

LD2: The cryptocurrency for a new value-stable paradigm

by Steven Brendtro and Extra von NotHaus

Abstract

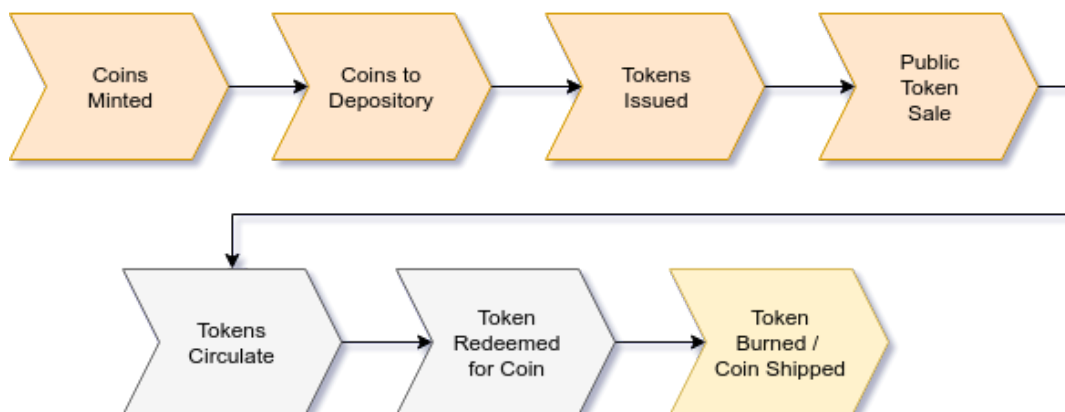
LD2 is an asset-backed cryptocurrency that facilitates vaulted, physical, ownership of precious metals and the real-time trading of physical precious metals. LD2 embodies the spirit, methodology, principles and community of the Liberty Dollar currency.¹ The management of LD2 LLC leverages years of operational and market experience from Liberty Dollar, which issued over \$50 Million USD of silver and gold into circulation² through its physical and digital, private alternative currencies. Building on this predecessor, LD2 aims to function as a “stablecoin” – a globally liquid, value-stable, low-volatility cryptocurrency, without a central bank, that’s 100% backed by, and 100% redeemable at any time, in precious metals³.

The LD2 cryptocurrency is a blockchain-based digital warehouse receipt⁴, issued by [ISSUER], with the precious metals backing on deposit with the [DEPOSITORY], and the [AUDITOR] providing a monthly examination of all holdings. The [AUDITOR] works on behalf of the token holders to verify that all issued tokens are backed by the prescribed amount of precious metals. This third-party vaulting verification and independent auditing ensures that there is exactly one troy ounce of physical precious metal in the vault for each token issued, at all times – independent of token ownership.

As a digital warehouse receipt, every LD2 token is fully redeemable through the [DEPOSITORY] for its precious metals backing. Physical redemption not only structures LD2’s economic and value proposition, but builds trust with token holders, something badly needed in the cryptocurrency ecosystem.

LD2 Life Cycle

1 Token = Digital Warehouse Receipt for 1 troy ounce of precious metal



¹ <http://libertydollar.org/>

² Bernard von NotHaus, Monetary Architect, Liberty Dollar, citing internal accounting records

³ <https://thecontrol.co/stablecoins-a-holy-grail-in-digital-currency-b64f3371e111>

⁴ https://en.wikipedia.org/wiki/Warehouse_receipt

Introduction

Ten years before Bitcoin⁵ existed, even before the likes of PayPal⁶, Liberty Dollar launched⁷ the second-most successful physical currency in the United States. Over the eight years that followed, Liberty Dollar would issue over \$50,000,000 worth of currency, 100% backed by .999 fine silver and .9999 fine gold. This included a digital currency with more than 100,000 account holders, which remained fully functional until Liberty Dollar suspended operations in 2009.⁸

Liberty Dollar was truly an innovator and first-mover in private, alternative currencies, especially digital ones. Virtually all the current platforms and competitors have modelled themselves in some way after the Liberty Dollar mission and structure. Indeed, the keynote speaker for one of the very first Bitcoin conferences⁹ was none other than Bernard von NotHaus, the founder/monetary architect of Liberty Dollar.

