

NQRust-Storage



Rust-Powered Geo-Distributed Object Storage

S3-Compatible, 14X Performance, Zero Vendor Lock-in

STORAGE FREEDOM

- Zero vendor lock-in
- Complete S3 compatibility
- Seamless migration
- Open architecture

GARAGE + RUST TECHNOLOGY STACK

Storage Engine	Garage Distributed Architecture + CRDT Sync
API Layer	S3-Compatible REST + K2V Key-Value
Runtime	Tokio Async + Rust Memory Safety
Consistency	Weakly Consistent + Anti-Entropy Repair
Distribution	Geo-Aware Placement + Smart Routing
Data Protection	Erasure Coding + Content Addressing
Security	AES-256 + Ring Crypto + mTLS
Monitoring	Prometheus + OpenTelemetry + Custom

GARAGE ARCHITECTURE

- CRDT consistency
- Self-healing storage
- Commodity hardware
- Proven at scale

ENTERPRISE OBJECT STORAGE CRISIS

\$70B+ Market Dominated by Vendor Lock-in
340% Cost Increase Over 3 Years

Cost Explosion
AWS S3 Lock-in
\$2.4M per 100 TB

Performance Lag
180ms Latency
Global Access

Vendor Lock-in
Migration Trap
Limited Control

Data Sovereignty
Compliance Risk
Regulatory Gaps

Multi-Cloud Chaos
Complex Management
Operational Burden

NQRUST-STORAGE REVOLUTION

Garage + Rust Architecture
S3-Compatible Freedom Platform

PERFORMANCE

Rust-Powered Efficiency

S3 API Gateway
Full Compatibility
Drop-in Replace

Geo-Distribution
Multi-Region
Edge Optimized

Garage Engine
CRDT Consensus
Self-Healing

Rust Performance
Memory Safe
14x Faster

14x Read Speed
Edge Performance
12ms Latency

BREAKTHROUGH DISTRIBUTED ARCHITECTURE

Weakly Consistent, Horizontally Scalable, Commodity Hardware, Self-Managing

CRDT Sync
No Consensus
Always Available

Block Storage
Content Address
Deduplication

Layout Engine
Smart Placement
Auto-Rebalance

Anti-Entropy
Self-Healing
Auto-Repair

ENTERPRISE INTEGRATION ECOSYSTEM

Universal S3 Compatibility
Seamless Migration from Any Provider

AWS Migration
S3 → NQRust
Zero Downtime

Application SDKs
All Languages
Native Support

Analytics Ready
Spark/Hadoop
Data Lakes

K2V Database
Key-Value API
Metadata Store

COST LEADERSHIP

- Predictable pricing
- No egress fees

OBJECT STORAGE LEADERSHIP MATRIX

AWS S3	180ms vs 12ms latency
Azure Blob	Vendor lock-in vs Freedom
Google Cloud	Limited geo vs Native
MinIO	Complex setup vs Simple, Limited scale vs infinite
Ceph	Expert required vs Self-managing
Total Advantage	14x performance, Zero lock-in
ROI Achievement	1,000% ROI with complete vendor independence

BUSINESS BENEFITS

ROI Impact

Cost Reduction
80% TCO Savings
vs Traditional IAM

User Experience
95% Satisfaction
Zero Login Friction

RUST PERFORMANCE

- Memory Safety
- 14x faster access
- Zero-cost abstractions
- Concurrent efficiency

MEDIA & CONTENT DELIVERY

4K Streaming

Media Analytics

Edge CDN

Transcoding

Archive Storage

Live Streams

FINANCIAL DATA LAKES

Transaction Data

Compliance Logs

Risk Analytics

QJK Reporting

Deployment Model	Read Latency	Throughput	Availability	Use Cases
Single Region	8ms	2.1 GB/s	99.90%	Development
Multi-Region	12ms	1.8 GB/s	99.99%	Production
Edge Distribution	6ms	1.2 GB/s	99.95%	CDN/Media
Hybrid Cloud	15ms	1.5 GB/s	99.97%	Migration
Global Scale	18ms	3.2 GB/s	99.99%	Enterprise

Storage Independence
Complete S3 compatibility
with zero vendor lock-in

Performance Leadership
14x faster than AWS S3
through geo-distribution

Architecture Excellence
Garage CRDT foundation
with self-healing storage

Enterprise Ready
99.99% availability SLA
with enterprise security

STORAGE FLOW LEGEND

- Legacy Problems
- Solution Engine
- Architecture Core
- Performance Boost



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NQRust-Storage Geo-Distributed Object Storage Platform v1.0

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