Snowside Whitepaper

version 0.1

Bitcoin security. Avalanche speed.

A dedicated Avalanche Layer-1 for the eCash hard-fork

July 2026

0xShomari

https://snowside.network

Table of Contents

1. Tl;dr

Snowside is a dedicated Avalanche Layer-1 blockchain built to host Paul Sztorc's upcoming eCash hard-fork. It runs as a clean EVM sidechain where the native gas token is BTC itself — no new minted tokens, no pre-mine, just Bitcoin security via blind merged mining.

Key properties:

- Native BTC gas — transaction fees paid in BTC, no new token, no pre-mine
- Bitcoin security via Blind Merged Mining (BIP-301)
- Sub-second finality through Avalanche Snowman consensus
- USDC bridging from C-Chain via Avalanche Interchain Messaging (ICM)
- Full EVM compatibility — Remix, Hardhat, Foundry work out-of-the-box
- NodΞRunr automation eliminates the operational overhead that killed EthSide
- Sovereign validator set — dedicated throughput for eCash operations
- No token. No ICO. No governance token. Infrastructure, not an investment vehicle.

2. Introduction

Bitcoin's scripting system is intentionally limited. This constraint preserves security and predictability but prevents the deployment of complex smart contract logic directly on the Bitcoin network. Sidechains have long been proposed as the solution: independent chains that inherit Bitcoin's security while offering expanded functionality.

Paul Sztorc's Drivechain proposal (BIP-300/301) provides a concrete mechanism for Bitcoin-secured sidechains. Blind Merged Mining (BIP-301) allows Bitcoin miners to secure sidechains without running additional software or understanding their internals. The upcoming eCash hard-fork activates Drivechains on a Bitcoin fork, enabling purpose-built sidechains to launch with Bitcoin-class security from day one.

Paul's previous EVM sidechain, EthSide, was discontinued because standalone chain management was too time-consuming. The chain required constant manual intervention for updates, monitoring, and maintenance — work that was not sustainable for a single maintainer.

Snowside solves this problem. By building on Avalanche's Layer-1 infrastructure and leveraging NodΞRunr for automated node management, Snowside gives Paul and his community a chain that they can actually use — without babysitting. The combination of Bitcoin's economic security model, Avalanche's high-performance consensus, and NodΞRunr's operational automation creates a sidechain that is both secure and trivially operable.

3. Architecture Overview

Snowside is an EVM-compatible Layer-1 blockchain running on Avalanche's consensus infrastructure. It combines three layers: an EVM execution environment, Avalanche's Snowman consensus protocol for fast finality, and Blind Merged Mining for Bitcoin-anchored settlement security.

3.1 EVM Execution Layer

Snowside runs a standard EVM execution environment. All existing Ethereum developer tools — Remix, Hardhat, Foundry, The Graph, viem, ethers.js — work without modification. Smart contracts written in Solidity or Vyper deploy identically to how they would on any other EVM chain.

The EVM is augmented with custom precompiles for eCash-specific logic, configurable via NodΞRunr's precompile concierge feature. This allows eCash protocol rules to be enforced at the consensus level rather than through external smart contracts.

3.2 Avalanche Consensus (Snowman)

Snowside validators use Avalanche's Snowman consensus — the linear-chain variant of the Avalanche Consensus Protocol. Snowman provides deterministic finality: once a block is accepted by the validator set, it is final and cannot be reverted. This eliminates the probabilistic finality problem of proof-of-work chains, where blocks can always be orphaned.

Key properties of Snowman consensus on Snowside:

- Sub-second finality — transactions confirm in approximately 1-3 seconds
- Sovereign validator set — independent of C-Chain or any other Avalanche subnet
- Permissionless participation — anyone meeting the stake requirement can validate
- Custom throughput — Snowside sets its own block size and gas limits

3.3 Blind Merged Mining Settlement

While Avalanche consensus provides fast, deterministic finality, ultimate settlement security comes from Bitcoin via Blind Merged Mining (BIP-301). Snowside block producers submit compact header commitments to Bitcoin miners, who include them in coinbase transactions. This creates a cryptographic link between Bitcoin's proof-of-work and Snowside's activity.

