



PQBioVault
POST QUANTUM READY • BIOMETRIC • SECURE • VERIFIABLE
IDENTITY VAULT

PQ BIO Vault

A Post-Quantum Biometric Authorization Platform for Institutional Digital Asset Custody

1. Executive Summary

PQ BIO Vault is an institutional digital asset custody authorization platform designed for banks, exchanges, custodians, stablecoin issuers, funds, family offices, treasuries, and tokenized asset platforms.

It protects institutional digital asset transactions by combining three critical controls:

1. **The transaction must be reviewed and approved by authorized human approvers.**
2. **Each approval must be tied to live biometric verification of the correct human approver.**
3. **The authorization layer must be protected for the post-quantum era.**

Most institutional custody systems focus on protecting keys, enforcing workflow approvals, or using HSM, MPC, multi-signature, or role-based access. These are important controls, but they do not fully solve the question:

Did the correct authorized human approvers approve this exact transaction before signing occurred?

PQ BIO Vault is designed to answer that question with stronger certainty.

It does not simply ask whether an administrator logged in, whether an API key was valid, or whether a custody system was technically able to sign. It requires transaction-bound biometric authorization from the required human approvers before institutional signing can proceed.

The core promise is simple:

No required human biometric authorization for the exact transaction means no institutional digital asset signing.

2. The Problem in Institutional Digital Asset Custody

Institutional digital asset custody has matured significantly, but several gaps remain.

Institutions need to control not only where private keys are stored, but also when and why those keys are used.

A bank, exchange, custodian, fund, or treasury may already have:

- HSM-based custody;
- MPC custody;
- multi-signature wallets;
- role-based access;
- approval workflows;
- treasury policies;
- compliance monitoring;
- audit logs;
- transaction limits;
- insurance requirements.

These controls are necessary, but they are not always sufficient.

2.1 Key custody is not the same as transaction authorization

Protecting signing material is essential. However, the key security event is not only where the key is stored.

The key security event is:

Who authorized the transaction, under what policy, and was the authorization tied to the exact transaction that was signed?

PQ BIO Vault focuses on that transaction authorization moment.

2.2 Institutional approvals can still be weak

Many approval workflows rely on:

- login credentials;
- email confirmations;
- dashboard approvals;

- API permissions;
- shared operational access;
- administrator rights;
- internal workflow systems.

These can be compromised, delegated, bypassed, or misused.

PQ BIO Vault strengthens the approval layer by requiring live biometric verification from authorized approvers.

2.3 HSM and MPC systems do not prove human intent by themselves

HSM and MPC systems can protect keys and signing operations very effectively. But they do not automatically prove that the correct human approvers reviewed and approved the exact transaction.

PQ BIO Vault does not replace HSM or MPC. It adds a human-authenticated transaction authorization layer before those systems are allowed to sign.

2.4 High-value transfers need stronger governance

Institutional digital asset transactions can involve large values, regulated assets, client funds, exchange reserves, stablecoin treasuries, tokenized securities, or corporate treasury assets.

For these transactions, the approval system must be stronger than ordinary access control.

PQ BIO Vault creates a more accountable transaction approval model.

2.5 Future cryptographic risk must be addressed early

Banks and custodians build infrastructure for long time horizons. Digital asset custody platforms should be designed with future cryptographic risk in mind.

PQ BIO Vault introduces a post-quantum protected authorization layer so institutions are not building only for today's threat environment.

3. What PQ BIO Vault Is

PQ BIO Vault is a bank-grade transaction authorization platform for institutional digital asset custody.

It ensures that protected institutional signing systems cannot be used unless the required human approvers complete live biometric authorization for the exact transaction.

It is designed for:

- banks;
- exchanges;
- custodians;
- crypto brokers;
- stablecoin issuers;
- ETF and fund custodians;
- family offices;
- corporate treasuries;
- tokenized security platforms;
- real-world asset tokenization platforms;
- CBDC and regulated digital money infrastructure.

PQ BIO Vault is not simply a wallet. It is not simply an approval dashboard. It is not simply a key vault.

It is a human-verified, transaction-bound authorization layer for institutional digital asset signing.

4. How PQ BIO Vault Works at a High Level

The institutional flow is straightforward.

Step 1 — A transaction is created

An authorized operator creates a transaction, such as:

- treasury transfer;
- exchange withdrawal;
- stablecoin movement;
- tokenized asset settlement;
- cold-to-warm wallet transfer;
- client custody movement;
- smart contract execution;
- token approval;
- regulated asset transfer.

