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TAN: An EVM-compatible L1 blockchain powered by Block Per Reward Proof of Stake (BPoS) Consensus

Abstract

TAN is a scalable, secure, and EVM-compatible Layer-1 blockchain with an Inflation Protection Model powered by a Block Per Reward Proof of Stake (BPoS) consensus mechanism. This paper provides a deep technical overview of TAN's architecture, its economic model, and use cases for stakeholders.

1. Introduction

1.1. Overview of TAN Network

TAN represents a quantum leap in blockchain architecture by providing a high-throughput, scalable, and secure ecosystem. Its design philosophy is rooted in delivering a blockchain that supports practical use cases while ensuring scalability, low costs, and an incentivized network for participants.

1.2. Problem Statement

Despite significant advancements, existing Layer 1 solutions face the following pressing challenges:

1. Scalability Bottlenecks: As blockchain adoption grows exponentially, many networks struggle to process transactions at scale without compromising efficiency. Congestion and high latency deter both developers and users, limiting the practicality of blockchain in real-world scenarios.

2. High Transaction Costs: Exorbitant transaction fees create a barrier, especially for smaller users and businesses. These costs limit adoption in markets where affordability is crucial. Without affordable solutions, blockchain risks remaining out of reach for those who could benefit most.

3. Security Vulnerabilities: Decentralization boosts resilience but often weakens network security. Most consensus mechanisms struggle to balance these aspects, making networks vulnerable to attacks, inefficiencies, or both, hindering their ability to ensure robust and secure operations.

4. Economic Sustainability: Many token economies face challenges like inflation and unsustainable validator rewards, undermining long-term network health and discouraging participation. Sustainable models are crucial for stability and ensuring active engagement within ecosystems.

5. Interoperability Challenges: Developers encounter substantial challenges when migrating Ethereum-based decentralized applications (dApps) to other networks due to limited compatibility with the Ethereum Virtual Machine, creating friction in the migration process.

These issues create a fragmented ecosystem where blockchains fail to meet the growing demands of users, developers, and enterprises. Without addressing the foundational problems, blockchain technology risks stagnation, undermining its potential to impact industries and economies at scale.

1.3. Mission and Vision

Our mission is to provide an EVM-compatible L1 solution that addresses the persistent challenges. Through our Block Per Reward Proof of Stake (BPoS) consensus mechanism and a robust economic model, TAN aims to create a high-throughput system that empowers developers and users alike.

Our vision is to amass developers with the tools to build scalable solutions and supporting the long-term growth of the ecosystem. With a focus on sustainability and scalability, TAN is poised to become the blockchain of choice for the next generation of decentralized applications and assets.

1.4. Key Features of TAN

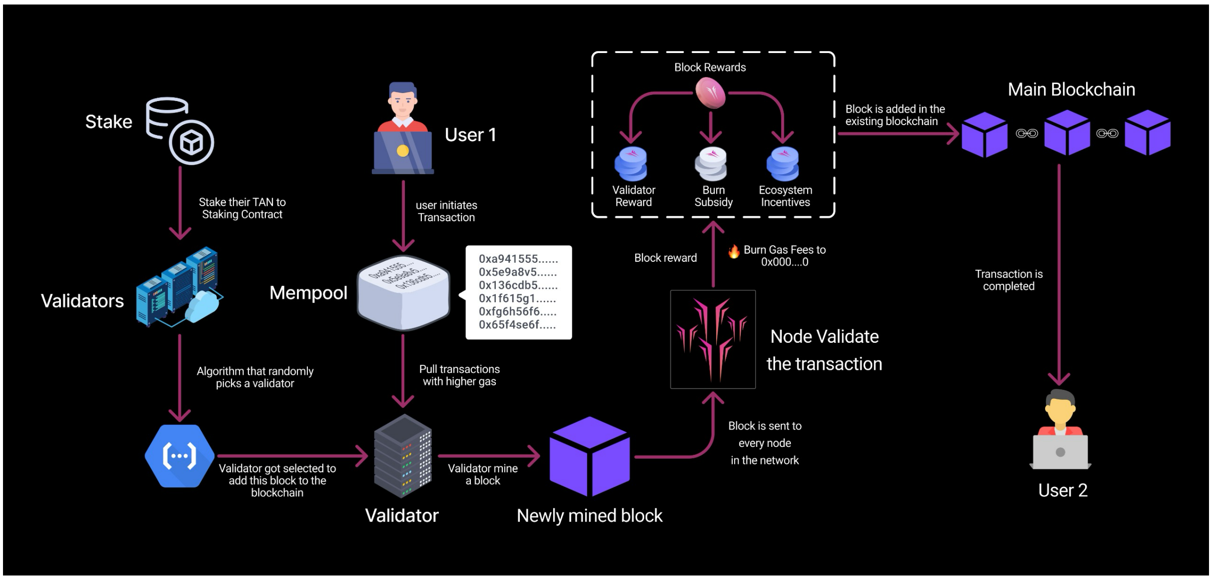
TAN is specifically designed to be future-ready. The network's EVM compatibility makes it easy for Ethereum-based dApps (decentralized applications) and smart contracts to migrate, while its advanced consensus mechanism ensures governance and scalability to meet the future demand.

The TAN blockchain is powered by the native coin $TAN, which serves as the unit of exchange, transaction validation, and staking. TAN's economy is designed with robust mechanisms that provide long-term growth, including a unique Block Per Reward Proof of Stake (BPoS) consensus, a token supply capping model, and multiple layers of inflation control.

2. Technical Overview

2.1. Blockchain Architecture

TAN's blockchain architecture is built to provide an infrastructure for dApps, smart contracts, and enterprise solutions. The design leverages advanced consensus mechanisms, transaction optimization, and native features to enable seamless integration and growth. Below is a detailed breakdown of the architectural components of TAN:



End-to-End Tan Blockchain

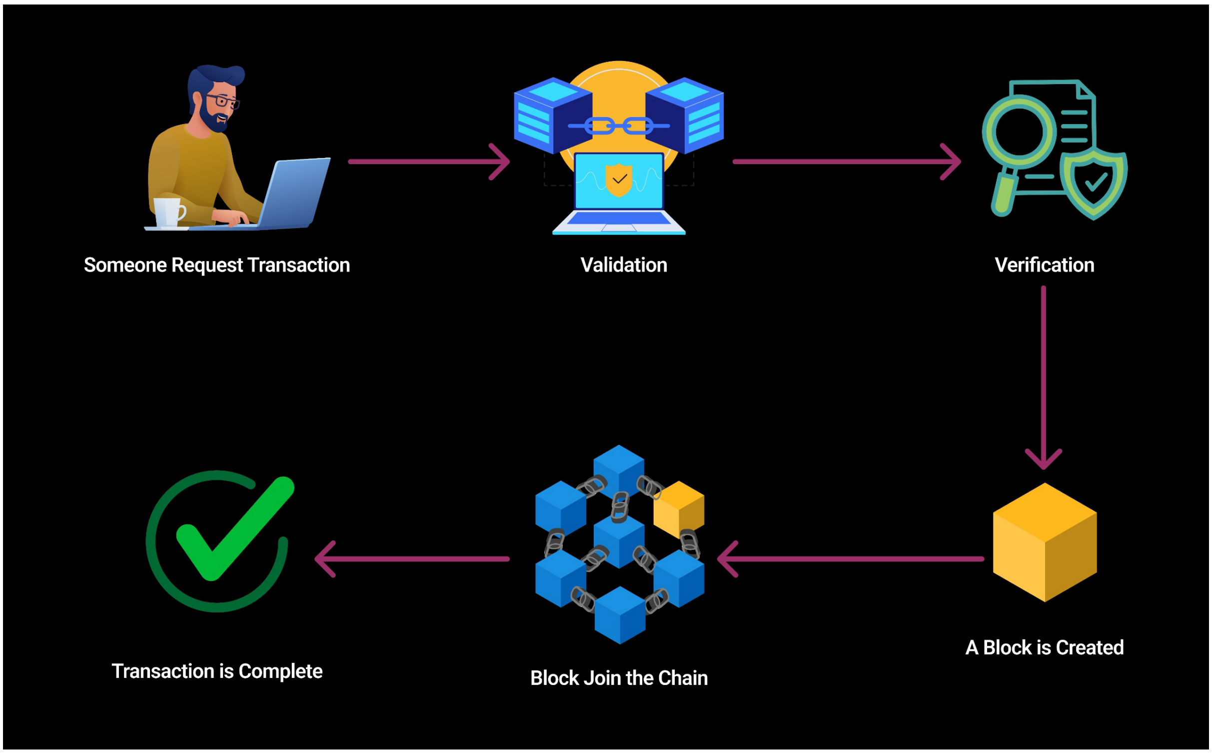
2.2. Consensus Mechanism

The Block Per Reward Proof of Stake (BPoS) is the consensus mechanism that drives the validation process on the TAN blockchain. It combines the benefits of Proof of Stake (PoS) with the unique Block Per Reward system, ensuring scalability and security. BPoS provides the following benefits:

- Block Creation: Blocks on TAN are created every 5 seconds, providing fast finality and high throughput compared to Ethereum, which has a 13-second block time. The smaller block time translates into quicker transaction processing and reduced network congestion.

