Starmark

The Planetary Scale Decentralized Open Message Network

October 30, 2025
Last Updated November 26, 2025

Abstract: Starmark is the first planetary scale decentralized open message network. The major problem with internet and social media today is the reliance on centralized services and all the trust that's required to make it all work. All social media networks retain ownership over user identities, and the users' social graphs, relationships, and gate-keep the flow of information. A purely peer-to-peer digital name and messaging system would allow messages to be sent directly from one party to another without going through centralized internet and social media services. We propose a massively scalable peer-to-peer message network based on proof-of-work with no trust required and no central parties. The users collectively create the world's first extremely scalable peer-to-peer Open Message network. The users remain in complete control of their identities, social connections and data.

1. Introduction

Communication on the Internet relies almost exclusively on centralized social media companies serving as trusted third parties to manage digital identities and process electronic messages. While the system works well enough for most communications, it still suffers from the inherent weaknesses of the trust based model. A messaging protocol called Nostr [1] has emerged which flips the traditional social media model on it's head and instead relies on signed messages, called *Nostr Events,* which are the basic building blocks and leaves the distribution and relaying of messages to any willing third party. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to relay or distribute messages.

A purely peer-to-peer digital name and messaging system would allow messages be sent directly from one party to another without going through centralized social media services or relying on the good faith of third parties to operate message relays. We propose a solution to the problem of message distribution and content discovery using a peer-to-peer network and a custom protocol similar to the one used by Nostr, but streamlined for blockchain networks. The network timestamps messages (transactions) by hashing them into an ongoing chain of hash-based proof-of-work just like in Bitcoin [2]. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will.

The initial intended configuration is that every user run their own Starmark node to effectively form the world's first and largest Open Message Network. The staggering advancements in bandwidth speeds and lowered storage costs have made it feasible for the first time in history to achieve the creation of a planetary scale open message network. We shall demonstrate in this paper that thousands of message per second are easily within reach today while still maintaining a very high level of decentralization.

2. Digital Identity

Digital identities are represented by Public Keys. Users sign messages with their Private Keys and publish them in the format of Starmark Messages encoded in transactions on the network. In this manner, all messages and data are signed by the users and there is no private data to the platform; users own all their content and data. This model of authorship puts users first and leaves the distribution of the messages to any willing third party.

Users follow, or subscribe, to other users by tracking messages published by the Public Keys of the other users. Messages are all public and it is straightforward to index all messages of interest and then present a message timeline to the user. There is no need for a "follower list" to be published on the network, that can remain entirely local and private to each user. Users merely index, filter and select the messages of interest and present them according to algorithm of their choice.

3. Open Message Network

Our proposed system Starmark is the world's first and peer-to-peer Open Message Network. The intended initial configuration is that users act as full nodes and create a massively decentralized social network with no trusted parties. The system is robust enough to serve as the global open communications backbone and exponentially increases the reach and stability of message relays.

In the long term, it will be larger service providers and sophisticated end users who will host the entire Starmark network and serve them up for a fee. It effectively

would turn the existing social media companies into infrastructure providers, while users still retain complete control over their digital identities, social graph relationships and data.

Users and miners alike are in complete control and create a massive message grid that can easily scale with exponentially increasing bandwidth speeds and cost effective storage solution. We show below in the Calculations section the scale that is possible to achieve today.

4. Decentralized Advertising

A major problem with existing social media platforms is the reliance on intrusive and manipulative digital advertising. Users are the product and are effectively sold to the advertisers. Social media companies have every incentive to *worsen* the user experience to maximize profits. Indeed, even departments within the same company are at war with each other; the user experience teams wants to enhance the user experience, however that is often times at odds with maximizing ad impressions or engagements. There is an elegant solution to solve the distribution problem by using a decentralized proof-of-work based advertising method.

The proposed solution is to leverage proof-of-work to signal that a message is valuable should be ranked higher. Users can specify the required number of zero bits as in NIP-13 and demonstrable proof opportunity cost. The node can automatically organize and rank the content with the highest level of proof of work globally or by hashtag or any other criteria. Users can also repost and react with "likes" and add additional proof-of-work so that those messages will get ranked higher. This method is resilient against manipulation and provides the only *provably honest signal* of the value of any given message.

5. Calculations

In this section we show that contrary to popular belief, it is possible *today* to operate a scalable decentralized peer-to-peer blockchain network that can sustain very large message volumes.

First we establish the following data about the state of internet infrastructure at the time of writing:

- Median internet speed (USA) is 289 mbps
- Median internet speed (Global) is 61 mbps
- The average household uses 6.3 TB of data per year, or just over 500 GB/month
- Cost for 28 TB of hard drive storage is $375 (US Dollars)
- There are about 500 million posts per day on X (5,787/second)

What would the bandwidth and storage requirements be for nodes to process a comparable volume of posts?

> Assume each message is text only with a maximum 300 characters.
>
> The message rate is 5,787 per second multiplied by 300 = 1.736 MB/second.
>
> Therefore each block would be on average 150 × 1.736 MB = 260.4 MB
>
> It would take about 7.2 seconds for each node to download each block in full.
>
> The resulting orphan rate would be 1 – (e^(7.2/150)) = 4.91%
>
> The daily storage requirements would be 148 GB or about 53 TB per year.

