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Applied Learning: Challenges with Alternative Name Systems

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About OCTO-034

Goals

Document some of the technical challenges in deploying alternative naming systems alongside the Domain Name System (DNS).

Non-Goals

In-depth analysis of how each alternative naming system works

Analysis of the policy-making process of each alternative naming system.

https://www.icann.org/en/system/files/files/octo-034-27apr22-en.pdf

Background: Alternative Naming Systems

Alternative naming systems are not new:
Many have existed in the past including alternate roots that led to the publication of ICP-3 in 2001

The popularity of blockchain in general is bringing attention to blockchain-based naming systems

The three most popular alternative naming systems today are:

Handshake (Bitcoin derivative)
ENS (Ethereum)
Unstoppable Domains (Ethereum derivative)

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Background: Naming Drivers in Blockchains

Blockchains users need to refer to "objects" (e.g. wallets) within their respective blockchains.

In the early days, objects were referred to by their blockchain address in hexadecimal format.

There was a desire to use human readable names instead of hexadecimal strings. This is the same idea as using names instead of IP addresses.

DNS extensions could be (and have been) developed to achieve this. However, blockchain communities decided to create their own naming systems within their own blockchain environments.

Many blockchains led to many blockchain-based naming systems.

Background: Alternative Naming Systems

ICANN-accredited registrars are selling blockchain-based names.

Blockchain-based domains are not bound by ICANN policies but by their own independent policies.

Deploying an Alternative Naming System

How can Internet users resolve a name from an alternative name system?

Native applications can use dedicated libraries

For legacy applications bridging techniques exist: URL/Resolver/dedicated browsers…

Issues:

Manual user intervention does not scale past the adopters/enthusiast stage.

Knowing they need to use (and then install) a specific app to reach a specific name, in a specific name space is beyond most consumers.

Deploying an Alternative Naming System

Issues:

Bridging name spaces from recursive resolvers on behalf of consumers has challenges that can lead to instability.

Behavior may vary depending on which resolver is being used

Consistency issues may occur when mobile or when using multiple Internet connections

Deploying Multiple Alternative Naming Systems

There is no community-driven coordination, neither between alternative naming systems, nor between those naming systems and the DNS:
→ Name collisions are unavoidable

Naïve approach: "More naming systems to chose from is great, if I can't get the name I want in one, I'll get it in another…"

Question: "How do users reach you?"

Answer: "I just tell them to use this app…"

Applications can connect to only one naming system at a time.

→ If not: unstable/unpredictable resolutions

→ Makes it very difficult for end users to navigate across naming systems

Deploying Multiple Alternative Naming Systems

Presents a risk of fragmentation with the creation of separate ecosystems, one for each naming system.

