BLOCKS®

Yellow Paper

Network Architecture

BLOCKS Network

Developing a Hybrid, Blockchain-Based Web 3 Network Architecture

Abstract

The purpose of the BLOCKS Network yellow paper is to provide a deeper technical documentation of the proposed BLOCKS Network architecture for use by global consumers, corporations and governments.

The BLOCKS Network is intended as a decentralized, open source, Web 3 project that will require the continuous contribution and development of global stakeholders, adoptive end-users, blockchain and web developers to realize its full potential in the future.

Proposing a Hybrid, Blockchain-Based, Web 3 Network Architecture for More Decentralized Consumer, Corporate and Government Systems Design

The BLOCKS Network proposes a blockchain-based, Web 3 hybrid architecture that leverages the stability of existing parent blockchains, such as Ethereum, with improved asset tokenization protocols of ERC-777, utilizing token engines, smart contracts, hooks, reentrancy guards and registry commitments, reverse compatibility with ERC-20 for digital exchanges, and the use of cross-chain capabilities such as oracle functionalities and payment network rails to deliver fast speeds, reduced costs and non-siloed capacity for customers, SMB's, Fortune 500 enterprise and government deployments.

Historical Global Networks Delivered Speed, Cost, Coverage, Silo, Matching and Routing Efficiencies

The BLOCKS Project Team notes that the successful global network, carrier and content architectures of previous Web 1 and Web 2 cycles, have been those that best simplified, routed, matched and aggregated the customer experience across a *BLOCKS Network Continuum of "UX -> Product -> Price -> Market -> Fit."* Avoiding speed delays, costs, friction and silos in relatively unnoticed ways along the customer, developer or enterprise experience pathways.

New Technologies Like Blockchain Offer Improved Data Controls, Tracking and Commerce Pathways For Global Customers and Entities

The advent of new computing technologies, like blockchain, afford practical and ideological discussion opportunities around the return of personal data and peer-driven transaction between end users across a truly decentralized, world wide web (Web 3). The BLOCKS Network will be open source (OS), free to consumers, fully decentralized and hold relatively unlimited processing capacity for over 7.5 billion potential end-users.

Delivering Simplified Use Cases, Toolkits and Channels To Improve upon the Adoption, Scaling and Use Case Gaps in Previous Blockchain Network Proposals

The BLOCKS Network core technologies and toolkits are explored like the BLOCKS Token Engine, The BLOCKS Smart Contract Engine, BLOCKS DeFi Builder, BLOCKS Fund Manager, BLOCKS Origin Assurance® and BLOCKS Title Assurance and a fully decentralized, public / private BLOCKS Registry ("Parking Lot"), that will allow customers to better record, track and exchange value with each other over the lifecycle of financial assets, physical goods and authenticated transfers of ownership in the coming decades.

Operating in The Absence of Complex Consortia or Consensus Mechanisms

The BLOCKS Network operates independent of complex consortia or voting mechanisms, that can further intimidate or put-off corporate and government adoption of decentralized technologies.

In a Deloitte survey [1], fully 61% of Fortune 500 companies said they intended to explore private blockchain implementations, due to issues such as "complex consortiums" and obscure protocols and implementation toolkits.

Simplifying and Improving the Security, Transfer and Storage of Global Assets

This data will be presented on The BLOCKS Network in simple ways across easily accessed peer, public and private state channels; with implications for transactions across: physical assets, financial assets, esoteric assets, intellectual property, authenticated search, verified payments and asset transfers, goods marketplaces, bid engines and inbound capital markets pathways across borders and project categories.

Saving Customers Time, Money, Fee and Bureaucracy Layers on the Network

The goal of the BLOCKS Network is to deliver reduced fee and middlemen layers, faster transaction processing, better goods authentication and tracking and a more accountable layer of registry in systems design, ranging from things like patent filings to voting authentication on the network.

Improving Corporate and Government-Based Systems Design with Decentralization

The BLOCKS Network proposes a return to more autonomous citizen controls in the construct of global peer-to-peer (P2P) commerce, merchant marketplaces (SMB's), business-to-consumer (B2C) and government-to-constituent (G2P) programs development.

