SDG BLOCKCHAIN ACCELERATOR

Technical Architecture Document – Template

1. Project Information

- **Project Name: _____**
- **Challenge & UNDP Office: _____**
- **Document Version: _____**

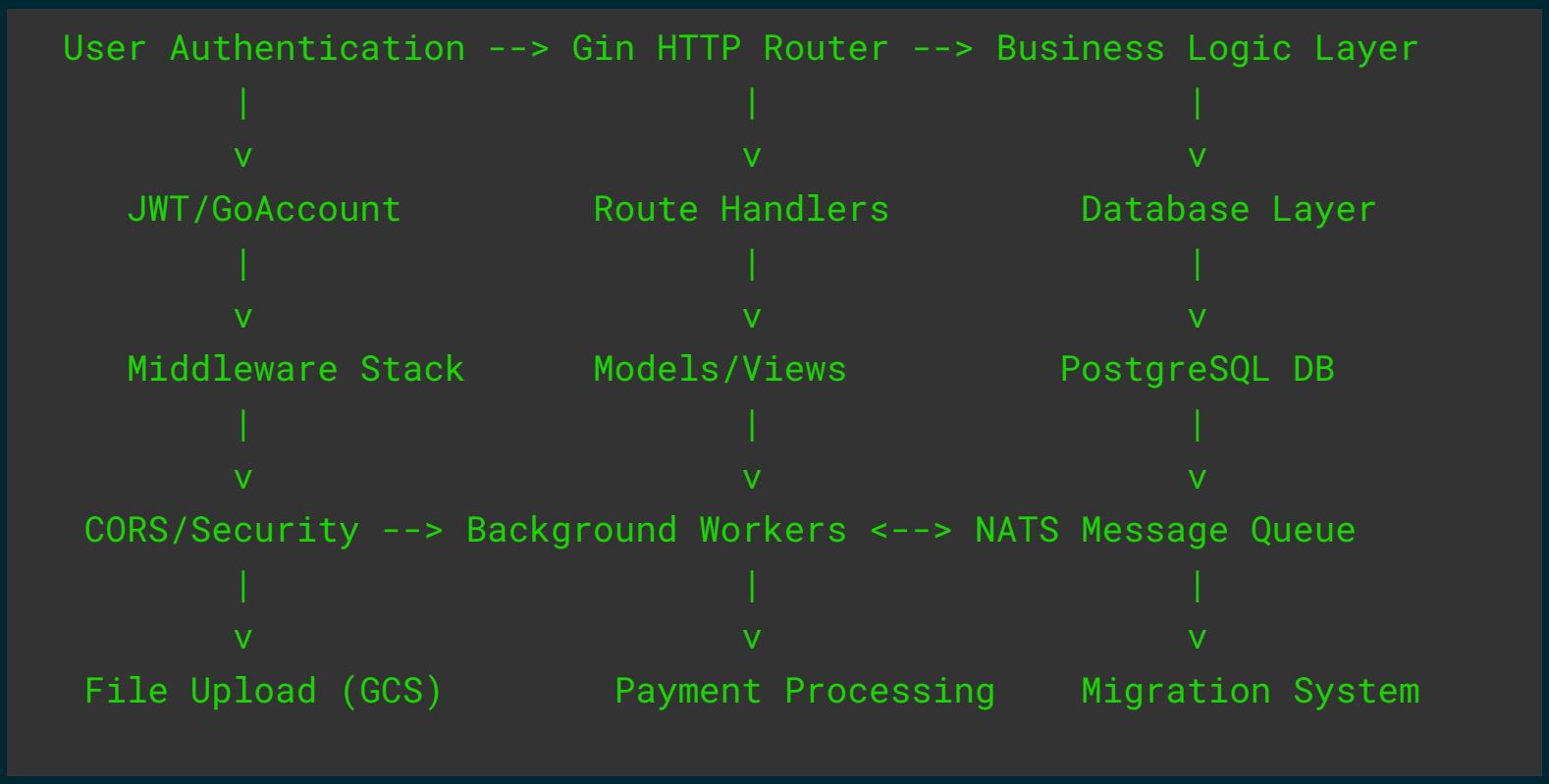
2. Overview

We are helping schools in Mauritius switch to solar energy through a blockchain-based crowdfunding platform.

- **This will lower schools' electricity costs, support the country's renewable energy targets, and build climate resilience.**
- **The initiative introduces a scalable, community-driven model for financing clean energy in Small Island Developing States (SIDS).**
- **It directly aligns with the Mauritian Government's energy strategy and contributes to several UN Sustainable Development Goals (SDGs).**
- **The project is being developed in partnership with the Mauritian government, UNDP, certified solar installers, and technology providers.**

3. System Architecture Diagram

Architecture:



4. Blockchain Design

- **Smart Contracts:**

  N/A

- **UTxO Model Usage:**

  N/A

- **Token Management:**

  N/A

- **Security Considerations:**
  N/A

Payment Integration:

- Cardano blockchain and other tokens supported via github.com/socious-io/gopay

Token management:

- ADA (lovelace) with 6 decimal precision
- Testnet configuration for Cardano Preprod

5. Data Flow & Transaction Lifecycle

(Explain how data moves from the user to the ledger and how off-chain components interact.)

1. User authenticates via GoAccount service
2. HTTP request hits Gin router with security middleware
3. Business logic processes request with database operations
4. Background workers handle async operations via NATS
5. Payment processing integrates with Stripe/Cardano

6. Off-chain Components

- **Backend Services:** Go HTTP API with Gin framework
- **Database:** PostgreSQL with migration system
- **Message Queue:** NATS for background job processing
- **File Storage:** Google Cloud Storage integration
- **Authentication Service:** GoAccount integration
- **Payment Services:** Stripe and Cardano blockchain support

7. Sandbox/Testnet Results

Transaction ID	Type	Status	CPU	Memory	Notes
8404d7f36d9ce5bed09718aa30d31a723451035665eca13d7ccf8446d00d89ca	Transfer	Success	N/A	N/A	Lovelace
1c68bb25054197852100ecfa064fa9ca07619dea9dc4a307514ff376ddef4585	Transfer	Success	N/A	N/A	Lovelace

8. Tools and Environments Used

- **Go 1.24.1** - Core language
- **Gin Framework** - HTTP routing
- **PostgreSQL** - Database
- **NATS** - Message queuing
- **Docker Compose** - Development environment
- **Ginkgo/Gomega** - Testing framework
- **Air** - Hot reload development
- **Cardano Preprod** - Blockchain testnet

9. Remaining Considerations / Next Steps

- Complete integration testing with Cardano blockchain
- Implement comprehensive error logging system
- Add performance monitoring and optimization
- Security audit for payment processing flows
- Scale testing for background worker system

Note: This project is primarily a Go web API with blockchain payment integration. Many Cardano-specific sections (validators, UTxO model, Aiken scripts) don't directly apply to this architecture.