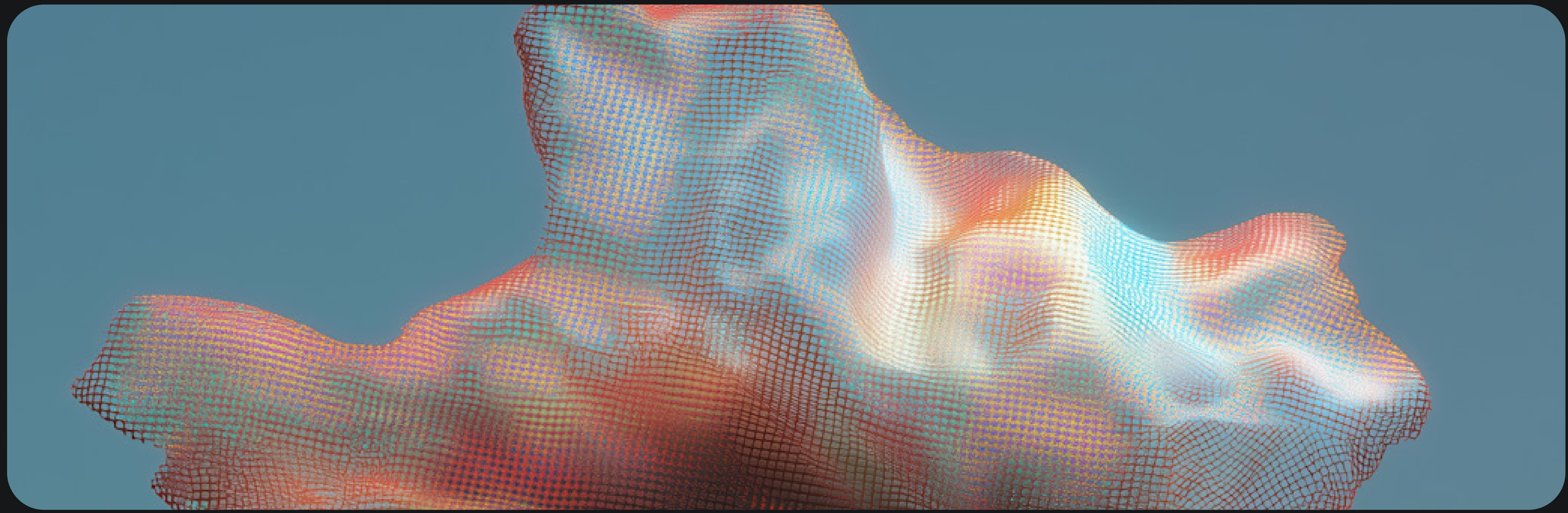
NFTs as Self-Sovereign Identity:

Exploring ERC-725 & ERC-735 in Decentralized Digital Identity Systems



Summary

While NFTs are commonly associated with art and collectibles, their true potential **extends into the realm of digital identity.**

This research focuses on how standards such as **ERC-725 (Key-Value Identity) and ERC-735 (Claim Registry)** enable NFTs to function as **self-sovereign identity objects**, with use-cases beyond ownership **toward verification, access control, and reputation.**

Background

The current Web2 identity systems rely on centralized accounts, opaque data, and external KYC processes. NFTs — especially **Soulbound NFTs (non-transferable)** — can represent verified, **on-chain identity proofs** or **behavioral records**, attached to an individual's wallet in a verifiable way.

Standards such as ERC-725 and ERC-735 provide a programmable structure for identity and claims.

Key Concepts

Component	Description
ERC-725	Standard for key-value storage of identity attributes on-chain (name, email, role, etc.)
ERC-735	Mechanism to store and manage third-party claims about an identity (e.g., “KYC verified by X”)
NFT Identity Object	A non-transferable NFT that carries metadata linked to identity
Soulbound NFT	Non-transferable NFT bound to one wallet, ideal for identity or certificates

Use-Cases in Web3 Ecosystems

Verifiable Web3 Resume

NFTs hold learning badges, skill endorsements, contributor history

Access Rights

Smart contract gates based on roles stored in ERC-725 NFT

Decentralized KYC

ERC-735 claims issued by third parties (auditors, DAOs, institutions)

Community Membership

Identity NFTs grant access to Discords, voting, or gated content

Interoperability & Privacy Notes

01

ERC-725 profiles are public by design

must limit sensitive fields

02

Encryption layer (e.g., Lit Protocol)

can add selective disclosure

03

Multiple identities per user wallet

can be deployed via NFT issuance from separate contracts

Opportunities & Risks

Opportunity	Risk
Modular identity system interoperable across DAOs & DApps	Sensitive data exposure if poorly designed
Identity verification without central authority	Risk of false claims or sybil attacks
Reputation building in open ecosystems	Reputation can be gamed or sold

ERC-725 and ERC-735 open new possibilities for NFTs to move beyond collectibles

toward *verifiable, self-owned identity systems*

By using NFTs as programmable identity objects, the Web3 ecosystem can build trust without compromising sovereignty.