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The Evolution of Smart Contracts and Cryptoeconomic Security

What is a Contract and What is its Purpose?

Contract:

A binding agreement between two or more persons or parties.

Merriam-Webster

Contract:

A legal document that states and explains a formal agreement between two different people or groups.

Cambridge Dictionary

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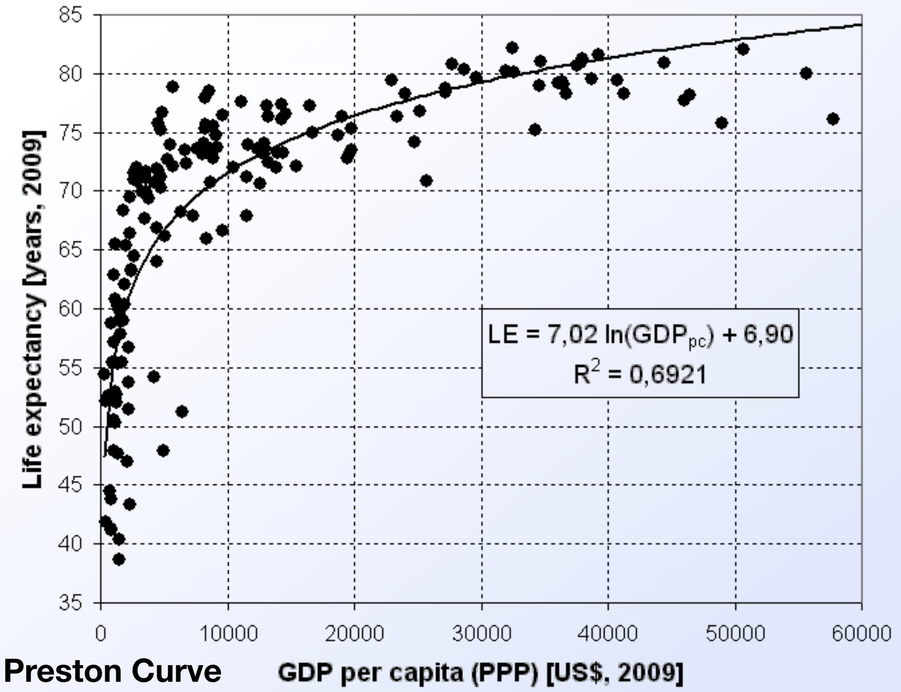
The Social Contract: The Foundation of Our Society

Signing the Mayflower Compact 1620, by Jean Leon Gerome Ferris, 1899

"Where no law ... the life of man, solitary, poor, nasty, brutish and short." ~ *Thomas Hobbes*



Preston Curve

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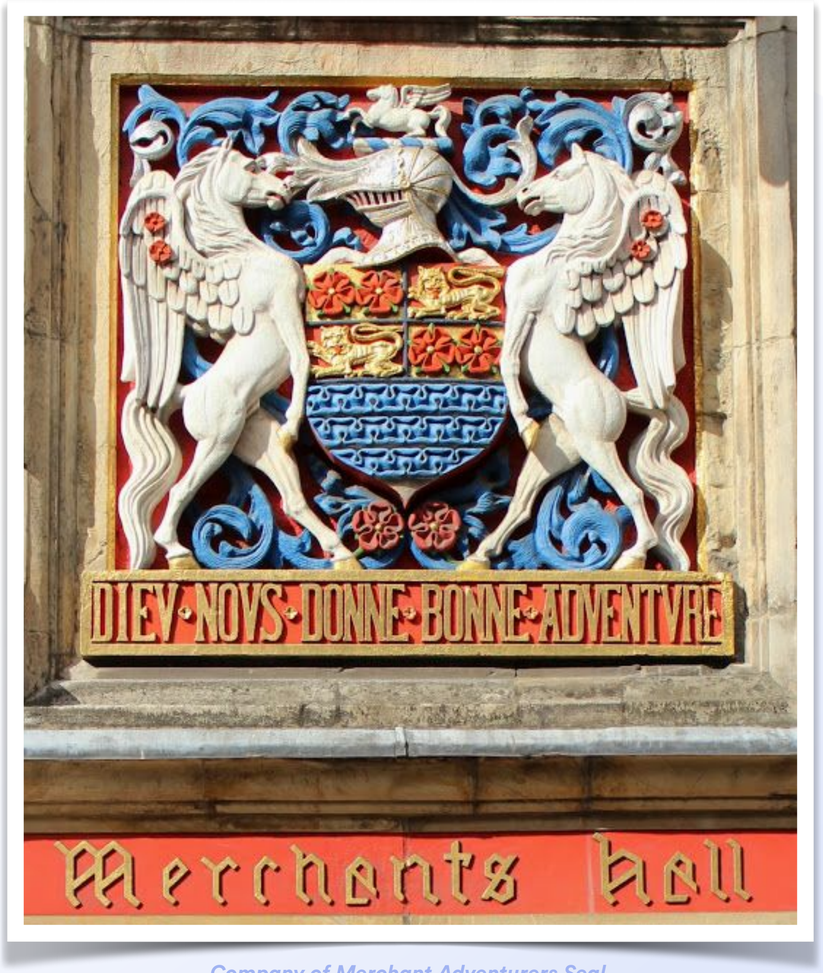
Commercial Agreements: The Foundation of Progress

Edward Lloyd's Coffee house, by William Holland, 1789



Company of Merchant Adventurers Seal

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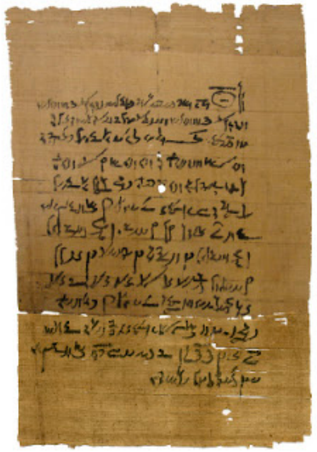
A Brief History of Commercial Contracts

Bill of Sale
(Ownership)
2600 BC



Employment Contract
(Income)
190BC

Roman Debt Contract
(Debt Obligations)
43AD

East India Company
(Corporations)
1600 AD

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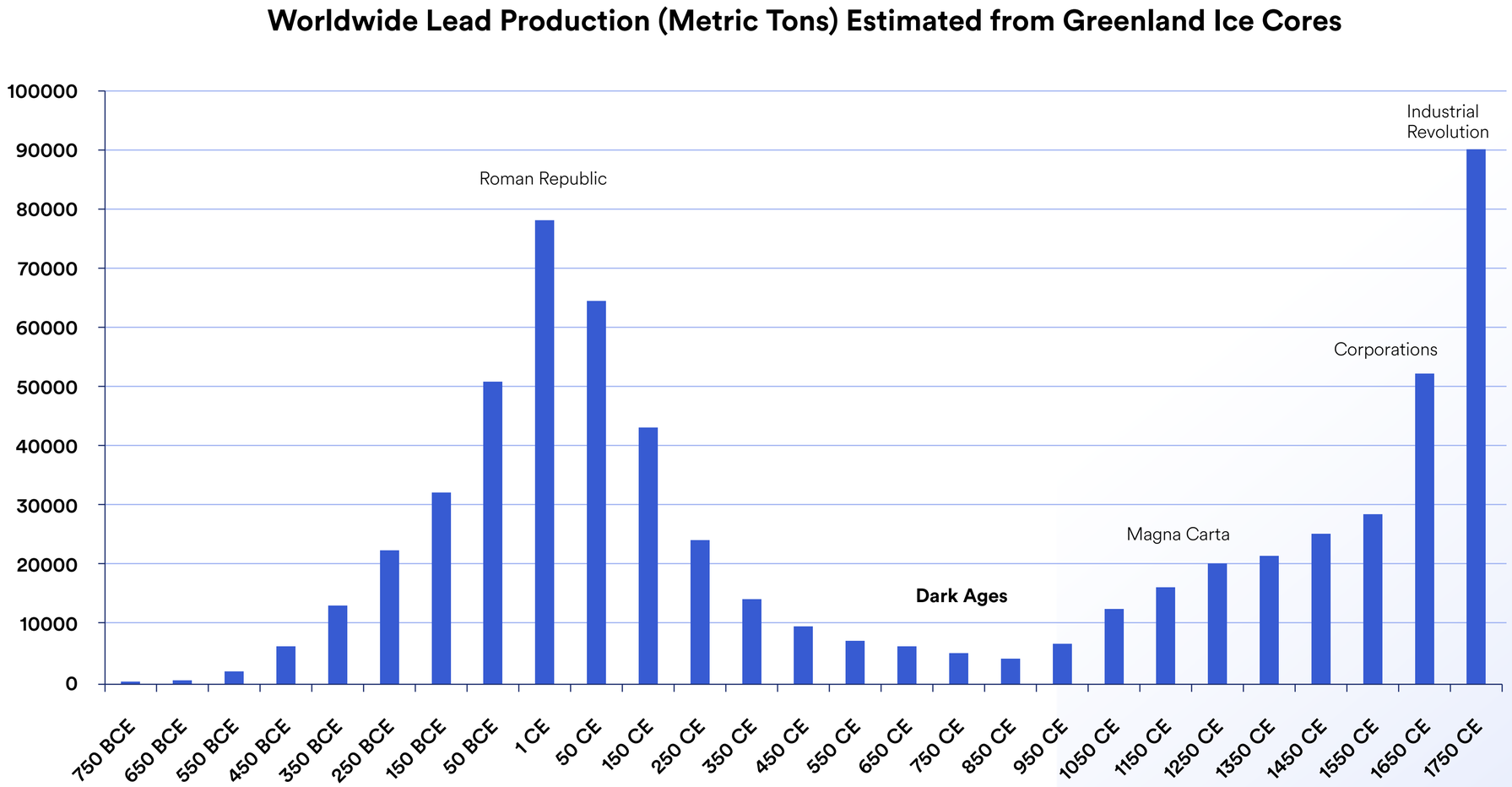
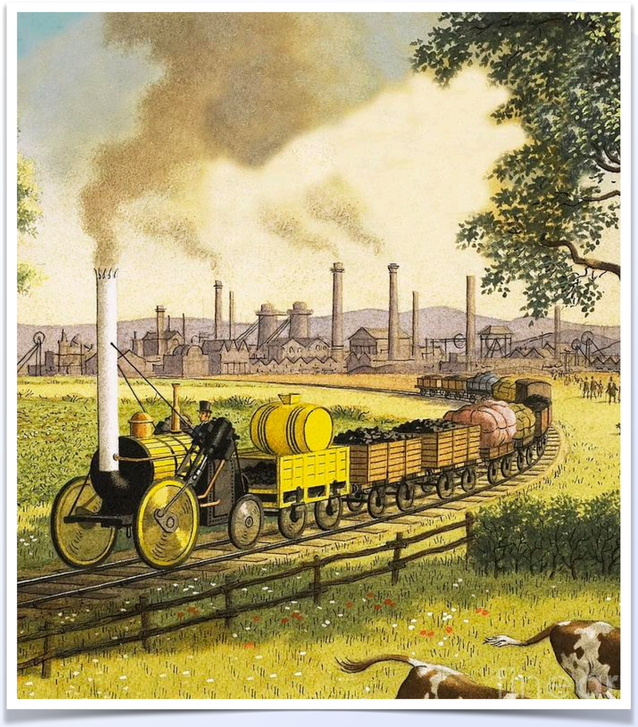
The Ability to Create Contracts Determines Progress





https://science.sciencemag.org/content/265/5180/1841

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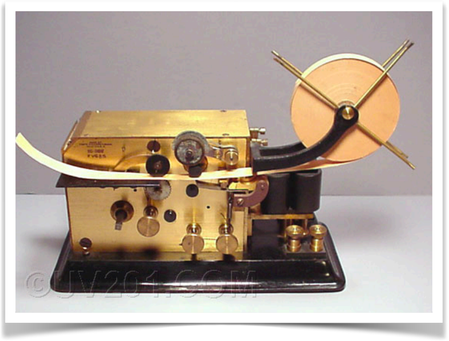
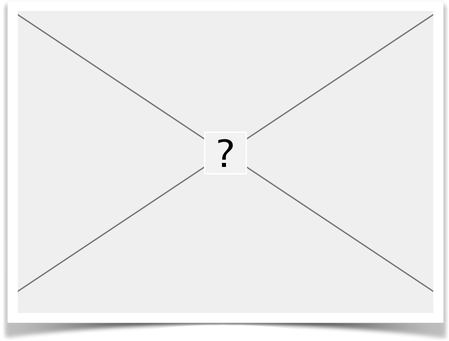
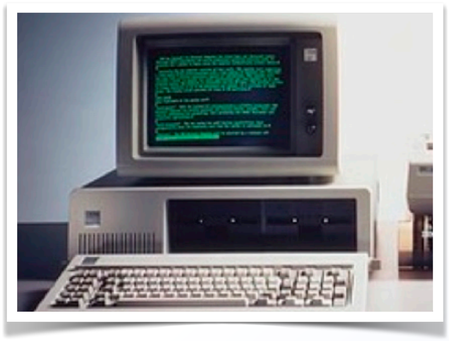
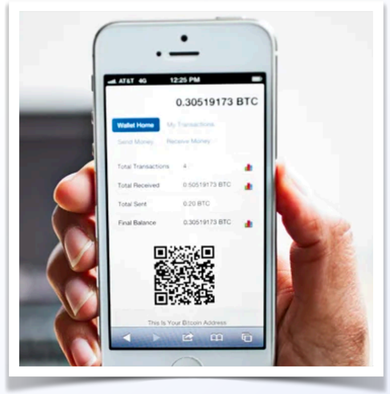
The Next Stage: Technologically Enforced Contracts









