Assessment Summary

- BA Labs supports the proposed deployment of Spark Protocol onto Gnosis Chain

- Initial supported assets will include DAI, ETH, wstETH, and GNO, with parameters listed below in the Protocol Parameters section

- Spark on Gnosis Chain would represent the first Maker ecosystem product offered on an external domain, which introduces novel governance and solvency risk factors

Overview

Spark Protocol is a fork of the Aave v3 protocol. In addition to the standard features of Aave v3, Spark has a close integration with the core Maker protocol to facilitate deep liquidity and low, stable DAI borrowing rates. Currently, Spark is only deployed on Ethereum mainnet. However, Karpatkey has submitted a [proposal to deploy Spark onto Gnosis Chain](#) (GC) as well.

Deploying on Gnosis Chain could create significant opportunities for growth of Spark Protocol, and increase existing synergies between Maker and Gnosis. Gnosis Chain already uses DAI (xDAI) as the native gas token which makes it a natural fit for expansion. Further collaboration could include integrating the GC deployment of Spark into Gnosis Pay and deployment of GnosisDAO treasury liquidity into the protocol.

In the future, it may be possible for Maker itself to deploy DAI liquidity into the protocol. However, doing this on an external domain brings increasing complexity and technical risk, and is not the focus of this analysis. More research, development work, and an additional assessment should be undertaken before Maker deploys liquidity into the proposed GC Spark deployment.

This assessment covers the deployment of Spark Protocol onto Gnosis Chain, including review of risk factors and possible mitigations, as well as proposed parameters for the initial protocol deployment.

Qualitative Risk

This section covers fundamental and non quantitative risk factors for the proposed deployment.

Gnosis Chain Risk Profile

Gnosis Chain uses a fundamentally similar architecture to Ethereum PoS. Due to GNO's lower price and lower total supply, running a validator is significantly more accessible for Gnosis Chain vs Ethereum (as little as 1 GNO or roughly than $115, vs more than $50,000 per Ethereum validator). However, the ownership distribution of GNO is much more concentrated. This may have a greater impact on decentralization vs minimum validator cost, and could result in a higher probability of chain halts, transaction censorship, and other validator centralization risk vectors.

Gnosis Chain offers several validator clients similar to Ethereum. Client diversity can increase chain safety by making it less likely that an invalid state transition would be committed to the chain, at the expense of liveness; if minority clients with greater than ⅓ of effective stake catch the invalid state transition the chain will stop finalizing. The degree of client diversity on Gnosis Chain is low based on reported info from GnosisScan, with over ⅔ of validators running the same majority client. This brings an elevated risk of invalid state transitions on GC if the client has a bug. This theoretically could result in loss of funds, rollbacks, or other unexpected behavior that could impair the GC Spark protocol.

On the whole, Gnosis benefits from using a similar technical architecture to Ethereum, facilitating knowledge transfer and adoption of best practices. But ownership concentration and lower client diversity leads to increased chain level risks versus mainnet. However, the level of risk is considered to be acceptably low to support deployment.

Gnosis Bridge Risk Profile

Gnosis Chain is working on significant upgrades to their bidirectional GC<>Ethereum bridge to support greater decentralization and security. Gnosis is planning to [use ZK light clients](#) to verify chain state on either side of the bridge and reduce trust assumptions. Specifically, the upcoming [Hashi bridge update](#) will verify bridge messages through a higher level multisig of different verification mechanisms and providers. At launch this is expected to include 2 zk light clients (Telepathy

and Dendreth), as well as multiple validator groupings such as Gnosis AMB and Sygma. A quorum of multiple different verification mechanisms (for example 2 of 4) will be required to process messages and token transfers.

However, for the time being the bridge is run solely on Gnosis AMB Bridge by a multisig of bridge validators requiring 4 of 8 to sign to approve messages and transfers. The bridge is also governed by a multisig to control upgrades, with 8 of 16 signers required to approve changes.

The bridge validators and governors are all reputable and competent organizations. However, in some cases there may be common control or tight coupling between different organizations; for example bridge validators include Gnosis DAO, Gnosis Safe, Cowswap, and Karpatkey, which are all core products or service providers of the original Gnosis entity. These entities may be under high levels of common control. Tight connection increases risk of voluntary collusion, potential outside pressure on the organization, and possibility of hackers being able to move laterally throughout the wider group of bridge validators to compromise the necessary quorum.

