

Vril: The Power of the Coming Monetary System

A Proposal for an Alternate System of Value Exchange

Inspired by Ripple

By

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*"THE DESIRE FOR GOLD IS NOT FOR GOLD;
IT'S FOR THE MEANS OF FREEDOM"*

Ralph Waldo Emerson

As an animal society matures, it gives birth to “specialization”. This has been the case time and time again. Single-celled organisms developed into multi-cellular organisms with different cells performing different functions; clustered tissues developed into entire organs dedicated to specific functions; hermaphrodites developed into multiple genders; animal societies developed to have distinct classes of individuals as in the distinction between the queen bee and worker bees; evolution prefers specialization. This says that the next step of evolution for human societies can only be achieved by further specialization. An example proof of this can be found in Ford’s invention of the assembly line; no surviving car manufacturer asks each employee to build an entire car today!

However, specialization poses a challenge. It shouldn’t come as a surprise that our brain uses a heck of a lot of power to operate, however dumb it may seem to us on the surface. But if our heart were to pump more blood to let’s-say our intestines than our brain, we’d be doomed! Luckily for us, not every organ gets equal treatment; our heart designed a biological solution to this distribution problem via having a bigger artery directed to the brain. Solving this distribution problem was the key! This is the same fundamental problem that the subject of economics tries to solve on the societal level.

The classical solution of establishing a free-market works great at solving this distribution problem; there’re limited resources (just as in the heart having limited blood to pump) and multiple parties competing for those limited resources (multiple organs in the biological body). Each proves its worth, which is judged by the free-market (as in the body judging the individual with more blood rushing to the brain as a human, vs more blood rushing to the gut as a koala; humans overpower koalas who get extinct over time). A system that enables and increases the efficacy of this process is therefore not only desirable but necessary lest we ourselves become extinct!

Hence it can be implied that anything that hinders or even slows down “specialization” is anti-evolution and hence anti-life! In the case of the free-market, that process is the infamous “free-trade”. As Adam Smith noted that a society where there’s more internal trade has more “progress” regardless of import/export. Trade is the driver of The Invisible Hand! Hence the process of trade must be made as efficient and flawless as possible in order to lift humanity to the next level!

Trade

In monkey societies, trade is very straightforward- you barter! That's it! "Give and get" is their motto! And to believe that barter never existed in human societies in the actual world is silly; it did exist, it's just that back then we used to walk on all four!

If an animal has memory, speaks truth, and can assess value, it's best to use bespoke IOUs for trade; such a system did exist and still does in the form of favors- you do me some favor, then I remember that and possibly someday do some favor to you in return for the one you did to me. In fact, it's so old and so deeply rooted in our psyche that most won't even be comfortable calling it money! Which brings us to...

Money

Short and simple- money is an illusion! The classical definition of money being a 'store-of-value', 'medium-of-exchange', etc. is at best ludicrous. The proponents (or rather the propagandist conspirators) of such checklists do not realize that this definition of money is arbitrary at best.

All money is worthless; and the only value it possesses is subjective, which is further based on its marginal utility for the beholder. **We give money its value, not the other way around.**

Trading value

Historically, when a society realized that it needed a system of value-exchange, it would start digging (literally). At least that's how our history has been- mankind realizes it needs such a system, picks up anything it finds in vicinity (stones, rocks, sea-shells, peanuts, you name it) and calls it "gold", establishes it as a standard medium of exchange (sometimes taking thousands of years to reciprocate throughout the globe); somebody finds a better something, calls it gold and convinces the world to do the same (took Bitcoin a good long 9 years and counting, and there are still people who need convincing that it's just as good as the yellow-metal, /* and just as bad */ and the process goes on and on. And this process is anything but efficient, for instance, trillions of man-hours have been wasted extracting from the ground the yellow-metal, which people value more than their own lives! And this craziness is just a symptom of a deeper underlying problem- that we're trying to find a solution to this 'intimate' intrinsic problem (intrinsic to the society) externally (via stuff that we've no control over). Imagine what would happen if the weather were to determine how much blood to pump to the brain, irrespective of your mental activity level! Life would be a havoc! And that's essentially what the humanity's condition is as of today!

An Intimate Solution

“If a being has memory, speaks truth, and can assess value, it’s best for a society of such beings to use bespoke IOUs for trade”

Gold does give the society a common denominator eventually, but it also misplaces incentives, and misplaced (or worse, negative) incentives eventually lead the system (the world) into a downward spiral. The reason society fell into this gold-trap in the first place was because the above three conditions were hard to meet back then. Our mental memory limit was too small (paper and pen weren’t much reliable), the human mammal turned out to be anything but truthful (signatures didn’t ensure the level of trust required either), and there was no consensus on how valuable something was! All this meant that we only had the gold-route for thousands of years, until quite recently. Truth being told, the issuance of paper-currency backed by Gold did make it more fluid, easy to transport and hence easy to trade. It goes on to say that a better system if in place would achieve what all previous ones never could. Hence, it’s worthwhile to keep considering alternate value-exchange systems at any societal stage of progression. Here is one such proposal.

The Vril System of Value Exchange (Ripple++)

Back to Barter

Money-free Free-money

The Most Obvious Form of Money

“If a being has memory, speaks truth, and can assess value, then it’s best for a society of such beings to use bespoke IOUs for trade”

It is well within reach of today’s technology to build a peer-to-peer, truthful, redundant and fault-tolerant system of accounting. However, the last challenge is a tough one to get around... Considering that we do not have the comfort of a benign benevolent God to make the value-judgements for us, it’s best to leave it (the third prerequisite) to the subjective, biased and selfish individuals that we are. With that in mind, let’s map our expectations from our novel value-exchange system.

A value exchange system is one which does the following:

- Offers the possibility to create and record value.
- Stores that value as long as it can and/or incentivizes the participants to actively make sure the value stays preserved.
- Offers the ability to exchange that value for some other.

Gold is a classical value-exchange system.

- Gold records value; an elegant mansion might be worth 1 kg of Gold, in which case you’ve abstracted away the value of the mansion in the 1 kg Gold bar (you surely can’t walk or sleep in the Gold bar, hence it’s an abstraction). Gold, as of writing this paper, can in this way abstract away 10 trillion worth of assets (in a world worth 360 trillion); the reason for that being that the primary function that it performs is facilitating trade, not recording value; as long as people only want to trade a fraction of what they possess, it doesn’t become a bottleneck. So, Gold does record value, but not for the sake of recording value of the assets that it’s measured against per-se, but as a side-effect of building faith-backed value for facilitating trade.
- Gold stores value in that its beholder rests in peace with this the false assumption that the gold he possesses is much more than just a shiny yellow bar that weights a heck of a lot! He believes in its “store-of-value” (but as argued earlier, it’s only a shallow belief that’s bound to fall apart some day in the late future, even if it’s as late as the doom of our civilization, on which day the beholder of gold would be regretting having not chosen water, soil, and liquid oxygen as his preferred store-of-value; there’s no true store of value; all stores of value are relative; bank stocks were just as good a store of value until they weren’t, for instance). But gold-like systems don’t necessarily incentivize its beholders to take proactive actions for keeping its value preserved (preserving the assets that Gold buys, or preserving the gold-sick civilization while also preserving its scarcity by, for instance, running for the president and passing a bill banning all future mining missions to asteroids containing gold! The effort is worth too much and the benefits are far too distributed).
- It achieves the third purpose insofar as the person you happen to be trading with values Gold as much as you do! Moreover, they must be willing to trust in Gold as a medium of further

exchange. It does no good to give a tribal man a bar of gold if his tribe's craftsman won't accept it in exchange for the tribal carnival uniform, assuming that's what the tribal man wants!

