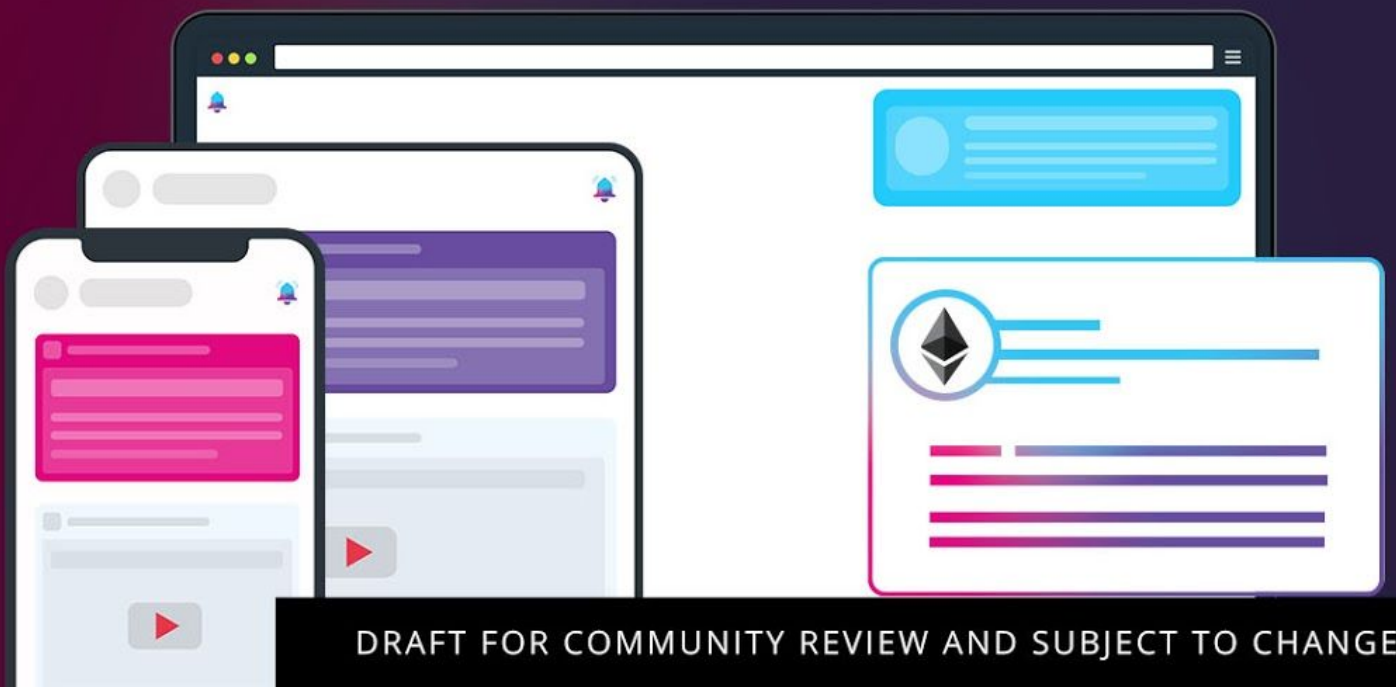# ETHEREUM PUSH NOTIFICATION SERVICE

LITEPAPER V1.0

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Abstract

The document introduces a decentralized notifications protocol that enables wallet addresses to receive notifications in a platform-agnostic fashion from both decentralized and centralized carriers. *Examples of platforms can be dApps, User Wallets, iOS and Android apps, Chrome or Firefox browsers, or any other such platforms.*

It also explores and describes the theory and technical aspects of the protocol/platform and the game theory that the protocol utilizes to ensure incentives for good actors in the ecosystem.

The Problem

The blockchain space is growing at an extremely rapid pace and the exponential growth is projected to continue rapidly in terms of users, services, and revenue. Despite the growth, services (dApps, services, smart contracts) still lack a genuine and organic communication medium with their users. The communication is often filled with alternative communication mediums like emails, Twitter, telegram, etc defeating the purpose of web 3.0.

Few use cases mentioned below explain the pain points of services and how lack of a standard decentralized communication layer impacts missing important updates, events, actions, etc..

- There is no way for smart contracts or dApps to inform wallets if their loan is about to get liquidated. For example, if loan liquidation on AAVE, Compound, or any DeFi protocol is missed since there is no way for users to receive notifications.
- Everytime a trade order is placed on a dEx, the user is expected to go back to the service to check if their trade is completed or not.
- ENS domain expiry has to be put on Twitter in the hopes that the grace domain user might read it.
- Important DAO Governance proposals are missed by token holders to vote on.
- Instead of waiting for a tweet, a PoolTogether lottery winner in the future can simply receive their winning lottery via a notification.
- Availability of digital art on a decentralized marketplace or limited edition NFTs can be shared with users by simple notification.
- New protocol feature launch can be shared with users

This is a major issue in communication as well as adoption and the problem will worsen more as the services keep on growing on blockchain especially DeFi.

