices, POs, receipts, contracts
- **Master Data Documents:** Customer files, vendor certifications, product specs
- **Financial Documents:** Tax documents, audit papers, compliance certificates
- **HR Documents:** Employee records, contracts, performance reviews
- **Operations Documents:** SOPs, quality certificates, maintenance records

## 5.4 ERP-Triggered Workflows

- **Invoice Processing:** AP automation with 3-way matching
- **Purchase Requisitions:** Automated approval routing
- **Contract Management:** Renewal alerts and compliance tracking
- **Quality Management:** Certificate validation and expiry tracking
- **Audit Trail:** Complete document-transaction history

## 6) Work Breakdown

### Weekly Deliverables

- **Week 1-4:** Core platform foundation
- **Week 5-8:** Document management features
- **Week 9-12:** Basic ERP integration
- **Week 13-16:** Advanced workflows
- **Week 17-20:** ERP connectors
- **Week 21-24:** Advanced features
- **Week 25-28:** Mobile app
- **Week 29-32:** Testing & deployment

## 7) Tech Stack

### 7.1 Frontend

- **Framework:** Next.js (React + SSR(Serverside rendering), SSG(Static Site generation))
- **State Management:** Zustand (for global state)
- **UI Library / Styling:** Tailwind + shadcn/ui
- **Forms validation:** Zod
- **Form Handling:** React Hook Form
- **File Handling:** React Dropzone, PDF.js viewer
- **Mobile:** React Native with Expo for cross-platform

### 7.2 Backend

- **Runtime:** Java 21

- **Framework:** SpringBoot
- **API:** REST api
- **Authentication:** JWT with refresh tokens, OAuth 2.0/OIDC
- **File Processing:** Sharp for images, pdf-lib for PDFs

### 7.3 Database & Storage

- **Primary Database:** PostgreSQL 15 with JSON support
- **File Storage:** AWS S3

### 7.4 Integration & APIs

- **API Gateway:** AWS API Gateway
- **Message Broker:** Apache Kafka for high-volume events
- **ERP Connectors:** Custom adapters with standardized interfaces
- **Web Scraping:** Puppeteer for legacy system integration

### 7.5 Infrastructure & DevOps

- **Containerization:** Docker with multi-stage builds
- **Orchestration:** Kubernetes with Helm charts
- **CI/CD:** GitHub Actions with automated testing

### 7.6 AI/ML Components

- **OCR:** Tesseract.js, Google Cloud Vision API
- **Document Classification:** TensorFlow.js, custom models
- **Natural Language:** spaCy for entity extraction
- **Search Enhancement:** Elasticsearch ML features
- **Analytics:** Custom analytics engine with ML insights

## 7.7 Security & Compliance

- **Encryption:** AES-256 at rest, TLS 1.3 in transit
- **Access Control:** RBAC with attribute-based policies
- **Backup:** Automated daily backups with 7-year retention
- **Disaster Recovery:** Multi-region with automatic failover

# 8) Key Workflows

## 8.1 Document Upload & Processing

1. **User uploads document** → System validates file type/size
2. **File stored in S3** → Checksum generated → Virus scan
3. **OCR processing** → Text extraction → Metadata extraction
4. **ML classification** → Auto-tagging → Folder assignment
5. **ERP sync check** → Link to relevant ERP entities
6. **Index for search** → Generate embeddings → Workflow trigger

## 8.2 ERP Integration Sync

1. **ERP event detected** → Webhook received → Queue processing
2. **Data validation** → Field mapping → Transform data
3. **Document lookup** → Create/update links → Trigger workflows
4. **Sync status update** → Error handling → Audit logging
5. **Notification sent** → Dashboard update → Report generation

## 8.3 Approval Workflow

1. **Document submitted** → Workflow template selected
2. **Approval chain initiated** → Tasks assigned → Notifications sent
3. **Reviewer accesses** → Document reviewed → Decision made
4. **Approval/rejection** → Next step triggered → Comments logged
5. **Final approval** → ERP update → Document status changed

