Janus

Proof-of-Belief Reserve Asset

Complete whitepaper (draft) • December 15, 2025

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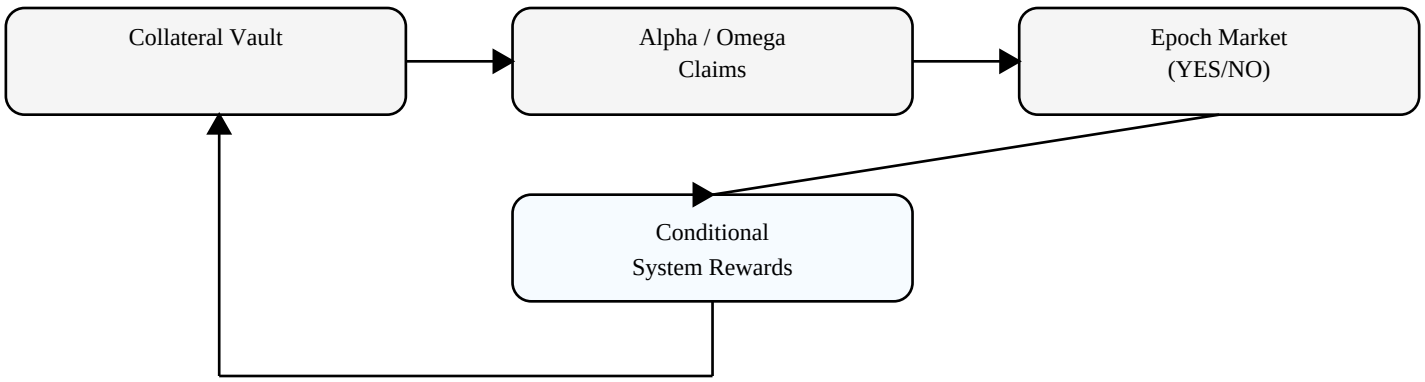
Abstract. Janus is a collateral-backed on-chain balance sheet that issues two claims: **Alpha** (junior, equity-like) and **Omega** (senior, defensive). Instead of relying on governance knobs or a hard peg, Janus runs one recurring prediction game per epoch. Participants can bet on whether the system will remain healthy and retain value; **system rewards unlock only when stability is sustained**, and only for participants who were right *and* remained committed. The result is a reserve-style asset that uses prediction markets as a truth layer, making dispersed real-world information actionable on-chain.



Belief -> commitment -> reward loop (repeated each epoch)

Core tagline: Institutional rails. Decentralized brain.

Contents

1. Executive Summary

Janus introduces a new category: a **Proof-of-Belief Reserve Asset**. It is designed for an ecosystem where crypto is increasingly accessed through institutional wrappers (e.g., spot crypto ETPs) while the core advantages of decentralization—self-custody, transparency, composability—remain essential for resilience [1][2][3].

What Janus is

- A **collateral-backed vault** with explicit capital structure.
- Two claims: **Alpha** (junior, upside) and **Omega** (senior, defense).
- A single **epoch prediction market** that prices "will stability persist?"
- A **conditional reward system**: rewards unlock only if stability is sustained, and only for correct + committed participants.

What Janus is not

- Not a fiat-backed stablecoin.
- Not an algorithmic stablecoin backed by reflexive "belief collateral."
- Not a governance-heavy system that requires constant parameter tuning.

Why prediction markets: Prediction markets can aggregate private and tacit information into a single tradable signal with accountability: being wrong has a cost. Interest in prediction markets has expanded materially, including via regulated and near-regulated venues and industry coordination efforts [6][7][8]. At the same time, data quality matters; measurement work has highlighted pitfalls in headline volume metrics, reinforcing the need for careful market and oracle design [9].

On top: Janus can support a derivative stable-note design (**JUSD-Ω**) that uses Omega as backing and a **prediction-market-priced insurance premium** to fund a Stability Reserve. The stable note targets $1-like behavior in normal conditions without claiming a guaranteed peg.

