INTENTIONAL DNS RESOLUTION

ICANN IDS
25th September 2024

Unintentional Events We Have Observed in Web3

+10,000

TLDs collisions across all namespaces on all chains

+6,000

TLDs collisions on Handshake only

+200,000

SLDs collisions across all namespaces on all chains

+1,000

TLDs derived, similar or equal to famous brand names, organisations, …

Unintentional Events We Have Observed in Web2 and Web3

+1,000

TLDs collisions

+200

TLDs collisions
on Handshake only

+10,000

SLDs collisions

Intentionality Across Web2 and Web3

Trust is built when systems behave as expected. The security, stability, and resilience of Web2 DNS and Web3 namespaces stem from **intentional design.**

By acting with purpose, we drive **predictable outcomes**. As Web3 namespaces evolve, our focus is on embedding quality and intentionality to strengthen trust and stability across the digital ecosystem.

About Freename AG

Freename AG is not Freenom

- Freename AG is a Swiss company founded in 2021
- First Blockchain namespace to accredit as ICANN Registrar
- Freename Domains is the namespace platform at freename.io
- Company with indexing, resolution, collision and abuse management patent pending technologies

Introduction to Namespace Challenges

Namespaces must behave predictably, with intentional and secure outcomes. However, certain areas require greater intentionality:

Namespace Collision

DNS Domain Abuse

Domain Spoofing in Web2 and Web3

For Web3 — Consider the implications of a spoofed wallet record— highlighting the critical need for enhanced security and intentional design.

The Problem: Namespace Collision

Namespace Collision

Recent example—.internal—to reduce unintended consequences from private namespaces colliding with new delegations (Web 2).

Web3 Collisions

Rapidly emerging namespaces since ICANN's 2012 round risk collisions with subpro TLDs (e.g., .CRYPTO, .COIN) and among themselves (e.g., Handshake vs. Unstoppable .WALLET).

Challenges

- Unregulated Web 3 domains introduce risks of trademark conflicts, domain abuse, and user confusion.
- Variations in user experience, including unsafe outcomes, highlight the need for intentional solutions.

Intentionality as a Solution

Mitigating Issues

Introducing intentional outcomes helps mitigate problems, ensuring a safer and more predictable user experience. This also benefits site operators by preventing audience diversion.

Broader Benefits

By focusing on intentionality, we can improve stability in domain resolution, leading to more predictable outcomes in unintentional circumstances, benefiting both users and operators.

Make it simpler

Ensure low or no user complexity is present.

Make it Safer: Guarding Against Malicious Intent

Domain Spoofing

- Detection of IDN homoglyph attacks
- Record spoofing
- Confusingly similar trademarks or portal subdomains

Proactive Defenses

Using partners like CleanDNS and their signals to guard against phishing, fake shops, and multi-hop 301/302 redirects.

Intentional Configurations

Tailoring outcomes to meet community standards, corporate policies, national directives, and parental controls

Coexistence Strategy

Ensuring smooth coexistence of solutions with the sophistication of our hybrid Web 3/Web 2 approach

Adding Elegance to Intention

Indexing

- Scanning and indexing blockchain namespaces
- Coupled Web 3-Web 2 indexing with analytics and processing
- Pre-processing delivers SPEED - response time is crucial

Analysis

- Zone file and resolution log analysis for conventional DNS
- Signals and Learning:
  a. Third-party abuse feeds
  b. Crowd trends and popular client configurations
  c. Analytics on non-identifiable user data and usage patterns

The NOTO Protocol: Intentional Web2 First Approach

Web2 as Bedrock

Utilize the well-established Web2 platform, offering users a seamless and intentional transition to Web3, while enhancing trust and experience.

Design Philosophy

The NOTO Protocol extends the sound principles of the conventional internet, adapting them to fit decentralized technology.

Key Elements

- Rules: Grounded in established internet standards and best practices
- Score: Enhances trust through measurable, transparent metrics.