Telegraph Agreements (Electronically Signed) 1869

Telex Machines (Telecom Based) 1930s

Digital Agreements (Internet Based) 1980s to Present

Smart Contracts (Blockchain Based) 2009 to Present

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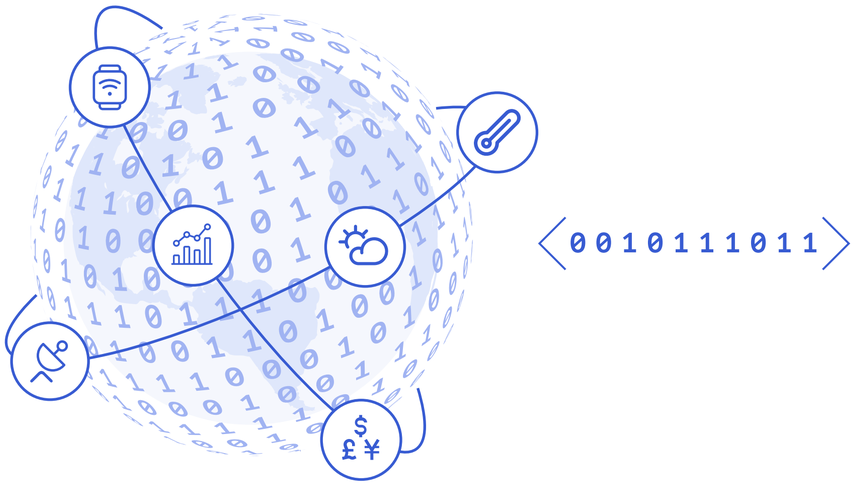
Digital Agreements

Performance Data



Contract Terms

Participants

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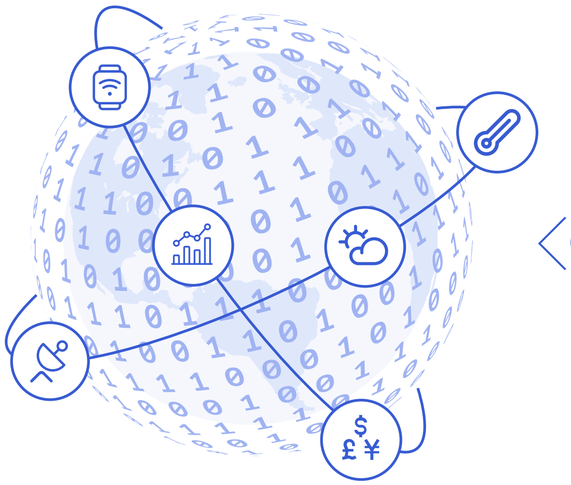
Web/Internet Agreements are Centralized & Unreliable

Performance Data



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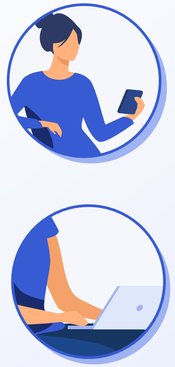
Contract Terms

1100100101

0110010010



Contract Operator Conflicts of Interest (Pricing Monopolies)

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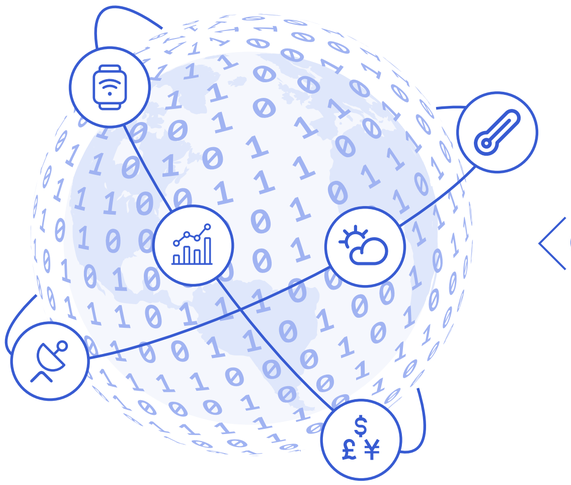
Smart Contracts are Decentralized & Highly Reliable

Performance Data



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Contract Terms

1100100101

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Participants

Tamper Proof
(Open Source Standards)

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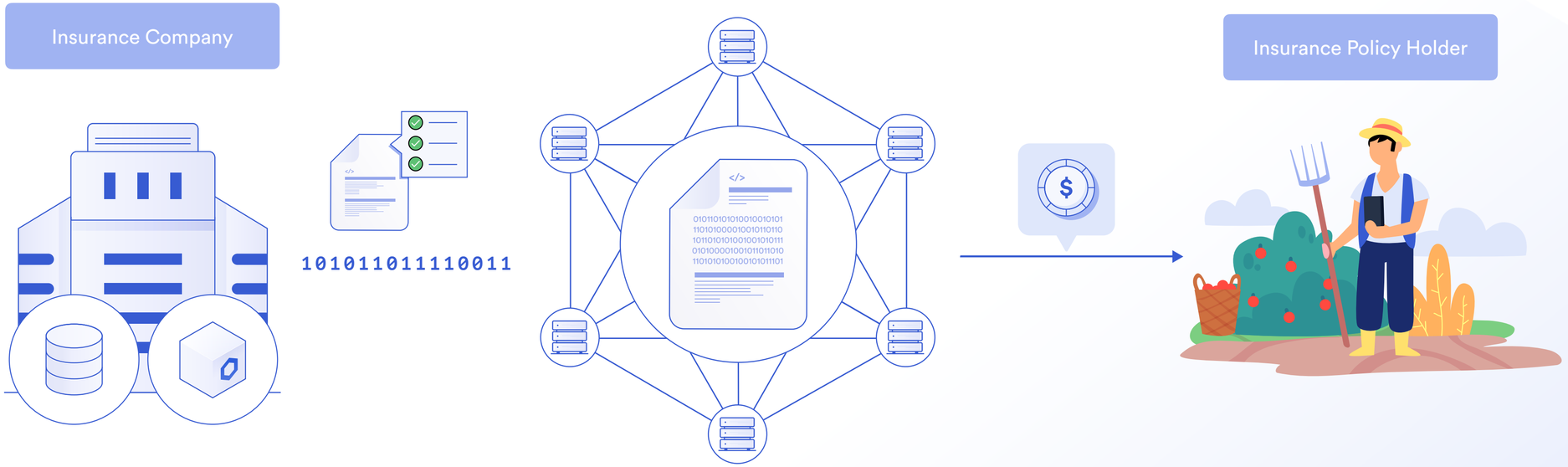
A Parallel Legal System for Emerging Market Growth



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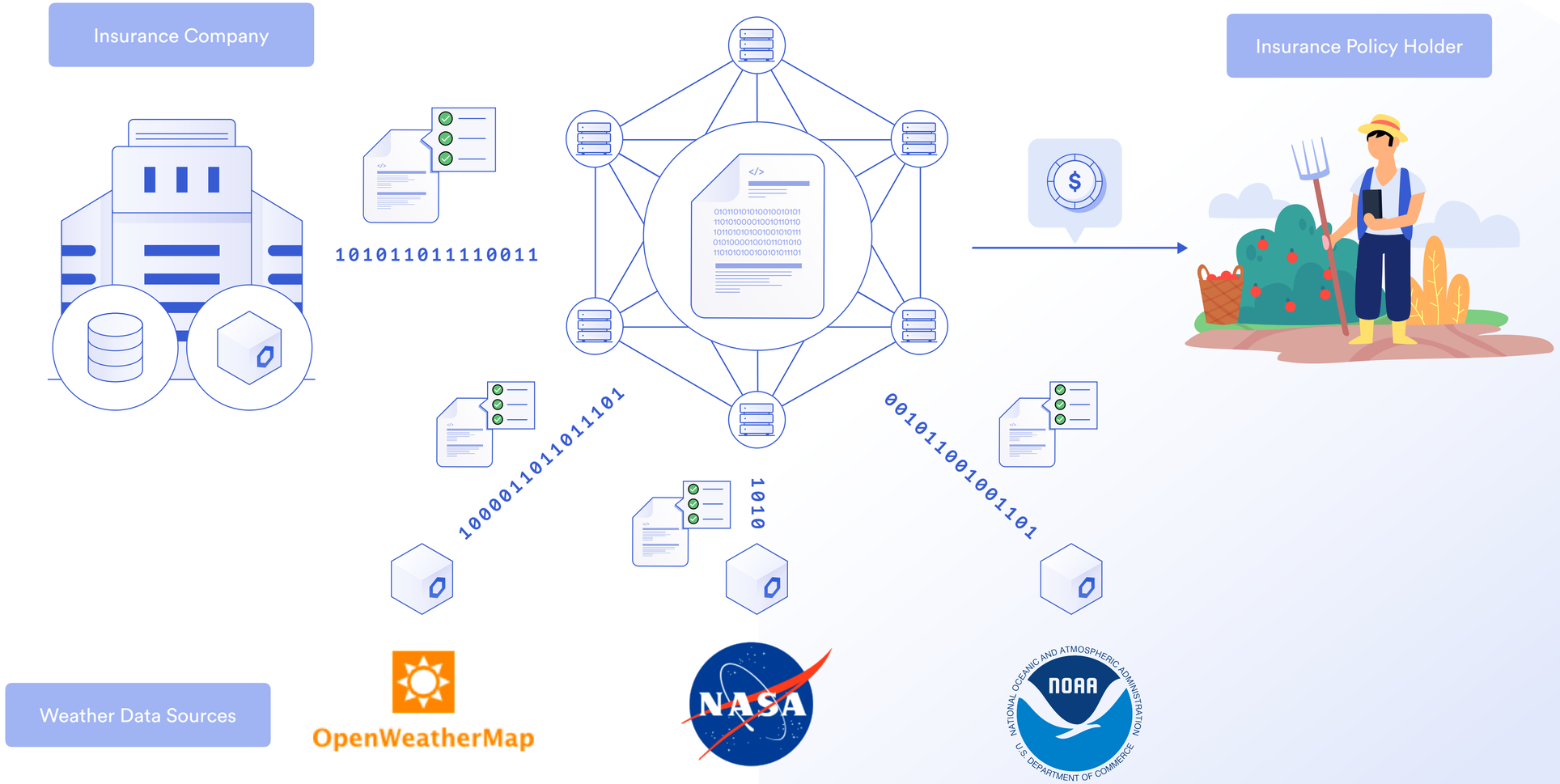
A Parallel Legal System for Emerging Market Growth