2. Why Now: Institutionalization and the Next Reserve Thesis

Crypto is increasingly accessed through **institutional rails**. In the U.S., the SEC approved the listing and trading of multiple spot bitcoin exchange-traded product (ETP) shares on January 10, 2024 [1][2]. In 2024, the SEC also approved rule changes enabling the listing and trading of spot ether ETPs [3]. These developments improved access and distribution, but they also highlight a structural trend: large pools of capital increasingly enter crypto through custodial wrappers.

At the same time, the **decentralized ethos** that made crypto resilient—self-custody, transparent settlement, censorship resistance, and composability—remains a core advantage. The next generation of “reserve assets” can benefit from both worlds:

- **Institutional-grade framing**: clear exposures, explicit risk, familiar instruments.
- **On-chain-grade resilience**: transparent solvency, permissionless markets, composability.

Janus positions itself as a **balance between the two**: an on-chain reserve-style asset that is legible to institutions (explicit balance sheet and seniority) while remaining natively decentralized (self-custody, open markets, transparent solvency).

Pitch in one paragraph. ETFs are rails. Janus is the decentralized brain that prices stress and coordinates behavior under uncertainty.

3. Prediction Markets as a Truth Layer (and Why AI Alone Is Not Enough)

Prediction markets are an information primitive. They convert dispersed beliefs into a single number (a price), and they force accountability because participants must stake capital. This is different from social consensus, influencer narratives, or model outputs: prediction markets punish wrongness.

Recent developments illustrate increasing attention and institutional participation in prediction markets, including new regulated offerings and industry coordination efforts [6][7][8]. That said, markets are only as good as their measurement and design. For example, research has highlighted ways headline on-chain volume metrics can double-count activity, reinforcing the need for careful market and oracle design [9].

Why markets can use information AI cannot

- **Private information**: humans observe local, non-public facts (flows, intent, operational risk) that may not exist in public datasets.
- **Tacit judgment**: humans perceive context and incentives that are not easily encoded.
- **Skin in the game**: markets weight beliefs by willingness to pay and accept loss.

Futarchy-adjacent, but simpler. In classic futarchy, markets guide policy decisions. Janus is inspired by the same insight but applies it to one narrow question: *who earns the upside*. Markets do not vote on parameters; they determine reward eligibility via a verifiable forecast of stability.

> **Design principle:** Janus uses prediction markets to determine *who earns the upside*, not to seize control of vault funds.

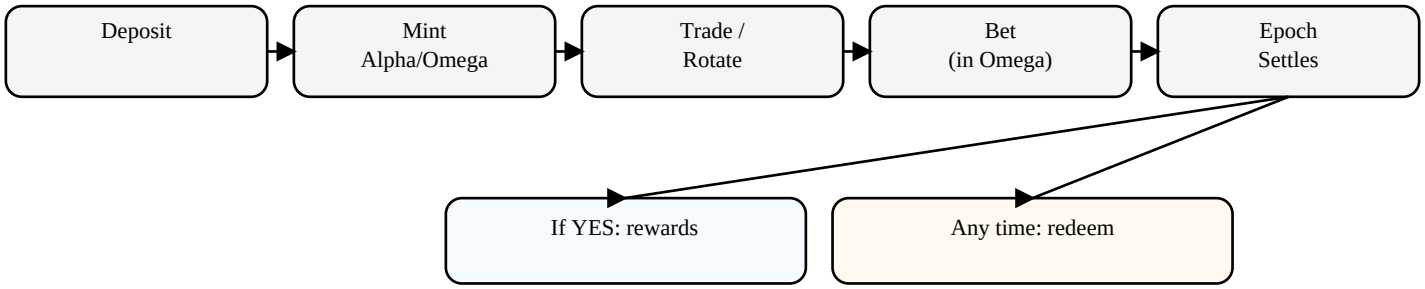
4. Janus Overview: Balance Sheet, Claims, and the Epoch Game

Janus is built around a simple idea: treat on-chain capital like a balance sheet, then use markets to coordinate around its health.