Compare it to monkeys' money (barter):

- Value gets recorded right at the instance of value-creation; if your apple tree that you planted years ago suddenly happens to bear 10 apples, you're 10 apples richer, and there are 10 apples more in the "money"-supply; each apple backing (or rather, *being*) an apple.
- The value in the apple is stored as long as the apple is! Moreover, the farmer is incentivized to preserve the apple, for the sake of the value that it represents. It might sound obvious and silly to point this out, but it's an important distinction from the other forms of value-exchange.
- The lack of double coincidence of wants being the single most problem that barter in the real-world faces (not to mention the problem with divisibility).

We currently live in a system that's a mix of Gold and barter, where Gold represents the frequently traded portion of wealth and is the everyday man's money (note that even that's not the case anymore, now that we have gone fiat), whereas barter existing solely at the highest levels on the scale of trade, where the value traded is so big (though infrequent) that trading in Gold is simply impractical, where barter is de-facto.

We owe all the wealth that we have generated over the past to the single most unique ability that we happened to have developed first among all the species co-inhabiting Earth: abstraction; which itself had arisen from our awesome ability to speak verbal languages with fluency, unlike other mammals (apes) who for biological reasons had had (and still do have) a tongue that simply didn't allow them to speak as effectively as us. It follows without saying that we must cherish this unique ability of abstraction that we owe all our economical and scientific advances to.

Moreover, if one lives long enough (for a few thousand years or more), one realizes that **wealth doesn't move!** Not an inch! It only changes hands, and the same hands change back among each other, and so on, for generations on end... What this means is that the barter system can effectively be made a great deal more efficient with abstraction and "deferred-favors" system of value-exchange (the IOU system repeatedly highlighted thus far). I do you a favor, you do someone else a favor who does another to me, and so on... *On average, the amount of favor I do and receive is equal.* Some will surely be able to do a lot more favor to the world and hence would expect a lot more in return (note that favor doesn't necessarily have to be sweat-work, nor does it have to be moral; all favor is subjective). Even this is cyclical too (coming in cycles of months to generations). A system that takes advantage of the above wisdom is Ripple.

Ripple

The name has two analogies associated with it. The obvious one being how the payments/favors ripple in the mutual-payment-settlement system that ripple is. If I can't directly do you a favor, then I do it to someone else, who does a favor to someone who finally does it to you; you eventually receiving only the favor you accept. It's like the ripples that form when a droplet touches the water-surface (indeed that's how the path-finding works, especially the breadth-first tree-traversal algorithms that make this rippling possible under-the-hood). The other analogy being how even account balances ripple like waves in the ocean (some being positive, some being negative); and it extends to higher patterns too, like how even high-balance accounts ripple over generations, and even balance (or wealth) inequality ripples too if observed long enough, and so on. It's like the Taoist philosophy of eternal change, everything being transient, things arising from nothing (mutual-credit), everything coming in cycles [everything moving, yet still; the sum being zero, yet the difference being impossible to miss]⁺⁺...

It makes sense to take what Ripple does to payment settlement a step further, to apply it to our value-exchange system altogether, by including all that it leaves out (via. Generalization).

And as mentioned earlier, gold-based systems aren't distributed, and take thousands of years to setup and get right; decentralization to the finest level should be another target for our hypothetical system.

Internal trade is directly proportional to the output (or GDP in today's sense); citing Adam Smith. Moreover, a recent study by economists found that open borders would triple the world's output (the world's GDP); imagine what a system would do to the world whereby everyone could transact to everyone else (almost everyone else) instantaneously, and that too without having to trust a common asset, a centralized institution or a third party. Gold/Bitcoin doesn't do that; you can't send a Bitcoin to someone who spits at it! Efficiency compounds over time. Even a percent of efficiency can make all the difference over a century. **The more the trade, the more the dependence on others for the supply of certain goods, the more the specialization, the more the efficiency, and the better-off we all get eventually!**

As a side note, the human ability of abstraction is the reason we have the best economic incentive system in all the species! Yet it's also the very reason why we sometimes find it hard to grasp the simple and the obvious! Hence it follows that our new system should keep abstraction in check, and only allow right abstractions to be made. People often end up abstracting away gold for happiness, or respect/reputation for opportunity, only to be later disappointed, for instance. Our system should make it explicit what abstractions can be made, and to what extent. However, some things will just not be within the reach of our value exchange system (or rather, any value exchange system for that matter), such as love and knowledge, simply due to the fact that we haven't yet figured out a way to trade away these goods in exchange for other goods, for better or worse...

Mutual Credit Accounting

As the name suggests, it's just that: an accounting system for an economy of mutual dependence. One account's balance goes up, another's goes down. That's all it dictates. How much should your balance go up for selling an apple? How much credit can you get? Generally, such systems tend to apply a credit-limit to all players, only to open doors to Sybil attacks, to combat which they introduce member-integrity-checks via a unique-biometric approach or some breed of KYC, hence making them unscalable in the real world, and are generally considered utterly flop! The ones that ever existed in the real world were those between closely knit communities of unrealistically few members, and are generally regarded as failed experiments (and not without reason)!

Ripple

Ripple solves the above problems with accounts which explicitly trust only accounts whose owners the account-holder already knows a-priori, and is comfortable placing trust in. Any transaction to accounts outside one's close circle ripples/recurses until it finds a path from the sender to the receiver such that the immediate receiver of each transaction in the process is someone who trusts the previous one, and trusts him enough for the said amount to be sent successfully. There are some nuances, like a transaction can go multiple routes by splitting into multiple transactions, each being sent through a slightly different path; but the general idea is the same. You only have to trust the ones you do. And just the above-mentioned invariant gives rise to entire structures (or defenses) within the system that shield it from the forces that threaten the previously discussed naïve mutual-credit systems. Indeed, Ryan's inception of the Ripple system is a highly prized ancient-wisdom worthy enough to be inscribed in stone for preservation. (Links to the original papers can be found in the references section at the end, just in case)

However, it has limitations too. It introduces centralization of denominations, i.e. it assumes everyone knows what numbers they're playing with, and what their real value is. (Although the second paper mentions that networks with independent denominations can co-exist, it still requires external integrations to do so and is not a feature of the protocol per-se, if I understand correctly). Moreover, the trust-in-human architecture makes trusting in another user a colossal act of bravery (though you can set limit on how much credit to trust a person with; it doesn't still eliminate the problem). Moreover, you can only spend the combined amount that your peers trust you with; this isn't a problem per-se, but it implies that your credit-history and balances be public and you be a reasonably trustable/respected member of the society if you wish to spend anything over such a network, hence hurting anonymity (though not pseudonymity, as pseudonymous users can still earn reasonable trust for themselves albeit not to the same extend as open users). Making the trusted-peers list public for the sake of gaining trust only hurts anonymity even more, while doesn't relieve the anxiety/fear/doubt in trusting others much either... Because of these limitations, Ripple in its current design is only best suited as a mutual payment/debt settlement system for big multiple co-dependent institutions with high bandwidth of value flowing mostly among each other (as opposed to a full-fledged value-exchange system), which is exactly what it advertises itself to be: a payment settlement system.

