RIPE NCC
RIPE NETWORK COORDINATION CENTRE

IP Blocklisting Basics

1 hour

July 2025

RIPE NCC Learning & Development


This session is
being recorded

Goals

- Explain **why** an IP address can get blocklisted
- **Prevent** IP address blocks from being blocklisted
- **Remove** IP addresses from blocklists using specific techniques
- Implement **best practices** for preventing IP addresses from being blocklisted

Agenda

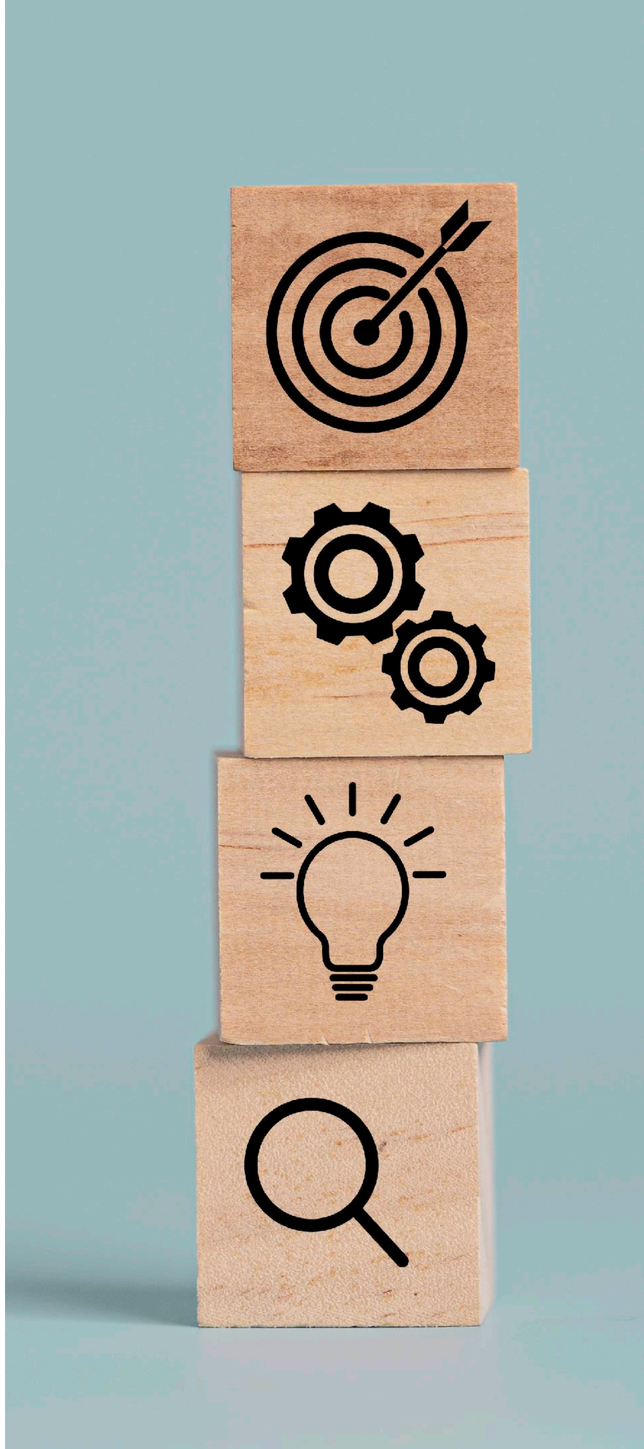
1. Internet, IPs, ASNs, Routing, etc.

2. IP and ASN Blocklists

3-7. How and why an IP prefix or ASN can be blocklisted

8-9. Best Practices:

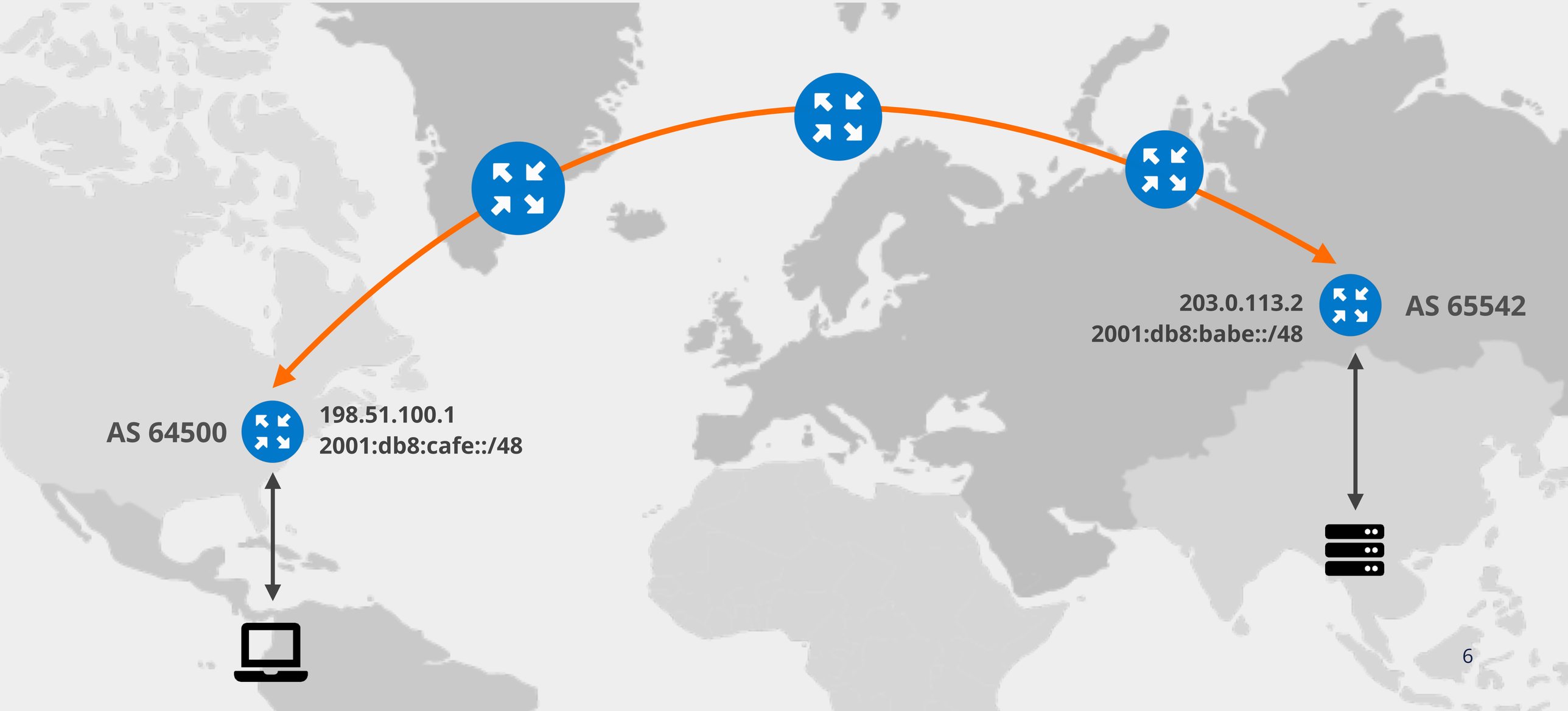
- How to prevent IPs and ASNs from being blocklisted
- How to remove IPs and ASNs from blocklists