LD2 LLC builds on these great foundations with the mission of creating the foremost precious-metals-backed cryptocurrency. This will be achieved over the following four stages:

- LD2.zero** A private-issue, limited edition, collectible, silver-backed token
- LD2.silver** LD2 Silver issued as an open-ended silver-backed token
- LD2.gold** LD2 Gold issued as an open-ended gold-backed token
- LD2.card** Establish a network-branded debit card for LD2's ultimate liquidity

Background

Historical Precedent

The Liberty Dollar currency was first issued by the National Organization for the Repeal of the Federal Reserve (NORFED) on October 1, 1998.¹⁰ NORFED subsequently re-branded itself as Liberty Services. In February, 2003 the physical Liberty Dollar currency expanded into a digital currency, “eLD”, which functioned until Liberty Services suspended operations in 2009. Every Liberty Dollar issued, whether digital or physical, was 100% backed by, and 100% redeemable at any time, for the underlying precious metal.

Their success was largely due to Liberty Dollar's warehouse receipt model. 100% of the Liberty Dollars put into circulation pre-2007, as well as the “eLD” currency, were redeemed or remain redeemable by its holders, even after the federal seizure and eventual return of Liberty Services' assets.¹¹

This, in fact, is the precise goal of LD2 LLC – to create a fungible, value-stable, asset-backed cryptocurrency, immune to outside forces, influence, and manipulation.

Legal Foundation

Just like the Liberty Dollar warehouse receipt, a LD2 token is a digital warehouse receipt and represents a contract made in accordance with the Uniform Commercial Code (“UCC”). The UCC is a uniform act put

⁵ Bitcoin genesis block, January 3, 2009 (<https://blockchain.info/block-index/14849>)

⁶ PayPal founded December, 1998. <https://en.wikipedia.org/wiki/PayPal>

⁷ Liberty Dollar launched as NORFED on October 1, 1998.

⁸ Liberty Dollar suspended operations July 31, 2009 [https://en.wikipedia.org/wiki/Liberty_dollar_\(private_currency\)](https://en.wikipedia.org/wiki/Liberty_dollar_(private_currency))

⁹ BTC Miami (<https://btcmiami.com>)

¹⁰ Liberty Dollar launched as NORFED on October 1, 1998.

¹¹ http://www.libertydollarnews.org/2015aug/632_c_r.pdf

into law in an effort to standardize commercial transactions. It has been adopted by all 50 states, the District of Columbia, and the vast majority of U.S. territories.¹² In addition to the UCC, other national and international legislation provides groundwork for digital contracts made under the LD2 token model.

Electronic Signatures

The Uniform Electronic Transactions Act (UETA) and Electronic Signatures in Global and National Commerce Act (E-Sign Act) both support agreements to conduct business by electronic means and electronic signatures. Subsequent US court cases have upheld the validity of such transactions.¹³ Beyond the United States, electronic signatures are valid and legally binding throughout the majority of countries around the world. Blockchain transactions are signed in a way that establishes this electronic signature.

Control of Electronic Document of Title

UCC § 7-106 specifies the following terms to define a person's control of an electronic document of title. It states that the system must be one that:

- “reliably establishes [the owner] as the person to which to which the electronic document was issued or transferred”
- Provides “a single authoritative copy of the document” that is “unique, identifiable... and unalterable” (which can be converted to/from a digital medium per UCC § 7-105)
- Identifies the person asserting control as “the person to which the document was most recently transferred”

All the requirements of § 7-106 are fulfilled by using blockchain transactions. The electronic document, a *digital warehouse receipt*, is represented as tokens issued on, and transacted over, a blockchain.

Warehouse Receipts

Multiple paragraphs and sections of the UCC help LD2 further frame these digital warehouse receipts:

UCC § 7-104, *Documents of Title*. All LD2 tokens issued are negotiable, as stated in § 7-104(a), and (c), by specifying that one troy ounce of .999 fine silver is on deposit at the warehouse ([DEPOSITORY]) and is to be delivered to the bearer (i.e. token holder) on demand.

UCC § 7-105, *Reissuance in Alternative Medium*, explains that both physical and electronic documents of title can be interchanged through reissuance. These digital documents are every bit as valid as physical ones, provided their substitution is appropriately executed.

