



WALLET INFRASTRUCTURE FOR THE MODERN FINANCIAL INSTITUTION

Executive Summary

The financial system is undergoing a significant structural shift. Stablecoins, central bank digital currencies, and real-world asset tokenization have moved from experimentation to live deployment, and the world's largest financial institutions are already operating on these new rails.

Yet, a critical disconnect remains. Legacy core banking systems cannot bridge this gap. The solution is a purpose-built institutional wallet layer that sits alongside existing infrastructure and does not replace it.

This paper presents a practical framework for banking, capital markets, and treasury teams. It covers the market forces driving urgency, the architectural and compliance challenges that must be solved, and a phased roadmap for integrating wallet-based digital asset infrastructure with existing core banking systems, without disrupting what already works.

The Structural Shift in Financial Infrastructure

There are three macro forces reshaping how value is stored, moved, and settled globally.

Stablecoins such as United States Dollar Coin (USDC), Tether USD (USDT), and PayPal United States Dollar (PYUSD), along with a growing cohort of bank-issued stablecoins, have evolved from tools used mainly in crypto to becoming trusted ways for institutions to move and settle money. Daily stablecoin settlement volumes now exceed \$30B, surpassing PayPal and Mastercard volumes. The infrastructure that handles these flows is no longer experimental; this infrastructure is already being used by global financial institutions.

Tokenized deposits are moving from pilot to production.

Bank-issued tokenized deposits are emerging as a regulated and institution-friendly alternative to stablecoins. These deposits maintain a direct claim on the issuing bank while enabling programmability, real-time settlement, and interoperability with digital asset ecosystems.

Leading financial institutions are already exploring tokenized deposit frameworks to modernize payments, treasury operations, and intra-bank settlements. For institutions without a wallet layer, accessing and operationalizing tokenized deposits will remain a challenge.

Real-world asset tokenization has crossed the proof-of-concept threshold. The big players have already digitized investments. BlackRock's BUIDL fund, Franklin Templeton's BENJI token and JPMorgan's Kinexys network are not pilots: they are live products managing billions in institutional capital. The key is that wallets are the access layer to this market, and institutions without one will not be able to participate.

The Biggest Names in Finance Have Already Moved

The actors driving this shift are the most recognizable names in global finance. Banks like JPMorgan, Citigroup, HSBC, and BNY have all deployed live digital asset infrastructure. Payment companies such as Visa and Mastercard are building multi-token settlement networks. SWIFT and other network providers are actively enabling interoperability between traditional financial messaging systems and tokenized asset and deposit infrastructures.

Companies like Fireblocks, BitGo, and Anchorage Digital are processing institutional flows at scale. Technology providers such as Polygon, Hyperledger, and R3 are providing the underlying technology (DLT substrate) on which this market operates.

The stablecoin market capitalization has grown from negligible in 2019 to more than \$170 billion today, with credible projections placing the tokenized asset market at \$16 trillion by 2030.

\$170B+

Global Stablecoin Market and growing rapidly

\$16T

Tokenized Asset Market projected by 2030

The key problem is that traditional core banking platforms were not designed for the macro forces reshaping global finance. And for institutions that delay, the cost of waiting is rising faster than the cost of acting.



Why Legacy Systems Cannot Bridge This Gap

The Core Banking Architecture Gap

The world's core banking platforms, such as Temenos, Finastra, FIS, Infosys Finacle, and Oracle FLEXCUBE, were designed for an era when batch processing, fiat currencies, and SWIFT-era messaging were the norm. However, the world has changed. The old banking software systems cannot read blockchain state, use digital signatures to authorize crypto transfers, or execute atomic settlement. With banks running 24/7, replacing these core systems is not a viable option considering cost, risk, and regulatory scrutiny.

Custody and Key Management Complexity

In digital assets, whoever controls the private key controls the assets. Single-key models create catastrophic single points of failure while on-chain multi-signature models impose blockchain coordination overhead, expose governance logic publicly, and are not supported natively across all chains or asset types. Institutions require a custody model that satisfies internal risk committees, external auditors, and regulators simultaneously – a requirement that legacy banks have never had to deal with before.

