Netsolar Network

Whitepaper v1.0

"Reinventing the Renewable Energy Marketplace using Blockchain Technology"

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I.   Introduction and Problem Statement

The primary roles of blockchain are to solve coordination problems among multilateral agreements between networks of participants. By ensuring transparency, assurance, and enforcement, we can enable multilateral agreements where they were not previously possible. When all parties are assured that the operations are not only transparent, but also the mechanisms are guaranteed to not change without significant effort, parties are more willing to coordinate. Participants have significantly higher guarantees that a single party has difficulty forcing other parties in the future into usurious rent extraction via a change in business processes or information asymmetry. In other words, any single participant is more willing to use systems where the business processes and mechanisms itself are not owned by any other single participant.

There is a fundamental coordination problem amongst payment processors, gateways, and financial institutions. For instance, a customer of a bank wishes to pay a merchant on another network. Traditionally, there have been significant efforts in engineering around payment systems which are compatible across payment networks and financial institutions. These are usually constructed by creating a clearinghouse which manages the interchange, usually via a messaging network with either a central counterparty clearinghouse or nostro/vostro accounts. Examples include FedWire, CHIPS, SWIFT, consumer card payment networks, NSCC/DTCC, OCC, and ACH.

These networks service different roles and functions, including local/national payments, international payments, credit, equities/asset exchange, and derivatives. We believe that there is currently a large emerging market of disruption in digital payments with new payment platforms (e.g. Venmo, Alipay, etc.).

These networks have significant aversion to interchange across networks, as it usually requires significant overhead costs in trust with the interchange facility. Parties are unwilling to use central counterparties, as neither party wishes to defer to the other, and use of nostro/vostro accounts require bespoke contracts between participants.

While the larger networks have significant incentive around protection of their network effects, we believe that there is a long-tail of entities wishing to provide eWallet services which require greater coordination amongst multilateral participants. These mid-size participants will be able to cross value across networks in order to reach sufficient network effects in usability.

The infrastructure and reference frontend for these providers will allow for the network effects to be encoded into this network, allowing for emerging eWallet participants to instantly create high network utility. Blockchains allows society to externalize the world's business processes from single centralized corporations into open, decentralized computing networks. [1][2] Netsolar Network (NSN) is a network which decentralizes market liquidity, orderbook matching and

execution, clearinghouse custodianship, and high-scalability payments to help resolve payments across these emerging eWallet payment networks. By shifting these business processes traditionally placed into a single corporation, it is possible to provide eWallet providers an entire interchange process in a decentralized high-performant open network.

II. Netsolar Network Solution

Lending money is all about trust and its mechanical gears such as collateral, quantified reputation, and fear of punishment. Born in already well-established societies, we take the existing business trust culture for granted; we rarely doubt its basics and address the quantitative measurements of business friction costs. However, to solve global credit gap – we should mostly operate in younger countries where business trust is not granted. Using trust based blockchain solution Netsolar Network ensures needed trust for all counterparties, especially investors, to operate within the ecosystem.
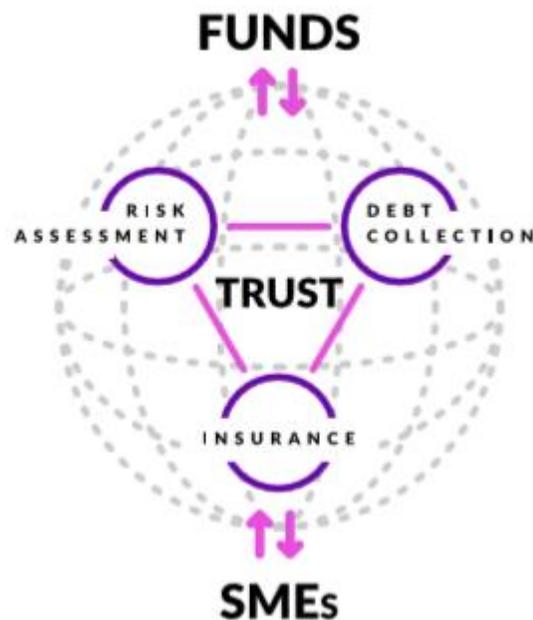
To consider comparatively complex lender-borrower relations, let's take a step back and see how Bitcoin and other cryptocurrencies may change and simplify retailer consumer interactions. To be able to conveniently pay in all stores, consumers go to the market of payment instruments where they have a narrow choice of VISA or Mastercard which are essentially the same.

