



Case Study

# Rebuilding the Vehicle Gallery Platform. From a Legacy CMS to a Scalable AWS-Powered Image Platform

# Executive Summary

The client is a leading online marketplace for collector, classic, and enthusiast vehicles. The platform operates a time-based auction model that combines transparent listings, a large and highly engaged community of members, and market-setting results, all in a fully digital environment.

The marketplace has sustained multiple consecutive years of more than \$1 billion in annual gross merchandise value across tens of thousands of auctions. Now part of a larger media holding company, the platform continues to operate independently, expanding into new geographic markets while growing its audience among younger buyer segments.

At the core of the client's experience is trust, and that trust is built on the quality and depth of every vehicle listing. Rather than simple imagery, photographs represent the essential signal of intent for buyers on a marketplace where transactions occur entirely without physical inspection.

# The Challenge

As the client's auction volume scaled, the limits of its legacy content-management-system-based image infrastructure became impossible to ignore. The platform was handling tens of thousands of vehicle listings, each requiring dozens of high-resolution photos, through an architecture never designed for that load.

## Key Client Needs

- **Replace fragile legacy upload** flows with a stable, scalable pipeline capable of handling large, high-resolution vehicle photo sets.
- **Centralize gallery state** — ordering, visibility, featured image, and deletion — outside of the legacy CMS, without breaking existing listing workflows.
- Introduce a **professional-grade admin image editor** with crop, rotate, redaction, and revert capabilities.
- Implement **secure image delivery** to protect high-value vehicle imagery from unauthorized access.
- Add AI-powered image classification and autosort to **reduce manual effort** for sellers and moderators at scale.
- Keep **legacy listings fully synchronized with the new AWS backend**, with zero disruption to the existing seller experience.

## Why AWS

- **Scalable Storage:** Amazon S3 and CloudFront provided the foundation for reliable, high-throughput image storage and low-latency global delivery.
- **Serverless Processing:** AWS Lambda enabled async image processing without managing infrastructure, scaling automatically with listing volume.
- **Security Controls:** KMS, Secrets Manager, SSM, and CloudFront signed cookies gave the client the security model required for a high-value transaction platform.
- **Event-Driven Reliability:** SQS, SNS, and EventBridge allowed decoupled, resilient sync flows between AWS services and the legacy CMS, with built-in retry and DLQ support.
- **Observability at Scale:** CloudWatch and X-Ray provided end-to-end visibility across the entire gallery pipeline from upload to delivery.

# The Solution

The solutions partner deployed a cross-functional team of 16–20 engineers over approximately 13 months to design, build, and harden a complete replacement for the client's gallery infrastructure. The engagement covered three interconnected workstreams: a new admin frontend, a purpose-built AWS gallery service, and a legacy CMS compatibility layer.

## Phase 1 — Admin UI & Image Management

The engagement began with a full redesign of the photo management experience for the client's admin team. The team built a drag-and-drop photo grid with multi-select, context menus, featured photo designation, zoom and detail modals, and bulk operations. Image editing was integrated directly into the admin flow using a third-party editing library, enabling crop, rotate, and redaction — along with revert-to-original and download/zip functionality.

## Phase 2 — AWS Gallery Service Backend

The core of the project was a new AWS-native gallery service designed to own all image and gallery state. The team built gallery and image management APIs backed by DynamoDB for state storage, S3 for durable image storage, and CloudFront for secure, signed CDN delivery. Upload flows were re-architected using a presigned-URL upload library, removing the legacy CMS entirely from the upload path and eliminating the fragility of large file handling through the legacy server-side stack.

Lambda functions handled asynchronous image processing with SQS-backed retries, dead-letter queues, and CloudWatch alarms providing reliability at scale. Gallery locking was implemented to handle concurrent admin edits, and a centralized manifest save/update API managed the complexity of image order, visibility, and featured state in a single authoritative source.

## Phase 3 — Legacy CMS Sync Layer

To preserve the existing seller and buyer experience, the team built a bidirectional sync layer that kept legacy CMS listings consistent with the new AWS gallery state. This included a legacy adapter pattern, gallery ULIDs for cross-system identity, and webhook callbacks that propagated attachment changes, ordering, visibility, and deletes back to the legacy system in real time.

## Phase 4 — AI Features & Hardening

With the core platform stable, the team integrated a third-party AI vision service for image classification and automated tagging, enabling AI-powered autosort for gallery organization — a meaningful efficiency gain for a platform processing thousands of new listings per week.

The final phase focused on production hardening: JWT authentication across all APIs, CloudFront signed cookies for secure image access, CORS and upload-size fixes, full test coverage, and a complete observability stack including Firehose-based data lake integration for audit and analytics.

## AWS Services & Architecture Overview

<b>S3 + CloudFront</b>	————	Scalable object storage and signed CDN delivery for all vehicle images
<b>Lambda + API Gateway</b>	————	Serverless gallery and image management APIs with JWT auth
<b>DynamoDB</b>	————	Fast, consistent gallery state and image manifest storage
<b>SQS + SNS + EventBridge</b>	————	Async processing, retries, and event-driven sync between AWS and the legacy CMS
<b>KMS + Secrets Manager + SSM</b>	————	Secure key management, secrets, and configuration
<b>Cognito + JWT</b>	————	Authentication layer for admin and API access control
<b>CloudWatch + X-Ray</b>	————	Full observability, tracing, and alerting across the platform
<b>Firehose + Data Lake</b>	————	Audit trail and analytics pipeline for image and gallery events
<b>Amplify + VPC</b>	————	Frontend hosting and isolated network security
<b>Third-party AI vision service</b>	————	Image classification and AI-powered autosort for gallery organization

# Outcome

The solutions partner delivered a complete, production-ready replacement for the client's gallery infrastructure — on time and without disruption to one of the most active collector car auction platforms in the world.

## Key Results

- A fully decoupled AWS gallery service replaced the legacy CMS as the system of record for all image and gallery state.
- Direct browser-to-S3 uploads via presigned URLs eliminated upload fragility and removed the legacy CMS from the critical upload path.
- CloudFront signed cookies and JWT auth enforced secure image delivery across all gallery assets.
- AI-powered classification and autosort reduced manual effort for gallery curation at scale.
- Legacy CMS listings remained fully synchronized throughout the migration, with zero disruption to the seller or buyer experience.
- The new architecture is designed to scale with the client's continued growth — supporting increasing auction volume, new market expansion, and future product development.

## Strategic Impact

For the client, the gallery is the product. Vehicle photos drive buyer confidence, bid activity, and final sale prices. A platform processing well over a billion dollars in annual transactions cannot afford gallery infrastructure that fails under load, leaks assets, or slows down sellers.

By migrating to a purpose-built AWS architecture, the client now operates a gallery platform with the reliability, security, and scalability to match its market position, and a foundation to support product expansion as the platform continues to grow.

For the solutions partner, this engagement demonstrates the ability to execute complex, multi-workstream modernization projects in high-stakes production environments, combining cloud infrastructure expertise, AI integration, and deep legacy-platform knowledge in a single cohesive delivery.

# Why Flatiron?

Flatiron delivers complex AI transformation projects at enterprise scale—fast, independently, and with no disruption to your existing teams. Our model lets you capture the value of AI while protecting your core business and product roadmap. From project management to technical delivery, we bring deep expertise, proven process, and clear accountability.

**Ready to see what AI can do for your company?**

**Let's talk.**

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