Gold-backed Digital Currency White Paper (Rev 2)

In regards to Texas HB4903 and SB2334

CC:
Texas HB4903:
  State Rep. Mark Dorazio
  State Rep. Giovanni Capriglione
  State Rep. Richard Peña Raymond
  State Rep. Cody Harris
  State Rep. Lynn Stucky
  State Rep. Todd Hunter
  State Rep. Ana Hernandez

Texas SB2334:
  Sen. Bryan Hughes
  Sen. Joan Huffman
  Sen. Juan "Chuy" Hinojosa

Texas Bullion Depository
  Macy Douglas

Tennessee Bullion Depository Act. SB 150
  Sen. Frank Niceley
  Rep. Bud Hulsey

Wyoming Bullion Depository HB0198
  Sen. Bo Biteman
  Sen. Bouchard
  Sen. Steinmetz

Rev 2 has extended proposal for Technical Working group, added economic details and additional State legislation regarding depositories.

Idaho HO180 - bullion depository.
  Senator Tammy Nichols
  Senator Scott Herndon
  Senator Brian Lenney
  Senator Carl Bjerke
  Senator Daniel Foreman
  Senator Cindy Carlson
  Representative Vito Barbieri

Mississippi SB2966
  Senator Melanie Sojourner

Missouri HB718
  Representative Dirk Deaton
  Representative Michael Davis
  Representative Justin Sparks

North Carolina h721 - State Depository Study
  Representative Mark Brody
  Representative Harry Warren
  Representative Donnie Loftis
  Representative Neal Jackson

Oklahoma Senate Bill 816
  Senator Nathan Dahm
  Representative Thomas Marti

Gold-backed Digital Currency White Paper - 2023

Broward Horne
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https://broward.ghost.io/

I'm a software developer with 30+ years of experience. For reasons listed here, there may soon be demand from State governments for R&D, prototyping and development of gold-backed digital currencies as described in Texas bills S.B. No. 2334 and H.B. No. 4903. **I want to do this project.**

Abstract:

This white paper is an overview of a **GOLD**-backed **DIG**ital currency (**GOLDDIGR**) using blockchain technology and backed by a State precious metals depository. It outlines economic forces, strategic design, key features and technical issues to familiarize readers with core concepts and impacts.

Key Issues

Low Energy Use

GOLDDIGR shouldn't consume enormous energy but the same energy as sending an email or editing a document. Most crypto-currencies refer to "mining", "Proof of work", etc, which are energy-intensive features to create artificial scarity. GOLDDIGR's scarity is the gold depository.

Low Complexity

GOLDDIGR should be less complex than other crypto-currencies. It won't require complex schemes to generate scarcity, validation, etc.

Cost

In 2018, I wrote a similar crypto platform using Ethereum. In my experience, a production system could be ready within a year by a team of five people for under $2 million.

Biggest Variable

In my opinion, the biggest technical variable will be revisions to the inventory system at the Texas Bullion Depository. Addressed later in the paper.

Economic Forces

This period of fiat currency has already lasted longer than previous fiats of the past several hundred years and contrary forces are aligning to end it. Russia and China have planned for the end of fiat for the past 15 years, the dollar is ripe for replacement as the world reserve currency, and the current Federal debt is unsustainable.

Gold Standard

The longest period in modern history without a gold standard is today; from 1971 to 2023. The last gold standard was the Bretton Woods which operated from 1944 to 1971. The United States has abandoned its gold standard in unusual situations (Civil war, World War 1) but only for a few years.

Russian Gold Reserves

Since 2009, Russia's central bank has steadily increased gold reserves to diversify away from the US dollar and foreign currencies. According to the World Gold Council, Russia's gold reserves more than tripled from 600 metric tons in 2009 to over 2,300 metric tons in early 2021.

Chinese Gold Reserves

China has consistently increased gold reserves since 2009 to diversify away from US dollars and foreign currencies, according to data from the People's Bank of China (PBOC). China's gold reserves grew from 1,054 metric tons in 2009 to over 1,948 metric tons in early 2021.

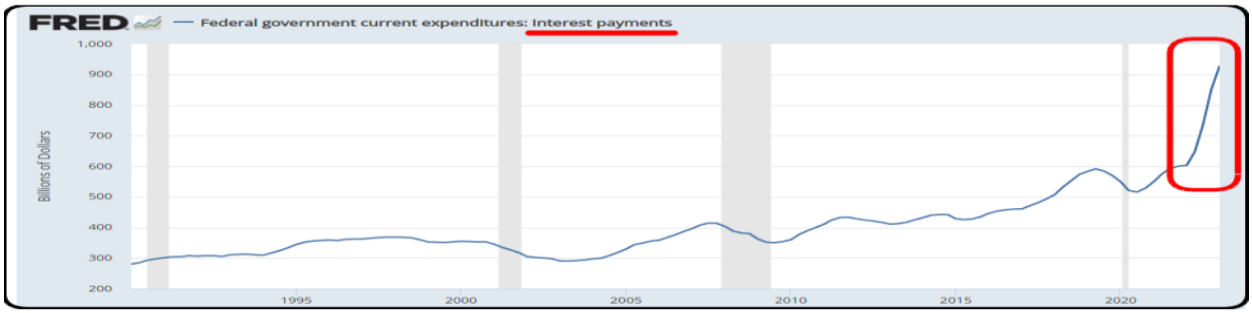
Hegemony

Western hegemonic empires since 1400 A.D. had an average lifespan of 95 years and the United States is at 103 years. The world reserve currency is usually a function of the current hegemony.

