

ServeFlow AI

Architecture & Progress Documentation

1. Project Overview

ServeFlow AI is a modern, AI-powered service marketplace platform that connects customers with service providers through intelligent request analysis, real-time communication, and transparent financial workflows.

The system is designed as a **production-ready, event-driven platform** rather than a prototype, with emphasis on:

- Resilient AI integrations
- Real-time UX
- Multi-role system design
- Scalable backend architecture

2. Technology Stack

Backend

- **Framework:** Django REST Framework (DRF)
- **Real-Time Layer:** Django Channels + Redis
- **Database:** SQLite3 (current), schema designed for PostgreSQL migration
- **AI Engine:** Google Gemini Pro Vision (google-generativeai SDK)
- **Authentication:** DRF Token Authentication (HTTP + WebSocket)
- **Email:** SMTP
- **Async & Events:** Signals + WebSocket event bus

Frontend

- **Framework:** React.js (Vite)
- **Styling:** Tailwind CSS + Custom Glassmorphism System
- **Animations:** Framer Motion
- **State Management:** Context API
- **Routing:** React Router DOM
- **HTTP Client:** Axios
- **Real-Time:** Native WebSocket integration via Context

3. Major Architectural Upgrades (Completed)

3.1 Production-Grade AI Intelligence Engine

Objective

Replace mock or static AI responses with a resilient, production-capable AI system.

Implementation

- Integrated **Google Gemini Pro Vision**
- Backend module:
`backend/api/views_ai.py`

Key Capabilities

- **Visual Request Analysis**
 - Accepts image uploads (multipart / base64)
 - Sends image + contextual prompt to Gemini Vision
 - Returns structured JSON:
 - Category
 - Technical title
 - Description
 - Urgency level
 - Estimated budget
- **Multi-Key Resilience System**
 - SystemSettings model stores **multiple independent API keys**
 - Automatic key rotation on 429 rate-limit errors
- **Graceful Degradation**
 - If all AI keys fail, system falls back to simulated AI output
 - Prevents request failure and preserves UX continuity

Status: Completed & Production-Ready

3.2 Real-Time Event Bus (WebSocket Ecosystem)

Objective

Eliminate HTTP polling and move to a fully event-driven architecture.

Infrastructure

- Django Channels
- Redis (`channels_redis`) as channel layer
- Supports fan-out and scalable real-time messaging

Security

- Custom `TokenAuthMiddleware`
- DRF token validation for WebSocket connections

Communication Channels

- `ws/notifications/`
 - Global notifications
 - Job offers
 - Status updates
 - System alerts
- `ws/chat/<job_id>/`
 - Isolated provider–customer chat rooms
 - Message persistence

Frontend Integration

- `WebSocketContext.jsx`
 - Centralized connection handling
 - Auto-reconnect strategy
 - Global state dispatch

Status: Completed

3.3 UI / UX Overhaul (Glassmorphism System)

Objective

Upgrade from a functional UI to a premium, modern product experience.

Global Design System

- Implemented in `index.css`
- Core utilities:
 - `.glass`, `.glass-card`
 - Backdrop blur
 - Semi-transparent layered panels

Animation System

- Custom motion patterns:
 - `blob` (floating gradients)
 - `scale-in` (modal & card transitions)

Component Modernization

- Landing Page:
 - 3D hero section
 - Animated feature cards
- Dashboards:
 - `Dashboard.jsx`
 - `ProviderDashboard.jsx`
 - `AdminPanel.jsx`
- Navigation:
 - Scroll-aware transparent navbar

Status: Completed

4. Backend Core Modules

Module	Purpose	Status
Authentication	User / Provider / Admin roles	<input type="checkbox"/> Complete
Request Engine	Service lifecycle management	<input type="checkbox"/> Complete
AI Service	Request & dispute analysis	<input type="checkbox"/> Complete
Matching System	Bid-based provider matching	<input type="checkbox"/> Complete
Financials	Invoices & commissions	<input type="checkbox"/> Partial
Messaging	Real-time chat	<input type="checkbox"/> Complete
Notifications	Email + UI alerts	<input type="checkbox"/> Complete
Audit Logs	Security & traceability	<input type="checkbox"/> Complete