- Validator Incentives: Each new block generated rewards validators with a portion of the block's TAN rewards. This ensures a higher level of network participation and decentralization. The block reward decreases over time through a halving mechanism, which helps control inflation.

- Security and Decentralization: The Block Per Reward Proof of Stake (BPoS) consensus ensures that the network remains secure, decentralized, and trustless. This means that transactions made with TAN are secure, as there is no central authority controlling or overseeing transactions.



Lifecycle of a Transaction in Consensus within the Tan Blockchain

2.3. EVM Compatibility

One of the fundamental design decisions in the TAN blockchain is its Ethereum Virtual Machine (EVM) compatibility. This ensures that TAN can integrate with existing Ethereum-based tools, libraries, frameworks, as well as dApps. The EVM compatibility provides the following key benefits:

- Interoperability with Ethereum: Developers can port their dApps to TAN without significant code changes, making the migration process smoother. Existing smart contracts can run on TAN, ensuring compatibility with widely used Ethereum frameworks such as Solidity and Hardhat.

- Tooling and Libraries: Developers can use familiar tools and environments like MetaMask, Web3.js, and Remix. These resources streamline the development process, minimize the learning curve, and reduce adoption barriers, without needing extensive training and onboarding.

- Cross-Chain Compatibility: The EVM layer enables TAN to seamlessly interact with other EVM-compatible blockchains, enhancing interoperability. This cross-chain compatibility expands TAN's utility and reach, allowing users and developers to benefit from a broader ecosystem.

2.4. Layer-1 Design Principles

TAN is designed as a Layer-1 solution, focusing on core principles that enhance its security and scalability. These principles guide the development and operation of the network to ensure an efficient foundation for dApps, enterprise solutions, and ecosystems. Key design principles include:

- Gas Efficiency: TAN's architecture is optimized for cost-effectiveness, ensuring significantly lower transaction fees compared to Ethereum. This gas efficiency makes TAN a more attractive option for developers and businesses, especially those building micro-transaction dApps.

- Security: TAN's distributed network of validators minimizes the risk of malicious activity. The BPoS consensus incentivizes widespread validator participation, enhancing decentralization and making it computationally infeasible for a single entity to compromise the network.

- Data Integrity: Validators play a critical role in maintaining data integrity by ensuring the ledger remains intact, preventing double-spending, and safeguarding against tampering. These measures ensure that transactions and contract executions are tamper-proof and trustworthy.

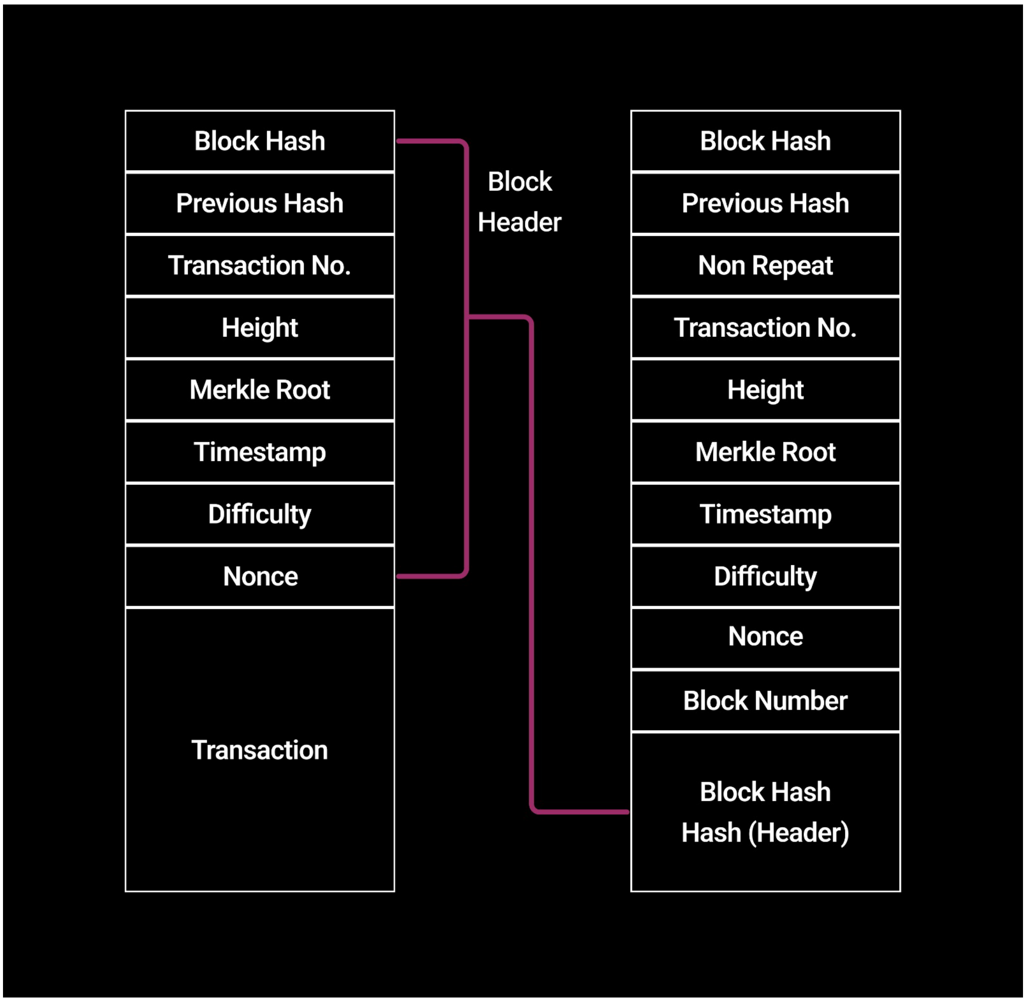
TAN’s block structure is optimized for speed and scalability. Here’s an outline of how each block is structured and the data flow:

- Block Header:
  - Previous Block Hash: Points to the hash of the previous block in the chain, ensuring continuity and immutability.
  - Timestamp: The exact time the block was created.
  - Merkle Root: A hash representing the root of all transactions within the block. It ensures that all transactions are valid and can be efficiently verified.
  - Block Height: The index of the block in the chain (starting from 0).

- Validator Signature: The cryptographic signature of the validator who produced the block, ensuring authenticity and accountability.

- Transaction Data:
  - The block contains a list of transactions, each of which is validated by the network. These transactions can involve transfers, smart contract executions, or other interactions within the ecosystem.

- Consensus Data:
  - Block Reward: The reward (in TAN) for creating the block, distributed according to the BPoS protocol.
  - Validator Staking Info: Information about which validators participated in block validation, along with the proportion of rewards they will receive.



Block Header

3. TAN's Consensus Mechanism

3.1. Overview of Proof of Stake

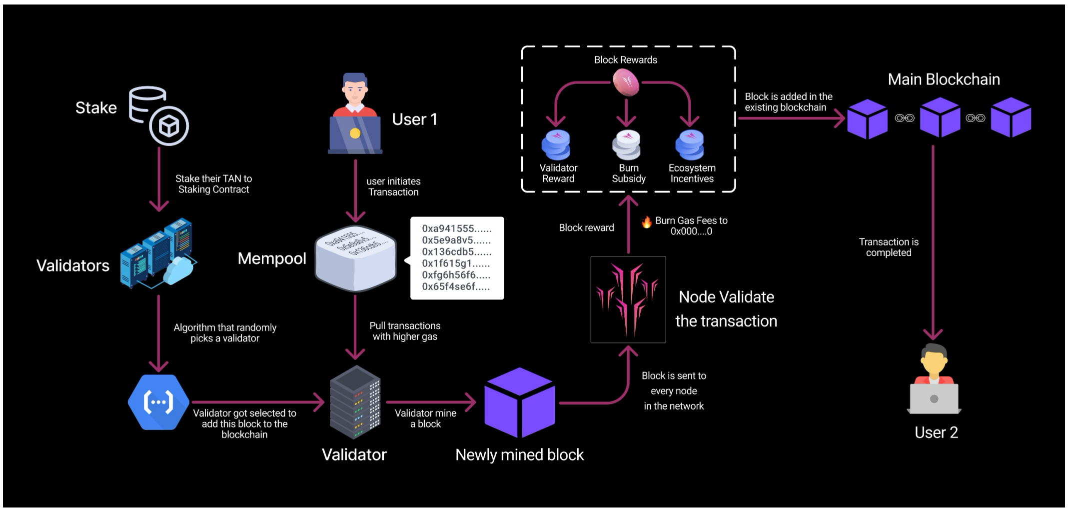
Proof of Stake (PoS) is a consensus mechanism where validators are chosen to create new blocks and confirm transactions based on the amount of cryptocurrency they hold and "stake" as collateral. It is energy-efficient compared to Proof of Work, promoting higher security and decentralization.