The Solution

Ethereum Push Notification Service (EPNS) is a blockchain protocol that enables services to communicate with its users (wallet addresses) in a decentralized way. The DeFi aspect of the protocol ensures the notifications are incentivized i.e. users will also be receiving token incentives from the notifications.

Furthermore, The decentralized nature of the protocol enables delivery to any centralized or decentralized platforms which paves the way for communication to occur across any platform whether it's a mobile app, user crypto wallets, web browsers, or any other platform that chooses to integrate the protocol.

EPNS Protocol

High-Level Application Flow
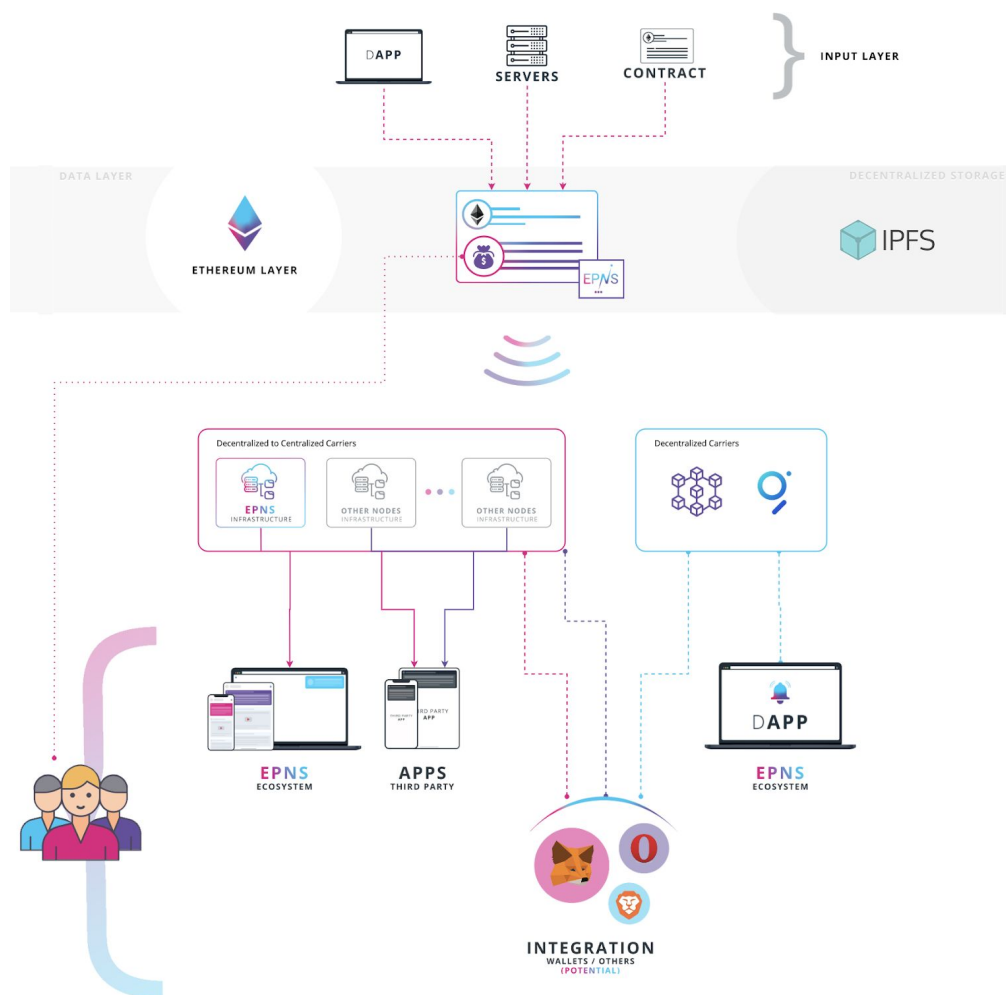
Definitions

The following definitions are used to refer to certain roles in the ecosystem. Most of the terminologies when it comes to services, users, and subscribers which is similar to **YouTube** analogies for most parts.

Role	Description
Service	Any dApp / smart contract / centralized service / etc who wishes to send notifications.
Channel	Any service that has activated themselves on the protocol and thus can send notifications to their subscribers.
Subscriber	The user who has subscribed to a particular channel.
Users	Any user who is present in the protocol.

Description

EPNS is a notification protocol at its heart. Built on top of Ethereum, It is a fully decentralized middleware layer that enables any dApps, smart contracts, or traditional services to communicate with their users in a privacy centric (wallet address) and decentralized fashion.

Among other things, the middleware ensures a spam free, user-centric, opt-in, transparent environment for the services and users to communicate.

