



UBeU – for Digital Identity & Digital Asset Management

Background

Digital identity can be considered an extension of a user as they interact and transact with DApps, services and resources across Hedera and the broader Web3 ecosystem. As the touchpoint for a self-sovereign Web3 digital identity, a digital identity NFT is a login and authorization for all Web3 DApps and resources. It is the basis of your Web3 profile, connecting your social profiles, contact details, and digital credentials. It is the name you use to receive payments and other digital assets. It can even be the domain for your Web3 website.

While many of the applications for digital identity are still being developed, one the most prevalent uses of a smart domain NFT is as an account alias; a self-selected human readable name that is used in lieu of more complex account identifiers when sending and receiving digital assets to and from Web3 wallets. Despite the near ubiquitous use of account aliases, paradoxically, Hedera wallets do not include an option to create an account alias during the account creation process; rather, a user is required to use a domain name provider to finish the process. Separating the creation of an account alias from the process of creating a wallet and network account is a bit like separating the selection of your email address from the process of creating an email account.

The cause for this inefficiency and inconvenience can be attributed to a myriad of factors: Hedera has multiple name providers with isolated registries and resolvers which would require a wallet to integrate with multiple domain registries. And further, even if a wallet developer wanted to undertake the effort of working with multiple registries, the name providers haven't developed the open source libraries, SDKs, and tools that would allow wallets or DApps the decentralize access they need to interact with domain registries. Finally, name providers have not developed the features or utility for their domains that would all users to optimize their use for digital identity.

