

Third Generation Digital Assets:
Smart Contract Stakes controlled by the
Q-ENGINE Core Algorithm to link and execute
on chain APP's

The QTOKEN

Function Integrated Modular Logical Units as
Standard for Digital Securities

A Technology
Designed and Developed
by

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Abstract

Third-generation digital assets are based on a completely new architecture. It consists of a central core that deterministically controls all functions on the blockchain, along with a series of extensions that can be added individually. The core ensures the secure execution of fundamental logics, coordinates functional interactions, and serves as an anchor point for process mapping. The extensions complement this foundation with specific functions that can be freely combined depending on the business model and use case. Only through this combination does a self-contained, clearly defined standard emerge—capable of representing currencies, securities, or even complex business processes. Within this architecture, the core is referred to as the **Q-Engine**, while the extensions are defined as **Function Units**. This marks a fundamental difference from earlier token approaches: they are not loose code fragments, but fully functional, modularly controlled systems that can be precisely tailored to the needs of enterprises and markets. The key innovation compared to existing software solutions lies in the complete on-chain storage and execution of all functions. As a result, the programs become transparent, reproducible at any time, maximally secure — virtually eliminating errors or manipulation.

In terms of function and purpose, these third-generation digital assets can be categorized into three overarching classes:

- **Third-Generation Digital Currencies** – fungible settlement units serving as the basis for payments, treasury, and clearing;
- **Third-Generation Digital Securities** – non-fungible assets such as securities, company shares, or RWAs with a complete capital-market lifecycle logic;
- **Autonomous Process Logic** – representations of real-world business processes, such as invoicing, tax collection, ticketing, or logistics systems, all executed deterministically via smart contracts.

These three categories can be seamlessly interconnected: currencies, securities, and process logics interact directly within the Q-Engine, eliminating the need for central intermediaries and enabling immediate settlement.

On a conceptual level, third-generation digital assets are characterized by four key properties:

- **SuperSecured:** Unlimited or unauthorized third-party access to wallets, currencies, or assets is excluded; the “infinite approval” problem of traditional ERC-20 tokens is finally resolved.
- **Fully Autonomous:** Every transaction and interaction can be initiated and executed by the user alone—without intermediaries or external authorities.
- **Reflective:** Digital assets are based on a normative framework and map real-world requirements, markets, and transactions precisely and verifiably.
- **Interactive:** All core functions are directly embedded in the smart contract and can be fully controlled by the owner without detours.

The primary application of this architecture is the **Q-Token Standard** – the reference class for digital securities. It arises from the Q-Engine in combination with five Function Units and integrates **Trading, Treasury, Identity & Compliance, Governance, and Payments**. This enables delivery-versus-payment directly within the contract; corporate actions and distributions are automated; intermediaries become obsolete; and regulatory requirements can be normatively implemented.

At the same time, the Q-Token Standard solves the fundamental **Trusted Third Party (TTP)** problem: transactions no longer rely on a central authority but are executed deterministically and verifiably within the smart contract itself. Trust is no longer established by intermediaries — it is

guaranteed by technology itself. This is crucial, as dependency on middlemen — banks, clearing houses, or platforms — has long been the main obstacle to efficiency, security, and global scalability in digital capital markets.

Thus, the Q-Token Standard unites all four core properties — it is **secure, autonomous, reflective, and interactive** — and represents the first coherent solution for third-generation digital securities.

Q-Token — The Institutional-Grade Digital Securities Protocol.

Safe-by-Design. Compliance by Code. Settlement Finality.

Abstract (English Translation)

Q-Token is the protocol layer for digital securities and the foundation of a new capital-markets infrastructure — featuring Atomic DvP, Peer-to-Peer Settlement, and Compliance by Code directly within the smart contract. Serverless, immutable, and decentrally replicated, it operates 24/7 worldwide. Owner-Only control, vault zones, and whitelist/ID badges eliminate “infinite approvals” — entirely without central intermediaries. The result: settlement finality in seconds, fewer interfaces, and fully auditable processes. Safe-by-Design, EVM/ERC-compatible, and the technological foundation of all SQUARES AG products.