A Hybrid, Web 3 Network Architecture Allows for Integration of New Technologies Like Quantum in the Future

Finally, future technologies such as Quantum Computing are visited, along with light exploration around random number generation in Proof-of-Stake (POS), and the ongoing evolution of The BLOCKS Web 3 Network across a hybrid deployment of cloud, blockchain and quantum computing technologies that will keep consumer, enterprise and government data safer, more decentralized, financially inclusive and citizen-accountable in the future.

BLOCKS Network Architecture

BLOCKS

The BLOCKS Network delivers a BLOCKS mobile wallet, BLOCKS web and software client and a BLOCKS utility token on the near-term roadmap, against the backdrop of a public / private BLOCKS® Registry for the decentralized, neutral and historical tracking of tokenized assets, customer accounts, data storage and verification suites on the blockchain-based web.

BLOCKS - An Improved Tokenization Standard for Assets

The BLOCKS Network delivers an improved ERC-777 tokenization standard, that utilizes asset tokenization and tracking, smart contracts, and hooks, that plug in elegantly to the BLOCKS Registry and other registry-based technologies like ERC-1820. [2]

```
interface IERC777Sender {
function tokensToSend(
address operator,
address from,
address to,
uint256 amount,
bytes calldata userData,
bytes calldata operatorData
) external;
}
contract ERC777 is Context, IERC777, IERC20, ReentrancyGuard {
using SafeMath for uint256;
using Address for address;
IERC1820Registry constant internal _ERC1820_REGISTRY =
IERC1820Registry(0x1820a4B7618BdE71Dce8cdc73aAB6C95905faD24);
mapping(address => uint256) private _balances;
uint256 private _totalSupply;
string private _name;
string private _symbol;
```

Exploring a BLOCKS Transaction with Data


```
[
	{
		"from": "0x3a15C4aBeCB28d280Cb7386B50FDb82d7e601965",
		"topic": "0x06b541ddaa720db2b10a4d0cdac39b8d360425fc073085fac19bc82614677987",
		"event": "Sent",
```

```
                "args": {
                        "0": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
                        "1": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
                        "2": "0x2417280a7DfE93Ce1176c3042F038B2421e40633",
                        "3": "100",
                        "4": "0x5468697320697320612064617461207472616e7366657220746573742100000",
                        "5": "0x",
                        "operator": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
                        "from": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
                        "to": "0x2417280a7DfE93Ce1176c3042F038B2421e40633",
                        "amount": "100",
                        "data": "0x5468697320697320612064617461207472616e7366657220746573742100000",
                        "operatorData": "0x",
                        "length": 6
                }
        },
        {
                "from": "0x3a15C4aBeCB28d280Cb7386B50FDb82d7e601965",
                "topic": "0xddf252ad1be2c89b69c2b068fc378daa952ba7f163c4a11628f55a4df523b3ef",
                "event": "Transfer",
                "args": {
                        "0": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
                        "1": "0x2417280a7DfE93Ce1176c3042F038B2421e40633",
                        "2": "100",
                        "from": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
                        "to": "0x2417280a7DfE93Ce1176c3042F038B2421e40633",
                        "value": "100",
                        "length": 3
                }
        }
]
```


The above code is the result of a successful BLOCKS transaction that involved sending BLOCKS tokens and data. Look at the “args” section within the above object. You’ll see some important information about the transaction:


```
    "from": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
"to": "0x2417280a7DfE93Ce1176c3042F038B2421e40633",
"amount": "100",
"data": "0x5468697320697320612064617461207472616e7366657220746573742100000",
```


The “from” and “to” are our Sender and Receiver addresses. The “Amount” is the amount of BLOCKS that was sent in the transaction. The “data” is our encoded data message which is added to the transaction as a “byte” type in Solidity.

This data value can be decoded and read as plain text, which reads:

"0x5468697320697320612064617461207472616e7366657220746573742100000",

“This is a data transfer test!”

The data field is a powerful tool for inserting immutable data onto the blockchain. BLOCKS transactions can store unique data hashes and information that is either encoded or human readable.

BLOCKS Network - Trading, Tracking and Transfer of Peer and Entity-Based Assets

This allows not only for the improved ownership, tracking and transfer of assets, but for the development of public and private “parking lots” in which data can be made more

visible, verifiable and historically tracked over time by consumers, corporations and governments on neutral territory.