Core components

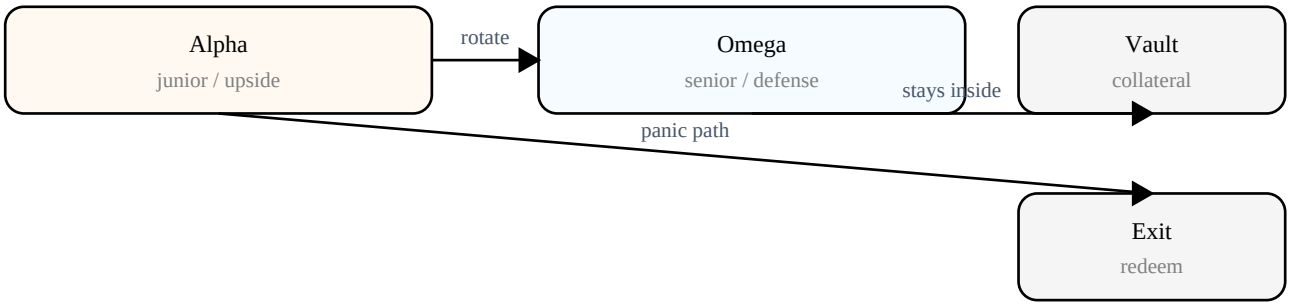
- **Collateral Vault**: holds collateral and is the sole source of fundamental value.
- **Alpha**: junior claim on the vault (first-loss, upside participation).
- **Omega**: senior claim on the vault (defensive position; paid first).
- **Epoch Market**: one canonical YES/NO market per epoch: “will stability persist?”
- **Conditional Rewards**: rewards unlock only when stability is sustained.

Any-collateral design (without complexity). Janus can support “deposit any crypto” by deploying *isolated vaults*. Each vault is denominated in its collateral (e.g., an ETH-vault issues Alpha_ETH and Omega_ETH). Cross-collateral mixing is optional and can be deferred to later versions.



v0 uses one canonical market per epoch and a fixed reward rule.

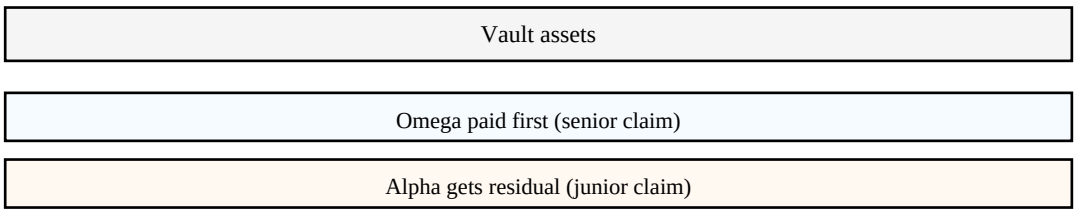
Stress narrative: rotation vs exit



4.1 Claim structure and pricing intuition

Alpha and Omega should be understood like **contracts / claims** (equity vs senior note), not as “meme tokens.” Their prices move because the market continuously reprices the vault’s future health and the likelihood of drawdowns.

Claim waterfall



If assets < Omega obligations: Alpha = 0 and Omega redeems pro-rata.

How Alpha price moves

- Alpha is the **residual**: it behaves like a levered bet on vault value above Omega obligations.
- When confidence and inflows rise, Alpha usually rises faster (upside leverage).
- When stress rises, Alpha is hit first (first-loss).

How Omega price moves

- Omega is the **senior claim**: it tends to be steadier in normal conditions.
- Omega can trade *below* par when the market prices default risk (vault < obligations).
- Omega can trade *above* par if it carries additional utility (staking demand in the epoch market, or demand as JUSD backing).