The Compliance and Regulatory Fragmentation Problem

Every country has its own rules due to which regulatory obligations for digital asset operations are fragmented, evolving, and jurisdiction-specific. For example, the Financial Action Task Force (FATF) Travel Rule requires institutions to pass sender and receiver details for transfers above \$1,000, using the InterVASP Messaging Standard 101 (IVMS101). On the other hand, the EU's Markets in Crypto-Assets Regulation (MiCA) regulation, live as of June 2024, imposes Crypto-Asset Service Provider (CASP) licensing requirements. In the United States, guidance from the Office of the Comptroller continues to evolve. Therefore, controls and compliance must be embedded at the wallet protocol level to ensure they are non-bypassable and fully auditable. Every destination address must be screened before settlement is authorized.

Competitive risk of inaction

Traditional banks are determining how to handle crypto and digital assets and adding those as an extra feature. Meanwhile, a new breed of companies has already built their entire business around it. Companies like Ripple and Circle are building regulated financial services with wallets as their core infrastructure and their fundamental business model. Three business lines that are most profitable for banks are at risk from disintermediation: payment flows, custody revenue, and corporate treasury relationships.

Institutional Wallet Infrastructure as the Bridge

The infrastructure gap is real, but it can be bridged. What financial institutions need is not a replacement of existing systems, but a purpose-built wallet layer that sits alongside them.

This wallet layer must be designed as an embedded wallet infrastructure, seamlessly integrated within existing banking channels and products. Rather than operating as a standalone system, the wallet should function as an extension of the bank's digital interface, enabling clients and internal systems to interact with digital assets natively.

The Six-Layer Institutional Wallet Stack

An institutional wallet is more like an entire banking operating system built for digital assets. It connects with the bank's internal ledgers and records, automatically complies with legal rules across jurisdictions, and operates across multiple blockchain networks.

The architecture of this wallet stack is organized across six functional layers:

- Settlement and ledger layer
- Blockchain abstraction layer
- Compliance and risk layer
- Custody and key management layer
- API orchestration layer
- Control layer with wallet-based policy enforcement and embedded wallet interfaces

The control layer is critical as it governs transaction authorization, policy enforcement, limits, workflows, and compliance rules before execution. This enables banks to retain full control over asset movement in a wallet-driven environment.

MPC – The Standard for Institutional Key Management

Multi-Party Computation (MPC) has emerged as the industry standard for institutional-grade key management, replacing both single-key and traditional multi-signature approaches. MPC distributes key material across independent parties such that no single operator ever holds or can reconstruct the complete private key. Signing operations are performed collaboratively, and the resulting signature is indistinguishable from a standard on-chain transaction. The full key is never reconstructed anywhere. This is the cryptographic foundation on which institutional custody must be built.

Connecting Wallet Infrastructure to Core Banking Rails

The critical engineering challenge is not building a wallet but integrating it with core banking systems through a wallet-based control layer.

The recommended approach is an API-first embedded integration model, where:

- The wallet acts as the execution and settlement interface
- A control layer governs permissions, limits, workflows, and compliance
- A Digital Asset Gateway bridges core banking systems and wallet infrastructure

This architecture enables:

- Core banking systems to remain the system of record
- Wallets to act as the system of execution
- The control layer to enforce policies across both environments

The result is a synchronized system where transactions initiated via wallet interfaces are validated, enriched, and controlled before posting into core banking systems.

Use Cases That Deliver Measurable Capability

The value of wallet infrastructure is already quantifiable across three business domains.

Banking

Stablecoin-based cross-border payments negate the need for multiple intermediary banks, reducing settlement times from one to three days to under a minute, and lowering transaction costs from \$25-\$45 to just a few cents. It also eliminates the need for banks to hold large pre-funded balances in foreign accounts, freeing up significant capital. In addition, bank-issued tokenized deposits introduce programmable capabilities, such as conditional payments, escrow, and time-based releases, while maintaining full regulatory alignment with traditional deposit frameworks.

