Structural Overview v.20200520

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Contents

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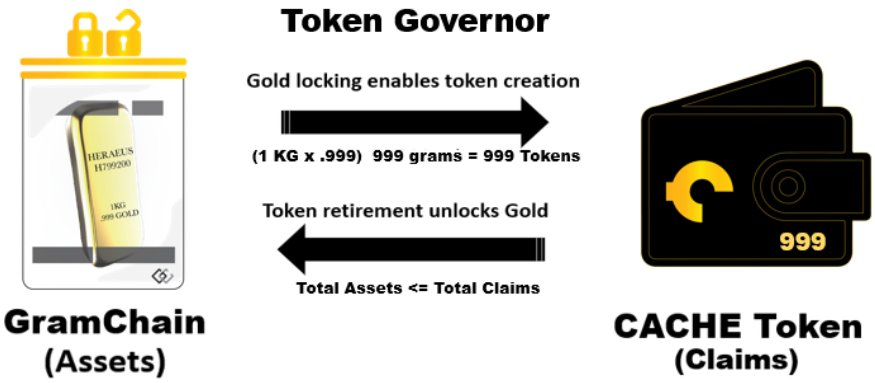
CACHE Structural Summary

CACHE token is an Ethereum ERC-20 standard token customized to transparently track claims upon fungible physical assets such as physical gold. CACHE is designed to provide superior proof of reserve (PoR) assurance and transparency as compared to existing asset-backed tokens.

The defining feature of CACHE is that tokens must be 100% backed by a physical asset that is registered, tracked by RFID, photographed and assigned to CACHE directly by commercial vault personnel using the **GramChain** asset tracking system (www.gramchain.net).

Accredited vaults use GramChain to track each asset parcel, broadcasting tracking data which is immutably embedded on a public blockchain in real time while allowing the general public to view this data via the CACHE GramChain Explorer. GramChain incorporates powerful checks and balances, is vault agnostic, multilingual, scalable, deployable by third-party vaults with minimal effort and requires zero integration with existing vault systems.

Each token is backed by one gram of CACHE-locked pure gold bullion where "pure gold" is defined as the bullion's stated mass times its stated purity, ensuring complete fungibility across a vast variety of gold bullion types. CACHE token issuance and redemption is restricted by the **Token Governor** which ensures that tokens are always fully asset backed by locking and unlocking parcels using GramChain.



The purpose of GramChain is to provide an **easily deployable, public, flexible** standard to digitize physical assets in the most **transparent, fungible** and **immutable** manner possible.

The purpose of CACHE is to track and redeem claims on GramChain physical assets and provide **transparency, completeness**, **reliability and automation**, including efficient collection of storage fees.

Together they enable gold to be securely converted into CACHE claims and vice versa, allowing individuals and companies to hold gold in either digital or physical form. CACHE itself is also suited for a new generation of Gold ETFs that can efficiently bring transparency, robustness and lower administrative costs to the industry.

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GramChain - Fungibility, Valuation, Tracking and Assurance

GramChain records data in data structures called “events” that occur on asset parcels tracked by RFID tags. Events contain three types of data:

- “**Event**” fields which record one-time data specific to the event, such as “who did what when”.
- “**Parcel**” fields which record the parcel’s physical characteristic and are created exclusively by vault personnel. Parcel fields are passed from event to event for a given RFID tag.
- “**Status**” fields that are passed from event to event for a given RFID and track where the parcel is, optionally who the custodian is and whether or not it is encumbered or “locked”.

Data fields can also include hashes of uploaded document or images. For a new scan event an image of the parcel is mandatory, and for an assignment event a scan of a vault statement pdf listing the parcel and the assigned custodian is necessary.

The raw data fields are hashed using the SHA-256 algorithm which generates 64-character hashes that are written to a public blockchain providing a unique, immutable signature of the event’s data. The raw event data, event hashes and the transaction ID for every event can be viewed publicly via the GramChaim Explorer at www.gramchain.net.

