Safe first, then free: a staged route to borrowing EUR against tokenized shares

We designed from requirements, not from a protocol, then built the loan end to end on a testnet to test the answers. Each slide says what the build confirmed, changed or left open.

1
Requirements
Customer promise, legal rights in the token, EUR delivery, how it can fail, regulatory perimeter.

2
Lifecycle & system
Eight loan events across entities, contracts, ledgers and the customer app.

3
Options & dependencies
Market hours, who may hold the token, EUR funding, wallet and protocol fit.

4
Staged release
Ship a restricted loan that works end to end; relax one constraint at a time.

EXECUTION PRINCIPLES

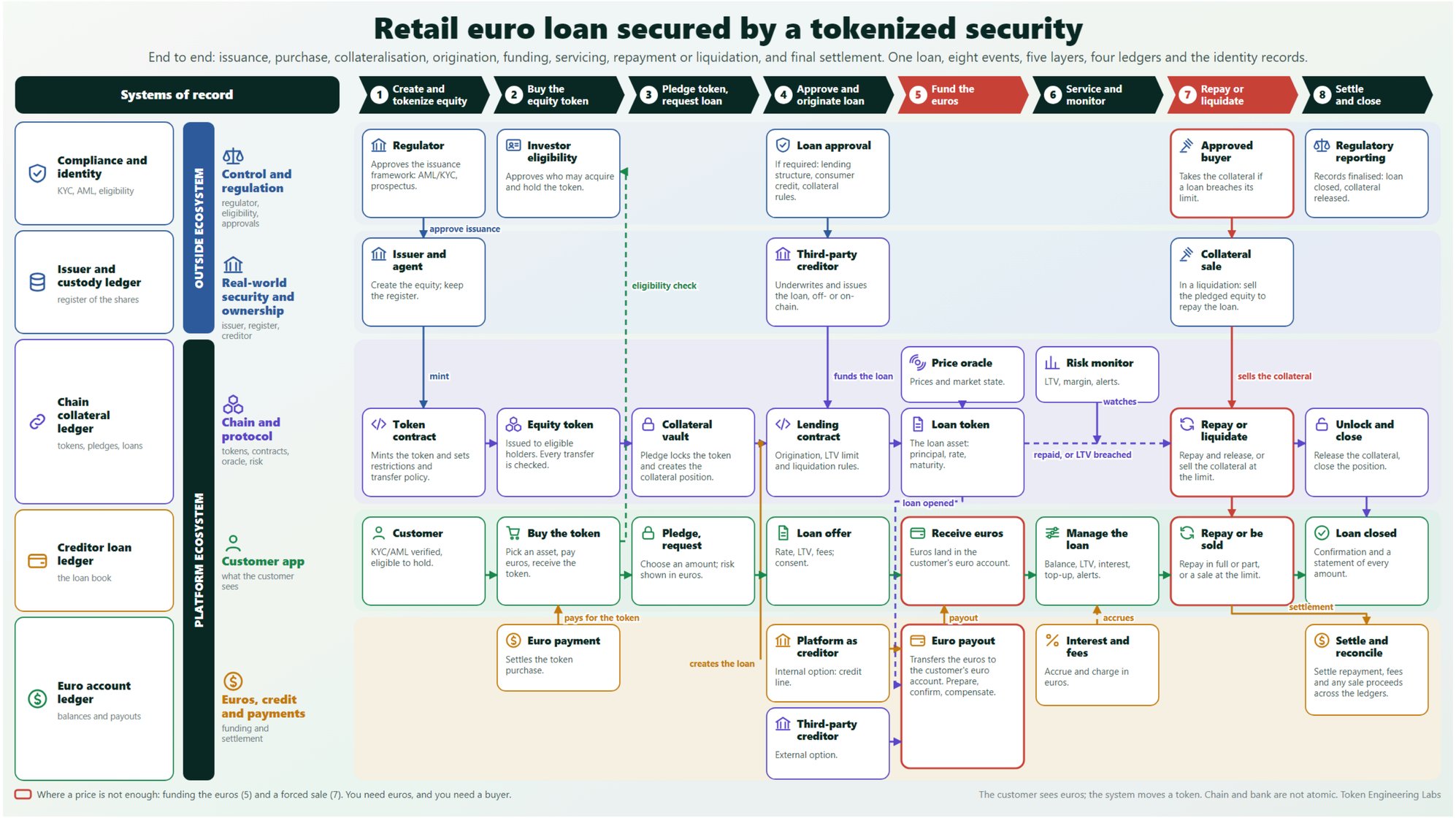
1. **Remove the risk of failure first.** The first version works end to end with strict limits; limits loosen, the design does not change.
2. **Release in modular stages.** Each stage is legally, technically and visibly (in the app) an extension of the last, never a switch to a new product.
3. **Go to market early.** Production versions arrive iteratively, not as one delayed V1.
4. **Tooling choices follow evidence.** The testnet build settled the lending protocol (Morpho Blue, unmodified). Wallet provider and token standard stay open until partners join.