UCC § 7-202, *Form of Warehouse Receipt*, underscores that the warehouse receipt must specify the following: 1) the location of the warehouse facility, 2) the date of issue of the receipt, 3) the unique identification code of the receipt, 4) a statement whether the goods are delivered to the bearer, named person, or its order, 5) the rate of the storage and handling charges, 6) a description of the goods being stored, 7) the signature of the warehouse or its agent. All of these are either part of the distributed LD2 tokens or included in the general terms of the LD2 digital warehouse receipt, which is made publicly available at the time of the token purchase, embedded onto the smart contract, and plainly expressed on [ISSUER]'s website.

¹² https://en.wikipedia.org/wiki/Uniform_Commercial_Code

¹³ *Alliance Laundry Systems v. Thyssenkrupp Materials*, 2008 U.S. Dist. LEXIS 58985 (E.D. Wisc. Aug. 5, 2008).

UCC § 7-207, *Goods Must Be Kept Separate; Fungible Goods*, makes a provision for commingled storage of goods. The precious metal coins backing the LD2 digital tokens are stored in a manner that commingles coins from the same issuance. This does not affect the ability to produce the coins to the bearer on demand.

Silver vs. Gold

As with the precursory Liberty Dollar currency, initial issuances will be in silver, followed by a gold issuance. There are numerous business, economic, and marketing advantages to starting with a silver-backed token. Many such benefits are outlined in the 2003 book, *The Liberty Dollar Solution*.¹⁴ As the solid backing for a “stablecoin”, silver and gold remain on equal footing, providing both stability and the opportunity for both asset and token price appreciation separately.

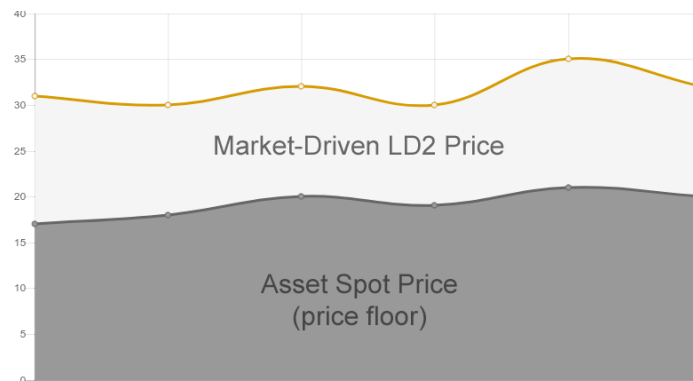
Here are just a few of the reasons why silver is a good place to start:

1. Usage: Silver is consumed. Rarely is it economically viable to reclaim silver due to its low cost.
2. Supply: A consistent shortfall of silver suggests that supplies could run out as soon as 2020.¹⁵
3. Demand: On an average day, three new uses of silver are patented in the U.S.

LD2 Tokens

As with its predecessor, the Liberty Dollar, LD2 functions with the support of US and international law, and the Uniform Commercial Code, as stated above.¹⁶

LD2 digital tokens are a warehouse receipt that guarantees its owner/bearer the precious metal stored in the insured vault. With the initial issue of LD2.zero, each token is backed by one troy ounce of .999 fine silver. Since LD2 tokens represent silver on deposit at a vault, there is an inherent price floor to the token price.



An LD2 token’s inherent value comes both from the underlying asset value as well as the utility value of the token itself. The utility value expresses its usefulness and convenience. Tokens are far easier to hold than

¹⁴ Von NotHaus, B. (2003). Part III: Gold & Silver In *The Liberty Dollar Solution to the Federal Reserve*. Evansville, IN: American Financial Press.

¹⁵ U.S. Geological Survey (2016), *Mineral Commodity Summaries*. Washington, DC: Author.

¹⁶ Von NotHaus, B. (2003). Redeemable by Bearer on Demand In *The Liberty Dollar Solution to the Federal Reserve*. Evansville, IN: American Financial Press.

large chunks of metal, and virtualization of the assets brings greater access to immediate exchange and divisibility. As such, LD2 tokens alleviate many of the problems with traditional precious metals ownership.

