

Payment Systems: Why Does Moving Money Still Take Three Days?

We stream movies in milliseconds but a bank transfer still takes longer than delivering a pizza

Digital Finance

Why Does Moving Money Still Take Longer Than Delivering a Pizza?

The Latency Paradox

An email arrives in 0.001 seconds. A video streams in real time across continents. Yet a bank transfer between two accounts at *different* banks still takes 1–3 business days. Why?

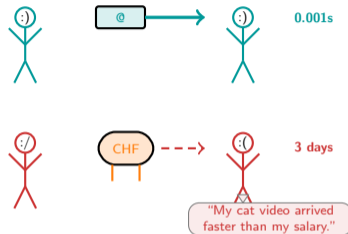
The infrastructure is old:

- SWIFT was built in 1973 – the same year as the first mobile phone call
- Card networks (Visa, Mastercard) date to the 1960s
- Interbank clearing systems were designed for batch processing, not real-time settlement

The delay is not accidental – it is profitable:

- “Float” – banks earn interest on money in transit (global float estimated by BIS at trillions of USD intraday)
- Nostro/vostro accounts (Latin: *nostro* = “ours with you”, *vostro* = “yours with us” – mirror accounts between correspondent banks) hold billions in pre-funded liquidity across correspondent banks
- Each intermediary in the chain charges a fee and adds a day of processing
- Faster settlement reduces float income, so incumbents have limited incentive to accelerate

Payment speed is not a technology constraint – it is an economic choice. Intermediaries profit from delay.



We digitized everything except money.

When Was the Last Time You Waited for Money That Should Have Arrived Instantly?

Reflection Prompt

Think about your last three payments. Maybe you sold something on Ricardo.ch and waited days for the transfer. Maybe you sent money to a friend abroad and lost 3% to hidden FX fees. Maybe you split a dinner bill and half the table used Twint while the other half fumbled with bank transfers.

Trace your last three payments through the system:

- 1 **What did you pay?** (Coffee, rent, online purchase, transfer)
- 2 **What rail did it travel on?** (Twint, debit card, credit card, bank transfer, cash)
- 3 **How long until the merchant received final settlement?** (Hint: even “instant” Twint batches through SIC overnight)
- 4 **How many institutions touched the transaction?** (Your bank, their bank, a card network, a processor, a clearing house?)
- 5 **What did you pay – explicitly and hidden?** (Direct fee + FX spread + float cost)

Most people can answer question 1 but not questions 3–5. The infrastructure that moves your money is deliberately invisible. That invisibility is both a feature (convenience) and a problem (you cannot optimize what you cannot see).

Bring your payment diary to class: three payments, five questions each.

Every payment travels through invisible infrastructure – you cannot optimize costs you cannot see.

What Are the Six Competing Rails That Move Your Money?

Rail	Speed	Cost	Reach	Regulation
Cash	Instant	Zero direct	Local only	Central bank
Card networks (Visa/MC)	Seconds (auth), T+1 settle	1.5–3% merchant	Global	PSD2, IFR
Bank transfer (SWIFT)	1–3 days	CHF 20–50 cross-border	Global	FATF, local
Real-time payments (SIC/TIPS)	Seconds	Low (cents)	Domestic/EU	Central bank
E-wallets (Twint, PayPal)	Seconds (display), batched settle	0–1.5%	Platform-specific	E-money regs
Crypto rails (stablecoins)	Minutes	Variable fees (gas)	Global, permissionless	Emerging (MiCA)

Regulatory anchors: PSD2 (Payment Services Directive 2, EU Directive 2015/2366, force Jan 2018, enabled open banking); IFR (Interchange Fee Regulation, EU 2015/751, caps consumer-card interchange 0.2–0.3%); FATF (Financial Action Task Force, Paris, 1989, 40 AML/CTF recommendations); MiCA (Markets in Crypto-Assets, EU 2023/1114, applies 2024–25); TIPS (TARGET Instant Payment Settlement, ECB, Nov 2018, EUR instant pan-European rail).