Bridging between Ethereum and Gnosis typically takes roughly 30 mainnet block confirmations (~6 minute), but could take longer in some cases. This means that even under normal operating conditions, it is not possible to use mainnet liquidity to atomically service liquidations on Gnosis Chain. And while historically availability of the bridge has been very high, there remains a possibility of technical issues causing the bridge to go offline for a period of time. Due to these factors, market analysis in later sections will consider GC native liquidity to assess appropriate asset risk parameters.

The bridge has operated successfully over a period of years (the arbitrary message bridge was one of the first production ready EVM bridges), and risks of compromise or serious interruptions of service are considered acceptably low. Once Hashi is live, the risk of invalid messages or censorship may decrease further.

As an additional safety measure, Spark on GC could utilize a timelock and Gnosis Chain based multisig to vet any governance messages crossing the bridge. In the event an invalid message is relayed, the multisig could veto it during the timelock delay period. This introduces a tradeoff where valid, potentially time sensitive messages (eg. risk parameter updates) may face additional delays before execution. The benefits versus risks of this additional timelock protection can be considered as part of the deployment process. We should note however that this multisig would only protect against invalid governance messages, and would offer no additional protection from the risk of assets being stolen from the bridge escrow in the event of a hack.

Spark DAI Rate Model

Operating on an external domain introduces a tradeoff for DAI based collateralization for the GC Spark deployment. On the Ethereum mainnet deployment, a separate sDAI market is used as collateral but is not borrowable. Because sDAI handles demand for using DAI as collateral, it is safe to implement an entirely flat interest rate model for the normal DAI market as there is little to no risk of liquidation failure when the market is at 100% borrowing utilization. Users wishing to borrow assets against DAI can simply use sDAI as collateral instead, and if their position becomes unsafe the sDAI can be immediately unwrapped and swapped for the debt asset to enable liquidation.

On Gnosis Chain, the DAI savings rate and sDAI contracts are unavailable, so it is not possible to atomically unwind sDAI to support liquidations. And while Gnosis Chain may host its own native sDAI contract, it is expected that this would earn the yield on the entire balance in the xDAI bridge escrow, meaning that the yield could exceed the standard DSR rate; in this case allowing GC native sDAI as collateral on Spark would be counterproductive as there would be a risk free leverage loop available to arbitrage higher sDAI rate versus lower Spark DAI borrowing rate, which would exhaust Spark's available liquidity and crowd out other collaterals such as ETH. The result is that sDAI collateral is not currently a viable option for the GC Spark deployment.

If GC Spark accepts the standard borrowable DAI market as collateral, this would require an increasing borrow rate slope at high utilizations to incentivize additional suppliers or debt repayments. This ensures that the market does not remain at 100% borrow utilization for long periods which would prevent atomic liquidations. This involves a tradeoff versus the mainnet Spark Protocol, where a key feature is the assurance of stable borrowing rates regardless of market utilization.

Alternatively, GC Spark could maintain a constant DAI borrow rate across the entire utilization spectrum, but disallow the borrowable DAI market as collateral. Theoretically, a second DAI market could be added as collateral while disabling borrowing, but it is expected that this would not see significant usage as users would be forgoing the opportunity to earn interest or the DAI savings rate on their DAI.

The initial recommendation is to adopt a modified DAI rate model for GC Spark including an increasing borrow rate at high utilization. This will allow for DAI to be usable as collateral without introducing an additional non-borrowable DAI market, and also improve flexibility and liquidity conditions for expected suppliers such as the GnosisDAO treasury. This would cause minimal impact on user experience, as utilization should typically be below the levels where rates would escalate.

[

Chart

1200×742 44.2 KB

](///makerdao-forum-backup.s3.dualstack.us-east-
1.amazonaws.com/original/3X/5/9/59b4b7e98989b6f41010d4c2dfc38aaddc783915.png)

Source:

Liquidity and Asset Risk

This section discusses market and liquidity risk factors and process for determining appropriate asset specific parameters.