COUNTRY	DATES	DURATION	CURRENCY	
Portugal	1450 to 1530	80 years	Real	
Spain	1530 to 1640	110 years	Escudo	duration was probably due to huge gold shipments from New World
Netherlands	1640 to 1720	80 years	Guilder	
France	1720 to 1815	95 years	Franc	
Great Britain	1815 to 1920	105 years	Pound	
United States	1920 to 2023	103 years	Dollar	WW1 loans boosted US$

Interest Payments

The current rate of increase in Federal debt interest payments is unsustainable.



Interest Rates

As debt increases, rates must fall to maintain equilbrium. Interest rates during the credit upcycle (1980 to 2020) have fallen as far as investors will tolerate. The return of higher rates will be disastrous for the current debt.

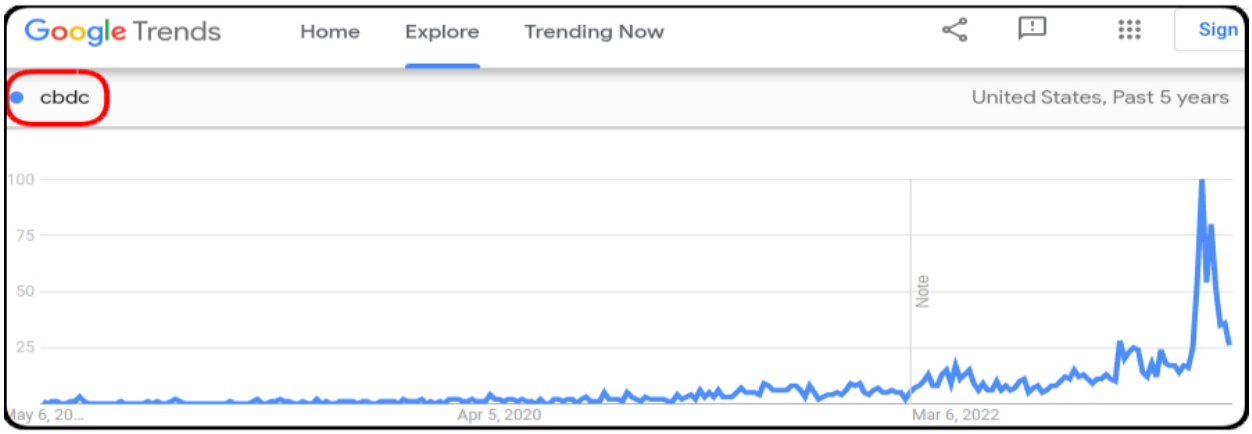
BRICS Strategy

De-dollarization. The BRICS separate financial system aims to use their oligopoly power to control commodity prices and bypass the US Dollar. BRIC countries control 1/2 of the world's food supply, most of the microchip supply (assuming China invades Taiwan) and enough energy to control pricing in concert with a partner like Saudi Arabia or Venezuela.

	Oil	*Natural Gas*	*Wheat*	*Rice*	*Fertilizer*	*Microchips*	*Titanium*	*Iron Ore*	*Aluminum*	*Nickel*	*Magnesium*	*Copper*
Brazil	4			2				17		4	6	
Russia	11	23	8		15			4	6	9		4
India			13	28			2	10			4	
China	5	7	17	35	13	20	40	14	57	4	63	8
South Africa							10					
Ukraine			3				2					
Iran	4	9	2		1						1	
Taiwan						50						
Worldwide Percentage	24	39	43	65	29	70	54	45	63	17	74	12

Central Bank Digital Currencies (CBDC)

Interest in CBDCs and development has accelerated in the past year. CBDCs centralize power and control of a currency which could lead to potential abuses and political interference in financial transactions.



The 14th Amendment

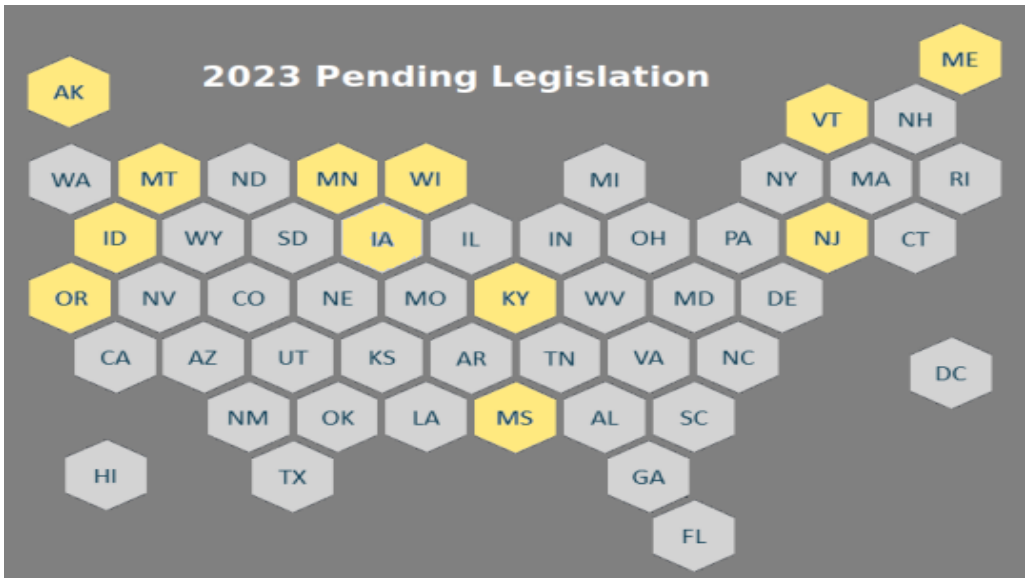
The threat of invoking the 14th Amendment to end the Federal debt ceiling.

