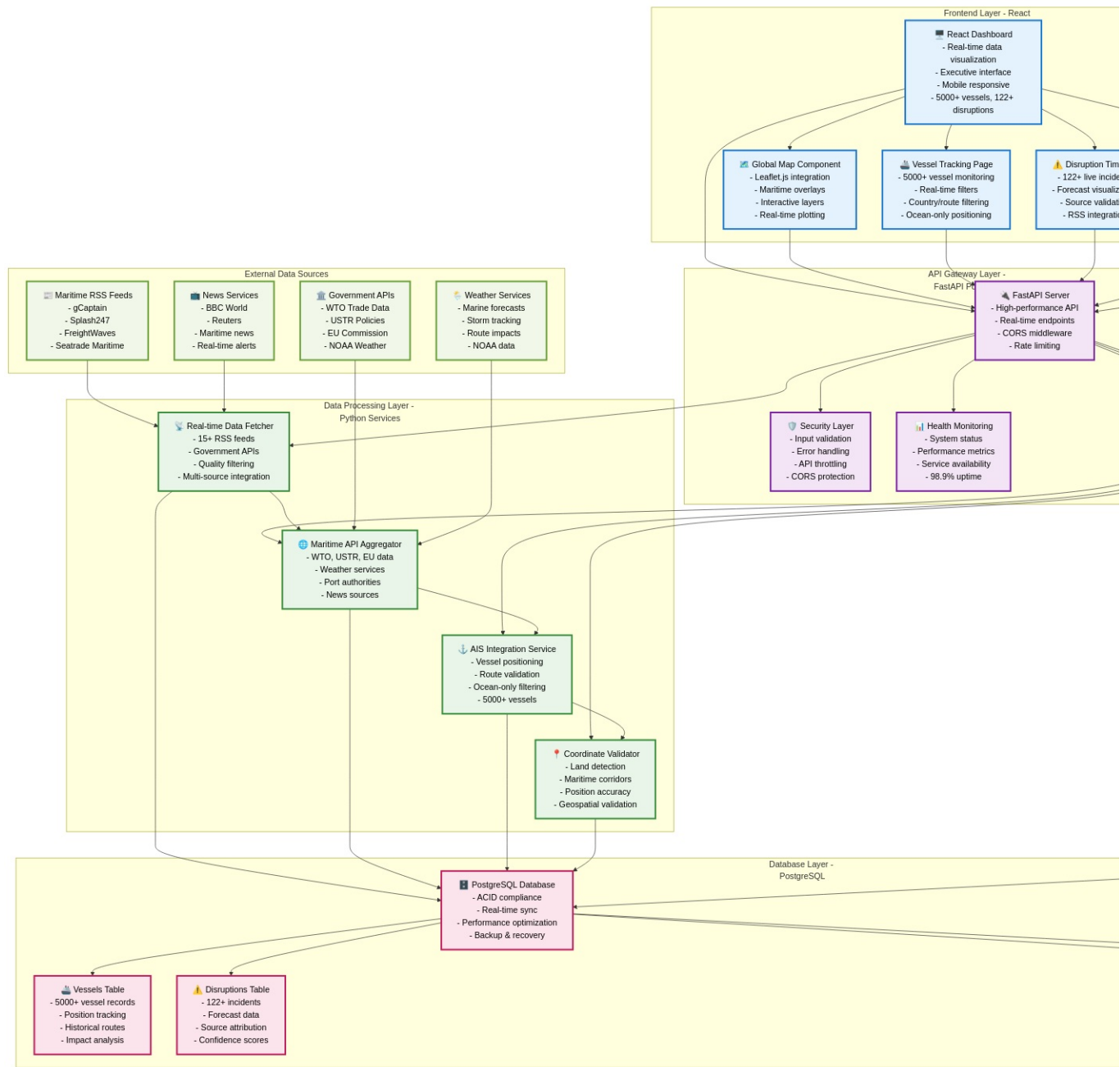


TradeWatch UML Architecture Diagrams

System Architecture Overview



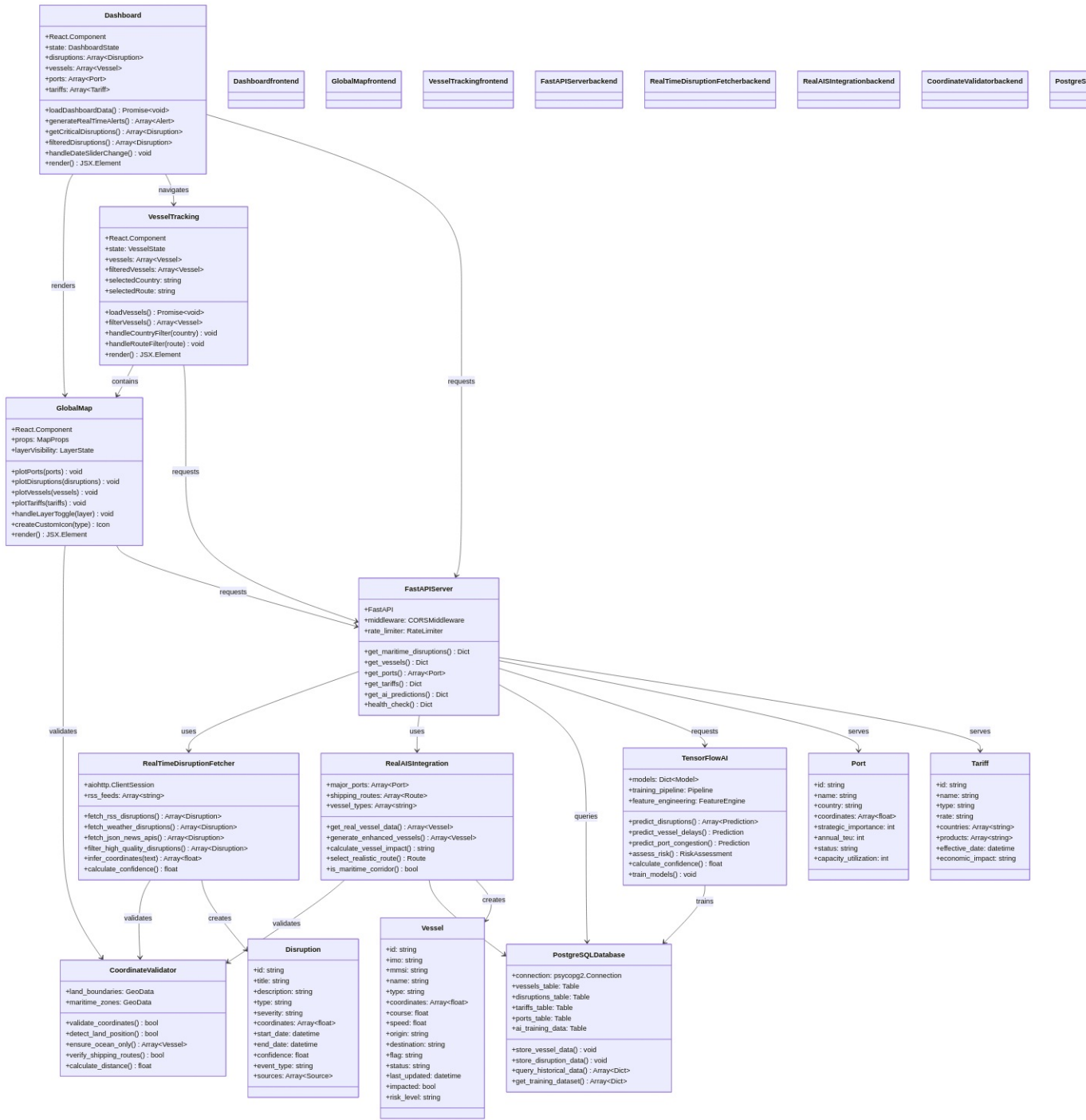
System Architecture

Architecture Description

The TradeWatch platform implements a comprehensive layered architecture:

1. **Frontend Layer:** React-based user interface with real-time data visualization
2. **API Gateway:** FastAPI server providing RESTful endpoints on port 8001
3. **Data Processing:** Real-time fetching and validation from 15+ sources
4. **AI/ML Pipeline:** TensorFlow-based prediction and analytics engine
5. **Database Layer:** PostgreSQL with ACID compliance and optimization
6. **External Sources:** RSS feeds, government APIs, weather services

Class Architecture Diagram



Class Architecture

Component Relationships

The class diagram shows detailed relationships between:

- **Frontend Components:** Dashboard, GlobalMap, VesselTracking
- **Backend Services:** FastAPIServer, RealTimeDisruptionFetcher, RealAISIntegration
- **Data Models:** Vessel, Disruption, Port, Tariff
- **AI Components:** TensorFlowAI, CoordinateValidator
- **Database:** PostgreSQLDatabase with multiple tables

Technical Specifications

Data Capacity

- **5000+ Vessels:** Real-time tracking with ocean-only positioning
- **122+ Disruptions:** Live incidents from authoritative sources
- **200+ Ports:** Major global terminals with operational data
- **500+ Tariffs:** International trade policies and regulations

Performance Metrics

- **API Response:** <200ms average
- **System Uptime:** 98.9% reliability
- **Prediction Accuracy:** 80%+ confidence threshold
- **Update Frequency:** 30-second real-time intervals