3.2. How TAN's BPoS Works

Block Per Reward Proof of Stake (BPoS) is a mechanism where validators earn rewards based on the number of blocks they propose, rather than the stake they hold. Blocks on TAN are created every five seconds. The smaller block time translates into quicker processing and reduced congestion.

In TAN's BPoS consensus, validators play a dual role of securing the network by validating and creating blocks while participating directly in governance with equal voting power. Delegators, on the other hand, contribute indirectly by staking their TAN tokens with trusted validators.

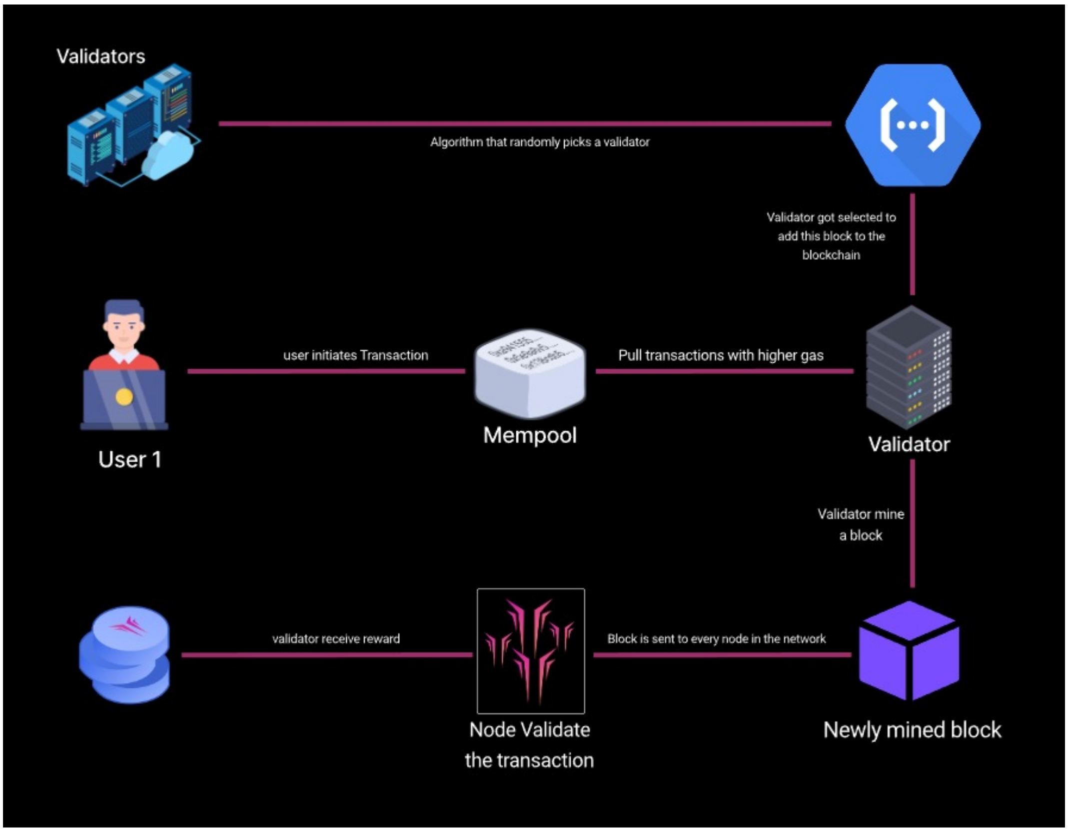
Delegators earn rewards proportional to their stake. Governance proposals require a 60% validator approval to pass, ensuring decentralization and fault tolerance, while rewards are distributed to incentivize both validators and the broader ecosystem through TAN's innovative subsidy model.



Working of BPOS Consensus

3.3. Validator Selection and Block Validation

Validators are randomly selected to create blocks, and their performance is directly tied to the rewards they receive. In this model, higher validator rewards ensure that participants are incentivized to secure the network and the ecosystem, which is important for maintaining decentralization.

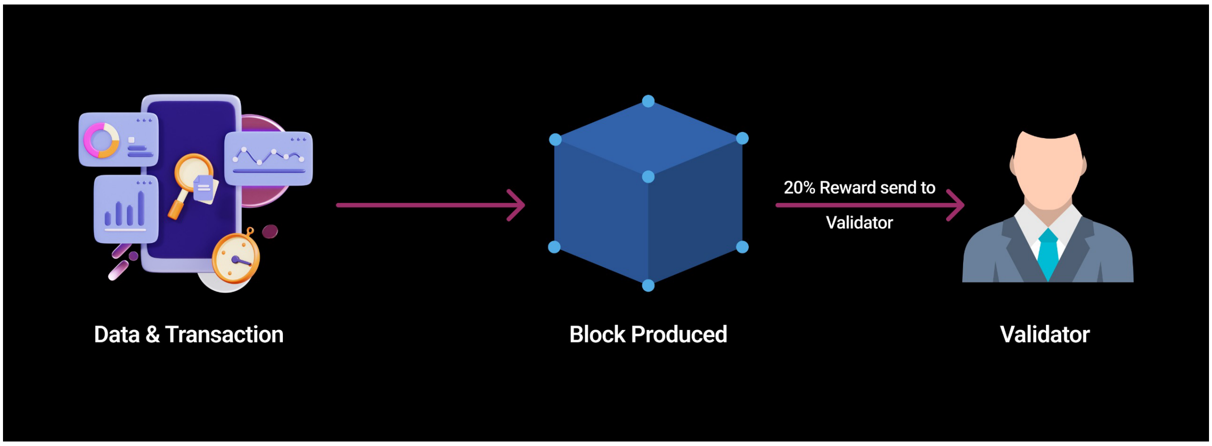


Validator Selection and Block Validation

3.4. Validator Rewards Distribution

The Block Per Reward Proof of Stake (BPoS) mechanism in TAN incentivizes network participants by distributing block rewards in a way that supports security and fairness, ensuring a balanced economic model while encouraging active participation in the network's growth and stability.

Validators' Reward: 20% of each block's reward is allocated to the validators which would be reduce overtime due to halving process in every 4 years. This ensures that validators are incentivized to participate in the network's consensus. Validators are selected based on their stake in the network and their ability to process transactions and add new blocks.



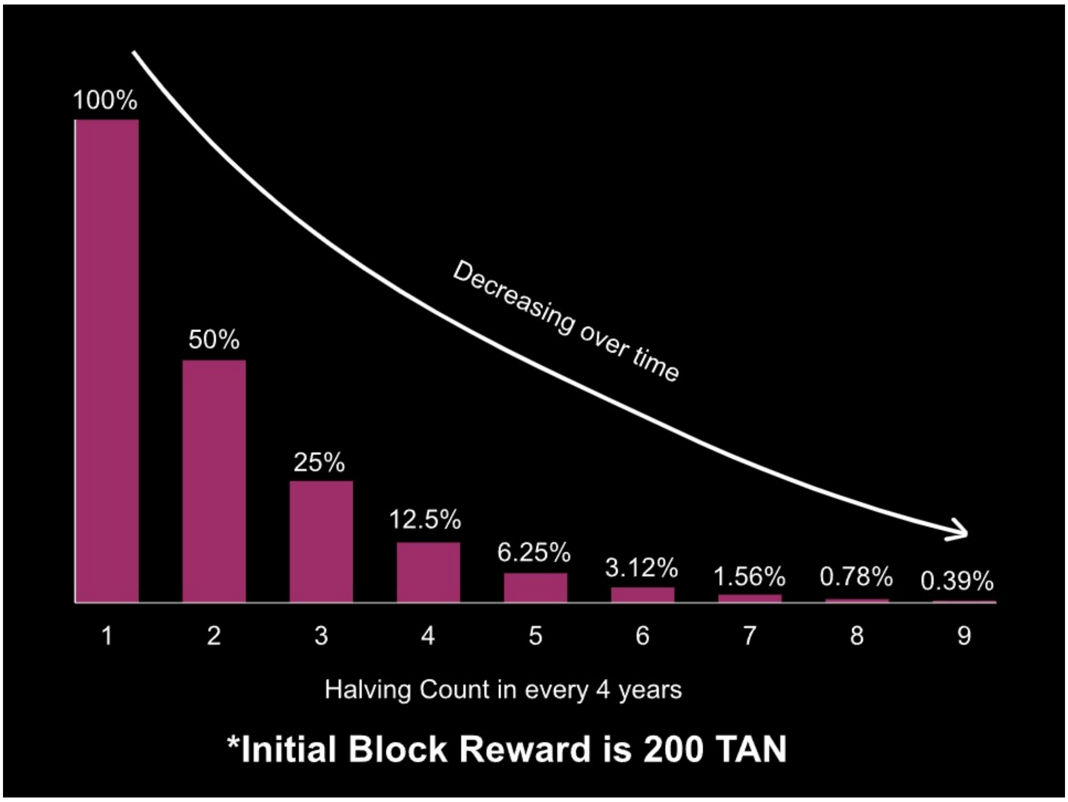
20% of Validator Rewards Distribution

3.5. Misbehavior and Slashing

Validator incentives are aligned with network integrity, encouraging honest behavior. Slashing penalties for inactivity or malicious actions ensure that only trusted validators participate in securing the network. The penalty amount incurred from slashing are burned for network economics.