USA Legislation

The **Sound Money Movement** is a political and economic movement that advocates for a stable, reliable currency and believes central banks should not manipulate currencies for political gain and that a gold or silver-based currency would provide greater stability. The movement supports precious metal legislation across the United States.

Three-Step Legislative Strategy

1. Establish gold and silver as legal tender
2. Create a State precious metals depository
3. Add a digital currency backed by depository

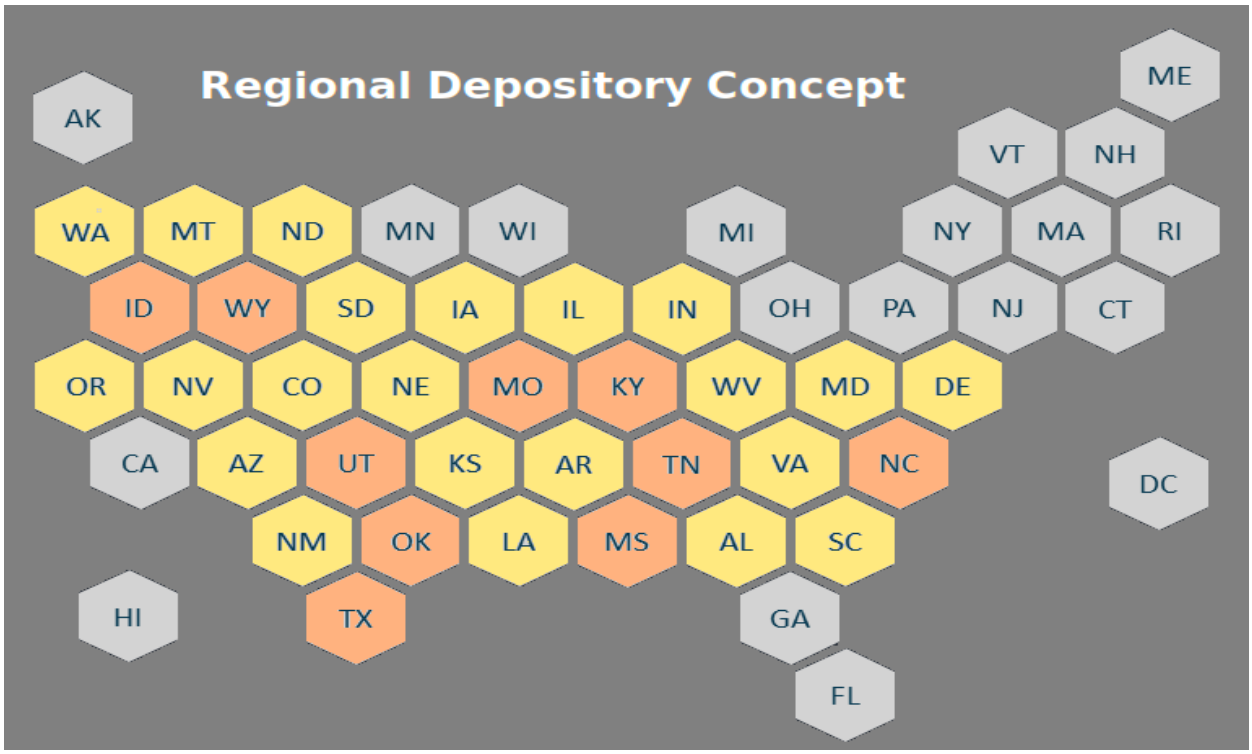


Depository Legislation

Texas Bullion Depository Bill - signed into law in 2015 to create a state bullion depository.
2023: Tennessee Bullion Depository Act - SB 150 to establish a precious metals depository.
2023: Mississippi SB2966 - establish the Mississippi bullion depository
2023: Missouri HB718 - create the "Missouri Bullion Depository."
2023: North Carolina H721 - State Precious Metals Depository Study
2023: Idaho H0180 - invest in precious metals held in a secure depository
2023: Oklahoma SB 816 - Establish a State Treasury Depository
2021: Utah Sound Money Amendments - create a state bullion depository.
2021: Kentucky Precious Metals Depository Act - create a precious metals depository.
2020: Wyoming bullion depository - for creation of a Wyoming bullion depository.

Regional Depository Concept

If all previous legislation passed, our depository map would look like this and Depository States (orange) could support regional currencies of non-depository States (yellow).