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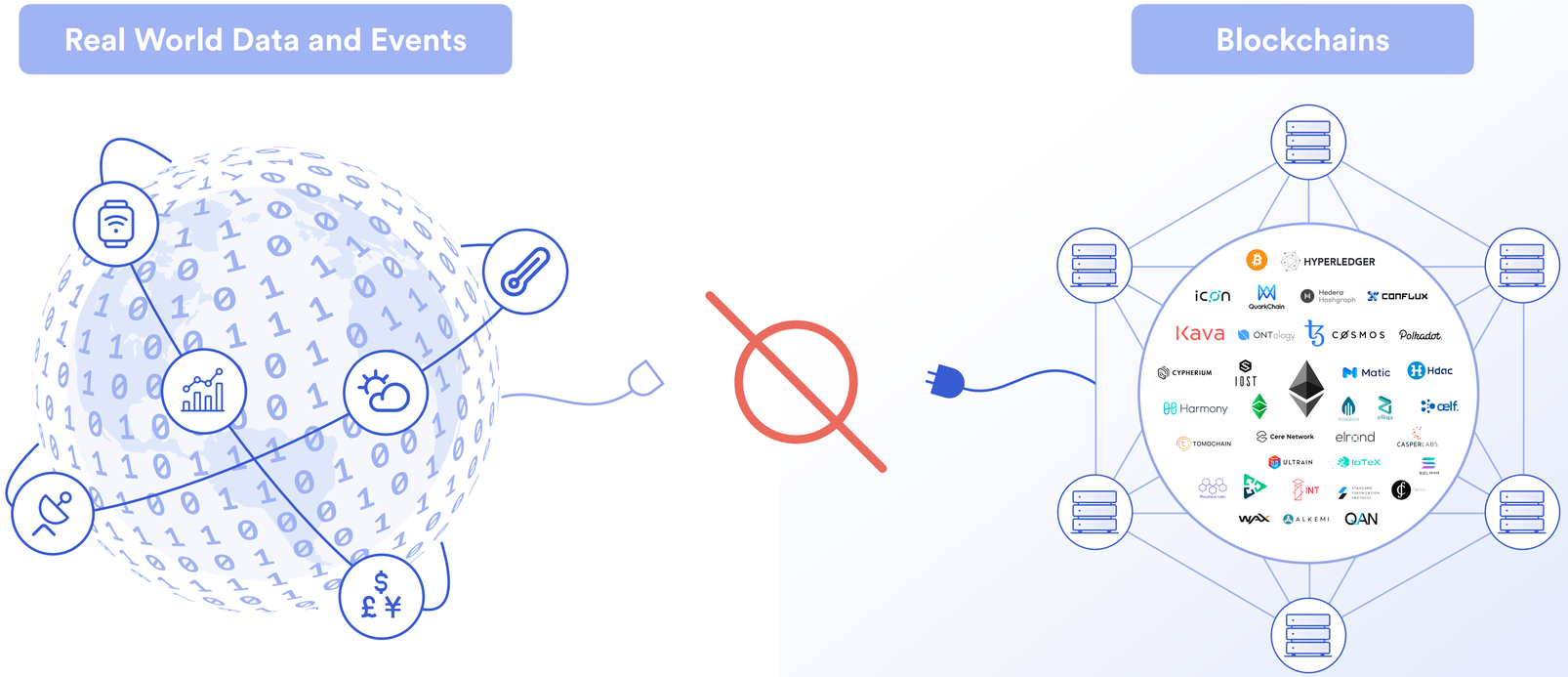
The “Oracle Problem” for Smart Contracts

Smart Contracts are unable to connect with external systems, data feeds, APIs, existing payment systems or any other off-chain resources on their own.



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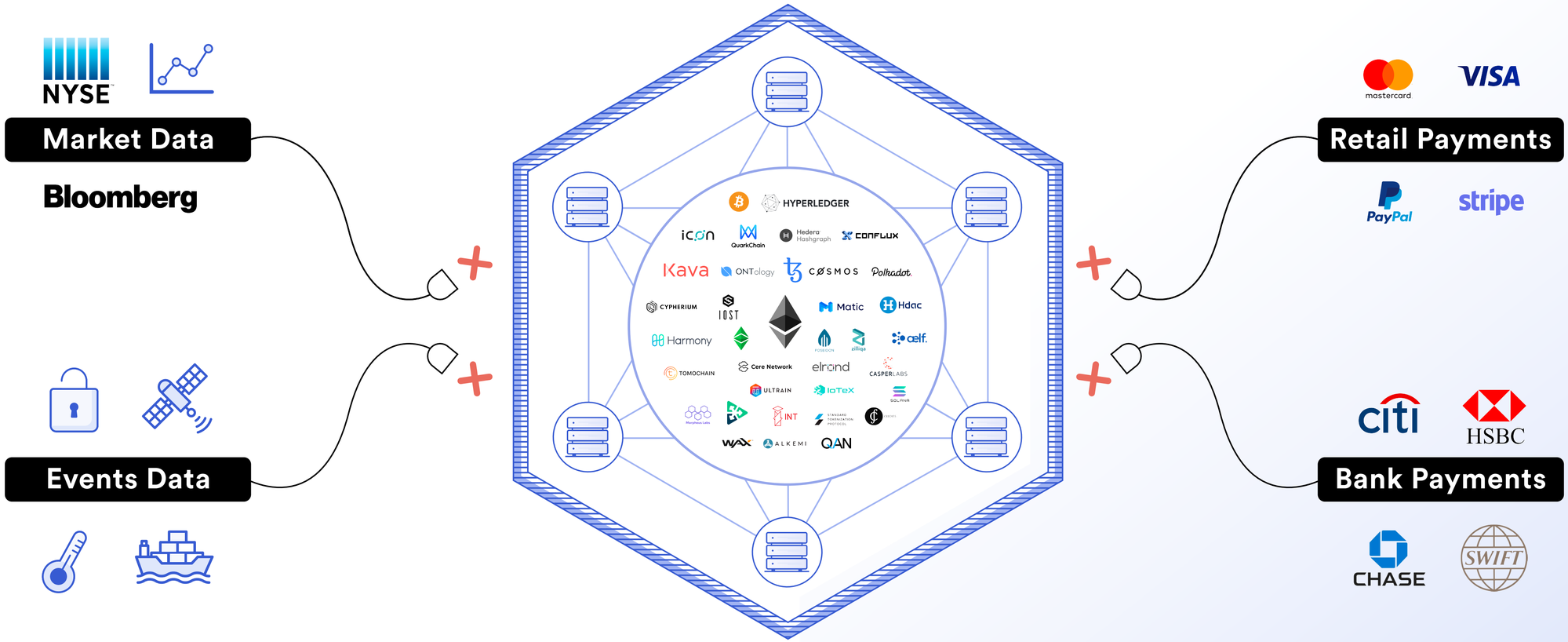
The “Oracle Problem” for Smart Contracts



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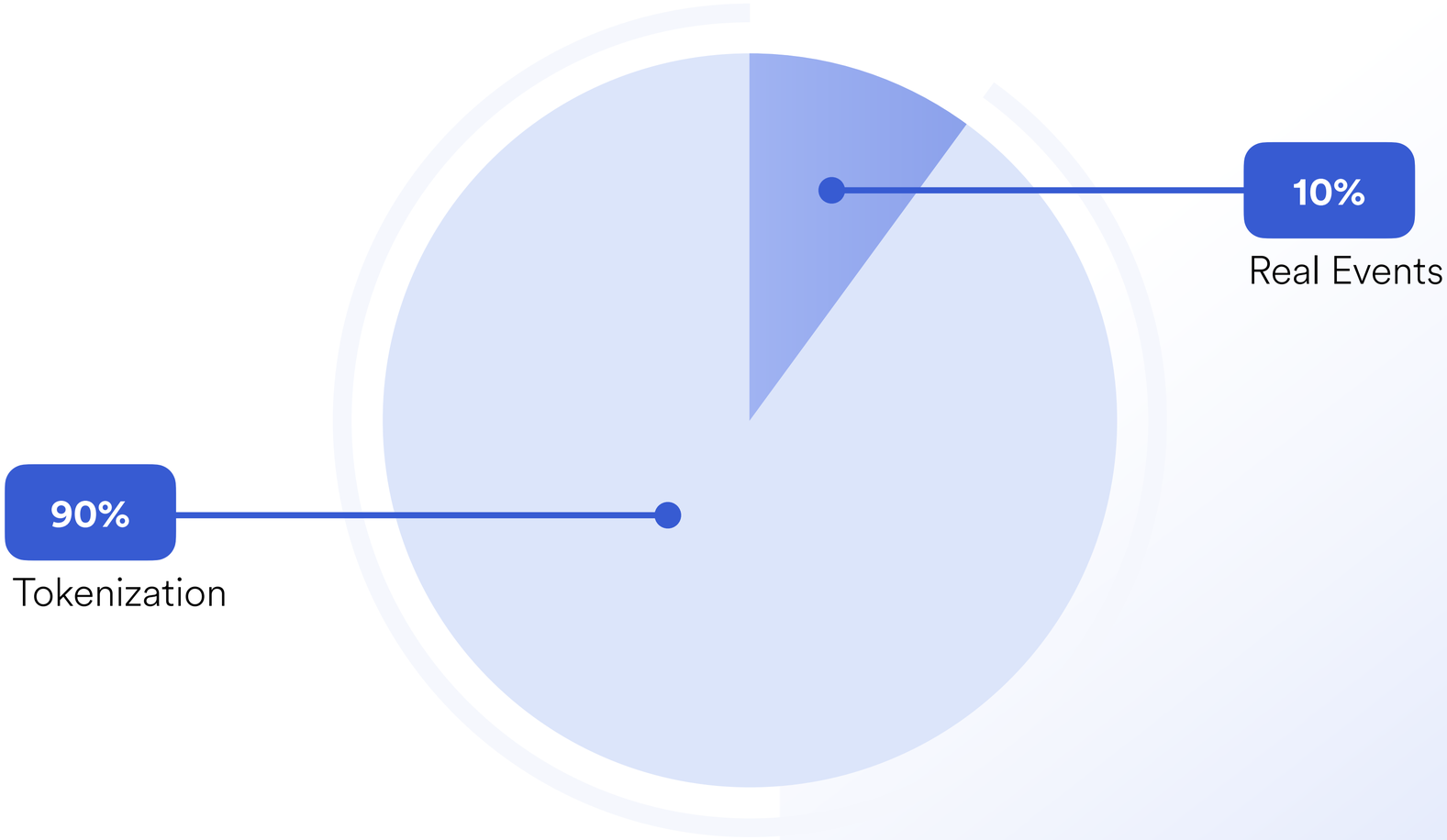
Smart Contracts are Currently Used for Tokenization



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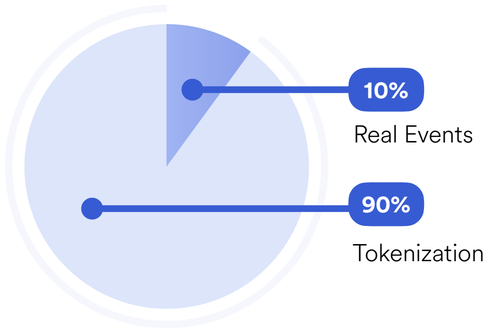
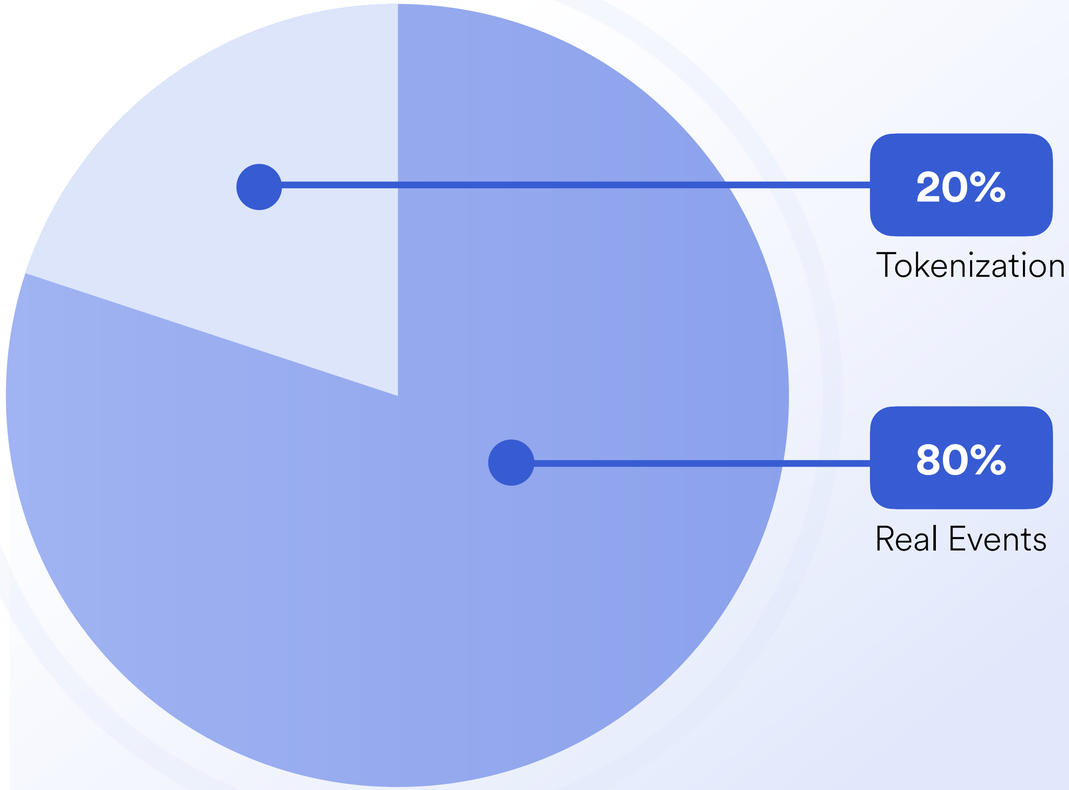
Redefining Smart Contracts With External Events