BLOCKS Smart Contract – Sample Peer-to-Peer Agreement and Transfer [2]

```
interface ERC777Token {
function name() external view returns (string
memory);
function symbol() external view returns (string
memory);
function totalSupply() external view returns
(uint256);
function balanceOf(address holder) external view
returns (uint256);
function granularity() external view returns
(uint256);

function defaultOperators() external view returns
(address[] memory);
function isOperatorFor(
address operator,
address holder
) external view returns (bool);
function authorizeOperator(address operator)
external;
function revokeOperator(address operator)
external;

function send(address to, uint256 amount, bytes
calldata data) external;
function operatorSend(
address from,
address to,
uint256 amount,

bytes calldata data,
bytes calldata operatorData
) external;

function burn(uint256 amount, bytes calldata data)
external;

function operatorBurn(
address from,
uint256 amount,
bytes calldata data,
bytes calldata operatorData
) external;

event Sent(
address indexed operator,
address indexed from,
address indexed to,
uint256 amount,
bytes data,
bytes operatorData
);
event Minted(
address indexed operator,
address indexed to,
uint256 amount,
bytes data,
bytes operatorData
);
event Burned(
address indexed operator,
address indexed from,
uint256 amount,
bytes data,
bytes operatorData
);
event AuthorizedOperator(
address indexed operator,
address indexed holder
);
event RevokedOperator(address indexed
operator, address indexed holder)
```

The Creation of Authenticated Listings on the BLOCKS Network

The BLOCKS Token Engine, BLOCKS Contract Engine, BLOCKS Title Assurance and BLOCKS Origin Assurance allow for the full-stack implementation of commerce in a disintermediated capacity.

- Assets
- Products
- Services
- Payments
- Recording
- Tracking
- Lifecycle Management

BLOCKS Smart Contracts as Means of Decentralized, Peer Exchange

Smart contracts allow for the immutable buy, sell and transfer of assets on the blockchain. The ability for peers, corporations or governments to move from a web of transactional content, to a web of transactional value, is fully realized in the process of tokenization, smart contracts, registration, payment and settlements (Trade. Track. Pay.).

The ability to exchange value in this manner means a) more authenticated and certifiable means of commerce, b) the confidence to transaction into new or cross-border capital markets, c) reduced beauracracy, fee layers and disputes around asset management and transactional records, ranging from land and title to voting and government contracts.

Standardized Token Types (Smart Contracts) Issued ERC-20 vs ERC-777 [3], [4]

Standard	ERC-20	ERC-777
Description	ERC-20 tokens are useful as a medium of exchange currency, voting rights, staking, and fractional ownership.	ERC-777 tokens are an iteration on ERC-20 and are focused around more complex interactions when trading tokens. The standard includes a data field as as well as hooks which allow accounts and contracts to reach when receiving tokens.
Functions	totalSupply() balanceOf(account) transfer(recipient, amount) allowance(owner, spender) approve(spender, amount) transferFrom(sender, recipient, amount)	name() symbol() granularity() totalSupply() balanceOf(owner) send(recipient, amount, data) burn(amount, data) isOperatorFor(operator, tokenHolder) authorizeOperator(operator) revokeOperator(operator) defaultOperators() operatorSend(sender, recipient, amount, data, operatorData) operatorBurn(account, amount, data, operatorData)
Events	Transfer(from, to, value) Approval(owner, spender, value)	Sent(operator, from, to, amount, data, operatorData) Minted(operator, to, amount, data, operatorData) Burned(operator, from, amount, data, operatorData) AuthorizedOperator(operator, tokenHolder)

		RevokedOperator(operator, tokenHolder)

BLOCKS Smart Contracts Govern Trustless Agreements Between Two People

The BLOCKS Token Engine® issues new tokens via a smart contract that is accomplished by either staking or sending a certain number of BLOCKS to a generated QR code for verification. The issued asset will be added to the immutable ledger of the Ethereum blockchain.

The BLOCKS Token Engine currently generates ERC-777 tokens [5] for customers and asset holders. The token details are also saved within the BLOCKS transaction data layer as a record or type of receipt.