5. Frontend Feature Modules

5.1 Mission Control – Provider Dashboard

File

- frontend/src/pages/ProviderDashboard.jsx

Core Concepts

- Jobs treated as “**Missions**”
- State machine:
 - Pending → Initiated → Completed
- Embedded real-time chat
- Live statistics engine:
 - Trust rating
 - Revenue
 - Mission success rate

Status: Completed

5.2 Intelligent Admin Control Panel

Files

- AdminSettings.jsx
- AdminCategories.jsx

Key Features

- Live theme & color preview
- Service category management with image previews
- Secure AI key vault (multi-key management)

Status: Completed

5.3 AI-Assisted Visual Request Creation

File

- frontend/src/pages/CreateRequest.jsx

Workflow

1. User uploads an image
2. AI analyzes the issue
3. System auto-fills:
 - Title
 - Description
 - Category
4. Backend maps AI output to internal category IDs

Impact

- Reduced user friction
- Higher-quality requests
- Faster provider matching

Status: Completed

6. Recent Sprint: Stability & Bug Fixes

Delivered Fixes

- Auth-aware navbar logic
- Branding & SEO consistency
- Footer icon import issues
- Admin save-flow repairs
- Image preview normalization
- Provider dashboard crash prevention
- Profile image uploads via `FormData`
- Notification triggers verified

Status: Completed

7. Gap Analysis (Current)

Feature	Status	Notes
Core Job Loop	Completed	End-to-end operational
Real-Time Chat	Completed	Persistent + secure
Visual Design	Completed	Glassmorphism system
Payments	Pending	Stripe integration planned
Dockerization	Planned	Dockerfile + compose

8. Overall Project Status

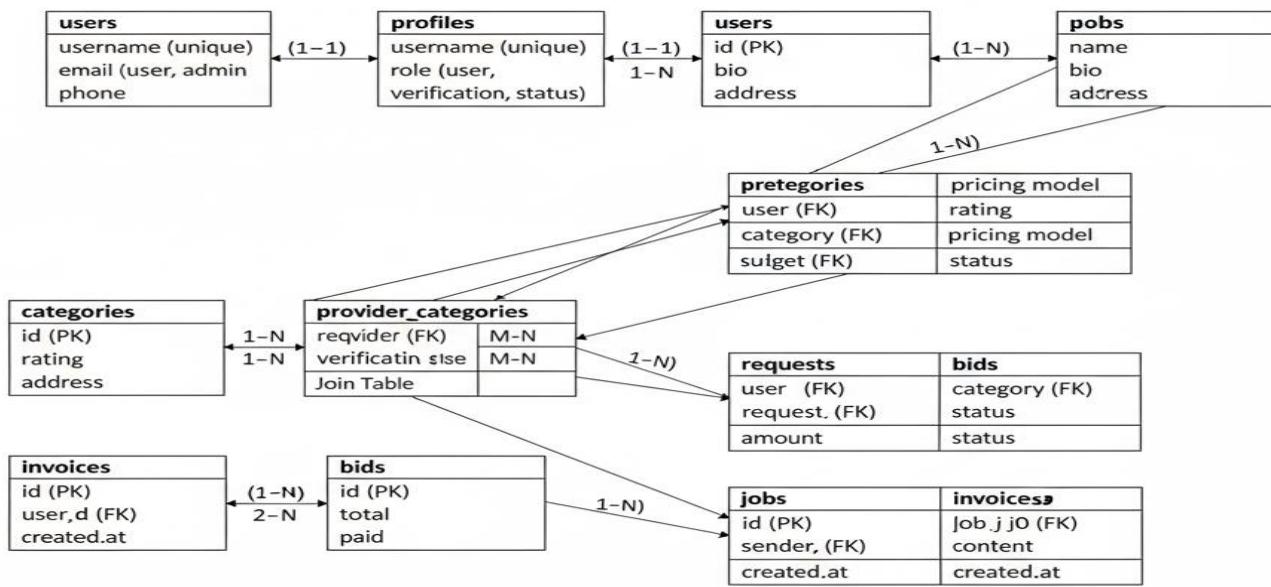
ServeFlow AI has moved beyond prototype stage.