This two-layer security model is described in detail in section 4 (Blind Merged Mining) and section 8 (Consensus & Security Model).

Figure: System architecture. Bitcoin miners secure Snowside via BMM commitments (left). Avalanche C-Chain provides USDC liquidity via ICM bridge (right). Snowside operates as a sovereign EVM L1 in the center.

4. Blind Merged Mining

Blind Merged Mining (BMM) is the mechanism by which Bitcoin miners secure Snowside without running a full Snowside node. It is defined in BIP-301 and activates as part of the eCash Drivechain (BIP-300/301) hard-fork.

4.1 How BMM Works

Snowside block producers create sidechain blocks and submit compact block header commitments to the Bitcoin mainchain. Bitcoin miners include these commitments in their coinbase transactions. The miner who includes a commitment earns a BTC fee from the Snowside block producer who submitted it.

Crucially, Bitcoin miners do not need to:

- Run a Snowside full node
- Validate Snowside transactions
- Understand Snowside's consensus rules
- Hold any Snowside-specific tokens

They simply include a small data commitment in a transaction they are already making. This is the "blind" in Blind Merged Mining — miners are blind to the sidechain's internals.

Figure: Blind Merged Mining. Bitcoin miners include a compact header commitment (zero marginal cost) and earn BTC fees from Snowside users. No additional hardware or software required.

4.2 Economic Incentives

The economic model is simple and self-sustaining:

- Snowside users pay BTC for gas (transaction fees)
- Block producers collect these BTC fees
- Producers pay a portion as BMM incentives to Bitcoin miners
- Miners include commitments because the marginal cost is zero and the fee is positive

Because the cost to miners is negligible — they are already producing blocks — rational miners will include Snowside commitments. This gives Snowside access to Bitcoin's full security budget.

4.3 Settlement Finality

BMM provides a third tier of confirmation: settlement. While Avalanche consensus confirms transactions in seconds, the BMM anchor to Bitcoin provides the ultimate security guarantee. Reverting Snowside's history requires attacking Bitcoin's hashrate — the most costly attack in all of cryptocurrency.

5. BTC as Native Gas

All transaction fees on Snowside are paid in BTC. There is no alternative gas token, no new minted token, and no pre-mine. The only assets on Snowside are BTC (for gas) and USDC (bridged from C-Chain via ICM).

5.1 Why BTC Gas Matters

Using BTC as the native gas token preserves Bitcoin's economic model. Users are not forced to acquire a new, speculative token to interact with the chain. They use Bitcoin — the most recognized and liquid cryptocurrency — for all transactions.

This design choice has several implications:

- No token launch, ICO, or pre-mine — Snowside is infrastructure, not an investment vehicle
- No governance token — protocol parameters are set by validators and the community
- Bitcoin holders can use Snowside without exposure to new token risk
- The gas market is denominated in the world's most trusted digital asset

5.2 Acquiring BTC for Gas

Users acquire BTC for gas through two mechanisms:

- Blind Merged Mining: BTC flows between Bitcoin and Snowside via the BMM peg mechanism
- Bridges: Users can bridge value from other chains to obtain BTC on Snowside

