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DNS to Web3 Wallet Mapping
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Abstract

This document proposes an implementation standard for mapping wallets to domain names using the new WALLET RRType, allowing for TXT record fallback while the WALLET RRType propagates through DNS providers. The goal is to provide a secure and scalable and unbiased way to associate wallets with domain names, enabling seamless lookup as well as suggesting required authentication mechanism. The proposal relies on DNSSEC or security successors to ensure trust and security.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on 12 February 2026.

Table of Contents

1. Introduction

There is fragmentation in the mapping of Web3 Wallets to Domain Names [RFC1034]. This document puts forth an implementation standard to map Web3 Wallet addresses to Domain Names, as well as investigates the associated security and technical concerns.

As the use of digital wallets and online services grows, the need for a standardized way to lookup wallet addresses in an human readable format becomes increasingly important. This proposal aims to provide a solution that is easy to implement, scalable, unbiased, standardized and secure.

The proposed notational implementation involves using the DNS WALLET RRtype [WALLET-IANA-RRTYPE] to map a domain name on the Global DNS system to wallet address information. The WALLET record will contain a object that maps the wallet address to a registered Namespace

[CHAIN-AGNOSTIC-NAMESPACES] and the registered coin type token [SLIP-0044] or [CAIP-2]. This implementation will handle multiple wallet addresses and chains, defaults, as well as defining a heirarchy to deterministicly be able to find the appropriate wallet address. It is assumed that the record will be part of a DNSSEC [RFC4033] [RFC9364] signed zonefile or its security successors, and that users of this service will verify the signatures to ensure that the record has been returned without alteration in flight. This implementation proposal is evolutionary to the the description in [WALLET-IANA-RRTYPE] because it defines standards for coin names, defaults, and conditions for rejection, in order to have consistant usages.

We also propose a fallback TXT record "_w3addr" which will be a backup for the WALLET RRtype and CAN duplicate the WALLET RRtype entries. This is intended to be a temporary measure while DNS Provider’s UIs support this RRType [RFC3597].

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. Terminology

This document will refer to Domain Name terminology [RFC9499].

3. Domain to Wallet Mapping

3.1. Record Format

The WALLET or TXT record SHALL have the following format:

```
    @ IN WALLET "namespace:reference:address1"
    @ IN TXT    "namespace:reference:address1"
```

@
: is the address

IN
: is the class of the record

WALLET / TXT
: is the type of the record

namespace:reference:address1
: is the value of the record

3.2. Grammar for the record in EBNF format

```
item = namespace ":" (coin_name | reference) ":" address
namespace = (letter | digit | "-"){3,8}
coin_name = (letter | digit | "_"){1,32}
address =  ( letter | digit | "-" | "." | "%" ){1,128}
letter = "A" | "B" | "C" | "D" | "E" | "F" | "G"
       | "H" | "I" | "J" | "K" | "L" | "M" | "N"
       | "O" | "P" | "Q" | "R" | "S" | "T" | "U"
       | "V" | "W" | "X" | "Y" | "Z" | "a" | "b"
       | "c" | "d" | "e" | "f" | "g" | "h" | "i"
       | "j" | "k" | "l" | "m" | "n" | "o" | "p"
       | "q" | "r" | "s" | "t" | "u" | "v" | "w"
       | "x" | "y" | "z"
digit = "0" | "1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9"
```

item
: represents a namespace-reference-address tuple

namespace
: covers a class of similar blockchains such as "Solana" or "eip155" specified by Chain Agnostic Namespaces [CHAIN-AGNOSTIC-NAMESPACES]. This is NOT case sensitive.

coin_name
: represents the Symbol of a Coin Type represented in [SLIP-0044]. This is NOT case sensitive.

reference
: a way to identify a blockchain within a namespace. As an example this would be chain ID within eip155 ecosystem as referenced by [CAIP-2]. This is NOT case sensitive.

address
: represents the public wallet address associated with a coin (e.g., "0xabcdefg", "0x12345", etc). This CAN be case sensitive as required by the wallet addressing scheme

This grammar can be used to parse the input string and extract the chain identifier and addresses.

