AN INTRODUCTION TO DANDELION

A next generation blockchain solution

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Dandelion

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Overview: Infinite Scaling, Unmatched Performance

Dandelion is a visionary blockchain platform designed to solve the key challenges of scalability, security, and decentralization. Through innovative architectural and consensus mechanisms, Dandelion offers unrestricted scalability without sacrificing decentralization or security, resolving the challenges that have long constrained blockchain innovation.

As the network evolves, Dandelion will scale from a niche, high-throughput blockchain network optimized for targeted use cases to a global, decentralized compute provider.

Decentralization, Security, Scalability

By utilizing a unique blocklattice architecture and innovative consensus mechanisms, Dandelion is able to achieve unprecedented performance and scalability while maintaining a high degree of decentralization and security.

Blocklattice Architecture

Cutting-Edge Blocklattice Architecture - Unmatched efficiency and throughput with a parallel processing core.

Client-Leader Consensus

A New Era of Consensus - Rapid finalization and unparalleled security, redefining trust in peer-to-peer transactions.

Asynchronous Clear-and-Settle

Fluid Transactions, Zero Bottlenecks - Seamless and dynamic clearing and settling across the network, enabling limitless scalability and eliminating bottlenecks and blocking.

With these innovations, Dandelion achieves over 230,000 transactions per second* per shard with sub-second finality, far exceeding traditional payment networks and other blockchain platforms.
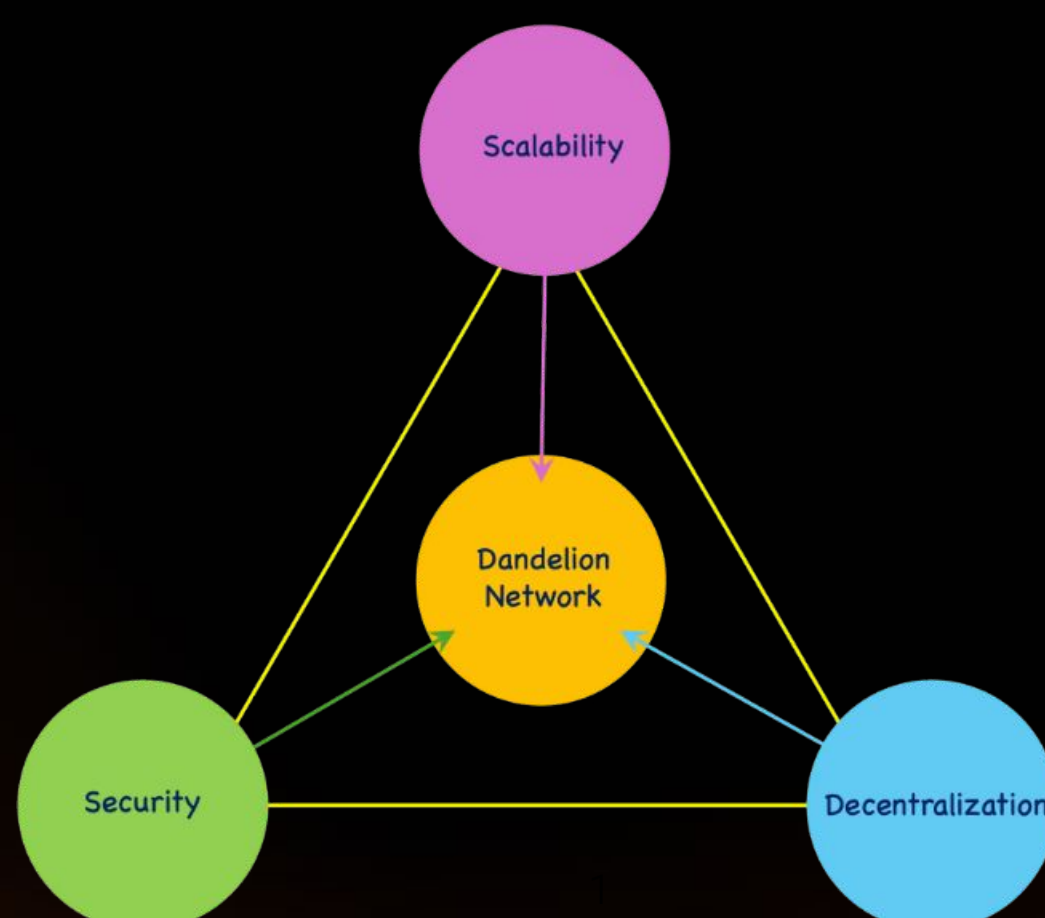
Innovation at the Core

Dandelion features and benefits extend beyond superior scalability and decentralization. Here are some other inherent features that make Dandelion stand out:

1 AI-Enhanced Performance

Intelligent Efficiency: The Future of Blockchain - Dandelion harnesses the power of AI to enhance network performance, security, and scalability in real-time.

2 Quantum-Ready Security

Built-In Defence: Uncompromised, Provable Security - Rigorous security protocols and defences against attacks in a post-quantum world.
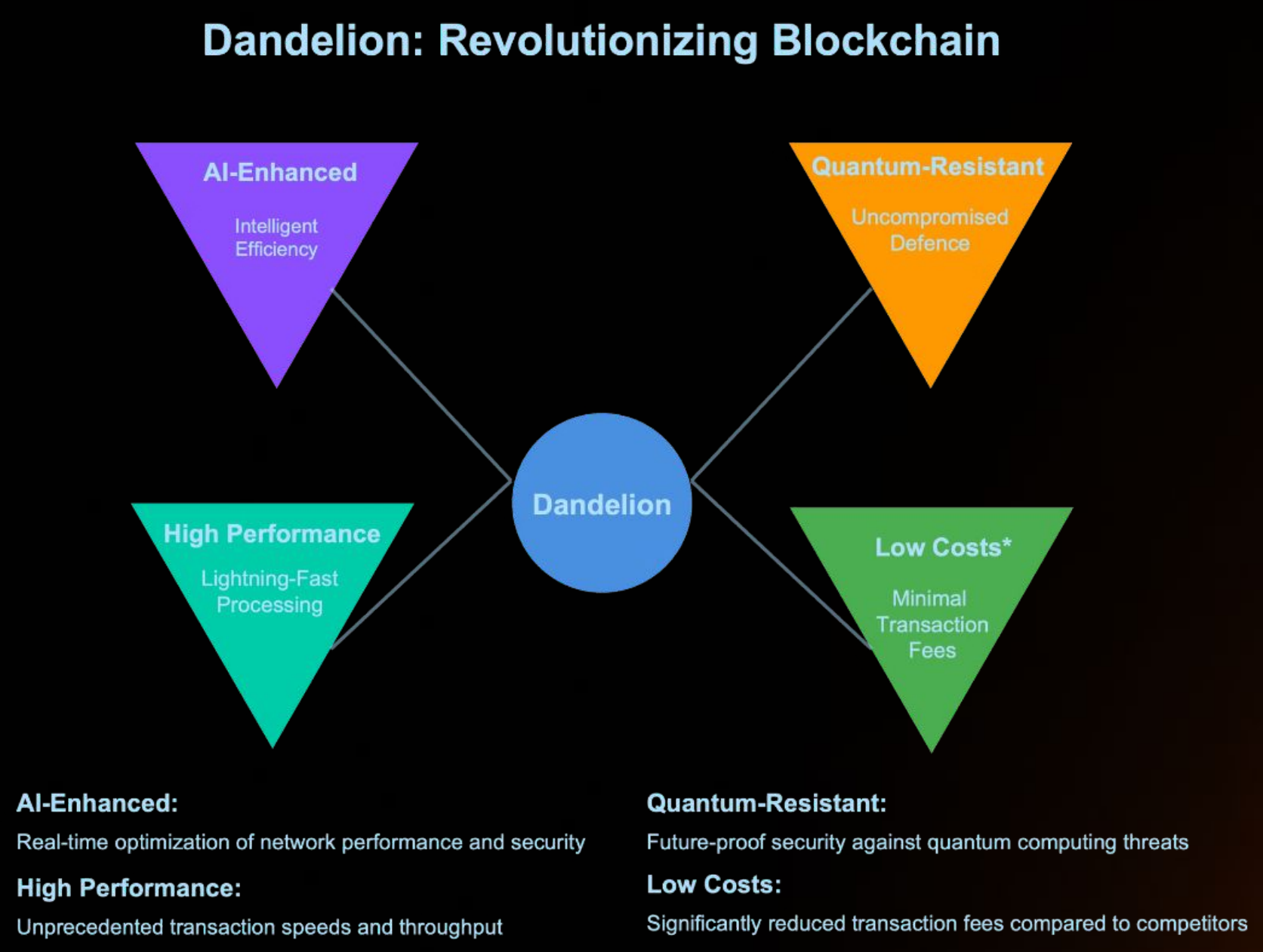
3 High Peformance

Lightning-Fast Processing: Performance Redefined - Unprecedented transaction throughput and finalization speeds, setting new benchmarks in blockchain speed and efficiency.

4 Low Costs*

Engineered for Efficiency: Transaction Fees are orders of magnitude lower than competing blockchain networks with no gas volatility. Dandelion offers a low barrier-to-entry for node operators.

Dandelion: Revolutionizing Blockchain

AI-Enhanced
Intelligent Efficiency

Quantum-Resistant
Uncompromised Defence

Dandelion

High Performance
Lightning-Fast Processing

Low Costs*
Minimal Transaction Fees

AI-Enhanced:
Real-time optimization of network performance and security

High Performance:
Unprecedented transaction speeds and throughput

Quantum-Resistant:
Future-proof security against quantum computing threats

Low Costs:
Significantly reduced transaction fees compared to competitors

* Dandelion offers significantly lower transaction costs and gas volatility than traditional blockchain networks. The network achieves this through its efficient architecture, which utilizes parallel processing and an optimized consensus mechanism, resulting in significantly lower operational costs. In addition, Dandelion vastly reduces the need for miner fees due to the absence of traditional mining, further reducing transaction costs. This low barrier to entry for node operators also contributes to minimal resource requirements, helping to keep overall network costs down.
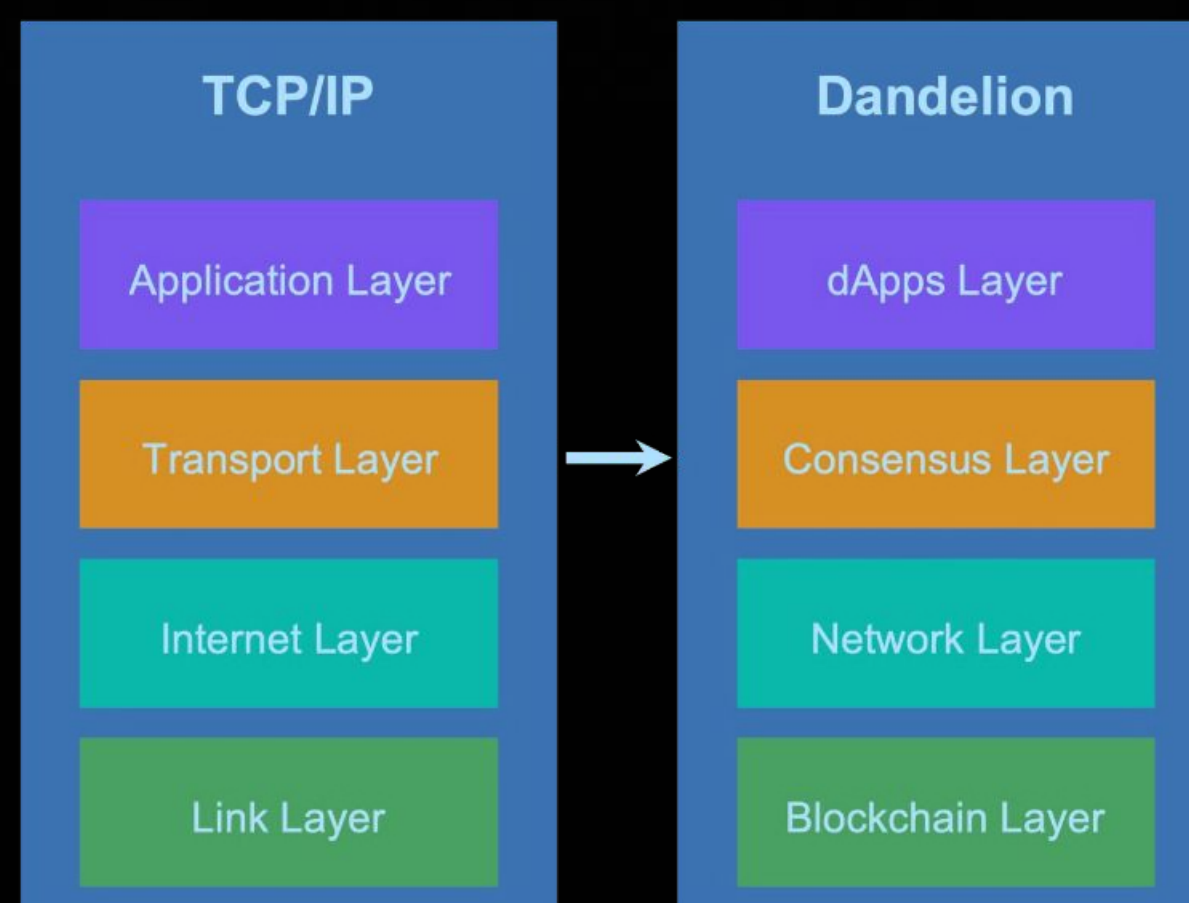
A Network of Networks