Retailers have more options — Ingenico, Verifone, and a few others—but, since the interchange fee is still there down the line, that seeming variety does not allow them to circumvent high costs. Putting its currency and monetary dimensions aside for now, when Bitcoin, a decentralized payment tool, steps in, it theoretically allows consumers and retailers to interact with no intermediary, using the free open source tool. In practice, however, there are 'Bitcoin operators' such as a wallet software or side-chain providers who make life a lot easier without charging monopoly-like fees.

III.   True Decentralization

There are 154 countries indicated by the World Bank where SMEs experience credit gap and where a solution like Netsolar Network could help closing that gap by providing ecosystem of counterparties and connecting it with global investors. However, saying that Netsolar Network team will just set up in 154 countries and bring the ecosystem to market on their own would be a fallacy.

As Netsolar Network is initial market maker and facilitator for solving worldwide credit gap by connecting SMEs with global investors who can rely on service provided by local or regional counterparties, i.e., verification, risk assessment, insurance, debt collection. It is possible to attract global investors to distribute their available capital as well as attract SMEs to borrow and finance their growth; however, to make the whole ecosystem truly decentralized, global and self-sustainable service providers will be organized in 'communities'.

Communities are decentralized and truly global, consisting of various service providers and 'institutional borrowers' - alternative finance companies already serving SMEs that could attract more global investment and restructure their portfolio by using Netsolar Network.

A community consists of one or many local or regional service providers that work together to ensure service provision. Members of the community can be both crypto or non-crypto (having a crypto agent) based. Communities will offer a unique motivation for each individual as well as whole group to become more trusted as when any service is performed both the individual counterparty and their community will earn or lose trust rating.

A community leader will get a fee via community's trust arbitrage smart contract from each of community's members activity, hence the leader would be motivated to develop business and grow the community - thus leading to self-sustainable Netsolar Network ecosystem in the long run.

Borrowers and investors should be excited to have communities within Netsolar Network as they can trust their service to community and whoever is there can deliver it. On the other hand, it is better for individual counterparty to be a part of a community as it provides more business opportunities and faster growth via trust (as community's trust grows, each counterparty's trust de facto grows).

Communities are also the ones that take care of resolving issues, marketing their members, growing the community and other tasks relevant to the community (on and off the blockchain). Each community will have a community leader who has additional functions available for community trust arbitrage smart contract.

We believe that using communities is the only way to ensure that needed level of control is decentralized and closer to the final customers of service providing counterparties – borrowers and investors. At the same time, such organizational design provides a lot of freedom to local and regional communities and service providers. We believe that this is the only way to ensure fast, efficient and stable global growth of Netsolar Network.