PRODUCT MATURITY

MVP	Weekday borrowing, 1–2 liquid shares, low LTV
Stage 1	More assets and higher limits, proven by data
Stage 2	Weekend lending where firm bids exist
Extensions	More lenders, buyers, wallets, products

The hard part is not locking a token. A smart contract can enforce **who may receive** a share, but it cannot create **a buyer** when the market is closed.

One loan, eight events: the customer sees euros, the system moves a token



The customer gets ordinary euros in the account, not a visible stablecoin. The collateral is pledged, not staked. Four ledgers must reconcile.

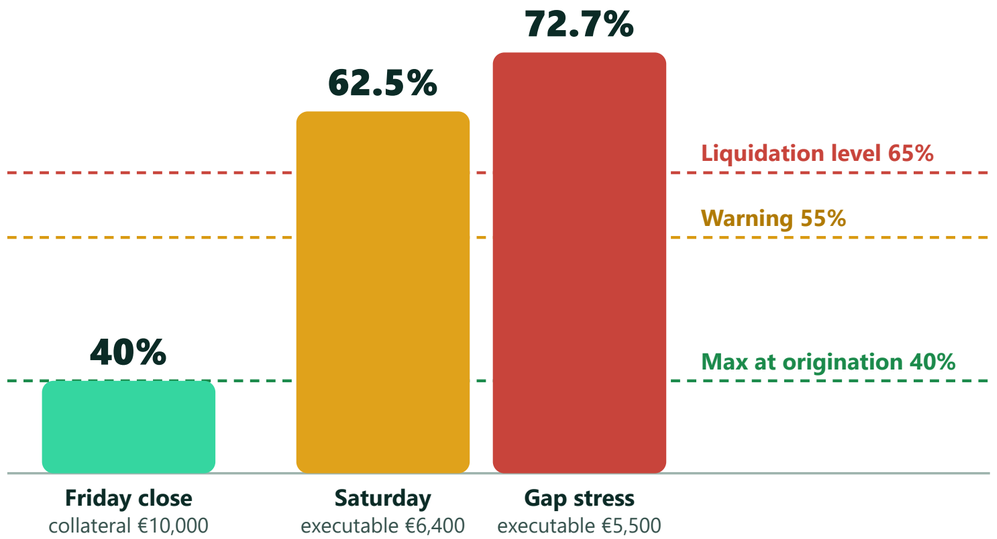
INDICATIVE

The chain never sleeps, the share does: lend against what can be sold, not what is quoted

Rule, built and tested: no new borrowing while the share is closed. Repay and top-up always work. Liquidate only against a firm bid from an approved buyer.

MARKET STATE	NEW LOANS	EXISTING LOANS	LIQUIDATION
● **Open**	**Allowed** within limits	Normal monitoring	**Normal**
● **Closed, normal**	**Paused**	Repay, top up; wider haircut	**Only vs a firm bid**
● **Closed, stressed**	**Paused**	Early warnings, tighter limits	**Controlled, human-reviewed**
● **Stale price or halt**	**Paused** for the asset	Keep servicing; verify price	**Automatic trigger off**

WORKED EXAMPLE · ILLUSTRATIVE NUMBERS



LTV = EUR debt ÷ executable value. Debt stays €4,000. Saturday bid −20%, then −20% execution haircut: €10,000 → €6,400. **Bad debt only appears if executable value drops below €4,000, a loss above 60%.** The low origination LTV is the buffer; a reserve, then the creditor, cover the rest.