Connecting the Dots:

A **Unified Blockchain Ecosystem**. Dandelion's visionary framework enables multiple interconnected networks and applications to operate seamlessly. The network aims to provide a scalable, secure, decentralized foundation for the next generation of blockchain applications in finance, supply chain, IoT, and beyond. Its unique architecture and consensus model solve longstanding challenges in the blockchain space.

The sharding approach allows for parallel processing of transactions and storage across multiple interconnected public or private Dandelion networks, ensuring scalability and high throughput, all based on the Dandelion core.

Dandelion is designed to interact with other blockchain networks, enabling efficient cross-chain transactions without compromising security or scalability. This "Network of Networks" approach positions Dandelion as a unifying layer for the fragmented blockchain landscape.

Dandelion: The Fundamental Layer for Blockchains

TCP/IP		Dandelion
Application Layer	→	dApps Layer
Transport Layer		Consensus Layer
Internet Layer		Network Layer
Link Layer		Blockchain Layer

A Network of Networks

Just as TCP/IP enables diverse networks to communicate,
Dandelion creates a standardized protocol for blockchain
interoperability, fostering a new era of decentralized applications.

The illustration shows Dandelion analogous to TCP/IP, with Dandelion being the future base layer for blockchain network interoperability.

Traditional Blockchain Challenges

The blockchain industry has made tremendous strides since the introduction of Bitcoin in 2009, enabling new paradigms for decentralized applications and peer-to-peer value transfer. However, as blockchain networks have grown in adoption and usage, they have encountered significant challenges around scalability, security, and decentralization - the so-called "Blockchain Trilemma".

Scalability Limitations

Most blockchains can only process a limited number of transactions per second, far below what is needed for mainstream adoption. Attempts to increase throughput often come at the cost of decentralization or security.

High Costs

Network congestion leads to high transaction fees, pricing out many potential use cases and users.
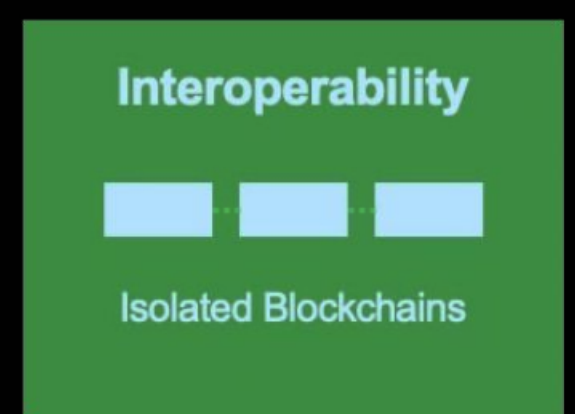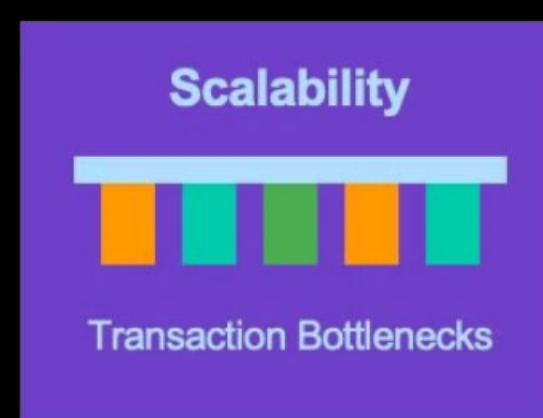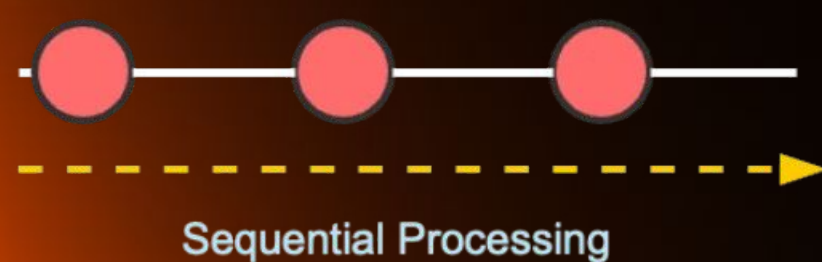
Centralization Pressures

Proof-of-Work and Proof-of-Stake consensus mechanisms tend to concentrate power among a small number of miners or large token holders over time. This undermines the core value proposition of decentralization.

Lack of Interoperability

Most blockchains operate as siloed ecosystems with limited ability to communicate or transfer value between chains.

Traditional Blockchain Structure

Sequential Processing

Scalability
Transaction Bottlenecks

Centralization
Power Concentration

High Costs
Expensive Transactions

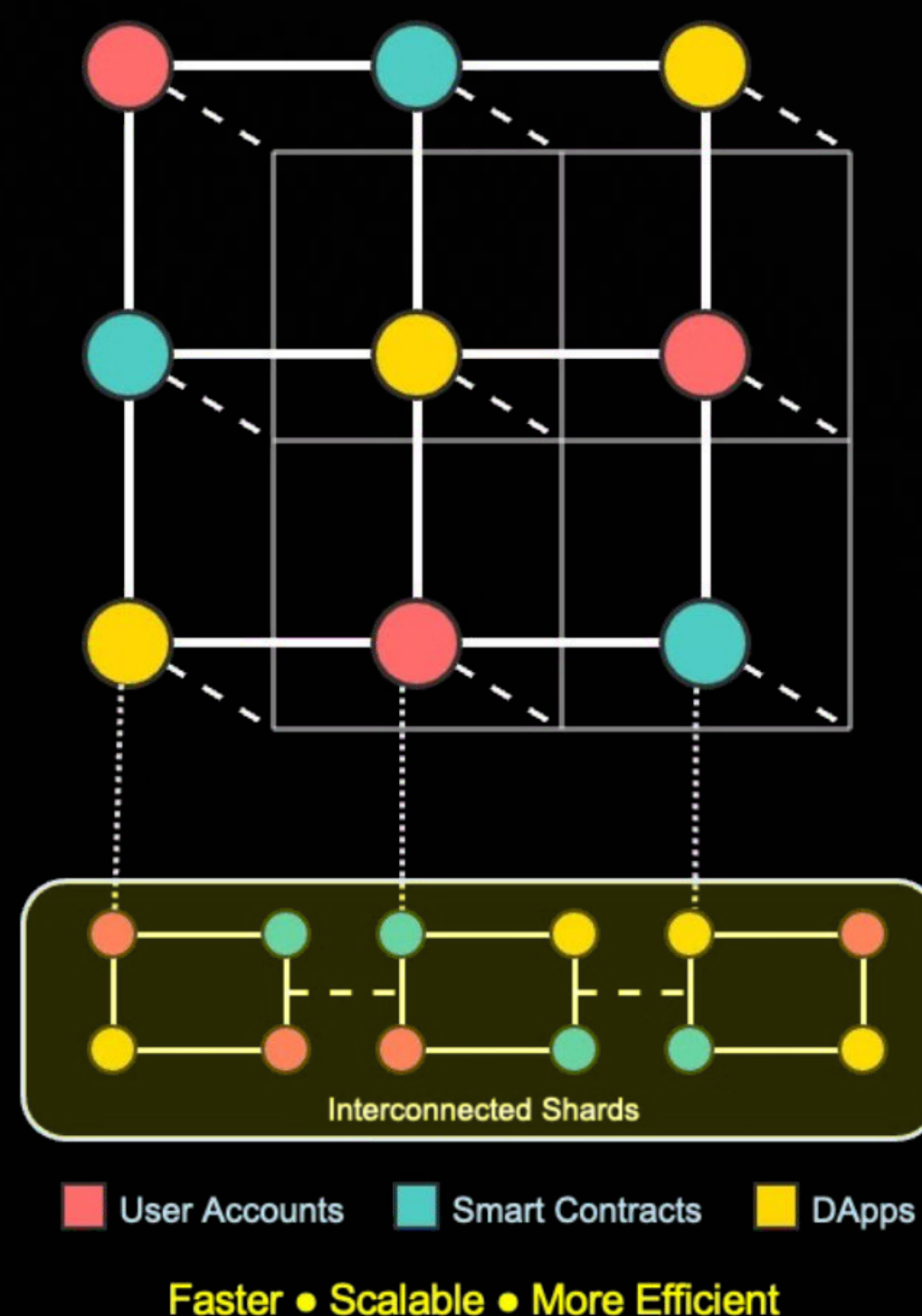**Interoperability**
Isolated Blockchains

These challenges limit widespread blockchain adoption

The Dandelion Solution

Dandelion aims address these challenges through a novel architecture that fundamentally reimagines how a decentralized network can operate. By leveraging innovations in consensus mechanisms, network sharding, and asynchronous transaction processing, Dandelion provides a highly scalable, secure, and truly decentralized foundation for the next generation of Web3 applications. Dandelion's sharding technology enables parallel processing of transactions, vastly improving the network's overall throughput. This ensures that the system can handle a high volume of transactions without compromising speed or security. Additionally, Dandelion's asynchronous transaction processing allows for increased scalability by eliminating bottlenecks and reducing latency, resulting in a frictionless user experience for Web3 applications.

Massively Parallel Processing Across Account Chains and Network Shards

Interconnected Shards

■ User Accounts   ■ Smart Contracts   ■ DApps

Faster ● Scalable ● More Efficient

Dandelion's patented consensus mechanism achieves an even distribution of block creation among all nodes, removing the need for centralized mining groups or stakers. The network also supports interchain communication, allowing for cross-chain interoperability and functionality. With Dandelion, users can enjoy fast, low-cost transactions without sacrificing decentralization or functionality.

Blocklattice Architecture

Unlike traditional blockchain systems that process transactions sequentially, blocklattice utilizes parallel processing through its lattice structure, allowing for unprecedented throughput and scalability. This design enables each account to have its own blockchain, operating asynchronously yet in concert with the broader network. As a result, blocklattice can achieve remarkable transaction speeds, potentially handling hundreds of thousands of transactions per second while maintaining decentralization and security. The system's ability to scale horizontally by adding more nodes and shards means that its performance can theoretically improve as the network grows, addressing one of the most persistent challenges in blockchain technology. This groundbreaking approach positions Dandelion as a potential game-changer for applications requiring high-volume, low-latency transactions in a decentralized environment.

