# Technical Case Study: Alloquy Grounded Fact Engine & AI Recruiter Companion

## Executive Summary

**Alloquy** is an AI-powered interactive proof portfolio and recruiter intelligence platform designed to replace flat, unverified 1-page PDF resumes with grounded, verifiable candidate proof systems. The platform combines deterministic LinkedIn export tools, multi-tier document access security, real-time media ingestion, and zero-hallucination conversational agents grounded strictly in candidate artifacts.

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## Target Audience & Ideal Customer Profiles (ICPs)

### 1. Executive Recruiters & Technical Talent Acquisition Leaders

- **Pain Point**: Overwhelmed by exaggerated claims, keyword stuffing, and unverified achievements on standard PDF resumes.
- **Value Realization**: An interactive recruiter AI companion that answers deep technical questions with direct citations to verified case studies, prototypes, and live code repositories.

### 2. Senior Technology Leaders, Staff Engineers & Product Architects

- **Pain Point**: 1-page PDF resumes cannot convey the depth of multi-year distributed systems architecture, complex migrations, or leadership impact.
- **Value Realization**: A live, interactive proof portfolio featuring zero-hallucination conversational agents, verified evidence packages, and a 1-click LinkedIn profile exporter.

### 3. Hiring Managers & Technical Interviewers

- **Pain Point**: Preparing for candidate screen interviews takes 30-45 minutes of manual resume parsing and cross-referencing.
- **Value Realization**: Instant candidate verification summaries, verifiable project evidence packages, and contextual technical drill-downs.

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## Primary Use Cases & User Workflows

### Use Case 1: Grounded Recruiter Inquiry & Technical Deep-Dive

- **Workflow**: A technical recruiter visits a candidate's public Alloquy profile and asks: *"What serverless technologies were used in the Wayfinder project and how was the database designed?"*
- **Execution**: The grounded fact engine retrieves verified project metadata and case studies, synthesizing an accurate, fact-checked response with citation pills linking directly to attached artifacts.

### Use Case 2: 1-Click LinkedIn Profile & Resume Export

- **Workflow**: A candidate updates their portfolio with new project achievements and wants to update their LinkedIn profile and resume bullets.
- **Execution**: The user opens the 1-Click LinkedIn Exporter, selects their desired tone (*Executive & Balanced*, *Technical Focus*, or *Impact Focus*), chooses their layout format (*Bullets*, *Consolidated Paragraph*, or *Hybrid*), and clicks **Copy All** to instantly paste calibrated copy into LinkedIn.

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# Technical Architecture & System Implementation

## Architecture Flow Pipeline

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None
[ Presentation Layer ]
  └─► Next.js 15 App Router (TypeScript / Tailwind CSS / Radix UI)
        |
        ▼
[ Application & Edge Layer ]
  └─► Server Actions & Edge API Routes
        |
        ├─► [ Data & Storage ]   : Firebase Admin & Cloud Firestore (Artifact Datastore)
        ├─► [ Fact Engine ]      : Google Genkit & Gemini (Grounding RAG Engine & AI Chat)
        └─► [ Billing & Access ] : Stripe Billing Engine (Tier Permissions & Webhook Sync)
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## Architectural Component Specifications

| Layer | Core Technologies | Primary Function & Responsibilities |
|---|---|---|
| **Presentation Tier** | Next.js 15 App Router, React 19, Tailwind CSS, Radix UI | Glassmorphic proof portfolio, dynamic exporter modals, responsive dashboards |
| **Application & Edge** | TypeScript, Next.js Server Actions, Edge Routes | Form validation, server-side proof generation, and session management |
| **AI Grounding Engine** | Google Genkit, Gemini Flash | Context-bounded RAG query synthesis with zero hallucination enforcement |
| **Database & Storage** | Cloud Firestore, Google Cloud Storage | Multi-tenant profile datastores, signed URL artifact links, real-time listeners |

| Layer | Core Technologies | Primary Function & Responsibilities |
| --- | --- | --- |
| **Monetization & Auth** | Stripe Billing, Firebase Authentication | Tiered access management (Free, Hobby, Pro), checkout sessions & webhooks |

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## Technical Highlights

### 1. Modern Front-End Architecture

- **Framework**: Next.js 15 (React 19) App Router utilizing React Server Components (RSC) and Client Components.
- **Styling & UI**: Tailwind CSS with custom glassmorphic design tokens, Radix UI accessible primitives, and dark/light adaptive theming.
- **State Management**: Reactive custom hooks and optimistic UI updates for seamless client-side filtering and sorting.

### 2. Grounded Fact Engine & AI Pipeline

- **Orchestration**: Google Genkit framework integrated with Gemini models.
- **Citation & Verification Layer**: Dynamic context grounding that bounds AI responses strictly to the candidate's verified achievements and uploaded document artifacts.
- **Deterministic LinkedIn Exporter**: Deterministic multi-style synthesis engine generating tailored executive accomplishment bullets, role paragraphs, and structured skills without AI hallucination.

### 3. Backend & Multi-Tier Infrastructure

- **Database**: Cloud Firestore with composite querying, collection indexing, and real-time document listeners.
- **File Storage**: Secure Cloud Storage with signed URL generation for verified artifact inspection.
- **Billing & Subscriptions**: Stripe Checkout, Customer Portal, and idempotent webhook handlers managing tiered feature access (Free, Hobby, Pro).

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## Core Technologies & Tools

- **Languages**: TypeScript, JavaScript, SQL, HTML5/CSS3
- **Frameworks & Libraries**: Next.js, React, Node.js, Tailwind CSS, Radix UI, Lucide Icons
- **AI & RAG**: Google Genkit, Google Gemini Models, Grounded Fact Synthesis
- **Cloud & Database**: Firebase Firestore, Cloud Storage, Firebase Auth, Google App Hosting
- **Integrations**: Stripe API, Google Drive REST API, Mobile WebRTC Uploads
- **DevOps & Quality**: Git, ESLint, Turbopack

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## Key Deliverables & Outcomes

- **Zero-Hallucination Recruiter Intelligence**: Delivered an AI assistant that answers hiring queries with 100% adherence to verified user facts and proof citations.
- **Streamlined Candidate Workflow**: Built a 1-click LinkedIn export tool reducing profile tailoring time from hours to seconds.
- **Enterprise-Grade Security**: Implemented gated evidence protection requiring recruiter inquiry verification before exposing sensitive document assets.