If you want…	Prefer Alpha	Prefer Omega
Upside / growth exposure	■ (residual upside)	■■ (limited upside)
Defense during stress	■ (first-loss)	■ (senior claim)
To participate in epoch betting	Optional	■ (stake asset in v0)
A building block for a stable note	Indirect	■ (backing layer)

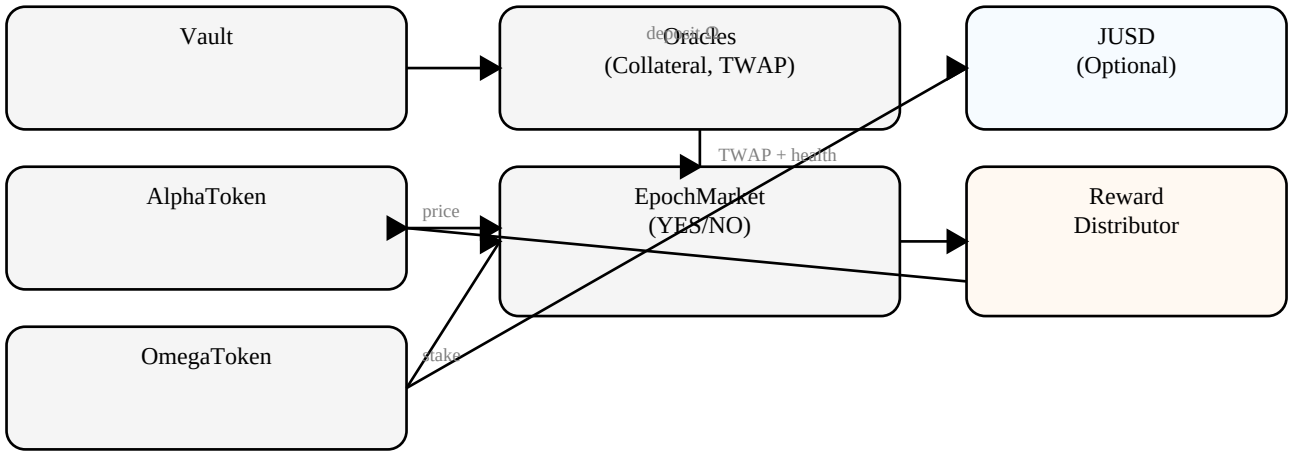
Omega as “shorting”: Omega is not a short token. It is the defensive side of the same balance sheet. If you want to short system health, the natural expression is to *short Alpha* and/or *buy NO* in the epoch market.

5. Core Mechanics and Minimal Equations

v0 intentionally uses a small set of equations. These define the balance sheet, solvency, and the Alpha/Omega waterfall. Everything else (market implementation, fee routing details, oracle sampling) is implementation detail.

Quantity	Definition
Vault value	$V(t) = Q(t) \cdot P_C(t)$
Omega obligations	$D(t) = S_\Omega(t)$
Health	$\text{HEALTHY}(t) \Leftrightarrow V(t) \geq D(t)$
Omega value per token	$v_\Omega(t) = \min(1, V(t) / S_\Omega(t))$
Alpha value per token	$v_\alpha(t) = \max(0, V(t) - S_\Omega(t)) / S_\alpha(t)$

Contract sketch (one possible implementation):



5.1 Deposit and issuance

Users deposit collateral into the vault and receive a chosen mix of Alpha and Omega. To keep Omega credibly senior, v0 uses a hard guardrail: Omega issuance is capped by a fixed coverage threshold θ (> 1).

`Seniority guardrail: S_Ω(t) ≤ V(t) / θ`

Intuition: the system always maintains a buffer of junior capital (Alpha) underneath Omega.

5.2 Redemption

Holders can redeem by burning Alpha or Omega. The payout always follows the fixed waterfall: Omega is paid first, Alpha receives residual. If the vault is undercollateralized, Alpha is wiped before

Omega takes pro-rata loss.