Capital Markets

In capital markets, tokenized securities allow Delivery vs Payment (DvP) to happen instantly. This reduces the risk of trades failing, which can affect 2-4% of transactions. It also unlocks intraday liquidity through more efficient, same-day lending cycles. These transactions can be executed through smart contract-based wallets that automatically manage collateral. Platforms like Kinexys by JPMorgan Chase are already processing over \$1 billion in such transactions daily.

Treasury

In treasury operations, programmable wallets can automatically move excess cash into interest-earning instruments in real time, fund payments as needed, and rebalance money across accounts and currencies. This reduces the need for manual cash management and can lower idle or unused funds by 40-60%. Stablecoin-based foreign exchange (FX) pairs, such as USD Coin / Euro Coin, enable round-the-clock settlements without relying on traditional systems like SWIFT or CLS Group. This reduces settlement risk from up to 48 hours to just a few minutes.



A Phased Roadmap to Production

The path to institutional wallet infrastructure does not require a big-bang transformation. It requires disciplined sequencing and building the foundation correctly before scaling. The following six strategic principles define that path.

1. Deploy an API-First Overlay

Rather than changing the bank's core systems, which could be risky, build a new layer called a Digital Asset Gateway on top of the core system. This layer acts like a bridge and connects the bank to digital asset systems, minimizing operational and regulatory disruption. It also allows the wallet layer to evolve independently, enabling faster innovation without impacting core systems. This mirrors the approach taken by leading global banks, already live in production.

2. Start with a Single Use Case

Select one high-conviction use case, such as stablecoin cross-border payments, and build production infrastructure around it. Demonstrate measurable business value, refine operations, and use early success to build internal momentum and regulator confidence before expanding.

3. Structure MPC Custody to Preserve Institutional Control

Third-party managed MPC can reduce initial build complexity and accelerate time-to-market. However, any MPC arrangement must be structured so that the bank always stays in control by holding at least one key shard and being part of every signing process. Custody ownership, signing authority, and overall responsibility must remain with the bank. MPC providers should be carefully evaluated against dimensions such as security protocols, independence of nodes, key refresh capability, support for algorithms and blockchains, clarity of the custody model, and strength of disaster recovery procedures.

4. Use Stablecoins as the Entry Rail

Starting with stablecoins allows treasury and payments teams to gain operational experience with wallet infrastructure before moving into more complex tokenized asset territory.

Stablecoins like USDC (for US dollars) and EURC (for euros) are regulated, audited, and operate within familiar legal frameworks, so they offer the lowest-friction entry point for institutions beginning digital asset adoption.

5. Engage Regulatory Sandboxes Early

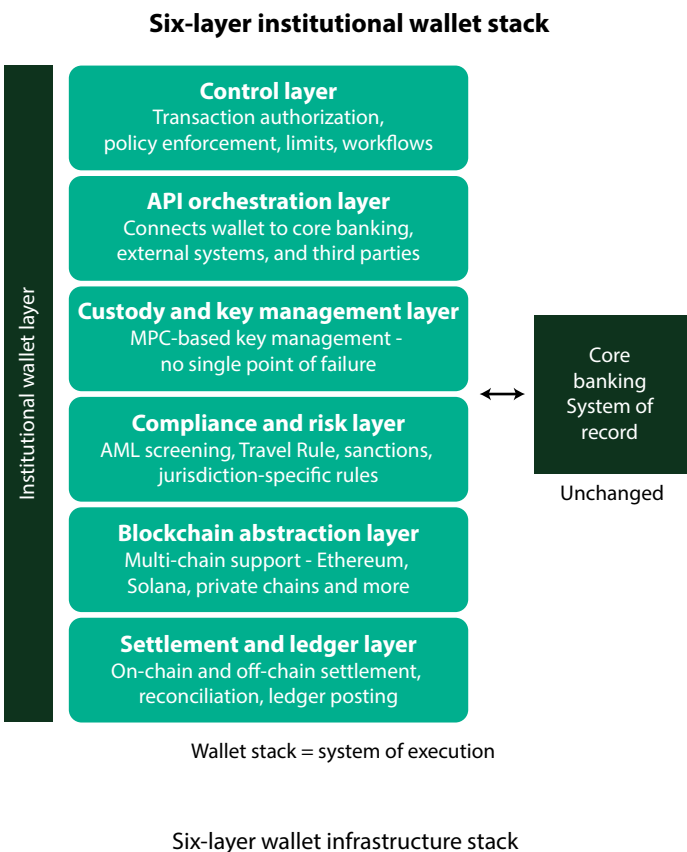
When banks start working with digital assets, they should engage with regulators early through "sandboxes." Initiatives such as the FCA Digital Securities Sandbox, MAS Project Guardian, or the Virtual Assets Regulatory Authority (VARA) in the UAE are safe testing environments that build regulator trust ahead of production launch. Sandbox participation ensures that architecture decisions are designed in line with evolving compliance requirements and reduces the risk of costly changes after launch.