Vril

“If a being has memory, speaks truth, and can assess value, then it’s best for a society of such beings to use bespoke IOUs for trade”.

We have no other option than to establish trust ourselves (be it in trusting that a communist regime won’t rise to power and expropriate your private property before buying that real-estate, or that your client would indeed repay you the loan they’re asking for, or that a quantum computer won’t break Bitcoin anytime soon, or that Amazon won’t fail overnight, rendering your Amazon cashback useless). What’s important is that the individual be free to choose in establishing trust and setting his preference for risk.

The following trust-based system is proposed. A system whereby:

- Anyone can mint vril-onus pairs, Vril being an asset to behold, onus being a liability (as in the balance sheet). Every amount of vril is backed by a “vow” (i.e., a promise, which can be nested or not), the legitimacy of which gives it its value. A vow is basically a promissory note signed by the promiser, i.e., the issuer. Onuses are liabilities to fulfill the said “vow”. Vril is tradeable, onuses aren’t, and for obvious reasons (your liabilities are yours and yours alone; others can still help you fulfill your liabilities, but can’t and shouldn’t be allowed to accept your liabilities as their own, as doing that only opens the door to Sybil attacks – indebted users will simply want to transfer their liabilities to fake users who can’t be tracked and have no physical presence).
- Vril can be traded (or better, offered) in exchange for goods/services (i.e., off-chain trade) or someone else’s vril backed by some promise of their own (i.e., on-chain). Possessing some vril assumes and implies that you trust in the issuer’s intention to buy them back in exchange for the services they have to offer, and vice-versa (you can only be sent the Vril of the promises you explicitly list as trustable).
- The onus-holder (the IOU issuer) is obligated to collect back the vril that they sold on behalf of their vow to buy it back in the future. Once collected back by the issuer in return for the said products/services (as per the vow), the corresponding vril-onus pairs get “annihilated”, i.e., the Vril gets melted.
- Onus-holder (the IOU issuer) can “default” on the onuses, the cost of which is born by the beholders of the corresponding vril which just vanishes upon defaulting. Hopeless vril-holders who realize that they won’t ever be able to get the service/asset backed by the vow (having discovered that the Onus holder won’t be able to buy the Vril back) can “burn” their supposedly worthless vril away; this operation also registers a default on the issuer.
- You specify the vows that you trust; you’ll ever only have the vril of the vows (and sub-vows for nested vows) that you trust. You specify your relative valuation of the multiple Vril-types you trust via a matrix of coefficients (an apple being worth two bananas for you, for instance).
- Each user is a currency-exchange in itself; such exchange-trading happens automatically in the background. (If there’s someone offering to give two or more bananas for an apple, your personal private exchange automatically trades it away leaving you with four or more bananas).
- The vril that you possess can be used as a currency for all instantaneous payments. If both you and the recipient trust a vow, then such vril can be directly send to him (irrespective of

whether the vril was issued by you or someone else). If not, then a rippling exchange is made (you trade what you have on the wider market to get something that the recipient will be willing to accept). If no rippling path can be found, new personal promise can be personally issued and the corresponding vril be send to the recipient. If the recipient party refuses to trust in the self-attested promise, no payment can be made.

- Ultimately, such a system becomes self-sustainable with most trade happening on-chain, with **every physical and virtual 'tradeable' good in the world having an abstraction /representation in the Vril system.**

Having independent denominations (for true logical decentralization) requires that the Vril backed by different promises be non-fungible. An inbuild rippling exchange system facilitates trade in such a system.

Trust in the Vril system is more explicit, i.e. trust in vows, not people; be it vows backed by a person's reputation, or a group's reputation (see contracts), or an algorithm (see contracts).

Also note that access to debt is the only thing absolutely anonymous accounts would struggle to do in such a system; they'd struggle to convince other users to establish trust in them. That does not restrict such users to establish trust in others, spend their Vril or perform trade/swaps on the inbuild exchange. Moreover, the only information that such a system makes public about a user is the list of the vows they accept/trust, the amount of a certain Vril they possess (only if they've listed it as on-sale), their credit history (if any), and their own vows (if any).

However solid, scarce, easy-to-store and easy-to-send some Gold variant may be (Bitcoin on the emphasis here), at the end of the day what it can buy is still decided (and decided solely) by trust! You cannot buy your firearms from The Empire Market with Bitcoins without trusting that they won't clean you out. Even if a DAO implementation makes that automated, you still have to trust that the implemented incentive systems will work out well and you'll get the desired goods actually delivered. **Humans want stuff that other humans make; conversely, humans only produce stuff that other humans want.** Period! That human element cannot be removed from any value-exchange system; and when that trust can itself be safely 'currency-fied' (as is the case today, thanks to the digital revolution), there seems no reason to do otherwise, therefore Gold today is purposeless (hence downright meaningless)! Gold today is just another level of useless indirection! It's a fiasco! It's a terrible waste of our time, energies, abstraction and resources! It gives birth to incentives we never planned to have in the first place, just to be able to create a viable incentive to incentivize all our incentives with. Gold is sickening, and is just as bad as fiat if not more; fiat attacks a civilization from the front, and that too over a very short period of time, whereas Gold hurts it slowly from the background, never revealing itself as the root cause of all the problems of the civilization that choses it as its money, carefully spreading its grip on the society like cancer, slowly slowing its pace down until the difference between what that civilization is and what it could have been becomes so stark that the latter gets termed as some sci-fi pipe-dream! Opportunity cost is the worst cost of all, as it's often not easily recognized. Yet that's what Gold costs us. An efficient system is one that cannot be improved upon; one that worsens off upon any attempt of change in the hope of making it more efficient. But as long as there exists a system that's more efficient (and feasible with the existing technology, moreover being both scalable and decentralized, thereby being more resilient), there seems no reason why not to crave it like hell over the existing ones.

Implementation

A platform like Holochain is suitable to implement the vril protocol. The below implementation will be Holochain-specific.