5.3 Fees and reward pot

Fees serve two purposes: (1) fund ongoing operations and (2) fund the epoch reward pot W(e). v0 can define W(e) as a fixed share of protocol fees accrued during epoch e.

Fee	Paid in	Purpose
Mint fee	Collateral	Funds rewards and/or reserves
Redeem fee	Collateral	Reduces run incentives; funds rewards
Market fee	Omega	Pays settlement/liquidity; funds rewards
Market creation bond	Omega	Anti-spam; returned if valid template

6. The Epoch Market: Settlement and Rewards

Janus runs one canonical YES/NO market per epoch. The market is designed to be **objective**, **hard to game**, and **tied to balance-sheet reality**.

Canonical question (epoch e)

- **Solvency condition:** the vault remains HEALTHY throughout the epoch.
- **Value condition:** Alpha's TWAP stays above a floor X throughout the epoch (or equivalently, the epoch TWAP exceeds X).

$$YES(e) \Leftrightarrow (TWAP_{\alpha}(e) \geq X) \wedge (\forall t \text{ in epoch: } V(t) \geq S\Omega(t))$$

Why this is strict: stability must persist, not merely flash at the end of the epoch. This discourages end-of-epoch window dressing and manipulation.

6.1 Rewards

Prediction markets are zero-sum. Janus adds a second layer: a reward pot W(e) funded from protocol fees/yield. Rewards unlock only if YES is true, and only for participants with belief *and* commitment:

- Held Alpha throughout the epoch (time-weighted or continuous holding).
- Bet YES in the epoch market (and the bet wins).
- Did not reduce net collateral contribution during the epoch.

$$w_i(e) = W(e) \cdot a_i / \Sigma a_j \text{ (eligible only; else 0)}$$

Mechanism design note: being right is not enough. Janus rewards the subset of correct predictors who also remained exposed to the system's upside and did not defect.

6.2 Permissionless markets vs the canonical market

Anyone can create additional Janus-related markets (e.g., "Alpha will go down," "collateral ratio will breach θ," or asset-specific questions). These markets are useful as **information surfaces**. However, v0 only uses the **single canonical epoch market** to determine protocol reward eligibility.

Market fees and creation bonds are paid in **Omega** in v0. Rationale: Omega is the defensive asset, and pricing stress should be expensive for those without conviction.

7. Game Theory: Incentives, Failure Modes, and Manipulation Resistance

Janus is a repeated game. Each epoch, participants choose positions (Alpha, Omega) and beliefs (YES, NO). The reward mechanism is designed to make the lowest-effort profitable strategy align with system health.

Strategy classes

- **Stabilizers (bullish)**: hold Alpha, bet YES, and keep capital committed. They earn rewards only if stability persists.
- **Hedgers**: hold some Alpha but rotate into Omega as risk increases; may still bet YES if they believe stability will hold.
- **Skeptics (bearish)**: bet NO. They can profit from being right, but do not receive protocol rewards.
- **Passive holders**: hold Alpha without betting YES (or withdraw collateral). They are excluded from protocol rewards.

Why negative markets help: A healthy protocol needs a way to surface bad news early. Allowing “NO” positions makes pessimism legible and tradable, instead of forcing it to appear only as sudden exits.

7.1 Why manipulation is expensive

To force YES, a manipulator must keep Alpha’s TWAP above X for the full epoch and keep the vault healthy throughout. This requires sustained capital commitment and exposes the manipulator to drawdowns and counter-trading. Because rewards require holding Alpha and not withdrawing collateral, the cheapest strategy is typically to become a stabilizer rather than to window-dress.