The protocol also assigns a content type to payloads which essentially means that the services are free to communicate whatever information they want with the users, ie: Sending images, call to actions, videos, or even encrypted transactions. Various examples of payloads and how they operate are further provided in the whitepaper. [Read in Detail]

Protocol Features

Incentivized Notifications for Users

The protocol requires services that want to send notifications to their subscribers to activate themselves by staking $DAI, this **stake** is then **lend** out by the protocol to AAVE DeFi protocol (at the time of writing) and starts generating **interest** which is then distributed in a weighted

proportion to all the subscribers that have opted in to receive notifications, the weightage rewards the early subscribers a bit more as they become the early adopters. [Read in Detail]

Platform Agnostic

The protocol allows retrievable information (encrypted or plain) of each notification and the storage on which their payload is stored which is mostly IPFS, but can support different storage (decentralized or centralized) in the future payload types, this enables universal notification delivery to any crypto wallets, mobile apps, web browser, dApps or other platforms as long as they integrate the protocol, as a reward for the integration, the fees paid by service for these notifications is shared between all wallets/infra providers who enable the delivery of them to user wallets. [Read in Detail]

Flexible (Arbitrary) Payload

Notification is stored and treated like JSON payload which is transformed as per the rules of the different carriers when the notification reaches them. JSON Payload can differ with payload types which ensures the flexibility of the content, data, storage interpretation, and delivery. This helps in creating different rules and content interpretation of the notification (for example: carrying images, call to action, live videos, etc). [Read in Detail]

User Centric and opt in notifications

The protocol allows users to be in direct control of what services they get notification from; it imposes rules on the services including spam protection for users, limiting their ability to add wallets as subscribers, etc. [Read in Detail]

Spam score and throttling

Each channel has a spam score that ranges from 0-1. Value of 0 means the channel has an excellent score and 1 means the channel is very unhealthy. The range adjusts based on positive actions such as a higher number of subscribers, with the passing of time while negative actions are higher than usual unsubscribers, higher than usual notifications, etc. This is guided by the protocol and at a certain range, the protocol will start throttling the notifications or even stop them until the score comes back to a healthier range. [Read in Detail]

Governance

The protocol governance is designed to incentivize continued adoption of the EPNS protocol. This is achieved by ensuring incentives for all the users involved by rewarding or encouraging them through incentives and penalty, their continued involvement is seen to be necessary for the growth and adoption of the protocol and to achieve the **vision of becoming a web3 notification standard**. The users of EPNS are categorized as **Service Providers, Subscribers, Wallet / Infra**

Services, and Governance Users, all of them are rewarded for their involvement and to ensure that they keep other parties in check for a healthy ecosystem according to the game theory described in the whitepaper. [Read in Detail]

EPNS Product

In order to facilitate the adoption of the protocol and to provide value to services, we are also building a product suite of EPNS to catalyze the adoption and growth. These currently include developing:

- **EPNS Mobile App** - Serves the purpose of delivering notifications from decentralized protocol to centralized EPNS Infra to centralized platforms (iOS and Android).
- **dApp** - Enables receiving notifications from web browsers and also enables delivery of notifications from protocol to decentralized carriers.
- **EPNS Infra (Push Service)** - Enables carrying notifications from decentralized protocol to centralized solutions (iOS, Android, Web, etc). Also enables third-party dApps, services, and protocols to start experiencing the notification impact as notifications are delivered following the entire protocol/product lifecycle.
- **Showrunners** -These are channels created and run by us for the benefit of the community and for users to come and see why push notifications transformed the traditional world. Few examples of showrunners which we will be running are -: Compound liquidation alert, Wallet crypto movement tracker, Eth Gas alerter, ENS domain expiry, etc.
- **JS Library** - Considerably reduces the integration time required for third party dApps, servers. We see these products to enable instant value add to the protocol and help in increasing awareness and eventually drive the adoption of the protocol.
- **Future Features -** There are some future features including decentralized video that is getting discussed and explored as well, you can read a brief synopsis of them over here. [Read in Detail]

Governance

The native digital cryptographically-secured utility token of the EPNS protocol (**$PUSH**) is a transferable representation of attributed functions specified in the protocol/code of the EPNS protocol, which is designed to play a major role in the functioning of the ecosystem on the EPNS protocol and intended to be used solely as the primary utility token on the network.

$PUSH tokens are used to control various core functionalities of the EPNS protocol, allowing users to vote on features of the protocol. For the avoidance of doubt, the right to vote is restricted solely to voting on features of the EPNS protocol; the right to vote does not entitle $PUSH holders to vote on the operation and management of the Company, the Distributor or their respective affiliates, or

their assets, and does not constitute any equity interest in any of the aforementioned entities. For example, the protocol fees are charged in **$ETH** or **$DAI** within the EPNS protocol, but the $PUSH token holders may vote to change these fee parameters. [Read in Detail]

Milestones

CURRENT

- PROOF OF CONCEPT

- DEFI INCENTIVES & GAME THEORY

- LIVE MOBILE PUSH NOTIFICATIONS

- ALPHA ROPSTEN LAUNCH

- PRODUCT / PROTOCOL IMPROVEMENTS

FUTURE

- DEVELOPER TOOLKITS

- L2 LAYER & PROTOCOL OPTIMIZATIONS

- WEB NOTIFICATIONS & DAPP INTERFACE

- AUDIT AND MAINNET

- INTEGRATIONS AND FUTURE REFINEMENTS

Achievements