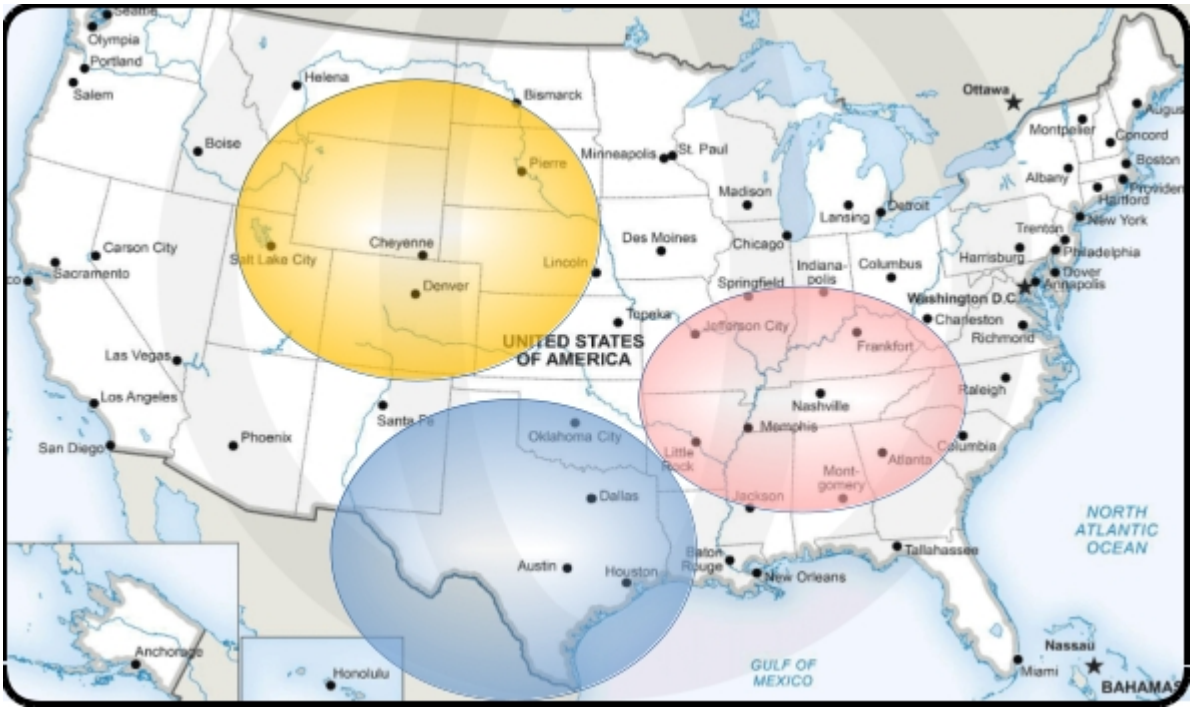


Regional Coordination

Will need to coordinate State laws, implementation, settlement schedule, delivery and security, reciprocity with adjoining States

Impedence-Matched Currency

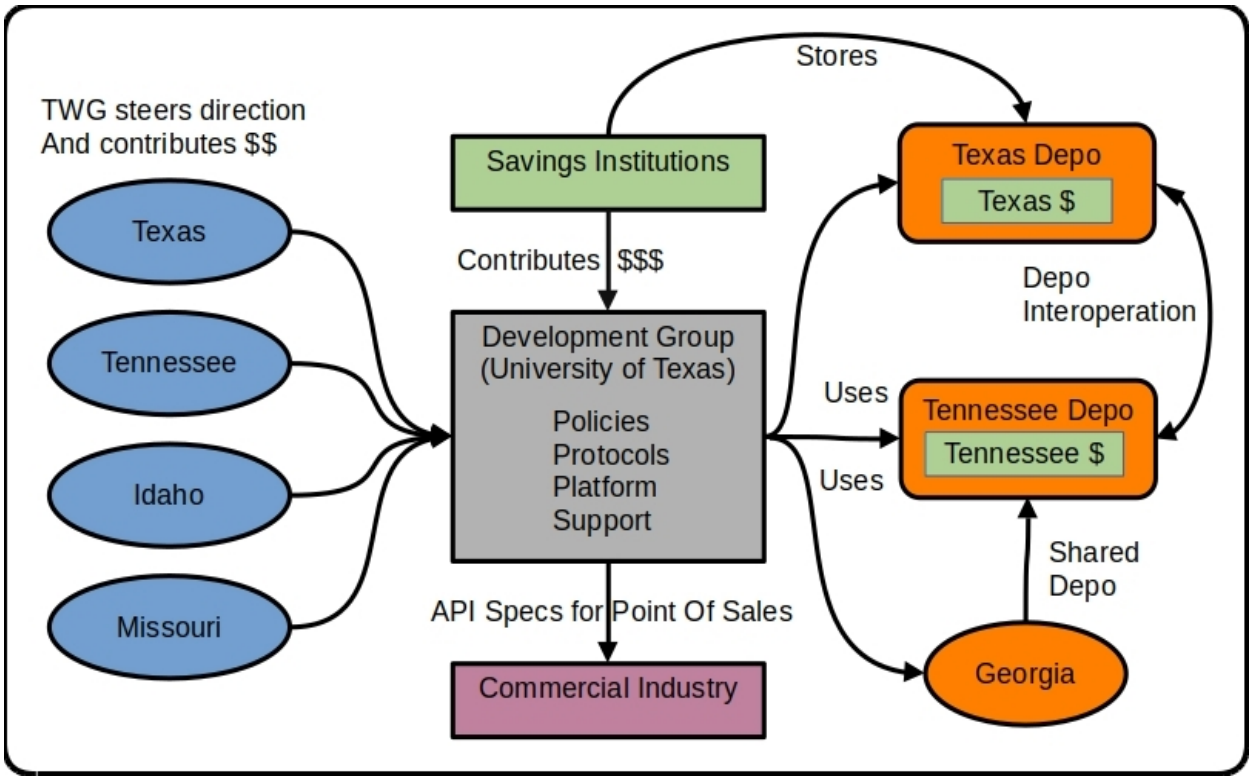
Creating the Euro was like harnessing a horse, a mule, a dog and a turtle to pull a wagon. A "one size fits all" strategy creates stresses because regions (States) have different histories, resources, skill levels and goals. Most economic transactions are within a local sphere and a regional currency would be controlled regionally.