The code snippet below represents data that was generated as an additional “receipt” after token creation. The asset and token detail data were then added to a BLOCKS transaction:

BLOCKS Transaction – Samoa Lodge Property Transaction

The example transaction below simulates an actual use case that was walked through by the BLOCKS Project Team on their market research trip to the Oceania Region, in which a beach front lodge owner sought to improve capital markets pathways, through the creation of 10 individual bungalows, each which were to be sold for $100,000 USD to investors who would receive 30 days free use per annum as well as 50% profit sharing of the bungalow rental fees.

https://ropsten.etherscan.io/tx/0x3e6cc5ba7427407ab0eaa2421d9f3a8c1503f98a584340db21ca7624e86f184e


```
[
	{
		"from": "0x3a15C4aBeCB28d280Cb7386B50FDb82d7e601965",
		"topic": "0x06b541ddaa720db2b10a4d0cdac39b8d360425fc073085fac19bc82614677987",
		"event": "Sent",
		"args": {
			"0": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
			"1": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
			"2": "0x2417280a7DfE93Ce1176c3042F038B2421e40633",
			"3": "1000000000000000000",
			"4":
"0x7b0a20202020226173736574e616d65223a202253616d6f61204c6f646765222c0a20202020226465736372697074696f6e223a
20222041205265616c20457374617461746520616e6420486f73706974616c69747920506f7274666f6c696f206f662054656e20436f6173
74616c2042756e67616c6f77732e222c0a20202020227065726563656e746167654f666665726564223a2033302c0a20202020227465
b656e4e616d65223a202253616d6f61204c6f646765222c0a2020202022746f6b656e53796d626f6c223a2022424c4f434b535f53616
d6f61204c6f646765222c0a20202020226f776e6572457468416464726573732 3a2022307863633841363363383365356461303664
433343134383631464635373146624132323438363335343422 2c0a20202020226465636 96d616c73223a20302c0a202020202274
6f74616c537570706c79223a2033300a7d",
			"5": "0x",
			"operator": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
			"from": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
			"to": "0x2417280a7DfE93Ce1176c3042F038B2421e40633",
			"amount": "1000000000000000000",
			"data":
"0x7b0a20202020226173736574e616d65223a202253616d6f61204c6f646765222c0a20202020226465736372697074696f6e223a
```

```
2022204120526561 6c20457374617465206 16e6420486f73706974616c69747920506f7274666f6c696f206f662054656e20436f6173
74616c2042756e67616c6f77732e222c0a2020202022706572636 56e746167654f666665726564223a2033302c0a20202020227 46f6
b656e4e616d65223a202253616d6f61204c6f646765222c0a2020202022746f6b656e53796d626f6c223a2022424c4f434b535f53616
d6f61204c6f646765222c0a20202020226f776e6572457468416464726573732 23a2022307863633841363363383365356461303 66
433343134383631464635373146624132323438363353434222c0a2020202022646563696d616c73223a20302c0a202020202274
6f74616c537570706c79223a2033300a7d",
                                "operatorData": "0x",
                                "length": 6
                        }
                },
                {
                        "from": "0x3a15C4aBeCB28d280Cb7386B50FDb82d7e601965",
                        "topic": "0xddf252ad1be2c89b69c2b068fc378daa952ba7f163c4a11628f55a4df523b3ef",
                        "event": "Transfer",
                        "args": {
                                "0": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
                                "1": "0x2417280a7DfE93Ce1176c3042F038B2421e40633",
                                "2": "1000000000000000000",
                                "from": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
                                "to": "0x2417280a7DfE93Ce1176c3042F038B2421e40633",
                                "value": "1000000000000000000",
                                "length": 3
                        }
                }
]
```


You can clearly see that there is more data in this BLOCKS transaction when compared the one described earlier in the white paper. Our token creation receipt data looks like this:


```
"data":
"0x7b0a20202020226173657365744e616d65223a202253616d6f61204c6f646765222c0a20202020226465736372697074696f6e223a
2022204120526561 6c20457374617465206 16e6420486f73706974616c69747920506f7274666f6c696f206f662054656e20436f6173
74616c2042756e67616c6f77732e222c0a2020202022706572636 56e746167654f666665726564223a2033302c0a20202020227 46f6
b656e4e616d65223a202253616d6f61204c6f646765222c0a2020202022746f6b656e53796d626f6c223a2022424c4f434b535f53616
d6f61204c6f646765222c0a20202020226f776e6572457468416464726573732 23a2022307863633841363363383365356461303 66
433343134383631464635373146624132323438363353434222c0a2020202022646563696d616c73223a20302c0a202020202274
6f74616c537570706c79223a2033300a7d ",
```