Current Distribution of Smart Contract Transaction Volume and Value Secured



Externally Connected Contracts

Future Distribution and 1000%+ Growth of Transaction Volume and Value Secured



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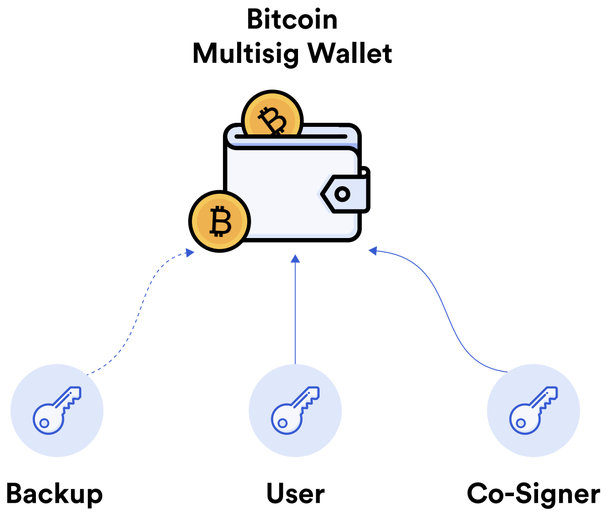
The Initial Leap Forward for Smart Contracts



Bitcoin Multi-signature as “Programmable Money”

Protocol Smart Contracts = Smart Contracts 1.0

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The Scriptable Leap Forward for Smart Contracts

Protocol Smart Contracts =
Smart Contracts 1.0

```
pragma solidity ^0.4.16;

contract MyToken {
    // This creates an array with all balances
    mapping (address => uint256) public balanceOf;

    // Initializes contract with initial supply tokens to t
    function MyToken (
        uint256 initialSupply
    ) payable {
        balanceOf[msg.sender] = initialSupply;
    }

    // Send coins
    function transfer(address _to, uint256 _value) payable
        require(balanceOf[msg.sender] >= _value);
        require(balanceOf[_to] + _value >= balanceOf[_to]);
        balanceOf[msg.sender] -= _value;
        balanceOf[_to] += _value;
    }
```

Scriptable Smart Contracts =
Tokenization/Smart Contracts 2.0

Chainlink

The Connectivity Leap Forward for Smart Contracts

```solidity
pragma solidity ^0.4.16;

contract MyToken {
    // This creates an array with all balances
    mapping (address => uint256) public balanceOf;

    // Initializes contract with initial supply tokens to t
    function MyToken (
        uint256 initialSupply
    ) payable {
        balanceOf[msg.sender] = initialSupply;
    }

    // Send coins
    function transfer(address _to, uint256 _value) payable
        require(balanceOf[msg.sender] >= _value);
        require(balanceOf[_to] + _value >= balanceOf[_to]);
        balanceOf[msg.sender] -= _value;
        balanceOf[_to] += _value;
    }
```

Scriptable Smart Contracts =
Tokenization/Smart Contracts 2.0

Externally Connected Smart Contracts =
All Other Dapps/Smart Contracts 3.0

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DeFi is the Beginning of Redefining Smart Contracts

Total Value Locked (USD) in DeFi

DEFI PULSE

SYNTHETIX

AAVE

bZx

Nexus Mutual

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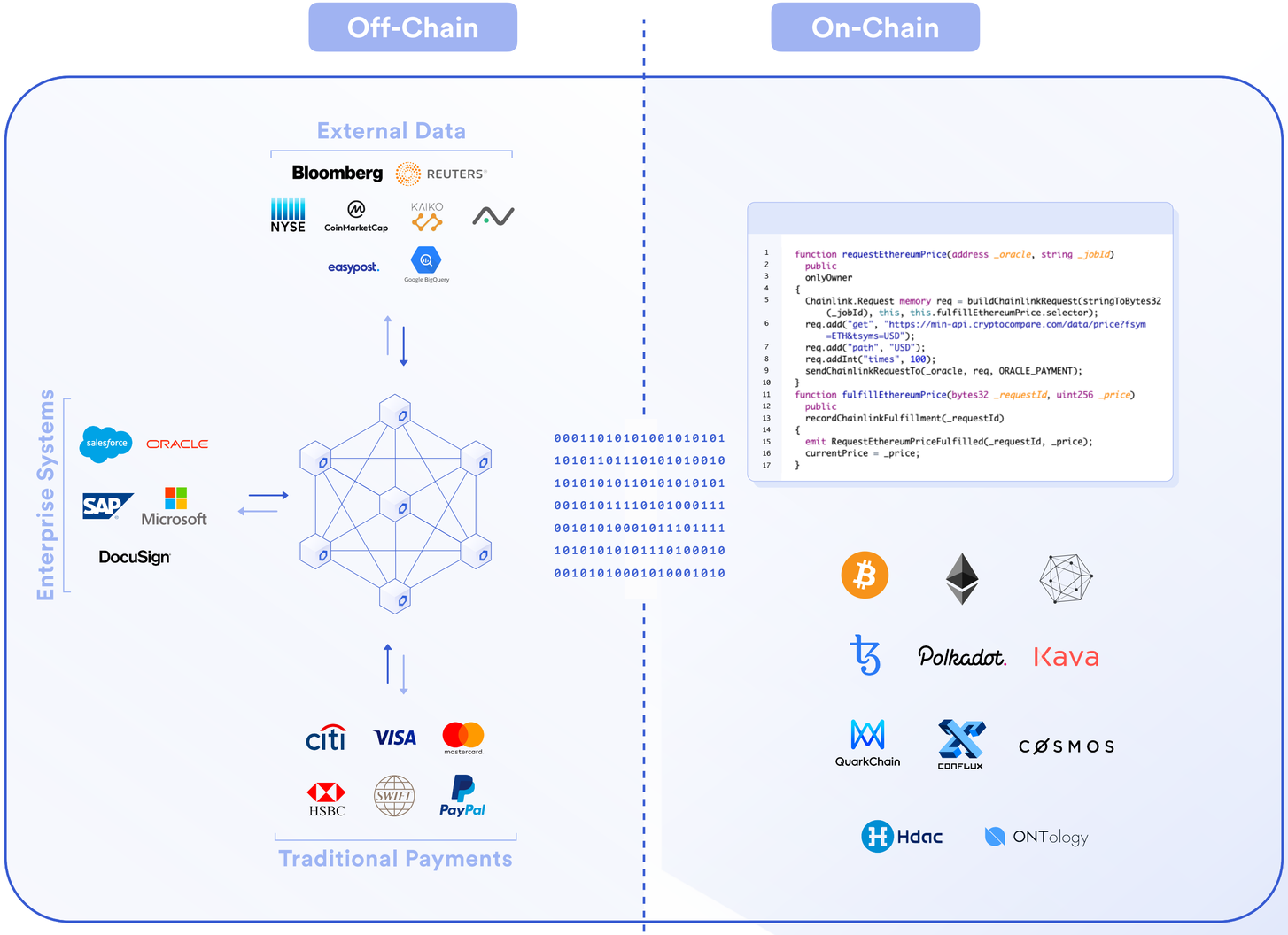
DeFi Smart Contracts Have Two Important Parts



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End-to-end Reliability Is The Promise of Smart Contracts

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Our Approach to Reliable & Secure Oracles for Web3

Decentralization of many Independent/Sybil Resistant Nodes into Oracle Networks

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Our Approach to Reliable & Secure Oracles for Web3

Decentralization of many Independent/Sybil Resistant Nodes into Oracle Networks

Provably Secure Nodes that provide cryptographic proof of their overall security

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Our Approach to Reliable & Secure Oracles for Web3

Decentralization of many Independent/Sybil Resistant Nodes into Oracle Networks

Provably Secure Nodes that provide cryptographic proof of their overall security

High Quality Data from multiple reliable sources and well validated by multiple nodes

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Our Approach to Reliable & Secure Oracles for Web3

Decentralization of many Independent/Sybil Resistant Nodes into Oracle Networks

Provably Secure Nodes that provide cryptographic proof of their overall security

High Quality Data from multiple reliable sources and well validated by multiple nodes

Cryptoeconomic Security using binding service agreements to generate staking penalties

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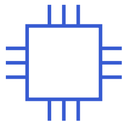

Defense in Depth, applying multiple layers of security (TEEs, ZK)

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Our Approach to Reliable & Secure Oracles for Web3

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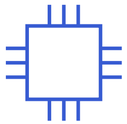

Defense in Depth, applying multiple layers of security (TEEs, ZK)

A Large Open Source Community of Node Operators, Developers, Researchers and Security Auditors

Chainlink

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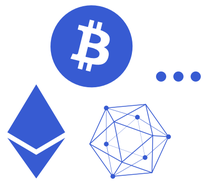

Connecting any blockchain environment to all inputs and outputs
Connected to the leading public and private blockchains. Accelerating what developers can build and the amount of places data can be sold on-chain.

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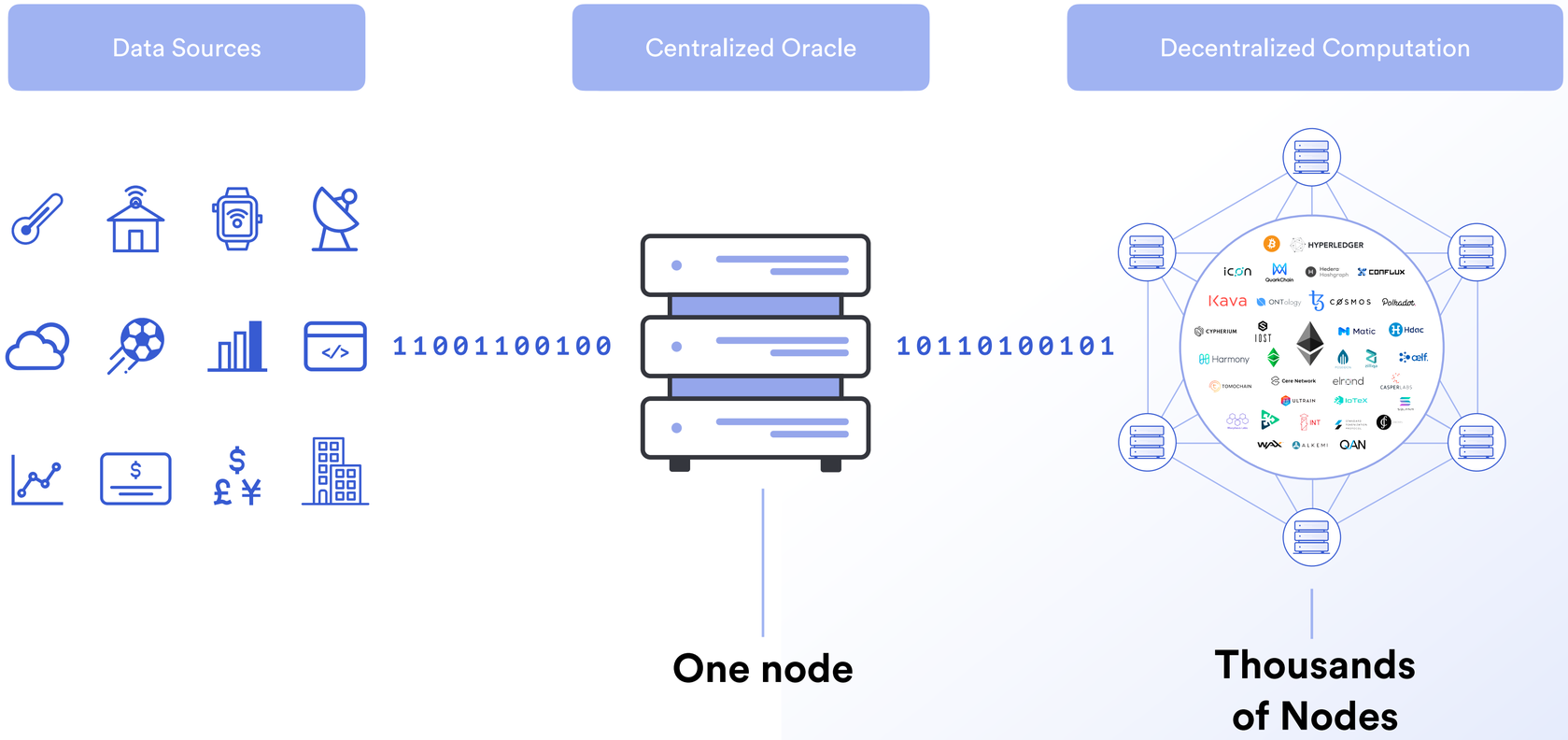
Centralized Oracles are a Point of Failure