3.6. Halving Mechanism and Token Deflationary Model

The halving mechanism reduces block rewards by 50% every four years, creating a deflationary model that controls token inflation. This predictable decrease in new token supply, commonly used in Bitcoin, ensures a gradual reduction in circulating tokens over time, maintaining scarcity.



Halving Mechanism

4. Economic Model

4.1. Tokenomics of $TAN

$TAN is the native utility token of the TAN, designed to fuel the ecosystem with high scalability, low transaction costs, and robust security. With a capped supply of 30 billion coins and an Inflation Protection Model, TAN offers a sustainable and value-driven solution for payments and rewards.

Key Economic Features:

- Fixed Maximum Supply: The total supply of TAN is capped at 30 billion TAN tokens, ensuring that no more tokens will ever be minted beyond this limit. This prevents inflationary pressures that could devalue the token over time.

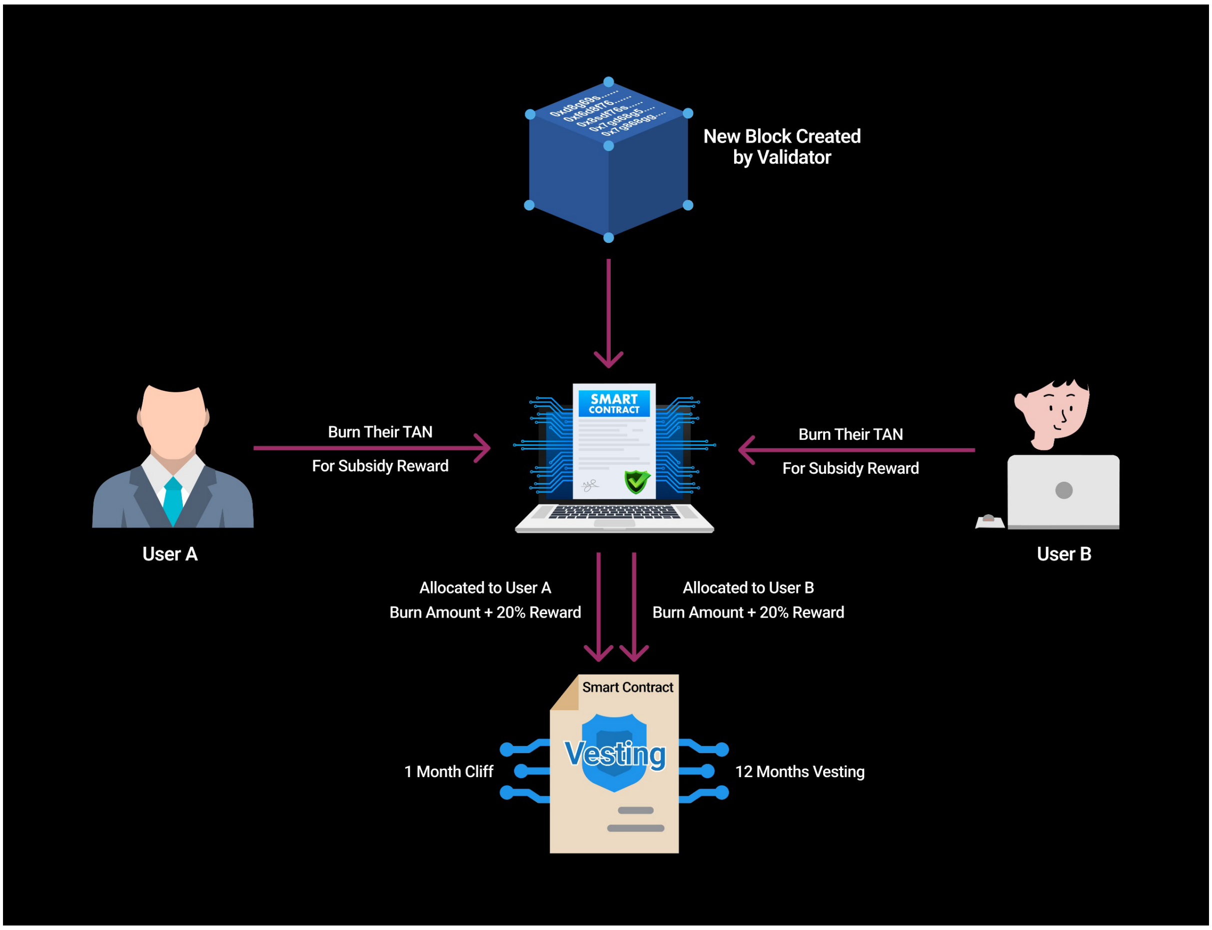
- Minting through Block Per Reward: A portion of the TAN supply will be minted as rewards for validators and network participants over time. The distribution of these rewards is governed by the BPoS consensus. The minting process is inflationary in the short term but helps provide incentives to secure the network.

- Deflationary Burn Mechanisms for Sustainable Token Economics: To ensure a deflationary and sustainable economy for the TAN token, tokens are burned through two key mechanisms: the Subsidy Layer and gas fees. Participants in the Subsidy Layer burn their tokens to receive incentives, directly reducing the circulating supply. Additionally, a network gas fees is also burned. These combined burn strategies help control inflation, promote scarcity, and support long-term token value, ensuring a healthier economic model for the TAN ecosystem.

4.2. Reward Distribution and Incentive

1. Validators' Reward: 20% of each block's reward is allocated to the validator who validate the block in consensus . This ensures that validators are incentivized to participate in the network's consensus.

2. Subsidy Layer: 50% of the Block Reward is allocated to the Subsidy Layer, The Subsidy Layer plays a crucial role in maintaining the integrity and sustainability of the network's tokenomics. By allocating 50% of the block rewards to the Subsidy Layer, it incentivizes participants to burn their tokens, thus reducing circulating supply and enhancing scarcity. Users who contribute by burning tokens, such as User A who burns 1000 TAN, receive a 20% incentive in the form of a 12-month vesting period. This mechanism not only promotes token utility but also strengthens the network's economy by encouraging long-term participation, fostering a deflationary environment, and supporting the overall growth of the ecosystem. The Subsidy Layer ensures a balanced and healthy token distribution, directly benefiting both individual participants and the network as a whole.