Vow

Since Vows have to be publicly accessible while also being nested (though not necessarily; however, it'll make a good design pattern to structure vows in a nested fashion; more on that later), paths can be used for their lookup on the public DHT.

```
vows.asdf(issuer #)  -> Vow -> Vow
                    -> Vow
                    -> Vow
                    |
                    (Link tag containing the Vow string for faster lookups)
```

For example,

```
Vow {
    TheVow,          // just a string
    LowestDivisibility,
    TotalCirculatingSupply,
    TotalEverAnnihilated,
    TotalEverDefaulted,
    TotalEverIssued,
} -> Vow           (the parent vow, if any; tagged 'parent')
  -> Vow           (a child vow; tagged 'child')
  -> Vow           (another child vow; tagged 'child')
  -> User          (the issuer; tagged 'issuer')
```

TotalEverIssued being the sum of the **TotalCirculatingSupply**, **TotalEverAnnihilated** and **TotalEverDefaulted**;

Consider a world having the following few companies:

- The Apple Company
- The Banana Company
- The Cola Company
- The Milky Monopoly
- The Peanut Company

The Apple Company's promise may look something like:

```
Vow {  
    TheVow: "AAT (an-apple-token): Worth a juicy apple, truthfully; @apple.com",  
    LowestDivisibility: 1  
    TotalCirculatingSupply: 10,000,000  
    TotalEverAnnihilated: 20,000,000  
    TotalEverDefaulted: 0  
    TotalEverIssued: 30,000,000  
} -> ...
```

[Vow, being the entry, -> representing links from it]

Note that the user can go to apple.com and verify that the vow they advertise to be theirs (officially issued by them, and redeemable with an apple) does indeed have the same hash as this one; if it doesn't, it's a fraud token! Note also that the vow is just a human-readable string for reference.

Value-Coefficients-Matrix

This matrix is like your personal funds manager; it represents the Promises you trust, your personal value-judgements of the Vrils you possess, how much of some Vril you can possess, and which ones are trade-able with which and at what ratios; your node will keep swapping them for each other to facilitate others' transactions throughout the day, however your combined net-worth would stay the same, as swapping one for the other only changes its form.

An example matrix may look like this:

[1In meaning that for 1 unit of a certain Vril coming in, how many of the other Vril are you willing to let go of; note that the diagonal will always be one for obvious reasons, except when you don't wish to ever trade away a Vril, in which case the whole vertical column representing that Vril shall contain all zeros]

Out	A	B	C	P
1In				
A	1	2	4	16
B	0.5	1	2	8
C	0.25	0.5	1	4
P	0.0625	0.125	0.25	1

Note that these numbers have to be in mathematical relationship with each other; any oddities should be caught by the UI and reported appropriately, lest the DNA rejects the "bad" matrix. Moreover, a good UI may also additionally suggest the most competitive market exchange value for the column hovered-over; setting a higher value than that signifies your bullishness on the In Vril over the Out Vril; although there's little speculation activity worth participating in a resource-backed value-exchange system, there can be edgy times (let's say the Out company's at the verge of declaring insolvency: its only storage facility is sure to be hit by a forest-fire next week, plunging its stock price with it any day from now) in which scenarios it'd be in the best interest of the user to convert his funds to more stable solid assets. However, note that such scenarios do have a rippling effect on the whole economy (as there can be many companies depended on it for fulfilling their own promises), for the most part, the immediate players suffer the hardest (which is good, as it limits the damage-radius). With the sole exception of monopolies, competition can and will (often immediately) fill the hole created by the failed asset/company. Note that dependence is a product of specialization and is not necessarily bad. In the real world, generalization often follows specialization, followed by further specialization and so on... That's how the world develops. However, too much dependence in too few providers should be avoided; companies would want to advertise their margin of safety in their annual filings, further strengthening their customers' trust in their competence.

Wallet

----- in Vril or Onuses -----					
Asset/ Liability	Max-cap/ max-floor	Balance	Net-worth/ net-liability	Auto Trade-in/ Annihilate	Auto Trade-out/ Mint
+A	+1000	+800	+1050	Yes	Yes
+B	+500	+500	+2100	Yes	Yes
+C	+500	+400	+4200	Yes	Yes
-P	-10000	-1600	+16800	Yes	Yes
(+)					

The above user by setting a lower cap on B and C effectively shields himself from placing too much trust in B and C; rather showing a preference for storing his majority wealth in A's stocks. The node will make sure his balances don't exceed the respective caps. Note that this user doesn't trust The Milking Monopoly (M) at all, and hence never holds any of its Vril/Stock. Note that the negative sign before P (The Peanut Company's promissory token) implies that it is this user's liability (this user is the owner of The Peanut Company). All in all, in total this user is the rightful owner of about 1050 apples (or 2100 bananas, or 4200 Coke bottles, or a whopping 16,800 peanuts; whichever number you prefer, there're all the same). All throughout the day as his node performs swaps (thereby facilitating other's transactions), his balance column would fluctuate, however, his net-worth column would stay constant.

Exchange

The double-auction exchange-market that Vril uses to facilitate transactions and trade (both big and small) is closely tied with the matrix-of-coefficients discussed prior. Here's the representation of the exchange's offerings on the public DHT:

```
exchange.desired.asdf(promise#).against.fghj(promise#).market
```

Imagine you have apples and bananas, and you wish to exchange your bananas for even more apples. In that case, you "desire" apples "against" bananas.

```
Market {
    HashOfDesiredPromise,      (what the initiator pulls)
    HashOfAgainstPromise,     (what the initiator pushes)
} <-> Offer <-> Offer <-> Offer <-> Offer <-> Offer <-> Offer (In descending-order by price)
```

```
Offer {
    Offeror,
    Price, (how many desired Vril can you pull for 1 unit pushed)
} -> Offer (Previous offer; more lucrative than the current one)
   -> Offer (Next offer; less lucrative than the current one)
```

Setting up your matrix automatically creates all the respective entries on the exchange for you on your behalf.

Negotiations:

Note that all negotiations happen privately via. node-to-node messaging (or capabilities, in the new methodology of Holochain). All that the public DHT paths discussed above do is they lead you to the doors that you should knock to close the deals that you care about. In other words, they tell you the “address”/the-public-key of the node whose price you find lucrative enough for the swaps that you desire to make; it’s your node’s responsibility to chat with it (remote-call) to query about how many Vrils it possesses of the promise you happen to be interested in, whether it’s allowed to auto-trade those Vrils with you instantly or would it have to first seek its owner’s permission, and so on. If you (your node) like the prospects, it can initiate the swap or transaction (whichever case may be).

Transactions:

A transaction is different from swaps in that in a swap all you do is 'give-and-get', whereas in a transaction you only 'give' (you do get back something; in case the recipient is the same organization that issued the Vril, you're getting back the promised service or the promised real-world-counterpart that that Vril represented; or it could just be an altruistic act of charity, in which case you're getting back the emotional satisfaction of being a nice person). Most transactions won't be the straightforward 'give's; the recipient may not be a fan of what you possess, so you (your node) would first have to find a viable path from what you possess to what the recipient accepts, making a transaction in each step/hop.