The transaction is converted into a final approval request.

Step 2 — Policy determines required approvers

The institution's approval policy determines who must approve.

Examples:

- one treasury approver for low-value transfers;
- treasury plus compliance approval for higher-value transfers;
- director-level approval for large movements;
- additional compliance approval for new destinations;
- enhanced approval for smart contract interactions;
- emergency approval rules for freeze or recovery events.

Step 3 — Approvers review the exact transaction

Each required approver reviews the final transaction details:

- asset;
- amount;
- destination;
- network;
- wallet;
- custody account;
- fee;
- risk status;
- policy reason;
- transaction type.

The approver sees exactly what they are being asked to approve.

Step 4 — Each approver completes live biometric verification

The required approver completes live OneBioID biometric verification.

The biometric event confirms that the correct human approver is present and approving the specific transaction.

This is not merely a login event. It is a transaction authorization event.

Step 5 — A transaction-bound authorization is created

Each approval is bound to the exact transaction.

If the transaction changes after approval, the approval becomes invalid.

This prevents transaction substitution, post-approval modification, and generic approval reuse.

Step 6 — Signing is allowed only if all required approvals are valid

Only after the required human biometric authorizations are verified can the custody system proceed to signing.

This applies whether the institution uses:

- HSM;
- MPC;
- threshold signing;
- cold wallet;
- warm wallet;
- exchange wallet;
- tokenization platform;
- internal custody infrastructure.

PQ BIO Vault controls when signing may occur.

5. Core Institutional Benefit

PQ BIO Vault gives institutions stronger assurance over digital asset movements.

5.1 It proves human authorization

The platform is designed to prove that required human approvers authorized the exact transaction.

This is stronger than simply proving that a system account, admin login, or API key was used.

5.2 It protects the transaction, not just the key

Traditional custody systems focus heavily on key protection. PQ BIO Vault adds transaction protection.

The question becomes:

Was this exact transaction approved by the correct human approvers before signing?

5.3 It reduces internal fraud and operational abuse

Institutions face both external attacks and internal operational risks.

PQ BIO Vault makes it harder for a transaction to be executed through compromised credentials, improper delegation, weak approval practices, or unauthorized operational access.

5.4 It strengthens audit and accountability

For every protected transaction, PQ BIO Vault can help establish:

- who approved;
- what role they approved under;
- what transaction they approved;
- when they approved;
- which policy required approval;
- whether the transaction changed after approval;
- whether signing occurred only after approval.

This creates a stronger audit position.

5.5 It supports institutional confidence in digital assets

Institutions need custody systems that are explainable to boards, compliance teams, auditors, regulators, insurers, and clients.

PQ BIO Vault provides a clear control narrative:

Digital asset signing cannot occur unless required authorized humans biometrically approve the exact transaction.

6. Where PQ BIO Vault Can Be Used

6.1 Banks offering digital asset custody

Banks entering digital asset custody need stronger control over asset movement.

PQ BIO Vault can sit above the custody infrastructure as a human-verified transaction authorization layer.

Use cases:

- client custody transfers;
- tokenized deposit movement;
- stablecoin transfer approval;
- high-value digital asset settlement;
- institutional treasury movement;
- regulated wallet operation.

6.2 Crypto exchanges

Exchanges manage hot, warm, and cold wallets across large asset pools.

PQ BIO Vault can help enforce biometric approval for:

- hot wallet replenishment;
- cold-to-warm wallet transfers;
- large withdrawals;
- treasury transfers;
- emergency freeze/unfreeze;
- exchange reserve movements.

6.3 Custodians and trust companies

Custodians need strong evidence that client asset movements were properly authorized.

PQ BIO Vault provides transaction-bound approval evidence linked to authorized human roles.

Use cases:

- segregated client account movement;
- omnibus wallet movement;
- institutional withdrawal approval;
- multi-client settlement;
- regulated custody reporting.

6.4 Stablecoin issuers

Stablecoin issuers move large amounts of tokenized value and may need high-assurance authorization for minting, burning, treasury movement, and reserve-related operations.

PQ BIO Vault can support:

- mint authorization;
- burn authorization;
- treasury wallet movement;
- issuer reserve movement;
- compliance-controlled transfers.

6.5 Tokenized asset platforms

Tokenized securities, funds, bonds, real estate, commodities, and other real-world assets require stronger transaction governance.

PQ BIO Vault can support:

- regulated token transfer approval;
- issuer-controlled asset movement;
- investor redemption transactions;
- settlement authorization;
- compliance approval before transfer.