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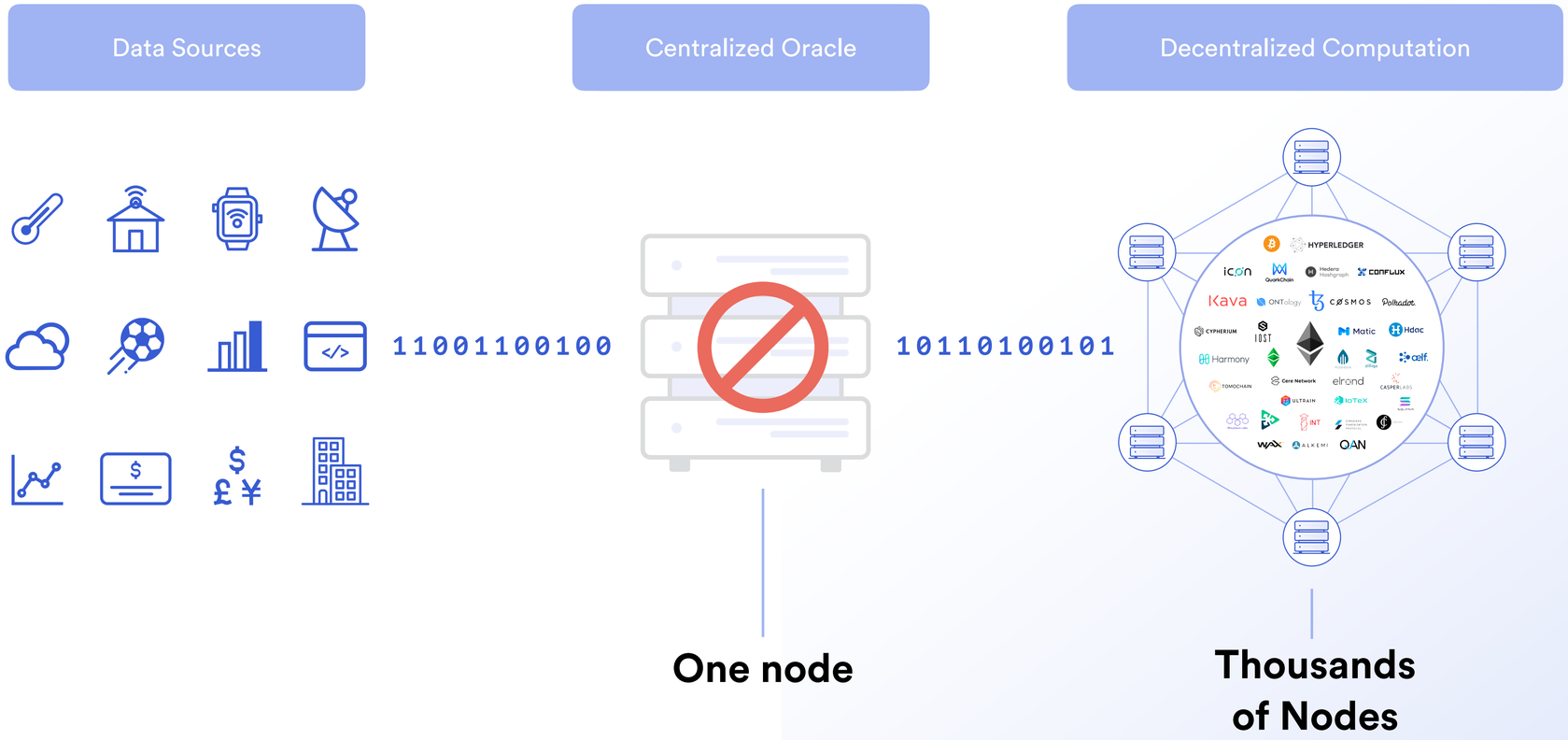

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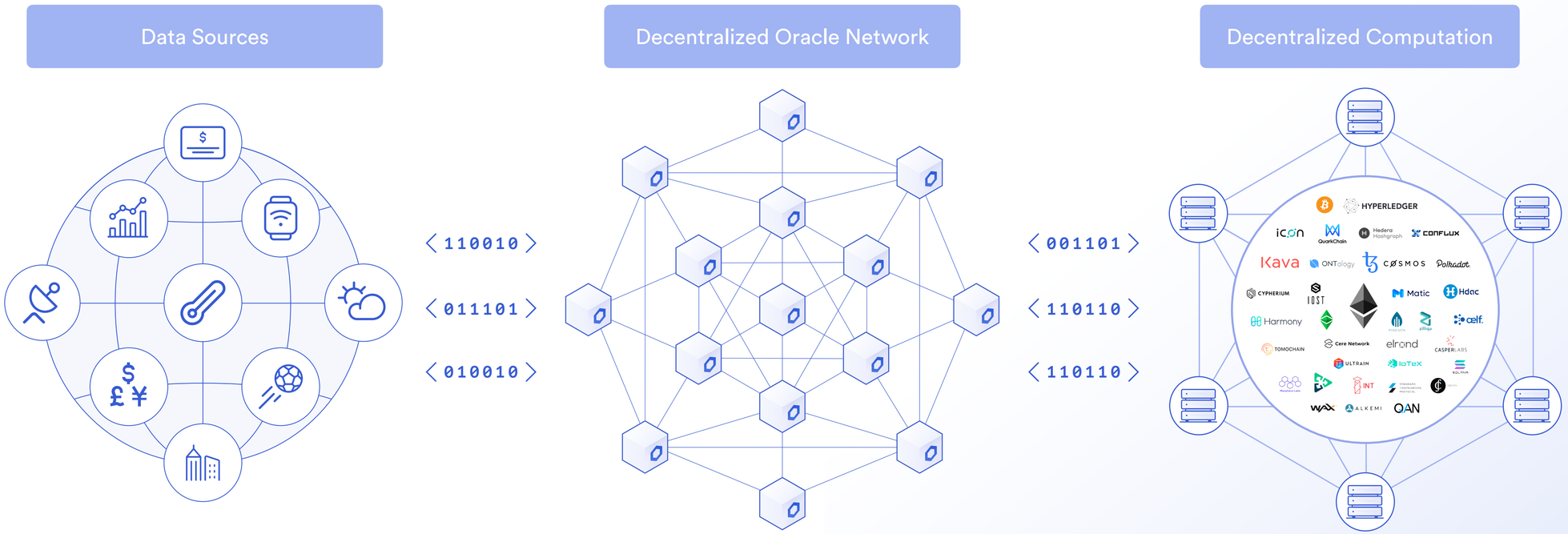
A Decentralized Oracle Network



Decentralized Oracles: A form of decentralized computation that validates data about real world events, making data reliable enough to trigger other forms of decentralized computation, e.g. smart contracts.

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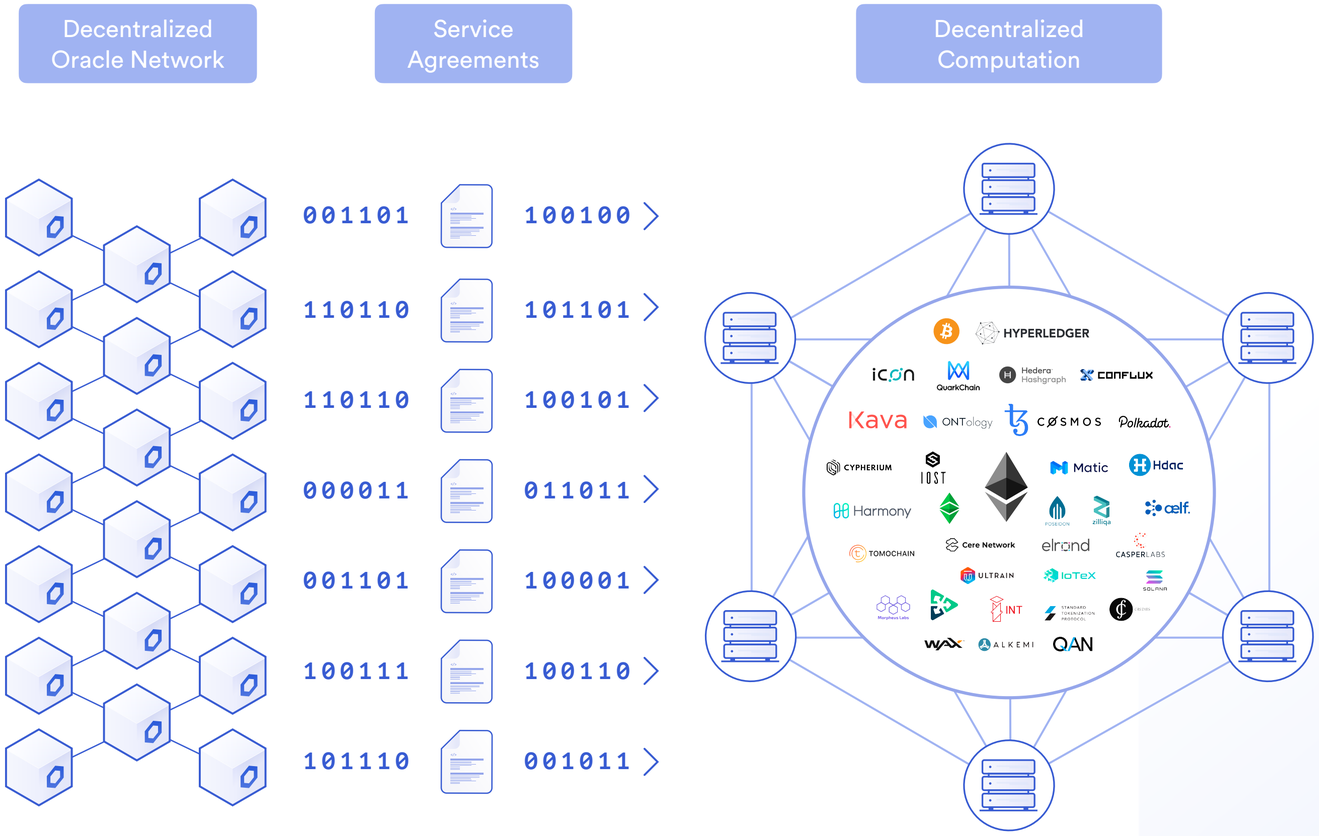
Binding Commitments by Oracles to Contracts



Binding Service Agreements

Technically enforced commitments to meeting high security and data quality standards are made on-chain by the oracle, committing them to high levels of quality.

Both the commitment and the final performance of the commitment are both on-chain and fully verifiable.

Creating a cryptographically provable performance history that can be relied on. Oracles that don't fulfill their commitments won't be selected for future quoroms, losing large future revenue.

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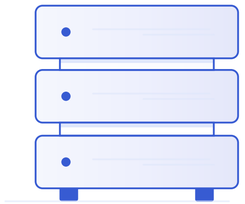
On-chain Service Agreements Provide Guarantees

Unpaid/Free OpenAPI

- Low Quality Data
- Unreliable Responses
- No Quality Guarantees

A Node Without Credential Management



- Undefined Data Delivery Terms
- Undefined Data Quality Terms
- No Data Quality Guarantees

Smart Contract With Low Quality Data

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On-chain Service Agreements Provide Guarantees

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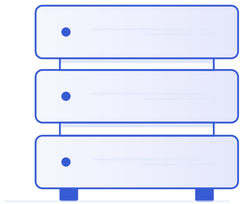
A Node Without Credential Management



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- Undefined Data Delivery Terms
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Smart Contract With Low Quality Data

Data Providers

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- High Quality Data
- Highly Responsive
- Quality Guarantees

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Chainlink Node

11011

On- chain Service Agreement

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- Defined Data Delivery Parameters
- Defined Data Quality Parameters
- Data Quality Connected to Payment