This structure allows for a value-backed safe-haven from the potential downside risk of other cryptocurrencies. Since token holders can physically redeem their precious metals and sell them independently, which virtually eliminates the potential for the exchange-based token price to cavitate – unlike almost every other cryptocurrency. LD2’s structure bounds every LD2 token holder’s risk of loss to the market/spot price of the underlying precious metal asset. At the same time, the up-side remains for the token price to appreciate significantly in the market. As LD2 tokens are always 100% redeemable for physical metals, holders can simply redeem their tokens in physical form and sell at the market price. Regardless of token exchange price, holders can always extract the value of the underlying asset.

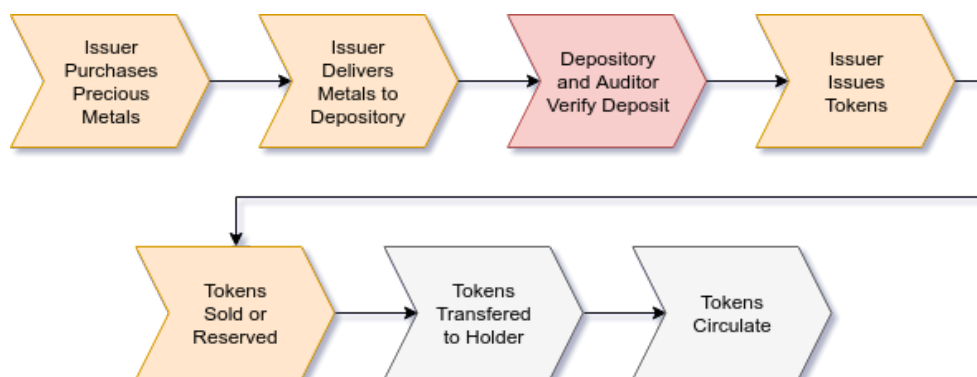
To further assure token holders, all issued tokens’ corresponding metal holdings have their storage and insurance prepaid for ten (10) years from the token issue date with reserved silver held by the [DEPOSITORY]. After ten (10) years, the storage fees will be paid for through a mechanism designated by [ISSUER] and [TRUSTEE].

To maintain ongoing availability and encourage market growth, LD2 tokens will be offered through multiple issuances over time. That is to say, LD2 token issuances, except LD2.zero, are open-ended. The timing of each subsequent issuance will be determined by the sell-through rate of the previous issuance and demand. Supply can be increased as the market demands. As such, LD2 should not be considered a scarce token.

This physical value of the underlying asset thereby provides unprecedented security in the event of a larger cryptocurrency crash, unavailability of an exchange to liquidate tokens, or even the insolvency of [ISSUER] (since tokens are redeemed directly through [DEPOSITORY]).

Issuance

[ISSUER] arranges for the purchase of, and subsequent minting of all precious metals into coins to back the LD2 tokens, then delivers that inventory to [DEPOSITORY]. [DEPOSITORY] and [AUDITOR] both independently verify the amount of these deposits and then certifies the amount on the smart contract. Only after the [DEPOSITORY] and [AUDITOR] smart contract verification can [ISSUER] issue new tokens on the smart contract to represent the deposit, and only up to the lesser of these two certified balances. The LD2 issuance process is designed to ensure that the precious metals backing the token are in the vault and examined before any LD2 token is ever issued and sold.



LD2.zero

Prior to the first open-ended issuance and sale of tokens, [ISSUER] will issue a “version zero” of the token as an ERC20 token on the Ethereum blockchain. This will be offered for private sale and will help ensure full operational functionality prior to fully public and open-ended issuances.

LD2.zero tokens will be identical to the LD2.silver version, but issued on a smaller scale and backed by a collectible numismatic. As a perk to early participants, the physical silver coins backing the LD2.zero tokens will be the limited edition pieces, one troy ounce brilliant uncirculated (BU) .999 fine silver coins, minted specifically as collectibles. Given this limited scale, LD2.zero will not be listed on public exchanges, but rather exchanged peer-to-peer through ERC20-compatible wallets and decentralized exchanges.

LD2.silver

The first publicly-available, open-ended issuance will be much larger in volume than LD2.zero. Each LD2.silver token will be backed by a one troy ounce of .999 fine silver, generally held as a brilliant uncirculated (BU) .999 fine silver coin. LD2 LLC fully expects to have LD2.silver tokens listed on multiple public exchanges, as well as decentralized exchanges. Timing of all subsequent issuances and related offerings will be determined based on the sell-through rate of the previous token issuance. As it is not the intent of LD2 LLC to create a scarcity of LD2.silver tokens, future issuances (e.g. supply increases) will be driven by market demand and funding availability.