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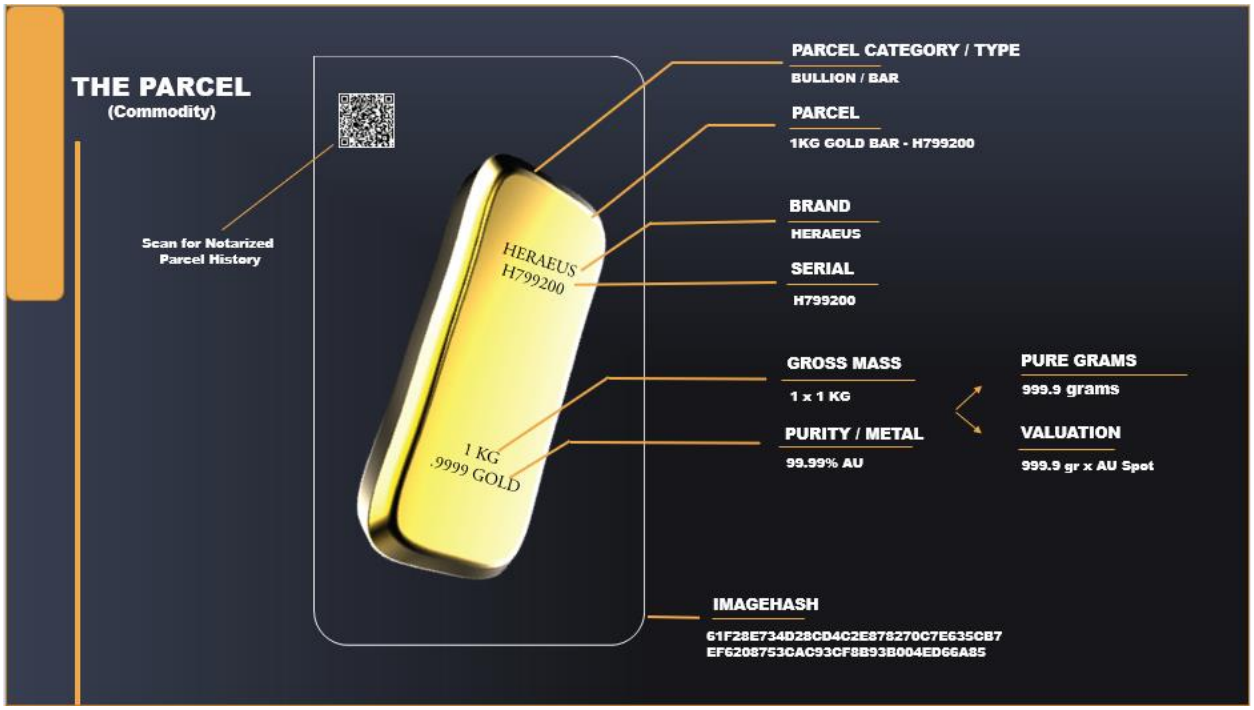
Parcel Fields: Fungibility & Valuation

GramChain uses the bullion's stated mass (e.g. 1 kg) times its stated purity (e.g. 99.99% purity) to obtain pure grams (e.g. 999.9 grams). Physical bar or coin premiums are not taken into account. The pure grams are valued based on the spot price of gold near real time.

This standardization makes CACHE's pure gold grams fungible and easy to value. The system encourages large gold bars (1 kg and above) to be deposited because such bars have the lowest premiums over spot.



