Questionnaire - Saga PWC

Questionnaire

Note: you can decline to answer certain questions (like marketing / go to market) which may be trade secrets and we will put in "declined to answer due to current trade secret".

a. General

    i. **Which blockchain / DLT are you building on top of?**

The SAGA token (SGA) is built as an ERC20 token on top of the Ethereum network. We have chosen to work on top of the Ethereum blockchain as it gives, to date, the best support for our needs. While we have confidence that the Ethereum network will be able to scale effectively, our system is designed so that we can relatively easily migrate to a better solution if one becomes available.

    ii. **How does the stablecoin work?**

Saga is not a stable coin - it has been designed to gain intrinsic value over time. We can understand why one might confuse Saga for a stable coin, because of its underlying fiat reserve mechanism.

Saga is designed to become a global, non-sovereign currency used in the global scope of trade and commerce, and complementing fiat currencies which are designed for national scopes.

Considering that any currency is but a quantifier of trust and that trust is gained over time through demonstration of value, Saga has implemented a monetary policy based on a variable fractional fiat reserve, allowing the currency to gradually gain organic trust while taming volatility.

Saga's money supply is fully elastic and determined by the market. When Saga in launched, there are no SGA in circulation. When SGA are bought from Saga's smart contract, new SGA are minted and the proceeds are deposited in full into the reserve.

Saga's smart contract also offers the market to sell SGA back at any time. In this case, funds are withdrawn from the reserve to reimburse the seller and the SGA token is liquidated. The funds in reserve serve no other purpose - their sole use is to back up the SGA currency by enabling the smart contract to reimburse people that sell SGA back to it.

Saga starts by maintaining a fixed price for SGA and consequently a full reserve - 100% of the value of all SGA tokens is backed up in the reserve.

Then, as more SGA are bought, we assume intrinsic value has begun to be built and the price of SGA rises. Saga's monetary policy model sets the increase in price of SGA so as to reduce the reserve ratio in a steady manner as more SGA are bought. In this way Saga models trust - as more SGA tokens are bought, our model takes this as an indication of increased trust in Saga, and therefore reduces the reserve ratio.

Saga's reserve is held in regulated banks in reputable jurisdictions such as Switzerland. Such banks are required to provide a daily attestation of the value of reserve they hold, to avoid necessity to trust Saga in this regard.

Our aim is for SGA to serve as a global digital currency, complementary to existing fiat currencies

iii.   **What is the purpose of your coin? What does it aim to achieve, and which problems does it solve?**

Saga is a 'not-for-profit' foundation and does not profit from its activity. Saga's operations are funded by the proceeds from the sale of Saga Genesis (SGN) - a voucher token convertible to up to 15 SGAs. Saga Genesis was allocated to different stakeholders, such as the team, investors, etc. So they are remunerated for the risks of funding and founding the project.

The Saga Genesis mechanism was designed so that the interests of SGN holders and the those of SGA holders are aligned. In particular, the number of SGN tokens is capped, the amount of SGA tokens SGN holders can received is capped at 15, and SGN holder's only receive SGA tokens if the SGA currency grows. In other words, SGN tokens are convertible to 0 SGA tokens when the economy first launches - the number of SGA received only increases if and when the SGA economy grows.

b.   Launch & marketing
   i.   **What does the market need to be confident in the stability of your token?**

Saga's smart contract's market making function for SGA mitigates volatility. The variable reserve ratio adjusts between two values of stability and increasing value. When Saga is in its nascent stages, stability is emphasised over growth, and Saga maintains a large fractional reserve.

As the economy grows, and trust in Saga becomes larger and more stable, Saga's reserve ratio decreases.

Like any reserve based currency, there are two additional elements that the market needs to be confident in:

1.   That the value of Saga's Reserve is as claimed and
2.   That the Reserve is used for its purpose - to buy SGA back from the market when demand falls.