Working mechanism of Subsidy Layer

3. Ecosystem Incentives: The remaining 30% of the Block Reward is allocated to the Ecosystem Incentives:

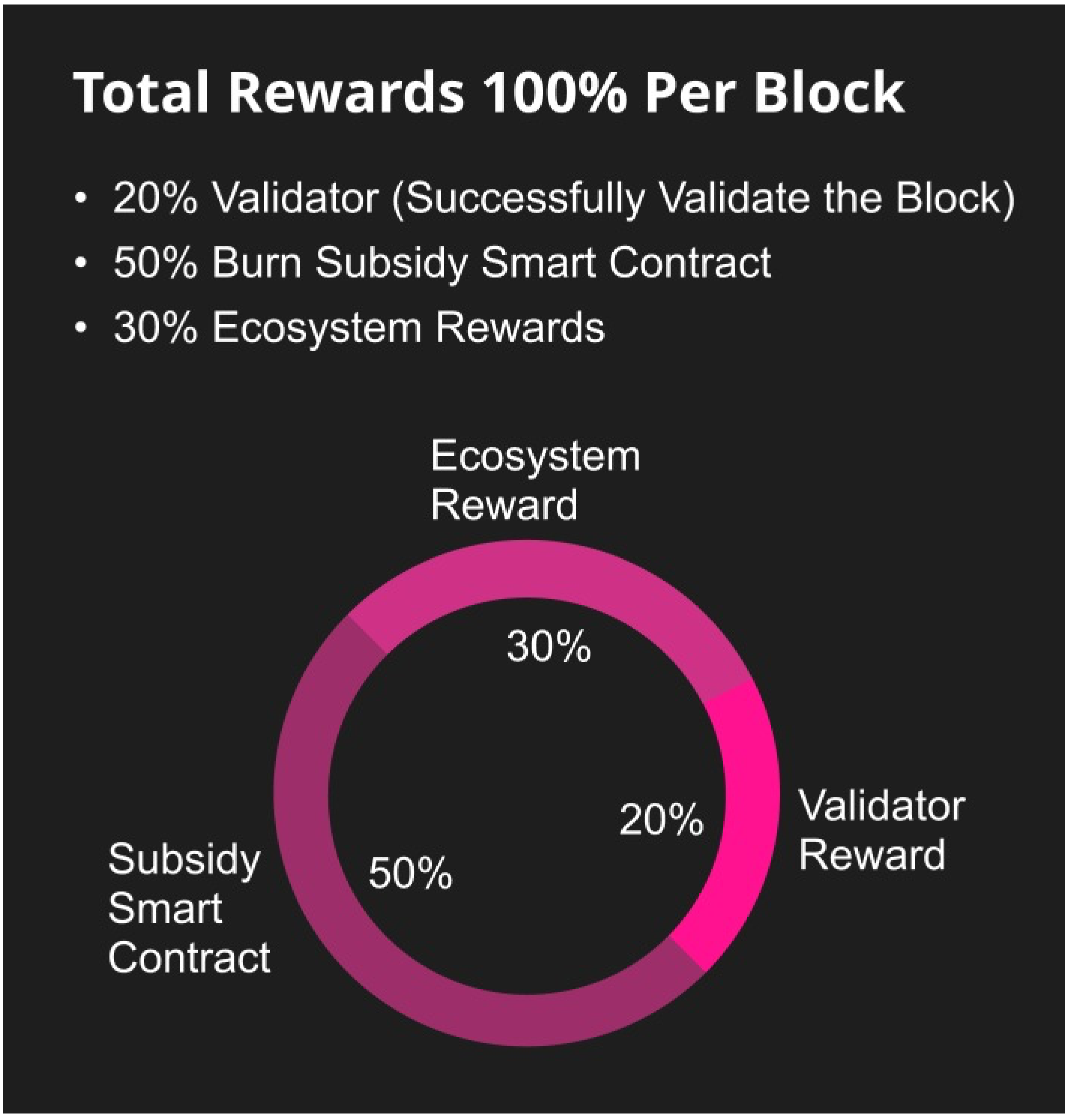
d. Wallet Incentives: Users who make frequent transactions will be rewarded based on transaction volume. For instance, users completing transactions in increments of 1,000, 5,000, 20,000, etc., will earn Incentives. This encourages adoption of TAN as a means of transaction.

e. Staking Incentives: This portion rewards those who stake their TAN tokens to help secure the network. Extra Staking Incentives along with block rewards help users earn additional tokens for supporting network operations.

f. Developer Incentives: Developers who contribute to the ecosystem (by building dApps, smart contracts, or adding to the Total Value Locked (TVL)) will receive Incentives. This helps encourage developer engagement and incentivizes the growth of the TAN ecosystem.

g. Holding Incentives: Investors who hold TAN for longer periods will receive Incentives based on the length of time they hold the token. This rewards long-term holders and further enhances the value proposition of holding TAN.

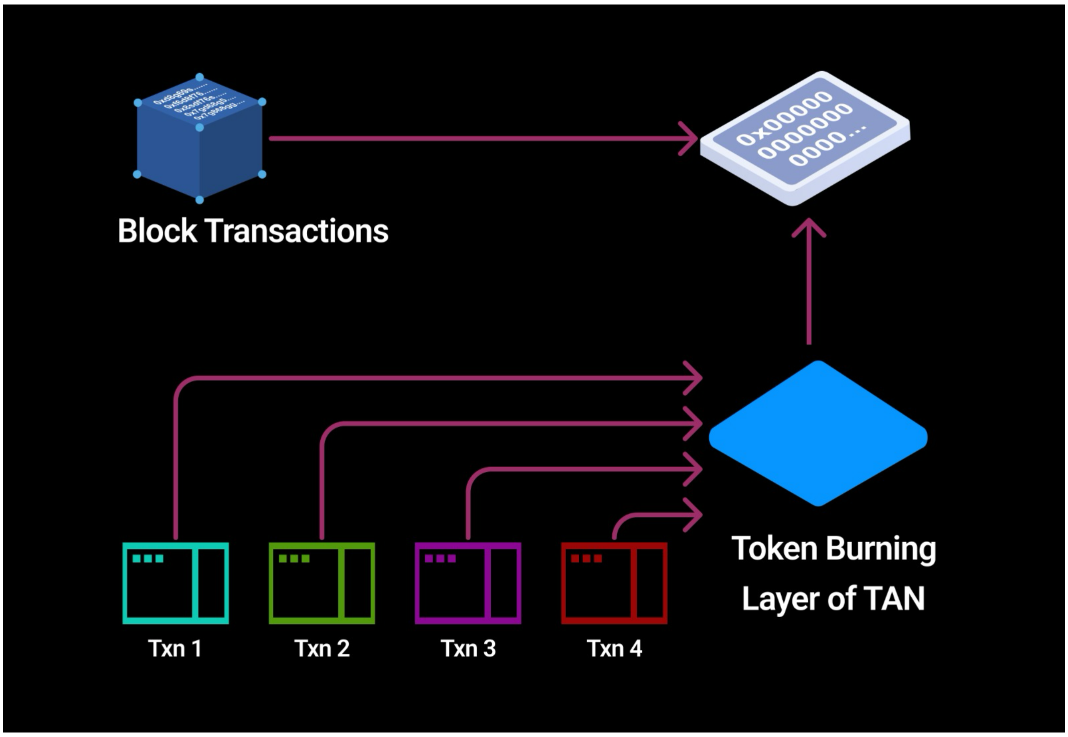
NOTE - The Ecosystem Incentives are set to stopped after first halving cycle i.e block number 25,228,800 and the incentives will be merged into subsidy layer.



Rewards Per Block Distributions

4.3. Gas Fee Burning Mechanism

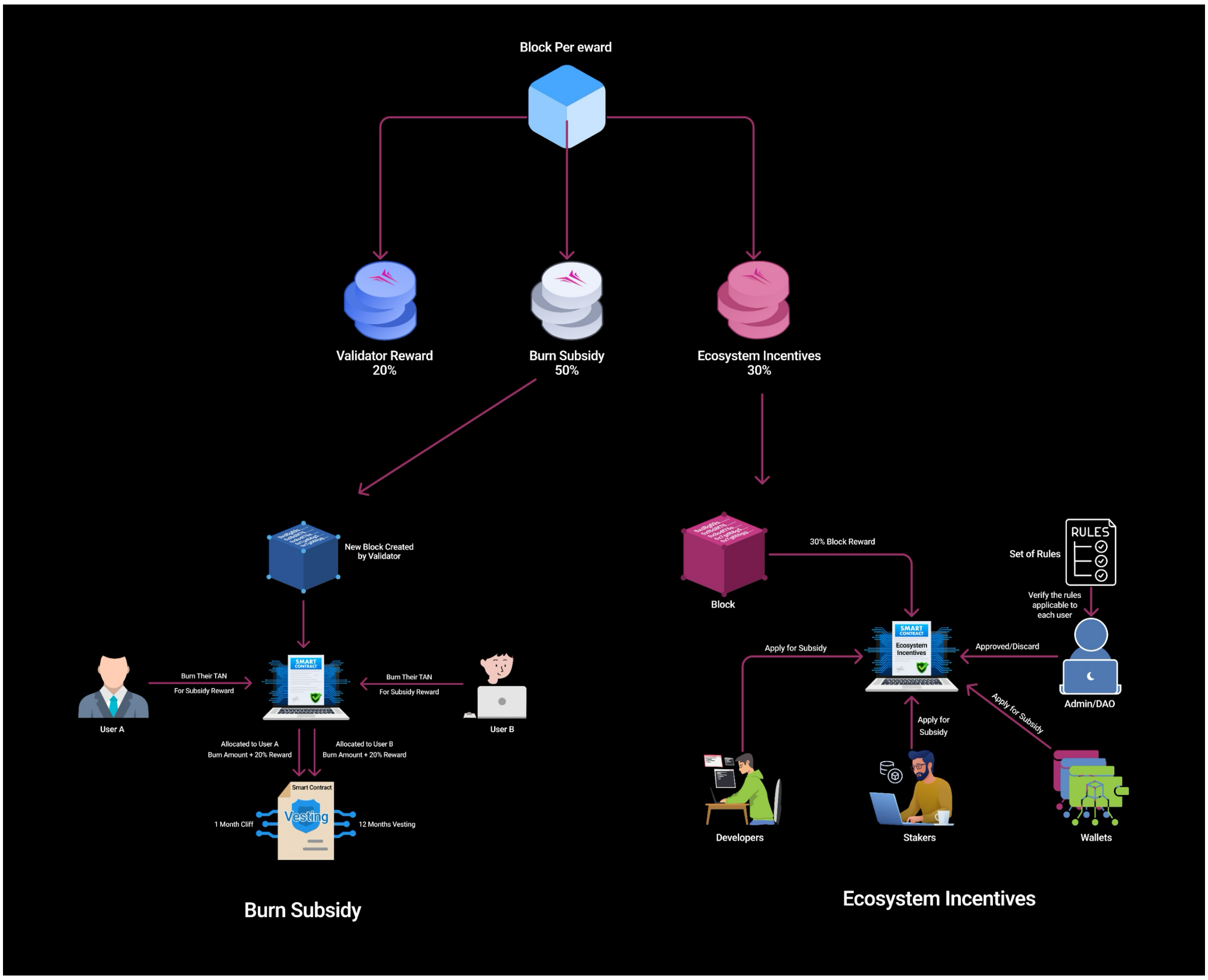
All transaction fees in $TAN are burned after being paid by users. This burning mechanism decreases the supply of $TAN in circulation, which acts as a deflationary pressure. The process ensures that as the network grows in terms of transaction volume, the supply of TAN decreases, increasing its value.