Olympia
Portland
Salem
Helena
Bismarck
Boise
Pierre
Minneapolis
St. Paul
Ottawa
Montpelier
Concord
Boston
Albany
Hartford
Madison
Detroit
Lansing
New York
Trenton
Philadelphia
Harrisburg
Dover
Annapolis
Carson City
Sacramento
Salt Lake City
Cheyenne
Lincoln
Denver
Des Moines
Chicago
Indiana-
polis
Columbus
Springfield
Washington D.C.
Charleston
Richmond
Topeka
Jefferson City
Frankfort
UNITED STATES
OF AMERICA
Las Vegas
Los Angeles
San Diego
Phoenix
Santa Fe
Oklahoma City
Nashville
Memphis
Raleigh
Little
Rock
Atlanta
Columbia
Mont-
gomery
Jackson
Dallas
Austin
Houston
Baton
Rouge
New Orleans
Tallahassee
NORTH
ATLANTIC
OCEAN
Nassau
Miami
BAHAMAS
GULF OF
MEXICO
Anchorage
Honolulu

Proposal

Recent legislation shows significant State interest in Texas-style precious metal depositories. This proposal is for a Technical Working Group (TWG) of interested parties to fund joint development of regional depositories with common procedures, protocols and digital currency platform.

Here's an example.



We used this model at Federal Highway in 1994-1996 to develop ASPEN, CDLIS and ISS software. We had a staff of **five permanent people** and ten States contributed 1-2 members each quarter for a three-day design and feedback meeting (about 500 manhours per year).

5 Major Components

1) Development Group - State-agnostic organization which combines design input to produce policies, protocols and platform to support State depositories.

2) Technical Working Group (TWG) - a steering committee of States which contribute funding and design feedback, policies, legal input from a few part-time advisors in each State.

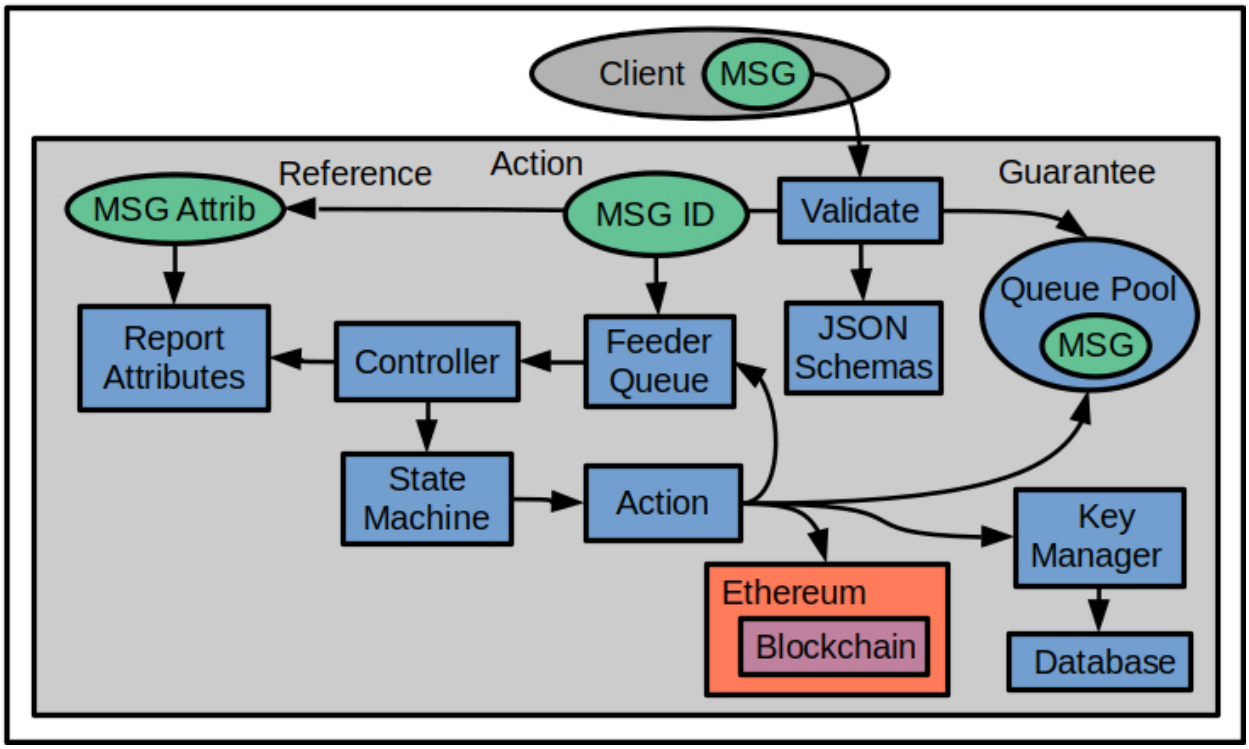
3) Regional Depositories - State depositories which support digital currencies, States which need a physical depo, and interoperate with other regional depos.

4) Savings Institutions - contribute funding to use the State depositories and currencies as a mechanism of investment and wealth preservation.