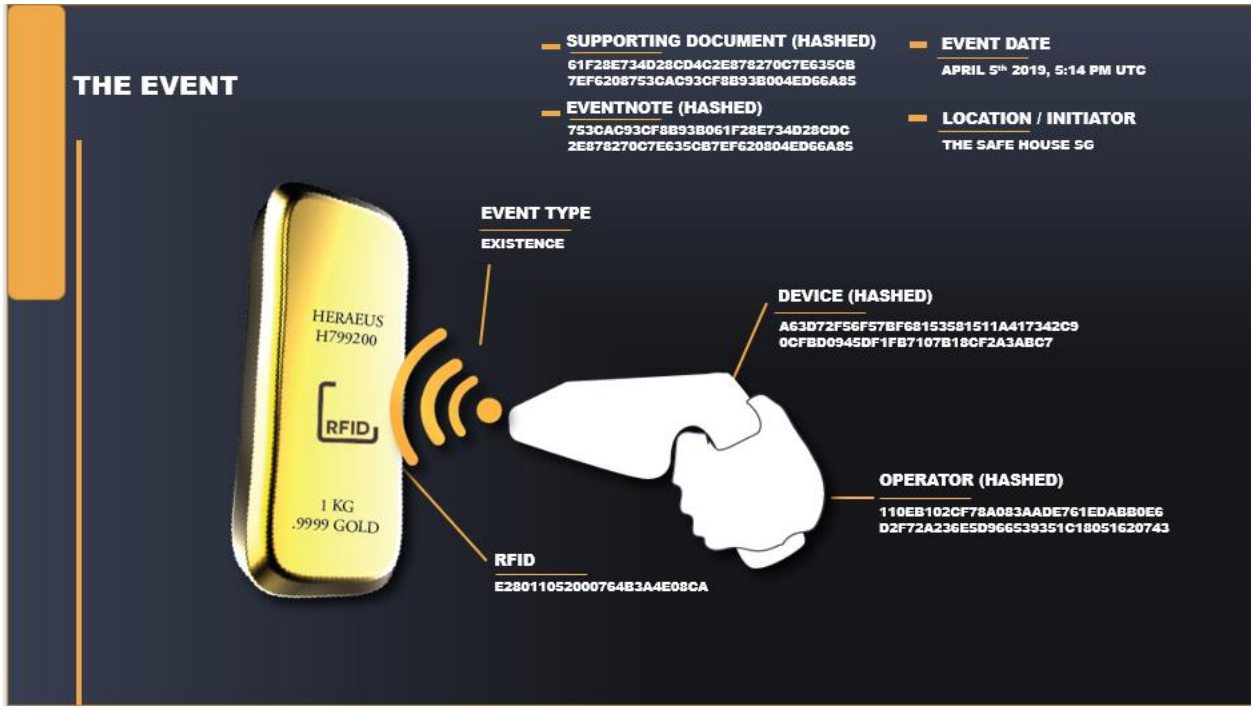
For CACHE tokens to be created the following two GramChain vault events are required:

1) Scan Event. The parcel's physical characteristics are entered by the vault operators. This consists of applying a GramChain RFID tag and entering the parcel's metal, weight, purity, brand and serial number (if applicable) into the scanner. Scan events are a precondition for **Assignment Events**.

2) Assignment Event. Custody of the asset needs to be determined. The custodian is the customer on record at an accredited vaulting facility for the given parcel. After the **Scan Event**, the vault's secure logistics department will verify the parcel data entered, assign the bar to CACHE and upload the supporting vault statement as prove of assignment. Assignment events are a precondition for the creation of CACHE tokens to ensure the bullion is indeed under the control of CACHE at the respective vault and cannot be removed or sold without CACHE's authorization.

Event Fields: Tracking and Assurance

Event fields record who-did-what, and where and when they did it. A **Device**, for example, determines the location of the scan while the **Operator** identifies who is operating the scanner. Sensitive data, such as the operator login, are hashed and salted before being published thereby allowing for a public audit trial without revealing any of the actual login details to the public.