Parameter Tradeoff Space

As mentioned above, the delays for using the Gnosis Chain bridge along with possibility of service interruption mean that GC native liquidity is an important limiting constraint for parameter selection. Gnosis has much more limited DEX TVL versus mainnet, so while parameters can be loosely modeled on the mainnet Spark deployment, additional margins of safety should be applied to avoid situations where local liquidity on Gnosis Chain is exhausted. Increases in borrow and supply caps should be counterbalanced by reductions in LTV and liquidation threshold, or vice versa.

Because reductions in liquidation threshold can cause poor user experience, it is recommended to set these parameters relatively lower at launch, to allow for more rapid growth in supply and borrow caps to meet demand. Liquidation threshold and LTV parameters can then be raised over time if it becomes clear that higher values are safe.

Oracle Deviation

Oracle networks aggregate price data from a range of highly liquid markets including centralized exchanges and top decentralized exchanges. However, because Gnosis Chain is somewhat remote from primary liquidity venues, there may be cases where prices deviate from the broader market and values reported by Spark's oracles. This may make it more difficult for participants to liquidate unsafe positions, as the price offered for liquidated collateral is based on the oracle price plus a fixed penalty rather than the prevailing market rate on Gnosis Chain.

If price divergence increases above the liquidation penalty, it will no longer be profitable to perform liquidations and this could allow for further market moves to push positions into insolvency. Even if divergence is initially not greater than the flat incentive for liquidations, the disposal of collateral into relatively thin Gnosis Chain DEX liquidity pools may itself cause this deviation to increase to unsafe levels.

Primary methods to mitigate this risk include limiting total supply and borrow caps for assets based on locally available liquidity, and increasing the liquidation penalty to offer a greater tolerance for oracle vs GC market price deviations. The need for a higher liquidation penalty is somewhat counterbalanced by the extremely low gas costs on Gnosis Chain, which implies a lower fixed cost required to perform liquidations.

At any one point in time, it will only be profitable to liquidate positions until the marginal market impact exceeds the liquidation penalty; after this amount of volume, DEX liquidity will need to be replenished from cross chain or stat arbs (traders who hold inventory of assets on multiple domains to take advantage of price discrepancies) before it becomes profitable to atomically liquidate positions. Given roughly ~6 minute timeline to transfer funds across the Gnosis<>Ethereum bridge, we can estimate hourly throughput (assuming the bridge is operational) by selecting the marginal market impact corresponding to a collateral asset's liquidation penalty, and then calculating 10 times the token quantity volume at the given market impact level. This offers a reasonable estimate of total liquidation throughput based on bridge latency and liquidation penalty, but may be over or underestimated depending on overall competition in the liquidator space, and participation levels of stat arbs.

Asset Specific Analysis

Gnosis Chain offers fairly robust stableswap liquidity between stablecoins (DAI, USDC, and USDT) as well as ETH and wstETH. It also offers reasonably strong liquidity for GNO, with roughly $10 million in TVL in USD and ETH pairings across Balancer, Honeyswap, and Sushi. But liquidity for ETHUSD pairs is extremely weak. A trade as small as selling 100 ETH (~$200,000) is quoted with 25%+ slippage on Cowswap and 1inch aggregators.

wstETH<>ETH Liquidity

stETH liquidity is fairly strong, with a Balancer stableswap pair holding over $5 million in TVL. Slippage is near zero for trade sizes of up to 1,000 ETH, then beginning to drop off quickly beyond 1,200 ETH. While it can be expected that arbitrage between Gnosis Chain and mainnet would provide additional liquidity backstopping, this may delay the process of liquidating positions larger than roughly 850 wstETH in the aggregate.

Source:

To avoid market manipulation attacks, wstETH borrow caps could be set well below this liquidity threshold. Additionally, LTV/LT for wstETH collateral will be held below mainnet Spark protocol values to ensure large positions can be liquidated over time without reaching insolvency, and liquidation penalty should be relatively higher to speed up liquidations even in a case where GC market prices diverge from oracle prices.

Proposed efficiency mode liquidation penalty of 3% implies up to 7,000 wstETH liquidations capacity per hour. The standard liquidation penalty is likely to be used for wstETH / USD positions, and liquidation throughput will be primarily dependent on ETH / USD liquidity available on Gnosis Chain.