Burning of transaction fee

4.4. Subsidy Layer and Ecosystem Incentives

Additionally, the subsidy and Ecosystem Incentives layer acts as a direct incentive for network participants and contributors. By rewarding validators, developers, and users based on their contributions, TAN's economic model aligns the interests of all stakeholders, ensuring the network's continued growth and stability.



Subsidy Layer and Ecosystem Incentives Flow and Working Mechanism

4.5. Halving and Its Impact on Token Supply

Every four years, the reward that validators receive will decrease by half. This mechanism reduces the rate of new $TAN entering circulation, adding another layer of control. The gradual reduction in rewards increases the scarcity of TAN, which can positively impact its value as the network matures.

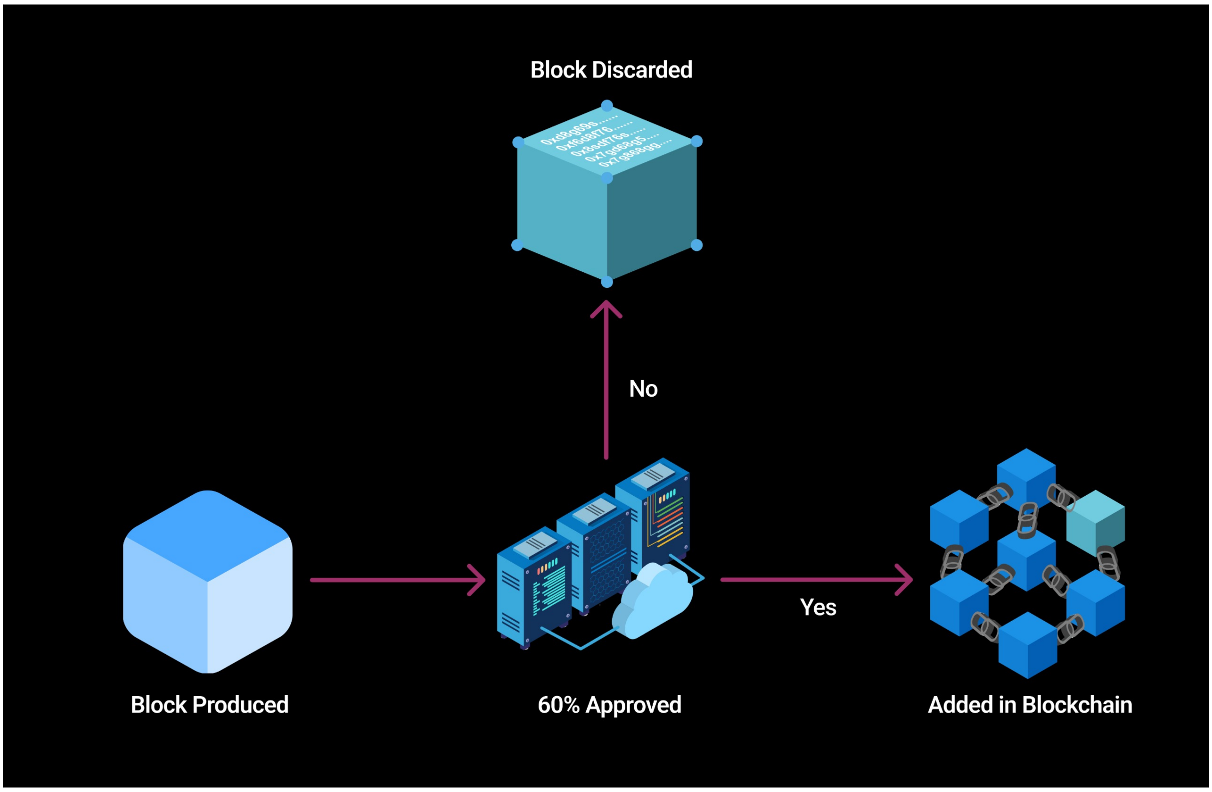
- Effect on Validator Incentives: Validators in the TAN network are incentivized to participate in securing the blockchain by receiving block rewards. These rewards decrease over time, but as a result of halving, the supply of new TAN decreases, ensuring scarcity and value retention.

- Effect of Token Scarcity: With fewer tokens entering the supply over time, the rate of inflation decreases. This scarcity can lead to upward price pressure if demand remains constant or increases. By slowing inflation, halving supports TAN's sustainable economic growth, aligning incentives for holders, stakers, and developers.

5. Security Model

5.1. Validator Security and Fault Tolerance

The 60% fault tolerance model means that the network will halt if fewer than 60% of validators are active. This design ensures that block production and transaction validation are only carried out when enough validators are available to maintain consensus. If the validator pool falls below this threshold (e.g., due to downtime, malicious actions, or misbehavior), the system halts to prevent invalid or incomplete blocks from being produced.



60% Validator Approval for Block Addition

Why 60% Fault Tolerance?

- Fault Tolerance Requirement: For the network to function securely, at least 60% of validators need to participate in consensus. This ensures that the validation process remains decentralized, and any disruption in validator availability can be quickly detected, avoiding any potential attacks or fraudulent activity.
- Chain Halt Protocol: If the number of active validators dips below 60%, the chain will halt, ensuring that no invalid or potentially malicious blocks are added to the ledger. This feature prevents forks, double-spending, or other forms of network manipulation that could occur when validators are unavailable.
- Validator Availability: Validators are incentivized to stay active and online since their failure to do so can result in the network halting. If validators remain online and continue to participate in consensus, they are rewarded through the block reward mechanism and subsidy layer.

5.2. Slashing and Penalties for Malicious Behavior

Validators must also be wary of slashing penalties designed to discourage negligent behaviors:

1. Slashing for Inactivity: Validators who remain inactive, such as failing to participate in block validation for long periods, face slashing penalties. This mechanism ensures that validators are motivated to remain active and consistently engage in the consensus process, maintaining the network's security and efficiency.

2. Slashing for Malicious Behavior: Validators who engage in malicious behavior, such as double-signing conflicting blocks or producing invalid blocks, face penalties that reduce their stake. This ensures that only honest and reliable validators are rewarded, while those who act maliciously are financially disincentivized.

6. Governance Model

6.1. On-Chain Governance Structure

In a blockchain where each validator has equal voting power (e.g., 1 vote per validator), the governance model can be designed around democratic decision-making. The key idea is that every validator has an equal say in protocol changes, rule modifications, and other important decisions. This contrasts with models where larger stakeholders or validators have more influence based on their stake.

Key Principles:

- Equal Voting Power: Each validator has the same influence, meaning no single validator can outvote others simply because they control more tokens.
- Proposal-Based Voting: Changes to the network (protocol upgrades, new features, etc.) are made via proposals. Validators vote on these proposals.
- Transparency: The decision-making process should be transparent, with each validator’s vote being visible to the public, ensuring accountability.

6.2. Decision-Making Process

6.2.1 Direct Voting Model

In this model, all validators directly vote on proposals for changes to the network. Each validator’s vote has equal weight, regardless of their stake. This model is the most straightforward and promotes fairness and transparency.

Process

- Proposal Submission: Validators, token holders, or other network participants submit proposals for network changes or upgrades.
- Voting: Every validator votes "Yes" or "No" on the proposal. Since each validator has equal voting power (1 vote), the decision is made by the majority.
- Threshold for Passing: For a proposal to pass, a majority of validators (e.g., 60%) need to vote "Yes". This aligns with your system's fault tolerance (60%).

Example

- Proposal to upgrade the network protocol.
- 10 validators, each with 1 vote.
- 6 votes "Yes" = Proposal passes.