Blocklattice differs from a traditional blockchain structure in several key ways, including:

- Each account maintains its own chain of transactions
- Transactions form individual links in account-specific chains
- Transactions are discretely matched and paired across accounts
- Chains are updated through an asynchronous clear/settle protocol
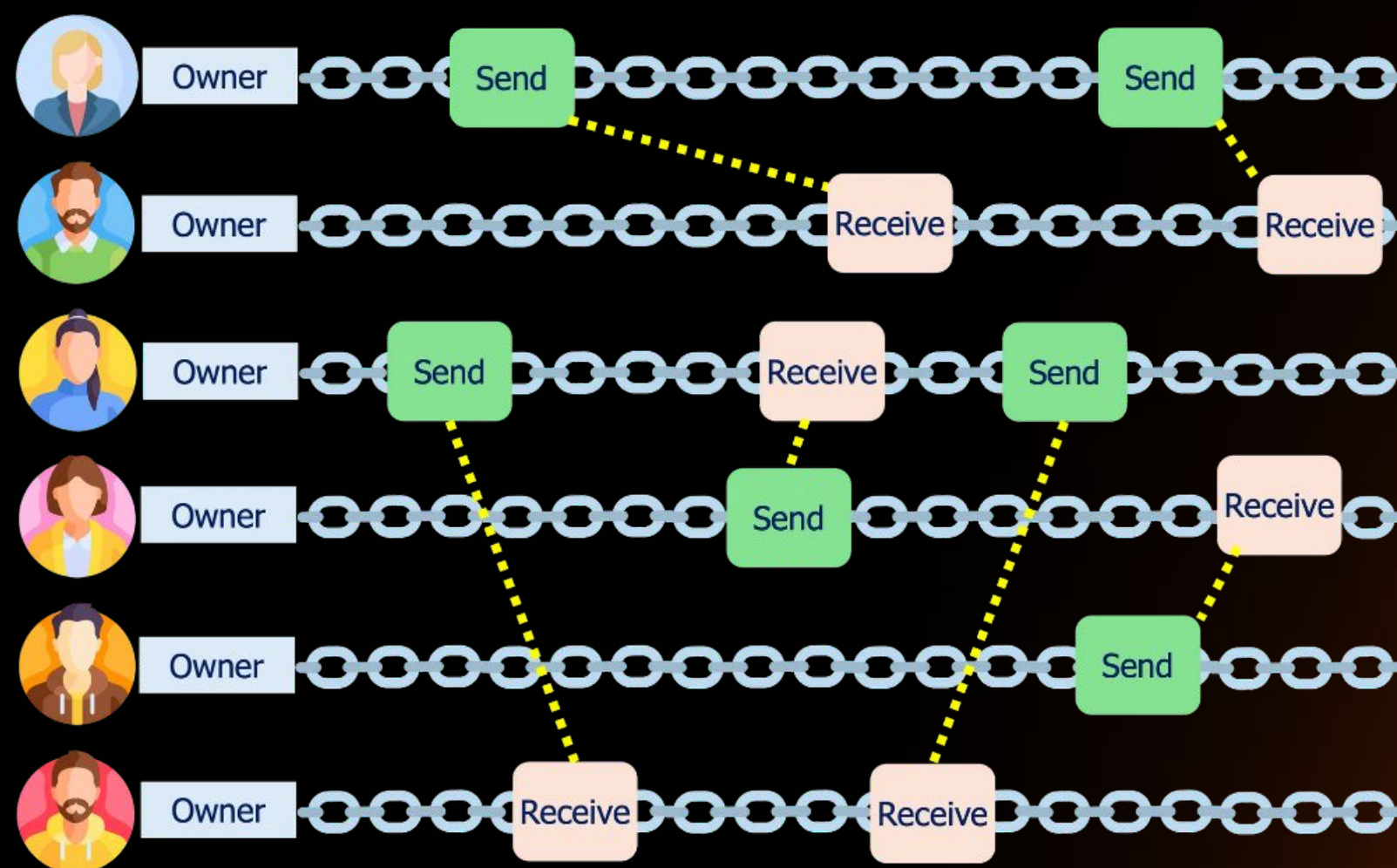
The illustration shows account owners (users of Dandelion) - each with it's own account chain - transacting with other network users.

Client-Leader Consensus

The **Dandelion** consensus mechanism revolutionizes blockchain architecture through its client-leader paradigm. In this system, each client's account is replicated across all nodes in its shard, with the client acting as the leader of its own account chain. This approach concentrates communication through the client, eliminating the need for inter-node communication. As a result, while client communication scales quadratically, node communication scales linearly, allowing the network to support a much higher node count and enhancing distributed trust.

This architecture offers several advantages: it improves overall network throughput, as the client's increased communication load doesn't limit total network capacity; it enables flexible client configurations to suit various needs; and it enhances security by limiting the impact of potential attacks to individual accounts. Dandelion's consensus mechanism creates a more scalable, efficient, and resilient blockchain infrastructure by shifting responsibilities to clients and streamlining node operations.

Dandelion's approach represents a significant departure from traditional consensus mechanisms, addressing many of the performance limitations associated with global consensus models while preserving the benefits of decentralized, trustless transaction processing.

Client Leadership
Clients act as leaders for their own account chains
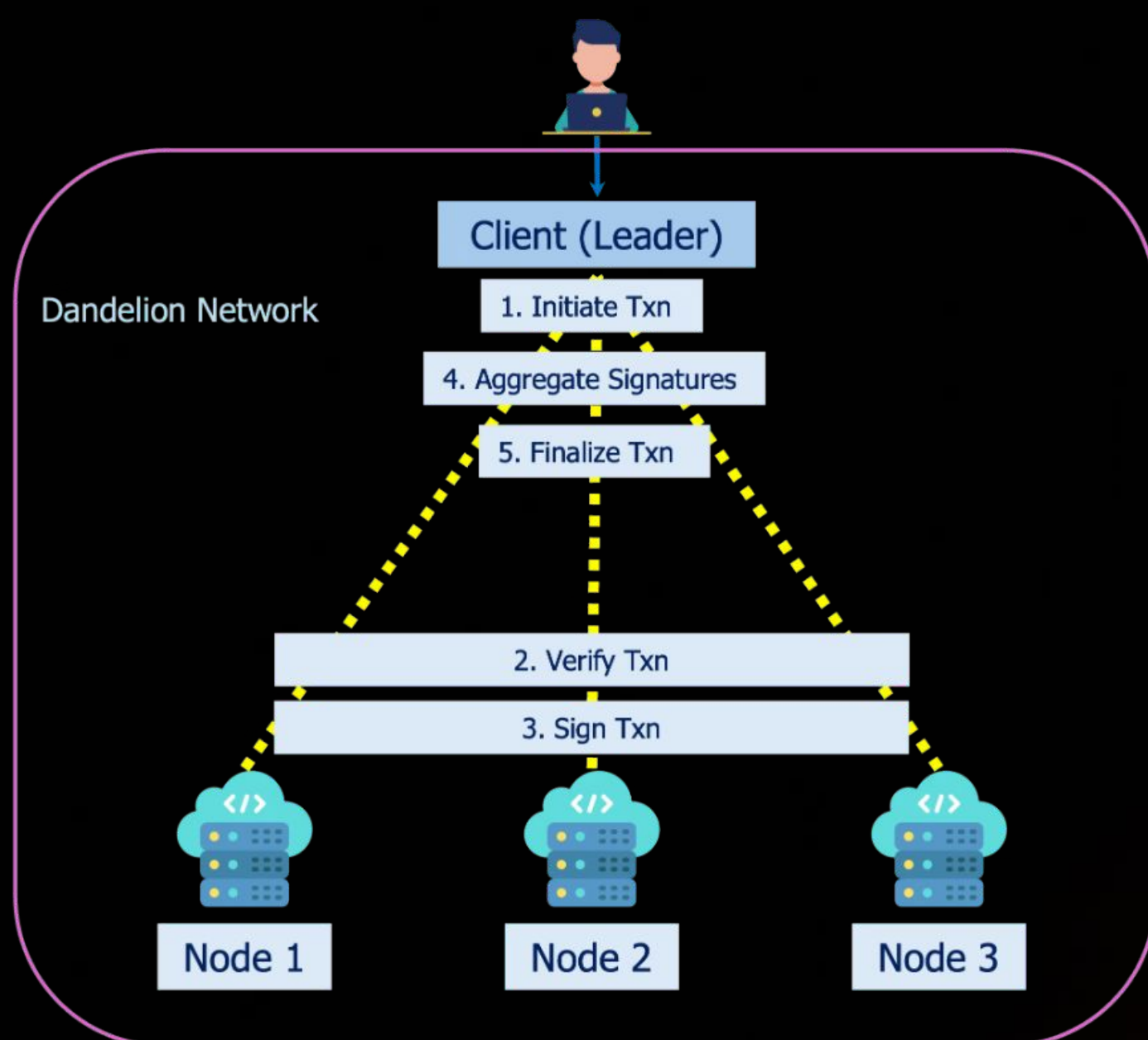
Node Communication
Nodes do not communicate directly with each other; all communications go through the client

Reduced Complexity
Offloads quadratic communication load from nodes to clients

Enhanced Decentralization
Enables high node counts and increased decentralization

Asynchronous Clear-and-Settle

Rather than relying on a centralized clearing and settlement system, Dandelion takes an asynchronous approach. The asynchronous clear-and-settle process outperforms traditional systems by decoupling transaction clearing from settlement, allowing unparalleled scalability and efficiency. This approach enables cross-shard transactions without global synchronization, eliminates the need for block confirmations, and allows the network to process transactions at the speed of the fastest available communication channels, resulting in near-instant finality and dramatically increased throughput.

In this paradigm, the sender's account is locked during transaction clearing, while the receiver's account has an unordered buffer, often referred to as a "transaction pool," for incoming transactions. The sender and receiver do not have to be connected at the same time to execute the transaction. The responsibility of settling these transactions onto their account chain lies with the receiver, which allows for transactions across shards and unrestricted scalability.