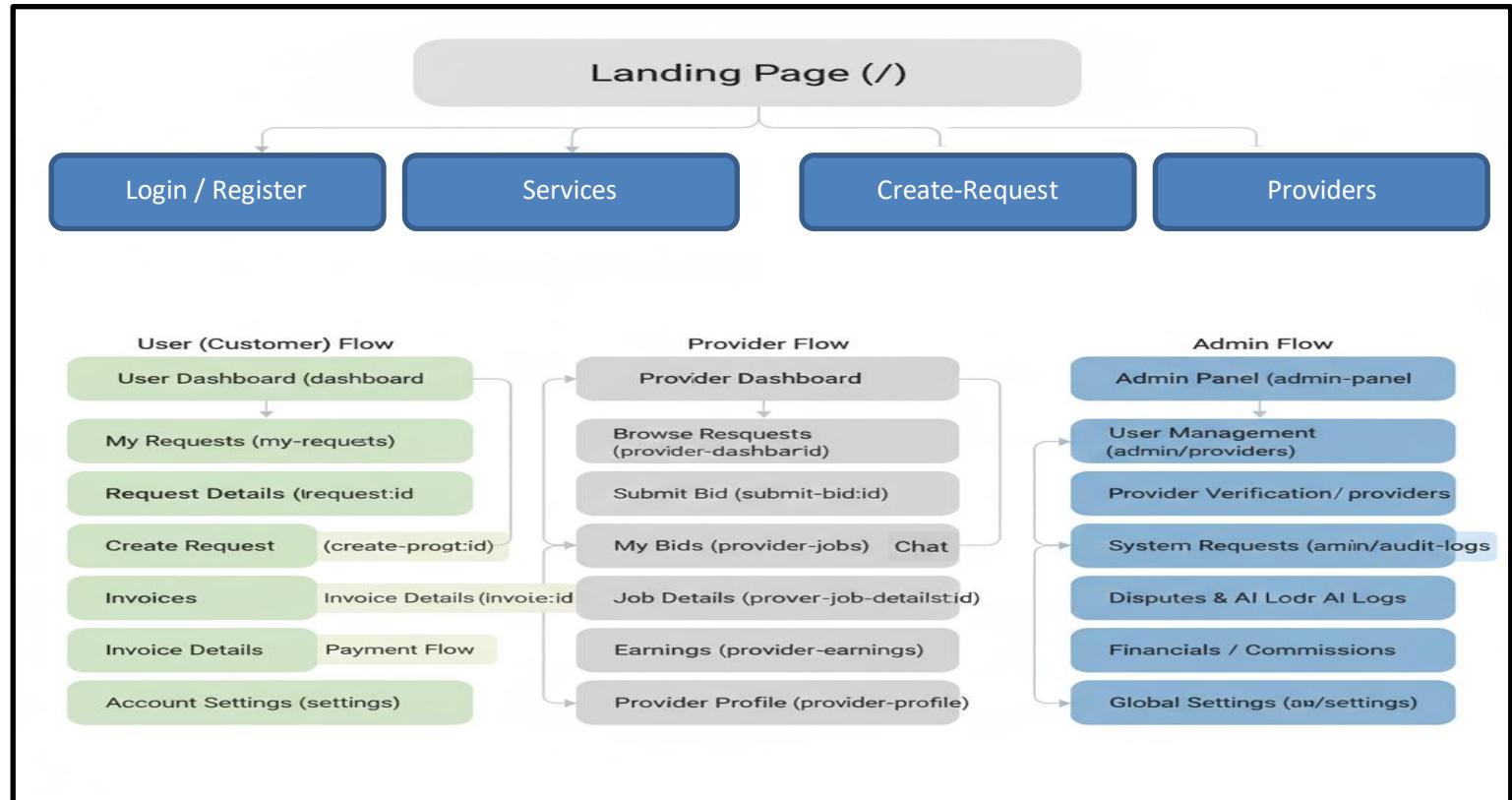