[Note that counter-signing hasn't yet been fully implemented in Holochain, so we wouldn't touch this implementation that deeply. However, here's a rough description of what happens under-the-hood: your node scans the DHT thoroughly to ultimately arrive at what Vril you need to rummage up in order to transfer it to the recipient in question, and finds out a series of swaps you'd need to make in order to get that specific Vril that your recipient accepts, then via the magic of counter-signing it executes all those swaps and the last transaction (your node only countersigns on the swaps and the transaction if all the other parties have countersigned as well, which makes sure that either the whole rippling process either happens in its entirety or not at all; this ensures that irrespective of whether the rippling was successful or not, you do not get left with unwanted Vril halfway through).]

Here's a diagrammatic representation of a Vril transaction that takes one intermediary.



The chimp doesn't trust bananas (so doesn't have any), but wishes to send some help to his monkey friend who just so happens to be the opposite in taste. The chimp's node runs the path-finding algorithm and discovers a node that trusts both and will be willing to facilitate the transaction at the price of 2 bananas per apple. Note that nodes are incentivized to facilitate such swaps and transactions; our intermediary node, for instance, is making a profit at the said price if in the real-world an apple is actually worth 3 bananas! Competition among nodes keeps such profiteering in check. Note that it's the sender who bears the cut of the intermediaries.

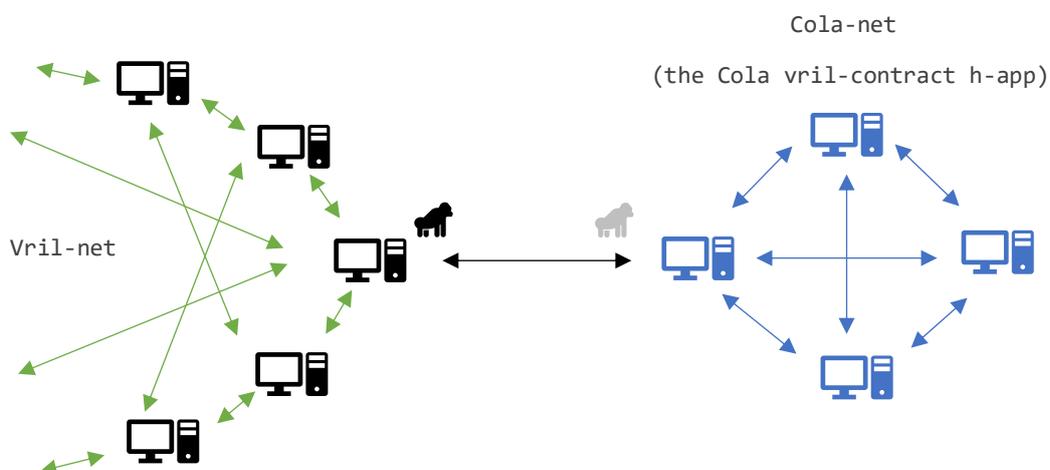
Contracts:

The functions that a node implements can also be implemented by a separate peer-to-peer DNA running on its own network, with its own (open-source) rules about when to issue more currency, how to set prices, what swaps to facilitate and so on. Organizations with many thousands of members, and millions of customers will seldom want their Vril account to be managed single-handedly. Note that one can even have a contract with as few as two agents and a few arbitrators, the participation being dictated by the membrane rules of the DNA (think of a joint venture, for example). Humans are selfish; however, humans often team up and work together in order to realize that selfishness. Contracts make that form of group-organizing a lot less tedious.

On the technical side, where a lone independent user has a private key to prove and authenticate all his actions with, a contract has none. However, a contract does have a DNA hash which the Vril app consults whenever it has to execute those functions. The following best represents this dichotomy in the Rust language:

```
enum User {  
    Lone (AgentPubKey),  
    Contract (DNAHash),  
}
```

The validation for all contract-related actions in the Vril (h)app get delegated to the contract (h)app, i.e., Vril makes remote calls in its validate routines when the concerned actor happens to be a contract, thereby creating a very strong, trustable and reliable link with the contract (thanks to redundant validations that Holochain guarantees). A graphical representation of the connection might look like this:



Note that your node only needs to spawn an anonymous instance of the Cola-net for all cola-contract related queries; you don't have to be a membrane-permitted full-agent (i.e., one who holds all the required registration rights). Those privileges are only needed to exert a vote or influence over the actions of the contract (and those too only for organizations modelled around humans; you can easily program an autonomous organization in which even those decisions like how much currency to issue on a particular quarter are made algorithmically).

Also note that since a contract doesn't have the privilege of a private-key and doesn't reside on a single agent's node, it's balance-sheet and subjective-valuation-matrix are by vary nature public (stored on the DHT).

```
contracts.ASDFGHJK    -> BalanceSheet  
                      -> Matrix
```

Delivering (h)app updates:

There does not have to be any update-delivery mechanism in the Vril (h)app. However, it's safe to assume that mankind will keep discovering better ways to do business; for instance, someone might come up with a better path-finding algorithm that takes one-tenth of the time. In such cases, a very smooth transition can be made to the new more-efficient (h)app: corporations one after the other can stop issuing further Vril of their products/services on the existing version, rather doing so on the newer more-efficient version. Once all the Vril of the old version gets annihilated (i.e., collected back by them in return for their products/services), they can safely divorce from the old version entirely.

Rough sketch of the possible extern-functions

[The Vril (h)app's functions]

- Get a Vow's Details
- Make a Vow

- Mint Vril
- Melt Vril

- Get Relative Valuations as a Matrix
- Set Relative Valuations as a Matrix

- Get the Balance Sheet (or wallet)
- Get Another's Balance of an Offered Vril (remote-call)
- Get Contract's Balance Sheet
- Set Balance Sheet Caps

- Send Vril (waiting for counter-signer)

- Execute a Contract's Pending Actions

[Anonymous functions that
a contract implements]

