



# Ethereum Tag Service

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Authors:	Michael Paler (@mhpaler) Zachary Williams (@0xZach) Nadim El-Jaroudi (@desertdeem)
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## **Abstract**

This document introduces a decentralized tagging service that enables third-party services (dApps, platforms, applications, smart contracts) and/or their customers to tag any addressable online artifact (nft, URL, transaction record) and record it to the blockchain. The service employs a novel, patent-pending invention whereby the tags themselves are ERC-721 non-fungible tokens that can be re-used for subsequent tagging by any participant of the system. Once recorded, the service indexes the tagging data and exposes it via public APIs.

The document covers in general detail practical and technical aspects of the service as well as the game-theory incentive mechanisms intended to drive network growth.

## The Problem

Web3 is experiencing exponential growth and is projected to grow rapidly in terms of users, services, and revenue. Despite this growth, services (dApps, platforms, services, smart contracts) still lack a genuine and decentralized content tagging infrastructure.

Today, content tagging, in both Web 2 and Web 3, is supported by centralized and redundant infrastructure. This leads to inefficient use of both resources (servers, databases, software) and human capital (developers, data scientists, etc).

Furthermore, the tagging data itself is fragmented and exists on siloed, gated, and manipulatable “data islands” controlled by the largest social networks. This has led to a scenario where the largest players capitalize on and extract most of the value in tags leaving the smaller players to derive limited value from implementing tagging systems of their own.

## The Solution

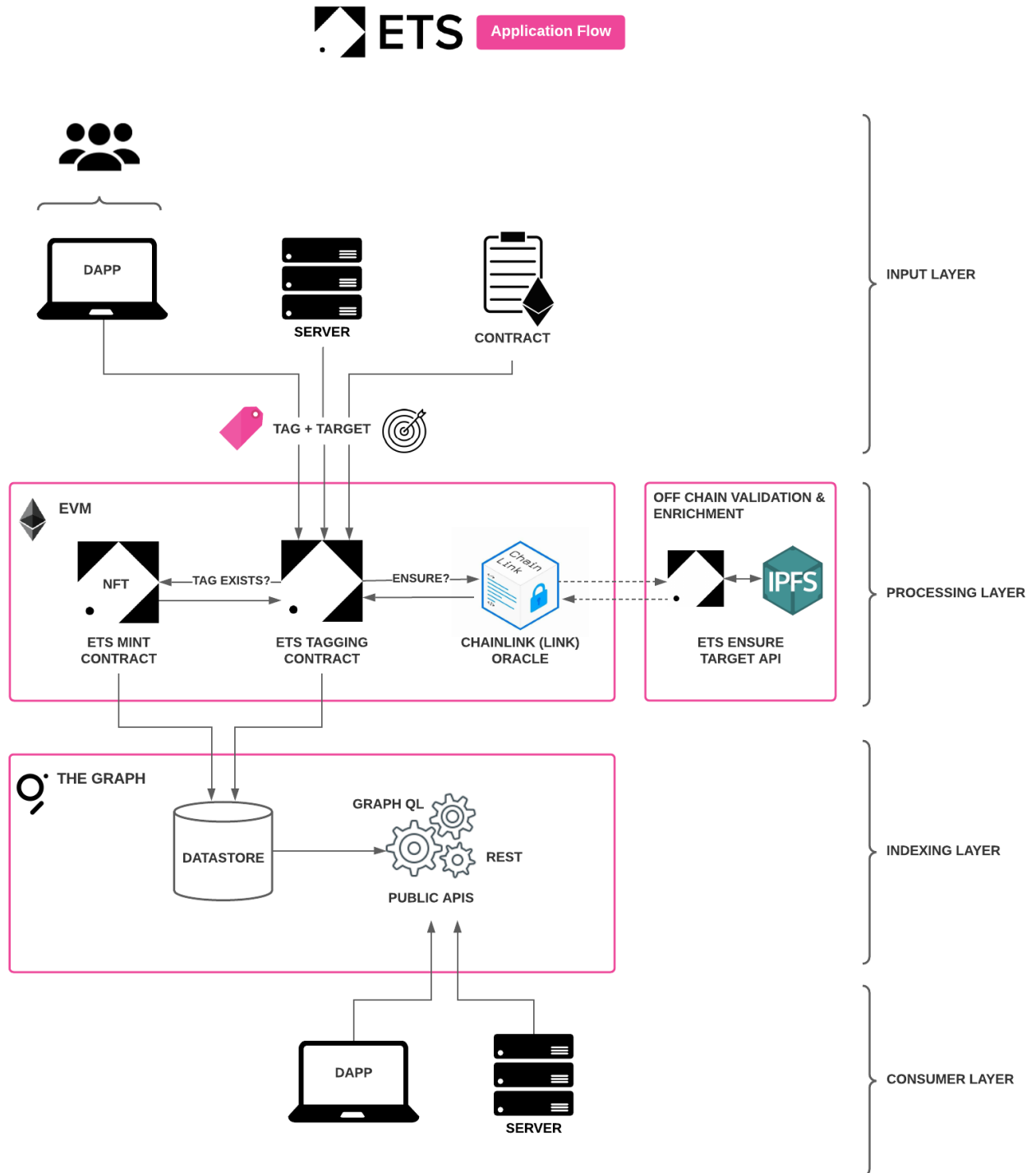
Ethereum Tag Service (ETS) is a blockchain service that enables third-party services to perform content tagging in a decentralized way. All tagging data is recorded to the blockchain, indexed by the service, and exposed via public APIs. There are no restrictions to the tagging data: any service may consume it as they see fit.