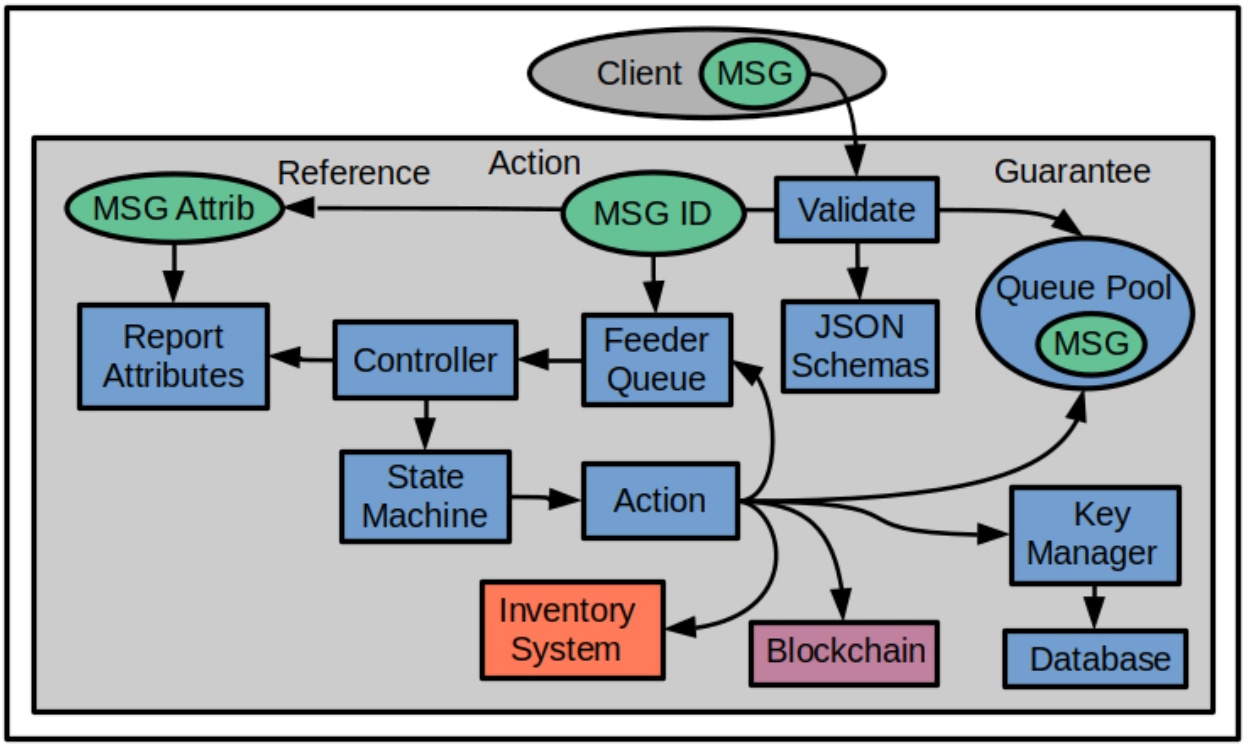
5) Commercial Industry - retail vendors, 3rd party developers, etc which support digital currencies.

Digital Currency Platform

In 2018, I wrote a successful crypto-currency platform on Amazon AWS, Sila stablecoin. Our goal was to help hundreds of 3rd party developers easily add crypto capabilities into their phone apps. This is an improved design I sketched out in 2020.



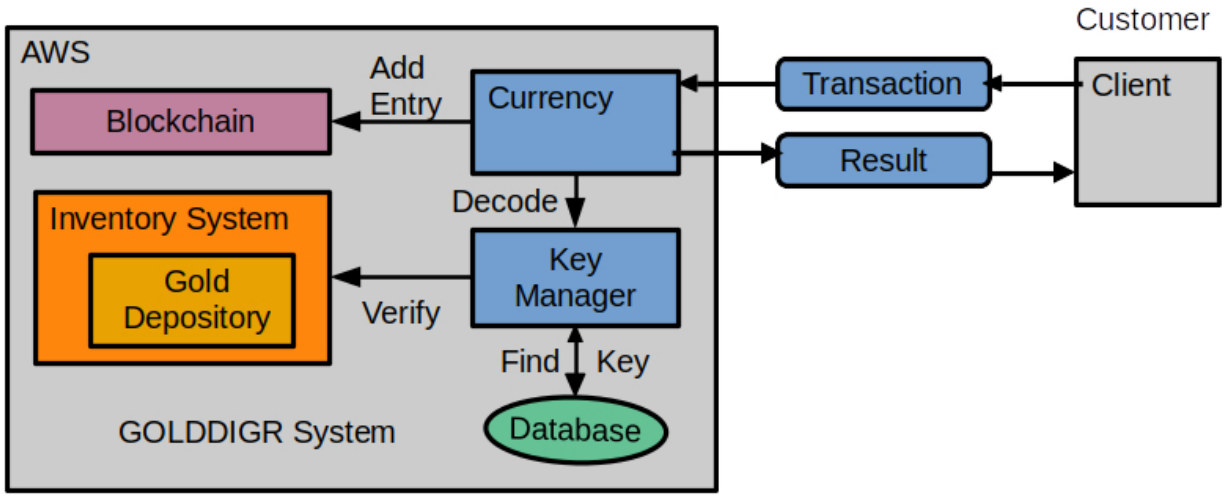
The proposal replaces the Ethereum component with a blockchain and Depository Inventory System.



Strategic Design

This is an abstract high-level diagram of how a gold-backed digital currency would work. A detailed design is at https://broward.ghost.io/golddigr/tactical

Depository: stores gold deposits.
Inventory System: manages gold deposits
Currency: manages cash transactions
Blockchain: equivalent to accounting ledger
Key Manager: equivalent to safety deposit box keys
Client: Customer with gold in depository



Assumptions: The depository has an existing inventory management system which needs to synchronize with the blockchain.