Rails are layers, not alternatives

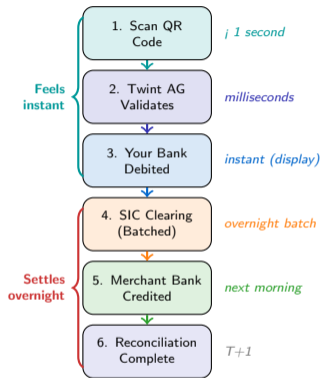
- Twint *rides on top of* the SIC interbank system
- A Visa transaction passes through the card network *and* the banking system for settlement
- PayPal holds internal balances but *uses* bank transfers to fund and withdraw
- Even crypto stablecoins ultimately connect back to fiat rails at on/off ramps

Key insight: No payment rail operates in isolation. Each new “instant” payment system is a user-facing layer on top of older, slower infrastructure. The speed you experience is not the speed of settlement – it is the speed of the promise that settlement will happen later.

Understanding which layers stack on which is essential for **evaluating cost, risk, and finality**.

Six payment rails, each built for a different era – and each new “instant” layer still settles through older infrastructure underneath.

Follow One Twint Payment from Your Phone to the Merchant's Bank



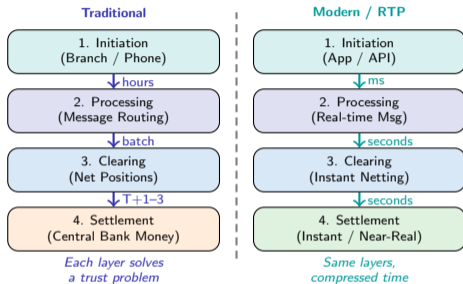
Six steps, four institutions

- **QR scan:** You scan the merchant's code. Twint authenticates your device and the merchant in milliseconds. You see "Payment successful" – but no money has moved yet.
- **Twint AG** (Switzerland, Zurich, 2014, joint venture owned by UBS, PostFinance, Raiffeisen and other Swiss banks): Acts as the orchestrator. Validates both parties, checks limits, logs the transaction. Twint is not a bank – it is a messaging layer.
- **Your bank debited:** Your bank reduces your visible balance immediately (a "hold"). The actual debit is queued for batch processing.
- **SIC clearing:** Switzerland's interbank clearing system (SIC = Swiss Interbank Clearing, operated by SIX Interbank Clearing AG since 1987 on behalf of the Swiss National Bank) processes Twint transactions in overnight batches. Around 4 million Twint transactions per day flow through this system.
- **Merchant credited:** The merchant's bank receives the cleared funds the next morning. Final settlement is T+1.
- **Reconciliation:** All parties confirm their ledgers match. Any discrepancies trigger exception handling.

Key insight: Twint *feels* instant because your balance updates immediately. But actual interbank settlement happens overnight through the same SIC system that has processed Swiss payments for decades.

Twint feels instant – but passes through at least four institutions and settles overnight through SIC batch processing.

What Are the Four Layers That Every Payment Must Pass Through?



Four layers, four trust problems

Every payment – whether cash, card, or crypto – passes through the same four logical layers:

- **Initiation:** Who is sending, who is receiving, how much, in what currency? This layer handles authentication and authorization.
- **Processing:** Route the payment instruction to the right institutions. SWIFT messages, card network auth requests, and API calls all serve this function.
- **Clearing:** Calculate who owes whom. Banks process thousands of payments per day; clearing “nets” them so only the difference moves between banks.
- **Settlement:** Actually move the money – typically in central bank reserves. This is the only step where “real money” changes hands. Everything before is a promise.

The modern path compresses all four layers into seconds instead of days – but the layers still exist. Real-time payment systems do not eliminate clearing and settlement; they accelerate them.

Every payment passes through four layers – initiation, processing, clearing, settlement. Speed innovations compress them but cannot eliminate them.

What Happens When the System That Moves Trillions Per Day Goes Down?