6. **Completion notification** → Audit trail updated

## 8.4 Document Collaboration

1. **User shares document** → Permission check → Share link created
2. **Recipient accesses** → Authentication → Document loaded
3. **Collaborative editing** → Real-time sync → Version control
4. **Comments added** → Notifications sent → Activity logged
5. **Final version** → Approval workflow → Publication

## 8.5 Search & Discovery

1. **User enters query** → Query analysis → Intent detection
2. **Multi-index search** → Content + metadata + tags
3. **Permission filtering** → Results ranking → Facets generation
4. **Results presentation** → Click tracking → Learning update

# 9) Compliance & Security Guardrails

## 9.1 Built-in Security

- **Zero Trust Architecture:** All requests authenticated/authorized
- **Encryption Everywhere:** Data encrypted at rest and in transit
- **Role-Based Access:** Granular permissions with least privilege
- **Audit Everything:** Immutable audit logs for all actions
- **Multi-Factor Auth:** Required for admin and sensitive operations
- **Session Management:** Secure sessions with automatic timeout
- **Input Validation:** Strict validation on all inputs

## 9.2 Compliance Features

- **Data Retention:** Automated retention policy enforcement
- **Right to be Forgotten:** GDPR-compliant data deletion

- **Audit Reports:** Automated compliance reporting
- **Data Classification:** Automatic PII/sensitive data detection
- **Access Reviews:** Regular permission audits
- **Backup Verification:** Regular backup integrity checks
- **Incident Response:** Automated breach detection and response

### 9.3 Document Integrity

- **Version Control:** Complete document history
- **Checksum Verification:** File integrity validation
- **Digital Signatures:** Non-repudiation support
- **Tamper Detection:** Alert on unauthorized modifications
- **Chain of Custody:** Complete document lineage
- **Time Stamping:** RFC 3161 compliant timestamps

## 10) Acceptance Criteria

### 10.1 Core Functionality

- ✓ Users can upload, store, and retrieve documents with 100% reliability
- ✓ Full-text search returns relevant results within 2 seconds
- ✓ Version control maintains complete document history
- ✓ OCR accurately extracts text from images and PDFs (>95% accuracy)
- ✓ Document metadata can be customized per organization
- ✓ Folder structure supports unlimited hierarchy depth

## **10.2 ERP Integration**

- ✓ At least 5 major ERP systems have working connectors
- ✓ Real-time sync maintains data consistency between DMS and ERP
- ✓ Document-transaction linking works for all supported document types
- ✓ Batch processing handles large data volumes without system impact
- ✓ Integration errors are logged and recoverable
- ✓ Custom field mapping supports any ERP schema

## **10.3 Workflows & Automation**

- ✓ Visual workflow designer allows non-technical users to create workflows
- ✓ Approval chains support parallel and sequential routing
- ✓ Automated notifications work via email, SMS, and in-app
- ✓ SLA monitoring alerts on overdue approvals
- ✓ Exception handling routes failed processes to human intervention
- ✓ Workflow templates can be shared across organizations

## **10.4 Security & Compliance**

- ✓ Role-based access control restricts document access appropriately
- ✓ All user actions are logged in immutable audit trail
- ✓ Data encryption works for files at rest and in transit
- ✓ Multi-factor authentication protects sensitive operations
- ✓ GDPR data deletion removes all traces within 30 days
- ✓ Backup and recovery procedures restore system within 4 hours

## 10.5 Performance & Scalability

- ✓ System supports 10,000+ concurrent users without degradation
- ✓ Document uploads complete within 30 seconds for 100MB files
- ✓ Search results load within 2 seconds for 10M+ document corpus
- ✓ Auto-scaling handles 10x traffic spikes automatically
- ✓ Mobile apps work offline and sync when reconnected
- ✓ API responses meet SLA targets under normal and peak loads

## 11) Implementation Suggestions

### 11.1 Phased Approach

**Phase 1 (Months 1-4):** Core DMS with basic ERP integration

**Phase 2 (Months 5-6):** Advanced workflows and 5+ ERP connectors

**Phase 3 (Months 7-8):** Mobile app, AI features, and enterprise deployment