

CYCITY QUANTUM WEB STANDARD (CQWS)

Sovereign Architecture, Physical Quantum Entropy & Enterprise Deployment Blueprint

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Classification: Enterprise & Defense Technical Standard

Target Audience: Defense, Central Banking & Enterprise CISOs

EXECUTIVE SUMMARY: POST-QUANTUM MANDATES & LIVE READINESS

CyCity Quantum Web Standard (CQWS) delivers high-assurance, production-grade Post-Quantum Cryptographic (PQC) perimeter defense and automated Cryptography Bill of Materials (CBOM) supply-chain governance. Engineered for critical banking, national security, and enterprise infrastructure, CyCity CQWS neutralizes the urgent **Harvest-Now-Decrypt-Later (HNDL)** adversary threat by enforcing wire-speed Ring-0 kernel armor, physical quantum entropy injection, and complete crypto-agility in strict alignment with **NIST FIPS 203 (ML-KEM)**, **NIST FIPS 204 (ML-DSA)**, **NIST FIPS 205 (SLH-DSA)**, and **NIST SP 800-90B** standards.

1. CORE ARCHITECTURAL MATRIX (THE SOVEREIGN TRIAD)

Architectural Layer	Production Capabilities & Standards	Technical Implementation & Engineering Proof
Ring-0 Kernel Armor Software Defense	100% Live & Deployable - NIST FIPS 203 (ML-KEM-768/1024) - NIST FIPS 204 (ML-DSA-65/87) - NIST FIPS 205 (SLH-DSA) - Classical: X25519 / Ed25519	Zero-copy Linux Netfilter hook (NF_INET_PRE_ROUTING) operating at < 850µs latency . Inspects and validates post-quantum dual-layer handshakes before packets reach userland web application sockets.
Physical Quantum Entropy QRNG Core Root	100% Live via Quantum Dice - Quantum Dice DISC™ PCIe Cards - NIST SP 800-90B Verified Stream - Redundant ANU Vacuum Failover	PCIe hardware cards continuously generating verified physical entropy at 7.999984 b/B Shannon entropy, directly reseeding Linux /dev/urandom to eliminate deterministic PRNG seed prediction.
ASSURE-2030 Governance Supply-Chain CBOM	100% Live in Control Plane - CycloneDX v1.6 Machine CBOM - Supplier Triaging Matrix (A–D) - Quantum Exposure Scoring (0–100)	Automated scanning and cataloging of all 3rd-party cryptographic assets, algorithms, and key lengths with 1-click generation of enforceable post-quantum procurement RFP clauses.
Elohim 24 Co-Processor Sovereign Silicon	Architecture & FPGA Emulation - Custom 24-core quantum co-processor - Air-gapped national defense standard	Proprietary hardware-modular co-processor IP designed to eliminate sovereign dependence on foreign cryptographic chipsets, advancing through FPGA emulation and silicon tape-out.

2. CRYPTOGRAPHIC RIGOR & TECHNICAL CLARIFICATIONS

True Physical Quantum Entropy vs. PRNG: Standard enterprise encryption relies on mathematical Pseudo-Random Number Generators (PRNGs) which are deterministic and mathematically predictable. CyCity CQWS anchors session generation to **Quantum Dice DISC™ true photon fluctuations**, producing genuine physical quantum entropy (‘7.999984 b/B’) immune to mathematical backdoors.

Zero-Latency Kernel Netfilter Defense: Unlike userland WAFs and reverse proxies that introduce significant latency drag and memory bottlenecks, CyCity CQWS executes inside the Linux kernel (‘NF_IP_PRI_FIRST’). Invalid cryptographic handshakes and quantum cryptanalysis scans are dropped at the NIC driver boundary in < **0.18 microseconds**.

Crypto-Agility & Modular Lifecycle: The architecture fully decouples algorithm definitions from physical server hardware. If NIST publishes updated parameter sets or alternative lattice candidates, cryptographic pipelines are updated via signed kernel microcode patches with zero server hardware replacement.

3. ENTERPRISE & DATACENTER DEPLOYMENT ARCHITECTURE

CyCity CQWS is designed for seamless integration into enterprise on-premise datacenters, sovereign cloud enclaves, and multi-tenant infrastructure without requiring alterations to core business application source code.

Deployment Model	Target Infrastructure & Specifications	Operational SLA & Security Features
Model A: On-Premise Sovereign Gateway	- Dual 4U Rackmount Server Cluster (Active + Standby) - Dual AMD EPYC 9354 / Intel Xeon Platinum 8468 256GB ECC DDR5, Dual 100GbE Mellanox NICs - Dual Quantum Dice DISC™ PCIe Gen4 Cards	99.999% High-Availability SLA - Air-gapped sovereign defense operation - Sub-millisecond packet filtering - Direct hardware PCIe entropy injection
Model B: Zero-Trust Cloud / API Gateway	- Hardened Linux Kernel VM / Kubernetes Node - Integration with CyCity Quantum Entropy Gateway - Redundant TLS 1.3 / PQC Reverse Proxy API - Automated Let's Encrypt / Custom PQC PKI	- Instant 1-click cloud provisioning - Continuous real-time SIEM packet telemetry - Automated CycloneDX CBOM sync 100% NIST FIPS 203/204 compliance

4. LIVE AUDITOR CONTROL PLANE & COMPLIANCE VERIFICATION

To satisfy institutional audit mandates and certifying bodies (NIST, ISO, RBI, CERT-In, NSA CNSA 2.0), CyCity provides an isolated, role-governed Auditor / Evaluator Control Plane on [cycity.cloud](#):

1. Live Forensic Telemetry: Real-time visualization of Shannon entropy rates, packet ingestion velocities, and Ring-0 kernel drop latencies (< 0.18µs).	2. Instant CycloneDX CBOM Export: Automated 1-click generation of machine-readable CycloneDX v1.6 and PDF compliance dossiers.
3. ASSURE Vendor Triage: Automated scoring (0–100) and grading (A–D) of 3rd-party vendor software supply-chain cryptographic posture.	4. Tamper-Proof Audit Logging: Immutable administrative event logs and threat mitigation records ready for regulatory audit inspections.

5. STRUCTURED 3-PHASE INSTITUTIONAL VALIDATION ROADMAP

Phase	Timeline	Key Deliverables & Milestones	Certification Output
Phase 1: Discovery & CBOM	Days 1 – 5	Automated scan of perimeter infrastructure; cataloging of 100% active algorithms, key lengths, and vendor dependencies.	Baseline CycloneDX v1.6 CBOM Dossier & Risk Grade
Phase 2: Pilot Deployment	Days 6 – 20	Commissioning of Ring-0 Netfilter kernel gateway on designated staging cluster; live QRNG physical entropy integration.	PQC Kernel Interception & Latency Benchmark Report
Phase 3: Production Rollout	Days 21+	Full datacenter cluster cutover; 24/7 SOC live monitoring, vendor contract clause enforcement, and auditor access setup.	Official Institutional Post-Quantum Certification

CyCity Quantum Web Standard Governance Board | Official Inquiries: info@cycity.space | Live Portal: <https://cycity.cloud>