Resolving a Domain and Handling Collision With NOTO

1. **RESOLUTION**
   Request

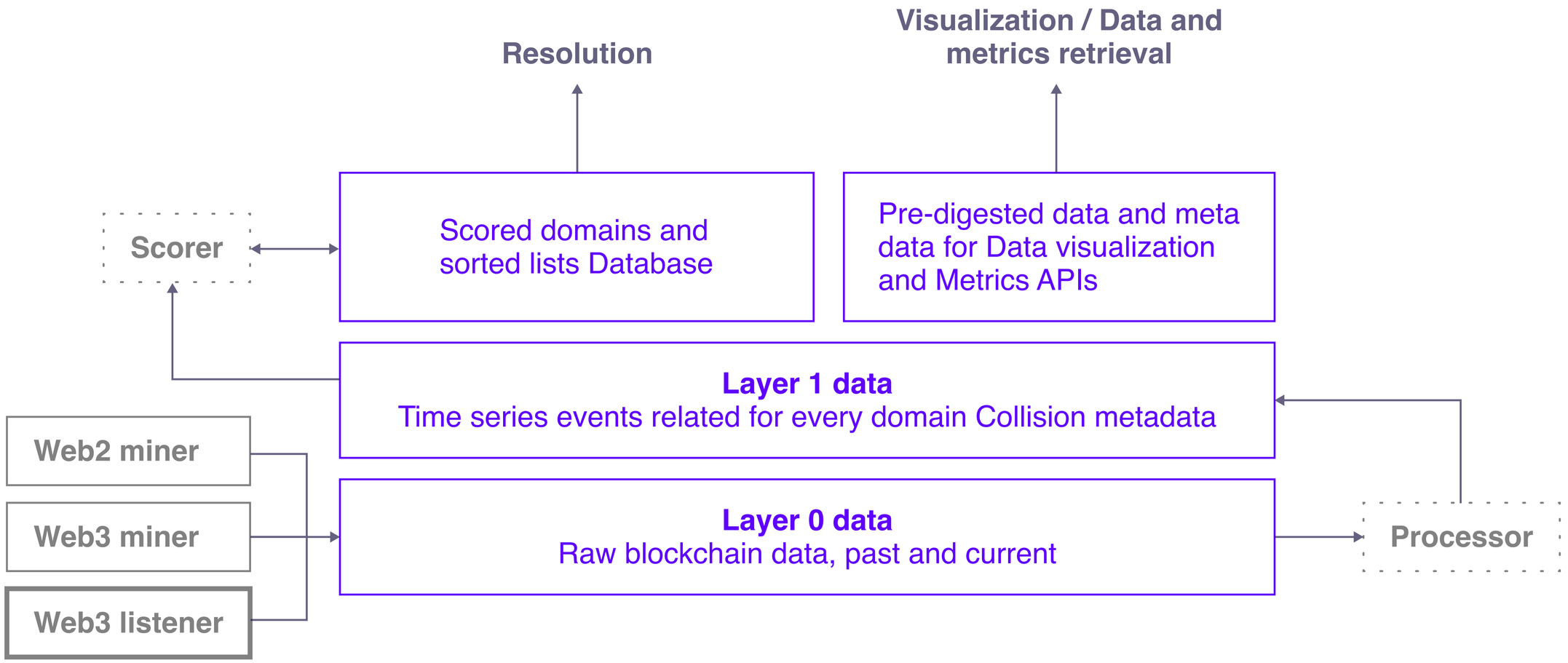
2. **FETCH**
   Obtain set of relevant Web3/Web2 domains

3. **FILTER**
   Apply Scoring computing algorithm

4. **SORT**
   Order domains by score

5. **DELIVER**
   Return results / records for the first domain

Resolving a Domain and Handling Collision With NOTO



Resolving a Domain and Handling Collision With NOTO

The process handles naming collisions during domain resolution, using our Collision Management Engine to navigate and mitigate conflicts between similar Web3 domains across multiple namespaces and Web2 DNS.