6.6 Funds and family offices

Funds and family offices may hold crypto assets, stablecoins, and tokenized investments.

PQ BIO Vault can give investment principals, directors, trustees, and authorized signatories stronger control over outgoing movements.

Use cases:

- high-value transfer approval;
- multi-signatory asset movement;
- director-level transaction approval;
- custody account oversight;
- treasury risk control.

6.7 Corporate treasuries

Corporate treasuries increasingly use stablecoins and digital assets for payments, liquidity, treasury reserves, and settlement.

PQ BIO Vault can provide policy-based, human-verified approval before corporate assets move.

7. Key Features of PQ BIO Vault

7.1 Transaction-bound biometric authorization

Approvals are tied to the exact transaction.

If the destination, amount, asset, network, fee, wallet, contract, or transaction content changes, approval is invalid.

7.2 Multi-approver institutional control

PQ BIO Vault supports approval structures such as:

- 1 of 1;
- 2 of 2;
- 2 of 3;
- treasury plus compliance;
- operator plus director;
- compliance plus settlement officer;
- board-authorized high-value movement.

7.3 Role-based approval

Approvers are not generic users. Each approval can be tied to a defined institutional role.

Examples:

- Treasury Approver;
- Compliance Officer;
- Director;
- Settlement Officer;
- Risk Officer;

- Recovery Officer;
- Custody Administrator.

7.4 Policy-based transaction governance

Approval rules can be based on:

- amount;
- asset;
- wallet type;
- destination;
- network;
- risk level;
- transaction type;
- jurisdiction;
- first-time recipient;
- smart contract risk;
- token approval risk.

7.5 Human-verified custody activation

PQ BIO Vault can sit in front of HSM, MPC, threshold signing, or custody provider systems and require human biometric authorization before signing is allowed.

7.6 Audit-ready approval chain

Each transaction can produce an approval chain showing:

- transaction context;
- required policy;
- approvers;
- roles;
- biometric verification reference;
- authorization status;
- signing result;
- timestamped audit events.

7.7 Freeze and emergency control

Institutions can freeze wallets, revoke pending approvals, block signing, and require enhanced approval for unfreeze or recovery events.

7.8 Post-quantum protected authorization layer

PQ BIO Vault is designed with a post-quantum protected authorization layer for institutional approval, audit, recovery and signing-control workflows.

This gives institutions a stronger long-term security posture.

8. How PQ BIO Vault Is Different

8.1 Different from a standard institutional wallet

A standard institutional wallet may support users, permissions, and transaction approvals.

PQ BIO Vault goes further by requiring live human biometric authorization for the exact transaction before signing is permitted.

Standard Institutional Wallet	PQ BIO Vault
User permission-based approval	Live human biometric approval
Transaction approval may be workflow-based	Approval bound to exact transaction
Focus on wallet operation	Focus on signing authorization
May depend on login/session controls	Requires live approver verification
Limited post-quantum readiness	Post-quantum protected authorization layer

8.2 Different from HSM custody

HSM systems protect keys, but they do not by themselves prove that the correct human approvers reviewed and approved the exact transaction.

PQ BIO Vault complements HSM custody by controlling when HSM signing is allowed.

HSM Custody	PQ BIO Vault
Protects key material	Protects transaction authorization

HSM Custody	PQ BIO Vault
Strong machine-level key control	Strong human-level approval control
Signing can be policy or system-triggered	Signing requires transaction-bound human approval
Hardware-centric	Human-authority centric
Key-security focused	Governance and transaction-security focused

8.3 Different from MPC custody

MPC custody distributes signing control across parties or systems, but the presence of a signing quorum does not automatically prove live human approval of the exact transaction.

PQ BIO Vault adds human biometric transaction authorization before MPC signing can proceed.

MPC Custody	PQ BIO Vault
Distributes signing shares	Verifies human approval
Reduces single-key compromise	Reduces unauthorized transaction approval
Quorum-based signing	Role-based biometric approval
Strong cryptographic custody	Strong human governance layer
Protects signing process	Controls whether signing should happen

8.4 Different from multi-signature wallets

Multi-signature wallets require multiple signatures, but they often depend on wallet addresses, devices, or private keys.

PQ BIO Vault focuses on the institution's human approval chain.