The former is attested to by the banks that host Saga's reserve, who will report the amount of funds that Saga holds in their accounts on a daily basis. The second is regulated by the Swiss authorities, under which the Saga Foundation is obligated to fulfil its purpose of creating and maintaining the SGA currency.

ii. **How are you bootstrapping to that level of confidence?**

When the Saga economy is small our monetary model applies a 100% fiat reserve - at this stage, SGA is fully backed and pegged to the SDR and the smart contract is always willing to buy back SGA at a known price. As a result, no external trust is needed to maintain the price at this stage.

iii. **What are your go-to-market strategies?**

Saga's approach of maintaining a backing reserve and of fully complying with regulation, will allow us to broaden our target audience to people that have up till now refrained from participating in the crypto market. We will give more details as we proceed to our launch.

c. Economics

i. **What is your coin stable with respect to?**

Saga's Reserve uses the IMF's SDR as its unit of account and the reserve is held in assets that replicate the makeup of the SDR.

The SDR is a basket of currencies created by the International Monetary Fund. Its composition is re-evaluated at least every five years and to date consists of:

1. 0.58252 USD (42%) 2. 0.38671 EUR (31%)

3. 1.0174 CNY (11%) 4. 11.9 JPY (8%) 5. 0.085946 GBP (8%)

ii. **How much volatility can this peg withstand? Is that the same for upwards and downwards pressure? How wide is the band of behavior it can support?**

Saga is not pegged and its price (in relation to the SDR) changes to reflect the strength of the Saga economy. Saga's monetary model applies a variable fractional reserve that results in higher price stability against market forces when the economy is small.

Our monetary policy model also includes a variable price band, that helps stabilise the price and provide liquidity when Saga's market cap is low while supporting the development of secondary markets as Saga's market cap grows. The model also incorporates counter-cyclical elements which provide stability.

iii. **How easy is it to analyze the band of behavior from which it can recover?**

Since Saga is not pegged there is no need to recover anything. SGA's price goes down in a shrinking economy and will appreciate again when the economy grows back. This process is done over the blockchain in a fully transparent and predictable way.

Our monetary policy models includes anti-cyclical measures to better support the economy in a shrinking scenario.

iv. **How expensive is it to maintain the peg/stability mechanism?**

How transparently can traders observe the true market conditions?

Since there is no peg, there is no mechanism and no costs. The model adjusts the price to changes in supply and demand.

Our monetary policy and the smart contract that implements it are both fully transparent, so market condition are always known.

v. **Which monetary theory (theoretical) assumptions do you think are not true and how does your protocol account for that?**

We have studied the history and evolution of money and have taken important lessons when designing our currency.

For example, we have taken several developments that occurred naturally in the evolution of currency and included them by design in our model.

The most important example, is our variable fractional reserve. Saga's currency begins with full reserve backing - echoing the gold standard currencies of the past. As our currency grows and trust in it is gathered, the reserve ratio is lowered, forming a fractional reserve currency. Eventually, when SGA reaches first-rank prominence we will consider abandoning the reserve-based monetary model - similar to the abandoning of the gold standard and the creation of fiat money.

Another lesson we have taken from central bank practises regards our model's price band. When the SGA currency is small, our smart contract applies a minimal price band - there is only a 0.15% difference in the price at which it sells SGA and the price at which it buys SGA back. At this point, the Saga smart contract effectively dictates the market price of SGA. Then as the economy grows, the price band widens and more room is given to the free market to determine the price of SGA. This mirrors actions taken by central banks when they wish to relinquish exchange rate controls on their currencies.

vi. **Does your stablecoin supply scale in response to demand? If so, how?**

Yes, SGA minting (and burning) is done in a continuous way through Saga's smart contract. As a result, SGA money supply is fully elastic and always adjusted to the market's demand.

vii. **Who provides the capital to maintain exchange rate peg? How are they compensated / Why do you think they would continue to lock up capital, given other investment opps?**

The proceeds from issuing new SGA tokens are deposited in regulated banks and stored so that Saga's smart contract can use them to buy back SGA tokens when demand falls.

The Saga reserve accrues interest and the Saga smart contract consequently raises the price of SGA, so long-term holders of SGA benefit from an increase in value.

