

Government Blockchain Association

The GBA Technology Whitepaper

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Disclaimers

This document has not been reviewed or approved by the GBA Leadership Team. It is a concept paper and does not reflect any formal decision made by the organization. It is intended to define a proposal that will be submitted, reviewed, and if accepted, approved.

References and Related Documents

* GBA GBBP Technical Specification
* GBA Member DAO Phase 1 Concept paper, 3/18/2020 (Max Gravitt)
* GBA DAO Whitepaper

# Introduction

The Government Blockchain Association (GBA) is a global non-profit organization comprised of thousands of government and private sector professionals dedicated to the improvement of government operations using blockchain technology.

The GBA is committed to helping government and private sector professionals and organizations around the world understand, implement, and benefit from blockchain related technologies and capabilities.

The GBA aims to be a thought-leader in developing and implementing ground-breaking blockchain innovations to support new management and economic frameworks. Consequently, the GBA itself is the test subject of an experiment to explore how any group of people, including corporations and government agencies, could replace traditional hierarchical management and governance models with a consensus-based model, leveraging the collective intelligence to achieve the following:

* Create a self-sufficient incentive-based economy that promotes positive contributions to the GBA and enhances the value of the network for the GBA community.
* Prove the blockchain technology use-case to enable organizations with large communities to benefit using a similar incentive-driven ecosystem.
* Create the infrastructure to transform the government blockchain community into a Distributed Autonomous Organization (DAO).
* Prove as a testing ground for the ultimate long-range vision of using a token to fuel inter- and intra-government transactions.
* Contribute to the goal of efficient public spending by providing transparency and governance frameworks.

To initiate this exploration, the Government Blockchain Association is introducing the GBA Decentralized Autonomous Organization (DAO)[[1]](#footnote-1), the Government Business Blockchain Platform (GBBP), and the GBA Token as the key components of the GBA ecosystem.

Each of these components is discussed in detail in the following sections.

# GBA Decentralized Autonomous Organization (DAO)

The GBA has set out to explore a transition of its governance structure to a Decentralized Autonomous Organization (DAO) model.

The GBA DAO is initially conceived as a voting or survey system to support GBA governance activities. The GBA Leadership Team remains the ultimate authority and can override DAO decision recommendations.

By incorporating the use of distributed ledger technology, the GBA will discover the feasibility of an organization that:

* Tracks and fairly rewards an individual’s contributions to an organization
* Grants those individuals voting power within an organization
* Operates by a rules-based consensus model
* Maintains transparency to eliminate fraud
* Enables sustainability through immutable records and peer-to-peer (P2P) transactions

# Government Business Blockchain Platform (GBBP)

## GBBP Overview

The Government Business Blockchain Platform is an Ethereum Proof-of-Authority[[2]](#footnote-2) (PoA) Consortium, write-permissioned blockchain configured, owned, and operated by the GBA.

All nodes on the GBBP are currently implemented with Hyperledger Besu[[3]](#footnote-3). Core blockchain nodes may utilize either a fully maintained system or a software as a service (SaaS) platform.

The GBA has 9 node managers in 3 regions. The organization seeks to increase the number of nodes and expand into additional global regions to enhance the worldwide network.

## Gateways

The platform includes GBA gateway nodes that connect the GBA Hub Blockchain to the EOS, Telos, Hive, and Ethereum blockchains. The nodes watch each blockchain and call smart contracts to transfer information and tokens. The gateways allow GBA tokens to freely pass between blockchains through the central GBA Hub as specified in the *GBA GBBP and Token Technical Specification* document. Additional gateways can be configured to accommodate any other blockchain for which client blockchain tokens and software are created.

## Transaction Fees

Gas[[4]](#footnote-4) prices are zero and simple token transactions on the core blockchain have no fees. The member pays any gas prices and/or any transaction or other fees on linked blockchains.

Gateway nodes may utilize either a fully maintained system or a software as a service (SaaS) platform. Node/gateway owners are responsible for the costs of maintaining their nodes/gateways. Machine node/gateway owners are also responsible for keeping the software on their nodes (including operating system, firewall and anti-virus) up to date. SaaS platforms provide this automatically as part of the service.

## Consensus Participants

Consensus participants (nodes that can write to the blockchain) and gateways must be approved by the GBA and may be removed at any time. Consensus participants and gateways shall not serve non-GBA functions nor connect to non-consortium machines except for standard Internet functionality, gateway-linked blockchains, and GBA-approved oracles[[5]](#footnote-5).

Consensus participants and gateways shall not accept connections from any non-participant except for GBA wallets, gateway-linked blockchains, GBA-approved oracles and GBA-approved read-only nodes.