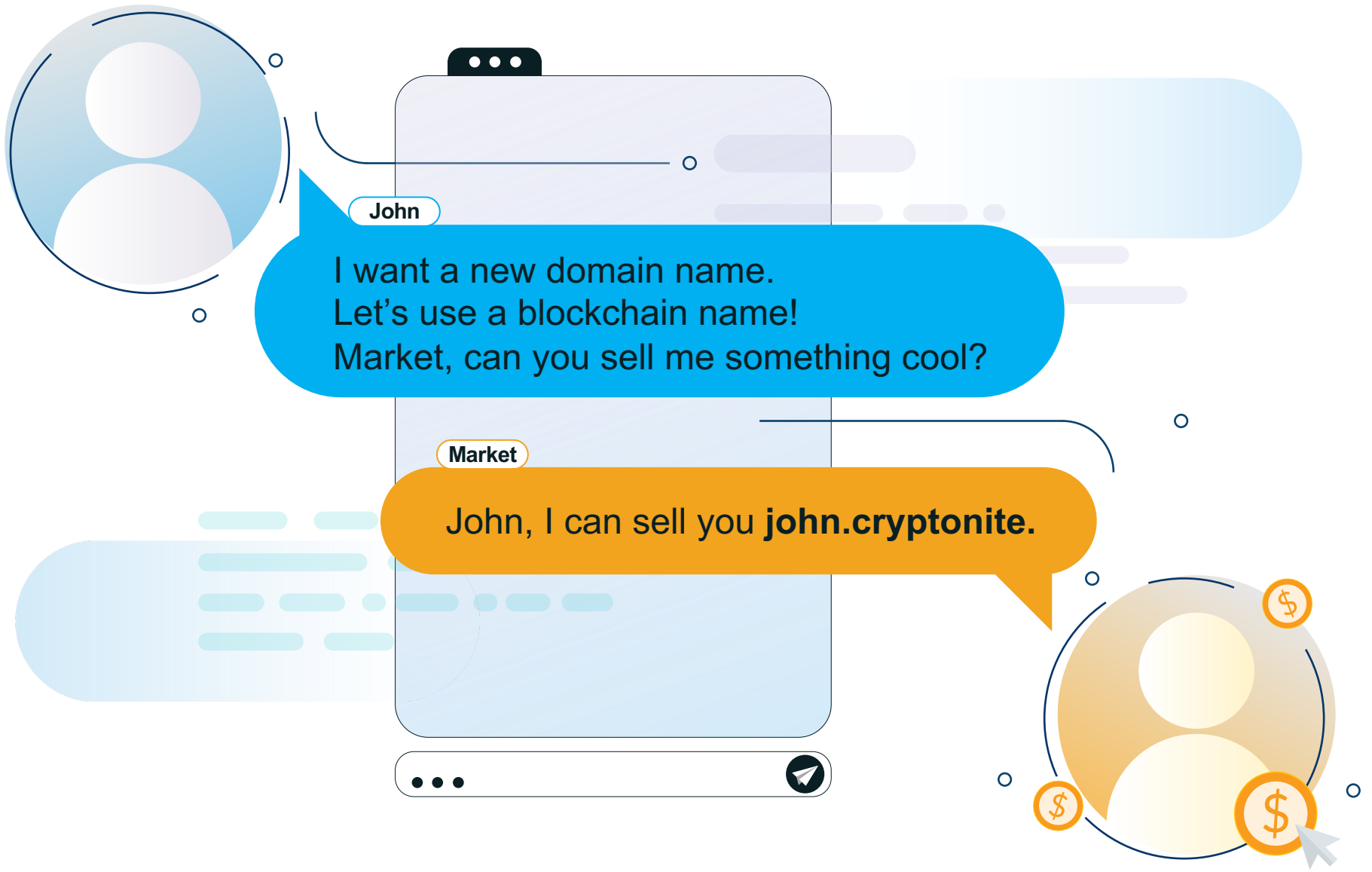
Back to 2001 and ICP-3

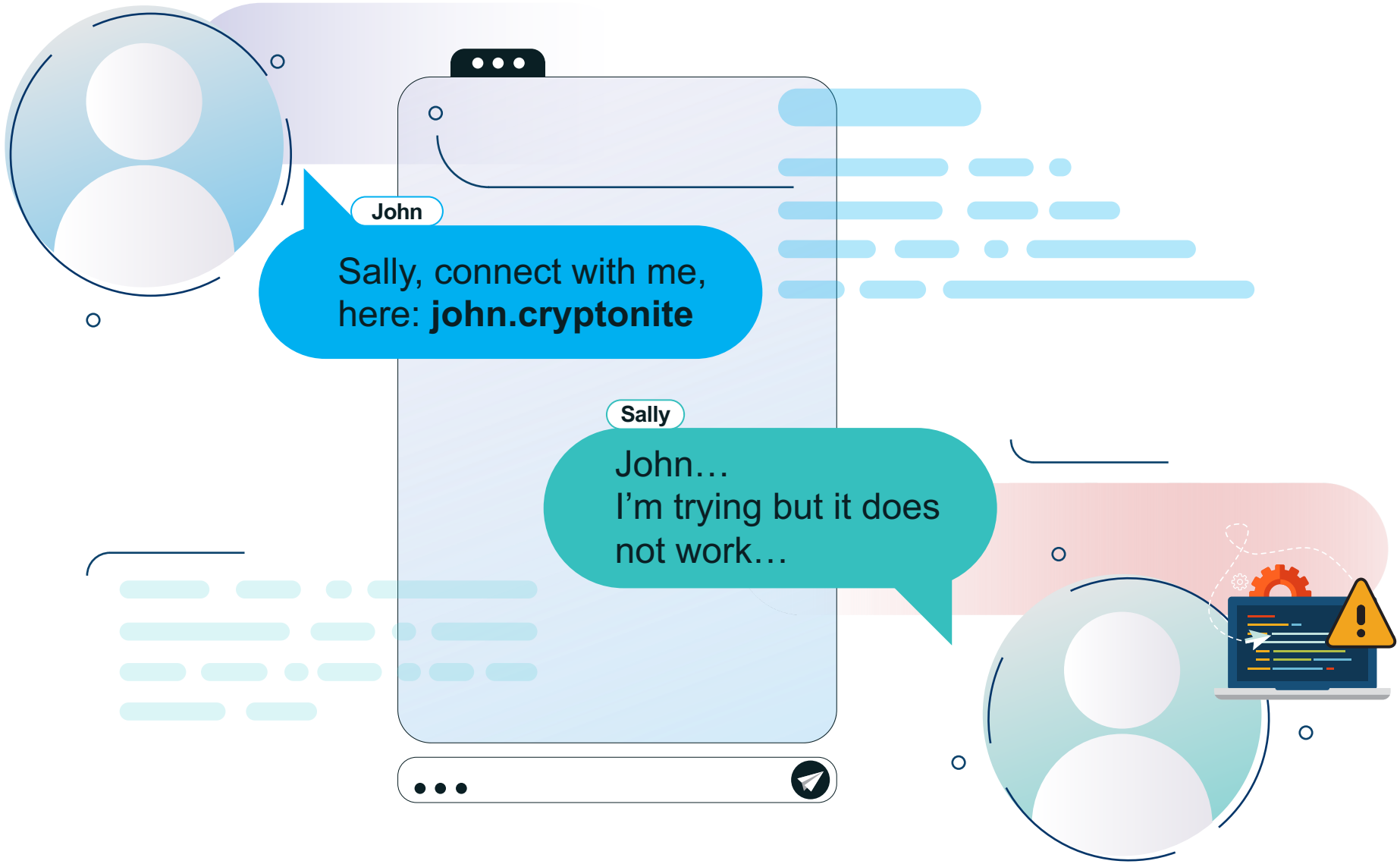
"This document reaffirms ICANN's commitment to a single, authoritative public root for the Internet Domain Name System (DNS) and to the management of that unique root in the public interest according to policies developed through community processes."