Verify New Vow

Verify Mint Vril

Verify Melt Vril

Verify New Valuations

Verify Balance Sheet Caps

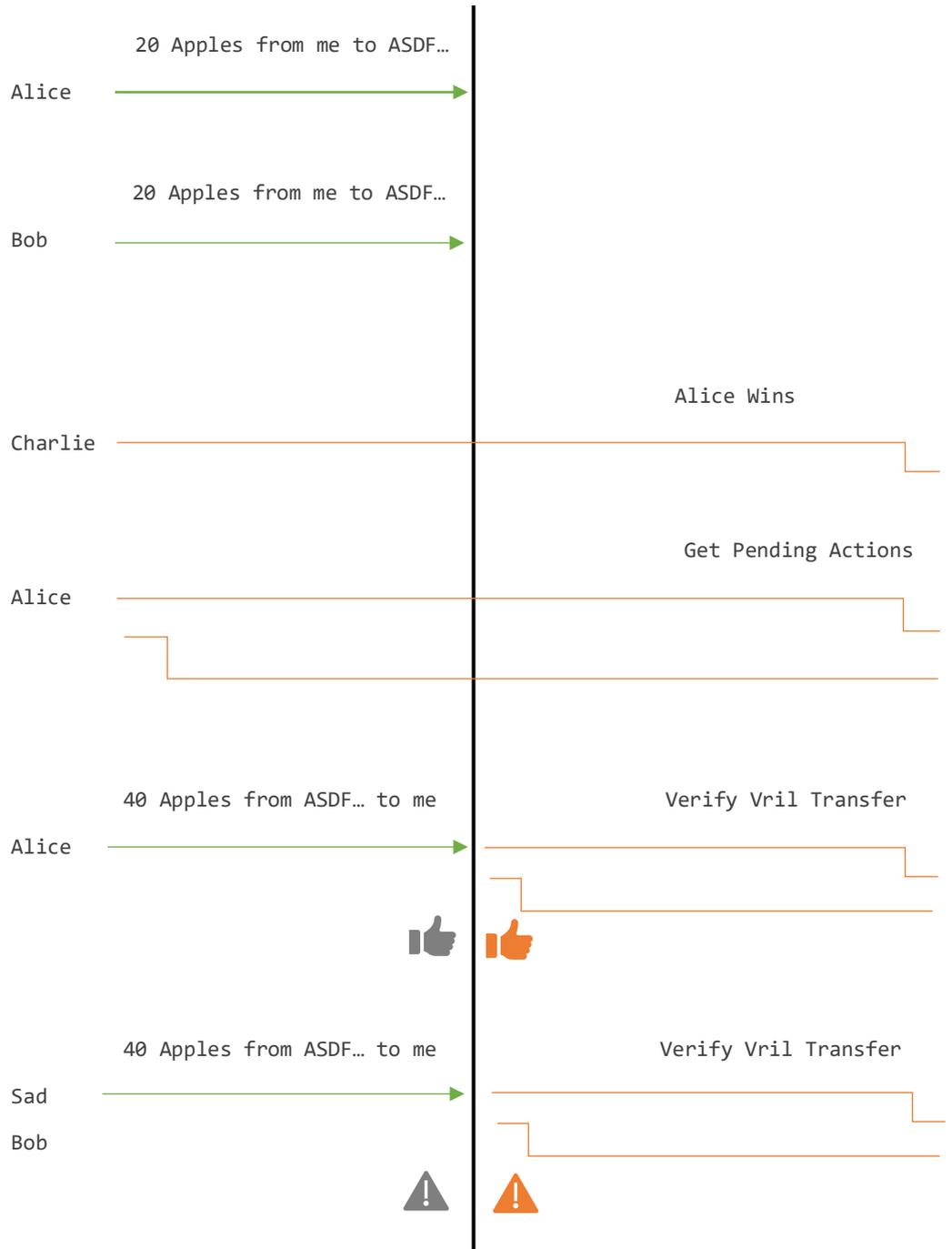
Verify Vril Transfer

Get Pending Actions

Imagine two friends Alice and Bob who wish to place a bet on an external event; they mutually agree to use their common friend Charlie as their arbitrator. The following describes the event-flow over time in such a case.

Bet-Contract
(ASDFGHJKL)

Vril



Contrast

Gold:

Gold is fiat in its finest form; there's nothing that backs it (except for the commodity aspect of it that requires mining, refining and alloying, which only makes up a very miniscule fraction of its price; the rest being just the beholder's faith that others will put the same faith in it too). Compare it to barter, where an apple is an apple, which implicitly implies that it be backed by it. Now compare both of them to the abstracted-barter system of value-exchange that Vril is, where the apple on your node's asset-list (Vril) is explicitly backed by the issuer's pledge to hand over to you the real-world counterpart (the apple) should you so desire. It overcomes Barter's many limitations, yet also preserves its magnificent glory that all other systems lack, i.e. true resource-backing. **Vril is Vril by virtue of the powers it possesses, thereby being valuable to the society; not the other way around.**

However, the history of mankind tells a very different story. Gold was for the past thousands of years the predominant form of money and exchange-unit. Even before the yellow-metal, there were other forms of gold (sea-shells, exquisite flowers, toy canons, you name it) that were equally valuable to those societies as the yellow-metal is to ours. It seems improbable that it was a mere coincidence that multiple independent societies ages apart from each other, geographically and culturally isolated from each other just so happened to have chosen commodities with absolutely no intrinsic value as their exchange-unit; "It won't do anything ... except look at you" (quoting Warren Buffett). Maybe we're wrong in judging that it is intrinsically valueless; maybe it does have a purpose. Something has to explain this phenomenon... Perhaps Gold's something we can 'chew' (as a stress reliever). "Gold is a way of going long on fear" (again quoting Warren Buffet). If we are to explain this phenomenon, we have to accept fear as a natural human tendency; man fears, and thereby has a need to satisfy that urge to fear; and what better a medium to satisfy that need than with faith; the demand for gold is therefore a demand for faith; there was the demand, and there will always be one; it's part of the human nature. In fact, it represents 10% of all demand in the world (sometimes even 25%, especially in the times of uncertainty)! That being said, though we cannot entirely replace that demand with Vril, we must strive to limit its size and score by virtue of creating a solid, robust and reliable economic system of value exchange whereby faith gets channeled in productive, intrinsically valuable assets; not for the sake of faith itself, rather faith being just a by-product of value-creation.

ERC-20:

Ethereum was built from the ground up as a golden currency; it just so happened that its developers realized (after quite a while) that a great number of smart-contracts being deployed on it were nothing but golden-currencies capitalizing on faith (just like their own). And so, a generalized interface was made that every token then on had to implement; termed the ERC-20 token standard. It's a one-size-fit-for-all solution; every token transaction gets replicated to millions of computers no matter what your needs are. Ethereum is this giant one-world-supercomputer that behind the scenes runs on millions of moderate computers whose combined potential far exceeds the theoretical maximum potential of the conglomerate! Meanwhile, in reaching that theoretical maximum, the Ethereum community happens to have invented problems that never existed before, and never would have, had they chosen to do things the right way; problems that they're always busy solving. Even the technical efficiency arguments aside, there's a fundamental difference between the way they envision the post-tokenization economy vs the Vril way; and the difference is in the principle: the ERC economy builds value first (faith-derived), then attempts to use that value for trade, whereas Vril primarily drives trade, thereby building value.

Another difference to note is that unlike Ethereum smart-contracts that facilitate every action related to the token, a Vril contract is just a user account that doesn't have a private-key associated with it, rather being controlled by a group of individuals (or even by a group of furthermore contracts) as per the contract code (the DNA in Holochain terms). This does mean that clever use-cases such as spying on every transaction of the said token, or automatically deducting a tax-amount from every transaction of the token can simply not be implemented in the Vril system. Such clever mechanisms are not only absent in the decentralized barter systems that Vril is inspired from, they are also anti-barter! This relieves some burden off of our diligent users' backs, as all they have to do on their part to make sure that some Vril/Vow is trustable is to assess the trust-worthiness of the respective custodian (the Vril issuer) for the promised goods and services.