FOR THE BORROWER

No weekend loans, but always a way to repay or top up. Pre-close alert on Friday. No forced sale at a thin weekend price.

FOR BAD DEBT

Low LTV and executable-value marking contain it. Residual gap risk sits in limits and a funded reserve, calibrated on real gap data.

WHY NOT THE EXTREMES

Always liquidate: one weekend buyer names the discount. **Never:** the lender carries the Monday gap alone.

BUILT AND TESTED

A zero overnight price breaks the liquidation math, so the oracle keeps a discounted price and a funded overnight bid caps it. No bid: the sale reverts and the loan stays open.

Thresholds (40 / 55 / 65%) and haircuts are placeholders to calibrate with Risk. The €10,000 / €4,000 example runs as a test in the prototype.

Two capacities limit every loan: euros to lend and approved buyers to take the collateral

2 HOLDING IS NOT THE SAME AS RECEIVING IN A LIQUIDATION

- **Hold:** every verified customer, via the KYC attestation.
- **Receive in a liquidation:** market makers, securities intermediaries, the vault contract, a funded backstop. Approved by the issuer or transfer agent after institutional due diligence, with a liquidator role, expiry and revocation on their attestation.
- **Enforcement lives in the token,** so a non-approved buyer's purchase simply fails. No fork of the lending core. **Tested:** an approved liquidator takes the shares, a refused one reverts; the unrestricted asset needs neither.

PRICE, AND WHAT IF NOBODY BUYS

Approved buyers quote in an RFQ / auction › **Backstop** contracted buyer › **Reserve** funded from spread › **Creditor loss** agreed waterfall

Surplus after debt and costs goes back to the borrower. If nobody bids we record no liquidation; we hold the position and stop new lending.

ATTESTATION ENDS

Expired	Block new credit, ask for renewal, keep repay and top-up open. **No automatic foreclosure.**
Revoked	Compliance-led hold (e.g. sanctions). Transfers restricted; repayment still extinguishes the debt.

3 ONE ORIGINATION GATE

$$\text{New loans} \le \min(\text{EUR funded}, \text{stressed buyer capacity} \times \alpha, \text{risk budget})$$

An oracle can publish a price. It cannot create an eligible buyer or a euro.

EUR to lend

A committed, authorized third-party creditor facility, with the payout path to the euro account proven. Treasury seeds early volume if needed.

Buyers, also at night

At least two independent approved buyers where feasible; out-of-hours bids only when firm and funded.

PAY FOR WHAT LASTS

- **Pay for:** qualified availability, firm bid size and speed, actual risk absorbed. Penalize failed fills.
- **Don't pay for:** quoted volume, turnover, or emissions that leave with the incentive.
- **Watch:** funding coverage, executable bid depth, weekend spreads, realized slippage, completion rate, reserve use.
- **Found in the build:** a direct borrow bypasses the gateway, and the lending protocol, not us, sets how much collateral a sale seizes.

Liquidity is proven by a contract and a test bid, not by an on-chain price.

A working build shows which rules the protocol enforces and which it leaves to us



The customer app (left, logged in, open loan at 40%) beside the operator desk: session calendar, price controls and token against underlying price. The desk moves the market so a warning or a forced sale can be reached in about two minutes.

THE STACK

- **One unmodified Morpho Blue**, pinned to a commit, two isolated markets, 65% loan-to-value limit
- **Gateway** for the product rules: 40% origination cap, no new loans while closed
- **Identity registry** with holder, liquidator and protocol roles; the restricted token checks every recipient
- **Market-state oracle** and a **funded overnight bid** that caps the price
- **Euro ledger** with idempotent postings and a compensation flag

18 tests pass

Including approved and refused liquidations and a direct-borrow bypass.

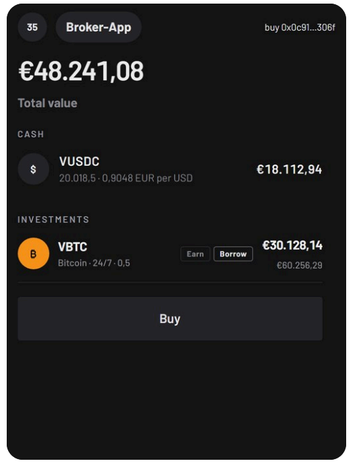
Testnet only

Demo tokens, placeholder rates, no audit, no legal opinion.