Dandelion's decoupled transaction clearing and settlement process:

- Sender's account is locked during transaction clearing
- Receiver's account has an unordered buffer ("**transaction pool**") for incoming transactions
- Receiver is responsible for settling transactions onto their account chain
- Allows transactions across shards, enabling unrestricted scalability
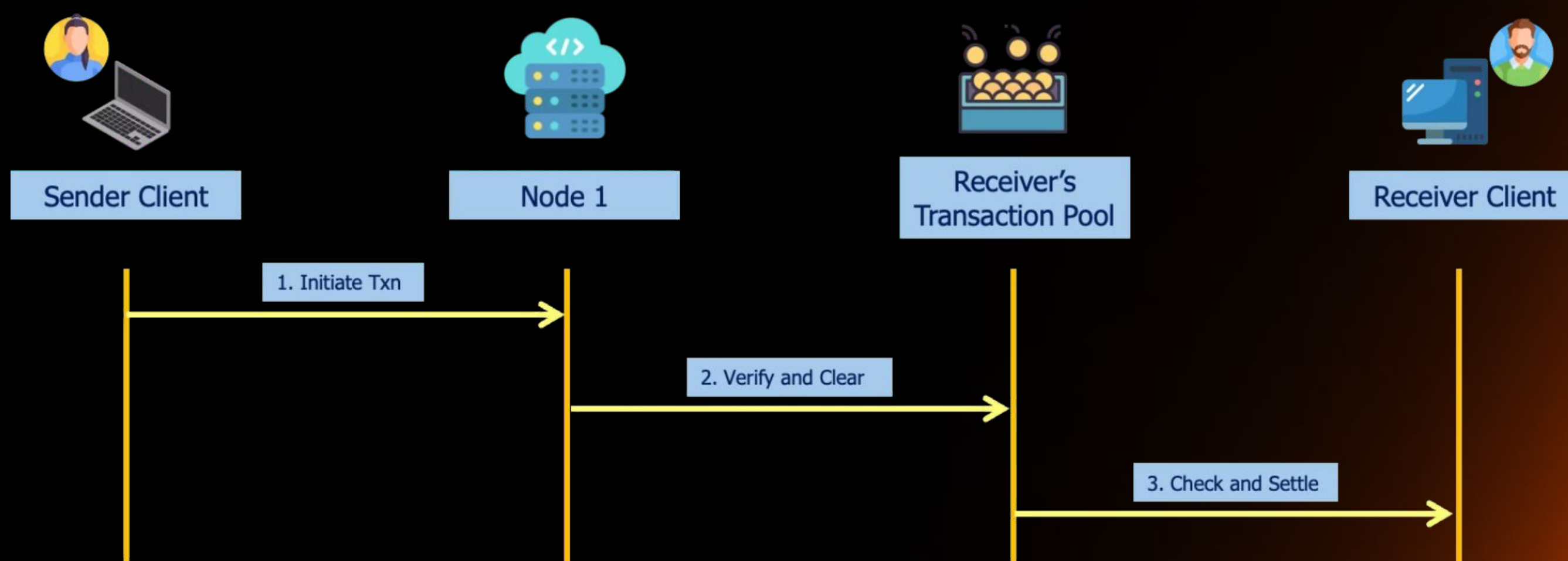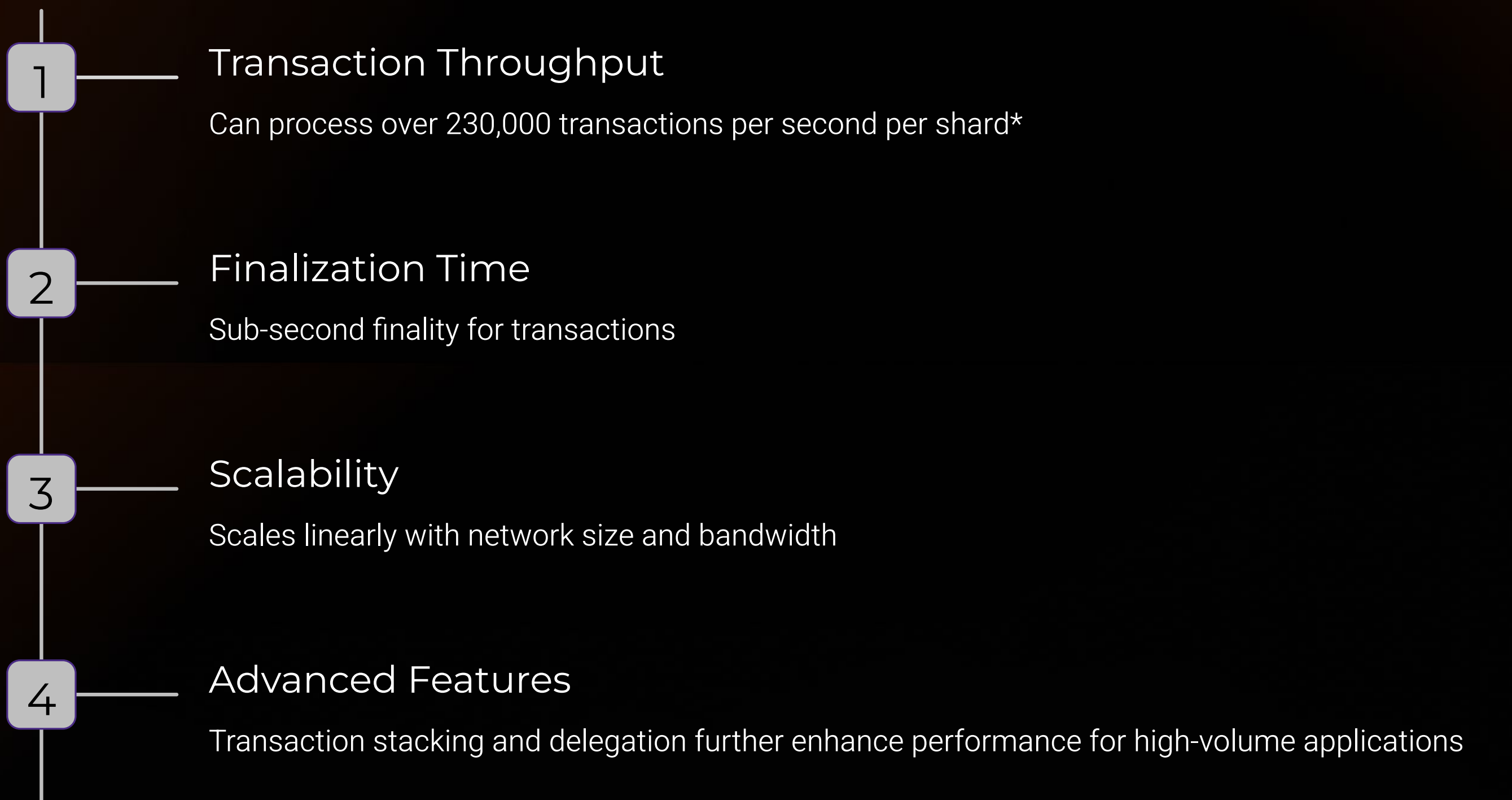

This asynchronous model enables high throughput and cross-shard transactions without compromising performance or security.

Performance and Scalability

Dandelion achieves unprecedented performance and scalability through its innovative architecture, featuring parallel dataflow processing, customizable sharding, and optimized consensus mechanisms. This design enables a throughput of 230,000 transactions per second*, near-instant finality, and limitless scalability across diverse network conditions, positioning Dandelion as a leading solution for high-performance blockchain applications.

1 Transaction Throughput

Can process over 230,000 transactions per second per shard*

2 Finalization Time

Sub-second finality for transactions

3 Scalability

Scales linearly with network size and bandwidth

4 Advanced Features

Transaction stacking and delegation further enhance performance for high-volume applications

Dandelion's transaction stacking feature allows multiple transactions to be grouped together and executed as a single transaction, maximizing throughput and reducing processing time. Additionally, the delegation feature enables users to assign transaction validation and execution to trusted third parties, further enhancing performance for high-volume applications. These advanced features, combined with the asynchronous model and parallel processing, contribute to Dandelion's ability to handle high throughput and provide unrestricted scalability.

Transactions Per Second (TPS) Comparison

	TPS
Dandelion	230,000
Visa	65,000
Ethereum	13
Bitcoin	7
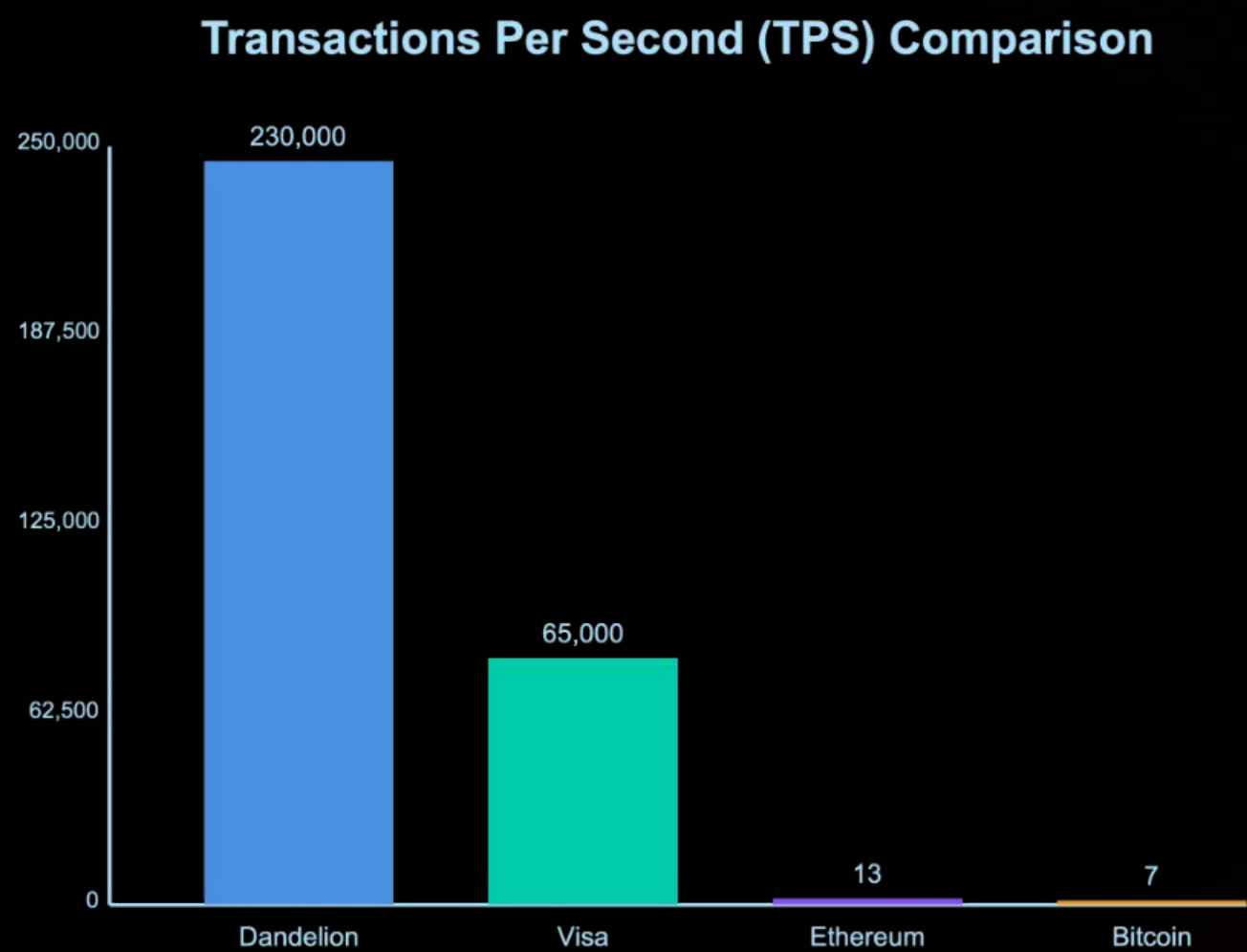
Decentralization

Dandelion achieves true decentralization through its unique 'network of networks' architecture, combining the client-leader consensus with a sharded structure. This approach enables widespread distribution of nodes, resistant to centralization pressures, while maintaining high performance and security. Dandelion's decentralized design ensures censorship resistance, equitable participation, and robust governance, making it an ideal platform for both Web3 and enterprise applications seeking genuine decentralization without compromising efficiency."

Open Membership
Any node with basic computing power can join the network, enabling true decentralization and mass adoption.