Here's a simple use case of transferring money:

1) Client sends a transaction to Currency API

```
{    "message": {
         "message_type": "texas_transaction",
         "version": 1.12,
         "date": "2024-02-03T06:48:07",
         "ID": 010102283,
         "payer":  12221,
         "payee": 1023,
         "amount": "$100"
 }  }
```

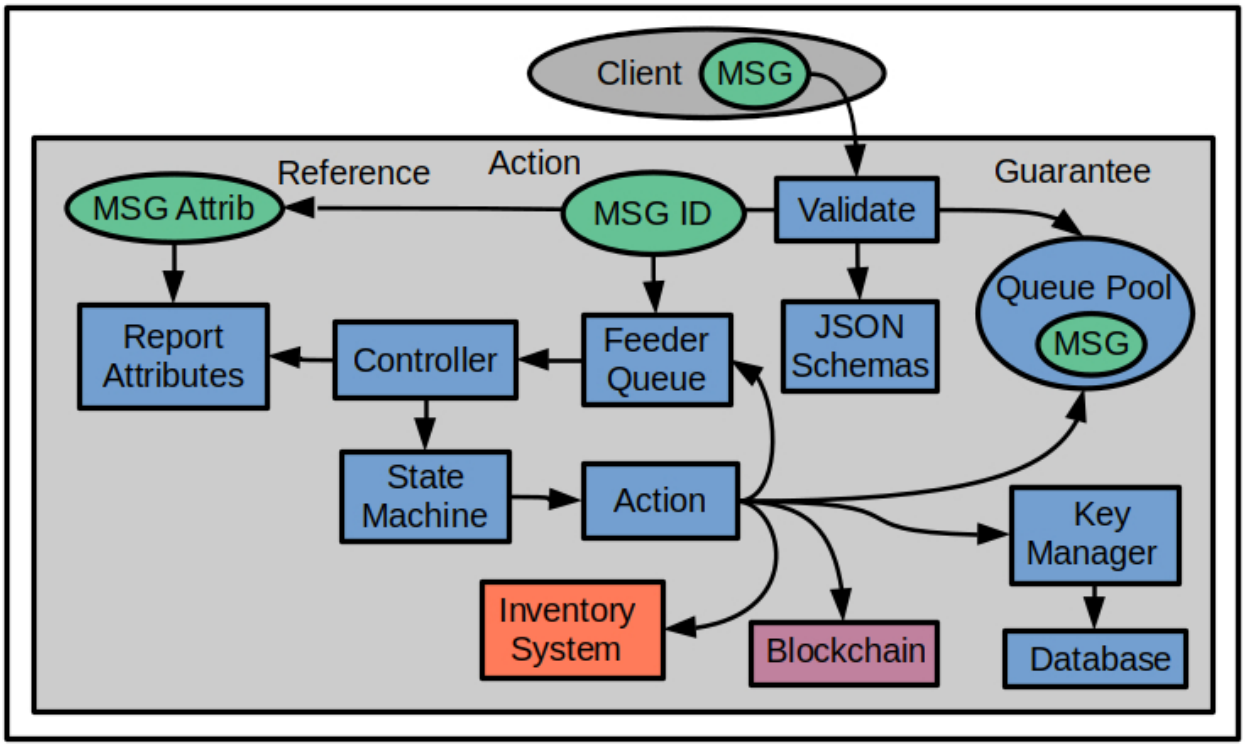
2) Currency forwards message to Key Manager.

3) Key Manager verifies the payer, payee and payer's balance.

4) Currency creates blockchain entry.

5) Currency sends result to client.

Tactical Design



Three internal domains defined - **Guarantee, Action, Reference**.

Incoming message is validated by ECDSA decryption of signer ID. JSON schemas enforce a language-agnostic message definition for 90 to 95% of validation rules. Add code functions to validate the remaining 5 to 10%.

Guarantee uses AWS SQS queues to guarantee state and execution. Stores the ECDSA-signed message in its own queue named by unique Msg_ID. This is the only place the original message exists until it is archived.

The **Action** Lambda function accepts Msg_ID and adds it into the feeder queue. The controller pulls Msg_ID entries, retrieves and passes the current state into State Machine which executes the next action. The action pulls the original message, executes, then updates Msg_State. The Msg_ID is re-submitted to the feeder queue for the next iteration until End_State is reached.

The **Reference** Lambda receives a subset of message attributes for reporting/tracking purposes, such as creation_date, client_id, etc. The original message is immutable except for Msg_State. The controller updates Reference with current state before each iteration.

Complexity is mostly isolated in the State Machine/Rule Engine, so most future changes are there. The rest of the system should be stable, needing few changes except the addition of new actions.

My original design should have had an entry API to issue a unique Msg_ID. This is the initial client call and the client adds it to the transaction message before it's signed, making it part of the immutable message. The Msg_ID's timestamp has an associated time window of only a few seconds to accept the message.
There's duplicate data between the three domains, Guarantee is the system of record if we get a data

mismatch. There's also a need to store temporary data which may get passed from action to action, so add a Msg_Ext message to the queue.

There's other peripheral areas to address like testing, security, continuous deployment, etc.
Many are covered here in my AWS primer.

AWS Cloud Formation Infrastructure (https://broward.ghost.io/aws_app_1/)
Messaging Strategy (https://broward.ghost.io/aws_app_2/)
Security considerations (https://broward.ghost.io/aws_app_9/)

Considerations

Design Issues

The most complex and controversial areas are

- Integration of blockchain with inventory system
- cash equivalency (KYC validation)
- key management (like safety deposit box keys)
- appropriate blockchain,
- SLAs for uptime and response time
- peak concurrent users, transactions

State Depositories

In 2009, there were 50 State governments and a handful of small crypto-currencies. In 2023, there are 23,000 crypto-currencies but still only 50 State governments. Many currencies are used mostly to buy other crypto-currencies. A State depository represents a significant option for **non-inflationary wealth preservation** for high-worth organizations and people. There should be funding potential here.