Gramchain is designed to be extremely transparent and traceable and therefore provides a high degree of **data assurance.** This transparency is created through adherence to three important principles:

- **Origin Integrity**: Events are always initiated by the party directly responsible for the given event and can be reliably tracked back to the initiating party. There is no reliance whatsoever on third parties.
- **Data Immutability**: Raw event data is hashed during upload and broadcasted to a public blockchain, guaranteeing data integrity via an immutable signature of the event.
- **Public Auditing:** Events, including the raw data, photos and hashes are publicly available in the Gramchain Explorer making anyone a potential auditor and providing the ability to independently verify all event data.

See www.gramchain.net for more details and demo.cache.gold for the CACHE redemption process (Username: *explorerdemo* , Password: *2000tokens*).

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CACHE – Digital Gold

The CACHE Gold Token is an ERC-20 compatible token that represents one gram of pure gold as recorded on GramChain by the vault personnel where the gold is physically stored. GramChain therefore provides CACHE token with a proof-of-reserve (PoR).

While CACHE is compatible with the ERC-20 standard, the token has additional functionalities that are non-standard. In particular, there is a storage fee that accrues over time as the token is held and a transfer fee that is paid when tokens are transferred from one address to another.

These fees are totally separate from Ethereum transaction fees which are paid in ETH when interacting with smart contracts, and are instead paid "in kind" with the CACHE token itself. The fees are collected when users transact or if a given address has no activity for a long period of time.

These functionalities are transparent and immutable providing long-term certainty to token holders.

Custom Functionalities Overview

The CACHE token has the following unique functionalities:

- **Token Governor Requirement:** Creation of new tokens must occur through the Token Governor process to ensure that sufficient unencumbered physical pure gold is stored under a CACHE GramChain account at accredited vaults.
- **Storage Fee**: A fixed 0.25% (25 bps) storage fee per year will be sent to the CACHE **Fee Address**. The fee is prorated and sent either when a transaction occurs or, should no transaction occur for an extended time period (e.g. one year), it can be collected by CACHE automatically.
- **Transfer Fee**: A 0 to 0.1% (0 to 10 bps) transfer fee will be sent to the CACHE fee address whenever tokens are transferred to a new address. The default fee is 0.1% and cannot be raised above 0.1%, but it can be lowered at any time at the discretion of CACHE.
- **Redemption**: CACHE tokens can be redeemed for any physical gold stored in any CACHE vault account. The entire event history and all details of the parcels backing CACHE are publicly available in real time on CACHE's GramChain explorer.

The storage fee collection process is fully automated and transparent and is used to pay vault fees, audit fees and insurance on the physical bullion stored at the participating GramChain approved vaults.

The custom functionalities described above are implemented via smart contract and will be made public (open source) before launch. The smart contract is also audited by third-party technical auditors and their findings will also be made public prior to launch.

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Internal Addresses

There are six addresses associated with the contract that are considered "internal" addresses. These addresses are not subject to storage or transfer fees.

1. **Owner** Address: The contract owner address is the only address that can create new tokens. After the contract is deployed, this address will be changed to a multi-signature (“multisig”) address so that tokens can only be created if multiple signers approve the transaction.
2. **Storage Fee Enforcer** Address: This address is able to force payment of storage fees and late fees on delinquent accounts. This is separate from the owner address because there is no security risk presented by allowing a single signer on these transactions since all fees collected are transferred to a multisig address.
3. **Backed Treasury** Address: The backed treasury is where all newly created tokens are sent prior to entering circulation. The **Backed Treasury** will be a multisig address.
4. **Unbacked Treasury** Address: The **Unbacked Treasury** is where tokens removed from circulation are stored. When gold bars need to be unlocked, the redeemed tokens will be moved to the **Unbacked Treasury**. Locking tokens in the Unbacked Treasury Address rather than burning them makes accounting and auditing simpler and more transparent. The Unbacked Treasury will be a multisig address.
5. **Fee** Address: The address where storage and transfer fees for external accounts are collected.
6. **Redeem** Address: The address that receives tokens to be redeemed for physical gold. The Redeem Address will also be used as part of the KYC process and will only accept transfers from whitelisted addresses.