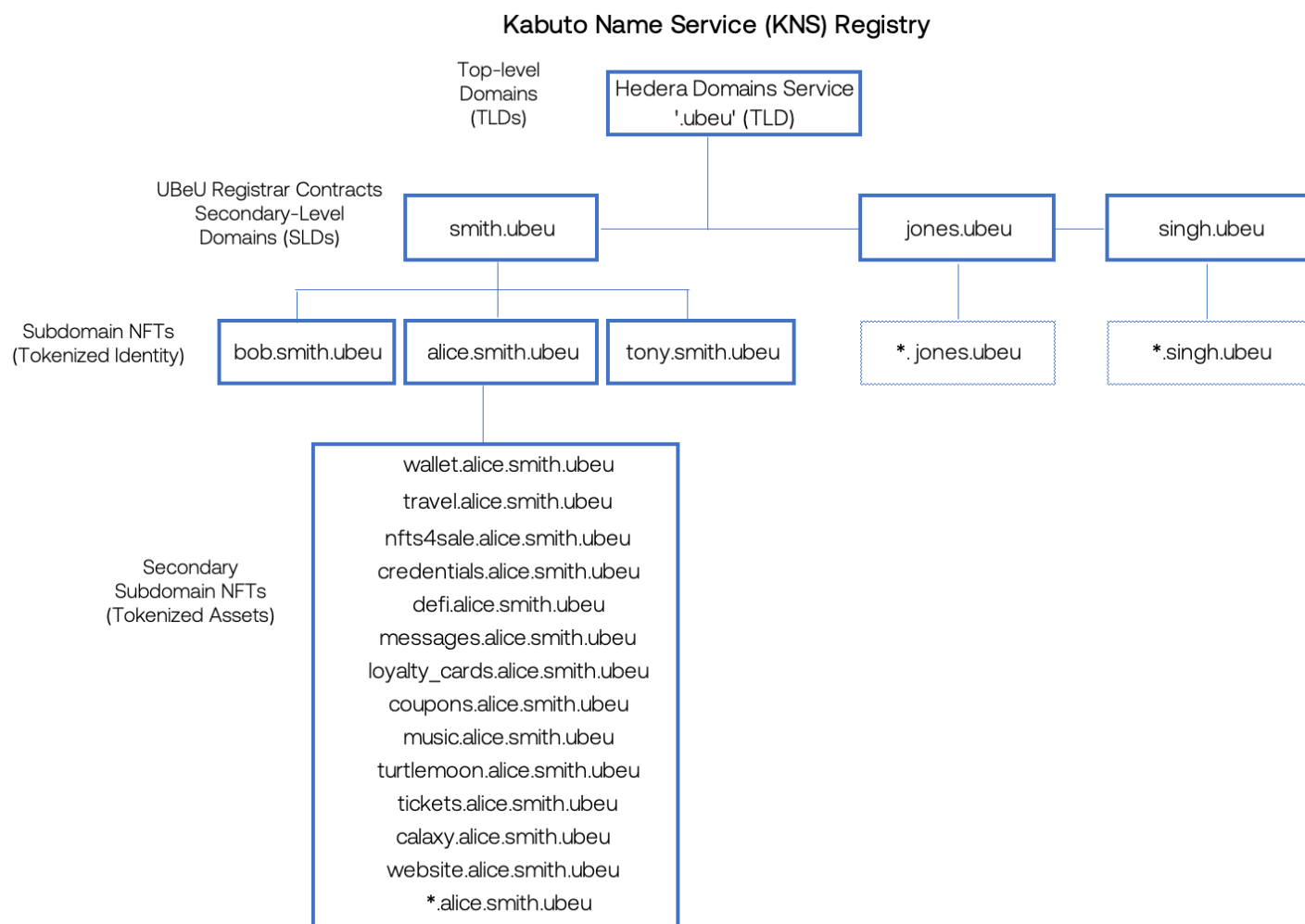
Introduction

Hedera Domains Service (HDS) is creating UBeU to be a single unified registry for digital identity on Hedera Hashgraph. The platform is being built on the Kabuto Naming Service (KNS) under the '.ubeu' TLD.



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A UBeU digital identity token is in the format 'firstname.lastname.ubeu.' and is created by tokenizing the subdomain of a surname SLD. By establishing a standardized format for digital identity tokens, the UBeU platform further leverages the hierarchal nature of the KNS protocol to allow '.ubeu' digital identity token holders to create an unlimited number of secondary subdomains ('*.firstname.lastname.ubeu') which allows users to map tokenized digital assets to designated wallets. This extends the utility of the UBeU platform beyond digital identity to digital asset management platform and an effective tool for risk mitigation as digital assets can be efficiently organized and partitioned among wallets.



Through the development of open source software, tools, and SDKs, the UBeU unified digital identity registry will be decentralized so that wallets and DApps throughout the Hedera ecosystem will be able to interact with it directly. By decentralizing access to



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the registry wallets will be able to integrate the creation of digital identity and the issuance of a digital identity NFT into the account creation process.

The digital identity NFT serves as authorization for the user to access and interact with the UBeU DApp to configure secondary subdomains. As well, the decentralization of the UBeU platform will enable third-party Hedera DApps to interact directly with the UBeU registry. This has several advantages including the ability to resolve names in a DApp, the ability for a DApp to support reverse resolution, and it also allow users to easily configure secondary subdomains or update a name they own from a DApp to point at a DApps resources. By providing users with an easy way to update a name they own to point at your application's resources, users can assign names they already own to your DApp's resources.

Abstract

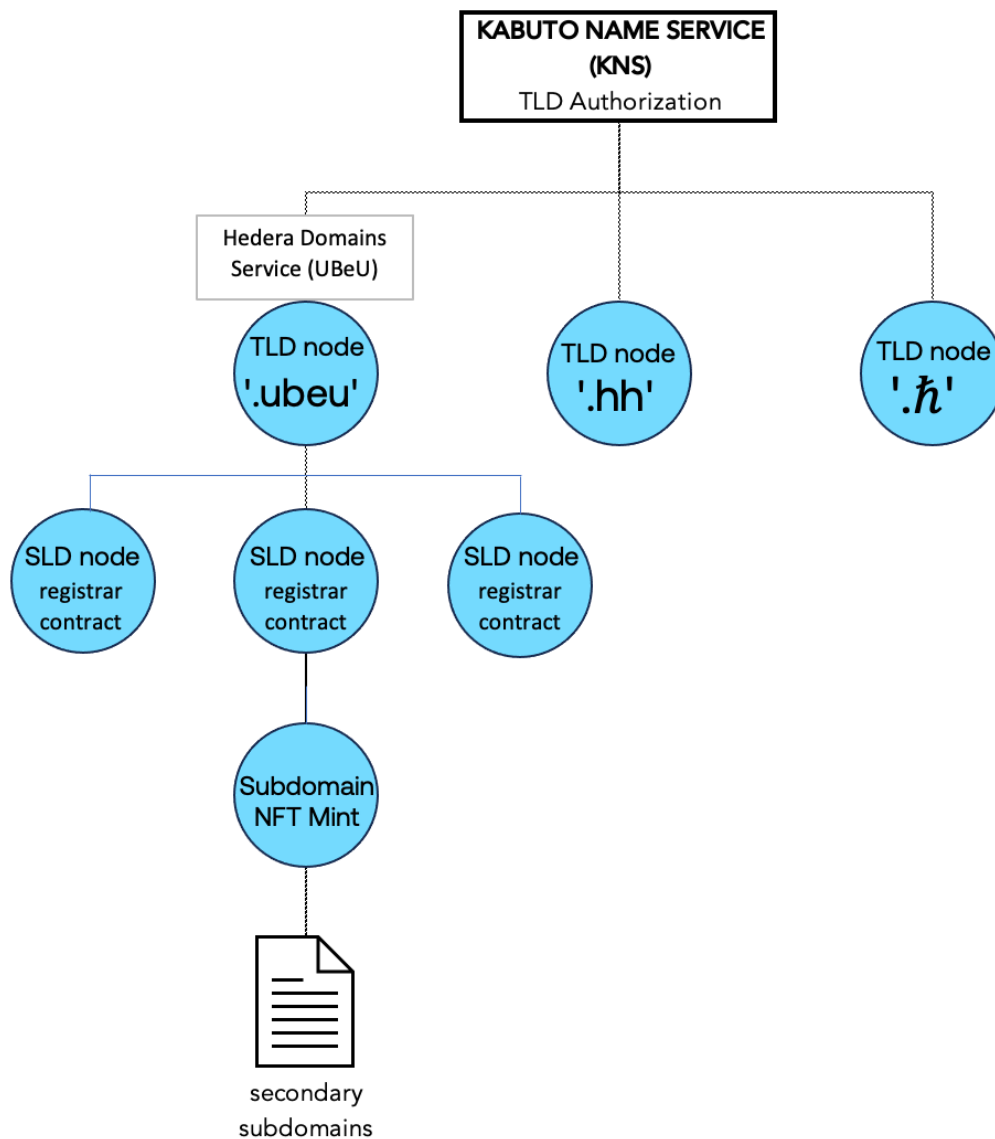
This document outlines the implementation of the UBeU platform, which will serve as a unified registry and decentralized platform for digital identification tokens and digital asset management. The platform consists of:

- a top-level domain (‘.ubeu’) and attendant registry which is the core contract that enables ‘.ubeu’ name resolution. The registry maintains a list of domains, recording the owner, resolver, and allows the owner to make changes to the data therein.
- a registrar which is the smart contract that owns the secondary-level domain and issues subdomain NFTs as ‘.ubeu’ digital identity tokens according to the rules defined by its contract code.
- Domain resolution is made using a KNS resolver.
- The UBeU DApp allows users to interact with the ‘.ubeu’ registrar contract and create a digital identity subdomain NFT. The subdomain NFT serves as authorization for its holder to interact with the DApp and configure secondary subdomains for their NFTs and view their digital asset holdings in wallets holding secondary subdomain NFTs of the ‘.ubeu’ subdomain in the registry.



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- The development of open-source libraries, tools, and SDKs will allow decentralized access to the '.ubeu' registry by wallets and Dapps throughout the Hedera ecosystem. By allowing wallets to interact with the TLD registry, users will be able to create digital identities (account aliases) during the account creation process. DApps interaction with the registry will provide users with an easy way to update a name they own, creating secondary subdomains mapped to the applications resources.



Motivation



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- The ability to create a digital identity and an account alias directly from a wallet during the account creation process is intuitive and necessary to facilitate the onboarding of more casual and less sophisticated network users.
- Digital identity account aliases based on a standard 'firstname.lastname.ubeu' format is intuitive and not dissimilar to traditional email. A standard format using labels for first and last name allow DApps to better personalize and customize products.
- The use of secondary subdomains ('*.firstname.lastname.ubeu') accommodates the proliferation of tokenized consumer real world assets on Hedera – coupons, music, loyalty cards, tickets, reservations, website, money, securities, etc. Users can interact with the UBeU DApp and configure '*.firstname.lastname.ubeu' secondary subdomains using the '.ubeu' subdomain NFT as authorization token. Decentralized access to the '.ubeu' registry by ecosystem DApps permits users to update names and map resources directly to DApps they interact with.
- Secondary subdomains allow users to partition digital assets between wallets which minimizes the assets a user exposes to the DApps and services interacted with to only those necessary. Asset partitioning limits the risk of losing assets compared to if a single concentrated wallet is compromised. Consider: long-duration, high value assets (stocks, the deed to a house etc.) can be held in accounts via cold storage wallet while short term liquid assets (currency) or those with expirations (concert tickets) can be assigned to hot wallets. The UBeU Dapp provides users with a unified platform for naming, viewing, and managing digital assets and accounts.

Rationale

By creating and administering an application specific '.ubeu' TLD, the UBeU platform will have the native ability to mint digital identity tokens based on any of the estimated 31 million global surnames. When a digital identity token is requested, a new surname SLD is created and the registrar contract for that surname is held by UBeU. Any future requests for a digital identity token based on that surname requires the registrar contract to issue a subdomain NFT to the user.



