This document serves as the complete **Technical Requirement Document (TRD)** for my **Premium Intelligent Adaptive Trading Agent**. It synthesizes all strategic decisions, risk protocols, and architectural designs discussed.

Technical Requirement Document: Premium Intelligent Adaptive Trading Agent

1. Executive Summary

The objective is to build an autonomous, multi-agent Forex trading system that utilizes a hierarchical decision-making process. The agent is designed to balance high-performance execution with institutional-grade risk management, maintaining a "glass-box" transparency through reasoning logs and human-in-the-loop (HITL) optimization.

---

2. System Architecture & Multi-Horizon Strategy

The agent operates through three distinct layers of temporal intelligence to filter noise and ensure high-probability entries.

Layer	Timeframe	Role	Key Inputs
Strategist	**1-Hour**	Sets the "Daily Bias"	Macro News, DXY Strength, Sentiment, 1H EMA Crossovers.
Architect	**15-Minute**	Defines "Market Structure"	Order Blocks, Fair Value Gaps (FVG), Range vs. Trend detection.
Tactical	**1-5 Minute**	Precise Execution	RSI Divergence, VWAP Tap, Tick Volume, Spread Monitoring.

---

3. Operational State Machine (The Gatekeeper)

To prevent "hallucinated" trades, the system follows a strict state-based logic. The 1H Layer acts as the primary gatekeeper.

- **RISK_OFF:** Emergency state. Triggered by high-impact news (NFP, FOMC), extreme volatility (VIX), or connectivity loss. No new trades permitted.
- **BIAS_LONG / BIAS_SHORT:** Directional filter set by the 1H Brain. The lower layers are locked to this direction only.
- **REGIME_SHIFT (15M):** Signals a transition between **Trending** and **Ranging** markets. Adjusts tactical scanners (e.g., from Breakout to Mean Reversion).
- **EXECUTION_READY (1M):** All horizons are synced. The system executes the order via OANDA v20 API.

---

4. Risk Management & Execution Engine

The system prioritizes capital preservation through a conservative risk model and low-latency infrastructure.

Mathematical Foundations

- Position Sizing: Fixed Fractional Risk Model.
  $$Units = \frac{Account \ Balance \times 0.5\%}{Stop \ Loss \ (Pips) \times Pip \ Value}$$
- **Risk per Trade:** 0.5% of total equity.
- **Dynamic Exits:** * **ATR-Trailing Stop:** Initial SL set at $1.5 \times 15M\ ATR$. Dynamically trailed as price progresses.
    - **Time-Based Exit:** 4-hour hard cut-off if neither TP nor SL is hit (Bias Neutralization).

Infrastructure (The "Slippage Killer")

- **Hosting:** Dedicated Trading VPS colocated in **Equinix NY4 (New York)** or **LD4 (London)**.
- **Connection:** WebSockets for price streaming; FIX or high-speed REST for execution.
- **KPI Target:** Fill Rate $> 99.5\%$ and Slippage < 0.5 basis points.

---

5. Performance Benchmarking (KPIs)

The agent must maintain these benchmarks concurrently during a minimum 100-trade paper-trading sample to qualify for live deployment:

Metric	**Benchmark**
Profit Factor (PF)	> 1.75

Sharpe Ratio	> 1.0
Max Drawdown (MDD)	$< 15\%$
Statistical Match	Paper results must match backtest within a 5% variance.

---

6. Data Persistence & Adaptive Retraining

The system uses a **PostgreSQL** database to ensure it never "loses its mind" during a crash and evolves over time.

- **State Recovery:** On startup, the agent syncs its local database with live OANDA ticket status to manage "orphan" trades.
- **Reasoning Logs:** Every trade is stored with a text-based "Rationalization String" explaining the 1H, 15M, and 1M logic at the moment of entry.
- **The Adaptive Loop:** Weekly self-diagnostics.
    - If **PF < 1.75**, the agent triggers Hyperparameter Optimization (HPO).
    - **Human-in-the-Loop:** All new optimized parameters must be **manually approved** before the agent restarts.

---

7. Implementation Roadmap

1. **Phase 1 (Connectivity):** WebSocket integration and PostgreSQL schema deployment.
2. **Phase 2 (Logic):** State machine build and asynchronous "Pub/Sub" message handling.
3. **Phase 3 (Validation):** "Shadow" paper trading on live data to verify slippage/fill rate.
4. **Phase 4 (Live):** Micro-lot deployment ($100–$500) before full capital scaling.