While sending of tokens is governed by CACHE’s public smart contract, creation and retiring of tokens is handled by the **Token Governor**. The Token Governor ensures that the total amount tokens of tokens in circulation are always equal or less than the amount of pure gold grams **CACHE-locked** by GramChain.

Once deployed, the smart contract code cannot be changed without issuing a new token.

The Token Governor

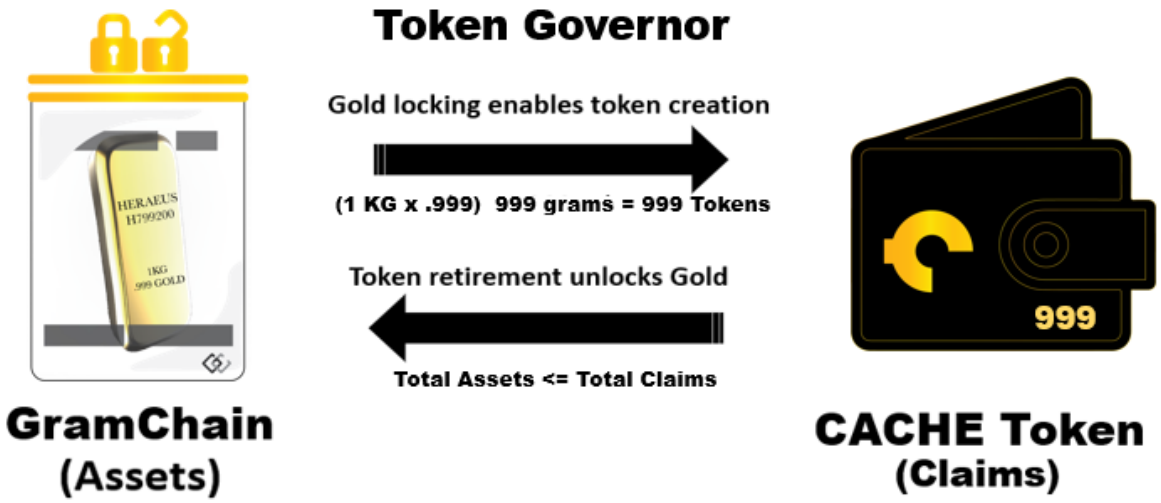
The **Token Governor** enforces that the number of tokens in circulation can never exceed the amount of physical gold that is stored and locked by CACHE. The **Token Governor** facilitates updates to add and remove tokens from circulation while enforcing full backing of every token in circulation. The **Token Governor** ensures that each token in circulation is backed by one gram of pure physical bullion.

The Token Creation Process

New tokens can only be created if the following requirements are fulfilled:

1. Parcels must have an associated GramChain RFID which is applied when a vault operator scans and photographs the parcel creating a Scan Event which determines:
    - The amount of pure gold grams
    - The unique ID of the parcel
2. GramChain gold parcels must then be assigned to CACHE by the vault as part of the Assign Event:
    - CACHE is the recognized custodian of the gold by the vault.
    - A data accuracy check was performed by the vault.

Only once the assign event is recorded will the **Token Governor** allow lock and unlock events on a given parcel which in turn allows the creation of new tokens if total grams CACHE-locked is greater than or equal to total tokens in circulation.



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The Token Redemption Process

Should a token holder decide to exercise his right to redeem his tokens for physical bullion, he would initiate the **Token Redemption** process. To do so he would be required to have a CACHE account and have passed CACHE's AML/KYC process which is modelled to fulfill the requirements of Singapore's Ministry of Law implementation of the Precious Stones and Precious Metals (Prevention of Money Laundering and Terrorism Financing, "PSPM") Act.

The process would involve logging into the CACHE website, specifying the address holding the CACHE tokens to be redeemed and verifying the CACHE token balance. The CACHE GramChain explorer would then allow the user to select parcels for delivery.

The user would then be given 30 minutes to transfer the required CACHE token balance from their registered address to the CACHE **Redeem Address**.