# GBA Token

There are 3 GBA tokens: **Reward** Token, **Utility** Token, and **Play** Token.

## Reward Token

The GBA Reward Token functions as a reward for GBA members, contributors, and leaders who make the most significant and impactful contributions to the GBA organization. GBA Reward Tokens may be used to pay for GBA membership, training, conference admission, participation on special projects, and other products and services within the GBA ecosystem.

Other groups may also use the GBA Reward Token to redeem products and services of their own or require a certain level of Reward Token ownership as a pre-requisite for certain privileges.

The GBA will never sell GBA Reward Tokens, but GBA Token holders may send tokens to other GBA wallets.

### GBA Reward Token Specification Summary

Token Symbol: GBAREW

Total Supply: (Fixed) 1,000,000,000

Divisible up to: 2 Decimal places (0.01)

## Voting Process

The initial purpose of the voting process is to operationalize the GBA bylaws and voting activities.

DAO members may submit proposals to the DAO and use their Voting Tokens to determine the outcome of a proposal. The proposals are considered in accordance with a quadratic voting[[6]](#footnote-6) process. This allows members to use or spend their vote based on the importance to the proposal. As individuals earn rewards, they also earn the right to influence the direction and activities of the GBA.

## Utility Token

Members can use GBA Utility Tokens to pay for GBA products or services, and to pay transaction fees when users access or use certain resources on the network.

The Ethereum-based GBA Utility Token can be used to transfer value across the network of supported blockchains.

The Utility Token will be tied to the value of Ethereum and can be bought from and redeemed by the GBA for an equivalent number of Ethereum (ETH) tokens.

Utility Tokens are “sold” by sending Ethereum to the GBA Ethereum main net account to receive an equal number of Utility Tokens. Conversely, Utility Tokens may be redeemed/exchanged for an equal number of Ethereum Tokens.

Other blockchains will be supported in the future for sale and redemption, but the value of Utility Tokens will always remain equal to the current value of Ethereum and exchanged with the blockchain’s local currency according to that rate.

Redemption fees will include the transaction costs or fees are assessed by redeeming local blockchain.

The number issued is always equal to the number of Ethereum in the GBA’s Ethereum account.

### GBA Utility Token Specification Summary

Token Symbol: GBAUTIL

Total Supply: (Variable) Equal to the number of Ethereum in the GBA’s Ethereum account

Divisible up to: 18 Decimal places (0.000000000000000001)

## Play Token

The GBA Play Token is used only for teaching, tutorials and platform testing purposes; they have no other value. The Token Tutorial and other sources distribute Play Tokens.

### GBA Play Token Specification Summary

Token Symbol: GBAPLAY or PLAY (TBD)

Total Supply: (Fixed) 1,000,000,000

Divisible up to: 2 Decimal places (0.01)

## Wallet

GBA members can use MetaMask, an open source wallet application available for various web browsers, that enables users to send and receive GBA tokens to and from another wallet.

MetaMask serves as a keychain for the GBBP’s complete wallet functionality.

The GBBP allows GBA tokens to be transferred between supported blockchains. The wallet user interface allows users to:

* Initiate cross-blockchain or core blockchain token transfers
* Store their GBA tokens and track their GBA token balance
	+ - * List GBA buy and sell requests

### Self-Sovereign Identity

EarthID, a self-sovereign identity solution, is integrated into the GBBP to provide decentralized identity management through the GBA wallet. The system will authenticate users and verify their active GBA membership status to allow GBBP network access.

## GBA Token Allocation & Distribution Model

### First Allocation & Distribution

The GBA bylaws specify the initial electors in the DAO based on their financial, time, and other impactful contributions to the establishment of the GBA organization early in its inception. In the first genesis, the GBA has distributed one GBA Reward Token to this small group of electors. For the list of electors, refer to the *GBA Bylaws*.

### Subsequent Allocations & Distributions

#### Allocations

GBA tokens are distributed each month from the GBA cold storage reserve to the GBA Distribution Bank that holds the available tokens for distribution. They are distributed at a rate of one token per active GBA member per month. Each quarter, the active number of GBA site users are multiplied by three (3) to determine the quarterly allocation of GBA Tokens for that quarter. They are distributed to active GBA members based on the model described in the following section of this document.

However, the DAO may change the monthly distribution amount at any time in the future. The GBA DAO may also determine the subsequent Token allocation criteria and distribution algorithm.

#### Distributions

Each GBA Reward Token holder will receive 100 voting credits each quarter. The weight of their voting credits is proportional to the number of GBA Reward Tokens they hold. At the end of each quarter, the vote credits may be spent on Token Requests submitted by active GBA members.