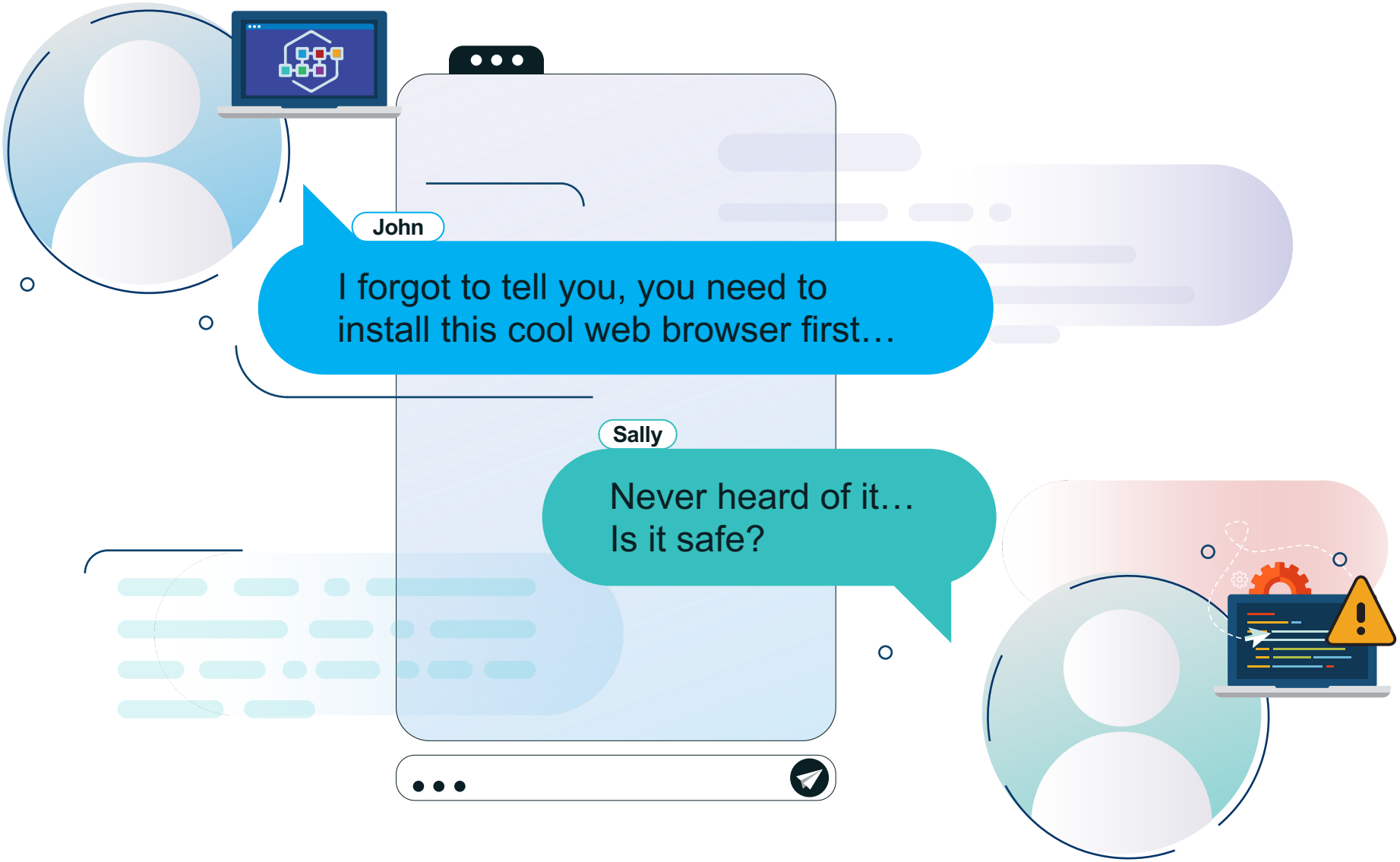
"These alternate roots typically substitute insular concerns in place of the community-based processes that govern the management of the authoritative root. Their operators decide to include particular top-level domains in these alternate roots that have not been subjected to the tests of community support and conformance with consensus processes – coordinated by ICANN – that would allow their inclusion in the authoritative root. These decisions of the alternate-root operators have been made without any apparent regard for the fundamental public-interest concern of Internet stability. The widespread use of active domain names in these alternate roots could in fact impair the uniqueness of the authoritative name-resolution mechanism and hence the stability of the DNS."