If the CACHE tokens are not received within the 30-minute window, the redemption process is cancelled automatically and any tokens received late would be returned to the sender. If the tokens are received within the 30-minute period, the CACHE redemption will be confirmed, the tokens will be retired to the unbacked treasury address, and the requested parcel(s) will be simultaneously unlocked by the **Token Governor**.

Logistics and delivery fees will be handled by the vault as is customary in the industry.

A partial demo of the CACHE redemption process is available at demo.cache.gold. (Username: *explorerdemo* , Password: *2000tokens*).

AML/CFT Controls

The CACHE token is an ERC-20 token that can be freely transferred between addresses in a manner similar to Bitcoin. It is the use of a public, instead of private, blockchain that renders these tokens trustless and tradeable on digital asset exchanges.

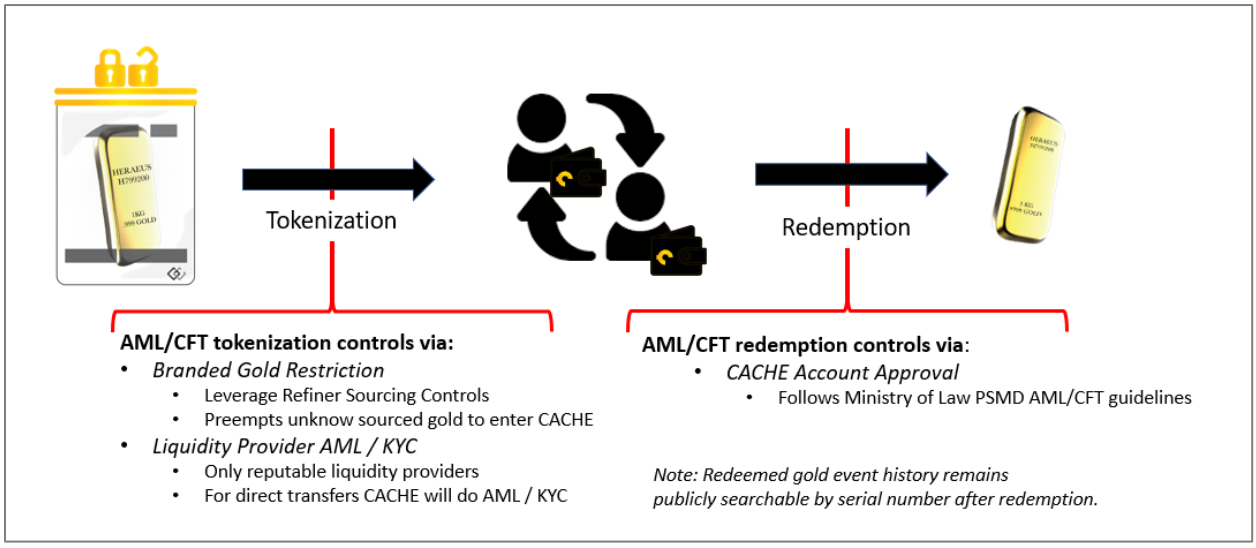
Just like physical bullion, AML/CFT checks will be applied on direct purchases or on redemptions of physical gold, which itself is limited to gold from LBMA or large refineries with strong gold sourcing controls. Still, CACHE tokens can be transferred between third parties like any other public blockchain token.

CACHE will implement AML/CFT policies that follow the guidelines specified by Singapore Ministry of Law's Precious Stones and Precious Metals Prevention of Money Laundering and Terrorism Financing Act (PSPM Act).

In particular CACHE will:

- **Perform Tokenization AML / CFT** checks either directly, when gold is transferred to CACHE, or indirectly through reputable bullion liquidity providers.
- **Restrict bullion sources** to LBMA Good Delivery refineries. These refiners have strong AML / CFT frameworks in place with clear origin policies.
- **Perform Redemption AML / CFT** checks on any delivery request.