When this hexadecimal is decoded we can see the human readable text:


```
{
   "assetName": "Samoa Lodge",
   "description": " A Real Estate and Hospitality Portfolio of Ten Coastal Bungalows.",
   "percentageOffered": 30,
   "tokenName": "Samoa Lodge",
   "tokenSymbol": "BLOCKS_Samoa Lodge",
   "ownerEthAddress": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
   "decimals": 0,
   "totalSupply": 30
}
```


BLOCKS Smart Contract Hooks into BLOCKS Registry of Public and Private Databases

These smart contracts are placed into public and privately available “parking lots” in which historical databases can be formed for the lifecycle of products, transactions, certifications, titles and services rendered, with public and private sector applications ranging from automotive, real estate, supply chain, logistics, financial services, loan and origination and fulfillment, public records management, contracts management and voting administration.

interface IERC1820Registry {
function setManager(address account, address newManager) external;
function getManager(address account) external view returns (address);
function setInterfaceImplementer(address account, bytes32 interfaceHash, address implementer) external;
function getInterfaceImplementer(address account, bytes32 interfaceHash) external view returns (address);
function interfaceHash(string calldata interfaceName) external pure returns (bytes32);
function updateERC165Cache(address account, bytes4 interfaceId) external;
function implementsERC165Interface(address account, bytes4 interfaceId) external view returns (bool);
function implementsERC165InterfaceNoCache(address account, bytes4 interfaceId) external view returns (bool);
event InterfaceImplementerSet(address indexed account, bytes32 indexed interfaceHash, address indexed implementer);
event ManagerChanged(address indexed account, address indexed newManager);
}

Hooks For Better Data Optimization in Contracts

Hooks allow BLOCKS contracts to react to receiving tokens or sending tokens. The response behavior is determined programmatically by the contract's developer. An example of this is a smart contract that receives tokens then splits the received amount and distributes them to multiple addresses using hooks, thus more efficiently organizing and storing the data. [6]

Greater Control for Holders of Assets

Hooks provide greater control to holders, who can accept or reject incoming tokens based on some parameters, for example located in the data fields. Hooks can also be used to prevent spam tokens from being received.

BLOCKS Hooks [2]

function tokensReceived(address operator, address from, address to, uint amount, bytes calldata userData, bytes calldata operatorData) external; The holder MAY block a send or mint process by reverting. (I.e., reject the reception of tokens.)	function tokensToSend(address operator, address from, address to, uint amount, bytes calldata userData, bytes calldata operatorData) external; The holder MAY block a send or burn process by reverting. (I.e., reject the withdrawal of tokens from its account.)

Hooks allow streamlining of the sending process and offer a single way to send tokens to any recipient.

BLOCKS Registry - Improving Public and Private Database Layers

The BLOCKS Network will also be architected with improved registry, data storage features, web torrents, state channels, oracle functionalities, and payment rail networks to improve processing speeds, reduce customer costs and optimize matching, trading and routing engines across the network.

BLOCKS Title Assurance - The Immutable Storage of Records

Further, for physical assets that require greater verification certainty, a product Title Assurance is used to reconcile the ownership of the property against a secured database—then querying a title registry regarding ownership of the property.

Title Assurance has implications for property, physical and esoteric assets, and governments that require a secure and immutable ledger. Smart contracts are used to tokenize unique assets. The resulting non-fungible token (NFT) provides proof of ownership that can be verified against the government database and the blockchain.

BLOCKS Network tokens can be used directly in certain instances where decentralized ownership verification must be relied upon in the event government systems are not available. By adding unique textual data to a BLOCKS transaction, the token allows for direct access to immutable records on the blockchain.

Further referencing the transaction listed above in the BLOCKS Token Engine, the data layer of BLOCKS becomes a powerful tool for use cases like Title Assurance, where sensitive data can be encrypted or hashed to hide personally identifiable details, while still allowing for ownership verification.

