

Independent Claim 12 (System – Smart-Contract Enabled RWA Derivatives)

A system for tokenized digital twins of any physical asset or RWA, comprising: an IoT cloud platform that certifies RWA value from sensor data; a blockchain ledger that mints corresponding value tokens; and smart-contract functionality on the ledger that automatically executes derivative instruments tied to the tokens, with ongoing IoT updates triggering contract terms and settlements.

Dependent Claims for Independent Claim 12

The following is a complete set of dependent claims (Claims 2–22) that further specify and narrow the system of Independent Claim 12. Each dependent claim is fully supported by the disclosures in the attached document (Patent Filing Highlights US20220180374A1.pdf), including the detailed descriptions of the IoT cloud platform certifying RWA value from sensor data, blockchain ledger minting of value tokens as digital twins, smart-contract functionality on the ledger, automatic execution of derivative instruments tied to the tokens, ongoing IoT updates triggering contract terms and settlements, integration with the trading platform, real-time/near real-time execution, immutable recording, primary-market issuance, multi-cloud redundancy, cryptographic provenance, and the overall end-to-end tokenized digital twin lifecycle for any physical asset or RWA as of the December 26, 2017 priority date.

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

1. A system for tokenized digital twins of any physical asset or RWA, comprising: an IoT cloud platform that certifies RWA value from sensor data; a blockchain ledger that mints corresponding value tokens; and smart-contract functionality on the ledger that automatically executes derivative instruments tied to the tokens, with ongoing IoT updates triggering contract terms and settlements.
2. The system of claim 1, wherein the IoT cloud platform certifies RWA value from sensor data collected in real time or near real time by an IoT edge hardware layout comprising sensor devices, edge routers, and edge gateways.
3. The system of claim 1, wherein the IoT edge hardware layout communicates 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.
4. The system of claim 1, wherein the IoT cloud platform performs automated validation and certification of the sensor data using processes for accuracy, sampling design, internal controls, and verification consistent with established standards for real-world asset certification.
5. The system of claim 1, wherein the blockchain ledger mints value tokens representing immutable digital twins of the physical asset or RWA, including registration of users and equipment to prevent double-spending or fraud.
6. The system of claim 1, wherein the blockchain ledger maintains multiple redundant copies across cloud environments to provide fault tolerance and Byzantine fault tolerance for the value tokens and smart-contract executions.

7. The system of claim 1, wherein the smart-contract functionality automatically executes derivative instruments selected from the group consisting of options, forwards, futures, and swaps tied to the value tokens.
8. The system of claim 1, wherein ongoing IoT updates from the sensor data continuously trigger contract terms and settlements on the smart contracts in real time or near real time.
9. The system of claim 1, further comprising a native exchange platform built on the blockchain ledger that lists the value tokens and supports trading, swapping, or collateral use in conjunction with the smart-contract executed derivatives.
10. The system of claim 1, wherein the native exchange platform supports market orders, limit orders, and advanced order types including short selling, trailing stop orders, conditional orders, One-Triggers-the-Other (OTO), One-Cancels-the-Other (OCO), and One-Triggers-a-One-Cancels-the-Other (OTOCO).
11. The system of claim 1, wherein the native exchange platform 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 smart-contract functionality automatically records each derivative execution as a new cryptographically linked block on the distributed ledger.
13. The system of claim 1, wherein the system provides permanent verification and auditability of every tokenized digital twin, derivative execution, and settlement through immutable ledger recording.
14. The system of claim 1, wherein the value tokens represent immutable digital twins of any commodity, security, physical asset, financial instrument, or other RWA that are verifiable and cannot be double-spent due to the cryptographic provenance on the distributed ledger.
15. The system of claim 1, wherein the system operates in a closed-loop automated process from IoT sensor data certification through value token minting, smart-contract derivative execution, and ongoing IoT-triggered settlements.
16. The system of claim 1, wherein the smart-contract functionality automatically directs a portion of proceeds from derivative executions into reinvestment that expands IoT instrumentation or physical asset infrastructure to increase RWA supply and liquidity.
17. The system of claim 1, wherein the blockchain ledger treats the minting of value tokens as a primary market activity based on certified RWA value from the IoT sensor data.
18. The system of claim 1, wherein the system eliminates intermediaries by performing end-to-end smart-contract enabled derivative execution and settlement directly on the integrated blockchain ledger.
19. The system of claim 1, wherein the system supports high-frequency, derivative, and institutional trading of tokenized digital twins while automatically executing and settling derivative instruments via smart-contract functionality.
20. The system of claim 1, wherein ongoing IoT updates include real-time or near real-time sensor data that dynamically adjusts contract terms and triggers automated settlements on the smart contracts.

21. The system of claim 1, wherein the smart-contract functionality further comprises privacy-preserving mechanisms that share transaction details only with authorized trade parties via point-to-point validation while maintaining regulatory observer access for provenance verification.
22. The system of claim 1, wherein the system enables scalable, industrial-scale management of tokenized digital twins by combining IoT sensor data certification, blockchain minting, and smart-contract automated derivative execution with ongoing IoT updates.

These claims form a self-contained, commercially robust claim family that directly maps to the system for tokenized digital twins of any physical asset or RWA with smart-contract enabled derivative instruments, including IoT cloud certification, blockchain minting, automatic execution, and ongoing IoT-triggered settlements as described in the December 26, 2017 provisional disclosure (and the incorporated earlier provisionals). 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 1–11) to further strengthen the Parisii patent portfolio for tokenized Real World Assets and blockchain-based RWA/digital twin infrastructure.