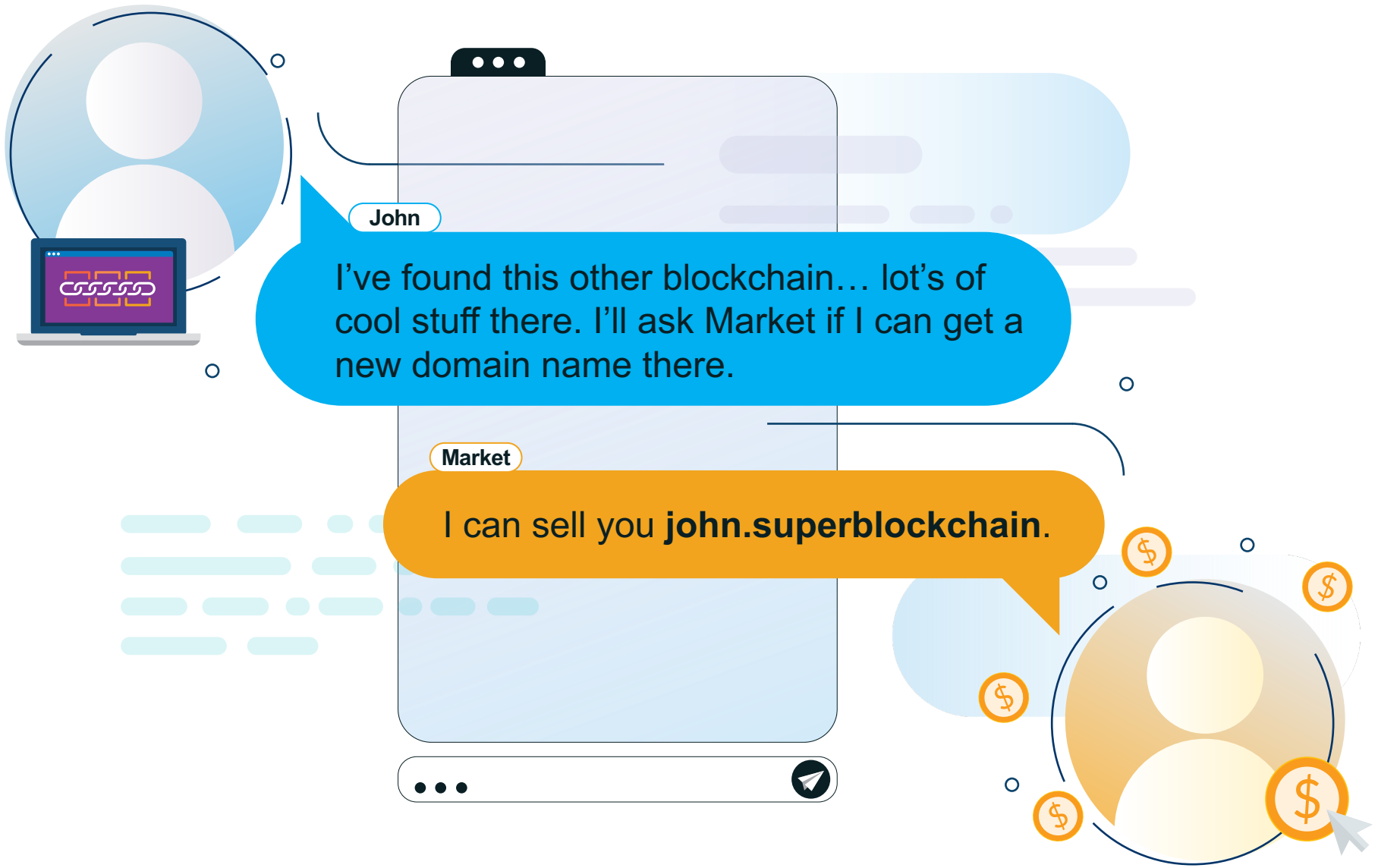
"ICANN's mandate to preserve stability of the DNS requires that it avoid encouraging the proliferation of these alternate roots that could cause conflicts and instability."

