FlowShare

Production-Grade Automated Hydrocarbon Allocation Platform

Weeks of Reconciliation, Minutes of Dispute

Slow & Error-Prone

Petroleum allocation reconciliation in joint ventures currently takes **weeks**, is prone to errors, and causes costly disputes between partners.

Costly Disputes

Errors in manual Excel reconciliation or expensive legacy enterprise software lead to significant financial disagreements between joint venture partners.

FlowShare: Automated, Accurate, and AI-Powered

FlowShare automates petroleum allocation calculations using **API MPMS 11.1 industry standards**, reducing reconciliation time from weeks to minutes with **99.9% accuracy**.

- 95% faster reconciliation (weeks → minutes)
- 99.9% calculation accuracy using API MPMS 11.1
- AI anomaly detection prevents costly disputes
- Complete audit trail with Excel exports
- Multi-role access control
- SCADA integration for automated data ingestion
- FlowshareGPT for natural language queries

Event-Driven, Serverless, and Multi-Agent AI

Cloud-Native Deployment

Deployed on Google Cloud Run with FastAPI backend and Next.js 15/React 19 frontend. Serverless cost efficiency (scale-to-zero).

Multi-Agent AI System

Three AI agents (Auditor, Accountant, Communicator) and Google Gemini AI for anomaly detection.
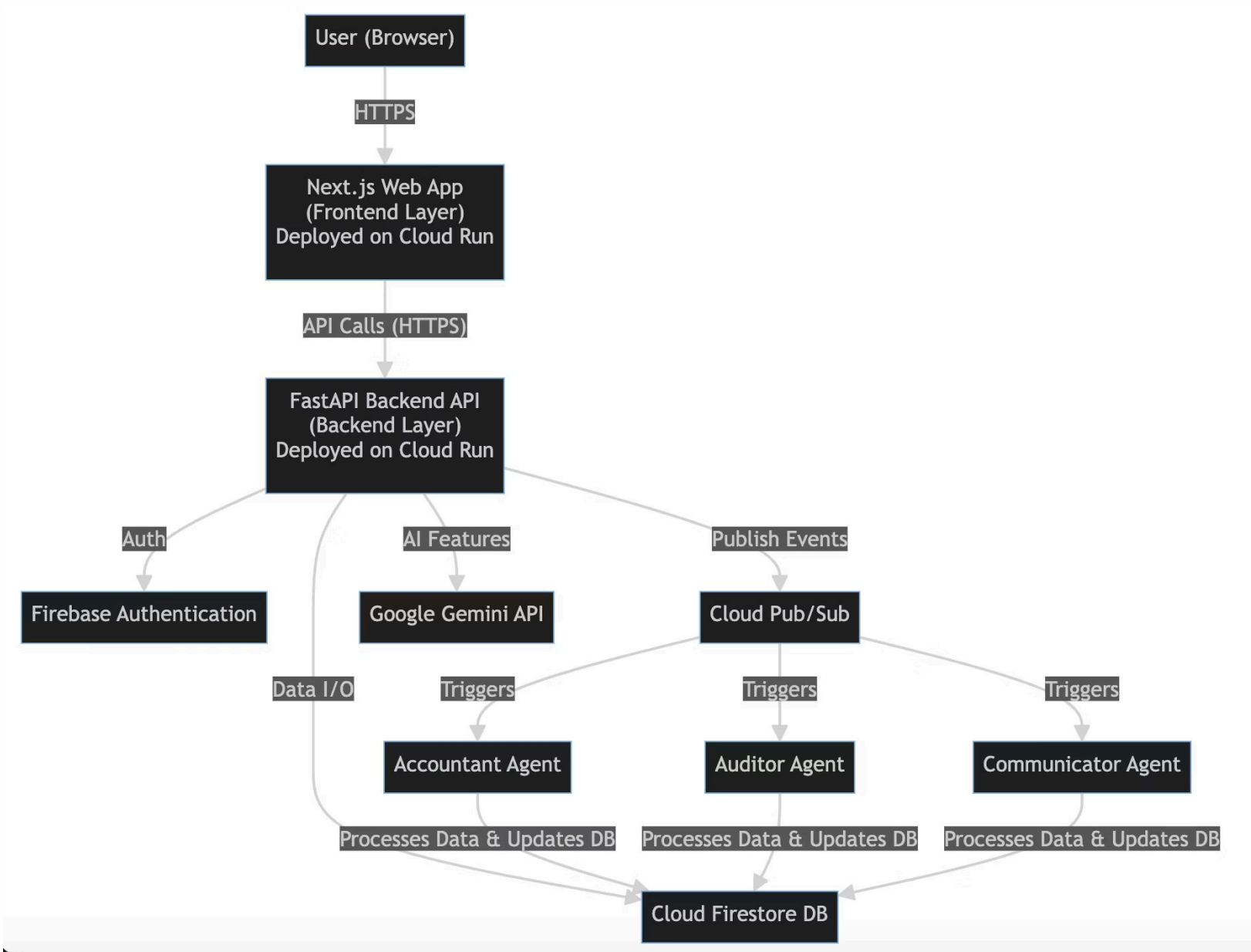
Event-Driven Architecture

Utilizes Cloud Pub/Sub (6 topics) for asynchronous communication between 5 Cloud Run microservices.