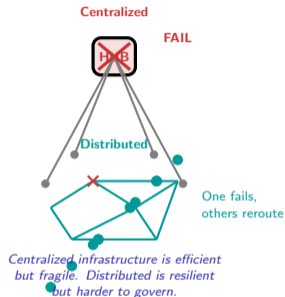
When Infrastructure Fails

Visa Europe outage (June 2018): A hardware failure at a single UK data center knocked out Visa transactions across Europe for 10 hours. Millions of card payments failed. Shops turned away customers. ATMs stopped dispensing cash. A single point of failure in a system processing 150 million transactions per day.

SWIFT as geopolitical weapon (2022): Disconnecting 7 Russian banks (incl. VTB, Otkritie, Novikombank) from SWIFT on 12 March 2022 following Russia's invasion of Ukraine demonstrated that payment infrastructure is not neutral. It is a lever of power controlled by a small group of nations.

Instant payment fraud risk:

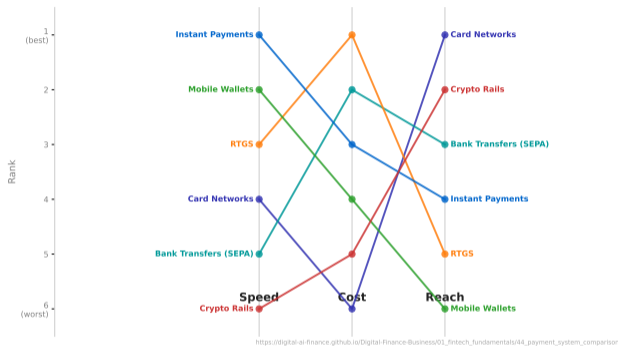
- Traditional transfers allow 1–3 days for fraud detection before settlement. Instant payments settle in seconds – no recall window.
- Authorized push payment (APP) fraud: victims are tricked into authorising the payment themselves – once sent on an instant rail, recovery is nearly impossible.
- UK Finance data: APP fraud losses exceeded GBP 485 million in 2022 across 207,372 cases



Centralized payment infrastructure is efficient but fragile – a single failure can halt millions of transactions.

How Do Six Payment Systems Compare on Speed, Cost, and Reach?

Payment System Comparison: Speed, Cost, and Reach



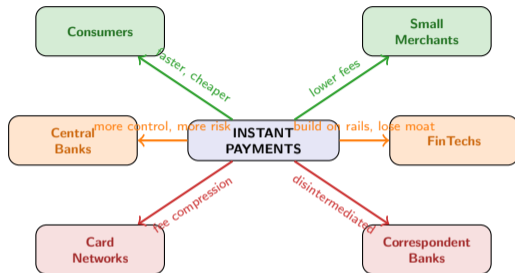
Reading the comparison

- **No single system wins all three dimensions.** Cash is instant and zero-cost but has no reach beyond physical proximity. SWIFT has global reach but is slow and expensive. Real-time payments are fast and cheap but limited to domestic or regional scope.
- **Card networks** offer the best compromise for consumer payments: near-instant authorization, global acceptance, but merchants pay 1.5–3% per transaction. Consumers rarely see this cost.
- **E-wallets** (Twind, PayPal) feel fast to users but batch-settle through traditional rails underneath. Speed is a user-experience layer, not a settlement reality.
- **Crypto rails** offer global reach and 24/7 operation but face volatility, variable fees, and limited merchant acceptance.
- **Real-time payments** (SIC Instant, Switzerland, launched Aug 2024; SEPA Instant, European Payments Council, Nov 2017; FedNow, US Federal Reserve, Jul 2023) are the emerging frontier: fast, cheap, and central-bank-backed – but still domestically bounded.

The trilemma: Speed, low cost, and global reach – pick two. No current system delivers all three at once.

Illustrative comparison. No payment system excels on all three dimensions – the trilemma of speed, cost, and reach remains unsolved.

Who Wins and Who Loses When Payments Become Instant and Free?