Private Gold-Back Currencies

Many private gold-backed cryptocoins were released in 2018. Most were based on Ethereum but several blockchains were released since then - Solana, Avalanche, Matic, and Cardano. Needs deeper research. Probably want a private blockchain.

Ethereum is probably adequate but not optimal.

Currency	Blockchain	Status
OneGram	Graphene, C++, probably custom written	last tweet was 2019
Digix Gold Tokens	Ethereum	Digix ceased operations 21 March 2023
Gold Bits Coin	Ethereum	last news was 2019
Goldmint	based on the original pBFT protocol	last news was Aug, 2022
ZenGold	NA	last news was 2019
Puregold Token	Ethereum	last news was Feb 2020
HelloGold	Ethereum	shut down in Jan 2023
Xaurum	Ethereum	active
PAXG	Ethereum	active
XAUT	Ethereum	Tether
PMGT	Ethereum	Active – Government mint
GLC	Ethereum	active

Perth Mint Gold Tokens

Perth Mint Gold Tokens are the closest equivalent to our proposed gold-backed digital currency. Perth Mint is government-owned, the tokens ran on Ethereum until the blockchain host discontinued support for legal reasons. This currency should be a primary research item.

Existing Depository

I have educated guesses as to what's inside the depository inventory system (although I'd like to verify them):

- traditional client-server app
- standard RDBMS for deposit entries
- no external API for remote entries
- no external API for verification of accounts
- security is mostly by physical location in depo
- has KYC validation

Ergo, integration with a digital currency would require modification of the inventory app. Probably significant work in security areas.

Conclusion

Action Items

Research the depository inventory software and determine effort to add API integration with a blockchain. There's sufficient State interest to establish a multi-State commission to research, standardize protocols, and develop a general digital currency framework.

Research Perth Mint Gold Tokens as they are the closest political fit to this project. PMGT is being shut down so there may be lessons to be learned.

Private gold-backed currencies demonstrate that **Ethereum is an adequate choice but probably not optimal**. The private currencies used Ethereum for credibility reasons but a State depository is already credible and most clients probably prefer their transactions stay private. Research into private blockchains is probably an action item.

Research into multi-signature security for administrative access to the blockchain.

Identify strategic goals.

- Do we want cash equivalency?
- Should it support a Region vs a State?
- Estimate peak users and transactions
- Estimate market - ($100-$10K transactions?)

Estimate project timeline. I'm pretty sure a prototype can be built in four months by a team of five professionals and be production ready in a year.

Author - Broward Horne

Thirty-four years of eclectic software development. Hands-on experience in over 30 IT projects, including seven startups, USDOT grants and corporate consulting. Three DEFCON presentations on analytics.

State governments

From 1991-1996, I was the original architect in several Federal Highway Administration grants developing the first handheld and wireless systems (ASPEN, CDLIS, ISS) for State-level motor carrier inspections. I led a quarterly design conference with representatives from ten States to define features, worked directly with State employees and achieved adoption in 40 States. I was Boise State University employee of the year in 1994 and received a commendation from the US Secretary of Transportation in 1996.

Digital Currencies

Hands-on work with three currencies - the Digital Money Trust in 1994 (a precursor to Bitcoin), Jing, an IoT token prototype in 2014 and Sila stablecoin in 2018 which received $21 million in venture capital. I developed the MVP (minimum viable product) in 100 days which was used in 50 demonstrations for funding. I designed and wrote about 75% of the original beta release code, API, security.

Contracting

Significant projects at Boeing (call center), Avnet (e-commerce), Aetna (insurance), Amdocs (payment system), DLVR.com (video analytics), Verizon (ring tone sales), Staples (e-commerce). Many run one million+ transactions per day and had requirements for integrations, legacy limitations, etc.

DEFCON

I was one of the first Internet data miners (1993) which led to three DEFCON convention presentations in 2005-2007 on predictive analytics and memetic manipulations such as election hacking. And I may be part of the composite character of "Zero Cool" in the "Hackers" movie (1996), as I hacked the planet in 1988.

Personal

I bought my first Krugerrands in 2003, my first Silver Eagles in 2004 and I've kept an interest in precious metals ever since. Here's a palladium sentiment graph I data-mined in 2006.

Related Materal By Me

GOLDDIGR White Paper, 2023	(https://broward.ghost.io/golddigr/)
How Bitcoin Will Fail, 2022	(https://broward.ghost.io/golddigr/bitcoin_fail)
Texas Depository, 2023	(https://broward.ghost.io/texas_depo)
Stablecoin Hack, 2022	(https://broward.ghost.io/stablecoin_hack)
Bitcoin Miner Bankruptcy, 2022	(https://broward.ghost.io/miner_bankruptcy)
Polymorphic API, 2022	(https://broward.ghost.io/polymorphic_api/)
Bitcoin Death, 2022	(https://broward.ghost.io/bitcoin_death)
Crypto Platform, 2020	(https://broward.ghost.io/crypto_platform)
Pandemic and Gold, 2020	(https://broward.ghost.io/pandemic_and_gold)
Bitcoin Scalability, 2015	(https://broward.ghost.io/bitcoin_scalability)
Digital Money Trust, 2015	(https://broward.ghost.io/digital_money_trust)