Any active GBA member may submit a token request to the GBA DAO. The request details the work that was performed and any results of that work. All the requests are listed on an online voting page.

Each active GBA member with voting credits may spend credits on one or more of the Token Requests. They could allocate all 100 voting credits to a single Token Request, or they may distribute their voting credits among many token requests.

The second allocation is a “catch-up” release of GBA Reward Tokens to retroactively reward those who have made significant contributions to the GBA since its inception. The second allocation covered the period between GBA inception and the current month. The third and subsequent allocations will be limited in scope to the preceding calendar quarter.

Note: Quadratic voting principles will be implemented to prevent a single member with a large token balance to accumulate a disproportionate amount of voting power.

## GBA Token Secondary Market

GBA members may opt in to a GBA Leader Board where the public may view who has Reward Tokens and their current balance. GBA wallet holders may also send and receive tokens and messages to one another. The GBA is not involved in any transaction between GBA wallet holders.

## Compliance

In order to comply with SEC regulations, the GBA will never sell GBA Reward Tokens. Initially, the tokens will be released manually on a quarterly basis. It is currently intended that eventually they will be released by a smart contract on a more frequent basis; however, no promises are expressed, or implied and token distribution may cease, or the details altered at any time.

### Secondary Market Considerations

GBA Token holders can sell their GBA Reward Tokens on the secondary market.

### Token Exchange

The GBA will not list the token on an exchange until the regulatory environment is defined to the point that GBA leadership has confidence that it can be done in full compliance with relevant legal, regulatory and statutory requirements.

# Key Benefits

## GBA Organization

The GBA token offers significant benefits to GBA.

* Allows the creation of an incentive-based economy to fuel the advancement of their program that still allows users to gain monetary rewards
* Rewards early members who grow the community the most while encouraging member retention
* Improves member acquisition by closing parts of the ecosystem to those who do not have access to tokens

## GBA Community Members and Participants

GBA members will benefit in several ways. Membership will include access to the GBBP, and members will be automatically granted a stake in the organization. Members will be incentivized to continuously contribute to GBA’s knowledge base, and tokens will drive membership growth for GBA, increasing the value of GBA membership.

# Token Roadmap

The table below describes the planned milestones to continue progress on the developing and maturing of the GBA token.

| **Milestone** |  | **Target Date** |
| --- | --- | --- |
| Review/approve the GBA Token Whitepaper | Board of Directors, Executive Director |   |
| Build GBA Leader Board | COO, CMO, CTO | Approval plus 1 week |
| Distribute GBA tokens | COO, CMO, CTO | Complete |
| Deploy GBA DAO Interface | DAO Working Group Engineering Team | Approval plus 1 week |
| Build GBA Token Payment Portal | GBBP Engineering Team | Approval plus one month |
| Internal Communications 2nd allocation Release (Members) | Communications Director | Complete |
| External Press Release | Communications Director | Approval plus one month |

# Appendix A – GBBP Architectural Overview

The GBBP is a multi-blockchain platform. GBBP nodes are established based on a set of rules established and maintained by the GBA. The GBBP nodes all maintain copies of the following items:

* Code that calculates and verifies the distribution & allocation of assets on the blockchain
* Shared ledger of the on-chain wallets, assets and balances on each linked blockchain platform.

Each GBBP node is linked with an existing blockchain platform. Each GBBP node contains an interface that facilitates the transfer of assets on and off the linked blockchain platform.

The GBBP nodes allow for assets to be moved between GBBP nodes and wallets. Wallets are also link to major cryptocurrency blockchains to allow wallet holders to send and receive cryptocurrencies as a payment to buy or sell assets.

The diagram below describes the interactions between the GBA, the GBBP nodes and the GBA wallet.

*Refer to the GBA GBBP Technical Specification for more information.*



**GBBP Design Approach**

GBA evaluated various technologies to implement the GBBP; the GBBP architecture design meets core requirements: free transaction costs, a large and stable Ethereum code base, relative ease of development, lower risk of collusion and other security concerns, and the growing interest in and popularity of Ethereum-based architecture (e.g., Besu) among various governments.

At that time, EOS was less stable, and there were concerns about collusion.

The DAO is being built on Telos with a EOS code base because it limits the concerns about collusion and stability.

# Appendix B – GBA History and Background

In August of 2016, Gerard Dache started a meetup called the Government Blockchain Professionals to bring people together to talk about how blockchain technology would impact government. After weeks of marketing and promotions, only two people attended the first event. By January of 2017 approximately 40 people were attending events. In March, Mr. Dache officially registered the Government Blockchain Association (GBA) as a legal entity, and later that year launched the organization’s website, gbaglobal.org.