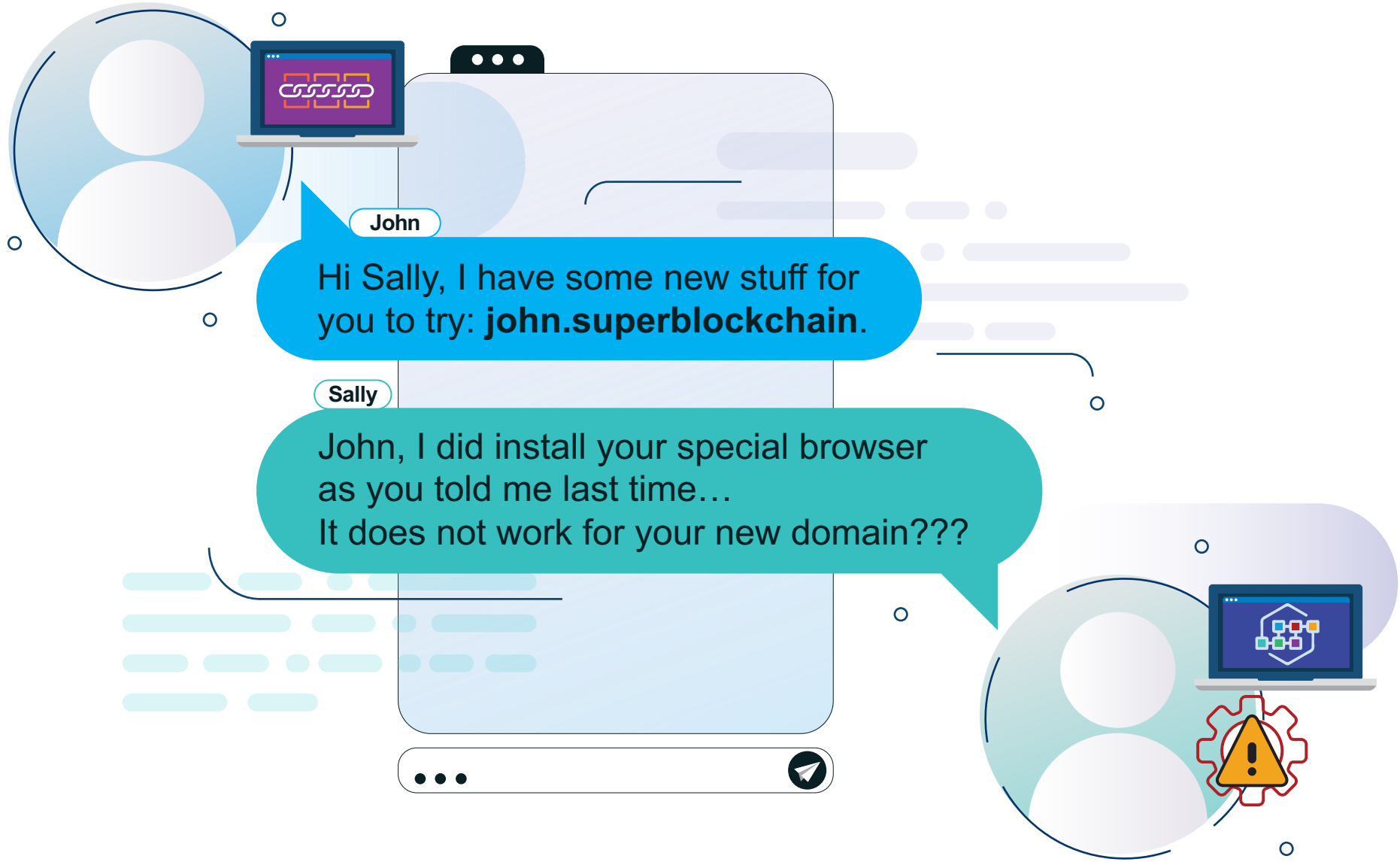
Name Collision Scenario

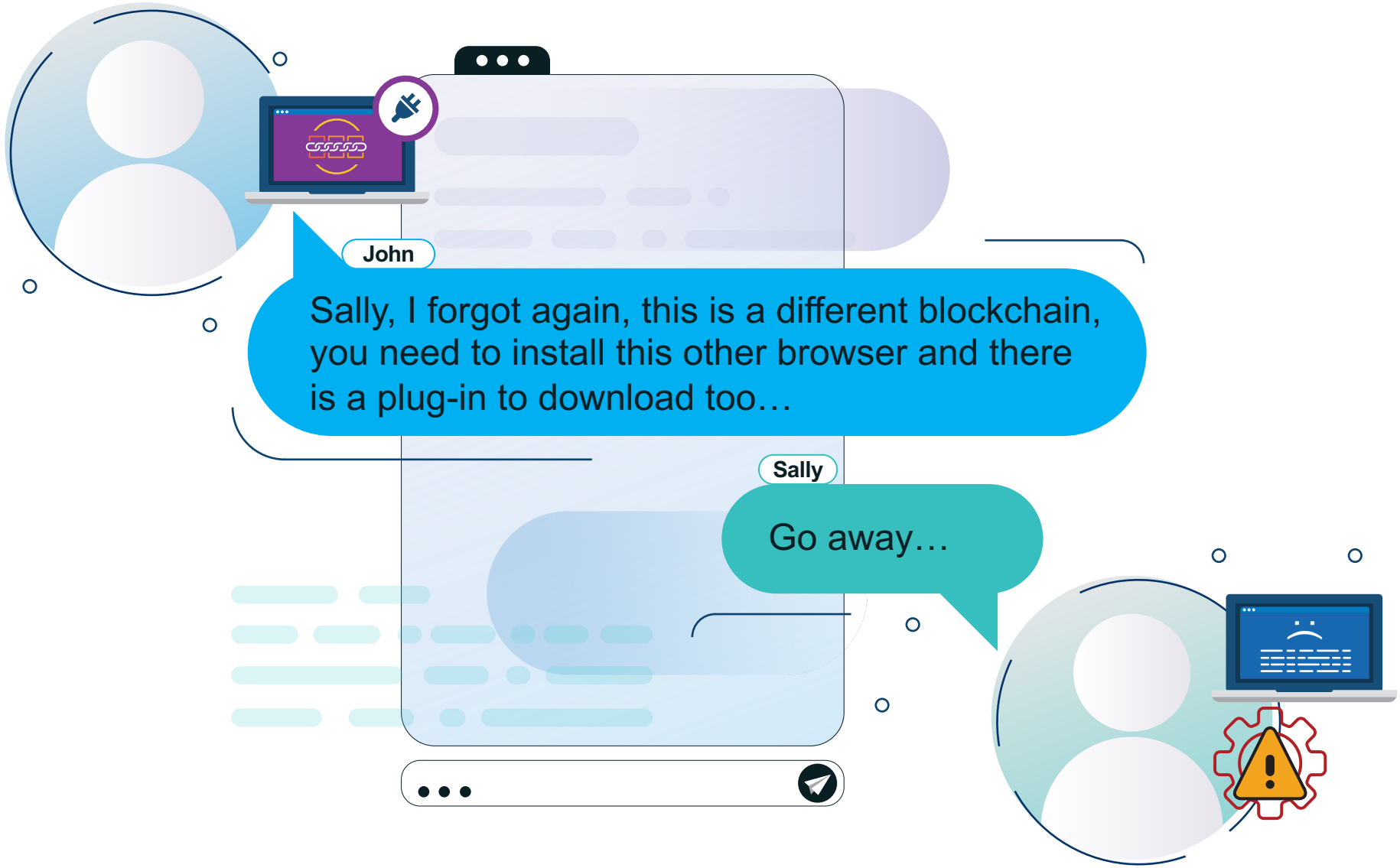

John
I want a new domain name.
Let's use a blockchain name!
Market, can you sell me something cool?
Market
John, I can sell you **john.cryptonite.**


John
Sally, connect with me, here: **john.cryptonite**
Sally
John…
I'm trying but it does not work…