Winners

- + **Consumers:** Faster access to funds, lower remittance costs, 24/7 availability. A freelancer paid on Friday evening gets funds immediately, not Monday.
- + **Small merchants:** Replace card terminal fees (1.5–3%) with near-zero real-time payment costs. Cash flow improves with instant settlement.

Losers

- **Card networks:** If real-time bank payments are free and instant, why pay 2% for a card? Visa and Mastercard face structural fee compression.
- **Correspondent banks:** SWIFT intermediaries earn fees from slow cross-border transfers. Instant settlement eliminates their role.

Mixed

- ~ **Central banks:** Gain real-time oversight but absorb more operational risk and must fund 24/7 infrastructure.
- ~ **FinTechs:** Can build on public rails cheaply – but their proprietary speed advantage disappears when the public rail is equally fast.

Instant payments benefit consumers and merchants but threaten card networks and correspondent banks whose business models depend on intermediation fees and float.

Four Questions That Reveal Any Payment System's True Cost

When evaluating any payment system – as a merchant, regulator, or consumer – ask these four questions:

1. What is the total cost, not just the visible fee?

Explicit fees are only part of the cost. FX spreads, float (interest lost while money is in transit), and hidden markups can exceed the stated fee. A “free” Twint payment still costs the merchant 1.3% in some configurations.

2. Who bears the risk if something goes wrong?

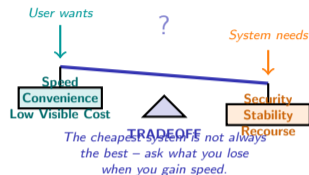
Card networks offer chargeback protection – the merchant bears the risk. Bank transfers offer no reversal – the sender bears the risk. Instant payments settle in seconds with no recall – the fraud victim bears the risk.

3. How many intermediaries sit between sender and receiver?

Each intermediary adds cost, latency, and a potential point of failure. A domestic Twint payment touches 4 institutions. A cross-border SWIFT transfer can touch 6 or more.

4. What happens under stress?

Does the system degrade gracefully when volume spikes? The Visa 2018 outage showed that even mature systems can fail completely under hardware faults.



The cheapest payment system is not always the best – the four questions reveal hidden costs, risks, and fragilities that sticker prices obscure.

Your Challenge: Decompose the True Cost of a Cross-Border Payment

Mini-Challenge (15 minutes)

You need to send EUR 500 from Switzerland to the United Kingdom. Compare three rails: (a) SWIFT bank transfer, (b) Revolut, (c) USDC stablecoin via Ethereum. Decompose the **true total cost** of each option.

Your deliverable: Complete this cost decomposition table:

USDC = USD Coin, 1:1 USD-pegged stablecoin issued by Circle Internet Financial (US, 2018); gas fee = per-tx network fee paid to Ethereum validators; CEX = Centralized Exchange (e.g. Coinbase, Kraken) for on/off ramp between fiat and crypto.

Component	(a) SWIFT Transfer	(b) Revolut	(c) USDC / Ethereum
Explicit fee	CHF 20–40	CHF 0 (free tier)	Gas fee (\$2–15)
FX spread	1–3% (bank markup)	0.4% (weekday)	CEX spread + on/off ramp
Float cost	1–3 days interest lost	Seconds (display)	15 min confirmation
Intermediaries	2–4 banks in chain	1 (Revolut internal)	0 (peer-to-peer on-chain)
Elapsed time	1–3 business days	Seconds to minutes	15 min to 1 hour

Discussion questions:

- Which option has the lowest *total* cost (not just the lowest stated fee)?
- Which option gives the recipient the most certainty of receiving exactly GBP equivalent of EUR 500?
- What happens if something goes wrong with each option? Who do you call?
- Would your answer change if the amount were EUR 50,000 instead of EUR 500?

The infrastructure caught up. The question is who controls it – and what you give up for speed.

The four-question framework works for any payment innovation – from SWIFT to stablecoins.