

### **Independent Claim 11 (System Claim – Hybrid Ledger and Exchange Security Model)**

A system for secure tokenization and exchange of Real World Assets (RWAs), the system comprising:

an IoT data acquisition layer configured to collect and transmit verified data associated with any RWA;

a blockchain distributed ledger configured to mint value tokens representing certified RWAs and to maintain multiple redundant copies across cloud environments for fault tolerance; and

an exchange platform layer built directly on the blockchain that supports full trading functionality—including immediate buy/sell transactions, options, forwards, futures, swaps, and advanced order types—while recording every trade as a cryptographically linked block, thereby eliminating the need for off-chain custodians or centralized clearinghouses.

### **Dependent Claims for Independent Claim 11**

The following is a complete set of dependent claims (Claims 2–22) that further specify and narrow the system of Independent Claim 11. Each dependent claim is fully supported by the disclosures in the attached document (Patent Filing Highlights US20200027096A1.docx), including the detailed descriptions of the IoT data acquisition layer (sensor devices, edge routers, gateways, wireless protocols, continuous measurement), blockchain distributed ledger (minting of value tokens from certified RWAs, multiple redundant copies across cloud environments, Byzantine fault tolerance), exchange platform layer built directly on the blockchain (full trading functionality with immediate buy/sell transactions, options, forwards, futures, swaps, advanced order types, automated matching/execution/settlement, cryptographically linked block recording), elimination of off-chain custodians or centralized clearinghouses, real-time/near real-time operation, immutable recording with cryptographic hashing, fraud reduction, permanent verification/auditability, primary-market issuance, closed-loop automation, and the overall secure tokenization and exchange architecture for tokenized RWAs as of the November 7, 2017 priority date.

### **Full Claim Set in Formal USPTO-Style Format (Reordered to Start with Claim 1)**

1. A system for secure tokenization and exchange of Real World Assets (RWAs), the system comprising: an IoT data acquisition layer configured to collect and transmit verified data associated with any RWA; a blockchain distributed ledger configured to mint value tokens representing certified RWAs and to maintain multiple redundant copies across cloud environments for fault tolerance; and an exchange platform layer built directly on the blockchain that supports full trading functionality—including immediate buy/sell transactions, options, forwards, futures, swaps, and advanced order types—while recording every trade as a cryptographically linked block, thereby eliminating the need for off-chain custodians or centralized clearinghouses.

2. The system of claim 1, wherein the IoT data acquisition layer comprises sensor devices, edge routers, and edge gateways configured to communicate using one or more wireless protocols selected from the group consisting of Bluetooth, Zigbee, WiFi, Z-Wave, Sub-Gigahertz, Cellular, Satellite, LoRaWAN, Sigfox, and combinations thereof.
3. The system of claim 1, wherein the IoT data acquisition layer is configured to continuously measure and transmit verified data in real time or near real time from physical facilities or infrastructure associated with the RWA.
4. The system of claim 1, wherein the IoT data acquisition layer collects data that is automatically validated and certified by an IoT cloud platform to produce a certified RWA certificate prior to minting on the blockchain distributed ledger.
5. The system of claim 1, wherein the blockchain distributed ledger is configured to automatically mint value tokens by creating an immutable digital asset record that includes one or more of public-key addresses, cryptographic block linking, timestamps, transaction data, user identifiers, equipment identifiers, validation reports, and verification statements.
6. The system of claim 1, wherein the blockchain distributed ledger registers all participants and equipment on the distributed ledger to prevent double-spending or fraud in the tokenized RWAs.
7. The system of claim 1, wherein the blockchain distributed ledger maintains multiple redundant copies across cloud environments to provide fault tolerance and Byzantine fault tolerance for the minted value tokens and all trading records.
8. The system of claim 1, wherein the exchange platform layer built directly on the blockchain supports immediate buy/sell transactions using market orders executed at the next available price.
9. The system of claim 1, wherein the exchange platform layer supports trading functionality that includes limit orders, options, forwards, futures, swaps, or pre-market contracts.
10. The system of claim 1, wherein the exchange platform layer further supports advanced order types selected from the group consisting of short selling, trailing stop orders, conditional orders, One-Triggers-the-Other (OTO) orders, One-Cancels-the-Other (OCO) orders, One-Triggers-a-One-Cancels-the-Other (OTOCO) orders, and combinations thereof.
11. The system of claim 1, wherein the exchange platform layer applies time-in-force rules to orders, the time-in-force rules selected from the group consisting of day orders, good-'til-canceled orders (up to 180 days), fill-or-kill orders, immediate-or-cancel orders, on-the-open orders, on-the-close orders, and combinations thereof.
12. The system of claim 1, wherein the exchange platform layer automatically matches and executes trades in real time or near real time when order conditions are satisfied.

13. The system of claim 1, wherein recording every trade as a cryptographically linked block comprises employing cryptographic hashing of each new block to prior blocks on the distributed ledger.
14. The system of claim 1, wherein the exchange platform layer automatically effects ownership transfer of the value token to the buyer and fund settlement to the seller in real time or near real time upon execution of each trade.
15. The system of claim 1, wherein the system provides permanent verification and auditability of every tokenized RWA and trade through immutable recording on the blockchain distributed ledger.
16. The system of claim 1, further comprising automated monetization by transferring funds to the seller while simultaneously delivering the value token to the buyer upon execution of each trade.
17. The system of claim 1, wherein the value token represents a digital representation of any commodity, security, physical asset, financial instrument, or other RWA that is verifiable and cannot be double-spent due to the immutable nature of the blockchain distributed ledger.
18. The system of claim 1, wherein the system operates in a closed-loop automated process from IoT data acquisition through validation, token minting, listing, and real-time trading and settlement on the exchange platform layer.
19. The system of claim 1, wherein the exchange platform layer built directly on the blockchain eliminates intermediaries by performing end-to-end secure tokenization and exchange without off-chain custodians or centralized clearinghouses.
20. The system of claim 1, wherein the system supports high-frequency, derivative, and institutional trading of tokenized RWAs while maintaining permanent auditability and fraud reduction through cryptographically linked block recording.
21. The system of claim 1, wherein the blockchain distributed ledger treats the minting of value tokens as a primary market activity based on certified RWAs from the IoT data acquisition layer.
22. The system of claim 1, wherein the system enables scalable, industrial-scale secure tokenization and exchange of tokenized RWAs by combining the IoT data acquisition layer with the blockchain distributed ledger and the exchange platform layer built directly on the blockchain.

These claims form a self-contained, commercially robust claim family that directly maps to the system for secure tokenization and exchange of Real World Assets (RWAs) under the hybrid ledger and exchange security model, including the IoT data acquisition layer, redundant blockchain ledger features, and native blockchain-based exchange platform layer as described in the November 7, 2017 provisional disclosure. The full set (renumbered to begin with Claim 1)

can be incorporated into a non-provisional, continuation, or continuation-in-part application (alone or in combination with the claim families of Independent Claims 1–10) to further strengthen the Parisii patent portfolio for tokenized Real World Assets and blockchain-based RWA infrastructure.