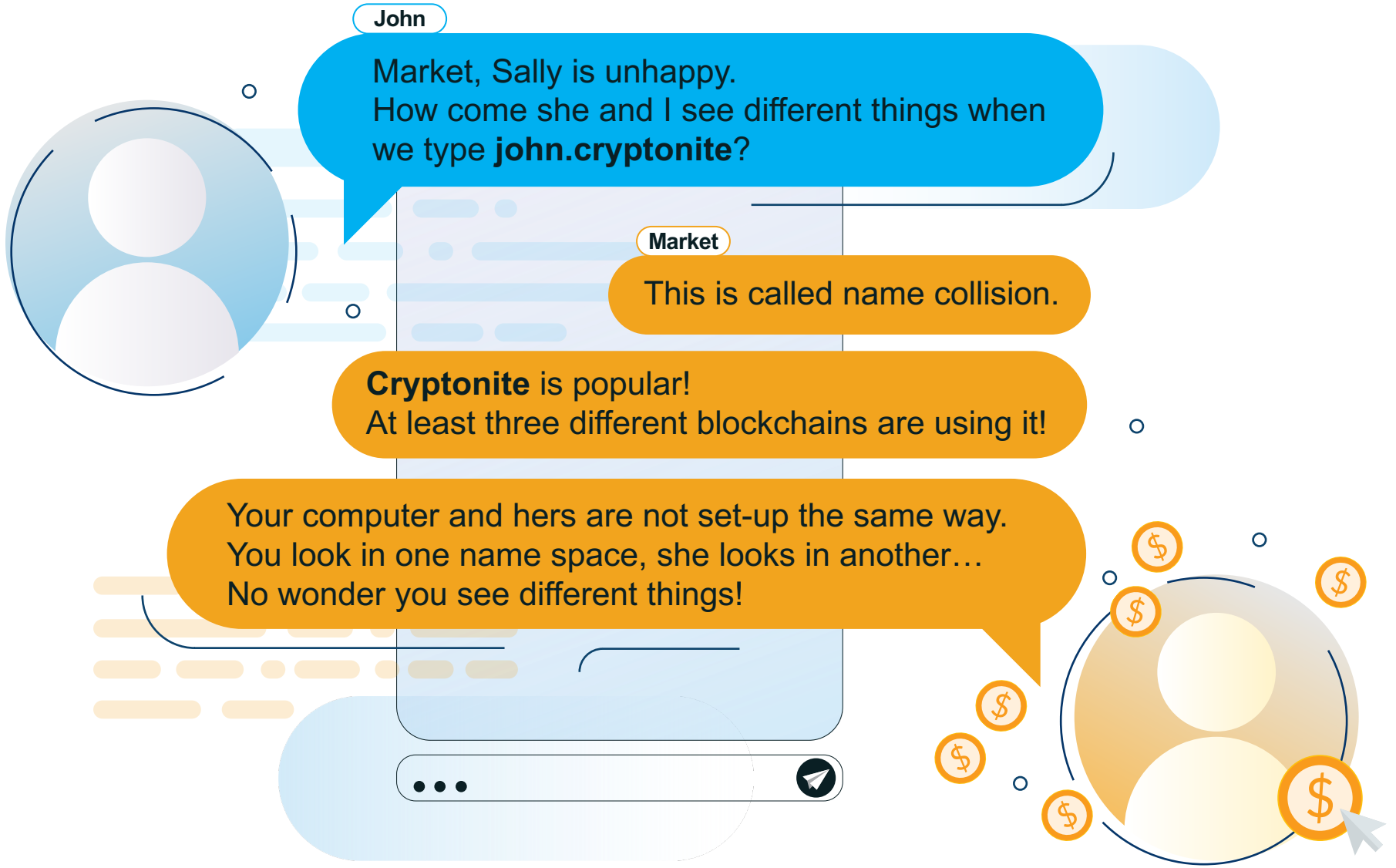

John
I forgot to tell you, you need to install this cool web browser first…
Sally
Never heard of it… Is it safe?

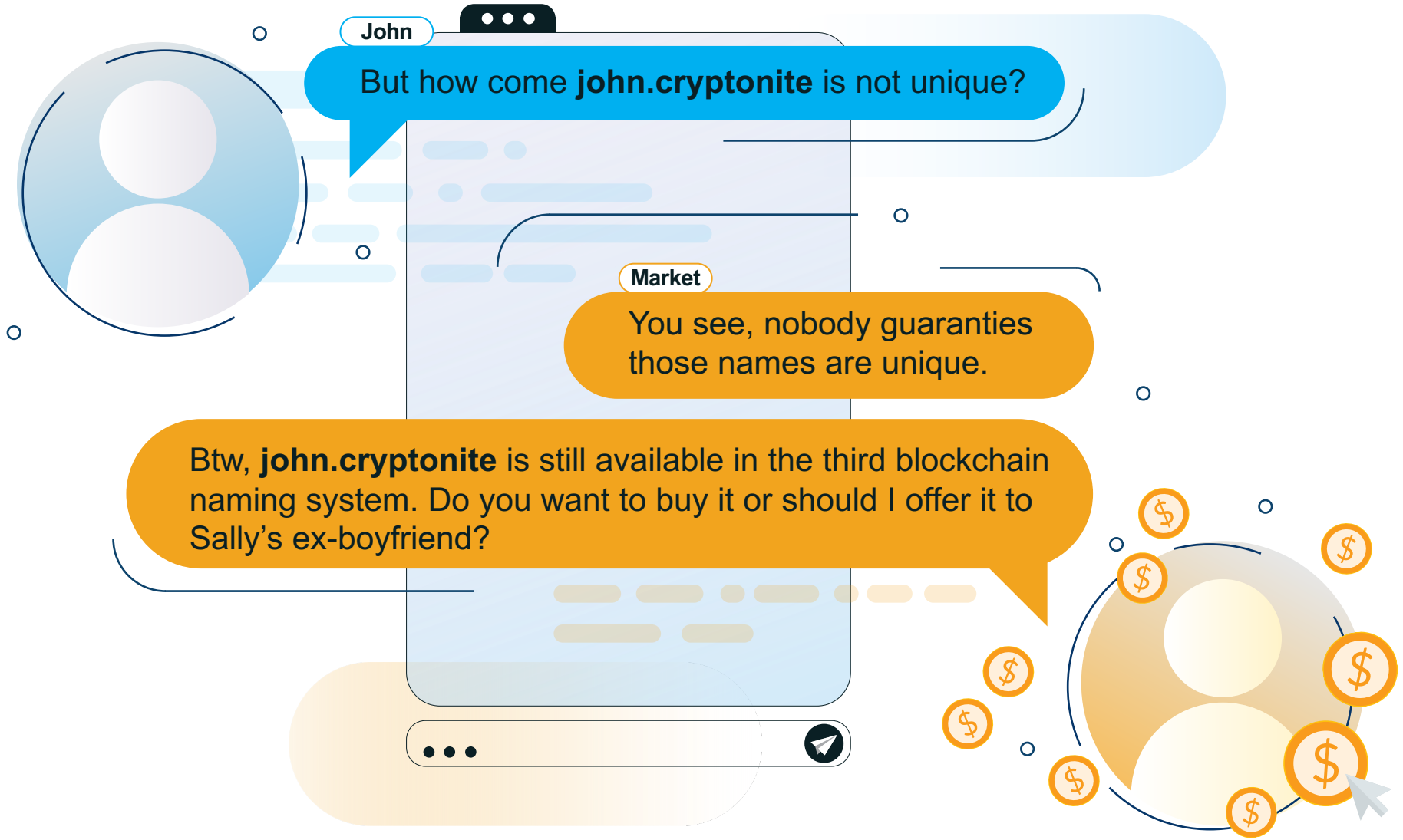

John
I've found this other blockchain… lot's of cool stuff there. I'll ask Market if I can get a new domain name there.
Market
I can sell you **john.superblockchain**.

