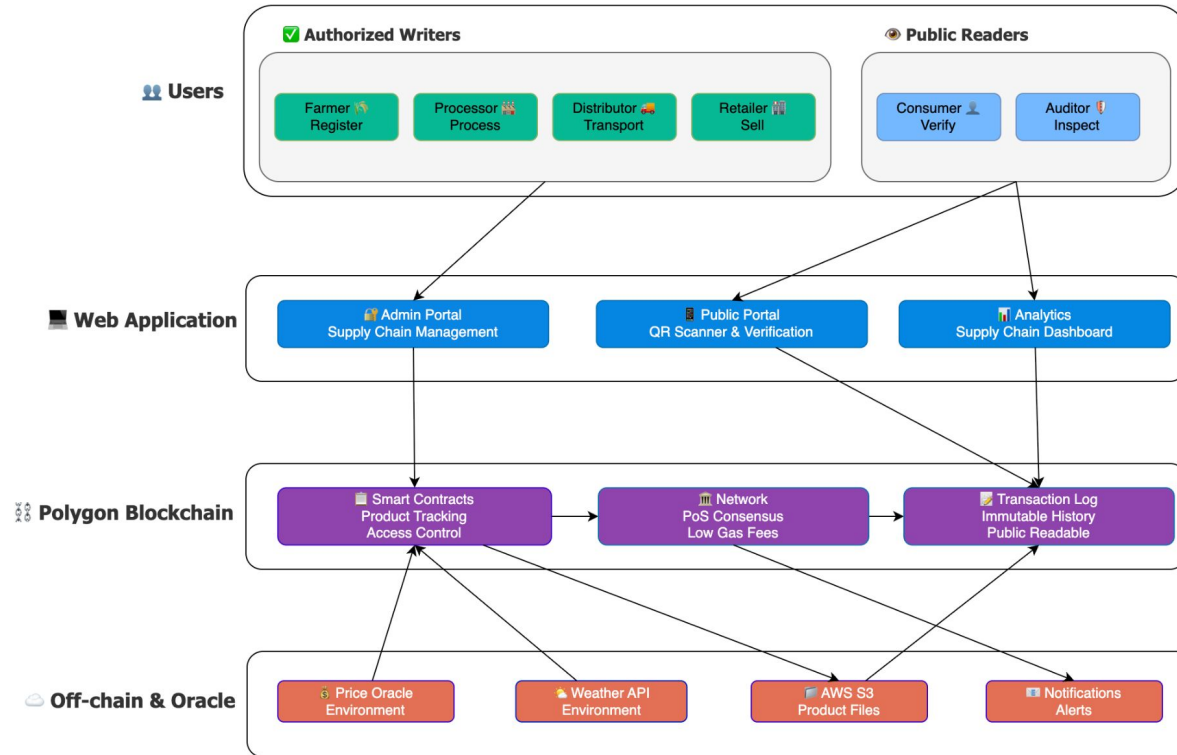# COMP6452

AVOCA TEAM
z5428082 - Peter Tran - Developer
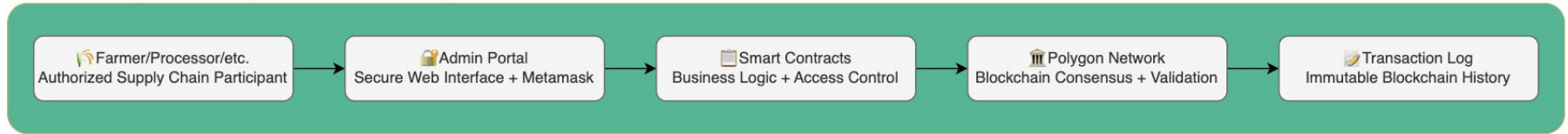z5428797 - Louis Nguyen - Developer
z5511376 - Duc Huy Nguyen - Developer

Main Architecture (Public + Permissioned)

Louis Nguyen - z5428797

✍️ Write Operations (Authorized Users)

| 🌾Farmer/Processor/etc.
Authorized Supply Chain Participant | → | 🔐Admin Portal
Secure Web Interface + Metamask | → | 📋Smart Contracts
Business Logic + Access Control | → | 🏛️Polygon Network
Blockchain Consensus + Validation | → | 📝Transaction Log
Immutable Blockchain History |

👁️ Read Operations (Public Access)

| 👤Consumer/Auditor
Anyone with Internet Access | → | 📱Public Portal
QR Scanner + Verification Interface | → | 📝Transaction Log
Direct Blockchain Query | → | 🗄️AWS S3
Retrieve Files via URLs | → | ✅Verification
Complete Supply Chain History |

Louis Nguyen - z5428797

Implementation details

- Key Technologies & Architecture:
    - Blockchain: Polygon network with Hardhat development framework
    - Smart Contracts: 12 Solidity contracts (10 contracts + 2 libraries)
    - Frontend: 2 React applications (Admin Portal + Public Portal)
    - Real-time Data: OpenWeatherMap API integration with Chainlink-compatible feeds
    - Testing: Comprehensive unit tests and integration testing suite
- Core Smart Contract System:
    - ProductBatch.sol: Product lifecycle with weather oracle integration
    - OfferManager.sol: Multi-type marketplace trading system
    - ShipmentTracker.sol: End-to-end logistics with real-time updates
    - Registry.sol: Analytics and marketplace data management
    - Weather Feeds: 4 updatable contracts (Temperature, Humidity, Rainfall, Wind)
- Weather Oracle Innovation:
    - API Integration: Real weather data from OpenWeatherMap
    - Smart Contract Compatibility: Chainlink AggregatorV3Interface
    - Automatic Updates: Configurable monitoring intervals
    - Production Ready: Multi-network deployment support