Rule-Based Resolution:

- **Execution Phase:** Pre-resolution or post-resolution application
- **Conditional Criteria:** Triggers rule execution
- **Priority Ranking:** Resolves conflicts between multiple rules
- **Authority Level:** Defines rule hierarchy
- **Action:** Determines operational behavior (e.g., resolve, block, redirect, etc)

Types of Rules:

- **Resolution Rules:** Block or redirect queries based on predefined criteria
- **Collision Management Rules:** Prioritize or sequence namespaces during collisions
- **Other Rules** or methodologies, different kind of abuse mitigation systems: child protection, civic laws, filter content...

Resolving a Domain and Handling Collision With NOTO

Score-Based Resolution: If unresolved, a scoring system ranks domains using qualitative and quantitative characteristics to determine the final resolution.

1. The default resolution is guided by an intention-based scoring mechanism, where thresholds can be adjusted either on an instance basis or tailored to specific users.

2. Concurrent or conflicting data is resolved systematically to maintain consistency.

3. A predictable default outcome is established, based on the intentional scores.

4. Administrators have the ability to override the default resolution for their specific instance. For example, if I'm managing the NOTO domain, I can define which domain should be prioritized within my organization.

Addressing Abuse Using Signals for Resolution Mitigation

1. **RECEIVE**
signal from Abuse partner

2. **EVALUATE**
and process signal

3. **ADJUST**
rules (if needed) for mitigation and notification

4. **STORE**
or update rule in Rules index

5. **APPLY**
the rule when triggered

Signal and Resolution Management for Mitigating Abuse

1. **Different abuses in Web2 or Web3**
Each mitigation is suited for purpose within namespace

2. **Role of Signal Management**
Critical in mitigating DNS abuses, with signals generated by DNS Abuse Management Providers to block domains or modify resolution records

3. **Outcome**
Enhances Web3 domain security, providing a safer user experience.

4. **Rule-Based Abuse Handling**
Abuse reports trigger signals processed by the Collision Management Engine, which creates rules to block or override domain resolutions, ensuring scalable abuse management

Signals for Abuse by IDN Homoglyph Attacks

Paypal.tld to the Latin letters but belong to the Cyrillic alphabet.

One possible homoglyph
for “PayPal” in Cyrillic could be:

PayPaI

In this version:

- “P” (Cyrillic letter for “R”) is used for “P”.
- “a” (Cyrillic letter for “a”) is used for “a”.
- “y” (Cyrillic letter for “u”) is used for “y”.
- “I” (Cyrillic letter for “I”) is used for “l”.