BLOCKS Title Assurance – Samoa Lodge Transaction

"data":
"0x7b0a20202020226173736574e616d65223a202253616d6f61204c6f646765222c0a20202020226465736372697074696f6e223a2022204120526561c204573746174652061e6420486f73706974616c6974792050 6f7274666f6c696f206f662054656e20436f617374616c2042756e67616c6f77732e222c0a20202020227065726563656e746167654f666665726564223a2033302c0a20202020227465 6b656e4e616d65223a202253616d6f61204c6f646765222c0a2020202022746f6b656e53796d626f6c223a2022424c4f434b535f53616d6f61204c6f646765222c0a20202020226f776e657245746841646472657373223a2022307863633841363363383365353646130366433343134383631464635373146624132323438363353434222c0a20202020226465636963696d616c73223a20302c0a2020202022746f74616c537570706c79223a2033300a7d ",

Sensitive elements within the data body can also be password or secret key encrypted by using a standard like AES-256:

After parsing and decoding, all data stored as human readable text.	In this example “assetName” has been encrypted with AES-256. The secret key to decode is 1234.

{
"assetName": "Samoa Lodge",
"description": "A Real Estate and Hospitality Portfolio of Ten Coastal Bungalows.",
"percentageOffered": 30,
"tokenName": "Samoa Lodge",
"tokenSymbol": "BLOCKS_Samoa Lodge",
"ownerEthAddress": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
"decimals": 0,
"totalSupply": 30
}
	{
	"assetName": pGawdTD4HCssJbxCZbwp+A==,
	"description": " A Real Estate and Hospitality Portfolio of Ten Coastal Bungalows.",
	"percentageOffered": 30,
	"tokenName": "Samoa Lodge",
	"tokenSymbol": "BLOCKS_Samoa Lodge",
	"ownerEthAddress": "0xcc8A63c83e5da06d3414861FF571FbA224863544",
	"decimals": 0,
	"totalSupply": 30
	}

Improving Data Storage and Security via Web Torrents and State Channels

The lowering of gas fees, consumer fees and processing times will be accelerated in the development of peer-to-peer (P2P) asset swaps and smart contracts on state channels, such as Web3Torrent [7], a browser based torrenting client that supports incentivized peer-to-peer filesharing using micropayments.

These micropayments are built using state channels that run on top of the Ethereum blockchain. Users can upload files and begin seeding to earn small, incremental, amounts of money from anyone that downloads from them.

Web3Torrent is running live on the Goërli testnet and under experimentation by the BLOCKS Network team for integration into its micro-payments and data storage layers. [8]

Hooks Provide Improved Smart Contract Commitments to Database Registries

The send function make use of a data field. These fields may be empty for simple use cases, or they may contain valuable information related to the movement of tokens, similar to information attached to a bank transfer by the sender or the bank itself.

Mitigating Attack Vectors

Reentrancy is a known exploit of smart contracts, and ERC-777 is no exception. [9] This attack can occur when a function makes an external call to an untrusted contract before it resolves any effects. External function calls are inherent in ERC-777s hooks.

Fortunately for BLOCKS, these exploits have already occurred in the wild, and solutions exist to mitigate future exploits. The BLOCKS smart contract will implement reentrancy guards on external functions to mitigate one of the most common exploits. Reentrancy

guards, or mutex, places a lock on the contract state, which prevents cross-function reentrancy attacks.

```
contract ReentrancyGuard {
uint256 private constant _NOT_ENTERED = 1;
uint256 private constant _ENTERED = 2;
uint256 private _status;
constructor () internal {
_status = _NOT_ENTERED;
}
/**
* @dev Prevents a contract from calling itself, directly or indirectly.
* function is not supported. It is possible to prevent this from happening
* by making the `nonReentrant` function external, and make it call a
* `private` function that does the actual work.
*/
modifier nonReentrant() {
// On the first call to nonReentrant, _notEntered will be true
require(_status != _ENTERED, "ReentrancyGuard: reentrant call");
// Any calls to nonReentrant after this point will fail
_status = _ENTERED;
_;
// By storing the original value once again, a refund is triggered (see
// https://eips.ethereum.org/EIPS/eip-2200)
_status = _NOT_ENTERED;
}
```

BLOCKS Routing Engine - Delivering Cross-Chain Applications in Overcoming Performance Silos and the Blockchain Trilemma of Speed, Scalability and Security

Finally, cross-chain healing functionalities will be used for higher velocity trading, matching, payment and oracle functionalities, such as the testing of ChainLink, Coinbase Pro API's and Stellar Lumens inside our BLOCKS Fund Builder and BLOCKS Asset Manager and BLOCKS Payment Network products.