Increased usage as a currency will also lead to higher demand for SGA and hence a higher price.

That being said, Saga is not an investment vehicle but a currency that aims to balance between the aims of storing value and acting as a means of exchange. We believe that Saga, with its variable reserve mechanism, balances between these two function effectively.

viii. **An eventuality plan in case of a "black swan" event.[1,2] The 1% case will happen eventually.**

Our monetary policy includes anti-cyclical measures that causes the reserve ratio to increase relatively quickly in a shrinking economy. In the case of a black swan event, the rising reserve ratio will ensure SGA holders that they are going to get back a significant part of their current holdings, preventing a 'run on a bank' scenario. Our monetary policy is designed to be sufficient to redeem all SGA in circulation in accordance with the Saga monetary model.

d. Tech
     i. **Are any novel consensus mechanisms used, over and above the underlying blockchain?**

Saga is using the Ethereum network and its consensus mechanism for its ongoing operations. Recognizing that the governance of a currency - including smart contract updates - is a central element in building intrinsic value, Saga has put together a research institute that is looking into advanced delegation-based consensus mechanisms.

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[1] https://en.wikipedia.org/wiki/Black_swan_theory

ii. **What transaction throughput can the blockchain currently handle and how does it plan to scale? Do its plans coincide with your plans for your estimated demand?**

As Saga is running on the Ethereum network, we are limited by its transaction throughput and its future scaling. Saga smart contract offers three basic operations: Buy, Sell and Transfer. Saga's monetary policy includes a variable price band that encourages the development of secondary markets, so we do not anticipate a considerable throughput of Buy and Sell operations. As for Transfer operations, their throughput depends on development of second layer solutions.

iii. **What tradeoffs does your protocol make and why did you make those tradeoffs? (supply/demand, temporarily peg breaking) (censorship resistance) (privacy tradeoffs) (accuracy of present market data and ease of manipulation of the data feed protocol uses (responsiveness of market and ease of manipulation)**

The SGA currency's value is composed of two elements: reserve based and intrinsic value. While the reserve main aim is to protect from volatility, it exposes SGA holders to counterparty risk and the risk that the SDR itself will lose value against other units of account. On the other hand, SGA's intrinsic value is prone to volatility.

The reserve ratio that sets how much of SGA's value is based on the reserve can be looked as the balance of the tradeoff between volatility and exposure to the SDR and counterparty risks. When the Saga currency is weak and the risk of volatility is high, our model applies a high reserve ratio, i.e more exposure to the SDR in favour of reduced volatility. As the Saga economy grows, the risk of volatility is reduced and the reserve ratio is lowered decreasing the exposure to SDR and counterparty risks.

This tradeoff can also be looked as a tradeoff between centralisation and decentralisation. In this regard, Saga's model can be thought of as a gradually decentralising model.

A second tradeoff is between easy access and acceptability. Saga wishes to be regulatorily compliant and acceptable to the mainstream financial world. Thus we have implemented a full KYC process that is a mandatory precursor to performing any SGA-related transaction. This reduces the ease in which people can buy into the Saga project. Our solution includes a user-friendly online KYC process that can be completed in a short time frame, whilst remaining compliant.

iv. **Are there any centralized components of your system? Would any of these be easy for govs to shut down?**

Saga blockchain based smart contract is surrounded by two off-chain operations:

1. A treasury reserve unit: Saga holds its fiat reserve in major regulated banks
2. As part of our regulatory approach Saga is fully KYC/AML compliant and therefore subject to regulation.

v. **Does your protocol require information outside the blockchain such as a feed of price data? If so, how does this oracle work? Who manages it, what are the incentives for managing it, and what happens if the data they provide has a glitch?**

There are two main data feeds needed as part of the regular operation of our smart contract:

1. ETH/SDR exchange rate - at the first stage this feed will be operated in a centralised fashion by the Saga Foundation. We are looking for ways to decentralise this feed. With time, the importance of this feed will decline, as new ways to buy/sell SGA directly from fiat will be offered.
2. Fiat reserve value - This oracle will be operated by the Saga Foundation and will forward the daily value attestations provided by reserve holding banks.

vi. **Which participants can see which transactions? What is the data and metadata available, and to whom? How does this impact privacy?**

The transparency of the transaction depends on the underlying blockchain. Since we are working on the Ethereum blockchain, all transactions are fully transparent.