ETH<>USD Liquidity

ETH liquidity against USD stablecoins is extremely weak on Gnosis Chain. This represents potentially the greatest risk to Spark Protocol, as only relatively small amounts of liquidations will be able to be processed atomically before GC local market prices shift significantly away from prevailing market rates used to calculate oracle feeds. When this happens, liquidators will need to wait until cross chain arbitrage traders return DEX prices to parity.

While there may be some interest from stat arb traders, the Gnosis Chain ecosystem is small enough that the arbitrage process may be slow and rely on non-atomic cross chain transfers to move liquidity, creating further delays that slow down liquidations. If market prices continue moving against unsafe Spark positions, then in a worst case scenario the remaining collateral value could fall below debt owned by the time the positions can be fully closed, resulting in bad debt.

While this will impact competitiveness and attractiveness for users, the best ways to mitigate these illiquidity risks is to set lower LTV and LT parameters, along with higher penalties to ensure

Source: [Data: Spark on Gnosis Chain](#)

Based on the proposed 5% liquidation penalty/incentive, the estimated liquidation throughput would be potentially around 120 ETH (~$250,000) per hour. However the ETHUSD pair is liquid enough that it is unlikely that this significant of a price divergence would persist for an hour or longer.

GNO Liquidity

GNO has roughly $10 million in DEX TVL against major pairings (ETH and USD stablecoins). Given the standard x*y=k invariant, this implies that disposing of $500,000 worth of GNO can be conducted with around 10% slippage. This is supported by observed market impact on GNO to USD trades on DEX aggregators.

The GNO market on Gnosis Chain is expected to be used primarily by smaller size users, which present a lower risk of insolvency versus large users like GnosisDAO on mainnet. To recognize this expected difference in user composition, the GC Spark deployment can offer higher LTV and liquidation threshold parameters, with a much lower debt ceiling to ensure that the asset does not reach unsafe levels of utilization.

Source: [Data: Spark on Gnosis Chain](#)

Competition for Liquidity

Agave, an Aave v2 style lending protocol with certain additional risk management features such as borrow and supply caps, is already present on Gnosis Chain. In a stressed scenario where collateral prices are falling, Spark and Agave may find themselves in competition for liquidity to be able to close unsafe positions. Agave's liquidation penalties should be considered when setting Spark on GC liquidation penalties, to ensure that Spark doesn't fall too far below Agave (or other future lending markets) in preference for liquidity. However Agave is a core part of the Gnosis Chain ecosystem so it is expected that parameters will be managed constructively rather than competitively between protocols. It should not be necessary to benchmark liquidation parameters against Agave.

Risk Backstop Exposure

Even if Maker and Spark don't make an explicit statement on the matter, users and the broader ecosystem may assume that any insolvencies on the Gnosis Chain Spark deployment would be backstopped by Spark. As Spark is a part of the Maker ecosystem, and currently does not have a token or significant capitalization, users may also assume that Spark liabilities would in turn be covered by the core Maker protocol. In addition to financial exposure, Maker and Spark could also face reputational damage if something went wrong.

To avoid any confusion or possible misunderstandings, Maker and Spark can make the amount and nature of any protocol backstopping explicit as part of the deployment process. This clarity should also help mitigate reputational damage that could arise from protocol faults and unmet user expectations. This can be further discussed by the Maker community, Gnosis, and Spark protocol as part of the deployment process.

Protocol Parameters

The following parameters are proposed based on current market and liquidity conditions present on Gnosis Chain. Note that risk parameters and limits are somewhat more conservative than equivalent assets on the mainnet Spark Protocol to account for limited liquidity and greater cross chain tail risks.

DAI

- Collateral: Yes

- LTV: 70%
- LT: 75%
- Liquidation penalty: 5%
- LTV: 70%
- LT: 75%
- Liquidation penalty: 5%
- Isolation mode: No
- Isolated debt ceiling: n/a
- Isolated debt ceiling: n/a
- Efficiency mode: No
- Borrowable: Yes
- Base borrow rate: Base DSR (equal to ETH-C rate)
- Optimal borrow rate: Base DSR
- Max borrow rate: Base DSR + 50%
- Optimal Utilization: 90%
- Reserve factor: 0%
- Base borrow rate: Base DSR (equal to ETH-C rate)
- Optimal borrow rate: Base DSR
- Max borrow rate: Base DSR + 50%
- Optimal Utilization: 90%
- Reserve factor: 0%
- Supply cap: 10,000,000 DAI
- Borrow cap: 8,000,000 DAI