LD2.gold

As demand permits, the LD2.gold issuance will follow the silver-backed, LD2.silver tokens. Each LD2.gold token will be backed by one ounce of .9999 fine gold, on deposit at [DEPOSITORY]. Like LD2.silver, the token will be listed on multiple exchanges, and token holders may exchange them peer-to-peer through compatible wallets. Again, subsequent issuances of LD2.gold will be determined based on sell-through rate of the previous issuance. Supply will continue to be driven by market demand.

Token Reserves

[ISSUER] may reserve a portion of tokens from any and all issuances, thereby excluding those tokens from public sale. These reserved tokens may be sold at market price to help cover [ISSUER]’s operational expenses, precious metals storage, marketing, and management team compensation. All issued tokens will be backed by precious metals as expected, regardless of the owner. Further details and accounting of all token issuances, and any reserves, will be provided on [ISSUER]’s website, as well as the smart contract.

Pricing and Sale

All issued LD2 tokens will be sold by [ISSUER] through a series of offerings via a token sale smart contract.

LD2 tokens will be priced with each issuance or offering at the discretion of [ISSUER] following two models/methods:

- The amount of precious metal represented by an LD2 token, in ounces, multiplied by the current spot price per ounce of that precious metal, plus direct costs and a premium
 - $[(\text{ounces} * \text{spot}) + \text{costs} + \text{premium})]$
- The current market/exchange price of the same version of LD2 token

The premium over spot will help [ISSUER] offset costs of general operating expenses, management, administrative, storage and insurance fees, and other costs incurred when moving metals to [DEPOSITORY].

Additional proceeds from token sales may be used to help ensure the [DEPOSITORY] maintains a positive ratio of precious metals to issued tokens at all times, and allow [ISSUER] to bring new tokens to market through future issuances. A portion of the token sale price may be used to pre-pay the metal storage fees and related insurance for ten (10) years. Again, after ten (10) years, the storage fees will be paid for through a mechanism designated by [ISSUER] and [TRUSTEE].

Physical Redemption

LD2 tokens may be redeemed by holders/bearers for physical precious metals directly from [DEPOSITORY] for a reasonable shipping and handling fee. The redemption process is initiated by the token holder "off-chain", e.g. on [DEPOSITORY]'s website. By providing basic information – shipping address, shipping method, and total number of tokens to redeem – [DEPOSITORY] produces a quote of shipping and handling charges for the redemption to the token holder. The token holder then arranges payment of applicable shipping and handling fees. [DEPOSITORY] confirms the payment by providing the token holder with a signed authorization code.

To complete the request, the token holder then interacts with the *redeem()* function of the smart contract, via the redemption page on [DEPOSITORY]'s website.

```
redeem( uint _unitsToRedeem, bytes32 _authcode )
```

The *redeem()* function verifies the signature and quantity, then sends the tokens to a burn address. The transaction ID of this action is passed back to the [DEPOSITORY] via the web application. The [DEPOSITORY] then waits for network confirmations of the transaction. Upon successful confirmation of the transaction, [DEPOSITORY] will ship the physical precious metal.

If for some reason the shipment is returned to [DEPOSITORY], it may be, at the owner's request, either redelivered to an alternate shipping address (for any applicable fees), or reissued as a token to the token holder's source address (less any applicable fees).



Technical Specifications

ERC20 Token Standard

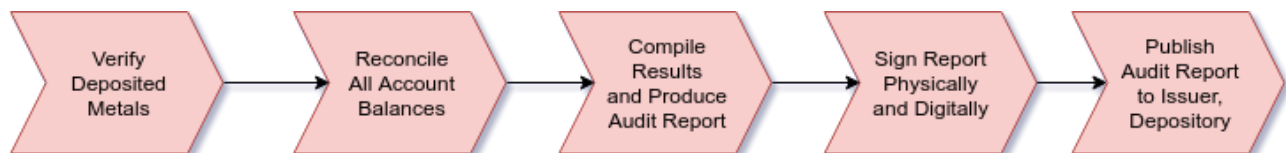
LD2.zero tokens will be issued on the Ethereum blockchain using the ERC20 Token Standard as the basis for its smart contracts. This standard allows token interoperability with a number of wallets and exchanges. Transactions on the Ethereum blockchain are affordable and fast. These smart contracts offer complete transparency to all aspects of the auditing, token issuance and redemption processes. Solidity, a

widely-utilized smart contract programming language, can be used to represent the entire life cycle of LD2.zero tokens, from issuance to redemption, with complete transparency to the token holders.