6.2.2. Delegated Voting (Staker Delegation)

In this model, token holders (who may not be validators) delegate their voting power to validators. The validators then vote on behalf of their delegators. While each validator still has equal voting power, the community of stakers indirectly influences governance by selecting trustworthy validators.

Process

- Delegation: Token holders delegate their votes to trusted validators. This allows token holders to participate in governance without directly voting.
- Voting: Validators cast votes on behalf of their delegators, but each validator's vote is still equal (1 vote).
- Majority Decision: The proposal passes if the majority of validators vote "Yes."

Example

- Token holders delegate their votes to 5 validators.
- 5 validators vote "Yes" for a proposal, and the majority wins.

6.2.3. Rotating Validator Voting

To ensure that the governance process remains fresh and not dominated by the same group of validators, validator participation in voting can rotate periodically. This model ensures that all validators, not just a small subset, actively contribute to governance decisions.

Process

- Rotation: A subset of validators (e.g., rotating every epoch) participates in governance votes.

- Voting: Each rotating validator has equal voting power. After a set period, the group of validators changes, and a new group is given the chance to vote.
- Majority Decision: The vote is determined by the majority of the participating validators during each period.

Example

- Validators A, B, and C vote in the first round.
- Validators D, E, and F vote in the next round.
- This ensures no single validator group has prolonged influence.

6.2.4. On-Chain Governance with Smart Contracts

Governance decisions can be automated and self-executing using smart contracts. In this model, once a proposal passes based on the validators' votes, smart contracts automatically execute changes or upgrades to the network.

Process

- Proposal Submission: A proposal is made to change the network, like upgrading a protocol.
- Voting: Validators vote using on-chain smart contracts, each with 1 vote.
- Execution: If the proposal passes, the smart contract automatically enforces the changes (e.g., software upgrade, parameter changes).

Example

- Proposal to change transaction fees.
- Validators vote, and if it passes, the smart contract automatically adjusts the fee structure.

7. Smart Contract Ecosystem

7.1. EVM Compatibility and Developer Tools

TAN enables developers to create, deploy, and interact with smart contracts and dApps through its EVM compatibility. This enables a rich ecosystem of decentralized applications to be built, from financial applications (DeFi) to gaming, supply chain management, and beyond.

Key Smart Contract Features:

- Gas Efficiency: TAN’s blockchain design ensures that transaction fees (gas costs) are lower compared to Ethereum, making it more appealing for developers building high-frequency dApps.

- Security: TAN employs multi-signature wallets, audit trails, and role-based access control (RBAC) for smart contract interactions, ensuring that contract execution is secure and tamper-proof.
- Cross-Chain Interoperability: Due to EVM compatibility, TAN can integrate with Ethereum-based tokens, assets, and other blockchain networks. This allows seamless interaction with external blockchain ecosystems, such as connecting Ethereum-based dApps to TAN.

7.2. Smart Contract Deployment and Interaction

TAN will also serve as a smart contract platform for creating decentralized applications. Developers can write, deploy, and interact with smart contracts using TAN's efficient Blockchain as a Service (BaaS) infrastructure, which supports the rapid deployment of decentralized applications.

7.3. Integrating with DeFi and dApp Ecosystems

DeFi Protocols: As the DeFi sector continues to expand, TAN will play a significant role in enabling decentralized lending, borrowing, and staking platforms. The low fees and fast transaction speeds will make TAN an attractive option for developers building lending protocols, decentralized exchanges, and liquidity pools.

Cross-Chain Interoperability: The EVM compatibility of TAN ensures that it can seamlessly connect with other blockchains and ecosystems, creating opportunities for cross-chain liquidity and interoperability. This allows TAN to be integrated into multiple DeFi ecosystems, enhancing its scalability and user base.

8. Sustainability and Growth

8.1 Token Burn Mechanism for Long-Term Stability

Burn Mechanism (Deflationary):

a. Transaction Fee Burning: To combat inflation, all transaction fees in TAN are completely burned after being paid by users. The burning process ensures that as the network grows in terms of transaction volume, the supply of TAN decreases, potentially increasing its value over time.
b. Subsidy Layer Burn Mechanism: The subsidy for burning TAN is designed to incentivize the reduction of the circulating supply of TAN. This ensures that as the network grows, more tokens are removed from circulation, contributing to deflationary pressure.

8.2 Ecosystem Growth and Adoption Strategy

TAN's economic model ensures that various stakeholders are motivated to contribute to the ecosystem, whether through staking, transaction processing, smart contract development, or network growth. The following groups are incentivized:

For Individuals:

1. Holding Subsidy: Individuals who hold TAN tokens are rewarded based on the duration of their holding. This incentivizes long-term investment in the TAN ecosystem.
2. Wallet Subsidy: Active users of the TAN network who regularly engage in transactions are rewarded based on their transaction volume. This encourages adoption and frequent use of TAN for everyday

transactions.

For Businesses:

1. Transaction Fee Savings: TAN offers lower transaction fees compared to Ethereum and other blockchain networks, making it an attractive option for businesses seeking cost-efficient transaction processing. Additionally, the burn mechanism ensures that businesses can benefit from a more deflationary economic environment, potentially increasing the value of their held TAN over time.
2. Developer Subsidies: Businesses can also tap into developer subsidies by building on the TAN blockchain, which offers rewards based on the activity and usage of their decentralized applications (dApps).

For Developers:

1. Developer Subsidy: Developers who build on the TAN blockchain can earn subsidies based on the Total Value Locked (TVL) in their dApps, the number of transactions, and the volume associated with their smart contracts. This creates an environment where developers are incentivized to innovate and scale their applications.
2. Smart Contract Execution: TAN's EVM compatibility allows developers to port over existing Ethereum-based applications and smart contracts. This makes the transition to TAN smoother, and the incentive model rewards developers who migrate to and build on the TAN network.

8.3 Partnerships and Strategic Alliances

The scope of TAN is vast, encompassing a wide range of industries, use cases, and applications that have the potential to drive its adoption in the coming years. Here's a detailed breakdown of TAN's expected scope:

a. **Payment Systems and Digital Transactions**
   - Global Payment System: TAN aims to provide a universal payment system where individuals and businesses can perform fast, secure, and low-cost transactions across borders, bypassing intermediaries like banks and payment processors. Its low transaction fees and instant settlement times (5-second block times) make it an ideal candidate for both micro-transactions and high-value transfers.
   - Merchant Adoption: The network will also cater to merchants seeking efficient payment solutions. With the native coin TAN and its seamless integration with existing e-commerce platforms, businesses can accept payments and instantly convert them into fiat, reducing the reliance on traditional financial institutions.

b. **DeFi Ecosystem Expansion**
   - DeFi Protocols: As the DeFi sector continues to expand, TAN will play a significant role in enabling decentralized lending, borrowing, and staking platforms. The low fees and fast transaction speeds will make TAN an attractive option for developers building lending protocols, decentralized exchanges, and liquidity pools.
   - Cross-Chain Interoperability: The EVM compatibility of TAN ensures that it can seamlessly connect with other blockchains and ecosystems, creating opportunities for cross-chain liquidity and interoperability. This allows TAN to be integrated into multiple DeFi ecosystems, enhancing its scalability and user base.

c. **Developer Ecosystem**

- Migration of dApps: With its focus on EVM compatibility, developers can easily migrate Ethereum-based dApps to the TAN blockchain. This will help TAN grow its ecosystem by bringing a wide array of existing decentralized applications and services onto its network, benefiting from its scalable infrastructure and low transaction fees.
- Smart Contract Platform: TAN will also serve as a smart contract platform for creating decentralized applications. Developers can write, deploy, and interact with smart contracts using TAN's efficient Blockchain as a Service (BaaS) infrastructure, which supports the rapid deployment of decentralized applications.

d. **Digital Asset and NFT Marketplaces**

- NFT Ecosystem: With the growing demand for Non-Fungible Tokens (NFTs), TAN will provide a platform for minting, buying, and selling NFTs in a more scalable and cost-efficient manner. Artists, creators, and collectors will benefit from the blockchain's ability to support high transaction volumes at low fees.
- Digital Asset Exchange: TAN's infrastructure will also cater to digital asset exchanges, offering an ecosystem for trading cryptocurrencies, NFTs, and other digital assets with fast settlements and low transaction costs.

e. **Stablecoins and Payment Gateways**

- Stablecoin Integration: TAN will be a natural platform for the development of stablecoins, especially as adoption of stablecoin-based financial services rises. TAN's high scalability and low fees make it an ideal solution for stablecoin issuers looking to offer a fast, efficient, and secure environment for transactions.
- Cross-Border Payments: The TAN blockchain will play a key role in cross-border payments, helping to reduce the friction in international transfers, while ensuring users can send value instantly with low fees.

f. **Tokenization of Real-World Assets (RWA)**

- Asset Tokenization: TAN aims to bridge the gap between traditional finance and blockchain by enabling the tokenization of real-world assets, such as real estate, commodities, and equities. This allows fractional ownership, increased liquidity, and greater accessibility for investors worldwide.
- Supply Chain and Asset Tracking: By leveraging its infrastructure, TAN can also support use cases like supply chain management and provenance tracking, ensuring transparency in the movement of physical assets. This enhances trust and efficiency across various industries.
- Regulated Frameworks: TAN's scalable and secure environment will allow for compliance with regulatory requirements in asset tokenization, ensuring the seamless integration of RWAs into the blockchain ecosystem.

