OFFLINE PAYMENTS AS CRITICAL INFRASTRUCTURE

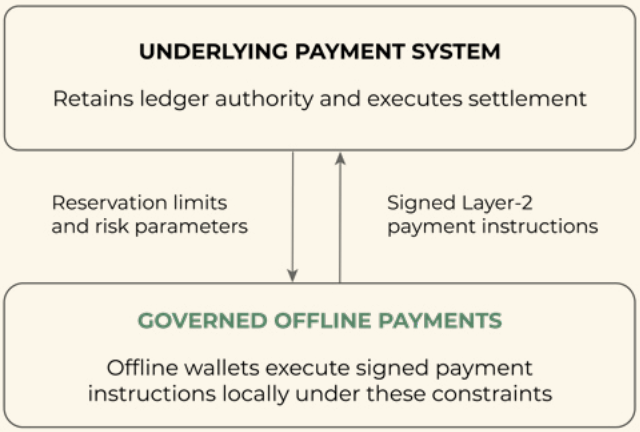
crunchfish
RETHINKING PAYMENTS

A governed offline architecture

Digital payments are critical public infrastructure, yet they fail when connectivity or backend systems are unavailable. Crunchfish enables offline payments as governed payment instructions. Payments execute offline under strict local limits, while verification, ledger authority, and settlement remain with the underlying payment system.

Crunchfish separates offline execution from online verification and settlement. Offline payments are executed as cryptographically signed payment instructions under locally enforced balance limits. All offline activity is verified and settled centrally once connectivity returns, ensuring predictable outcomes without fragmenting payment ecosystems or introducing unmanaged risk.

Payments keep working, even during outages.



Crunchfish enables governed offline payments by extending existing payment systems with reservation-based limits and risk parameters enforced locally, while ledger authority and settlement remain unchanged.

Reserve

Funds are reserved while systems are available. Value remains in regulated accounts under the authority of the existing payment ledger.

Pay

Payments are executed offline using signed layer-2 payment instructions. Spending is limited to balances derived from reserved funds.

Settle

Offline payments are verified, converted, and settled in the underlying payment system once connectivity and system availability return.

Users can only spend value they already control.

Let's talk about payment resilience

Introduction | What we solve | How it works | Technology & IP | Demos

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Offline architecture comparison

Architecture	Immediate	Governed	Deferred
Settlement timing	Immediate	**Deferred**	**Deferred**
Spending limit	**Balance-based** (device-held value)	**Balance-based (reservation-derived)**	Not balance-based (credit accumulates)
Risk	Systemic device risk	**Governed and bounded risk**	Hidden offline credit risk
Scalable	No, hardware-limited	**Yes, deployable system-wide**	No, card-based acceptance
Interoperable	No, token-specific	**Yes, payment-rail agnostic**	No, card-scheme specific
Physical analogue	Cash	**Banker's cheque**	Personal cheque

Crunchfish's governed offline architecture combines immediate-mode spending discipline with deferred settlement.

A governed architecture matters

The offline architecture determines risk, scalability, and interoperability.

Governed and bounded risk

Users can only spend value they already control, preventing hidden or accumulating offline credit.

System-wide scalability

Offline capability can be deployed system-wide without device- or hardware-based constraints.

Interoperable by design

Works as a Layer-2 overlay without modifying existing payment rails, ledgers, or settlement infrastructure.

Who is it for

System Operators: Central Banks and Payment Networks

Introduce offline resilience as national payment infrastructure while preserving governance, liquidity management, and regulatory oversight.

National payment resilience.

Service Providers: Banks and Payment Applications

Ensure payments continue during outages and congestion without changing settlement rails or fragmenting existing payment architectures.

Every attempted payment can succeed.

Technology Providers

Integrate governed offline capability into payment platforms and applications using a Layer-2 approach, without requiring changes to underlying payment systems.

Integrate once. Deploy offline capability to multiple system operators and service providers.

Users, Merchants & Agents

Digital payments remain available anytime, anywhere, even when the underlying payment service is not available.

Predictable payment availability matters most.

CRUNCHFISH DELIVERS

- Offline Wallet SDK
- Offline Terminal SDK
- Offline Protocols and APIs
- Offline Backend Components

Underpinned by Patents

Crunchfish delivers a governed Layer-2 offline payment infrastructure that can be deployed across payment systems and applications while preserving native settlement and authority.