ETH

- Collateral: Yes
- LTV: 70% (vs 80% on Mainnet)
- LT: 75% (vs 82.5% on Mainnet)
- Liquidation penalty: 5%
- LTV: 70% (vs 80% on Mainnet)
- LT: 75% (vs 82.5% on Mainnet)
- Liquidation penalty: 5%
- Isolation mode: No
- Isolated debt ceiling: n/a
- Isolated debt ceiling: n/a
- Efficiency mode: ETH
- Borrowable: Yes
- Base borrow rate: 1%

- Optimal borrow rate: 4%

- Max borrow rate: 104%

- Optimal Utilization: 80%

- Reserve factor: 10%

- Base borrow rate: 1%

- Optimal borrow rate: 4%

- Max borrow rate: 104%

- Optimal Utilization: 80%

- Reserve factor: 10%

- Supply cap: 5,000 ETH

- Borrow cap: 3,000 ETH

wstETH

- Collateral: Yes

- LTV: 65% (vs 68.5% on Mainnet)

- LT: 72.5% (vs 79.5% on Mainnet)

- Liquidation penalty: 8% (vs 7% on Mainnet)

- LTV: 65% (vs 68.5% on Mainnet)

- LT: 72.5% (vs 79.5% on Mainnet)

- Liquidation penalty: 8% (vs 7% on Mainnet)

- Isolation mode: No

- Isolated debt ceiling: n/a

- Isolated debt ceiling: n/a

- Efficiency mode: ETH

- Borrowable: Yes

- Base borrow rate: 1%

- Optimal borrow rate: 4%

- Max borrow rate: 104%

- Optimal Utilization: 45%

- Reserve factor: 30%

- Base borrow rate: 1%

- Optimal borrow rate: 4%

- Max borrow rate: 104%

- Optimal Utilization: 45%

- Reserve factor: 30%

- Supply cap: 5,000 wstETH

- Borrow cap: 100 wstETH

GNO

- Collateral: Yes

- LTV: 40% (vs 20% on Mainnet)

- LT: 50% (vs 25% on Mainnet)

- Liquidation penalty: 12% (vs 10% on Mainnet)

- LTV: 40% (vs 20% on Mainnet)

- LT: 50% (vs 25% on Mainnet)

- Liquidation penalty: 12% (vs 10% on Mainnet)

- Isolation mode: Yes

- Isolated debt ceiling: $1,000,000

- Isolated debt ceiling: $1,000,000

- Efficiency mode: No

- Borrowable: No

- Base borrow rate: n/a

- Optimal borrow rate: n/a

- Max borrow rate: n/a

- Optimal Utilization: n/a

- Reserve factor: n/a

- Base borrow rate: n/a

- Optimal borrow rate: n/a

- Max borrow rate: n/a

- Optimal Utilization: n/a

- Reserve factor: n/a

- Supply cap: 200,000 GNO

- Borrow cap: n/a

ETH Efficiency Mode

- LTV: 85% (vs 90% on Mainnet)

- LT: 90% (vs 93% on Mainnet)

- Liquidation penalty: 3% (vs 1% on Mainnet)

Guarded Launch

Given novel risk factors involved in the Spark on Gnosis Chain deployment, it may be prudent to ramp up maximum potential exposure with lower initial supply caps. This would limit maximum user losses in case something goes wrong. Phoenix Labs may propose lower caps for a guarded launch at their discretion based on potential risks. As the market proves to be stable, and assuming liquidity on Gnosis Chain improves over time, the above caps and risk parameters could be loosened to allow for greater utilization and capital efficiency.

References

Spark Protocol and Deployment Proposal

- [Spark Lend on Gnosis](#)

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- [Arbitrary Message Bridge | Gnosis Chain](#)

- [GIP-57: Should Gnosis DAO support research of a zkSNARK-enabled light client and bridge? - GIPs - Gnosis](#)

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Asset Data Sources

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- [CoW Swap | The smartest way to trade cryptocurrencies](#)

- https://info.honeyswap.org/#/

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- [Balancer](#)

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