6. Buy Before Building the Gateway

Procure proven gateway infrastructure from providers like Fireblocks and Copper to get started faster and rely on systems that are already tested and secure. This approach reduces time to first production transaction, leverages existing security audit history, and preserves internal engineering capacity for differentiated build.

Key Takeaways:

- 1. **The financial system has already shifted; this is not a future trend.** Stablecoins, tokenized deposits, and real-world asset tokenization are live and in production at the world's largest banks.
- 2. **Legacy banking systems cannot keep up.** When fintech first arrived, banks had to connect many new services like payments, lending, and BNPL through an orchestration layer that tied everything together. With digital assets, banks may need another orchestration layer to connect core banking with new tokenized assets and tokenized money layers.
- 3. **The solution is a purpose-built wallet layer.** A dedicated institutional wallet and custody infrastructure that sits on top of existing core banking systems without disrupting them would be ideal.
- 4. **The wallet is a six-layer stack.** It covers settlement, blockchain abstraction, compliance, custody, API orchestration, and a control layer.



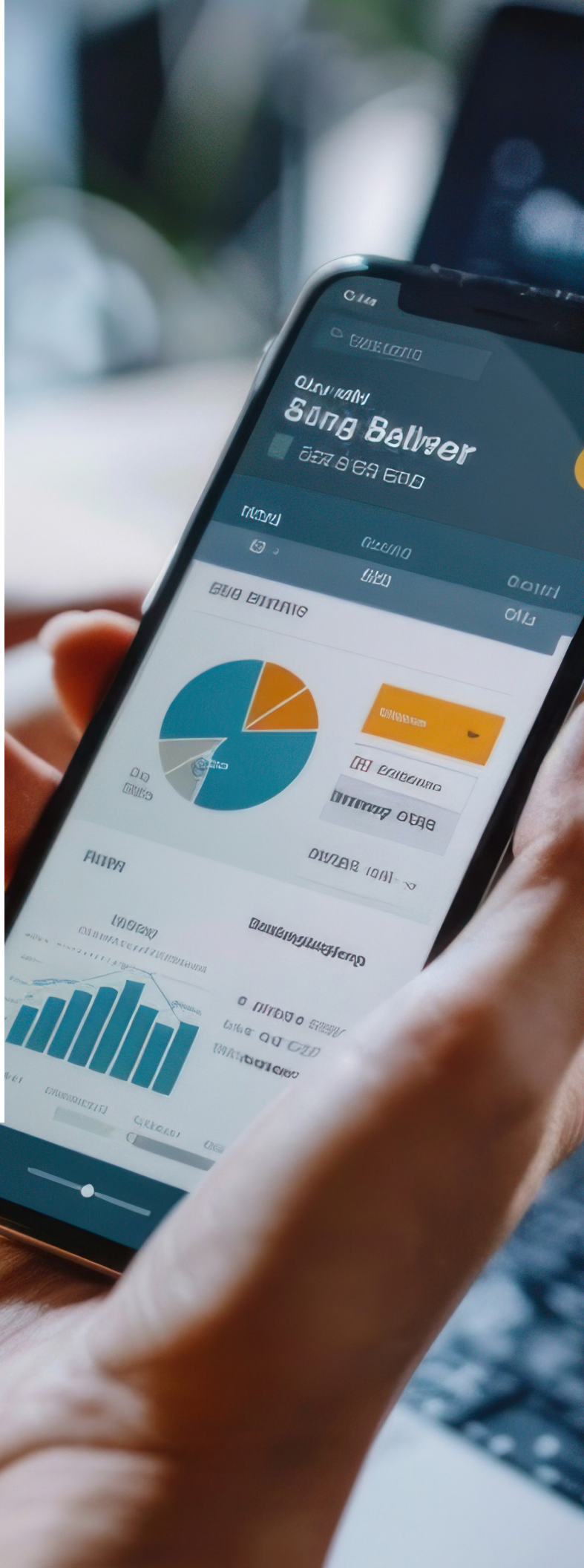
5. **MPC is the gold standard for key management.** Multi-Party Computation eliminates single points of failure in custody. No single party ever holds the full private key.
6. **The capability and revenue generation is already measurable across certain business domains.**
7. **The path to adoption is a multi-year roadmap, and the time to start is now.** Regulation is no longer a barrier. The rules exist, and they are increasingly clear across major jurisdictions. The path forward is a phased, multi-year investment roadmap: start with one high-conviction use case, build a Digital Asset Gateway as an API overlay, buy proven infrastructure rather than building from scratch, and scale from there.
8. **The cost of waiting is rising.** Three of the most profitable banking revenue lines, payments, custody, and corporate treasury, are directly at risk if traditional banks do not act. Crypto-native firms have already built regulated, wallet-first businesses, capturing these flows faster and cheaper. Every quarter of inaction is market share transferred, and infrastructure debt compounded.

The Path Forward: Building the Institutional Wallet Layer