7.2 Common failure modes and v0 mitigations

Failure mode	What happens	v0 mitigation
Low Alpha liquidity -> noisy TWAP	TWAP can be moved cheaply; settlement becomes gameable.	Long TWAP window; minimum liquidity threshold; vetted price sources.
Oracle outage or divergence	Settlement truth breaks; disputes increase.	Deterministic fallback oracle; void epoch and skip rewards if needed.
Free riding	Users hold Alpha + bet YES but do not contribute stability.	Eligibility requires no net collateral reduction; optional minimum lock.
Epoch-end window dressing	Temporary deposits make system appear healthy only at the end.	Sample HEALTHY multiple times across epoch, not only at end.

8. AI Agents: Augmenting, Not Replacing, Markets

Janus is compatible with an “agentic” future: AI systems that observe markets, generate forecasts, and place trades.

Key design choice: AI agents do not “vote” on protocol parameters. They simply participate in the same markets as everyone else:

- Provide Alpha/Omega liquidity.
- Take hedges (rotate Alpha -> Omega).
- Place YES/NO bets in the epoch market.
- Arbitrage discrepancies between market prices and fundamental claim values.

This allows Janus to benefit from AI without giving AI privileged control. The market remains the judge: agents that are consistently wrong lose money and influence; agents that are consistently right gain capital and impact.

AI + markets is stronger than either alone:

- AI is cheap cognition (summaries, scenarios, pattern matching on public data).
- Markets are credible truth discovery (private info + accountability).

> Janus makes real-world information actionable by forcing it through a cost function: the willingness to stake, hold, and remain exposed for an entire epoch.

9. JUSD-Ω: An Omega-Backed Stable Note with PM-Priced Insurance

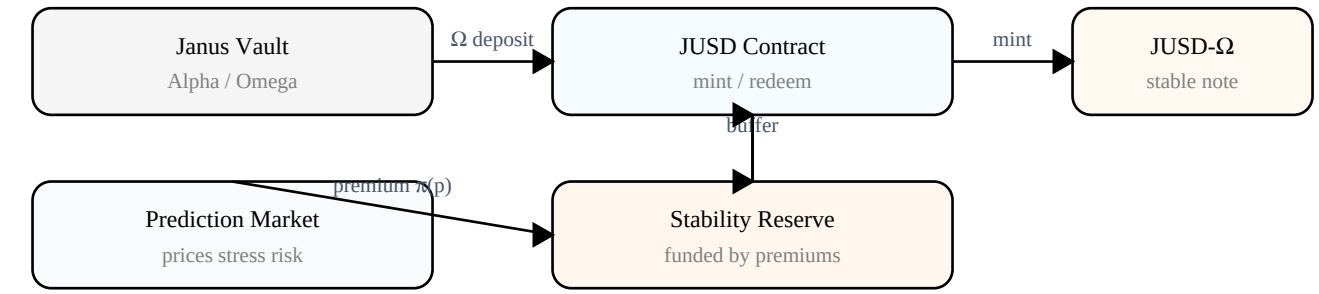
Janus is not a stablecoin. However, Janus' structure (explicit senior claim + transparent solvency + embedded risk markets) enables a **stable-note derivative** on top.

JUSD-Ω design

- **Backing layer:** Omega (senior claim on the Janus vault).
- **Stability layer:** a Stability Reserve (SR) funded by insurance premiums.
- **Pricing layer:** the insurance premium is set by the epoch market's implied probability of stress.

Positioning: JUSD-Ω targets $1-like behavior in normal conditions. It does not claim a guaranteed peg or guaranteed redemption value.

JUSD-Ω stable note on top of Janus



9.1 Stress event and premium

Each epoch e defines an objective stress event E(e). A recommended v0 event is: *"Janus becomes UNHEALTHY at any point during epoch e."* The epoch market produces an implied probability p_e for E(e).

```
E(e) = ∃t in epoch: V(t) < SΩ(t)
```

Premium function (minimal):

```
π(p_e)=π_min + α·p_e
```

Premiums are routed to the Stability Reserve SR to subsidize redemptions during stress.