Client-Leader Consensus
Offloads communication complexity from nodes to clients, allowing for tens of thousands of participating nodes.
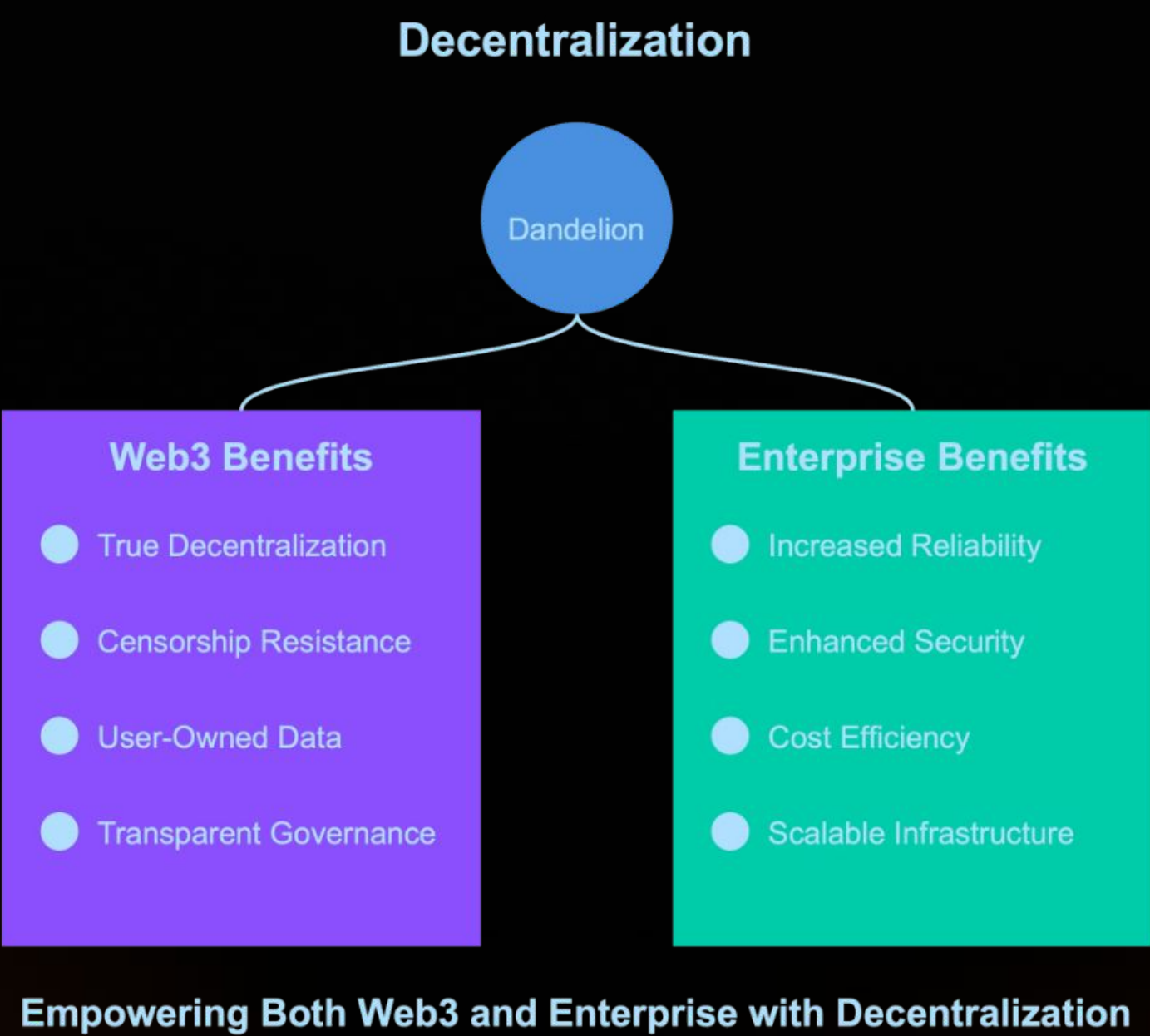
Resistance to Centralization
Network design inherently resists the centralizing forces of economies of scale that have affected other blockchain networks.

Trustless Validation
The network ensures trustless validation through the use of consensus algorithms, eliminating the need for intermediaries and promoting decentralization.

Fault Tolerance
The decentralized nature of the network allows for fault tolerance, as it is not dependent on a single point of failure. This ensures that the system remains operational even in the event of individual node failures.

Decentralization

Dandelion

Web3 Benefits
- True Decentralization
- Censorship Resistance
- User-Owned Data
- Transparent Governance

Enterprise Benefits
- Increased Reliability
- Enhanced Security
- Cost Efficiency
- Scalable Infrastructure

Empowering Both Web3 and Enterprise with Decentralization

Security Features

Dandelion's security features provide provable, post-quantum, and Byzantine fault-tolerant protection, leveraging AI for enhanced anomaly detection, automated threat response, and predictive maintenance.

Provable Security

Mathematically proven security model published in the peer-reviewed Mathematics journal in 2022*.

Designed For Quantum-Resistant Cryptography

Dandelion employs cryptography that is designed to future-proof against attacks by quantum computers. This is a critical feature, as the rise of quantum computing could potentially render many existing cryptographic methods obsolete.
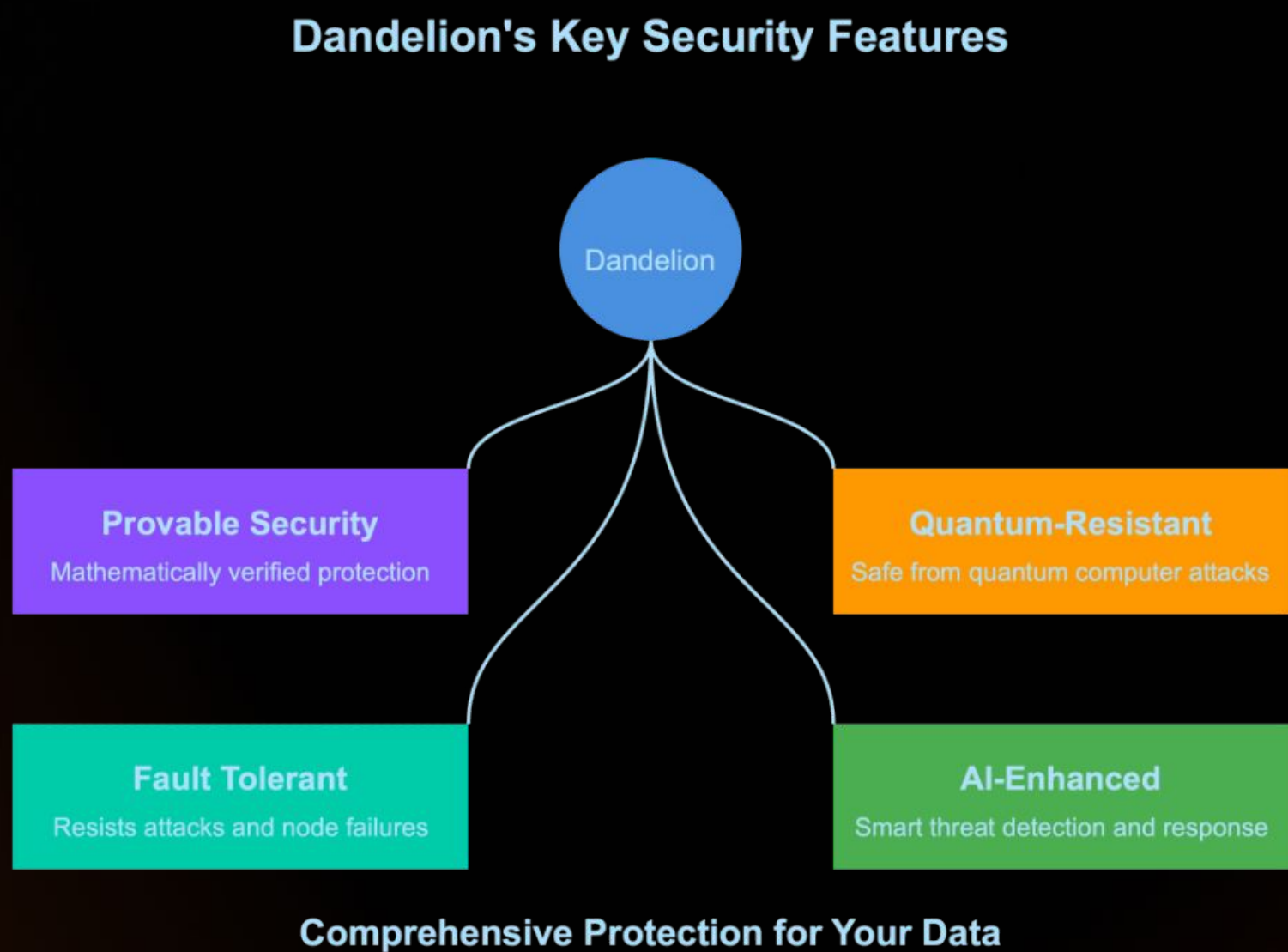
Byzantine Fault Tolerance

Maintains network integrity even if up to 1/3 of nodes are malicious or faulty.

AI-Enhanced Security

Leverages AI for anomaly detection, automated threat response, and predictive maintenance.

Dandelion's Key Security Features

Dandelion

| Provable Security | Quantum-Resistant |
| Mathematically verified protection | Safe from quantum computer attacks |

| Fault Tolerant | AI-Enhanced |
| Resists attacks and node failures | Smart threat detection and response |

Comprehensive Protection for Your Data

* For more information, see the "*On the Security of the Dandelion Protocol*" paper published in Mathematics journal: https://www.mdpi.com/2227-7390/10/7/1054
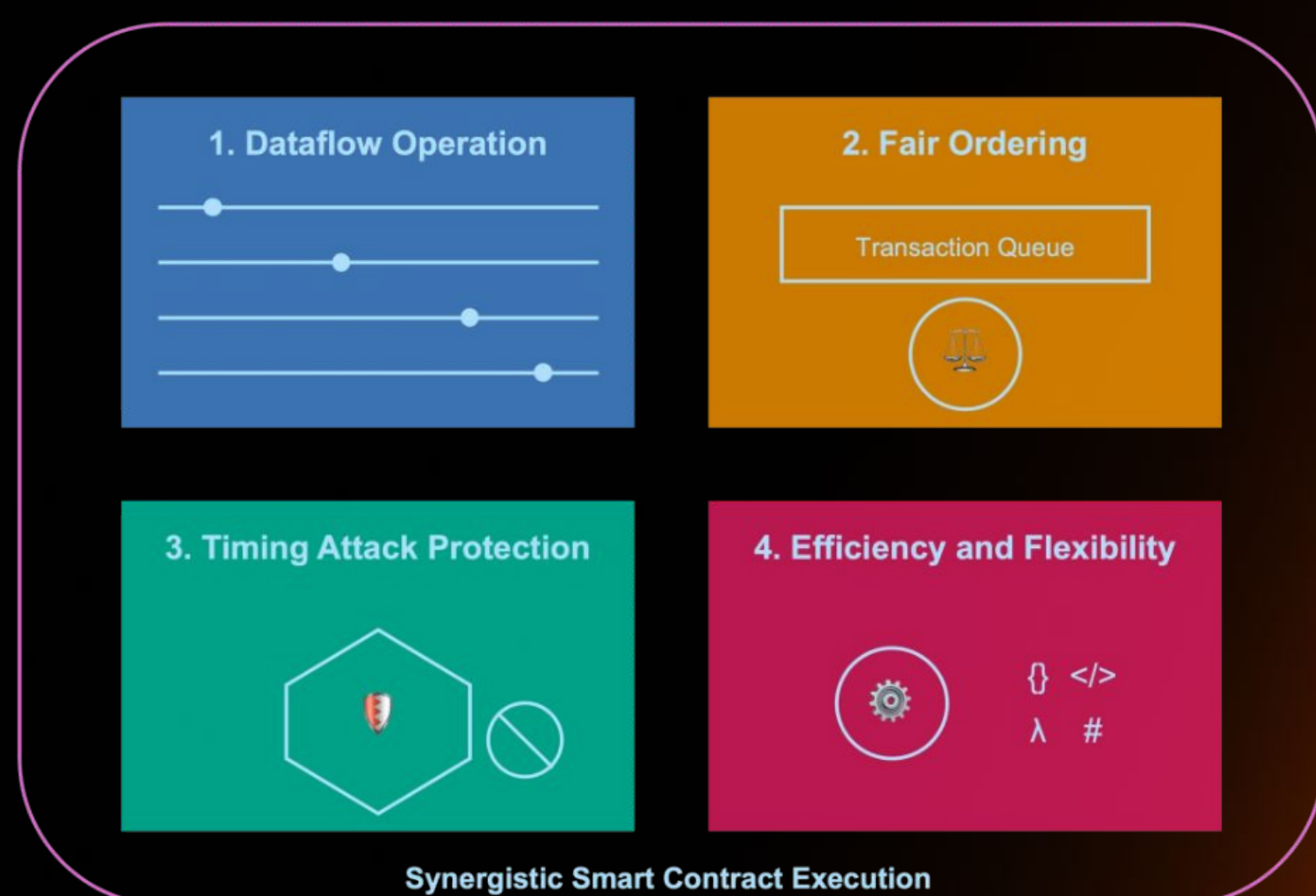
Smart Contracts on Dandelion

The Dandelion network provides a powerful, modular platform for executing smart contracts with several key advantages:

1 **Dataflow Operation**
Leverages inherently parallel architecture to enable dataflow-based smart contract execution, allowing for fully parallel operation without risks of deadlocks or livelocks.