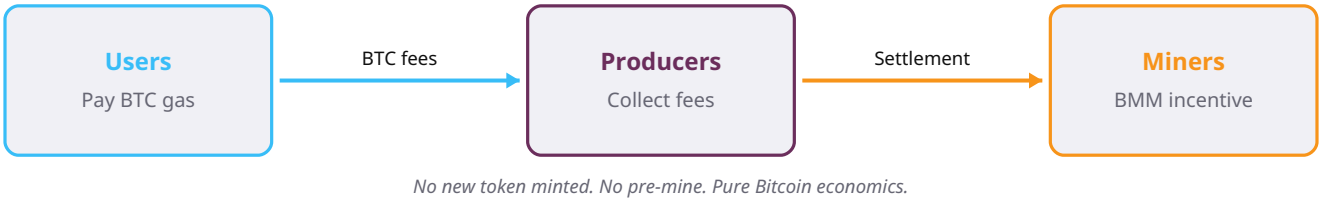

Figure: BTC gas flow. Users pay BTC for transaction fees. Block producers collect fees and distribute BMM settlement incentives to Bitcoin miners. No new token is minted — the Bitcoin economic model is preserved end-to-end.

5.3 Preserving Bitcoin's Economic Model

Because BTC is the only gas token, Bitcoin's economic incentives flow directly into Snowside. Miners who secure Snowside via BMM are paid in BTC. Users who transact on Snowside pay in BTC. The economic loop is entirely Bitcoin-native — no competing incentive structures, no token dilution, no governance games.

6. USDC Bridge via Interchain Messaging

A native, trust-minimized bridge connects Snowside to Avalanche's C-Chain via Interchain Messaging (ICM). This allows USDC holders on C-Chain to transfer their stablecoins directly to Snowside without relying on third-party custodians or wrapped token representations.

6.1 Native ICM Bridge

Avalanche's Interchain Messaging protocol enables communication between Avalanche subnets and the primary network. The ICM bridge provides:

- Trust-minimized: No third-party custodian holds the bridged assets
- Native: Built into the Avalanche protocol, not a bolt-on bridge
- Fast: Transfers confirm in Avalanche finality time (seconds)
- Bidirectional: USDC can flow in both directions

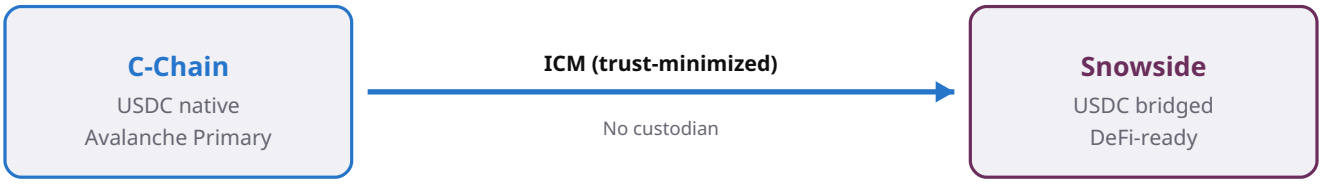

Figure: ICM USDC bridge. USDC moves trust-minimized from Avalanche C-Chain to Snowside via native Interchain Messaging — no third-party custodian, no wrapped tokens, available from mainnet launch.

6.2 DeFi-Ready from Day One

By bridging USDC from C-Chain at mainnet launch, Snowside provides immediate access to the world's most recognized stablecoin. This makes Snowside useful for DeFi applications from day one — lending, borrowing, trading, and payments can all use USDC without waiting for a separate bridge deployment or liquidity bootstrapping.

7. NodΞRunr & Validator Management

NodΞRunr is the open-source node management daemon that makes Snowside operable without babysitting. It handles every aspect of validator lifecycle: deployment, monitoring, updates, and communication.

7.1 One-Click Deployment

Running a Snowside validator with NodΞRunr takes under a minute. The process requires:

- A server (VPS) with basic specifications
- AVAX for the Avalanche Primary Network stake
- The NodΞRunr Snowside template

NodΞRunr handles the rest: node installation, configuration, key generation, and network registration. No manual editing of config files, no hand-written genesis files, no SSH gymnastics.

7.2 24/7 Monitoring & Automatic Updates

NodΞRunr continuously monitors validator health — block production rate, peer connections, disk usage, memory, and CPU. When an update is available, NodΞRunr can apply it automatically with zero downtime. Alerts are sent via encrypted channels if intervention is required.