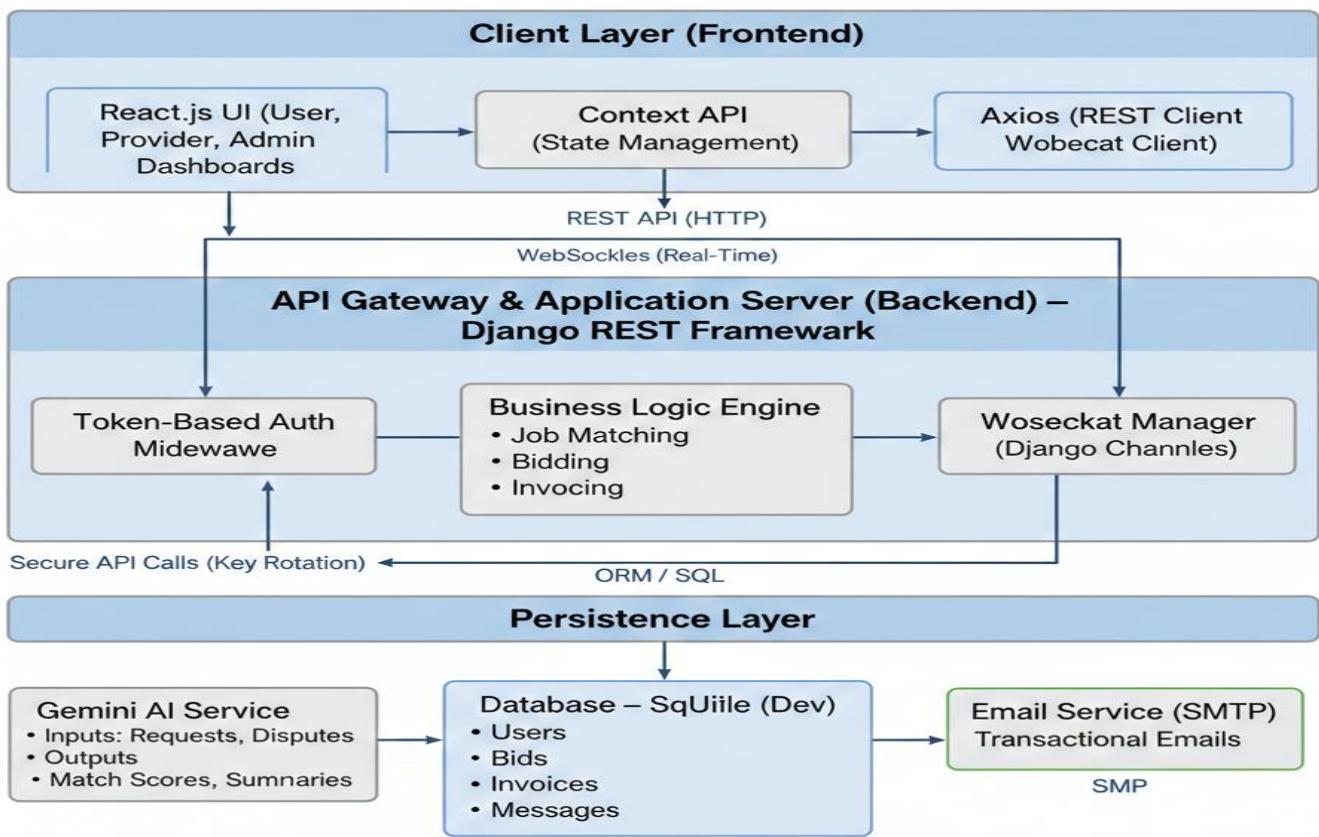
The platform now has:

- **A real AI engine**
- **Event-driven real-time UX**
- **Multi-role dashboards**
- **Production-grade architecture decisions**

Remaining work is **infrastructure hardening**, not core system design.

DIAGRAMS





SCREENSHOTS

The screenshot shows the homepage of the ServeFlow AI website. At the top, there's a navigation bar with the logo "ServeFlow" and links for "Features", "Services", "Providers", "Log In", and "Get Started". Below the header, a banner features the text "AI-Powered Service Aggregator" and a large, bold title "Services at the Speed of AI". A subtext below the title reads: "Experience the future of home services. Our advanced AI matches you with top-rated professionals instantly, ensuring quality and peace of mind." Two buttons are present: "Book a Service" and "Watch Demo". To the right, a callout box displays a professional profile for "John Doe" (Plumbing Specialist), showing a 5-star rating, a "Verified Pro" badge (Background Checked), and a "Job Completed" status with a green checkmark icon.

The screenshot shows the sign-in page of the ServeFlow AI website. It features a "Welcome back" message and a "Please enter your details to sign in" placeholder. There are fields for "Email address or Username" and "Password", with a "Forgot password?" link next to the password field. A "Sign in" button is located at the bottom of the form. Below the form, a link says "Don't have an account? Sign up for free". To the right of the sign-in form is a large, semi-transparent promotional image. The image shows several people in a modern office setting, working on laptops and discussing documents. Overlaid on this image is the text "The AI-Powered Marketplace for Professional Services" and a subtitle: "Experience the future of service connection. Intelligent matching, seamless bidding, and secure completions."

Create Account

Join our AI-powered service platform

I want to register as:



Customer
Request services



Provider
Offer services

First Name *

Last Name *

Username *

Email *

Phone (Optional)

Password *

ADMIN

PROTOCOL ACTIVE



A Admin Session
Status: Encrypted

Command Center

Global infrastructure management and protocol oversight

System Config

S ServeFlow AI
AI CORE POWERED

NAVIGATION HUB
Command Center

MANAGEMENT

Client Base

Service Force

Market Specs

SYSTEM PROTOCOLS

Live Bids

System Jobs

Terminate Session

CLIENT BASE

7



SERVICE FORCE

2

ACTIVE JOBS

8



NET REVENUE

PKR130



VERIFICATION QUEUE

PENDING BOTS

SYSTEM HEALTH

GLOBAL API

NOMINAL

AI DIAGNOSTICS

ACTIVE



NEW SPEC



LIVE FLOW

All entities successfully verified.

VIEW ENTIRE FORCE ARCHIVE

ServeFlow AI
AI CORE POWERED

PROVIDER
PROTOCOL ACTIVE

Execution Hub
Managing active missions and performance metrics

TOTAL MISSIONS 3

SUCCESSFUL ENDS 2

TOTAL REVENUE \$810

TRUST RATING 2.50

AVAILABLE MISSIONS

ID #9 **Protocol Implementation** COMPLETED
MATCH: % INITIATED: 12/31/2025

ID #7 **Protocol Implementation** ACCEPTED
MATCH: % INITIATED: 12/31/2025

[\[→\] Terminate Session](#)

Provider Session
Status: Encrypted

STATUS
Online & Ready

POTENTIAL TASKS 3

ServeFlow AI
AI CORE POWERED

DASHBOARD
PROTOCOL ACTIVE

System Status
Monitoring your service ecosystem in real-time

TOTAL DEPLOYMENTS 5

ACTIVE PROTOCOLS 0

VALIDATED RESULTS 4

OPERATION CENTER

Initialize New Request
Launch AI-powered service diagnostics

Deployment History
Monitor active protocols and logs

Live Efficiency Metrics
System performance is currently optimal with 99.9% uptime across all active nodes.

[\[→\] Terminate Session](#)

User Session
Status: Encrypted

New Request

ServeFlow AI AI CORE POWERED

NAVIGATION HUB

- Command Center
- Client Base**
- Service Force
- Market Specs
- Live Rides
- Terminate Session

PROTOCOL ACTIVE

Users Management

Manage all platform users

ID	Username	Email	Role	Status	Joined	Actions
#1	admin *	admin@example.com	admin	Active	12/4/2025	Edit Delete
#2	Admin *	codewithtaha.mentor@gmail.com	admin	Active	12/4/2025	Edit Delete
#3	taha	noreply@ecommerce.com	user	Active	12/7/2025	Edit Delete
#4	company123	compay123@gmail.com	provider	Active	12/7/2025	Edit Delete
#5	test_provider_debug	p@debug.com	provider	Active	12/8/2025	Edit Delete
#7	electricpro	electric@pro.com	provider	Active	12/10/2025	Edit Delete

ServeFlow AI AI CORE POWERED

NAVIGATION HUB

- Command Center
- Service Force**
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- Live Rides
- Terminate Session

PROTOCOL ACTIVE

Provider Management

Verify and manage service providers

All Providers

S Smart Solutions VERIFIED

No bio provided.