Technology stack: Next.js 15, React 19, FastAPI, Google Cloud Run, Firestore, Pub/Sub, Gemini API, Firebase Authentication.

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Multi-Agent System Data Flow

```
                    ┌─────────────────┐
                    │  User (Browser) │
                    └─────────────────┘
                             │
                           HTTPS
                             │
                             ▼
                ┌──────────────────────────┐
                │     Next.js Web App       │
                │    (Frontend Layer)       │
                │   Deployed on Cloud Run   │
                └──────────────────────────┘
                             │
                      API Calls (HTTPS)
                             │
                             ▼
                ┌──────────────────────────┐
                │    FastAPI Backend API     │
                │     (Backend Layer)        │
                │   Deployed on Cloud Run    │
                └──────────────────────────┘
              Auth         AI Features    Publish Events
               │               │               │
               ▼               ▼               ▼
    ┌──────────────────┐  ┌──────────────┐  ┌──────────────┐
    │     Firebase     │  │ Google Gemini│  │ Cloud Pub/Sub│
    │  Authentication  │  │     API      │  │              │
    └──────────────────┘  └──────────────┘  └──────────────┘
                              Triggers    Triggers    Triggers
                                 │            │            │
                                 ▼            ▼            ▼
                  ┌──────────────┐ ┌──────────────┐ ┌──────────────────┐
         Data I/O │  Accountant  │ │   Auditor    │ │   Communicator   │
                  │    Agent     │ │    Agent     │ │      Agent       │
                  └──────────────┘ └──────────────┘ └──────────────────┘
     Processes Data & Updates DB  Processes Data & Updates DB  Processes Data & Updates DB
                             │            │            │
                             ▼            ▼            ▼
                         ┌──────────────────────┐
                         │  Cloud Firestore DB   │
                         └──────────────────────┘
```

Targeting a $3.2 Trillion Industry

Target Market

Oil & gas joint venture operators globally - **$3.2 trillion industry** with thousands of joint ventures requiring daily allocation reconciliation.

Business Model

SaaS subscription model with three tiers based on number of partners and reconciliations per month:

- Starter: Free
- Professional: $499/month
- Enterprise: $999/month

Outperforming Legacy Systems

Method	Manual Excel reconciliation or expensive legacy enterprise software	**AI-powered validation** and automated calculation
Architecture	Monolithic, on-premise	**Event-driven**, serverless, multi-tenant SaaS
Cost Efficiency	High fixed costs	**Serverless cost efficiency** (scale-to-zero)
Accuracy	Prone to human error	**99.9% accuracy** using API MPMS 11.1

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Industry Experts Give a Positive Nod

Production Ready

Deployed production system on Google Cloud Platform.

Expert Feedback

Met with industry professionals and gotten encouraging feedback.

Key Endorsements

Particularly a senior staff at Oando, the Former Council Chair of Society of Petroleum Engineers Nigeria Council, and the President of Nigeria Institute of Petroleum and Gas Engineers have provided insight and given it a positive nod.

See the live application: **https://flowshare-frontend-226906955613.europe-west1.run.app/**

Demo admin panel: **https://flowshare-frontend-226906955613.europe-west1.run.app/demo-admin** (Password: FlowShare@Demo2025)

Demo video: **https://youtu.be/yjV5SEOnyAU**

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Meeting Codematic Hackathon Requirements

1 **Production Readiness**

Production-ready application deployed on Google Cloud Platform.

2 **Real Industry Impact**

Solves a real industry problem with measurable impact (95% time savings, 99.9% accuracy).

3 **Technical Excellence**

Demonstrates technical excellence (event-driven architecture, multi-agent AI, serverless deployment).

4 **Modern Cloud-Native**

Uses modern cloud-native technologies (Cloud Run, Pub/Sub, Gemini API).

5 **Validated Traction**

Has validated traction with industry experts.

6 **Scalable Model**

Scalable business model with clear monetization strategy.

Engineering Excellence Meets Industry Need

Team Expertise

Daniel Olagunju - Petroleum Engineering graduate, current Masters student in Petroleum Engineering at UTP Malaysia, Software Engineer by profession with over 5 years of experience building production systems.

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