9.2 Minting and redemption (minimal)

Mint: deposit Ω, pay premium, receive JUSD-Ω. Redemption: burn JUSD-Ω, receive Ω (and optionally SR support). Let vΩ(t) be Omega's fundamental value. A conservative mint and redeem rule is:

```
Mint: ΔJ = ΔΩ · vΩ(t) · (1 − m)
```

```
Redeem: Ω_out = (ΔJ / vΩ(t)) · (1 − r)
```

SR support is bounded by a fixed policy cap to prevent one-block drains. The SR is not magic; it is an explicitly funded buffer.

9.3 Why PM-priced insurance matters

In calm conditions, p_e is low and mint premiums are small, enabling growth. When informed participants perceive rising stress, they can bet on E(e), pushing p_e higher. That automatically increases premiums and grows SR before insolvency. This prices risk *before* it becomes visible on-chain.

> **Tagline:** Stability is purchased, not promised.

10. Competitor Landscape and Differentiation

Janus is best understood as a new primitive at the intersection of reserve assets, structured finance (seniority), and prediction markets. It is not trying to replace Bitcoin or Ethereum; it is designed to sit alongside them and, in many deployments, be collateralized by them.

10.1 Differentiation vs Bitcoin and Ethereum

Bitcoin is a reserve asset secured by Proof-of-Work and valued for scarcity, neutrality, and censorship resistance. **Ethereum** is a programmable settlement layer where capital can be composed. Janus differs in purpose: it is a **market-governed balance sheet** that explicitly separates junior vs senior risk and uses prediction markets to coordinate around solvency and sustained value.

> If Bitcoin is “reserve by immutability” and Ethereum is “reserve by programmability,” Janus is “reserve by accountability”: it rewards correct, committed forecasts of stability.

10.2 Differentiation vs stablecoins and flatcoins

Fiat-backed stablecoins optimize for a tight peg but rely on custodians and legal structures. Crypto-collateral stablecoins optimize for on-chain transparency but often require governance, liquidations, and parameter tuning. Flatcoins attempt to target purchasing power but introduce complex oracles and lagging policy loops. Janus takes a different path: it does not promise stability; it prices it and rewards it.

10.3 Landscape table

Category	Value source	Stability promise	Coordination mechanism	Notes / trade-offs
Bitcoin (BTC)	Scarcity + PoW security	None	Market only	Inert reserve; no internal balance sheet.
Ethereum (ETH)	Network security + compute	None	Market + protocol rules	Settlement layer; not a stability product.
Fiat-backed stablecoins	Custodied reserves	Strong $1 target	Issuer + legal framework	High peg quality; centralized trust.

Crypto-collateral stables	On-chain collateral	Targeted peg	Liquidations + governance	Transparent but complex; parameter risk.
Flatcoins	Varies (index targets)	Purchasing power target	Oracles + policy loops	Hard oracle problem; lag and complexity.
Janus (Alpha/Omega)	Vault collateral	None	Epoch prediction + rewards	PoB Reserve Asset: explicit seniority + truth layer.
JUSD-Ω (stable note)	Omega + insurance reserve	$1-like target (soft)	PM-priced premiums + SR buffer	Stable behavior purchased via insurance; honest stress behavior.
Prediction market platforms	N/A (markets)	N/A	Event contracts	Infrastructure/tailwind; Janus integrates the primitive.

11. Regulatory and Risk Considerations

Not legal advice. Regulatory treatment depends on jurisdiction, product design, distribution, and marketing. Projects should consult qualified counsel before launch.

Janus is not marketed as a stablecoin. Janus Alpha and Omega are claims on collateral and do not purport to maintain a stable value. That distinction can matter because some regulatory frameworks define “stablecoin-like” categories based on whether a crypto-asset purports to maintain a stable value by referencing a currency or other value. In the EU, MiCA institutes uniform rules for crypto-assets and includes dedicated regimes for asset-referenced tokens and e-money tokens [4][5].