2 **Fair Ordering**
Implements fair ordering of incoming transactions and provides a mechanism to fairly disambiguate "simultaneous" submissions, preventing manipulation of transaction ordering.

3 **No Latency Arbitrage**
Eliminates the possibility of exploiting small timing differences, ensuring fairness in contract execution.

4 **Efficiency and Flexibility**
Executes smart contracts with high efficiency and supports a wide range of programming languages and paradigms.

Interconnected Smart Contract Features

Dandelion achieves efficiency and flexibility through its streamlined execution of smart contracts, enabling developers to write code in various programming languages and paradigms. Smart contracts are built using a visual editor with support for integration features, including APIs and webhooks, prioritized.

Dandelion Web3 Wallet

A New Entry Point for Web3 Wallets

The Dandelion Web3 wallet represents a major advancement in blockchain technology, expertly merging financial transactions with messaging capabilities. This innovative integration creates a unified platform that facilitates optimised peer-to-peer payments and enables rapid, Twitter-like communication. With its focus on user empowerment, the Dandelion wallet introduces features such as user discovery and user-led privilege management, setting new standards for accessibility and control in the Web3.

Integrated Peer-to-Peer Payments
Seamlessly transfer funds between users directly without intermediaries.

End-to-End Encrypted Chat
Communicate securely with other users through encrypted messaging.

Hyperscalable Broadcasting
Deliver messages at rapid speeds comparable to social media platforms.

User Discovery
Effortlessly find and connect with other users on the platform.

User-Led Privilege Management
Empower users to control their access and permissions within the system.

Multi-Token Support
Enabling projects to create and manage their own custom tokens with ease.

Dandelion Web3 Wallet: Unified Finance and Communication

Peer-to-Peer Payments ●↔●

Hyperscalable Messaging

Dandelion Web3 Wallet

User Discovery

User-Led Privilege Management
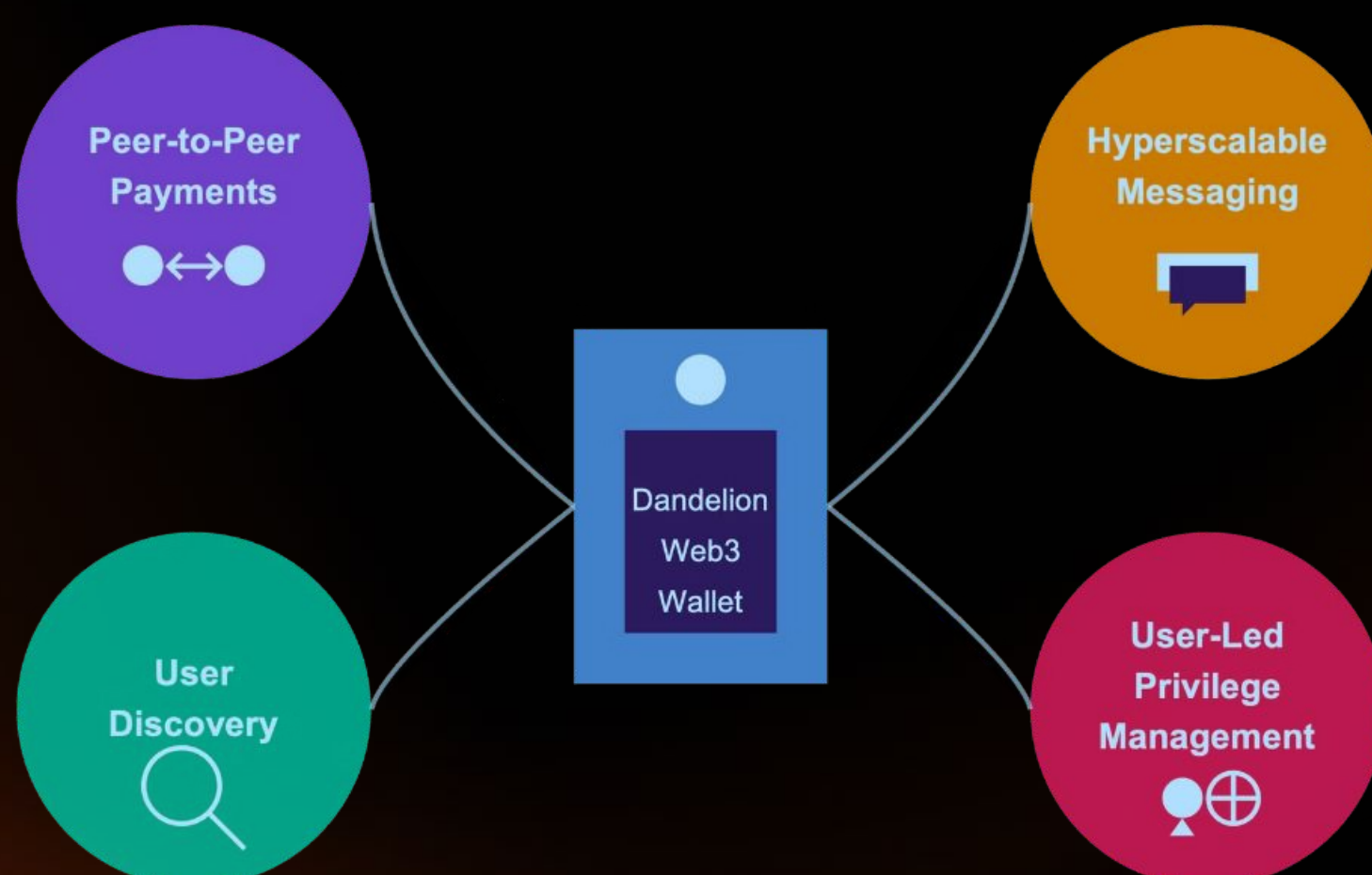
Dynamic NFTs

A New Paradigm for Trading Real-World Assets

Dandelion introduces Dynamic NFTs (dNFTs) that combine the unique, immutable attributes of traditional NFTs with updatable properties, offering:

1. **Permanent Core**: Unchangeable unique identifiers and essential, immutable data.

2. **Mutable Attributes**: Specific properties updatable over time, subject to defined rules..

3. **Partial Fungibility**: Some aspects can be divisible, interchangeable, or tradable.

dNFTs are valuable in trading certain types of real-world assets. Dandelion has several exciting partner projects keen to exploit this new technology, including in the fast-growing carbon capture and sustainability markets.

Key benefits of dNFTs include:

- Preserves asset provenance and authenticity

- Enables real-time updates on asset status and performance

- Allows for fractional trading of asset quantities

- Makes real-world assets more liquid, bringing liquidity on-chain and providing previously untapped liquidity sources for market participants, unlocking markets for potential derivative products

- Enhances transparency and traceability in the market

Dynamic NFTs: Fungible and Non-Fungible Properties
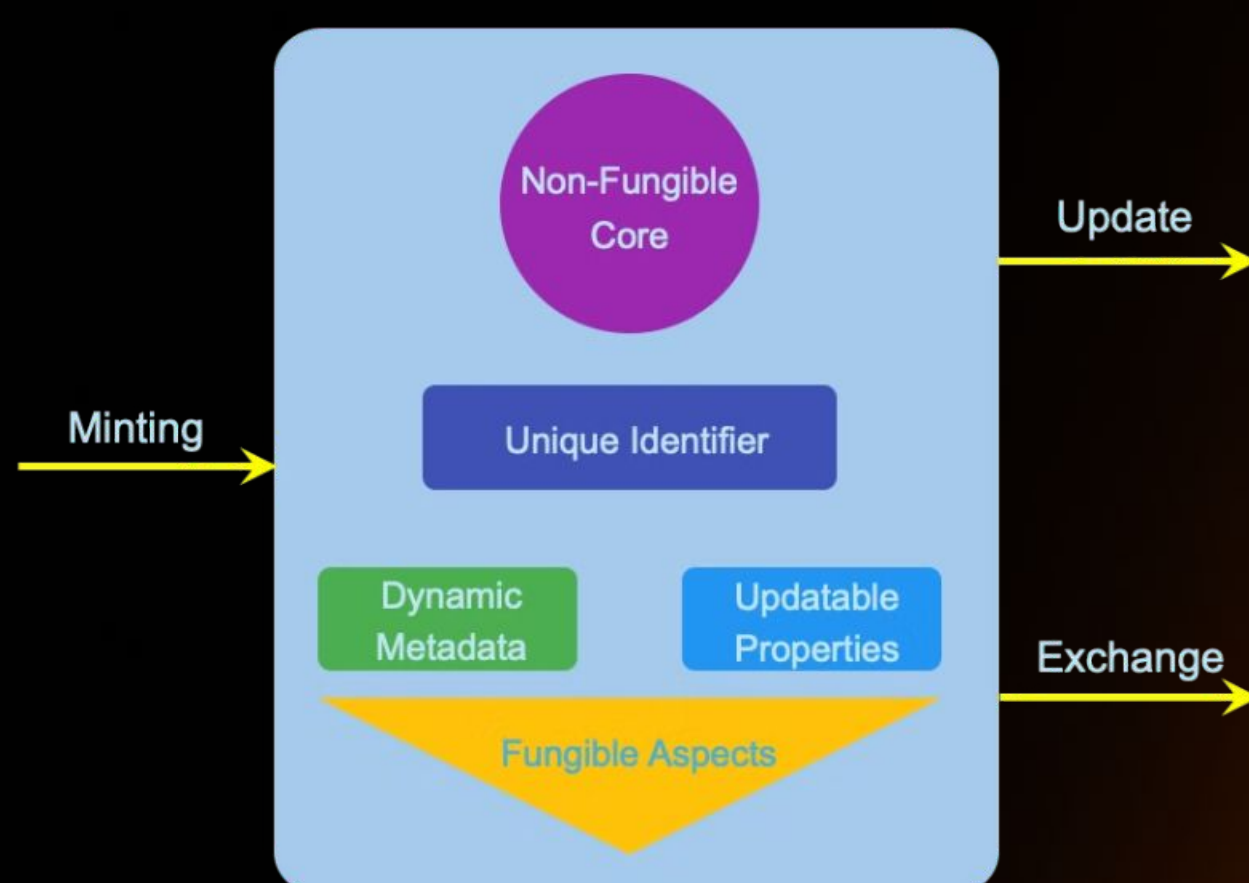
dNFTs can improve efficiency and flexibility in trading real-world assets while maintaining necessary accountability and verification standards. This is applicable to various industries where asset tracking, divisibility, and ongoing certification are required.