Should an AML/CFT check fail then the transaction will be prohibited. Furthermore, bullion tracking by serial number is public information available via GramChain, therefore CACHE is providing physical tracking and transparency.



AML / CFT control schematic

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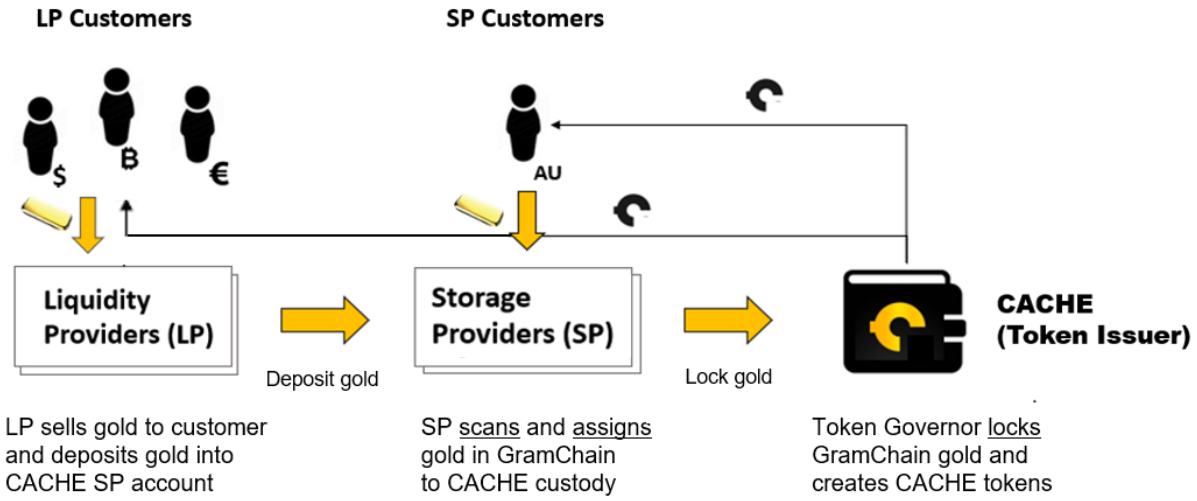
CACHE Business Model

As a legal entity, CACHE's only functions are to convert physical gold stored at approved GramChain **Storage Providers** (SPs) into tokens and to facilitate redemption of CACHE tokens for physical gold. CACHE does not accept any assets or payment instruments other than physical gold and CACHE tokens, and requires all physical gold to be deposited into a CACHE account at an approved SP. CACHE is neither designed nor meant to be used as a digital payment token.

Customers that wish to purchase tokens using fiat currencies or digital assets can purchase physical gold from CACHE Liquidity Providers (LP), such as approved bullion dealers, and then deposit the gold into a CACHE account at an approved SP.

Customers who already have gold stored with an approved Storage Provider can transfer the gold directly to CACHE's account for tokenization.



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Gold Token Utility Examples

Direct Distribution Channel

A well-designed token is very flexible and can be used as the basis for many types of services and projects while providing superior reliability, transparency and cost savings. Gold dealers, for example, can sell gold to customers who could then request the gold to be transferred to a CACHE account at a commercial vault and receive CACHE tokens in exchange for the physical gold.

Under this scenario gold dealers would have a one-time bullion sale and storage providers would collect ongoing storage fees from CACHE.

Platform Distribution Channel

CACHE tokens could easily be used as the basis for ETFs. Fund managers and financial institutions could use these tokens as building blocks for new and innovative financial products and services while avoiding the complexities of managing, valuing and documenting the underlying physical assets.

Since ETFs tend to charge more than 25bps per year in fees, any difference in fees would be gross profit for the token holder as compared to typical precious metal ETFs.