Derivative stable notes may be treated differently. A product like JUSD-Ω is explicitly designed to target $1-like behavior. Depending on its design and how it is marketed, it may fall within stablecoin-related regimes or other categories. A conservative approach is to design disclosures and controls as if it will be scrutinized as a stability product.

Prediction markets are regulated and evolving. In the U.S., event-contract and prediction-market regulation involves both federal and state considerations, and disputes have emerged over jurisdiction and classification [10]. Janus’ protocol design can be implemented permissionlessly, but real-world distribution decisions will matter.

Risk disclosures (non-exhaustive)

- **Smart-contract risk:** bugs can cause loss.
- **Oracle risk:** price feeds can fail or be manipulated.
- **Liquidity risk:** thin markets can distort TWAP and premiums.
- **Market-manipulation risk:** incentives reduce but do not eliminate adversarial behavior.
- **Regulatory risk:** rules, interpretations, and enforcement can change.

12. Roadmap

Janus is designed to be simple at v0 and expand only when the underlying primitives (liquidity, oracles, market depth) are strong enough.

v0 (ship a coherent primitive)

- Single collateral type per vault (isolate risk).
- Alpha/Omega issuance with fixed seniority guardrail θ.
- One standardized epoch market template.
- Simple reward eligibility (hold Alpha, bet YES, no net collateral reduction).
- Optional JUSD-Ω stable note prototype gated by conservative limits.

v1 (expand expressivity without adding governance knobs)

- Multiple isolated vaults (different collaterals), each with its own markets and accounting.
- Additional market templates (e.g., collateral ratio bands) once dispute resolution is robust.
- Better liquidity bootstrapping (market-maker incentives funded from fees).

v2 (agentic markets)

- Native support for AI agents providing liquidity and market-making.
- Richer “risk surfaces” (multiple tradable event contracts that price stress paths).
- Composability modules for institutional wrappers (custody-optional) while preserving on-chain transparency.

> Janus should grow by adding new markets and collateral domains only when each layer is measurable, liquid, and hard to game.

Appendix A: Parameter Table

Parameter	Meaning	Typical v0 choice
Epoch length T	Duration of each prediction game	7 days (or 14)
Coverage threshold θ	Caps Omega issuance (seniority)	1.2
Price floor X	Alpha TWAP must stay above this	Set per epoch (e.g., 0.9× Alpha NAV)
Reward pot W(e)	Fees/yield allocated to rewards	Fixed share of epoch fees
Health sampling	How HEALTHY is checked	Hourly (or every N blocks)
PM liquidity threshold	Minimum depth before using p_e	Set conservatively; fallback if unmet
SR support cap γ	Max share of SR used per redemption	Small fixed fraction

Appendix B: Glossary

Alpha (α)	Junior claim on the vault. First-loss, equity-like upside. Eligible for protocol rewards when held through an epoch and paired with correct prediction.
Omega (Ω)	Senior claim on the vault. Defensive position paid first. Used as staking asset for prediction markets and as backing for JUSD-Ω.
HEALTHY	State where vault value V(t) is at least Omega obligations SΩ(t).
Epoch	Fixed time interval in which one canonical market resolves and (optionally) rewards are distributed.
TWAP	Time-weighted average price. Used to reduce sensitivity to momentary manipulation.
Proof-of-Belief (PoB)	In Janus: an incentive layer where beliefs become credible only when staked and held through time; not a consensus algorithm.
JUSD-Ω	A stable-note derivative backed by Omega and supported by a Stability Reserve funded via PM-priced premiums.
Stability Reserve (SR)	Buffer fund that can subsidize JUSD-Ω redemptions during stress; explicitly funded, capped, and auditable.

Appendix C: References

[1] U.S. Securities and Exchange Commission (SEC). “Statement on the Approval of Spot Bitcoin Exchange-Traded Products.” Jan 10, 2024.
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