Depository/Vault Examinations

The procedures and standards for the examinations of the [DEPOSITORY] will be developed by [AUDITOR], with the full cooperation of [ISSUER]. Physical, in-person, examinations by the independent [AUDITOR] will ensure that for every token issued, exactly one ounce of precious metal is on deposit at [DEPOSITORY]. [AUDITOR] will also verify that the total number of burned tokens equals the number of ounces shipped by the [DEPOSITORY] during redemptions. Beyond these critical examinations of the precious metals held at the [DEPOSITORY], the [AUDITOR] will agree to the efficacy of the procedures used by [ISSUER] during token issuance, and those used by [DEPOSITORY] during token redemption.

[AUDITOR] will physically and digitally sign every audit report before it is published on the [ISSUER]'s website. Prior to any token issuance, [AUDITOR] will verify all balances, perform a physical audit of holdings at the [DEPOSITORY], and certify the new deposit on the smart contract. Then, and only then, will the smart contract allow [ISSUER] to issue new LD2 tokens, representing the new precious metals on deposit at [DEPOSITORY]. Physical exams will occur each month, and prior to every token issuance.



Checks and Balances

A key aspect of many blockchain/cryptocurrency models is decentralization. Transaction validation happens in a way that distributes trust around the network, with no single entity holding the power to usurp that trust. When working with tokenized assets, such as precious metals, those assets are stored in a central location with a single custodian, the trust again becomes centralized. There are few ways around this.

LD2 LLC introduces a system of checks and balances to ensure specific roles are divided, assigned, and carried out by autonomous entities, all with transparency. The effect is similar to that of the decentralized network – the trust can be distributed between multiple parties and stakeholders have visibility into key operations. This division of power, full transparency, public pressure, and the rule of law, helps hold all these entities in check, producing a system that can be considered worthy of trust.

[ISSUER] purchases and deposits precious metals with [DEPOSITORY]. [DEPOSITORY] has these deposits independently verified by [AUDITOR], who publicly releases their exam results. Both [DEPOSITORY] and [AUDITOR] certify the amounts on deposit on the smart contract. Then, and only then, can the [ISSUER] issue tokens. Ongoing examinations by [AUDITOR] provide the assurance transparency necessary to maintain the trust of the token holders. At any time, the token holders can redeem their precious metals from the [DEPOSITORY], again, with complete transparency.

The vast majority of these checks and balances are implemented on the smart contract.

Network-Branded Debit Card

As cryptocurrency technologies advance, significant increases in transaction throughput will follow. When blockchain transactions speeds increase up to, and possibly beyond, card interchange network speeds, LD2 can establish a network-branded debit card for ultimate liquidity. Other businesses have previously developed card programs that functioned by liquidating cryptocurrency assets and pushing the funds to load cards.¹⁷ While that process is novel, it does not adequately provide real-time liquidity.

LD2 LLC has access to patents and intellectual property, allowing it to deploy a real-time asset-backed debit card, directly linked to LD2 tokens and their underlying assets.^{18 19} The very act of swiping a debit card at the point of sale initiates the exchange transaction. With such a card, you could spend LD2 tokens virtually anywhere. Members of LD2 LLC management team worked extensively on the patent-holder's projects, and have the operational experience and banking/processing connections to make this card a reality.

Key Functions

Issuer

[ISSUER] is responsible for purchasing precious metals, minting, and delivery to [DEPOSITORY], LD2 token issuance, and their offerings/sale. They maintain a website for marketing, informational, and token sale purposes. [ISSUER]'s website also provides a link to the token redemption process on [DEPOSITORY]'s website. In cooperation with [DEPOSITORY], [ISSUER] facilitates and ensures the transparency of regular independent examinations. All signed examination reports are published on [ISSUER]'s public website.