IV. EWallet

While Netsolar Network supports payments, is not designed first and foremost a payment processor within a specific eWallet payment providers (EPP). It is our belief that there is no coordination problem within a single EPP, and the coordination problem lies primarily between EPPs. However, due to the need for transactions between EPPs, payment activity may be conducted over a blockchain. This blockchain allows for the EPP to provide token issuance on Netsolar Network. This allows for fiat-denominated currencies backed by fiat on the platform, or for any asset class (such as loyalty points). Netsolar Network is an open system allowing for anyone to issue assets, but it is up to individual users (or EPPs acting on behalf of the users) to ensure correct issuance/auditing. This is achieved by creating issuance attached to a script (with private keys) which allows for issuance. An alternative approach would be to issue ERC-20 tokens on Ethereum, lock them up in a smart contract and handle on Netsolar Network chain - similar approach to what one would do to handle existing ERC-20 tokens on Netsolar Network chain (REP, GNT etc.). In the default configuration, it is presumed that an EPP holds funds directly on behalf of its users for ease-of-use. This is similar to full-custodian cryptocurrency wallets such as Coinbase or many centralized exchanges today. This allows for the EPP to construct fee-free transactions within their own network, as it doesn't result in blockchain activity. However, it may also be possible to withdraw directly from the EPP and transact their issued token (e.g. fiat currency) on the Netsolar Network chain (but transfers may result in on-chain fees if not transferred within an EPPs custodial account on-chain). This allows for decentralized transfers, as well as serving the needs of some EPPs which need zero-fee transactions on their own network. The EPP may provide software which is centralized similar to many hosted cryptocurrency wallets, which significantly reduces deployment time, and only payments crossing networks is hosted on the EPP's infrastructure. Third parties may also in the future develop decentralized wallets which can hold EPP balances on-chain. By building an eWallet platform as part of the blockchain, it will be possible to directly exchange fiat-backed tokens with decentralized currencies and protocol tokens on the Netsolar Network blockchain.

V.   eWallet Compliance

Transfer restrictions requiring a certificate from the issuer of the token may be allowed for issued tokens (not decentralized cryptocurrencies) depending upon issuer policy. An EPP may require KYC validation before signing a certificate. Restrictions include limitations of transfers only to certificate holders and flow control (limitation of transfers per account in flow and maximum account balance for that particular issued token). This does not apply to tokens which do not flag these restrictions, nor decentralized crytpocurrencies. It is the responsibility of each EPP to ensure licensing and compliance with their issued token.

VI.   Decentralize Exchange

The central component for an eWallet interchange platform is a decentralized exchange. While this supports issued tokens from EPPs, it also supports trading between decentralized cryptocurrencies. A decentralized exchange may be ideal for eWallet interchange, as they may have different underlying representations of value, and even when transacting with the same underlying, there's different counterparty risk and costs. eWallet A is different from eWallet B's, even if they are backed by the same thing. For that reason, a liquid market is necessary for proper market operation (even if the exchange rate differences are miniscule).

The decentralized exchange will initially use a batch-auction construction where every round exchange matching occurs. It is possible to buy into particular rounds (block-heights)

or to leave open orders on rounds until the order is filled. A batch auction allows for orders to be placed and execution happens at once at a specific interval. This construction allows for higher assurance and performance over a decentralized network. Orders may be left on the orderbook, but execution can happen quick enough to be comparable to EMV card terminals (requires more research with the consensus mechanism). In the event there is insufficient speed for particular use cases, EPPs are responsible for holding balances of other EPPs they wish to support for fast transactions (they may charge a higehr spread), this can be used for things like small everyday purchases and larger value purchases are via the Decentralized Exchange.

While it is desirable to be able to perform low-latency high-frequency order execution, there are significant impediments to doing so in a decentralized network. It is a necessary function of order matching that execution is occurs at a single point. Without execution where an order occurs with a single "engine", it opens the possibility to either sybil attacks or trust in a single party. If one can make an order and have execution occur at many places, then no real order commitment has occurred – one can easily sybil the network and pretend to self-execute. Additionally, with untrusted execution venues, it's not possible to create a ticker for use externally with smart

contracts – a necessary function of this network. The purpose of this network is designed with the goal of being the preeminent high-value exchange and settlement platform (not a high-volume low-value network).

An alternative which allows for fast execution with low-latency would be allowing for external centralized venues, however, this establishes trust in execution on a single entity. As trading liquidity naturally centralizes (far stronger than payment centralization), there are significant trust/coordination problems, which end up looking like current cryptocurrency exchanges (with the only difference being that it is non-custodial). This construction, however, does not resolve significant coordination problems around participants needing to resolve a coordination issue around not wanting to trade on a single trusted vendor. The goal of Netsolar Network decentralized exchange is to have transparent, known execution behavior. We believe that trusted non-custodial execution is a credible option as a complement to a decentralized execution engine and Netsolar Network may support these platforms in the future as well.

Amature decentralized exchange has the benefit over a non-custodial trusted execution environment of being able to use it as a decentralized oracle for smart contracts.