Saga requires its participants to go through a standard KYC (know your customer) procedure. This procedure is executed off-chain so all KYC information remains private. Saga protects the privacy of its participants by encrypting all KYC information in a way that will prevent any access to it, except for a lawful demand from the participant's jurisdiction.

vii. **Are you doing anything with formal verification? Smart contracts used?**

We are not doing anything with formal verification.

viii. **What is the rebase period? (Length of time between currency adjustments.)**

Adjustment in the currency supply (and therefore also in SGA price) is done in a continuous way.

ix. **Can we make this automated?**
   1. **Do we use a smart contract, or network rules of the blockchain operators?**

   The control on SGA money supply and its price is fully automated and done in a decentralised fashion ("on-chain")

e. Regulation
   i. **What are your perceptions of local and global regulation in supporting stable coin, asset backed token economies?**

   Saga acknowledges regulatory and public policy concerns and is therefore working closely with regulators to make sure that Saga answers these concerns and remains regulatory compliant.

   ii. **What could be done to improve regulation in terms of speed, quality, value for your company?**

   Clarity - Clear regulation, be it strict or less so, would help us design and build our product without any question marks about regulatory demands. 2. Classification - Not all tokens are equal. A clear classification of the different tokens in the crypto market is needed. As an example, one can look at the guidelines published by FINMA (the Swiss financial regulator). 3. Innovation - Regulators need to apply innovative mechanisms to allow innovation in the market to flourish. Regulatory sandbox is such a mechanism and it is already being applied by some regulators, such as MAS (Singapore), FCA (UK) and ISA (Israel). 4. Coordination - Many jurisdictions have several regulators that govern different aspects of the financial market. Coordination between regulators within a jurisdiction is needed in order to allow market players to construct a clear regulatory framework.

f. Testing
   i. **What kind of simulations have you done and what have they helped you learn? (simulating broad array of market conditions)**

   We have made a massive variety of simulations to test whether the Rya system stabilizes and reaches equilibrium and have fine-tuned the system as a result. These models have been econometric + computer sims + live testing in test net (our test net is live).

      1. **Mental models for simulations**
      2. **Econometric models**
      3. **Agent-based Modelling / Computer simulations**
      4. **Other (Please describe)**

We have performed three-fold testing

1. **Advisory review** – Saga has assembled an advisory board of world-renowned thought leaders in various fields, who have examined and critiqued our models. Their advice and suggestions lead to several improvements in our model.
2. **External review** – We published detailed accounts of our general approach economic model as well as our monetary policy model a year before launch allowing any interested party to review it.
3. **Monte carlo simulations** – We ran a series of Monte-Carlo simulations to test Saga's monetary model. These simulations proved the ability of the reserve to tame the effect of market forces on SGA's price. The results are available in the document we have published on Saga's monetary policy model.

g. Suggested additional questions:

i. **When we say something is stable what do you think it means? And when it comes to monetary policy specifically.**

Stability must be relative to something else. For a currency, in general stability in its purchasing power (which can be measured relative to a basket of goods, say) is desirable so that it can function as a unit of account.

Saga uses the SDR as its unit of account. Given that the currencies that make up the SDR are established and widely used units of account we measure SGA volatility relative to them.

ii. **What is the purpose of your coin? What does it aim to achieve and which problems does it solve?**

Saga is designed to become a global, non-sovereign currency used in the global scope of trade and commerce, and complementing fiat currencies which are designed for national scopes.

We see fiat currencies as appropriate for national currencies but we also see a place for a global currency. Without a global government and central bank to issue and back such a currency, we utilise technology for this purpose.