7.3 Custom Precompiles

NodΞRunr's precompiles concierge feature allows eCash-specific logic to be integrated directly into the L1 configuration. This is essential for enforcing protocol rules at the consensus level rather than through external smart contracts that could be bypassed or exploited.

7.4 Why EthSide Failed — and How NodΞRunr Fixes It

Paul Sztorc's previous EVM sidechain, EthSide, was discontinued because standalone chain management was too time-consuming. Every update required manual intervention. Every validator restart required SSH access. Every monitoring alert required human attention. For a single maintainer, this was unsustainable.

NodΞRunr solves every one of these problems:

- Deployment: one command instead of a multi-hour setup process
- Monitoring: automated health checks instead of manual log reading
- Updates: automatic, zero-downtime patches instead of manual restarts
- Communication: encrypted, structured alerts instead of ad-hoc notifications

The result is a chain that can stay alive without constant human intervention — the exact requirement Paul identified for a sustainable sidechain.

8. Consensus & Security Model

Snowside's consensus and security model combines two layers: Avalanche's Snowman consensus for fast, deterministic finality, and Blind Merged Mining for Bitcoin-anchored settlement. Together, they provide a three-tier confirmation model that lets users choose the trust level appropriate to their use case.

8.1 Layer 1: Avalanche Snowman Consensus

Snowside validators run Avalanche's Snowman consensus protocol. Snowman is the linear-chain variant of the Avalanche Consensus Protocol, designed for blockchains that require a total ordering of transactions. Key properties:

- Deterministic finality: once a block is accepted, it is final — no probabilistic waiting
- Sub-second confirmation: transactions typically finalize in 1-3 seconds
- Validator-set sovereignty: Snowside validators are independent of C-Chain or any other subnet
- Permissionless participation: anyone staking AVAX with the Primary Network can validate

8.2 Layer 2: BMM Settlement to Bitcoin

While Snowman consensus provides fast finality among Snowside validators, BMM anchoring to Bitcoin provides the ultimate security guarantee. Every Snowside block (or batches of blocks) is anchored to Bitcoin via a BMM commitment. Reverting Snowside's settled history requires attacking Bitcoin's hashrate — economically irrational for any attacker.

8.3 Three-Tier Confirmation

Snowside provides three tiers of confirmation, each with a different trust/security tradeoff:

Figure: Three-tier confirmation model. Instant (Avalanche, ~1-3s), Confirmed (PoW block, ~2min), Settled (BMM anchor to Bitcoin, ~10-20min). Users choose the tier that matches their trust requirement.

Users and applications choose the tier that matches their requirements: payment applications can accept Instant confirmation, while high-value settlements may wait for Settled confirmation.

9. Validator Economics

Running a Snowside validator is designed to be cheap, simple, and permissionless. The economic model ensures that community-run validation is genuinely feasible — not just in theory, but in practice.

9.1 Avalanche9000 Subscription Model

Snowside validators participate in Avalanche's Primary Network by staking AVAX. The Avalanche9000 upgrade introduced a subscription model that dramatically reduces the cost of running a subnet validator. Operational costs are approximately $10-20 per month per validator — negligible compared to the revenue from BTC gas fees.

9.2 Revenue: BTC Gas Fees

Validators earn revenue from the BTC gas fees paid by Snowside users. As network usage grows, validator revenue grows. The fee market is denominated in BTC, providing validators with Bitcoin-denominated income rather than a speculative new token.

9.3 Permissionless Participation

Anyone can run a Snowside validator. The requirements are minimal:

- A server (VPS) with basic specifications
- AVAX for the Avalanche Primary Network stake
- The NodΞRunr Snowside template (free, open-source)

No special hardware, no complex setup, no approval process. NodΞRunr handles deployment, monitoring, and updates automatically.