The tokens are demonstration ERC-20s. Euro balances are a contract ledger, not a bank payment.

One familiar EUR loan journey: the wallet and attestation stay in the background, the risk stays in front

1 HOLD

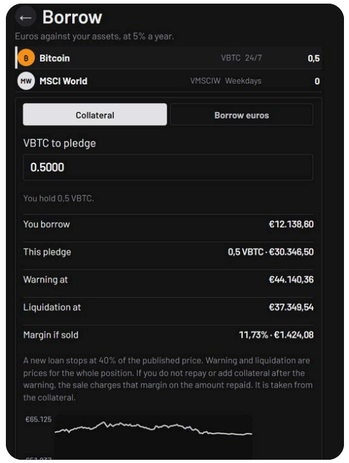


SEES Token as a normal holding

SIGNS Nothing

BEHIND Attestation, embedded wallet

2 QUOTE

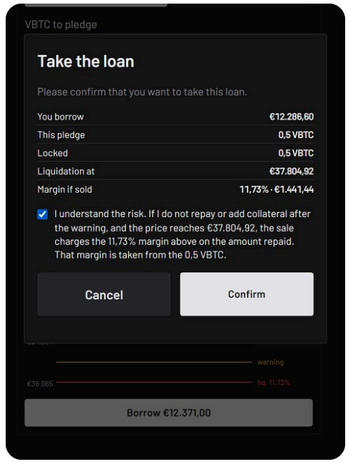


SEES Amount, cost, warning and sale levels in euros

SIGNS Nothing yet

BEHIND Price, funding, buyer checks

3 CONSENT

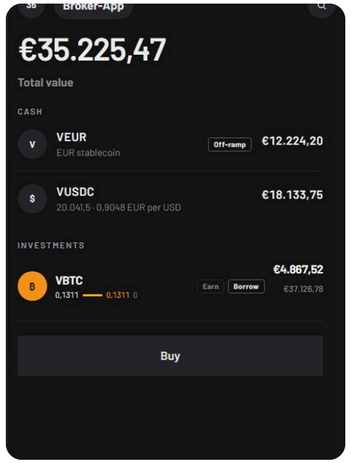


SEES Plain-language terms

SIGNS Loan agreement and the exact pledge, separately

BEHIND Gas, batching, calldata limits

4 EUR LIVE

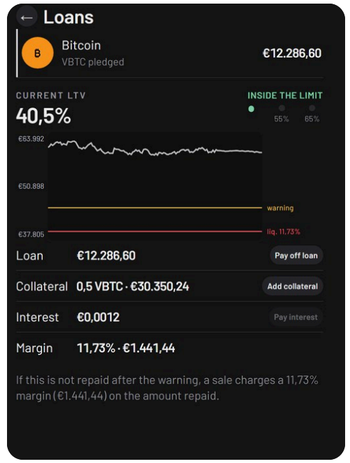


SEES Ordinary EUR, no stablecoin

SIGNS Nothing

BEHIND Prepare, confirm, compensate

5 SERVICE

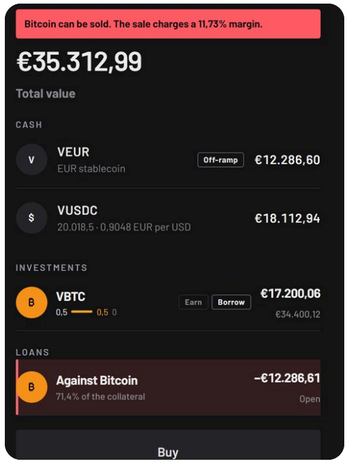


SEES Debt, interest, buffer, alerts

SIGNS Repay or top up

BEHIND Oracle, market state

6 IF IT FALLS



SEES Banner at 55% and 65%, sale margin in euros

SIGNS Repay or top up

BEHIND Liquidator, four-ledger reconciliation

HONEST ABOUT RISK

Show the price at which shares would be sold, in euros, before the customer signs, and say what changes at weekends.