Description

Q-Token serves as the protocol layer for digital securities — optimized for Atomic DvP, Peer-to-Peer Settlement, and Compliance by Code. As the backbone of a new capital-markets infrastructure, Q-Token embeds market and settlement logic directly into the smart contract: immutable, decentrally replicated, and serverless — ensuring 24/7 global availability, geo-redundancy, and deterministic traceability.

Trading, security, and compliance functions are executed on-chain: Owner-Only control, vault zones, and whitelist/ID badges. Global allowances are eliminated — “infinite approvals” are excluded by design. Transactions are completed without central intermediaries and achieve settlement finality within seconds. This minimizes interfaces and potential errors, reduces back-office workload, and enables fully auditable operations.

Q-Token is EVM/ERC-compatible and forms the technological foundation of all SQUARES AG products — built for banks, exchanges, and sovereign institutions.

Applications (English Translation)

The protocol layer addresses the four most significant levers in institutional operations: **T+0 Post-Trade, Compliance by Code, Market Data / Valuation / Risk Management, and Asset Segregation & Access Security**. Together, they transform trading and settlement processes into continuous, deterministic flows that integrate seamlessly with existing market structures. The design aligns with regulated capital-market standards — from **CSDR** and **SEC/UK T+1** to **MiFID II/MiFIR, BMR, UCITS/AIFMD, FCA CASS, EMIR, and Books & Records** requirements.

1) T+0 Post-Trade (Atomic DvP)

Matching, clearing, and delivery-versus-payment are merged into a single on-chain action; ownership and payment are exchanged simultaneously within one transaction. This shortens settlement cycles to seconds, reduces reconciliation effort and intraday funding needs, and minimizes settlement fails and cash penalties. The solution is designed in line with **CSDR Settlement Discipline** and supports the transition to **T+1** in the US and UK through **T+0 finality**.

2) Compliance by Code

Authorizations and product rules are verified by **policy gates** prior to execution; reusable **KYC badges**, whitelists, and attribute-based permissions control access, limits, jurisdictions, and sanctions lists. Versioned terms and a complete **audit trail** enable verifiability within minutes,

reducing operational and legal risks. The approach is fully compatible with **MiFID II** (product governance), **AML/CFT** standards, and **MiFIR T+1** reporting through consistent on-chain records.

3) Market Data, Valuation & Risk Management

Signed **price feeds** drive valuations; the contract autonomously calculates **NAVs**, triggers **dividends, coupons, and fees** based on predefined rules, and enforces **margins, LTV, and breaker thresholds**. As a result, valuation, cash flow, and risk become a **straight-through processing (STP)** chain governed by clear rules, minimal dispute rates, and faster closing and reporting cycles. Governance aligns with **BMR** (Benchmarks), **UCITS/AIFMD**, and **SEC Rule 2a-5** (Fair Value Processes) with a verifiable **Books & Records** path.

4) Asset Segregation by Code & Access Security

Multi-dimensional **vault zones, owner-only control, M-of-N approvals**, and an **encrypted command channel** establish ring-fencing, rights management, and discretion directly in the code. Client funds, collateral, and operational balances remain cleanly segregated; sensitive transfers occur without market leakage and are fully traceable at all times. The structure supports **MiFID II Safeguarding, UCITS/AIFMD Depositary Segregation, FCA CASS 6/7**, and **EMIR** segregation requirements.

Benefit Categories of the Q-Token

Primary Benefits: Finality, Security, Compliance

- **Finality within seconds (T+0):** Execution equals settlement — exposures shrink to seconds.
- **Safe by Design:** Owner-only control, no global allowances, no “infinite approvals.”
- **Compliance by Code:** One-time KYC, policy gates, and a complete audit trail.

Secondary Benefits: Efficiency, Speed, Regulatory Compatibility

- **Efficiency & Cost ↓:** Fewer system breaks, reconciliations, and manual workflows.
- **Speed & Cash Flow ↑:** Single-transaction processes, instant capital usability, shorter cycles.
- **Regulatory Readiness:** Fully aligned with MiFID II/MiFIR, AML/CFT, CSDR, and T+1 frameworks.

Tertiary Benefits: Reputation, Ecosystem, Differentiation

- **Institutional / Sovereign Grade:** Audit-ready, supervisory-grade infrastructure.
- **Ecosystem & Partnerships:** Access to curated markets and integrations.
- **Innovation Profile:** “Powered by Q-Token” — a clear differentiator from competitors.

