



Case Study: AI/ML Filing Review and Decision Support for U.S. Circuit Court

Accelerating Judicial Review Through Secure, Explainable AI

CloudWave delivered an advanced AI/ML-powered filing review and decision support solution for U.S. Circuit Court environments to improve the speed, consistency, and accuracy of judicial filing analysis.

The solution, powered by CloudWave's DocDigitizer AI platform, enables automated filing deficiency analysis, metadata-driven question answering, and source-grounded free-form Q&A across Civil, Criminal, and Bankruptcy filings, including handwritten Pro Se submissions.

Designed specifically for sensitive Federal judicial environments, the implementation leveraged CloudWave's proprietary "No-Data Architecture," ensuring that all AI processing, prompts, embeddings, logs, and outputs remained entirely within the customer-controlled infrastructure.

The result was a highly secure, auditable, and explainable AI platform that reduced manual review effort, improved consistency in filing analysis, and accelerated access to critical case information while maintaining human oversight and procedural integrity.



Customer Overview

The customer operates within a U.S. Circuit Court environment responsible for processing high volumes of judicial filings across multiple case types, including:

- Civil Matters
- Criminal Proceedings
- Bankruptcy Cases
- Pro Se Filings
- Handwritten Submissions & Scanned Attachments

Court personnel, clerks, attorneys, paralegals, and judges must rapidly review filings while maintaining strict standards for procedural fairness, evidentiary traceability, and judicial compliance.

Key Challenges

The Court faced significant operational challenges associated with processing and reviewing large volumes of heterogeneous filing data.

High Manual Review Burden

Court staff spent significant time reviewing filings against procedural checklists and extracting key information from lengthy case documents.

Complex Document Types

Filings included structured forms, scanned PDFs, attachments and exhibits, handwritten Pro Se submissions, and mixed-format judicial records.

Need for Accuracy and Auditability

Judicial workflows require traceable decisions, source-backed responses, explainability, repeatability, and human oversight.

Security and Compliance Constraints

Because filings contain highly sensitive judicial information, all AI capabilities had to operate entirely within the Court-controlled environment while supporting security, compliance, and ATO requirements.



CloudWave Solution

CloudWave implemented its DocDigitizer AI/ML platform using a secure compound AI architecture designed specifically for Federal and judicial environments.

Core Capabilities Delivered

Filing Deficiency Analysis

DocDigitizer analyzes filings against dynamically selected procedural checklists based on:

- Filing Type
- Case Type
- Filing Timelines
- Court Metadata
- Applicable Judicial Rules

The system identifies potentially deficient filings and provides source-backed reasoning to support human reviewers.

Metadata-Driven Question Answering

The platform automatically evaluates filings against predefined question sets selected through filing metadata. Examples include:

- Missing Documentation Detection
- Filing Completeness Verification
- Procedural Requirement Validation
- Case-specific Information Extraction

Free-Form Judicial Q&A

Authorized users can ask natural language questions across:

- Individual Filings
- Case Bundles
- Supporting Exhibits
- Historical Case Materials

Responses are generated only from authorized source material and include traceable evidence.



No-Data Architecture

CloudWave's No-Data Architecture ensured:

- **No judicial data left the Court-controlled environment.**
- **No prompts or responses were transmitted externally.**
- **No embeddings or vector data were shared with third-party services.**
- **No external AI vendor retained customer information.**

The Court retained full control over:

- Identity and Access Management
- Logging and Monitoring
- Security Policies
- Retention Controls
- Infrastructure Operations

AI/ML Approach

CloudWave implemented a compound AI system combining deterministic software with governed AI/ML capabilities.

Deterministic Components

Traditional software controlled:

- Workflow Routing
- Checklist Selection
- Access Controls
- Audit Logging
- Human Review Processes
- Metadata Management

AI/ML Components

AI capabilities supported:

- OCR and Handwriting-aware Extraction
- Semantic Retrieval
- Retrieval-augmented Generation (RAG)
- Metadata-filtered Retrieval
- Source-grounded Answer Generation
- Evidence-based Synthesis



Governance, Explainability, and Trust

CloudWave designed the implementation to maximize stakeholder trust and judicial transparency.