Rating 0.00 ★

Completed Jobs 0

Total Earnings \$0.00

Manage View Profile ✖

J John Electrician VERIFIED

No bio provided.

Rating 2.50 ★

Completed Jobs 0

Total Earnings \$0.00

Manage View Profile ✖

ServeFlow AI
AI CORE POWERED

NAVIGATION HUB

- Command Center

MANAGEMENT

- Client Base
- Service Force
- Market Specs**

SYSTEM PROTOCOLS

- Live Bids
- Terminate Session**

CATEGORIES

PROTOCOL ACTIVE

Service Categories
Manage available services and pricing

+ Create New Category

Name	Pricing Model	Base Price	Status	Actions
Plumb	Hourly	\$50.00	Active	
Electrical	Hourly	\$50.00	Active	
Cleaning	Hourly	\$50.00	Active	
Carpentry	Hourly	\$50.00	Active	
Painting	Hourly	\$50.00	Active	

ServeFlow AI
AI CORE POWERED

MANAGEMENT

- Client Base
- Service Force
- Market Specs

SYSTEM PROTOCOLS

- Live Bids**
- System Jobs
- Global Config
- Terminate Session**

REQUESTS

PROTOCOL ACTIVE

Service Requests
Manage and monitor all user service requests

Search requests... All Status

ID	TITLE	STATUS	USER	DATE	ACTIONS
#8	Urgent Plumbing Repair Needed	completed	taha	12/31/2025	
#7	Urgent Plumbing Repair Needed	assigned	taha	12/31/2025	
#6	clean my office	completed	taha	12/11/2025	
#5	my electricity is flickering	completed	taha	12/10/2025	
#3	fix my kitchen sink water leakage	completed	taha	12/7/2025	

ServeFlow AI

AI CORE POWERED

JOBS
PROTOCOL ACTIVE

NAVIGATION HUB

- Command Center
- Client Base
- Service Force
- Market Specs

SYSTEM PROTOCOLS

- Live Bids
- System Jobs

Jobs Management
Monitor and manage all jobs

All Pending Accepted Started Completed Cancelled

Pending	Accepted	Started	Completed	Cancelled
1	1	0	4	1

Job ID	Request	Customer	Provider	Status	Budget	Created	Actions
#9	Urgent Plumbing Repair Needed	taha	electricpro	completed	\$800.00	12/31/2025	View
#8	Urgent Plumbing Repair Needed	taha	company123	pending	\$800.00	12/31/2025	View
#7	Urgent Plumbing Repair Needed	taha	electricpro	accepted	\$800.00	12/31/2025	View
#6	Urgent Plumbing Repair Needed	taha	company123	cancelled	\$800.00	12/31/2025	View
#5	clean my office	taha	electricpro	completed	\$100.00	12/11/2025	View

Terminate Session

A Admin Session Status: Encrypted

ServeFlow AI

AI CORE POWERED

SETTINGS
PROTOCOL ACTIVE

NAVIGATION HUB

- Command Center
- Client Base
- Service Force
- Market Specs

SYSTEM PROTOCOLS

- Live Bids
- System Jobs

System Settings
Command center for platform-wide logic and aesthetics

LIVE

Platform

- Payments
- AI & Features
- Mail Server
- Revenue
- Appearance

General Platform
Manage public identity and basic info

Platform Name: ServeFlow AI

Support Email: support@serveflow.ai

CURRENCY & DISPLAY

Symbol: PKR

Maintenance Mode
When active, only administrators can access the platform.

Platform is Online

A Admin Session Status: Encrypted