Real-World Use Cases: Traditional Finance (TradFi)

Dandelion's high throughput and low transaction costs enable near-instantaneous international money transfers at a fraction of the cost of traditional systems. By leveraging its efficient execution and scalable infrastructure, Dandelion enables cross-border payments that are both fast and cost-effective. The network's high throughput reduces the settlement time for international money transfers. At the same time, its low transaction costs make it an attractive solution for individuals and businesses looking to streamline their cross-border payment processes. With Dandelion, traditional finance institutions can leverage blockchain technology to improve the efficiency and affordability of their cross-border payment services.

The network's fast finality and fair ordering of transactions make it ideal for high-frequency trading and securities settlement. Dandelion's blockchain technology has the potential to revolutionize the securities trading industry. Using blockchain technology eliminates the need for a middleman, reduces costs, and improves the security and transparency of the process. Furthermore, with Dandelion's scalable infrastructure and fast finality, transactions can be settled in near real-time.

Dandelion's scalability and customizable sharding features allow for the creation of networks suitable for stablecoin implementations. This is a critical capability as the demand for blockchain-based digital currencies continues to grow.

By leveraging Dandelion's advanced architecture, developers can build stablecoin networks that can scale to meet the needs of millions of users and transactions. The customizable sharding features enable the creation of dedicated chains optimized for stablecoin use cases, ensuring high performance and reliability.

Decentralized Finance (DeFi)

- Decentralized Exchanges (DEXs): Dandelion's high throughput and low latency enable the creation of high-performance DEXs with minimal slippage.
- Lending and Borrowing Platforms: The network's fast finality and cross-chain capabilities allow for efficient, multi-asset lending protocols.
- Yield Farming and Liquidity Mining: Dandelion's low transaction costs make complex DeFi strategies more accessible and profitable for users.
- Asset Tokenization: With its customizable sharding capabilities, Dandelion enables the tokenization of real-world assets, such as real estate or commodities, unlocking liquidity and fractional ownership opportunities.
- Automated Market Makers (AMMs): Dandelion's fast and secure blockchain infrastructure supports the creation of efficient AMMs, enabling efficient token swapping and liquidity provision for DeFi users.

In addition, Dandelion's robust smart contract capabilities and interoperability allow for increased composability and flexibility in DeFi applications, leading to further innovation and growth in the ecosystem. Its decentralized governance model also ensures security, stability, and community-driven decision-making for the platform and its users.

Powering DeFi Innovation

Decentralized Exchanges (DEXs)
High Performance
Minimal Slippage

Lending and Borrowing
Fast Finality
Multi-Asset Support

Dandelion

Yield Farming & Liquidity Mining
Low Transaction Costs
Complex Strategies

Automated Market Makers
Efficient Infrastructure
Seamless Token Swaps

Asset Tokenization
Customizable Sharding
Fractional Ownership

Key Features: Smart Contracts | Interoperability | Composability | Decentralized Governance

Supply Chain, IoT, and Identity

Supply Chain Management

Dandelion enables real-time tracking of goods, accurate inventory management, and integrated supplier verification across complex supply chains.

Dandelion's transparent and secure ledger can revolutionize supply chain management by enabling real-time tracking and verification of goods at each stage in the supply chain. This can greatly reduce inefficiencies, improve transparency, and enhance trust among participants.

Internet of Things (IoT)

The network's scalability and low transaction costs make it suitable for processing millions of data points from IoT sensors in smart cities, industrial settings, and connected vehicles.
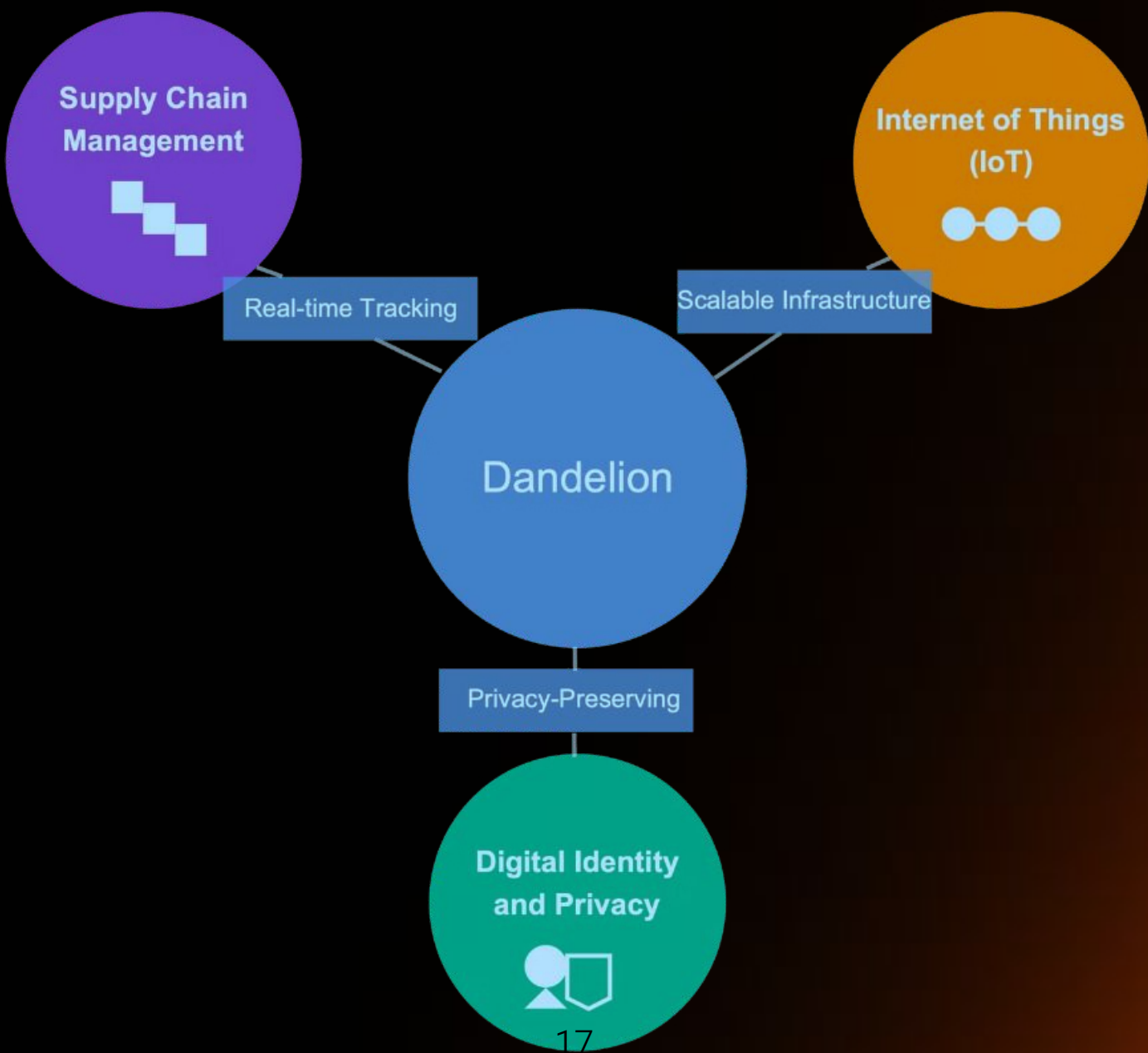
Dandelion's efficient and scalable infrastructure allows for integration of IoT devices, enabling real-time data processing, secure communication, and automated transactions. This can significantly enhance the capabilities and effectiveness of IoT applications, enabling smart cities, industrial settings, and connected vehicles to operate more efficiently and securely.

Digital Identity and Privacy

Dandelion supports the creation of decentralized identity systems and enables privacy-preserving applications in healthcare, finance, and other sensitive sectors.

These decentralized identity systems ensure that individuals have control over their personal information and can choose which data they share with different entities. By providing a secure and private foundation, Dandelion can facilitate the development of innovative applications that require sensitive data while still protecting user privacy.

Dandelion: Enabling Real-World Solutions

Supply Chain Management

Internet of Things (IoT)

Real-time Tracking

Scalable Infrastructure

Dandelion

Privacy-Preserving

Digital Identity and Privacy

17

Key Benefits: • Enhanced Transparency • Improved Efficiency • Secure Data Management • Scalable Solutions

The Dandelion Token

Dandelion utilizes a carefully designed tokenomics model to fund network operations, incentivize network participation, ensure stability, and drive adoption. At the core of this model is the Dandelion utility token, which plays a crucial role in the network's operations and economic structure:

The **$DDLN** Token*

Dandelion has its own native token, $DDLN, with a total supply of 50 million tokens minted over the first 25 years of the life of the network.

Minting Schedule

In the first year, 10 million $DDLN tokens will be minted. Annual minting will decrease by 20% each year, incentivizing early participation.

Rewarding Node Operators

$DDLN tokens will be awarded to node operators who contribute computing resources to power Dandelion.

Powering the Network

The $DDLN token enables transactions and interactions between participants, serving as the medium of exchange within the Dandelion ecosystem.

Organic Decentralization

As Dandelion grows and more nodes are added, the token supply becomes increasingly decentralized.

Burning for Utility

Users can burn $DDLN tokens to power transactions and computations on Dandelion.

Value Appreciation**

With the expected growth of Dandelion, demand for the $DDLN token is likely to increase, potentially leading to price appreciation for token holders.

* $DDLN tokens will be issued pursuant to the laws and regulations of the British Virgin Islands and the Cayman Islands.

** As with any investment in cryptocurrency or technology startups, the potential for value appreciation is inherently dependent on broader market conditions and cannot be guaranteed.

Conclusions

Dandelion represents a significant leap forward in blockchain technology, addressing critical challenges that have limited the scalability and adoption of existing platforms. By resolving the Blockchain Trilemma, Dandelion provides a foundation for truly decentralized, secure, and scalable applications that can drive innovation across various industries.

As the blockchain landscape continues to evolve, Dandelion's cutting-edge solutions to long-standing problems make it a promising platform for developers, enterprises, and users seeking a more efficient, secure, and scalable blockchain infrastructure. The network's ability to adapt and improve through its AI-enhanced management and flexible architecture ensures its relevance and competitiveness in the rapidly advancing world of distributed ledger technologies.

Furthermore, Dandelion's focus on academic collaboration and research provides a valuable platform for researchers to contribute to the improvement of the Dandelion protocol. Through open collaboration, researchers can propose innovative ideas and help drive the continuous evolution of blockchain technology. By embracing this collaborative approach, Dandelion ensures that it remains at the forefront of advancements in the field.
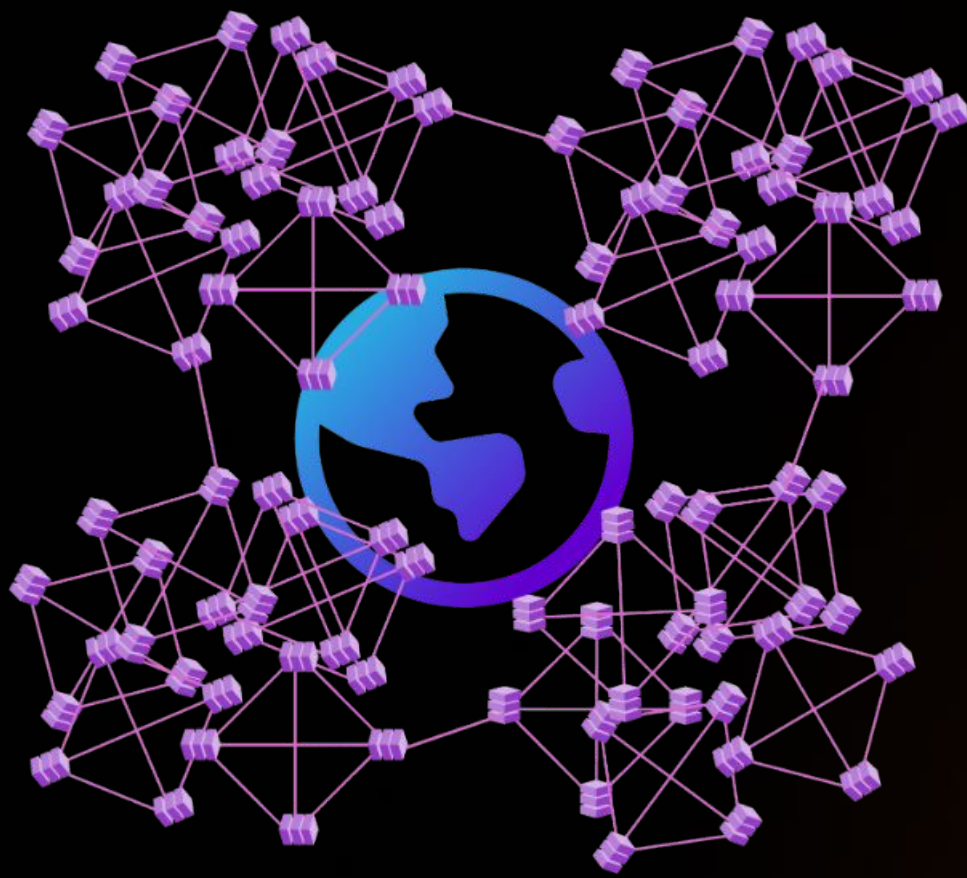
Frequently Asked Questions

Q: What is Dandelion?