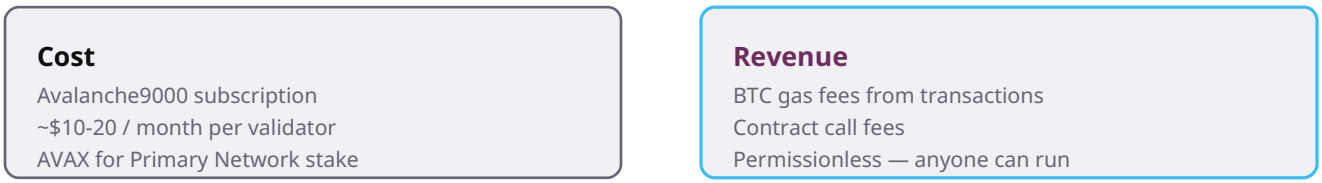

Figure: Validator economics. Operational cost is ~$10-20/month via Avalanche9000 subscription. Revenue comes from BTC gas fees. NodΞRunr eliminates manual maintenance, making community-run validation feasible.

10. Comparison with Alternatives

Snowside is not the only way to build a Bitcoin sidechain. However, it is the only approach that combines Bitcoin economic security, Avalanche-grade performance, and automated operational management. Below is a comparison with the main alternatives.

10.1 vs Ethereum L2/Rollups

Ethereum L2s and rollups offer EVM compatibility but require wrapping BTC to use it as gas. They share a sequencer with other L2s, have multi-minute confirmation times, and offer no custom precompiles. Snowside provides native BTC gas, sovereign validators, sub-second finality, and custom precompiles.

10.2 vs Avalanche C-Chain

The C-Chain uses AVAX for gas and shares validators with all C-Chain users. Snowside has its own validator set, uses BTC for gas, and can implement custom precompiles for eCash-specific logic. This sovereignty is essential for a Bitcoin-aligned sidechain.

10.3 vs Standalone Chain

A standalone chain could theoretically implement BTC gas and custom precompiles, but it would lack Avalanche's ICM bridge for USDC, require expensive manual validator operations, and miss the operational automation provided by NodΞRunr. Snowside inherits all of Avalanche's infrastructure benefits while maintaining Bitcoin alignment.

11. Risks & Mitigations

No project is without risk. We have identified the key risks and designed mitigations for each.

11.1 Paul Sztorc withdraws support or changes the eCash spec

Mitigation: Snowside is EVM-compatible and can host other Bitcoin sidechain experiments. The NodΞRunr template is modular and open-source. We are coordinating directly with Paul to ensure alignment, but the infrastructure remains valuable regardless of eCash's specific direction.

11.2 Low validator adoption

Mitigation: NodΞRunr's one-click setup removes the main barrier. We seed 3-5 initial validators ourselves. Documentation and community outreach (AMAs, tutorials) drive adoption. Target: 5+ independent validators within 60 days.

11.3 Security vulnerabilities in eCash contracts

Mitigation: Limited-scope audit prior to mainnet launch. Post-launch bug bounty program. All contracts use established, audited EVM patterns where possible.

11.4 BTC bridge or custody risk

Mitigation: Use established, audited bridge infrastructure. Avalanche ICM for USDC is trust-minimized with no third-party custodian. BMM design for BTC avoids centralized custody entirely.

11.5 Grant funding insufficient for full scope

Mitigation: Project is modular — testnet launch and documentation can proceed with $10k. Mainnet launch and community programs can be phased. We may apply for the Team1 Accelerator Grant ($30k) for expanded scope.

11.6 Avalanche protocol changes

Mitigation: NodΞRunr is maintained actively and tracks Avalanche upgrades. Snowside benefits from all Avalanche9000 improvements automatically.