Explainable AI Controls

CloudWave designed the implementation to maximize stakeholder trust and judicial transparency by prioritizing explainability throughout the system architecture. The solution incorporated source-grounded responses, retrieval provenance, citation-backed outputs, deterministic replay capabilities, and repeatable response generation to ensure consistency and traceability. Human-in-the-loop validation mechanisms were also embedded into workflows, allowing court personnel to review, verify, and validate the exact source material supporting each answer or filing determination.

Hallucination Mitigation

To reduce hallucination risk and increase confidence in AI-generated outputs, CloudWave implemented multiple safeguards designed around evidence-first decision-making. The system leveraged closed-corpus retrieval, retrieval confidence scoring, citation-required responses, policy guardrails, and multi-pass verification processes to ensure outputs remained grounded in authoritative information. When sufficient evidence could not be identified, the system was designed to abstain rather than generate unsupported or potentially inaccurate answers, reinforcing reliability in high-stakes judicial workflows.

Security and Compliance

Because the implementation involved sensitive judicial information, CloudWave integrated AI capabilities directly into the Court's existing security and compliance framework.

Security Features

- Role-based Access Controls
- Access-aware Retrieval
- Customer-controlled Identity Management
- Audit Logging and Traceability
- Monitoring and Operational Controls
- Retention Policy Enforcement

Compliance Alignment

The implementation aligned with:

- NIST AI Risk Management Framework
- Federal AI Governance Guidance
- ATO Review Processes
- Judicial Data Handling Requirements
- Privacy and Evidentiary Controls



Measurable Outcomes

The implementation delivered measurable operational improvements across judicial workflows.



Reduced Manual Review Burden

AI-assisted deficiency analysis allowed reviewers to focus on exceptions and edge cases instead of manually validating every filing requirement.



Faster Information Access

Natural language Q&A accelerated access to relevant facts and case information.



Improved Consistency

Metadata-driven checklist analysis improved procedural consistency across filing reviews.



Enhanced Stakeholder Trust

Source-backed responses and full auditability increased confidence in AI-assisted decision support.



Scalable Foundation for Future Automation

The solution established a secure, governed path toward expanded automation after validation and operational maturity.

CloudWave Differentiators

Federal-Grade No-Data Architecture

AI operates entirely inside the customer environment.

Full Explainability and Auditability

Every answer can be traced back to authorized source material.

Compound AI Architecture

Combines deterministic workflows with governed AI/ML capabilities.

Human-in-the-Loop Governance

Supports responsible adoption for sensitive mission workflows.

Secure AI for Sensitive Environments

Purpose-built for Federal, judicial, and regulated environments.



Technologies and Capabilities

CloudWave leveraged the following advanced AI/ML capabilities:

- Retrieval-Augmented Generation (RAG)
- Hybrid Semantic and Keyword Retrieval
- OCR and Handwriting-aware Extraction
- Metadata-aware Retrieval
- LLMOps / ModelOps Governance
- Deterministic Replay
- Access-control-aware AI
- Continuous Evaluation and Monitoring
- Source-grounded Generation
- AI Risk Management and Governance

Conclusion

CloudWave successfully delivered a secure, explainable, and operationally effective AI/ML solution for U.S. Circuit Court environments, enabling faster filing review, improved consistency, enhanced transparency, and trusted AI-assisted decision support.

By combining Federal-grade governance, No-Data Architecture, source-grounded AI, and human oversight, CloudWave demonstrated how modern AI capabilities can responsibly support sensitive judicial workflows without compromising security, privacy, or procedural integrity.

About CloudWave

CloudWave delivers secure digital transformation solutions across Federal, State, and commercial environments with expertise in:

- Artificial Intelligence and Machine Learning
- Cloud Engineering and Modernization
- Salesforce Government Cloud
- Data Integration and Analytics
- Application Modernization
- Enterprise Automation
- Secure Federal Architectures

CloudWave specializes in delivering mission-focused, compliant, and scalable technology solutions for highly regulated environments.