Underneath the Dataset

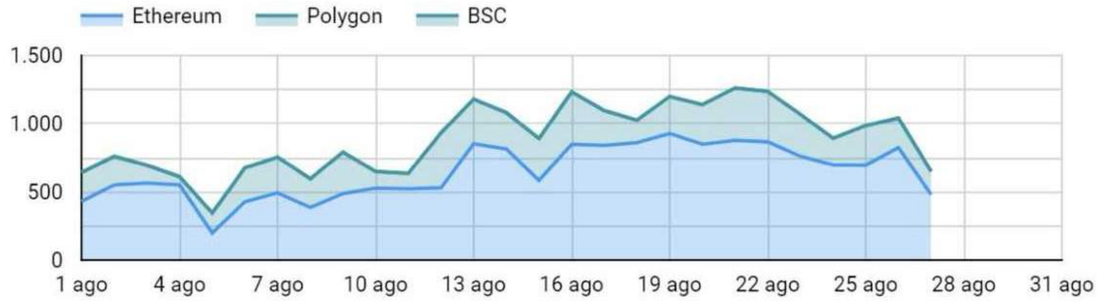
Raw data via APIs

	uuid	name	asciiname	zonelevel	chain	contract	
141	09fc7620-de21-4791-933c-269a17832ef5	1551.unstoppable	1551.unstoppable	SLD	POLYGON	0xa9a6a3626993d487d2dbda3173cf58ca1a9d9e9f	10
142	bbaafc80-3758-4e48-94ad-5c753b7252b1	🇦🇺🌽	xn--q77hma29j	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	a5
143	c4270a00-b0f6-4189-9813-0c700158339f	🇦🇺👷	xn--q77hma50j	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	b4
144	b4f644b1-42f5-4436-aac3-d8620d6b8c54	🇦🇺🇮🇹	xn--m77hhasf	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	7e
145	06a919cb-b63f-492c-9b4a-dbd7f14e72a0	chocotoy.nft	chocotoy.nft	SLD	POLYGON	0xa9a6a3626993d487d2dbda3173cf58ca1a9d9e9f	10
146	446fb1c7-b7a8-46f2-9d0f-ca56222123c6	emails.cruzeiro	emails.cruzeiro	SLD	POLYGON	0x5792c3534f6231b1e019740c6079233b3d021dfe	15
147	6423791a-e97c-4ce9-8d56-bd14976c29de	🇦🇺🍌	xn--q77hma43h	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	ed
148	1ea3d470-23cc-49fe-93e1-8b5b866876f8	lubbock.valve	lubbock.valve	SLD	POLYGON	0x5792c3534f6231b1e019740c6079233b3d021dfe	15
149	2740f30e-e164-4208-82fe-bd257b369cf9	aijobportal.nft	aijobportal.nft	SLD	POLYGON	0xa9a6a3626993d487d2dbda3173cf58ca1a9d9e9f	10
150	c11c38b8-793b-43b6-9d05-c36d6c9c4cda	plantdadsam.wallet	plantdadsam.wallet	SLD	POLYGON	0xa9a6a3626993d487d2dbda3173cf58ca1a9d9e9f	10
151	77ec0898-a703-4a32-be5a-07c1f6ac49ce	🇵🇭🇦🇺	xn--g77huas0a	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	26
152	ceb43880-9440-4ec1-b247-ef56149295da	shrinkservice.zil	shrinkservice.zil	SLD	POLYGON	0xa9a6a3626993d487d2dbda3173cf58ca1a9d9e9f	10
153	8367c8f3-251f-4e14-b357-f9c025904e5f	xn--1ug66v4915bya580d	xn--1ug66v4915bya580d	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	a5
154	77a7110d-3ebf-4beb-af02-56cb1e478d85	🏄🇦🇺	xn--q77hma386c	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	db
155	999a4414-8b14-42cc-bd2b-67a0b069bb4e	mars2117.x	mars2117.x	SLD	POLYGON	0xa9a6a3626993d487d2dbda3173cf58ca1a9d9e9f	10
156	ff6f5c3b-a140-4bb0-97a1-aa371d8120da	leaharmanus.crypto	leaharmanus.crypto	SLD	POLYGON	0xa9a6a3626993d487d2dbda3173cf58ca1a9d9e9f	10
157	5d18ba09-b81c-49c3-85ab-5959205c2282	xn--1ug1164psa46m27a	xn--1ug1164psa46m27a	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	7c
158	76ce362c-5189-4e10-8fd6-3cf3e5deaa82	drfeelzgood.eth	drfeelzgood.eth	SLD	ETH	0x57f1887a8bf19b14fc0df6fd9b2acc9af147ea85	10
159	44a9eb39-5a3f-4e90-abb5-3957d3e420fe	evgenovviktor.nft	evgenovviktor.nft	SLD	POLYGON	0xa9a6a3626993d487d2dbda3173cf58ca1a9d9e9f	10
160	6e6a12e9-4b36-42e5-b4a2-aa15e472cdd2	giorgiobalbi.eth	giorgiobalbi.eth	SLD	ETH	0x57f1887a8bf19b14fc0df6fd9b2acc9af147ea85	10
161	c79a8999-f489-4c6e-8824-07c1f9327234	xn--1ug26vbn25bya05u	xn--1ug26vbn25bya05u	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	28
162	95eb7d4d-ea8b-48d2-9de6-0e39d4b233de	🌆🇦🇺	xn--q77hma21m	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	2c
163	2aa07cc0-89dd-486b-89eb-880e82f2a27d	🌉🇦🇺	xn--q77hma11k	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	c6
164	a2b5483b-7b29-4849-a944-d6a65e876e26	🎸🇦🇺	xn--q77hma92k	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	7d
165	ab136bde-b32e-4bd9-a8f0-670e697cb076	eth.الرودبوم	xn--mgbqf9ehqbp.eth	SLD	ETH	0x57f1887a8bf19b14fc0df6fd9b2acc9af147ea85	10
166	d87c6290-6636-4783-a65b-5eb78d9b07da	🟡🇦🇺	xn--q77hma497c	TLD	HANDSHAKE	hs1000000000000000000000000000000000000000	3a
167	62a21992-c4cc-4098-a7a2-56da3541b16a	enmanuelblockchain.blockchain	enmanuelblockchain.blockchain	SLD	POLYGON	0xa9a6a3626993d487d2dbda3173cf58ca1a9d9e9f	10
168	04cfed9e-56e8-4c23-ba3e-419e1886856d	elkgrove.barbecues	elkgrove.barbecues	SLD	POLYGON	0x5792c3534f6231b1e019740c6079233b3d021dfe	15