Smart Contract with High Quality Data

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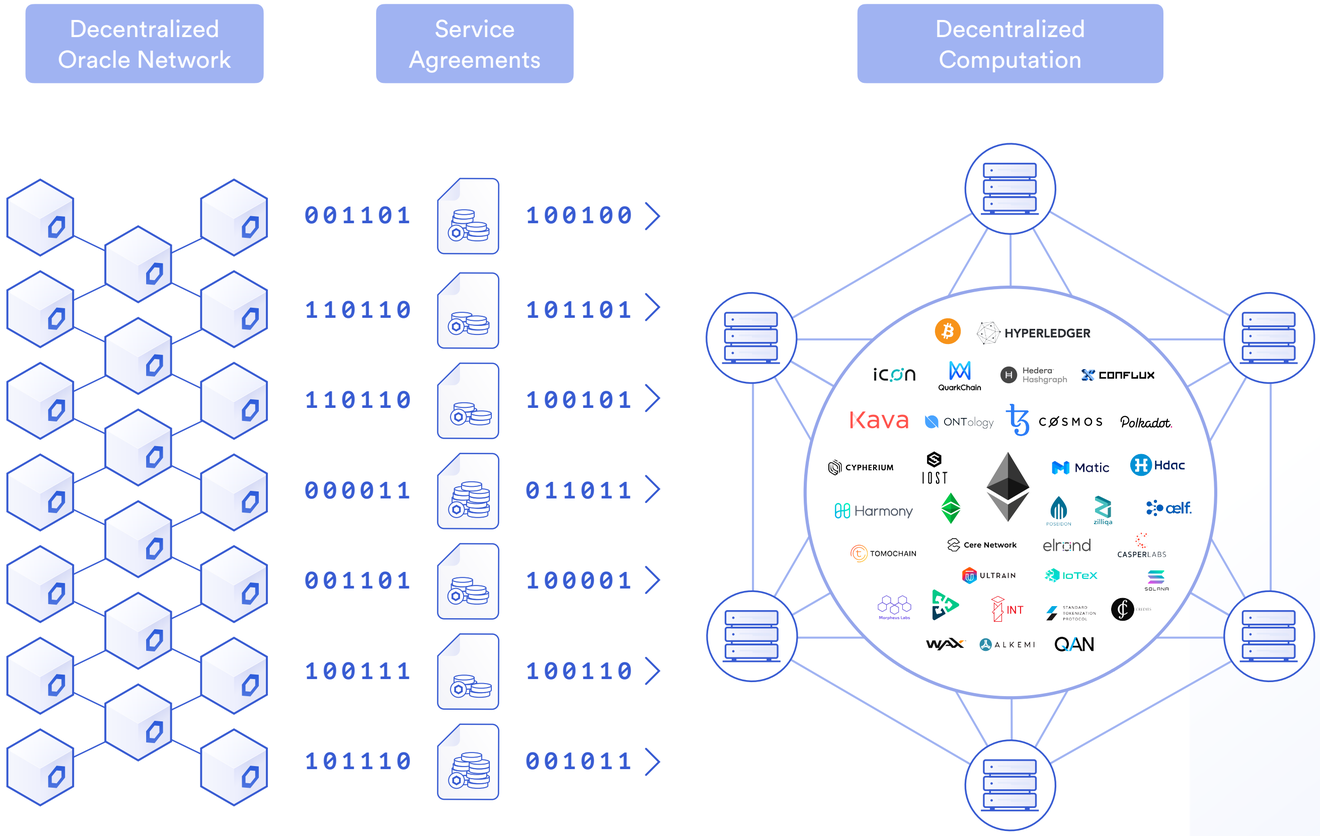
Crypto-economic Security from Staking



Cryptoeconomic Security from Staking

Using the commitments from binding service agreements, we can define clear parameters for the penalties for misbehaving nodes, bad data providers and any other point in the data origination and/or data transfer process.

Staking ensures that there is a penalty for node misbehavior, data inaccuracy and any other key condition specified in an on-chain binding service agreement. Staking guarantees are not only very specific and expandable, to properly manage new risks as they appear, but the amount of stake can be increased as value secured by an oracle rises.

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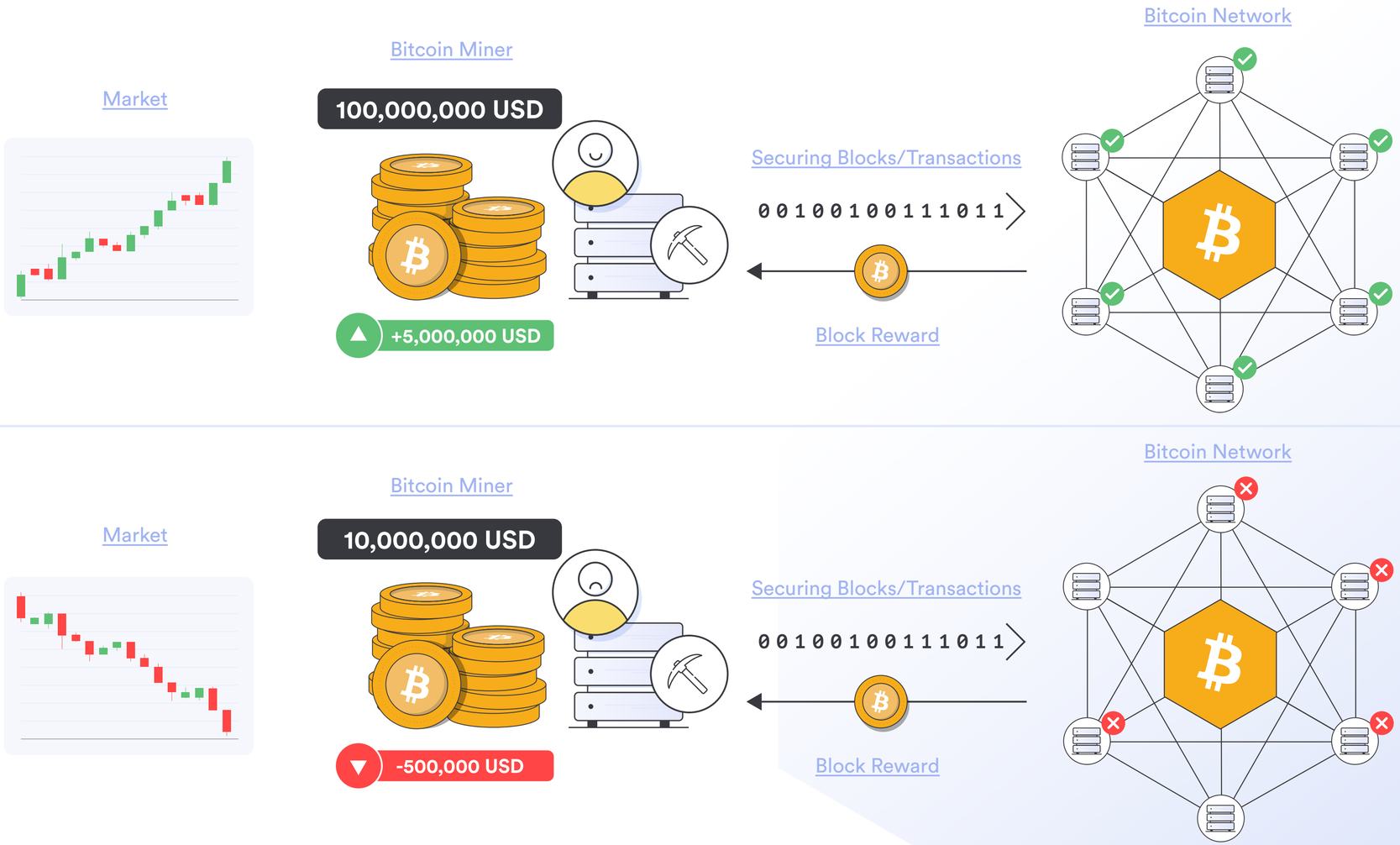
Forms of Staking Already Support Network Security

Implicit Staking: Holding an asset whose value can decrease based on deviations from a protocol run by you and others.



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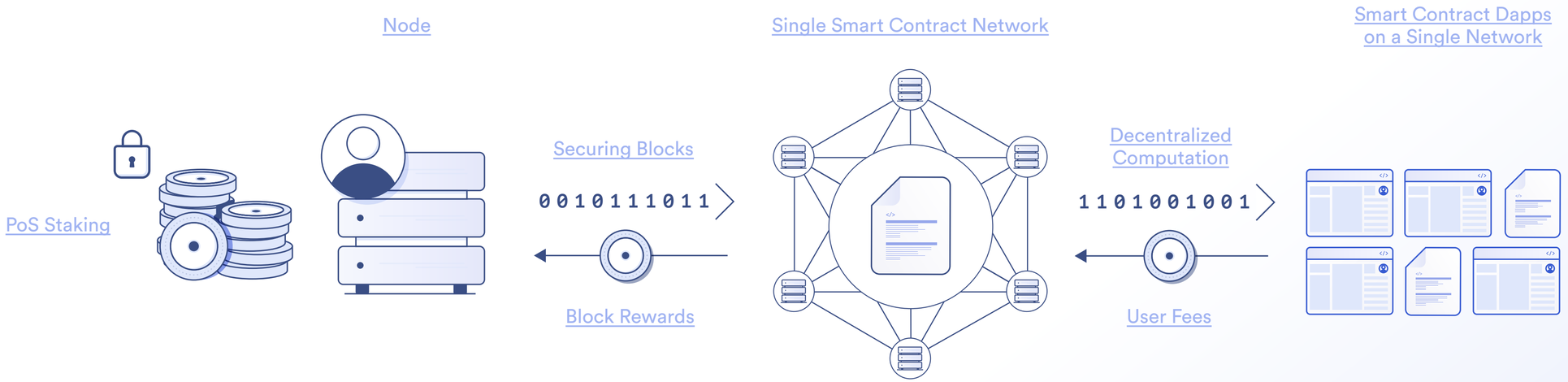
Crypto-economic Security from Staking for Blocks

Explicit Staking: Putting down a deposit, that may be lost if only you deviate from a protocol.



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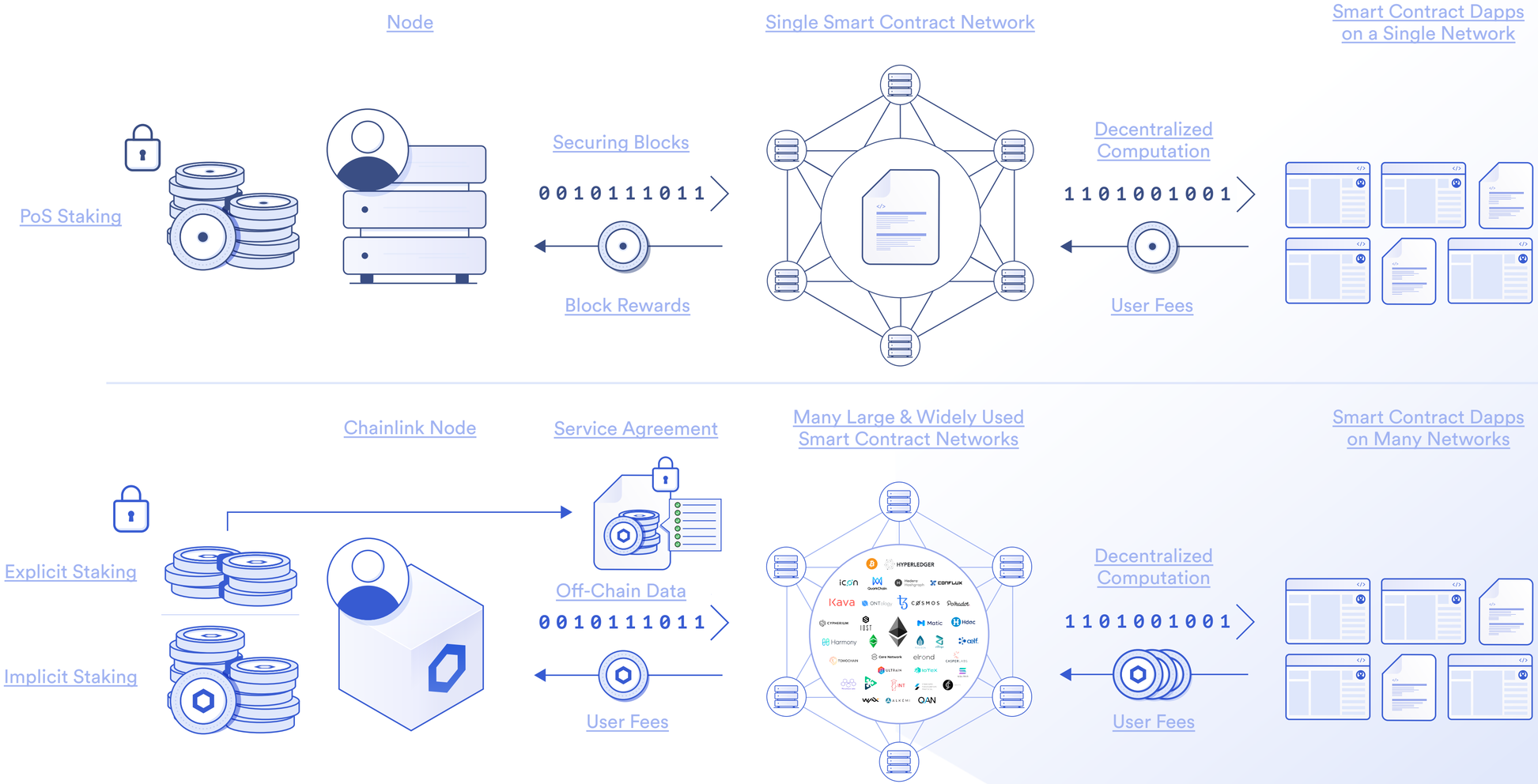
Crypto-economic Security from Staking for Data Delivery

Explicit Staking: Putting down a deposit, that may be lost if only you deviate from a protocol.