NO PHANTOM LOANS

A pending payout is never shown as an active loan. A failed payout cancels the pledge.

THREE CONSENTS, KEPT DISTINCT

Credit agreement, collateral pledge, wallet signature: shown together, recorded separately.

Screens from the testnet prototype: demo tokens, placeholder rates, a local demo wallet. Amounts differ from the worked example.

Six things a lending protocol does not do, and what the product adds

QUESTION	THE PROTOCOL GIVES	THE PRODUCT ADDS
Underlying market closed	A price from an oracle. No notion of sessions.	Session-aware discount, no new loans while closed, a funded overnight bid that caps the price a liquidation can see. A zero price breaks the maths, so the rule is cap, not zero.
Who may hold	Nothing. Any address can hold an ERC-20.	A token that checks every recipient against the identity registry.
Who may liquidate	Anyone. Seized collateral goes to the caller.	An approved liquidator, or a defined route to an approved buyer, for the restricted token. The unrestricted asset needs neither.
Policy enforcement	None. A direct borrow bypasses the gateway.	A decision to treat the gateway as the product path, not a wall, and to say so.
Euros	A loan token on a chain.	A separate ledger: a repeated operation never credits twice; a failed posting sets a compensation flag.
Seizure and default	The protocol decides how much collateral a sale seizes, bonus included. No instalments.	Interest on an open balance, repay any time, three plain thresholds (40 / 55 / 65%). The overnight cap does not touch the seizure bonus.

Each row is covered by a test or a recorded limitation in the prototype.

INDICATIVE

A gated path to production, with working hypotheses that harden as partners join

GATE 0 · WEEKS 0–3
Feasibility
Token rights, lender of record, exit partners.
Go: Legal + creditor viable

GATE 1 · WEEKS 4–8
Testnet vertical slice
Attestation → pledge → EUR simulation → repay, failure, refused buyer. **Built: 18 tests pass; public-testnet smoke test open**

GATE 2 · WEEK 9+
Restricted launch
1–2 shares, low LTV, weekday draws, funded exit. **Go: joint sign-off**

GATE 3 · LATER
Extend with evidence
More assets, weekend lending, more providers. **Go: data, not hope**

TOOLING: WHAT THE BUILD SETTLED

Morpho Blue, unmodified
Pinned commit, two isolated markets, 65% LLTV; policy in a gateway and the token.
Compound III was not tested. Open: direct borrow bypasses the gateway; the protocol sets the seizure bonus.

Wallet: still open
Prototype uses a labelled local wallet, or Privy when configured.
Compare Turnkey, Privy, Dynamic: EU hosting, recovery, account binding.

Restricted token: attester registry
Holder, liquidator and protocol roles. ERC-3643 style only if the issuer supports it.

WHO SAYS YES, IN ORDER

1. Product and Partnerships: scope, issuer, creditor
2. Legal, Compliance, Risk: rights, permissions, limits
3. Treasury and creditor: funding, reserve
4. Engineering and the app team: build, audit
5. Support, Marketing, regulated entity: launch

WHAT WE CUT

- Weekend borrowing
- Long-tail equities
- Open external lender market
- Visible loan stablecoin, loan NFT
- Unattended weekend liquidation

RULES IN SCOPE
Securities, banking and consumer-credit rules, payments, AML, data protection, operational resilience, market abuse; crypto-asset rules only for a euro token. All to be confirmed with counsel.

WHAT WE DON'T KNOW → HOW WE FIND OUT

- **Token entitlement, lender of record** → issuer terms, Legal
- **EUR settlement finality** → Payments, bank partner
- **Weekend bid depth** → test RFQ with 2–3 market makers, gap data
- **Revocation path** → issuer, transfer agent
- **Protocol fit** → testnet slice built; audit and hardening open

AI use. An AI coding assistant wrote the prototype contracts and app; the 18 tests were run locally. Tools also helped structure requirements, draft diagrams and list failure modes. Legal and regulatory points are marked for validation with Legal, not treated as settled. Discarded: unlimited weekend liquidation, permissionless sale of restricted shares, regulator approval per wallet, a bespoke lending engine.

Dates are hypotheses that depend on legal, partner and liquidity readiness.