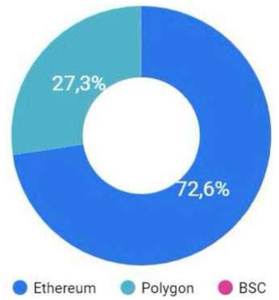
Underneath the Dataset

Visualization Dashboard

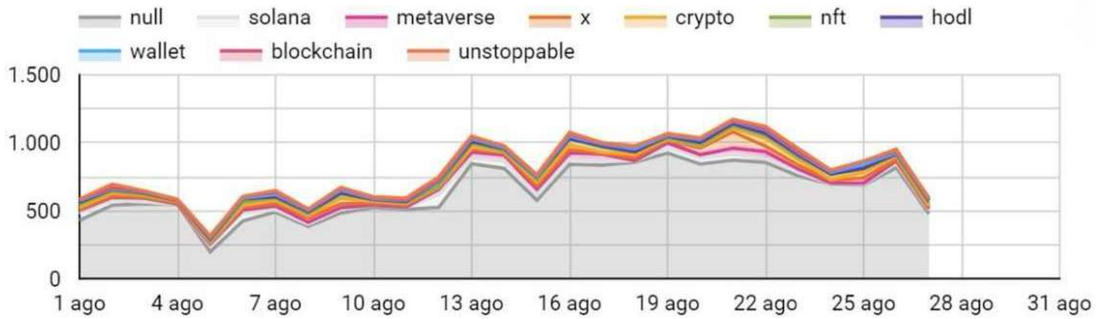
Total Domains by Blockchain



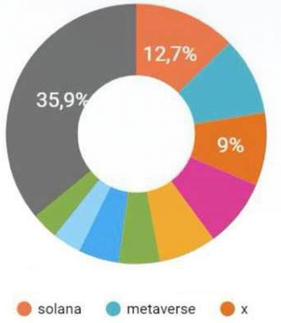
Domains by Chain



Total Domains by TLDs



Domains by Chain



Request Access to Dataset

Questions?

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Background:

- Conduct & Information Analyst, Swiss Army
- Industry 4.0 Cybersecurity consultant for Bureau Veritas, Milan
- Founder of Goodcode (Software house)
- MsC Software Engineering