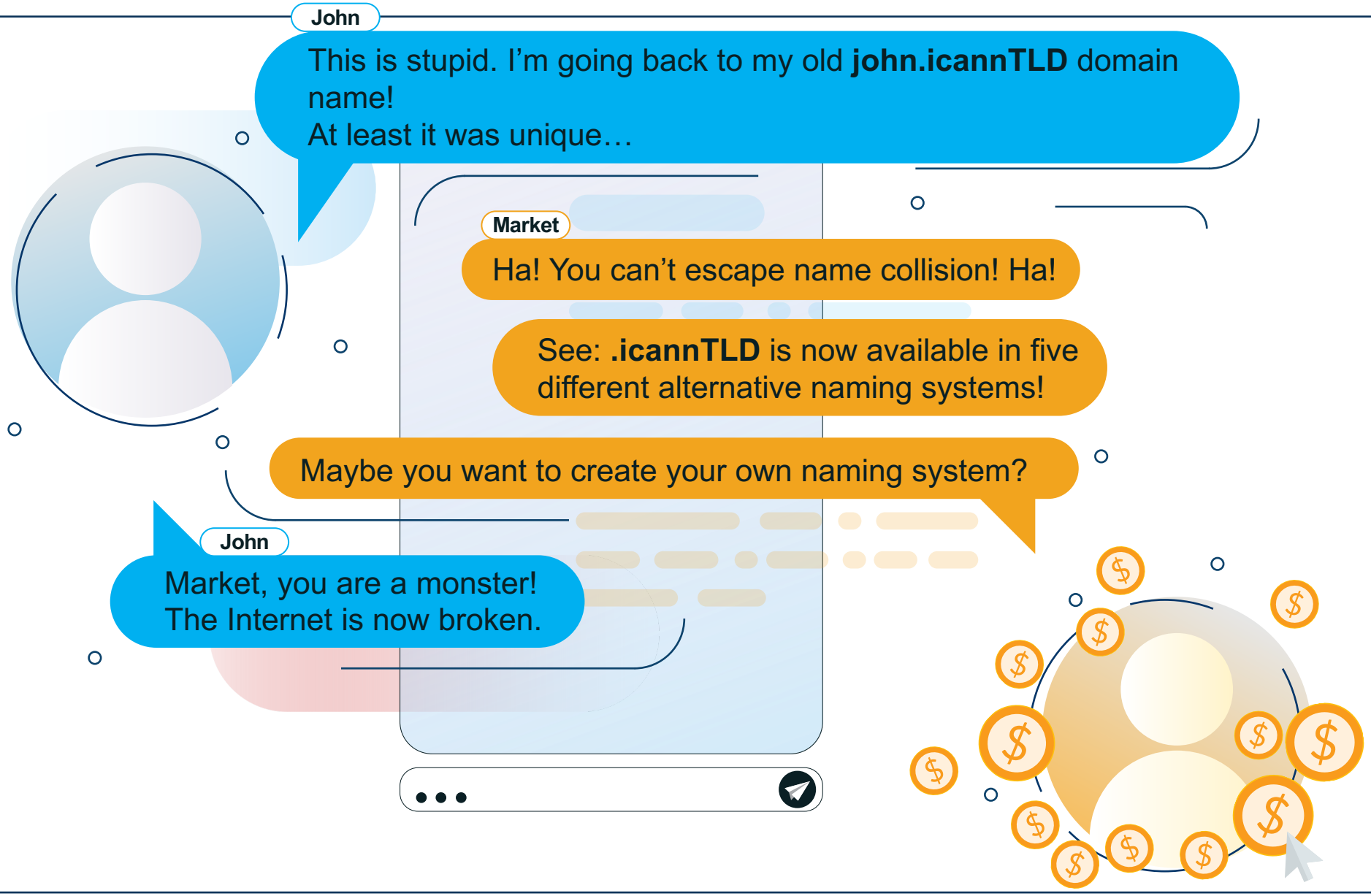

John
Hi Sally, I have some new stuff for you to try: **john.superblockchain**.
Sally
John, I did install your special browser as you told me last time…
It does not work for your new domain???


John
Sally, I forgot again, this is a different blockchain, you need to install this other browser and there is a plug-in to download too…
Sally
Go away…

Sally
John, I eventually followed all the steps you gave me…
I can now see you at **john.superblockchain**.
But when I try **john.cryptonite**,
I see my ex-boyfriend's profile???
John
What? I have not done anything!!!
See, this is my profile!


John
Market, Sally is unhappy.
How come she and I see different things when we type **john.cryptonite**?
Market
This is called name collision.
Cryptonite is popular!
At least three different blockchains are using it!
Your computer and hers are not set-up the same way.
You look in one name space, she looks in another…
No wonder you see different things!


John
But how come **john.cryptonite** is not unique?
Market
You see, nobody guaranties those names are unique.
Btw, **john.cryptonite** is still available in the third blockchain naming system. Do you want to buy it or should I offer it to Sally's ex-boyfriend?


John
This is stupid. I'm going back to my old **john.icannTLD** domain name!
At least it was unique…
Market
Ha! You can't escape name collision! Ha!
See: **.icannTLD** is now available in five different alternative naming systems!
Maybe you want to create your own naming system?
John
Market, you are a monster!
The Internet is now broken.

Engage with ICANN

Thank You and Questions

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