Vaulting and Fulfillment

[DEPOSITORY] is the custodian for all assets backing LD2 tokens. They are responsible for managing the vaulting relationship(s), if any, handling logistics of precious metals to be vaulted, and fulfillment of physical redemption activities. They pay – and/or are reimbursed for – storage and insurance fees as well as receiving a predetermined portion of the handling fees during physical redemption. The [DEPOSITORY] is also responsible for maintaining all insurance on the assets held in their vault.

During the physical redemption process, [DEPOSITORY] verifies the redemption transaction and resulting burn of the tokens, withdraws the corresponding precious metals from the vault, and ships it to the owner, per the redemption request from the token holder.

[DEPOSITORY], cooperates with [AUDITOR] for all exams, and updates the smart contracts as to its own holdings, ensuring a secondary source for the asset accounting verification.

Precious Metal Minting

North American Mint has minted precious metals for over 40 years and is a second-generation family owned business. The Liberty Dollar Founder has worked with them for 20 years. The quality of their work stands alone. Additional minting resources may be utilized depending on market demand.

¹⁷ <https://www.weusecoins.com/bitcoin-debit-cards/>

¹⁸ Pratt, J., and von NotHaus, B., (2012). *U.S. Patent No. US8296226* Washington, DC: U.S. Patent & Trademark Office.

¹⁹ Pratt, J., and von NotHaus, B., (2010). *U.S. Patent No. US7752108* Washington, DC: U.S. Patent & Trademark Office.

Trustee

[TRUSTEE] is an independent trust, responsible for ensuring that all issued tokens can continue to be redeemed, and token holders are the beneficiaries of this trust. In the unlikely case of insolvency of one or more of the parties listed in *Key Functions*, [TRUSTEE] will appoint organizations to fulfill those functions, on behalf of all token holders. After ten (10) years from the original token issuance, the storage fees will be paid for through a mechanism designated by [ISSUER] and [TRUSTEE].

Auditor

[AUDITOR] conducts physical examinations to ensure that at all times, exactly one ounce of precious metals is on deposit at [DEPOSITORY] for each LD2 token issued. They regularly report and account for every token redeemed - both that the token is properly burned and the underlying precious metal is delivered. As part of these examinations, [AUDITOR] also verifies all issued tokens are accounted for, and report on the creation of any new tokens. This can also be independently verified by anyone with access to [ISSUER]'s smart contract address on the blockchain, the single source of all issued tokens.

Conclusion

LD2 LLC expands beyond the historical foundations of the Liberty Dollar to produce a truly innovative, asset-backed and value-stable cryptocurrency, that's 100% backed by, and 100% redeemable in precious metals. Implementing a system of digital warehouse receipts represented through digital tokens, brings precious metals ownership into the age of the blockchain. These digital warehouse receipts are supported as contracts under the Uniform Commercial Code and international law.

Through multiple issuances of both silver- and gold-backed tokens, the LD2 cryptocurrency ecosystem can grow and thrive, eventually becoming the foundation of a network-branded debit card. Asset-backed tokens allow their owners to minimize downside risk of loss, while remaining liquid and exchangeable. Trust is established between the token holder, [ISSUER], [DEPOSITORY], and [AUDITOR]. LD2 LLC accomplishes this confidence through a fully-audited system of checks and balances, along with full transparency of key operations performed on smart contracts. The LD2 cryptocurrency can in fact become the trusted "stable-coin" the cryptocurrency market is searching for.

Steven Brendtro has over twenty years of experience in Fintech, alternative/digital currencies, web development, systems architecture, and DevOps engineering, and was a founding member of multiple start-ups. Steven also served as a Regional Currency Officer for the Liberty Dollar, and was later instrumental in building an asset-backed debit card platform. He holds a Computer Science degree from Augsburg University in Minneapolis, with joint instruction from the University of Minnesota.

Extra von NotHaus has over twenty years of experience in precious metals markets, alternative/digital currencies, international banking and Fintech, and was a founding member of multiple start-ups. He developed the first graduate-level course on Blockchain at Northeastern University as well as a series of workshops on Blockchain at Massachusetts Institute of Technology (MIT). Extra earned both a MBA in Investments and Masters in Finance at Northeastern University and a Bachelors in Physics from UCLA.