ETS employs a novel, patent-pending invention whereby tagging is performed as a pay-per-tag cryptographic microtransaction and the tags themselves are ERC-721 non-fungible tokens (NFTs).

The crypto-enabled nature of ETS enables tagging to be incentivized: participants receive direct economic benefits for using the service. Tokenizing tags has the dual benefit of 1) being able to preserve and reuse tags across participating platforms and 2) enables innovative economic incentives and cash flows around both tagging and the ownership of the tags themselves.

For projects that are actively tagging or considering tagging content, our solution will replace centralized infrastructure; simplify & automate tagging; increase customer engagement; and generate additional revenue streams.

# ETS High-Level Application Flow



# Technical Overview

## Definitions

The following definitions refer to the role of participants of ETS.

Role	Description
<b>Publisher</b>	Wallet address of whitelisted third-party service (dApp, smart contract, application) that implements ETS
<b>Tagger</b>	Wallet address credited with initiating a tagging event
<b>Creator</b>	Wallet address credited with creating a new tag
<b>Sponsor</b>	Wallet address that pays transaction fee for tagging or minting a tag
<b>Auctioneer</b>	Wallet address that supports initial sale of a tag
<b>Owner</b>	Wallet address that purchases a tag at auction or secondary market
<b>Curator</b>	Wallet address of user that verifies tags

## Description

The core of ETS is a set of Ethereum Virtual Machine (EVM) compatible smart contracts running on Ethereum Mainnet and being migrated to Polygon.

The centerpiece is a public tagging function that takes as arguments a digital artifact identifier, what we call the “target” (currently NFT contract, token id & chain id though potentially any internet addressable artifact), a tag (currently single Twitter style hashtag string; multi-tag coming soon), the Publisher address and the Tagger address. The transaction cost is made up of the gas plus a small ETS service fee. The wallet address is recognized as the Sponsor.

When called, the tagging function checks if a *tag* (itself an NFT) exists for the hashtag string. If it does, a reference between the *tag* and the *target* is written to the blockchain. If no *tag* exists, a new one is minted and then the new *tag* x *target* reference is written to the blockchain (this as a “mint & tag”). Also stored in the tagging record is the Publisher address and the Tagger Address. The entire tagging event is indexed by The Graph.