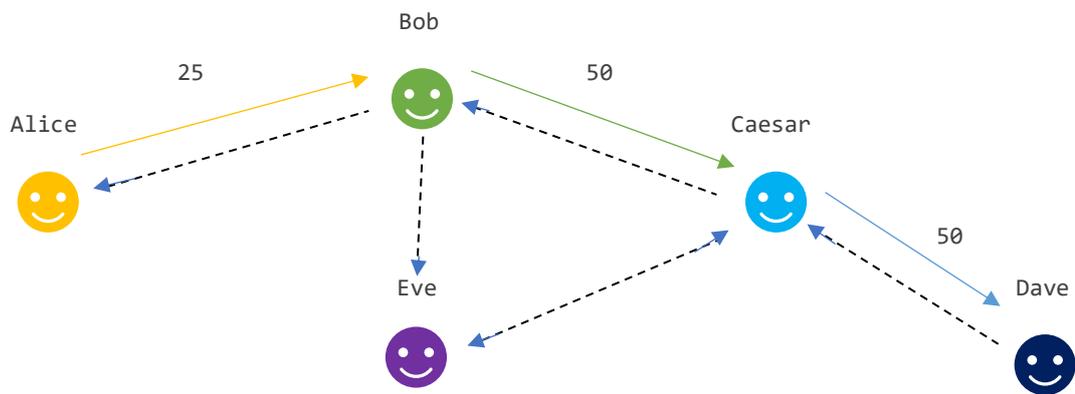
Fiat:

There are some fundamental differences worth pointing out between the fiat bank-money system and Vril (especially credit-backed Vril).

It's tough to tell for sure (none of it was planned per-se, or happened overnight), but the best guess is that the intent behind the design of the modern banking system was to minimize bank-runs, maximize lending, while also maintaining a positive APY (annual percentage yield) for the account-holders; which do not at all go hand-in-hand! For lending literally means giving some money away to someone for a fixed duration after which you can expect your principal plus some interest in return, if you can still access your lent money, then it hasn't actually been lent. In reality, banks do nothing but mint currency in the name of lending, which effectively qualifies the bank-notes as a form of IOU, backed by some collateral, or the issuer's ability to repay it in the future; however, in a credit-backed money-system, when a lender lends you some valuables, it is you who issues the IOU and hand it over to the lender, and not the other way around, as is the case with banks. Moreover, banks don't lend you valuables, rather they lend you the same IOUs which they somehow convinced the previous debtors to accept as payment (how else would they repay their debt); hence the name 'fiat'. The circulating money-supply therefore is a function of the total-debt in such a system; what's even more striking is that the only way to shield yourself from such an inflation of the money supply is by borrowing as much as your potential allows you to! Factoring in the fact that at the end of the day it's the banks who decide how much credit-worthy someone is, the modern banking system seems like a pretty unjust system. Moreover, the bank always expects more than it lent (so the money supply can never vanish; the total debt can never be settled; someone always has to go in debt to repay the old debt, that "someone" mostly being the state). Plus, the APY is a myth too; it always happens to be lower than the inflation rate. What the system effectively does is it steals purchasing-power from the supposedly unworthy masses deemed unfit for credit and hands it over to the top of the food-chain. One has to ask oneself as to why on earth would the masses agree to such an unfair system; and the answer is: they won't, had they the freedom to choose so. **The fiat system requires that it be forced upon the society coercively;** for if there were an alternative, no man in his right mind would choose to live under such a system. **Fiat requires the state, and the state requires fiat.** Add to the equation the centralized Keynesian control apparatus that the enforcers possess over the economy and it becomes certain that the free markets that exist in such a system are anything but free. And to let the free-market run wild once and for all, it's therefore not only important but also essential that the fiat-system be replaced by a true value-exchange system; and Vril, unlike Gold, with its true credit-backing characteristics and distributed architecture is flexible, stable and resilient enough to do just that.

Ripple:

Vril expands beyond Ripple in that it's not just a payment-settlement system but rather a full-fledged value-exchange system, thereby requiring independent-denominations and subjective value-judgements (see the theory of marginal utility and subjective value). In fact, Vril is more like a virtual barter system of value exchange that solves the problem of double-coincidence of needs with Ripple. Yet it's fairly easy to represent a pure Ripple-like system in Vril; the below demonstrated apparatus does just that.



[For the sake of clarity, we've omitted from the diagram the fact that those smiling-faces represent Vows and not actual users (as in the original Ripple). Read the section on transactions about how this process happens under-the-hood with countersigning.]

Bob's coefficients-matrix:

Out	A	B	E
1In			
A	1	2	4
B	0.5	1	2
E	0.25	0.5	1

[The dotted lines show trust-relationship between the actors; Dave trusts Caesar, who trusts Bob and Eve, Bob trusts Eve and Alice and Eve trusts Caesar. The solid lines represent the movement of Vril; for the sake of clarity, the respective onuses have been omitted from the diagram. Dave demands 50 of "C" IOUs (as Caesar is all who he trusts) from Alice. Alice could scavenge "C" IOUs from somewhere, such as by working for Eve who can pay in "C" units, but she chooses not to. She is in desire of "C" Vril, but also wishes to settle the payment as quickly as possible. Her node looks up the DHT and finds out that "C" Vril can be bought in exchange for "B" or "E" tokens. It then realizes that "B" can be bought in exchange for the Vril of "A". Since "A" is her own Vow, she mints some of it. She then sends her newly minted IOU to Bob, who mints and sends his own IOUs to Caesar, who mints and sends his own IOUs to Dave. Note that Bob values Alice's tokens twice as much as his own. Thus, she only has to promise 25 units of her service to Bob in order to convince him to promise 50 units of his service to Caesar. As a side note, notice that Eve and Caesar can exchange IOUs between them all day long, as they both trust each other.]

Case Studies

In this section we'll be looking at some real-world examples of the Vril way...

Besides consumable goods (apples, bananas, clothes) and services (hosting, transportation, entertainment), Vril is also a very good facilitator for transactions involving private-property such as real-state and art pieces. Since every such property is unique and bears a different value, it makes sense to let each be represented by its own unique Vril. Thanks to nested Vows, the private property enforcer could create a Vow promising to preserve and maintain the property rights of the area it represents, the properties within which get their own distinct second-level Vows that contain the latitude-longitude of the land they cover as their Vow. Ownership of such a Vril proves the ownership of the property it represents. Moreover, it implies that, once mainstream, property-holders would be able to trade properties as though trading shoes with each other! No broker or brokerage firm needed!