Based on these benefits, the following reference use cases illustrate how Q-Token delivers measurable impact in institutional operations.

Reference Use Cases

Summary:

The four reference blueprints demonstrate how Q-Token solves concrete institutional challenges — achieving **T+0 settlement**, measurable **regulatory compliance**, and **technically enforced security**. From a regulatory perspective, the protocol supports **CSDR** and **T+1 regimes (US/UK)**, meets **MiFID II/MiFIR** and **AML/CFT** requirements in distribution and trading, reinforces **valuation and cash-flow standards** under **UCITS/AIFMD** and **BMR**, and fulfills **segregation and safeguarding** obligations such as **FCA CASS** and **EMIR**.

1) Central Bank & Tier-1 Bank: Wholesale DvP for Government Bonds / Repo

Task: Enable intraday DvP using CBDC/settlement tokens to reduce exposures, penalties, and improve auditability.

Solution: Q-Token operates within a **Closed Community** using **whitelists/ID badges**;

SecureTokenSwap (STS) provides **atomic DvP** against approved currencies; **MBM vault zones** ring-fence collateral; **AxxesControl** enforces **M-of-N approvals**; terms and amendments are versioned via **MOC**.

Effect: Settlement within seconds, counterparty risk reduced to intraday seconds, significant decline in reconciliations and buy-ins; reports originate directly from the on-chain audit trail.

Regulation: CSDR Settlement Discipline, PFMI for FMI, EU DLT Pilot Regime, SEC/UK T+1 (operational T+0).

2) Global Asset Manager: Fund Units, Corporate Actions & NAV Management

Task: Distribute share classes across jurisdictions, ensure robust NAV/pricing, and automate coupon/dividend/fee execution with strict segregation and auditability.

Solution: Signed **price oracles** feed valuations; the token calculates **NAVs**, manages **gating windows**, and triggers **corporate actions** rule-based; **Owner-Only control** and **vault zones** separate operational, client, and collateral holdings; distribution runs exclusively via **Compliance Gates** (KYC badge, target market).

Effect: End-to-end STP valuation and payouts, fewer disputes, significantly faster monthly and quarterly closings.

Regulation: UCITS/AIFMD (valuation/depositary/segregation), BMR (benchmarks), MiFID II (product governance/distribution).

3) Digital Exchange / MTF (incl. Crypto Exchanges): Whitelist Trading with Atomic Settlement

Task: Eliminate settlement errors, hot-wallet risks, and global allowances; securely link regulated counterparties; strengthen market integrity and finality.

Solution: **Whitelist-enabled P2P trading** within the contract using **atomic DvP**; **no infinite approvals by design**; **AxxesControl** and **Closed Community** define roles and access; **MOC** fixes listing terms; **event schemas** power monitoring and reporting.

Effect: Sharp reduction in fails and custody leakage, finality within seconds, integrated proof for regulators and market oversight.

Regulation: MiFID II (MTF/OTF frameworks), CSDR (settlement), MAR (market abuse/transparency).

4) RWA Platform & Security Token Projects: Primary / Secondary “Out of the Box”

Task: Launch issuance, placement, and secondary trading for RWAs/securities with unified KYC, document integrity, and automated cash flows.

Solution: **DirectSale/3** enables single-transaction subscriptions; **STS** supports secondary P2P trading; **MOC** locks terms/prospectuses; **ID badges** provide once-KYC across contracts; **RTP** distributes fees and waterfalls in real time.

Effect: Reduced time-to-market, fewer errors and interfaces, faster due-diligence and audit processes.

Regulation: EU Prospectus Regulation (documentation/transparency), AML/CFT, MiFID II (product governance/distribution), and EU DLT Pilot Regime (infrastructure).

Technical Architecture

Q-Token is a **modular protocol layer for digital securities**. Its proprietary **Q-Engine** (core algorithm “SQUARES/2”, patent pending) forms the runtime environment that orchestrates all functional modules.

Execution, control, and reporting all occur through a single, unified code path — making the **Q-Token Standard** operate like an **operating system for capital markets**, establishing a new, decentralized market infrastructure.