9. Roadmap

9.1 Phase 1: Network Launch and Validator Setup

Focus on network growth, establishing partnerships with businesses and developers, increasing validator participation, and promoting adoption for payments and smart contract development.

9.2 Phase 2: Ecosystem Expansion and Governance Development

Transition into global digital payment systems with real-world adoption by merchants, governments, and payment processors. Expansion of DeFi, NFTs, and stablecoins integration.

9.3 Phase 3: Layer 2 Integrations and Interoperability

Achieve widespread mainstream adoption, establish cross-chain interoperability, and solidify TAN as the preferred blockchain for global payments, DeFi protocols, and enterprise applications.

9.4 Future Enhancements

TAN aims to deliver products that align with market demands and advancements. Our roadmap includes the integration of AI agents and real-world assets (RWA). Furthermore, a key focus area is mobile hardware-based validator support, enabling validation directly from mobile devices.

10. Conclusion

10.1 Key Takeaways

TAN is not just another blockchain project — it's a visionary platform that integrates scalability, security, and economic sustainability to create a next-generation digital payment system. With its EVM compatibility, innovative consensus mechanism (BPoS), and deflationary inflation protection model, TAN offers a unique combination of features that position it as a leader in the blockchain space.

10.2 The Future of TAN

Over the coming years, TAN will serve as the backbone of a global decentralized economy, supporting everything from cross-border payments and DeFi protocols to NFT marketplaces and smart contract development. As the blockchain industry grows and evolves, TAN will continue to adapt, ensuring that it remains a scalable, secure, and user-centric network capable of handling the increasing demands of the digital economy.

With its visionary approach, robust economic model, and low transaction fees, TAN is set to play a pivotal role in the future of finance. As we move toward a more decentralized, borderless world, TAN is poised to become the preferred blockchain for payments, digital assets, and decentralized applications (dApps).

11. Appendices

11.1 Technical Specifications

TAN's proprietary Layer 1 blockchain, is designed to address the limitations of earlier networks like Bitcoin and Ethereum while offering a robust foundation for dApps and smart contracts. Below is a detailed comparison of TAN with Bitcoin and Ethereum across various dimensions:

Consensus Mechanism

- **Bitcoin (BTC):** Utilizes Proof-of-Work (PoW), which relies on energy-intensive mining to validate transactions and secure the network.
- **Ethereum (ETH):** Transitioned to Proof-of-Stake (PoS) with Ethereum 2.0, reducing energy consumption and improving scalability.
- **TAN:** Employs an BPoS mechanism, combines the benefits of Proof of Stake, with a unique Block per Reward system, thus ensuring high scalability, security, and incentivization.

Economic Protection

- **Bitcoin:** Economic security depends on mining rewards and high transaction fees during congestion, which can limit its utility for smaller transactions.
- **Ethereum:** Implements gas fees, which can become prohibitively high during network congestion, limiting usability for small-scale dApps and micro-transactions.
- **TAN:** Features low transaction fees, making it viable for both micro and high-value transactions. Its economic model is designed to encourage adoption across various industries.

Transaction Speed and Scalability

- **Bitcoin:** Processes 7 transactions per second (TPS) on average, making it unsuitable for high-volume applications.
- **Ethereum:** Can handle approximately 15–30 TPS, with scaling solutions like Layer 2 networks (e.g., Optimism, Arbitrum) improving performance.
- **TAN:** Delivers significant improvements with a block time of 5 seconds and a TPS capacity 3,200, ensuring scalability for high-demand applications like DeFi and real-world asset tokenization.

Smart Contract Functionality

- **Bitcoin:** Limited smart contract functionality, primarily designed as a store of value and medium of exchange.
- **Ethereum:** Pioneer of smart contracts, offering a robust ecosystem for decentralized applications but struggling with congestion and high costs.
- **TAN:** Combines the versatility of Ethereum's smart contract capabilities with scalability, reduced fees, and a developer-friendly environment, encouraging migration of existing dApps.

Energy Efficiency

- **Bitcoin:** High energy consumption due to its PoW consensus.
- **Ethereum:** Transition to PoS has substantially lowered energy requirements.
- **TAN:** Built natively on BPoS principles, TAN operates with minimal energy usage, while maintaining high throughput and network security.

Interoperability

- **Bitcoin:** Minimal interoperability with other blockchain networks.
- **Ethereum:** Supports cross-chain solutions through bridges and Layer 2 networks, but complexity and costs remain challenges.
- **TAN:** Fully EVM-compatible, TAN ensures seamless interoperability with Ethereum and other EVM-based networks.

User Accessibility

- **Bitcoin and Ethereum:** While widely adopted, both face challenges like high fees and slower speeds during peak usage.
- **TAN:** Offers a streamlined user experience with lower fees, faster transactions, and robust support for developers, wallet holders, and enterprises.

By addressing key limitations in earlier blockchains and building on their strengths, TAN is positioned as a next-generation Layer 1 blockchain designed to drive mainstream adoption and innovation.

11.2 Glossary of Terms

11.2.1. 51% Attack: A 51% attack (or majority attack) refers to a potential threat to the integrity of a blockchain system in which a single malicious actor or organization manages to control more than half of the total hashing power of the network, potentially causing network disruption.

11.2.2. Block: In short, the term block refers to computer files that store transaction data. These blocks are arranged in a linear sequence that forms an endless chain of blocks - hence, the term blockchain.

11.2.3. Consensus: Consensus algorithms help different computers in a blockchain network agree on what's true, even if some of them aren't playing fair. In other words, a consensus algorithm is a mechanism or set of rules used to achieve agreement in a distributed network of users (computers) that don’t necessarily know or trust each other.

11.2.4. Custody: In financial circles, custody refers to the holding of assets on behalf of a client, generally by some form of institution. The use of a custodial service can be desirable to an asset holder, as it mitigates security risks like theft or loss.

11.2.5. EVM: The Ethereum Virtual Machine (EVM) is a Turing-complete programmable machine that is the computational heart of the blockchain network’s ecosystem. One can think of the EVM as a decentralized supercomputer that uses its resources to host and run applications.

11.2.6. Gas; The term gas refers to the pricing mechanism used on the Ethereum network. Such a mechanism calculates the costs (fees) for performing a transaction or executing a smart contract operation.

11.2.7. Halving: Halving refers to a process that reduces the rate at which new cryptocurrencies are created. More specifically, it reduces the reward miners get for validating blockchain transactions. Halving events ensure that a crypto asset can follow a steady issuance rate until it eventually reaches its maximum supply.

11.2.8. PoS: Proof of Stake (PoS) is a consensus mechanism where block validators are selected based on the number of coins they are staking. In this case, the term staking refers to the act of validators committing funds to the system. So validators can only participate in the process of producing new blocks if they lock their coins.

11.2.9. Slashing: In the blockchain space, slashing is a mechanism used to penalize validators (nodes) for malicious behavior or significant errors. Slashing is used in blockchain networks that use the Proof of Stake (PoS) consensus mechanism. The penalty usually involves the reduction or loss of the validator’s staked assets.

11.2.10. Smart Contracts: Smart contracts are self-executing contracts that exist on certain blockchain networks. Their conditions and terms are written directly into lines of code. This innovative concept was introduced by Nick Szabo in 1994, but it gained significant traction with the rise of blockchain platforms like Ethereum.

11.2.11. Token: Tokens, generally speaking, are non-mineable digital units of value that exist as registry entries in blockchains. Tokens come in many different forms – they can be used as currencies for specific ecosystems or encode unique data. Additionally, some tokens might be redeemable for off-chain assets (i.e., gold, property, stocks).

11.2.12. Total Supply: Total supply refers to the number of coins or tokens that currently exists and are either in circulation or locked somehow. It is the sum of coins that were already mined (or issued) minus the total of coins that were burned or destroyed.

11.3. Legal Disclaimer

This whitepaper is for informational purposes only and does not constitute investment advice, an offer to sell, or a solicitation to buy any securities or financial instruments. Participation in the TAN ecosystem is subject to local regulations, and users are encouraged to consult with financial and legal advisors before engaging with the platform.