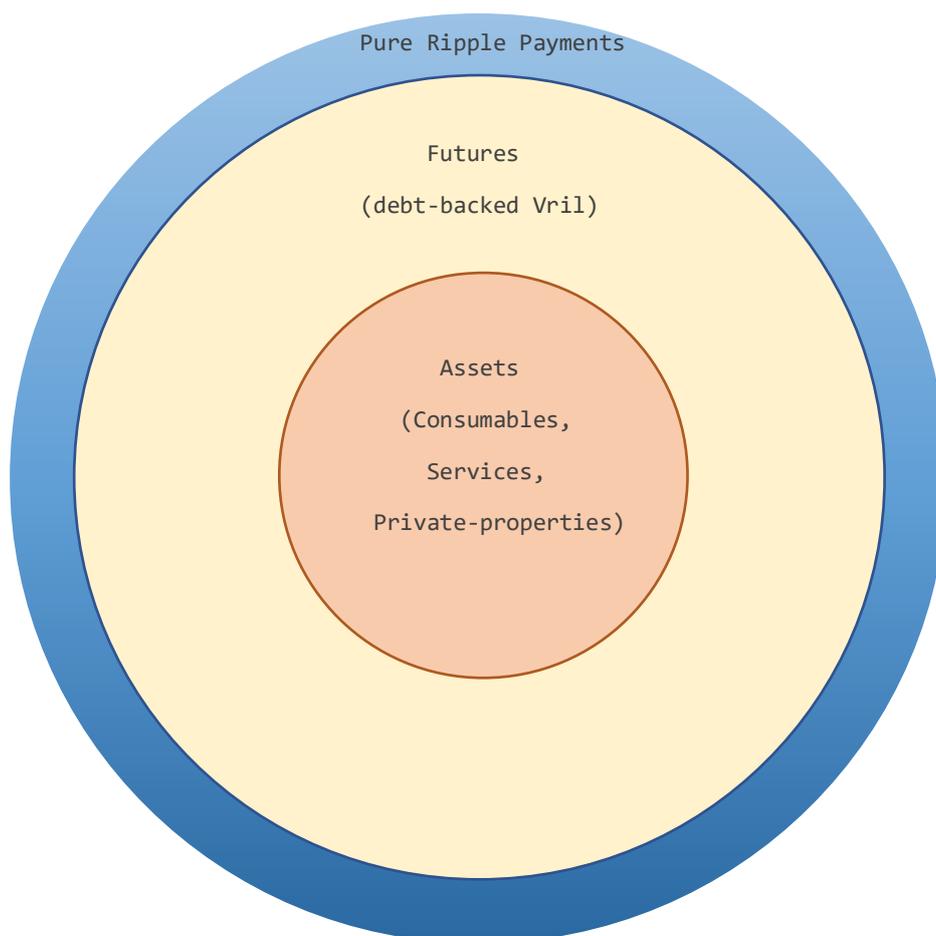
Besides goods, services and properties, Vril can also be used as a payment for labor; in fact, the laborers can even be paid in the same company's stocks that they contributed in producing. Note that those stocks are not the same as the shareholder's stocks; the former gives you the right to claim the produce, whereas the latter gives you the right to claim the profits.

If there's something that Vril cannot and should not be used to represent, then that's intangible properties that are intrinsic in nature to the person it's issued for (such as a proof-of-citizenship, proof-of-veganity, driver's license), simply because such properties are intrinsic to the individual and for the same reason untradeable.

Economic Signals in the Vril System

The beauty of any system lies in its simplicity. Vril, being the rippling abstracted-barter system that it is, has very few economic signals that aren't straightforward to think and reason about. Most notably, inflation doesn't exist; the rise in the total supply of the Vril of a certain asset signals a rise in the total available quantity of that asset. Moreover, even debt-backed Vril (as discussed multiple times before) doesn't inflate prices; all it does is it increases the debtor's present purchasing power at the cost of his future purchasing power (unlike fiat which does inflate prices).

The pure-ripple arrangement of payment settlement behaves like a mutual-credit currency, whereby all positive balances are expected to fall while negative balances are expected to rise. In such an arrangement, there's a potential limit to how deep one can go in debt (the credit-line; balance caps achieve the same in Vril), often closely correlated to the individual's (or organization's) credit-worthiness. Note that all possible Vril arrangements can co-exist and thrive, as demonstrated in the following diagram.



Why now?

“If a being has memory, speaks truth, and can assess value, it’s best for a society of such beings to use bespoke IOUs for trade”

Never before did there exist a technology that enabled the everyday-man to hold huge amounts of transactional memory, and to be able to prove with absolute certainty the truthfulness in his sayings, doings and actions (thanks to computers and cryptography; in fact, if you think about it, even Gold is an accounting system: instead of using paper and pen, it uses more reliable vaults and yellow metal-bars). With the personal computer revolution already having taken-off, same with the internet revolution that connected the world together, and the distributed-computing paradigm-shift on the verge, it only makes sense to start building such systems of power-equilibrium, systems that incentivize us to do what actually matters! We are late, indeed very late, and we have lost much already due to the centralized systems hitherto, but not anymore. The 3000 years journey ends here. **The laissez faire free-market of the future demands a free money.**

Consequences

It goes without saying that such a system would do a great job functioning as a platform for privately-issued currency. Private currencies have existed before, though the strict regulatory measures taken against them by the various governments have been enough to silence such systems in the past. However, today's crypto technology and advancements in peer-to-peer systems mean that a system can be designed such that it remains resilient enough to survive even a state-level oppression; it's more of an inevitability that the private sector and the general public at large would finally take hold of the one supreme privilege that it had been denied thus far- the issuance of currency. In fact, it may not be odd at all in the near future for an entire section to be devoted to "currency-strength-and-performance-metrics" in the 10-k filings of public companies. A new breed of currency-index-funds shall emerge, offering the public the luxury of diversification, with easy-to-configure heterogenous matrix composed of the best performers as its constituents (all that via. a text file). The abstracted-barter (tokenization) revolution would make the financial industry cheaper, faster, and more accessible, thereby unlocking huge amount of value currently held in illiquid assets, and vastly increasing the volume of trade.

In general, the Vril system adheres to the notion of free-trade and free-market capitalism- strong and reliable currencies issued by reputed companies with sufficient backing power will survive, and less reliable ones will succumb to extinction; every dealer issuing his own currency to be in control of his fate; ultimately leading to a world which has its entire worth represented, recorded, privatized and traded in The Vril System.

Challenges

Gold has been anything but stable over its lifetime – new entire reserves being unearthed every couple of centuries, inflation and even periodic deflation shaking the gold price, price changes entirely due to sheer speculation... However, the one thing gold has been great at is at making the everyday people abandon their businesses and dig for gold (see the California Gold Rush of the 19th century; this decade's Bitcoin rush), then hold it till someone offers a big enough price for it. Fear of Missing Out (FOMO) is real, and is especially great at making people move. However, a system like Vril inherently lacks any motivation for people to jump in and get on board... This does make adoption a bit of a challenge...

Luckily for us, the barrier to entry is quite low; heck even underage kids can start using Vril for trading toys with each other, then grow up some day only to trade yet bigger “toys”; or perhaps use it to keep count of who did how much favor to whom (ripple-mode); and all this over the same network! *Value is anything you assign a meaning to.* It doesn't even need to have a physical representation; in that sense, Vril has use-cases that far exceed the use-cases of any other existing medium of value-exchange.

THE DESIRE FOR GOLD IS NOT FOR GOLD;

IT'S FOR THE ILLUSION OF FREEDOM

- *The A Man*

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Discuss @

<https://forum.holochain.org>

Contribute @

[https://github.com/the-a-man-006/\(coming-soon\)](https://github.com/the-a-man-006/(coming-soon))