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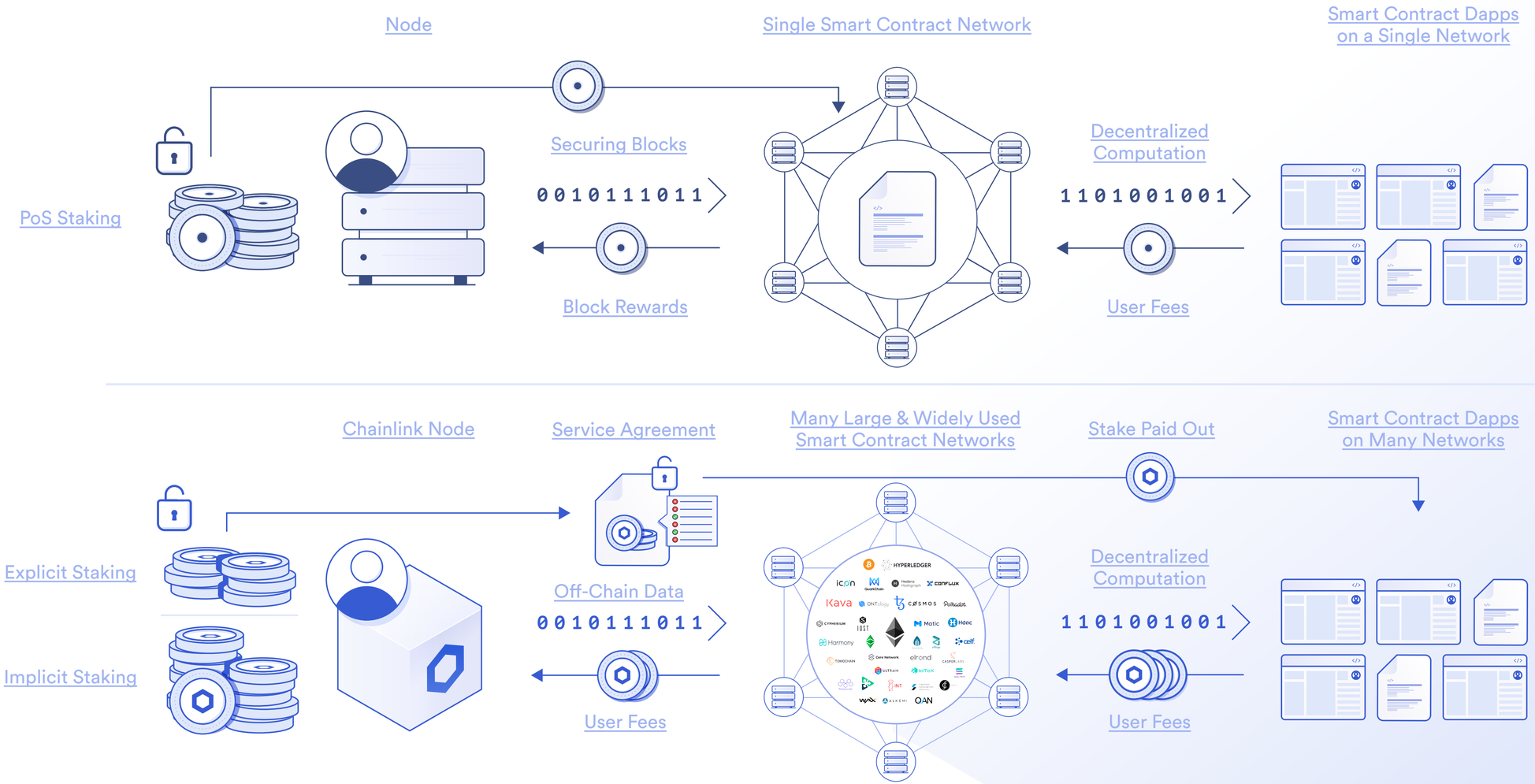

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On-chain Service Agreements Enforce Data Delivery

Unpaid/Free OpenAPI

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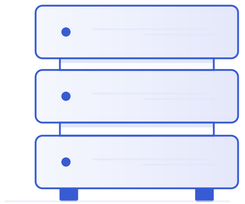
A Node Without Credential Management



- Undefined Data Delivery Terms
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- No Data Quality Guarantees

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Smart Contract Broken by Bad Data

Data Providers

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- High Quality Data
- Highly Responsive
- Quality Guarantees

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Chainlink Node

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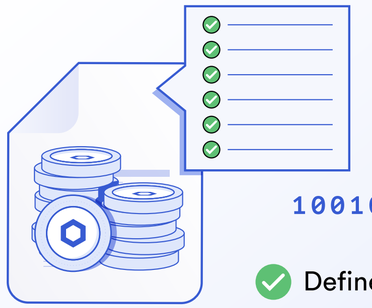
On- chain Service Agreement



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- Defined Data Delivery Parameters
- Defined Data Quality Parameters
- Data Quality Connected to Payment

Smart Contract with High Quality Data

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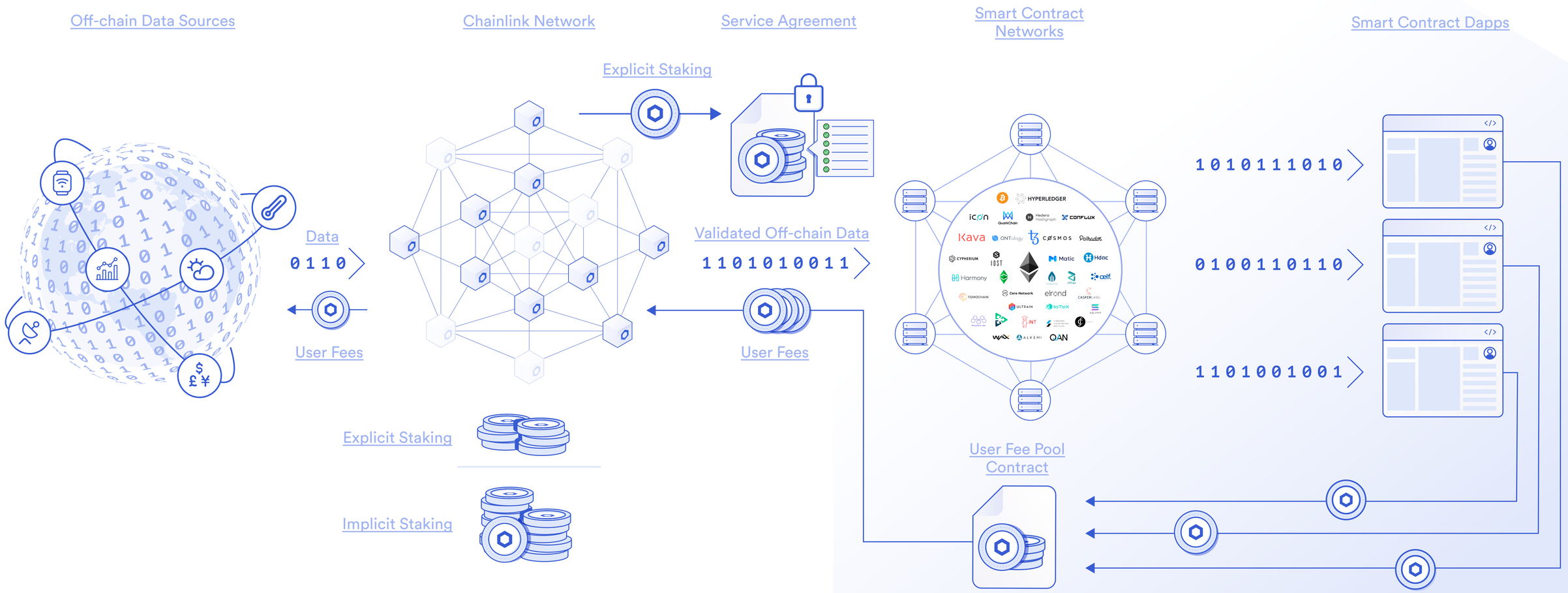
User Fees Go to Node Operators For Data Delivery



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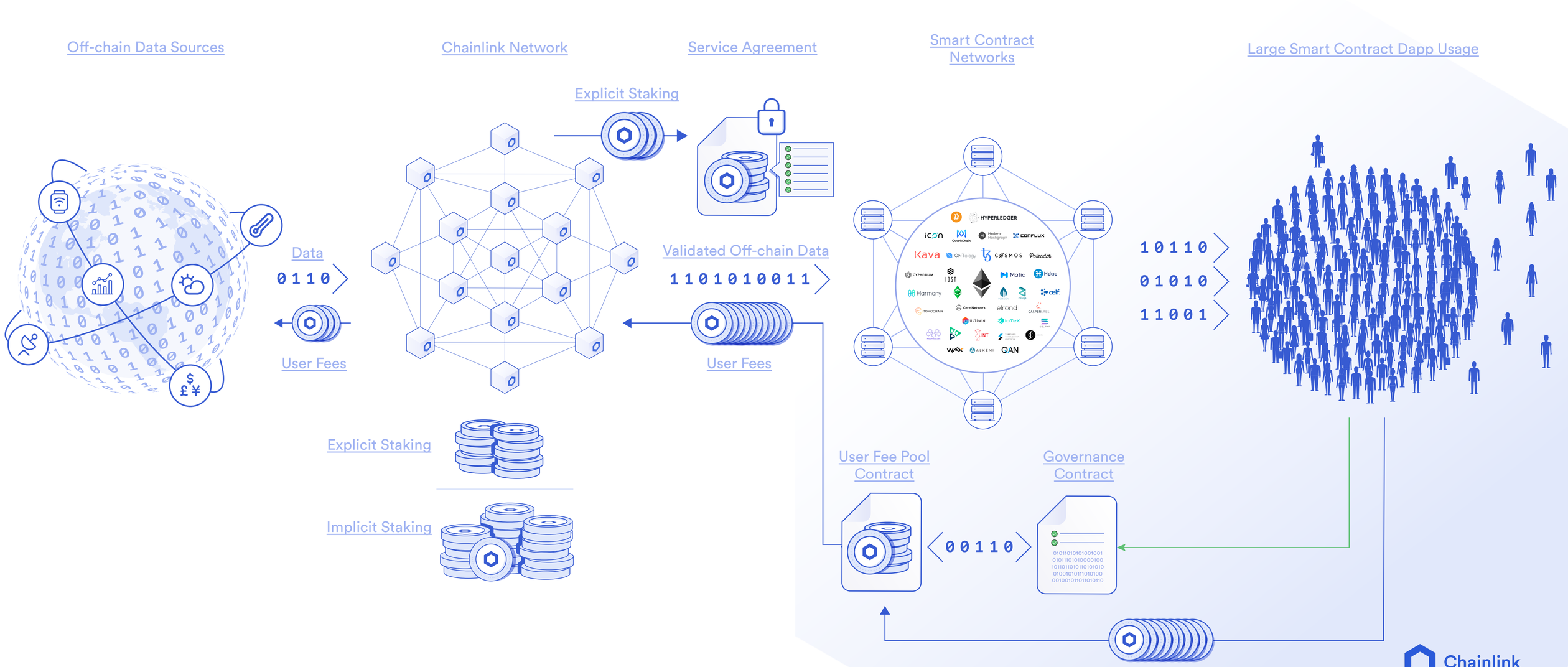
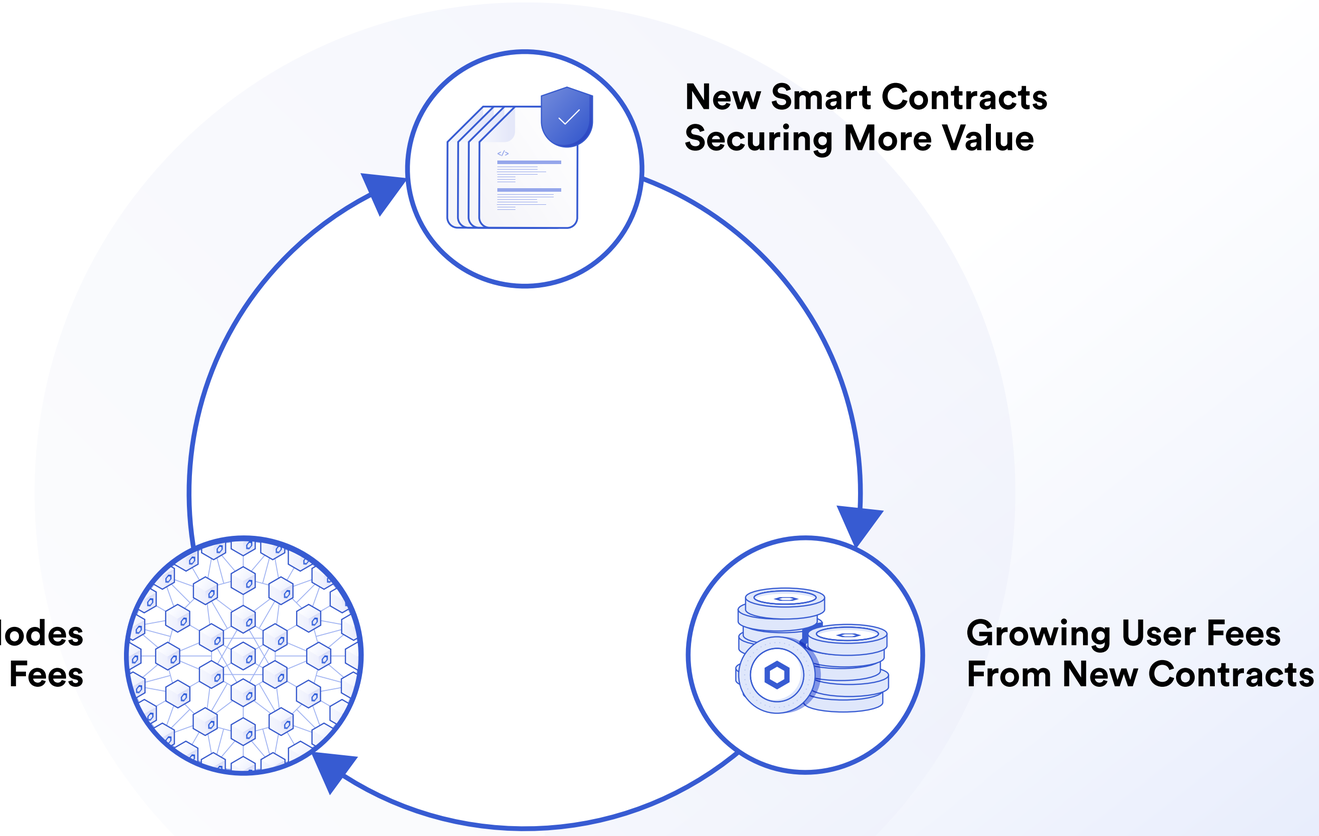
Fees and Staking Grow With Smart Contract Usage