BLOCKS Payment Network and Matching Engines - Establishing Oracle Functionalities, Payment and Settlement Rails For Global Acceleration

It is proposed that payment and settlement networks like Stellar Network may hold outsource opportunities for improved payment speeds, network reach and settlement times, as well as lower fees to consumers vs. mega cap coins, traditional banks and wire services in both the developed and emerging markets.

A Decentralized Layer For Data Storage

Decentralized data and file storage becomes possible with BLOCKS. A large file can be split among several BLOCKS transactions. The file data is then parsed, merged and used to create "infohashes" or "Magnet URIs" when uploaded to webtorrent services. [10] This process decentralizes file storage and content distribution directly through peer-to-peer browser connections.

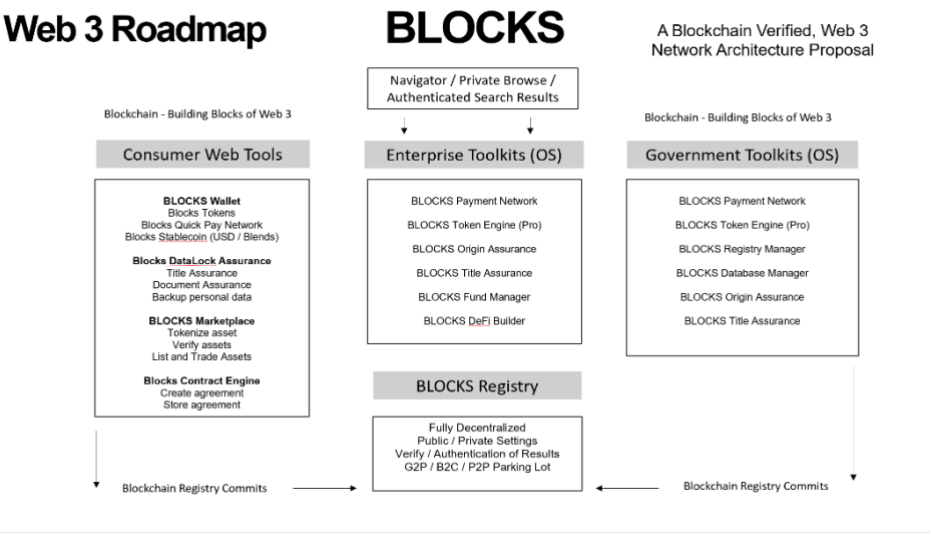
BLOCKS provides the foundational elements needed to create a decentralized cloud storage layer. By splitting files and saving data among several transactions, individuals and businesses can leverage a global decentralized storage network as an alternative to “Big Data” solutions.

Long-Term Roadmap

BLOCKS will deliver a near-term roadmap of BLOCKS Mobile App and BLOCKS Web client for consumers, corporations and governments to begin using blockchain or building on it with simple applications, SDK’s and toolkits that are customized for these respective channels.

Contingent upon capital and project uptake in the global markets, BLOCKS will be looking long-term to develop a BLOCKS browser and search engine client that allows for:

1. Privacy - Improved privacy controls for end-users
2. Personal Data - Improved personal data controls for end-users
3. Search - Authenticated and verified search outcomes
4. Customer Experience - Modern, Web 3 experience with improved design, data and personal customization features and tools for end-users and developers
5. Engagement Based Rewards – BLOCKS tokens in exchange for the exchange of engagement between customers and advertisers, refined by user customization profiles, at their choice.
6. Mobile Apps, SDK’s and Toolkits – Further open-source tools for development on the network



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Legal Disclaimers

The BLOCKS Network is intended as a fully decentralized, open source, Web 3 project that will require the contribution and development of global participants across the network and is not owned by anyone.

The BLOCKS Network team reserves the right to revisit, adjust or cancel any of the above proposed network upgrades, ideations, initiatives or developments, based on any variety of reasons ranging from capital or labor availability constraints, to unforeseen regulatory changes in blockchain-based laws.

This paper contains current thinking, is non-binding to any participants and will be adjusted as new planned and existing open-source technologies and applications become available, or are developed, for the further scaling, quality improvements or decentralization of The BLOCKS Network in service of its end users and developers. A BLOCKS Foundation will be established that will fund areas like education, research, network upgrades, development tools and grant applications for development on blockchain-based networks or future technologies, such as quantum computing.