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Specifications

- Top level domain (TLD) administered by UBeU '.ubeu'
- Write a contract that owns the surname SLDs. 'surname.ubeu'
- Registrar contract issues its own NFTs for requested subdomains.
- User buys/licenses subdomain NFT
- User interacts with UBeU app using '.ubeu' NFT as authorization to configure secondary subdomains.
- Open source libraries, tools, and SDKs will decentralize access to '.ubeu' registry providing wallets and DApps with the ability to interact with it directly.

Alternative Approaches & Rejected Ideas

- **Superlink** built on the Handshake protocol is an effort to replace DNS with blockchain alternatives. UBeu, built on KNS, is part of the KNS namespace which complements and extends the usefulness of DNS with decentralized, trustworthy name resolution for web3 resources such as blockchain addresses and distributed content.

Superlink has bought at auction or in the secondary market 1.2 million TLD surnames which is a small percentage of the estimated 31 million global surnames. The Superlink surname portfolio has significant holes: holding 56 of the top 100 surnames globally, and 40 of the top 100 surnames in the USA. Assembling a portfolio of surnames is capital intensive and will continue to grow more so over time. UBeU natively supports digital identities based on 31 million global surnames and represents a complete solution to wallets and DApps that gain functionality and efficiency by interacting with single unified digital identity registry.

Superlink infrastructure does not support subdomains, nor does it support organizational identity. The ability to create secondary subdomains gives UBeU utility as a digital asset management platform, which will grow in importance as the tokenization of real world assets increases.

- **The Hedera Name Service** has multiple weaknesses as compared to UBeU which make it ill-suited for the purpose of creating a single unified digital



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identity registry. UBeU is an application specific platform with the ability to mint subdomains based on all 31 million global surnames while HNS' SLDs are widely distributed which makes the formation of a cohesive platform challenging. HNS' SLDs lack subdomain or secondary subdomain utility while multiple naming systems complicates wallet and DApp integration. Finally, the lack of protocol layer policy (on pricing and domain expiration) introduces uncertainty and risk into any HNS based business models.

UBeU: Scalable, Decentralized, and Future-Proofed

The UBeU model does not require any pre-buying of assets but rather the platform writes contracts to hold SLDs when an SLD is first requested; the contract issues subdomain NFTs to users creating '.ubeu' digital ID tokens. Therefore, the UBeU model natively supports digital ID tokens for all 31 million surnames at inception. And technically, the UBeU platform could add additional TLDs ('ubeu2') to its service if needed which provides unlimited scalability.

UBeU will pursue a decentralization path making its single unified digital identity registry directly accessible to wallets and DApps. The UBeU model supports unlimited customizable secondary subdomains for managing digital assets; it therefore can accommodate future tokenization models and services.

User Stories

A new network user creates an account through a Hedera wallet integrated with the UBeU registry and is able to create a UBeU digital identity token to serve as an account alias and the users authentication key. User stories

- 1) As an NFT creator, UBeU wants to send an NFT to an onboarding digital identity token holder, given only their public key. (see HIP-542)
- 2) An existing network user connects a Web3 wallet to the UBeU.io app and registers a UBeU digital identity token.
- 3) A user with a UBeU digital identity token connects his Web3 wallet to the UBeU app and is able to create secondary subdomain NFTs based on his digital identity token. ('*.first.last.ubeu'). These new NFTs can be used as account aliases for accounts holding tokenized digital assets: digital art, defi assets, hbar, reservations, credentials, etc.



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- 4) A user connects his Web3 wallet to a DApp using his UBeU digital identity token and decides to subscribe to the Dapps service. The Dapp is integrated with the UBeU registry and by interacting with the registry creates an authorization token that maps its resources directly to the users wallet. 'galaxy.first.last.ubeu.'
- 5) A user with a UBeU digital identity token connects his wallet to the UBeU app and can view, organize, and name all digital assets that are mapped to his 'ubeu' digital identity token NFT.

Governance/Protocol Management

TBD

Reference Implementation: Account creation by issuance of UBeU token.

AUTOMATIC ACCOUNT CREATION WITH HBAR

Send HBAR to the alias of an account ID that does not yet exist to automatically create a Hedera account

(V0.21 - HIP-32)

AUTOMATIC ACCOUNT CREATION WITH TOKENS

Send fungible and non-fungible native tokens to the alias of an account ID that does not yet exist to automatically create a Hedera account

(V0.31 - HIP-542)

TLD Node (registry, KNS resolver)

Technical Architecture

TLD Node (registry, KNS resolver)

SLD Node (registrar contracts)

Subdomain NFT mints

Secondary Subdomain configuration

SDK, libraries, tools to provide decentralized access to UBeU registry.