Multi-Sig Wallet	PQ BIO Vault
Multiple wallet signatures	Multiple verified human approvers
Address/key based	Role and identity based
On-chain signature model	Off-chain institutional authorization control

Multi-Sig Wallet

May reveal signer structure

Good for crypto-native governance

PQ BIO Vault

Can maintain institutional approval records privately

Better suited to bank-grade governance

8.5 Different from PAM or access management

PAM and access management systems control access to privileged systems.

PQ BIO Vault controls digital asset transaction authorization.

PAM / Access Control PQ BIO Vault

Controls system access Controls transaction signing authorization

User/session based Transaction-bound approval based

Useful for IT systems Built for digital asset movement

Privilege-focused Asset-movement focused

Login governance Signing governance

8.6 Different from ordinary approval workflows

Many enterprise workflows can show that someone clicked approve.

PQ BIO Vault is designed to show that the correct human approver biometrically authorized the exact digital asset transaction under the correct policy.

That is a higher standard.

9. Why PQ BIO Vault Is Better for Institutions

9.1 It closes the gap between approval and signing

Many systems have approval workflows, but signing can still be separated from approval in ways that create risk.

PQ BIO Vault connects approval and signing more tightly.

Signing is not permitted unless the required transaction-bound human authorizations are valid.

9.2 It creates stronger governance evidence

Institutions need evidence, not just internal confidence.

PQ BIO Vault can support evidence that:

- the transaction was reviewed;
- the correct policy applied;
- the correct roles approved;
- the approvers were live verified humans;
- the transaction did not change after approval;
- signing occurred only after required approvals.

9.3 It reduces credential-only risk

If an attacker obtains credentials, API access, or operational access, that should not be enough to move assets.

PQ BIO Vault requires human biometric authorization tied to the transaction.

9.4 It improves board and regulator confidence

Boards, regulators, auditors, insurers, and clients need to understand how institutions protect digital assets.

PQ BIO Vault provides a clear, defensible control:

Institutional digital asset transactions require live human biometric approval from the required authorized roles.

9.5 It works with existing custody infrastructure

PQ BIO Vault does not require institutions to abandon HSM, MPC, threshold signing, or existing custody providers.

It can be positioned as an additional authorization layer that improves the security and governance of existing custody infrastructure.

9.6 It supports post-quantum migration

Institutions should not build digital asset custody controls that are already outdated.

PQ BIO Vault introduces a post-quantum protected authorization layer, giving institutions a forward-looking security foundation.

10. Institutional Value Proposition

For banks

PQ BIO Vault helps banks offer digital asset custody with stronger human authorization, transaction governance, and auditability.

For exchanges

PQ BIO Vault helps exchanges protect high-value wallet movements, hot/warm/cold wallet transfers, treasury movements, and large withdrawals.

For custodians

PQ BIO Vault gives custodians stronger evidence of client asset movement authorization and policy compliance.

For stablecoin issuers

PQ BIO Vault supports controlled minting, burning, treasury movement, and reserve-related asset transfers.

For tokenized asset platforms

PQ BIO Vault supports regulated asset transfer approval, settlement authorization, and compliance-controlled movement of tokenized value.

For funds and family offices

PQ BIO Vault creates stronger controls for directors, trustees, investment principals, and authorized signatories managing digital assets.

For corporate treasuries

PQ BIO Vault helps treasury teams use stablecoins and digital assets with stronger policy-based human approval.

11. The Core Differentiator: Human-Verified Institutional Signing Authorization

The central innovation is not simply custody.

The central innovation is:

Live biometric verification of required human approvers, bound to the exact institutional transaction, before signing is permitted.

PQ BIO Vault is not asking only:

Is the custody system technically able to sign?

It is asking:

Did the correct authorized humans approve this exact transaction under the correct policy?

That is the difference between key custody and transaction governance.

PQ BIO Vault is built around transaction governance.

12. Summary

PQ BIO Vault addresses one of the most important gaps in institutional digital asset custody: the gap between protected key storage and verified human transaction authorization.

Existing systems protect keys, enforce workflows, or distribute signing control. PQ BIO Vault adds the missing human authorization layer.

It provides:

- transaction-bound biometric approval;
- role-based institutional authorization;
- multi-approver control;
- policy-driven governance;
- audit-ready approval evidence;
- compatibility with HSM, MPC and custody providers;
- freeze and recovery controls;
- post-quantum protected authorization;
- stronger protection for high-value digital asset movement.

PQ BIO Vault is designed for institutions that need digital asset custody to be secure, explainable, auditable and future-ready.

Its core promise is simple:

No verified approval from the required authorized humans for the exact transaction means no institutional digital asset signing.