Greater User Fees Drive Greater Security Guarantees



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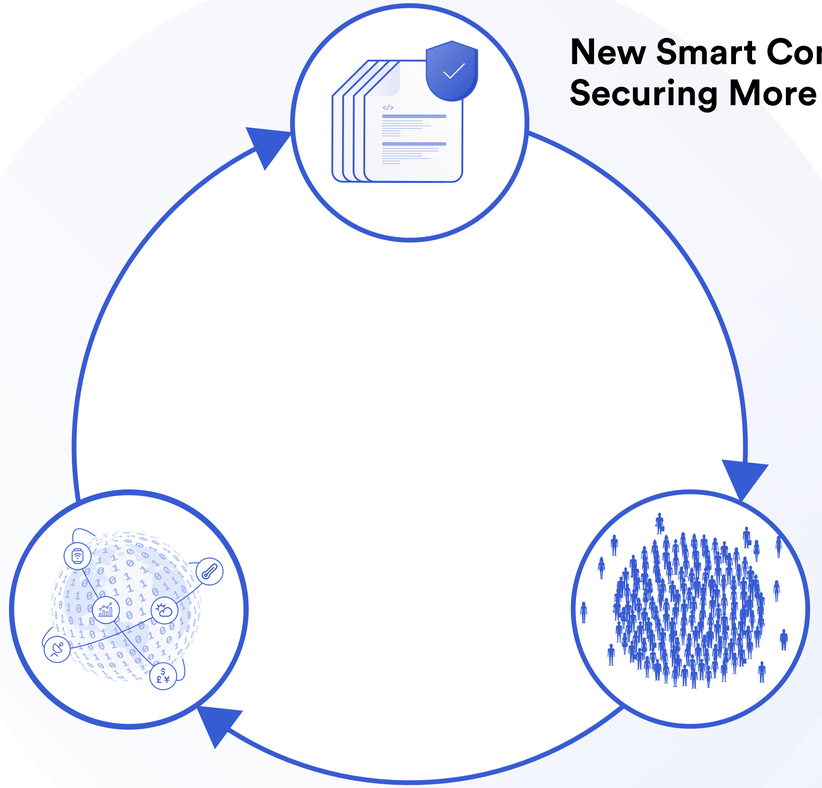
Greater Usage of Data Drives More Data On-chain



New Smart Contracts
Securing More Value

Increased Usage of Data
by Smart Contracts/Users

More APIs and Data
Sources Made Available

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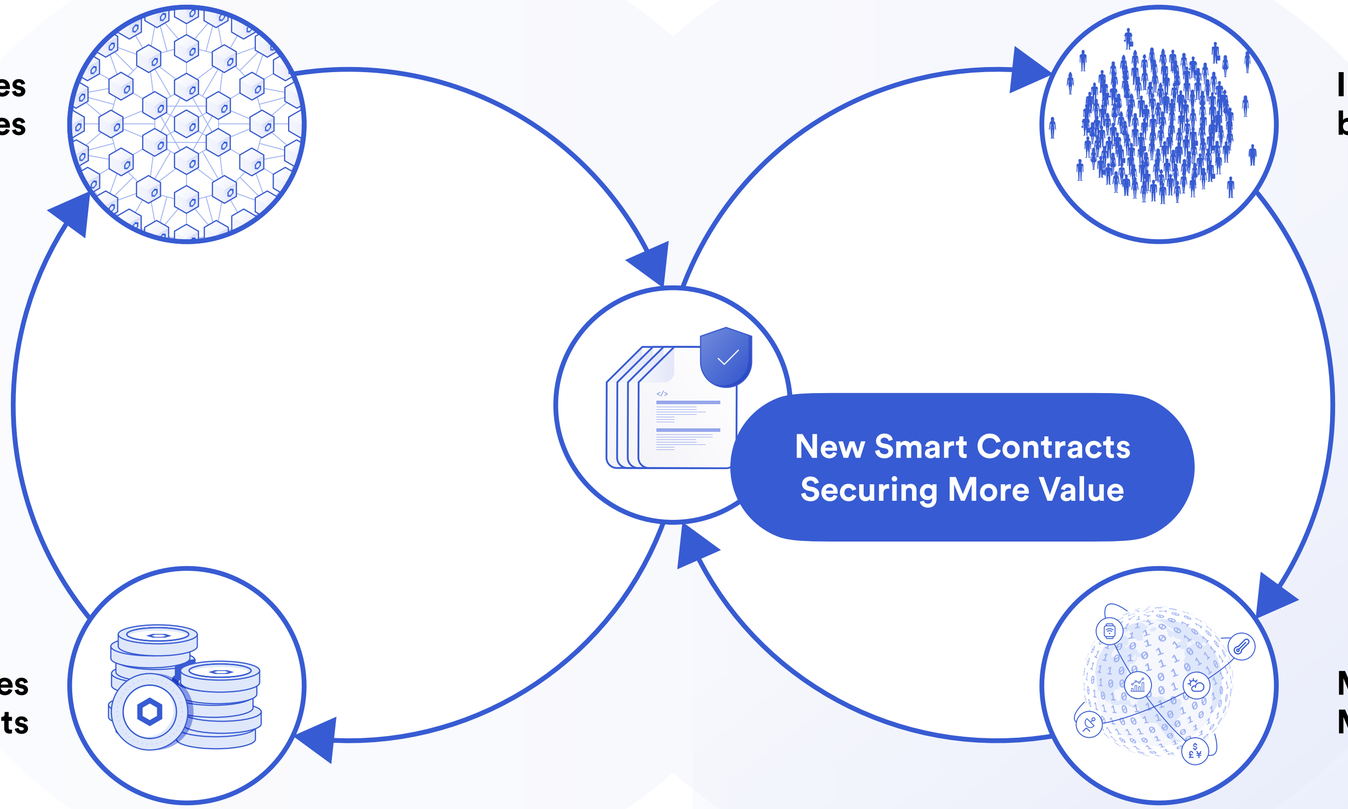
Smart Contracts as The Dominant Digital Agreement



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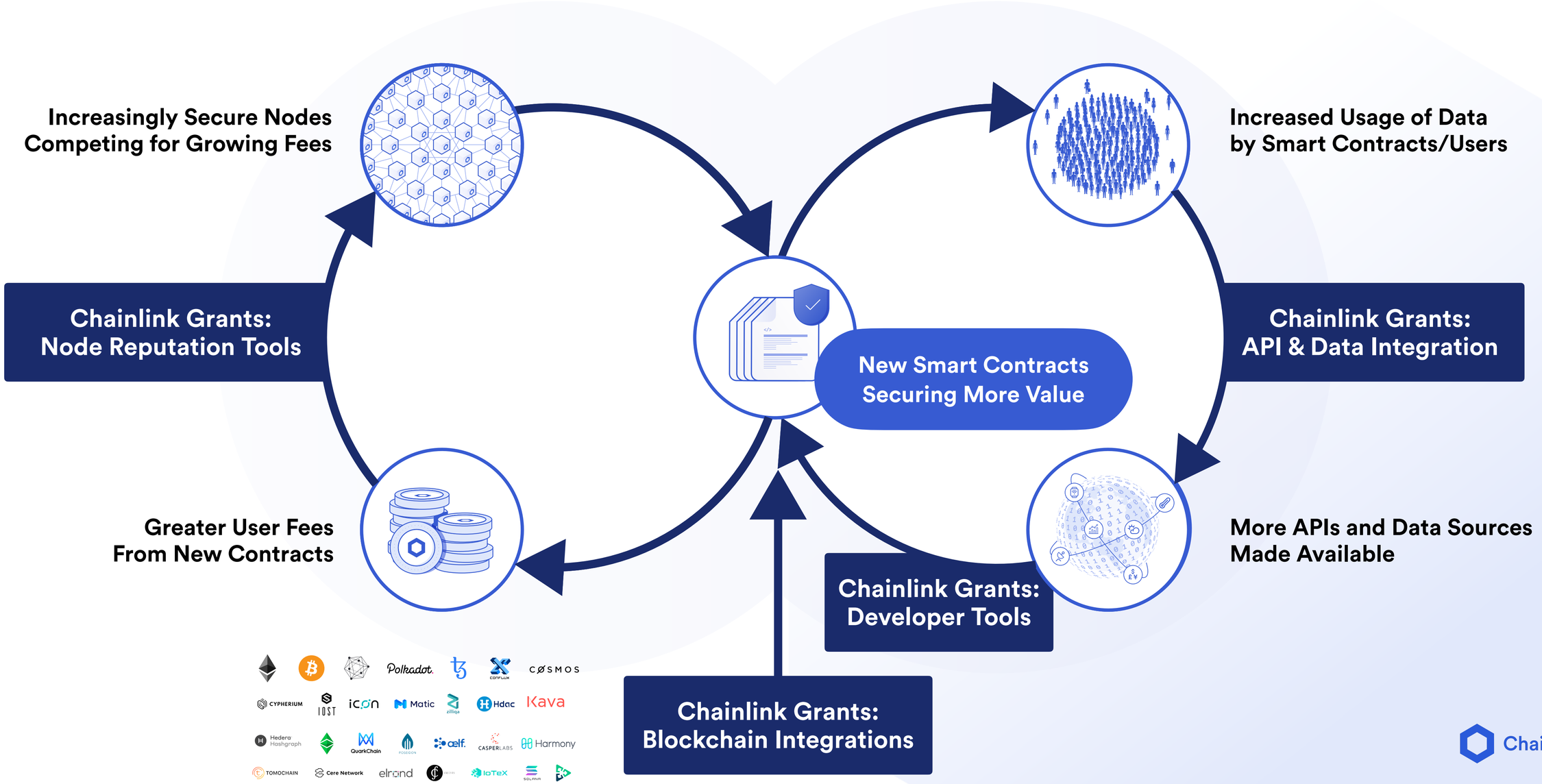
Accelerating the Creation of Various Smart Contracts



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We’re an idea meritocracy where the best ideas win.

We’re a remote team working with great people all over the world.

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Thank You

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