The technology for institutional wallet infrastructure is in production at Tier 1 banks. The regulatory frameworks are maturing, and the competitive pressure is real and building.

The business case is proven; JPMorgan's Kinexys processes more than \$1 billion daily intraday repo. HSBC Orion has issued over \$1 billion in tokenized bonds. Franklin Templeton manages more than \$350 million in tokenized money market funds. The ROI is measurable: 60-80% reductions in operational costs, T+0 settlement, and trapped liquidity freed at scale.

Institutions should prioritize embedded wallet adoption combined with wallet-based control layers, ensuring that digital asset capabilities are integrated directly into existing banking workflows rather than delivered as separate systems.



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Bharat is driving growth and innovation across banking and capital markets in digital assets, tokenized money, and blockchain-based financial infrastructure. With over 25 years of experience, he specializes in helping financial institutions bridge traditional finance with crypto and decentralized finance (DeFi), enabling scalable strategies, ecosystem partnerships, and production-grade implementations that unlock new revenue streams and efficiencies.

Bharat has led large-scale transformation initiatives, advising clients on digital asset adoption, tokenization, payments evolution, and data-driven decision-making. He combines deep domain expertise with a strong track record of building new business capabilities. He holds a master's degree from IIT Delhi, where he conducted research in photonics and optical communications.



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Vivek Dwivedi leads portfolios at Infosys encompassing Payments, Exchanges, Market Infrastructure, and Banking for the North America region. Based in Phoenix, Arizona, Vivek brings over 25 years of expertise in driving business outcomes for Fortune 500 companies through digital transformation initiatives.

An expert in cards and payments, banking, investment management, and retirement services, Vivek operates at the intersection of business and technology. His inclusive leadership style and focus on fostering a high-performance work culture enable him to deliver exceptional value to clients and stakeholders.

Vivek holds an MBA from NYU-Stern School of Business and an engineering degree from the Indian Institute of Technology.

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