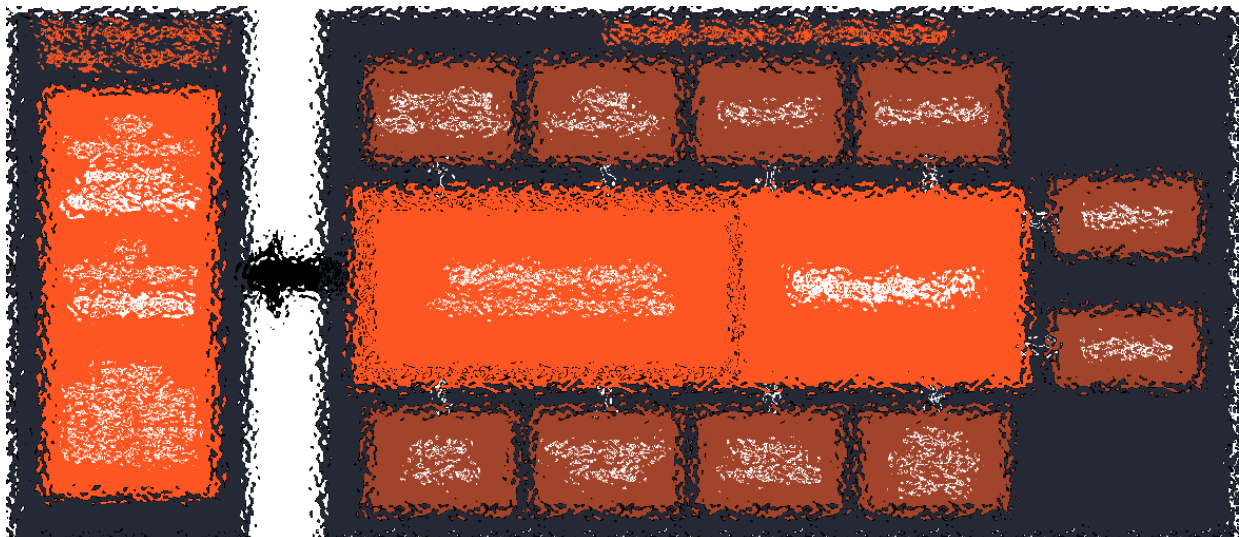
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List of Technology Modules:

Modul Nr. 1:

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Modul Nr. 12:



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List of Function Units:

Core:	QENGINE/1 – Contract Stake Core Algorithm
Function Unit I:	Trading & Settlement
Function Unit II:	Treasury & Balances
Function Unit III:	Identity & Compliance
Function Unit IV:	Governance & Access Control
Function Unit V:	Payments & Revenue Sharing

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Implementation of SQUARES AG's Core Values within the Q-Token Protocol

Precision

Q-Token does not merely translate rules into software — it transforms them into binding market logic. Intention, execution, and verification occur within the same clearly defined process. Contracts become sequences of states with explicit decision points; every change is time-stamped and attributable, every effect reproducible. This creates a one-to-one correspondence between regulation and outcome — reliable, verifiable, and consistent from design to operation.

Simplicity

Rather than managing complexity, Q-Token reorganizes it. Processes are condensed into end-to-end flows; interfaces are reduced; and all decisions follow a unified code path. For users, this means fewer, clearer steps to completion; for operators, fewer dependencies, fewer exceptions, and technology that remains invisible — so that work itself can flow.

Sovereignty

Q-Token ensures that authority and responsibility are one. Whoever owns a right also controls its execution — without permanent third-party access or hidden dependencies. Access is granted and revoked with precision; relations are direct, accountabilities are clear, and decisions lead straight to finality. Independence is not declared but experienced — as a foundation for trust and long-term capability.

In Synergy

Q-Token unifies all components into a continuous chain of decision and effect: authorization defines the framework, trading utilizes it, settlement enforces it, and documentation proves it. Identities, rights, assets, and payments follow the same rules and timelines; a single change applies universally. Clear process flows replace fragmented interfaces — from issuance to execution, from execution to finality, from finality to reporting. The Q-Engine synchronizes responsibilities and timing. For capital markets, this means that pricing, settlement, risk, and reporting all operate on the same dependable foundation — consistent across instruments and counterparties.