Low-Cost and Transparent Storage

CACHE is designed to be an efficient way to store physical bullion for the average customer since the 0.25% storage fee tends to be lower than typical retail storage costs in the industry. In this respect it is important to point out that CACHE tokens represent claims to fully-backed physical unencumbered gold. This is different from zero storage fee token schemes that are used to finance inventory or lease out bullion to third parties and thus cannot provide the transparency and redeemability provided CACHE.

Furthermore, CACHE leverages the redundancies and resilience inherent to public blockchains by automating storage fee collection without incurring the costs and risks that institutions would typically face with legacy investment products.

Glossary

CACHE Token: An Ethereum ERC-20 compatible token that is based on an open source smart contract that enforces full gold backing via GramChain parcels.

GramChain: A physical asset and event tracking system designed for bullion vaults. GramChain provides tracking, assurance, fungibility and valuation of precious metals. See www.gramchain.net for more details.

GramChain Event: GramChain stores all data in data structures called "events". This event-based data structure is very flexible and ideally suited to work in conjunction with public blockchains.

Liquidity Provider (LP): An entity that sells bullion to customers to be stored at a CACHE storage provider. For example, a bullion buyer might instruct their bullion dealer (the LP) to deposit the gold at the local CACHE SP instead of taking delivery.

Storage Provider (SP) / Vault: An entity specializing in secure insured storage of physical assets, such as gold, that has implemented GramChain asset tracking

Token Governor: An administrative interface for creating new tokens, removing tokens from circulation and managing delivery requests while ensuring each token in circulation is fully physically backed.

GramChain Specific:

GramChain Assign Event: This event determines who the custodian of the parcel is and is performed by a Storage Provider. The event is created via a the GramChain web interface. The Custodian assignment must match the vault's records and requires a corresponding statement to be uploaded.

GramChain Custodian: The vault-assigned controller of a parcel. The Custodian is the entity that controls the storage account at the vault as per the vault's management system. Any bullion used to back CACHE tokens must be scanned and assigned to CACHE by the vault where it is stored. Only once assigned to CACHE can the Token Governor lock the available parcels to back creation of new tokens.

GramChain Delivery Event: Set by the Cache Token Governor to assign the parcel to be delivered.

GramChain Gold Valuation: For informational purposes, GramChain uses near real-time (3- to 4-minute delay) gold spot prices to conservatively value parcels based on their pure gram mass.

GramChain Gross Grams: GramChain tracks bullion mass in grams. Gross grams represent the mass either as specified on the bullion or as measured at sea level with the precision of $1/100^{th}$ of a gram.

GramChain Lock Event: Set by the CACHE Token Governor to mark the parcel as encumbered by CACHE tokens. While locked the parcel cannot be moved, sold or further encumbered.

GramChain Parcel: A unique asset tracked by RFID. A parcel can either be a single item (e.g. a bullion bar) or multiple items secured at the same time (e.g. 10 maple leaf gold coins in a tube). A photo of the parcel is always provided and is valued based upon pure grams of gold.

GramChain Pure Grams: Gross Grams adjusted for the stated purity. The purity adjustment follows the LBMA methodology for converting gross mass into fine mass as described in Annex H of the The Good Delivery Rules for Gold and Silver Bars.

GramChain Scan Event: A parcel scan by a vault operator to create or audit a parcel. Scan events set the physical characteristics and include a photo of the parcel. Scan events can only be performed by vaults when the parcel is physically present and they require the use of a GramChain scanner.

GramChain Service Provider: A third party that performs specific events on GramChain. An Example would be third-party auditors. Valuators or testers are other common service providers.

GramChain Storage Provider: A facility which stores parcels and administers Scan and Assign Events. This is often referred to as a "vault".

GramChain Unlock Event: Set by the Cache Token Governor to mark the parcel as no longer encumbered, meaning it can be moved or sold.

Hash Function (SHA-256): A cryptographic hash is a cryptographic signature of data. A hash function is a one-way function. This makes it suitable for digital fingerprints of given data. SHA-256 is one of the strongest hash functions currently available.