

# **DEVELOPMENT OF AN ELECTRONIC DOCUMENT MANAGEMENT TOOL WITH APPROVAL ROUTING AND TASK EXECUTION CONTROL IN IT COMPANIES**

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## **Анотація.**

У тезах представлено програмний засіб електронного документообігу для ІТ-компаній, який підтримує реєстрацію, зберігання та пошук внутрішніх і зовнішніх документів. Ключовою особливістю є налаштовувана маршрутизація погодження (послідовна та паралельна) з фіксацією візувань, коментарів і версій. Система дозволяє призначати доручення відповідальним виконавцям, контролювати строки та статуси виконання, а також автоматично надсилати нагадування й ескалації у разі прострочення. Для прозорості процесів формуються журнали руху документів і зведені звіти щодо стану проходження та дисципліни виконання. Запропоноване рішення підвищує керованість процесів та аудитопридатність у розподілених командах.

## **Abstract.**

This paper presents an electronic document management tool intended for IT companies that provides registration, secure storage, and fast retrieval of internal and external documents. The core capability is configurable approval routing (sequential and parallel) with traceable endorsements, comments and version history. The system supports assigning actionable tasks to responsible staff, monitoring deadlines and execution status, and issuing reminders and escalations when terms are breached. Operational transparency is strengthened through journals of document movement and summary reports on throughput and compliance. The proposed solution reduces manual

coordination, improves accountability and provides an auditable workflow for managers.

### **1. Introduction.**

IT companies handle contracts, HR and procurement documents, project artefacts and internal policies, often in distributed teams. When coordination is performed via email and shared folders, the organisation loses a single source of truth, approval history becomes fragmented, and outdated versions are reused. Document-related actions (reviews, revisions, client responses) require deadline control and clear ownership. These factors justify an electronic workflow that couples approval routing with execution monitoring.

### **2. Objective and requirements.**

The goal is to create a software tool for registering and storing documents, configuring approval routes, assigning responsible persons, controlling task deadlines, and producing journals and reports on document progress. The tool must support document types and metadata, file uploads with versioning, role-based routing, delegation and substitution, commenting and endorsement at each stage, task linkage to documents, notifications, and reporting by status, department, and period. Key non-functional requirements include usability, access control, audit logging and reliable persistence.

### **3. Workflow model and routing.**

A document is represented by metadata, attachments and a lifecycle state, whilst routing is defined as a configurable sequence or set of stages. Sequential routing processes stages one at a time; parallel routing collects multiple endorsements in a single stage. For each decision (approved, rejected, returned for revision), the system stores the actor, time stamp and comment, forming an auditable trail. Role-based participants, delegation, and temporary substitution address staff turnover and absences without disrupting routine.

#### **4. Task execution control.**

To bridge document circulation and operational work, the system creates tasks bound to a document, with a performer, due date, priority and status. Deadline control includes pre-due reminders, overdue notifications and escalation to a supervisor role after a configurable delay. Managers monitor progress through status transitions and time-to-completion metrics, which help to identify bottlenecks and improve process discipline.

#### **5. Architecture and security.**

The prototype follows a modular client-server architecture that separates the web interface from business services and data storage. A relational database stores metadata, routing states and audit events, while document files are kept in a protected repository with integrity checks. Security is enforced through role-based authorisation, permissions by document type and confidentiality level, and immutable audit records for critical actions. The design allows future integration with corporate identity providers and electronic signature services.

#### **6. Journals, reporting and evaluation.**

The tool generates journals of document movement (current stage, assigned participants, time in stage and final decision) and summary reports on throughput, average approval time, overdue tasks and workload distribution. Verification uses scenarios covering registration, versioning, sequential and parallel routing, rejection loops, delegation and escalation, plus consistency checks for the current state and approval history. The results show higher transparency of approvals and earlier detection of overdue work. Further development may include advanced full-text search, role-specific dashboards and integrations with project management and messaging platforms.