Inside a newly minted *tag* token (which can also be minted on their own using a public mint function) are recorded the hashtag string, the Publisher address, and the address that paid the transaction fee, referred to as the “Creator”. Ownership of the *tag* is retained by ETS until released to the market for auction. If purchased at auction, the proceeds are divided among the Publisher, the Creator and ETS.

Being an open system, ETS places no restrictions on tags or targets: Any whitelisted Publisher may tag any *target* with any *tag*. When successfully executed, the ETS tagging fee is split and accrued to the wallets of the original *tag* Publisher, the *tag* Creator (or Owner if it has been purchased), and ETS.

In the future, depending on token models, provisions will be made for some very interesting cash flows including:

1. Incentivizing & rewarding Taggers with “sponsored tags” or Publisher level tagging sponsorships.
2. Incentivize & reward engaged community members to validate and/or rate tagging quality, effectively turning them into Curators. We are calling this “work-to-earn”.

## Additional Features

### “Pluggable” Tag Target Architecture

Smart contract architecture utilizes an interface contract (IETSTagTarget) to permit extension of core tagging contract by third parties to tag virtually any internet addressable artifact.

### Target Ensuring and Enrichment

By design the tagging contract requires only the minimum viable information to identify a target. For example, for a nft, we only require chain id, contract address and token id (or only a token address for some chains).

To accommodate this, we are developing an off-chain “Ensure Target API”. This API, accessed from the tagging contract via a ChainLink oracle, will validate the target and enrich the metadata we store both on-chain and in the consumer API.

### Tagging Data Consumer API

The entire tagging social graph, including role x tagging activity, as well as all economic flows are indexed into a highly available and queryable graphql database hosted decentrally by The Graph Protocol.

### Governance

Our goal is to progressively decentralize ETS. As part of this we are exploring issuing a native digital cryptographically-secured utility token (**\$ETST**). The primary utilities for this token would be 1) provide a decentralized mechanism for enabling Publishers through staking, 2)

incentivizing participants of the system, including Taggers, Curators and Owners and 3) incentivizing governance participation.

## Product Suite

In order to facilitate adoption of our service and to provide value to our customers, we are building a product suite composed of the following:

- Browser plugin
- Administrative portal that features:
  - Untag/Retag targets
  - Ensure & enrich target metadata
  - Monitor/drawdown service revenues
- Statistical dashboards
- JS Libraries
- Documentation



## Use Cases

### **Tagging infrastructure replacement**

Given it's flexible architecture and user graph, ETS will be used as a drop-in replacement for a wide range of Web 2 tagging use cases on publisher sites such as free tagging, predetermined tags/categories, like buttons, vote up/down.

### **Curated lists**

For example token lists, whale transactions, user curated galleries, topics and categories (eg. Pinterest), social bookmarking.

### **Automated/programmable tagging**

Heartbeat style or status tagging from IOT devices to support service level agreements. For example, proof of up-time.

### **Sponsored tagging**

Given their crypto nature, tags (ETSTag tokens) and publishers (publisher address) can be directly funded by sponsors. For example, the token #CocaColaChristmas could be funded for a specific tagging campaign ("tag all images with CocaCola logo and Christmas trees") and taggers could be directly rewarded for their work.

### **Crowdsourced tagging/identification**

Apps like iNaturalist where wildlife images are uploaded and identified (eg. tagged); and identifications are verified (eg. by curators). Tagging in this case could be gamified and/or incentivized.

### **Work-to-earn**

Again, using the sponsored tag or publisher model, taggers could be incentivized to perform tagging operations that provide utility or some sort of service. For example: tagging landmarks on Google Maps; tagging fraudulent blockchain transactions;

## Recent Milestones and Development Roadmap

For additional detail on development progress, please see [project updates](#) on our Substack.