We can see from the calculations above that the major limiting factor is total bandwidth usage. However it is predicted that with the growth of high resolution video that internet bandwidth by the year 2030 will exceed 2,000 mbps.

6. Legal Compliance

For a global messaging system to gain acceptance, it is critical to address legal requirements of various countries and jurisdictions. We state unequivocally that Starmark is technology that is intended to fully comply with legal requirements and restrictions on speech and internet communications. No one is obligated to host content they disagree with and there should be a way for governments around the world to enforce their laws. Starmark supports the development of technology and techniques for the synchronization of blockchain data, while permitting users to selectively filter, block and remove content for any reason whatsoever, including being ordered to do so by their governments.

There are various techniques being developed in the industry as a whole to deal with the problem of content filtering on blockchains. We simply recognize and support all efforts to all blockchain data to be synchronized while simultaneously blocking, filtering and removing unlawful content. There are promising developments in the areas of Non-interactive zero-knowledge proofs [3] and Unspent Transaction Outputs (UTXO) snapshots and synchronization technology which could permit the network to synchronize while serving up the latest or approved content only.

7. Conclusion

We have proposed a planetary scale open message network without trust. Starmark is the world's first peer-to-peer Open Message Network. Users retain control over their digital identities, social graphs and data by using their Public Keys as identities. Our system also introduces the concept of a decentralized advertising leveraging proof-of-work to demonstrate honest costly signals. Starmark is extremely capable and scalable to handle thousands of posts per second and users remain in complete control of their identities and data.

References

[1] Wikipedia contributors. (2025, August 25). Nostr. In *Wikipedia, The Free Encyclopedia*. Retrieved 12:41, September 8, 2025, from https://en.wikipedia.org/w/index.php?title=Nostr&oldid=1307808354

[2] S. Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System" https://bitcoin.org/bitcoin.pdf 2009

[3] Wikipedia contributors. (2025, September 19). Non-interactive zero-knowledge proof. In *Wikipedia, The Free Encyclopedia*. Retrieved 22:03, September 20, 2025, from https://en.wikipedia.org/w/index.php?title=Non-interactive_zero-knowledge_proof&oldid=1312216764

Tokenomics

The Starmark blockchain network will be bootstrapped through a fair launch and no pre-mine. 100% of the tokens shall only be created by miners. The Starmark full node and GPU-based miner software shall be released in advance of the fair launch date to give developers time to prepare.

Name: Starmark
Ticker: $MARK
Maximum Supply: 1,680,000,000
Divisibility: 8 decimals
Block Time: 2.5 minutes
Initial Subsidy: 2,000 $MARK per block
Halving Period: Every 420,000 blocks (approximately every 2 years)
Consensus Algorithm: Proof-of-work — Triple SHA256

The initial difficulty target of the Starmark Genesis Block will be set to 1,000 to ensure that no one can employ any instant-mining strategy. The usage of GPUs is thus required and the network will quickly calibrate itself with the Difficulty Adjustment Algorithm (DAA). Through this measure it would ensure that the network block rate settles relatively quickly settles to the target time of 2.5 minutes per block.

Development Team

The original development team has not raised funds and will never raise funds to develop any part of the Starmark node, wallet, miner or any related software.

Stated simply and unequivocally the original development team behind Starmark will abandon the project at some time in the future. There may or may not be notice or any warning in that future event. Thus the future of Starmark will ultimately remain in the hands of the community and individuals who wish to help make it succeed, just the same as with Bitcoin.

It is understood that Starmark shall forever be a decentralized volunteer effort in the same way that Bitcoin development contributions are a decentralized volunteer effort. The only way forward to establishing a truly open and decentralized message network is to make it a movement of volunteers without any official leaders or development teams.

Full Disclaimer

Nothing in this White Paper is an offer to sell, or the solicitation of an offer to buy, any tokens and neither does it constitute a prospectus. Nothing in this White Paper should be treated or read as a guarantee or promise of how Starmark or tokens will develop or of the utility or value of the tokens. This White Paper is an overview of the features, which could change at its discretion, and the success of which will depend on many factors, including market-based factors and factors within the data and cryptocurrency industries, among others. Any statements about future events are based solely on a limited analysis and do not constitute any kind of commitment, roadmap, promise, or guarantee. It is likely that the limited analysis and statements of future events are incorrect. This disclaimer does not create an attorney-client relationship, nor is it a solicitation to offer legal or financial advice.

Starmark does not represent a common enterprise nor does not constitute any kind of security or investment. The original Starmark developers did not raise any outside funds and shall never solicit or raise any funds. All tokens are created by miners only. There are no guarantees or promises about the value or utility of the Starmark token or network.

The Starmark creators and those associated with Starmark shall never request the listing of the token for sale or trade on any exchange or market. Any potential future token listing shall be done at the sole discretion of the respective exchanges. There shall be no direct or indirect support in any form for the listing of the Starmark token for purchase or trade. Satoshi Nakamoto created Bitcoin and in a similar spirit we created Starmark and desire to ignite a revolution that is just as fundamentally driven by individuals and their own efforts.

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