3.3. Example

Suppose a user wants to map their wallet with the public keys to the domain "example.com" using the registered coin type tokens BTC, SOL and and Ethereum mainnet chain id. The WALLET record in the zone would be:

```
@ IN WALLET "bip122:BTC:0x1234567890abcd"
@ IN WALLET "solana:SOL:0x567890123456789"
@ IN WALLET "eip155:1:0x987654321098765"
```

3.4. TXT Record Example

Suppose a user wants to map their wallet with the public keys to the domain "example.com" using the registered coin type tokens BTC, SOL and Ethereum mainnet chain id using a TXT record. The TXT record in the zone would be:

```
_waddr IN TXT "bip122:BTC:0x1234567890abcd"
_waddr IN TXT "solana:SOL:0x567890123456789"
_waddr IN TXT "eip155:1:0x987654321098765"
```

3.5. Multiple Records

To support multiple coins, multiple coin:address pairs will each be represented by their own WALLET record. There is no guarantees on ordering the records so overlapping records MAY be ordered at the resolver’s discretion. In the event of duplicate coin types it is RECOMMENDED that multiple records be returned deduplicated for identical addresses.

3.6. Implementation

Wallet resolver implementations of this RFC SHALL:

1. Support the creation and retrieval of WALLET records for any given level of the DNS system.

2. Validate the records as being properly signed by DNSSEC or its successors.

3. Provide the wallet’s address for a human readable domain name.

4. Provide an authoritative NXADDR if no address can be found.

4. Security Considerations

To ensure the security of the mapping, the following measures will be taken:

1. The WALLET RRtype record SHALL BE stored in a secure location, such as a DNSSEC-signed zone.

2. The implementation SHALL validate the DNSSEC record or its IETF approved successors.

3. The wallet record SHALL be protected from replay attacks via DNSSEC time invalidation (or approved successors).

The WALLET RRtype might not be available throughout entire end to end DNS infrastructure. In the event that DNSSEC is not supported end to end, a wallet resolver MUST indicate that the wallet address is informational only and CANNOT be trusted.

If the source of the DNS zone is compromised, the wallet address mapping is compromised. It is imperative that this not occur for both DNS stability, as well as wallet mapping Notationaly using DNS.

5. IANA Considerations

This proposal does not require IANA changes.

6. References

6.1. Normative References

[RFC1034] Mockapetris, P., "Domain names - concepts and facilities", STD 13, RFC 1034, DOI 10.17487/RFC1034, November 1987, <https://www.rfc-editor.org/info/rfc1034>.

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[RFC9364] Hoffman, P., "DNS Security Extensions (DNSSEC)", BCP 237, RFC 9364, DOI 10.17487/RFC9364, February 2023, <https://www.rfc-editor.org/info/rfc9364>.

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6.2. Informational References

[SLIP-0044] "Registered coin types for BIP-0044", <https://raw.githubusercontent.com/satoshilabs/slips/master/slip-0044.md>.

[CAIP-2] Warta, S., , Gomes, P., and A. Herzog, "CAIP-2: Blockchain ID Specification", December 2019, <https://github.com/ChainAgnostic/CAIPs/blob/master/CAIPs/caip-2.md>.

[CHAIN-AGNOSTIC-NAMESPACES] "Chain Agnostic Namespaces", <https://namespaces.chainagnostic.org/>.

[WALLET-IANA-RRTYPE] "Wallet Completed Template", 2024-06-24, <https://www.iana.org/assignments/dns-parameters/WALLET/wallet-completed-template>.

Appendix A. Example code

Here is an example of how to create and retrieve a WALLET records using the domain name:

```
import dns.resolver.wallet
# Retrieve the WALLET record
record = dns.resolveWallet("example.com", "BTC")

print(record.value)  # Output: "0x1234567890abcdef"
xs
```

Contributors

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