This decentralized exchange is designed to be high-performant where orders are propagated over the proof-of-stake network. When sufficient participants have the order with block confirmations, the order is then placed on the order book. The order book for a particular batch-execution point is a running tally of all orders which do not execute until the batch-execution point (so there are orders which are matched on the book). The initial configuration includes transparent orders, but it is possible to do a fauxcoin-like construction whereby blinded orders are placed, then no more orders are accepted, the blinding keys are released by the participants who placed orders, and finally execution occurs after a set time. Initial versions will use a fully transparent system (which a batch-execution format mitigates some amount of adversarial behavior).

The result is a system where trade execution occurs on a single "engine", namely that of a proof-of-stake decentralized exchange, but with the assurance that the rules of execution is transparent and verifiable.

VII.   Ethereum Trading

As Netsolar Network requires fullnode validation of the public Ethereum blockchain for maximum efficiency and security, it's possible to create a contract on the Ethereum blockchain which locks up funds dependent upon the condition of the Netsolar Network chain.

These funds are now bonded and locked and its activity is enforced by the Netsolar Network chain. When an order executes, a proof is provided to unlock the funds on the Ethereum side. This construction presumes that Schnorr or BLS signatures will be available on Ethereum in the near future. A transaction tracks the activity of the Netsolar Network chain, and needs some level of maturity confirmations before payment is delivered on the Ethereum chain. Funds can still be settled on Netsolar Network and balances updated for continued trading, it is only for final delivery when the payment occurs on Ethereum.

The behavior of the Netsolar Network chain enforces the behavior of payments on the Ethereum chain. In an non-adversarial environment, , anyone can provide proof and the sender's balance would be slashed. This allows for greater computational and bandwidth efficiency on the Ethereum chain. This construction on the Netsolar Network chain is for trading Ethereum, Ethereum-like chains, and Ethereum issued tokens similar to ERC-20 using bonded smart contracts.

VIII.   Limitation

This network is an open network, it is necessary for accurate trading activity to require activity on the decentralized exchange to eventually be public, even with blinded commitments/bids. While new cryptography is possible via SNARKS, it is currently too slow and resource intensive for a high-volume trading network. We are currently optimizing for performance and speed. Since this is a pseudonymous network natively (with optional AML/KYC constructions for issued tokens). SPV validation of other chains is presumed to be insecure with blockchains that do not discourage reorganizations. For chains which allow reorgs, either full-node validation of that chain is required or an HTLC-clearinghouse construction is needed. It presumes that Ethereum will create greater reliability and guarantees around finality (current Proof-of Stake research).

These technologies are new and not yet tested. While we will do our best to construct it with maximum security in an adversarial setting, we are modeling the security model of these mechanisms which require real-world use case with human behavior to properly understand. When interaction between chains, it is difficult to roll-back errors, one should only put the minimum necessary to transact at a time on this chain when doing significant decentralized

cross-blockchain activities. Initial versions may have less robustness in adversarial settings, and we recommend lower values at stake, as often times attacks (especially Denial of Service attacks) are resolved over time as the software develops. Performance and real-world behavior implications of the design is not yet clear. It is not yet clear what the long-term value participants of this network can derive, and may be affected by competition in this space, there are no guarantees provided by participating as a validator, as this is an area which is still being technically explored in this space. The total value of cleared transfers (but not yet settled) at any one time must be below the total bonded value of the validators. It is possible to bond an additional amount, but may not be necessary if the total value of the token is sufficiently high. Further modeling is necessary of enforcement mechanisms inherent to the system. Execution of this vision is ultimately the responsibility of the Netsolar Network team, the authors not part of the Netsolar Network team are principally only responsible for providing technical guidelines and the architecture.