12. Roadmap

Month 1 — Fuji Testnet Launch:

- Finalize eCash L1 specification (VM, gas token, precompiles)
- Develop and test NodΞRunr Snowside template
- Deploy to Fuji testnet
- Public testnet RPC endpoint available

Month 2 — Security & Integration:

- Limited-scope security audit of eCash smart contracts
- Integrate C-Chain USDC bridge via ICM
- Onboard first 3-5 community validators on testnet
- Begin documentation: "How to Run a Snowside Validator"

Month 3 — Mainnet Launch:

- Mainnet launch with at least 3 independent validators
- Public RPC endpoint and block explorer live
- NodΞRunr Snowside template publicly available
- Bridge USDC from C-Chain to Snowside mainnet

Month 4 — Community Onboarding:

- Host AMA with Paul Sztorc
- Release tutorial video: "Launch a Bitcoin Sidechain with NodΞRunr"
- Distribute small testnet bounties to early users
- Target: 500+ unique addresses interacting with Snowside

Ongoing — Growth & Sustainability:

- Validator growth (target: 10+ validators)
- Protocol maintenance via NodΞRunr automation
- Explore additional Bitcoin sidechain templates
- Open-source all Snowside configuration files

13. Conclusion

Snowside represents a new approach to Bitcoin sidechains: Bitcoin's economic security via Blind Merged Mining, Avalanche's sub-second finality, and NodΞRunr's automated operational management — all in a single EVM-compatible chain.

By using BTC as the native gas token, Snowside preserves Bitcoin's economic model without introducing a competing token. By leveraging Avalanche's Interchain Messaging, it provides immediate access to USDC liquidity from the C-Chain. And by automating every aspect of validator management through NodΞRunr, it eliminates the operational burden that killed Paul Sztorc's previous EVM sidechain.

The result is a chain that is secure enough for Bitcoin purists, fast enough for real applications, and operable enough to stay alive without constant human intervention. That is what a sustainable Bitcoin sidechain looks like — and that is what Snowside delivers.

The Fuji testnet launches in Month 1. Mainnet follows in Month 3. Builders, validators, and Bitcoin enthusiasts are invited to participate from day one.

14. References

[1] BIP-300: Hashrate Escrows — https://github.com/bitcoin/bips/blob/master/bip-0300.mediawiki

[2] BIP-301: Blind Merged Mining — https://github.com/bitcoin/bips/blob/master/bip-0301.mediawiki

[3] Drivechains: Sidechains for Bitcoin — https://drivechain.info/

[4] Avalanche Consensus Protocol — https://arxiv.org/abs/1906.08936

[5] Avalanche Interchain Messaging (ICM) — https://docs.avax.network/

[6] Avalanche9000 Documentation — https://docs.avax.network/

[7] NodΞRunr — https://layer1.run

[8] NodΞRunr Documentation — https://docs.layer1.run

[9] Ethereum Virtual Machine Specification — https://ethereum.org/en/developers/docs/evm/

[10] USDC by Circle — https://www.circle.com/en/usdc

15. Legal Disclaimer

This whitepaper is for informational purposes only and does not constitute financial, investment, legal, tax, or any other form of professional advice. It is not an offer to sell, a solicitation of an offer to buy, or a recommendation to purchase any security, token, or digital asset.

Forward-looking statements contained in this document — including but not limited to statements regarding the Snowside network, roadmap milestones, validator adoption targets, and the eCash hard-fork — involve significant risks, uncertainties, and assumptions. Actual results may differ materially.

The Snowside software and related tooling are provided "as is" without warranty of any kind. Participation in the Snowside network carries technical, economic, and regulatory risks, including but not limited to: smart-contract bugs, consensus failures, chain reorganizations, mining attacks, key loss, regulatory action, and total loss of funds.

No regulatory authority has reviewed, approved, or endorsed this whitepaper. References to third-party protocols (Bitcoin, Avalanche, eCash) or individuals (Paul Sztorc) do not imply endorsement.

There is no Snowside token. Snowside is infrastructure, not an investment vehicle. No token launch or ICO is planned, now or in the future.