With dozens of chapters initiated globally, and more to be onboarded, GBA Working Groups were formed to focus discussions and initiatives around chapter-specific topics.

Today the GBA is an organization of more than fifteen thousand affiliated professionals, members, and volunteers across approximately a hundred chapters all over the world developing blockchain solutions globally to deploy locally.

There are now more than 50 GBA Working Groups covering Acquisition Management; Architecture, Engineering, and Construction; Artificial Intelligence; Asset Management; Banking; Big Data; Budgeting, Appropriations & Tracking Working Group; Cannabis; Contract Management; Crypto Asset Management; Cybersecurity; Digital Identification; Economic Analysis; Economic Development; Education & Training; Energy; Financial Regulatory & Compliance; Government Ontology; Health Care; Higher & Continuing Education; Identity Management; Information Technology; Insurance; Intellectual Property; Land Titling; Legislative & Legal; Mining & Cryptocurrency; Public Accountability; Records Management; Simulation; Smart City; Supply Chain; Taxes; Voting, and more.

# Appendix C – The GBA Token Project Team

**Board of Directors:** The Board of Directors’ review and approved the *GBA Token Whitepaper* and any changes that may have an economic or legal impact on the GBA organization or their members.

**Executive Director:** The Executive Director reviews and approves any formal decisions submitted to the Board of Directors.

**GBA Leadership Team:** Reviews and approves any technical architecture changes and algorithmic changes to the GBA token that may impact GBA members.

**Chief Technology Officer (CTO):** The CTO is responsible for the design, development, implementation and maintenance of the GBA token suite of technologies. This includes managing the change control process to ensure that all changes are adequately reviewed and approved by the appropriate levels of oversight.

**Working Groups:** The Working Groups form an advisory function. However, all comments from the Working Groups will be recorded and addressed. All recorded comments and responses will be presented to the GBA Leadership Team (Executive Director, COO, CMO and CTO) for review and approval prior to any change that may impact GBA members. All Working Group leads will be informed of any changes to the *GBA Token Whitepaper*.

**GBA Node Managers:** Individuals responsible for managing GBA Nodes and reviewing, approving, and complying with the *GBA Token Requirements Specification*. These individuals are identified in the *GBA Token Requirements* Document.

# Appendix D – Acknowledgements

The GBA would like to express our appreciation to the following individuals for their contribution to the development of this whitepaper:

* Bill Elder (Communications)
* [Denise Ferguson](https://www.gbaglobal.org/members/dferguson/) (System QA)
* [Gerard Dache](http://www.gbaglobal.org/members/gdache/profile) (Executive Director)
* [Joe Walton](https://www.gbaglobal.org/members/waltonjb/profile/) (Token/GBBP Working Group Lead)
* [Mark Waser](https://www.gbaglobal.org/members/mark-wasergmail-com/profile/) (CTO)
* [Max Gravitt](https://www.gbaglobal.org/members/digital-scarcity/profile/) (DAO Working Group Lead)
* [Miles Vaughn](https://www.gbaglobal.org/members/mvaughncogentlaw-co/profile/) (Compliance)
1. Wikipedia: A [Decentralized Autonomous Organization (DAO)](https://en.wikipedia.org/wiki/Decentralized_autonomous_organization): is an organization represented by rules encoded as a computer program that is transparent, controlled by shareholders and not influenced by a central government. [↑](#footnote-ref-1)
2. Proof of authority (PoA) is an algorithm used with blockchains that delivers comparatively fast transactions through a consensus mechanism based on identity as a stake. (Wikipedia.org) [↑](#footnote-ref-2)
3. GBA evaluated various technologies to implement an architecture that would meet its core requirements: free transaction costs, a large and stable Ethereum code base, relative ease of development, lower risk of collusion and other security concerns, and an Ethereum-based architecture (e.g. Besu) as its popularity is increasing among various government organizations. [↑](#footnote-ref-3)
4. Gas is a unit that measures the amount of computational effort that it will take to execute certain operations. (source: Blockgeeks.com) [↑](#footnote-ref-4)
5. Blockchain oracles are third-party service providers. They provide external information to smart contracts and act as a bridge for connecting the outside world of applications and services with blockchain. Source: <https://101blockchains.com/blockchain-oracles/> [↑](#footnote-ref-5)
6. <https://en.wikipedia.org/wiki/Quadratic_voting> [↑](#footnote-ref-6)