A: The Dandelion network is a next-generation blockchain platform designed to solve key challenges facing current blockchain systems, namely scalability, security, and decentralization. It uses innovative architectural and consensus mechanisms to achieve high performance and scalability while maintaining strong security and decentralization.

Q: How does Dandelion differ from other blockchain networks?

A: Dandelion uses a unique blocklattice architecture instead of a traditional blockchain, employs a novel client-leader consensus mechanism, and implements an asynchronous clear-and-settle paradigm. These innovations allow for parallel processing, high node counts, and unrestricted scalability.

Q: What are the key benefits of Dandelion?

A: Key benefits include:

- High scalability (over 230,000 transactions per second per shard)
- Sub-second finality
- Low transaction costs
- Strong decentralization (supports tens of thousands of nodes)
- Quantum-resistant security
- Cross-chain interoperability

Q: How does Dandelion achieve such high transaction throughput?

A: Dandelion's blocklattice architecture allows for parallel processing of transactions. The client-leader consensus model and asynchronous clear-and-settle mechanism further enable high throughput without sacrificing security or decentralization.

Q: Is Dandelion secure against quantum computing attacks?

A: Yes, Dandelion employs post-quantum cryptographic algorithms to ensure long-term security against potential attacks using quantum computers.

Q: How does Dandelion handle smart contracts?

A: Dandelion supports smart contracts with several unique features:

- Dataflow operation for fully parallel execution
- Fair ordering of transactions
- Prevention of latency arbitrage

Frequently Asked Questions

Q: What is the role of the DDLN token in the network?

A: The DDLN token is the native cryptocurrency of Dandelion. It is used for transaction fees, rewarding node operators, and as a medium of exchange within the network ecosystem.

Q: How can I participate in the Dandelion network?

A: There are several ways to participate:

- Run a node to help secure and decentralize the network
- Use Dandelion-based applications
- Develop applications on the Dandelion platform
- Identify real-world use cases that benefit from Dandelion's unique technology

Q: Has Dandelion's security been formally verified?

A: Yes, Dandelion's security has been mathematically proven in a peer-reviewed academic paper published in Mathematics 2022. The full analysis is included as an appendix to the whitepaper.

Q: How does Dandelion compare to traditional payment networks like Visa?

A: Dandelion can process over 230,000 transactions per second per shard, far exceeding Visa's peak capacity of about 65,000 TPS. Dandelion also offers sub-second finality, lower fees, and the benefits of decentralization and programmability.

Q: Is Dandelion environmentally friendly?

A: Yes, Dandelion does not use energy-intensive proof-of-work mining. Its efficient consensus mechanism and parallel processing allow for high performance with minimal energy consumption compared to traditional blockchain networks.

Glossary of Terms

Asynchronous Clear-and-Settle: A paradigm that decouples transaction clearing and settlement, enabling unrestricted scalability across shards.

Blocklattice: The core data structure used by Dandelion, which allows for parallel processing of transactions and smart contracts.

Byzantine Fault Tolerance: The ability of the network to maintain integrity even if up to 1/3 of nodes are malicious or faulty.

Chain: A set of hash-linked balances resulting from successive clear and/or settle operations.

Clear: An operation in which an amount is debited from an account, creating a new balance.

Client: A network-connectable device that holds the private key to an account and executes the processes required to clear and settle transactions.

Client-Leader Consensus: A novel consensus mechanism that offloads communication complexity from nodes to clients, allowing for a highly decentralized network of tens of thousands of nodes.

Dynamic NFTs (dNFTs): Novel NFTs that contain both immutable and mutable characteristics or attributes.

Fee: An amount charged for a transaction, which is burned by including it in the debited amount in clear operations but not in the credited amount of the matching settle operation.

Minting: The process by which nodes are rewarded tokens for execution of their activities.

Network: The full set of all shards in the Dandelion ecosystem.

Node: A computer that earns tokens through ongoing maintenance of a dynamic subset of accounts and verifying/authorizing transactions involving its designated accounts.

Quantum Resistant: Dandelion is designed to actively resist, partially or wholly, future quantum computing attacks.

Shard: A subset of nodes that maintain and cross-verify the same subset of accounts.

Glossary of Terms

Settle: An operation in which an amount is credited to an account, creating a new balance.

Settled Transaction: A complementarily matched pair of exactly one clear and one settle operation, occurring asynchronously.

Smart Contract: Independent pieces of code running on the network with the property of distributed trust.

Token: The Dandelion network's fungible currency exchanged between accounts through transactions.

Transaction: An incoming, unsettled transaction stored in the transaction pool.

Transaction Pool: An unordered buffer associated with an account-chain which stores incoming transactions prior to settlement.

Transction Set: A collated and serialized list of transactions

Transaction Linked Directed Acyclic Graph (TLDAG): The underlying blocklattice structure of the Dandelion network, which differs from traditional blockchain architectures.

Appendix: Blocklattice vs Blockchain

Dandelion's blocklattice architecture offers several advantages over traditional blockchain systems, addressing fundamental limitations in structure, processing, and scalability. Some of the key differences include:

Structure

- **Blockchain**: Single, linear chain of blocks containing multiple transactions.
- **Blocklattice**: Multiple account-specific chains, each transaction is its own "block", enabling high parallelism, greater transaction throughput, and eliminating bottlenecks.

Consensus Scope

- **Blockchain**: Global consensus on the entire chain.
- **Blocklattice**: Consensus within shards for individual transactions. The shard-based consensus significantly reduces the computational and communication overhead, allowing for faster and more efficient transaction validation.

Scalability

- **Blockchain**: Often struggles with scalability due to global consensus requirements.
- **Blocklattice**: Designed for significantly better scalability through parallel processing. The inherent parallelism and sharding approach of Dandelion's blocklattice allows it to scale more effectively, handling a much higher transaction volume without performance degradation.

Transaction Processing

- **Blockchain**: Batches transactions into blocks.
- **Blocklattice**: Processes individual transactions allowing for faster confirmation times and more efficient handling of high-volume transaction scenarios.
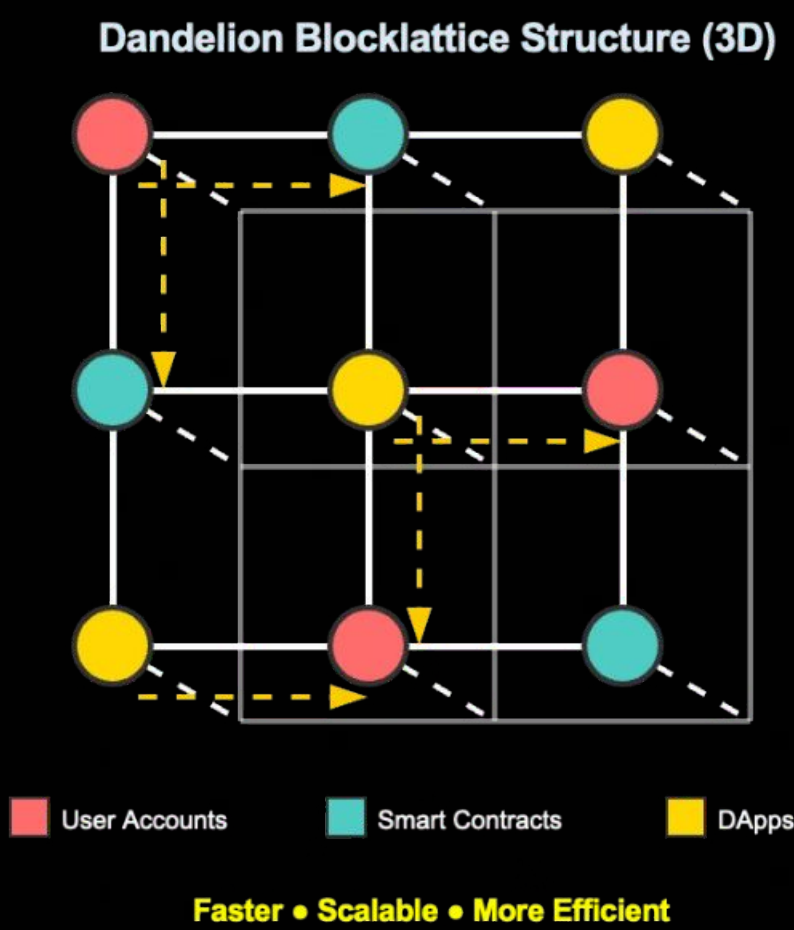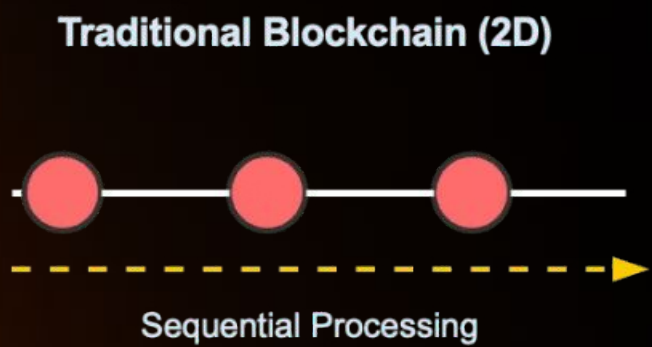
Block Concept

- **Blockchain**: Uses blocks to group transactions.
- **Blocklattice**: No blocks in the traditional sense; each transaction is its own entity. Removing the block concept eliminates issues like block size and time constraints and allows for more flexible and responsive transaction processing.

Transaction Finality

- **Blockchain**: Often requires multiple block confirmations.
- **Blocklattice**: Can achieve faster finality on individual transactions. Faster finality enables near-real-time applications and improves user experience, particularly for time-sensitive transactions.

In simple terms, the major structural difference is that while a traditional blockchain offers a 2D-like structure, the blocklattice provides a 3D, multi-dimensional framework.

Traditional Blockchain (2D)

Sequential Processing

Dandelion Blocklattice Structure (3D)

■ User Accounts ■ Smart Contracts ■ DApps

Faster ● Scalable ● More Efficient

Contact Us

We welcome any questions or inquiries you may have about the Dandelion network. Please feel free to reach out to us via email at support@dandelionnet.com or our social media channels.

Our team is ready to assist you with any queries you may have.

Dandelion