IX.   Conclusion

With the emerging popularity of eWallet platforms, siloed networks are becoming a problem. This creates a unique opportunity for fiat tokens to interchange across a decentralized network, along with cross compatibility with cryptocurrencies. In order to build this decentralized interchange network, it requires not only a blockchain well-suited for payments and interchange of issued tokens, but also a decentralized exchange which supports these activities, as well as incentives around creating well-functioning liquidity pools. Eventually, these issued tokens may asymptotically get closer and closer to full decentralization (including user-owned keys) which maximizes agency of the individual. This can be achieved by creating not only transparency in the business process of payment interchange, but also removing the ownership of the business process itself from a single trusted entity. Netsolar Network allows for stakeholders, from individuals to issuers, to have significantly greater assurance in the financial mechanisms of society.

X.   Whitepaper Summary

Token Information:

Smart Contract: 0x0b8f53f5cb26f27ecf46840c14cc93577221822d
Symbol: NSN
Decimal: 0
Total supply: 3,000,000,000 NSN
Current price: 0.000001 ETH = 1 NSN

What is Netsolar Network?

Netsolar is a company who is an environmental advocate to save our planet from the pollution made by burning of fossil fuels, such as coal, oil, natural gas, and gasoline to produce electricity and power our vehicles, Carbon dioxide (CO_2) is a good indicator of how much fossil fuel is burned and how much of other pollutants are emitted as a result.

Netsolar is an energy trading platform that allows people and businesses to sell their surplus renewable energy to the market without an intermediary.

Netsolar eliminates the wait time by creating an instant transaction between buyer and seller. By cutting out the middleman, it means sellers earn more and buyers pay less. A win-win on both sides.

Netsolar team offers an electricity and power marketplace platform using blockchain technology to ensure the massive growth of renewable energy usage in our global community.

We're reinventing the energy marketplace to ensure the efficiency and effectiveness of our renewable energy market.

We have partnered with the know renewable energy company around the world to ensure a larger marketplace for our users.

ERC20 Ethereum Blockchain Technology.

NetSolar will use the blockchain technology on the ERC20 / Ethereum platform to create the NSN Token. This means that the NSN Token will be fully integrated with the latest features of the Ethereum blockchain system. This is a distributed ledger system with automatic calculation, reliable and secure. Use NSN Token combined with NSN Wallet as the basis for payment, instead of using the normal cash payment gateway. More specifically, NSN Token is a new electronic money type used to exchange and pay for services on the Netsolar Network platform. NSN Wallet is a secure and secure electronic wallet used to store NSN Token as well as to allow the NSN Token to be transferred to other digital exchanges.

😬 Token Distribution:
- For ICO: 70%
- For Founders: 10%
- For Team: 5%
- For Advisors: 3%
- For Airdrop: 12%

🤓 ICO Timeline:
1. ICO Round 1: from 9/15/2018–11/15/2018
   1 ETH = 1,000,000 NSN
2. ICO Round 2: from 11/16/2018–01/15/2019
   1 ETH = 800,000 NSN
3. ICO Round 3: from 01/16/2019–03/15/2019
   1 ETH = 600,000 NSN
4. ICO Round 4: from 03/16/2019–05/15/2019
   1 ETH = 500,000 NSN

😐 When Netsolar list on Exchanges:
- All token sold out
- End of ICO

😎 Which Exchanges:
- Mercatox (negotiating)
- Etherflyer
- IDEX
- DDEX
- HitBTC

😊 How to buy NSN(Netsolar Network Token):
1. Ensure you have at least 0.01 ETH in your MEW Wallet
2. Set GAS = 100,000, GWEI = 12
3. Send ETH to Smart contract: 0x0b8f53f5cb26f27ecf46840c14cc93577221822d
4. Done! NSN Token will automatically sent to your wallet.

😲 Check detail transation
here: https://etherscan.io/address/0x0b8f53f5cb26f27ecf46840c14cc93577221822d

😲 Social channel:
Website - https://www.netsolar.tech
Telegram Channel - https://t.me/netsolarnetwork
Telegram Community - https://t.me/netsolarnetworkcommunity

Medium - https://medium.com/@netsolarnetwork
Twitter - https://twitter.com/netsolarnetwork
Facebook - https://www.facebook.com/netsolarnetwork
Support - support@netsolar.tech