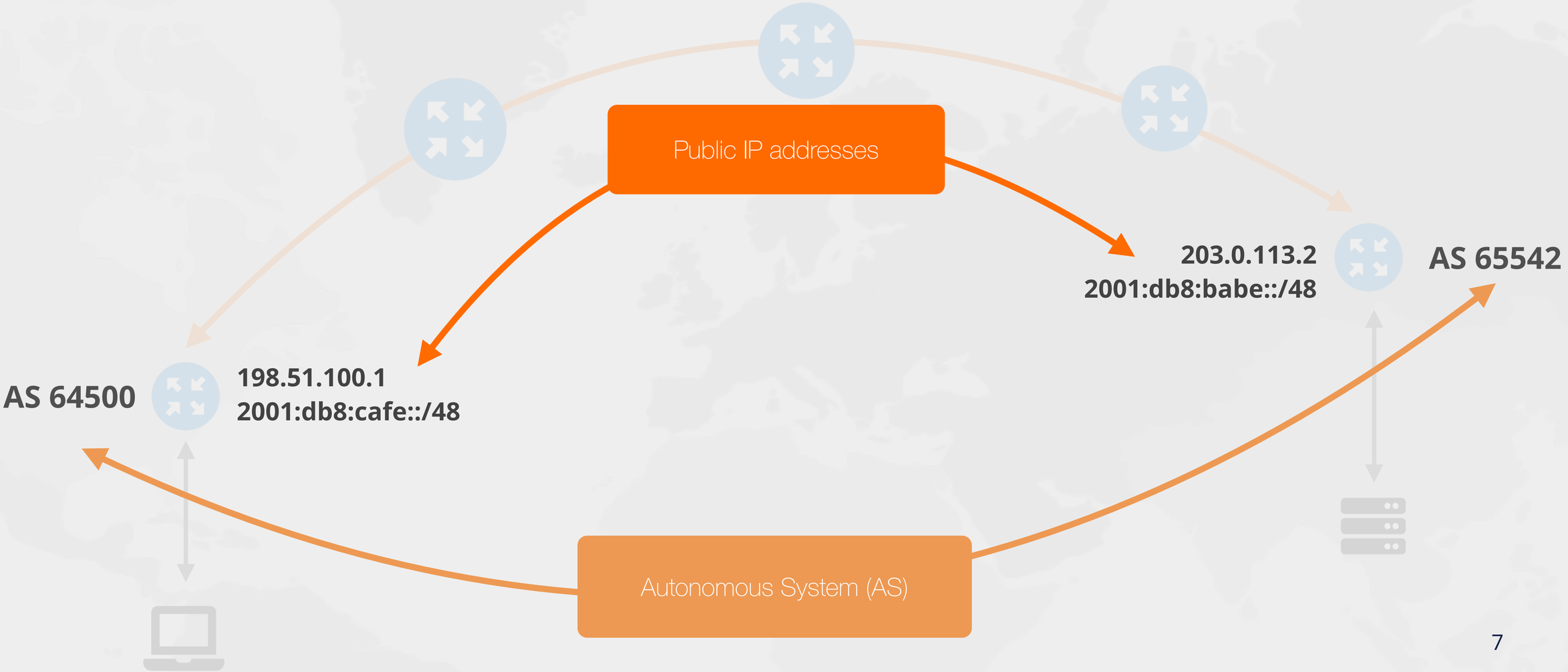
Internet, IPs, ASNs, etc.

Section 1 of 9

How do we address nodes on the Internet?



Focus on these numbers:

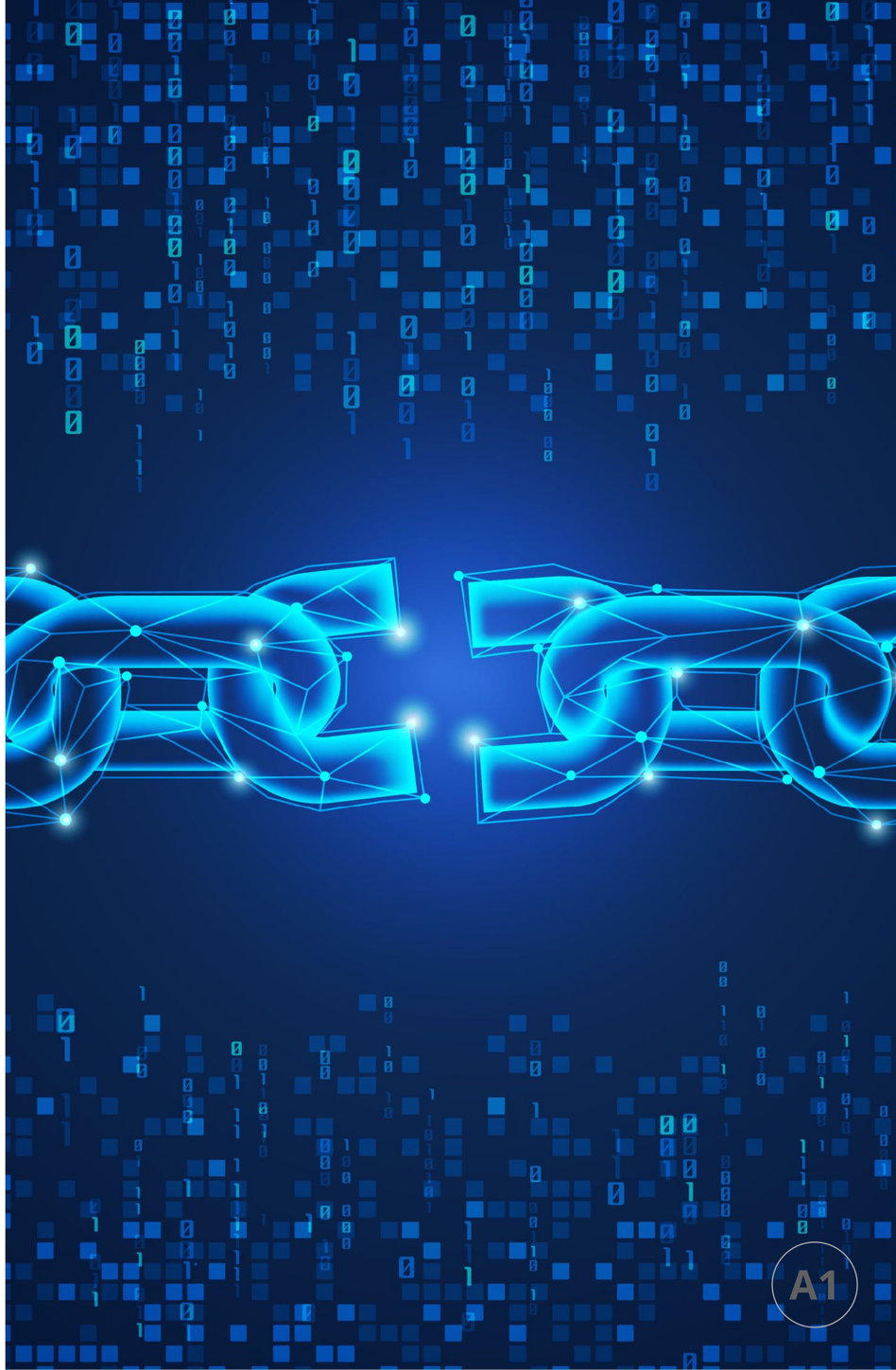


What can go wrong?

How can somebody **abuse** or **misuse** resources on the Internet?

Choose all possible situations in the poll, and tell us your experience in the chat window.

1 min.



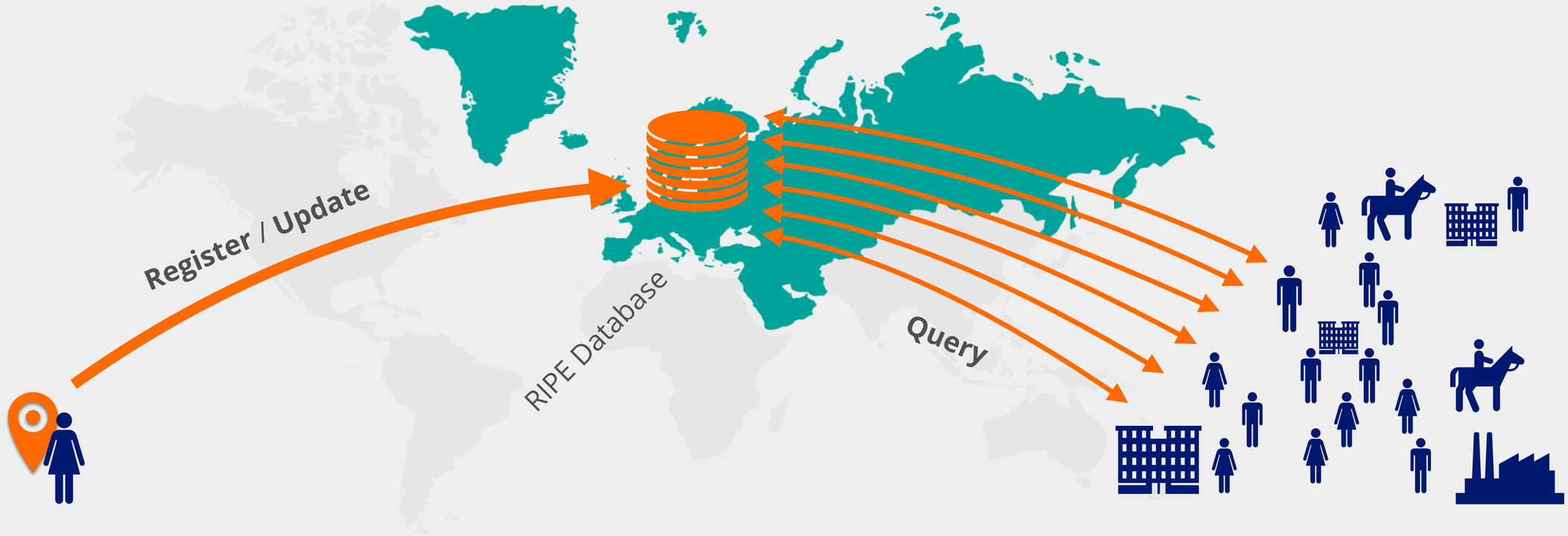
IANA and the 5 Regional Internet Registries (RIRs)

The RIPE NCC and its 20k+ LIRs

Local Internet Registries (LIRs) are responsible for:

- Distributing Internet Number resources (IP addresses and ASNs) **to End Users**
- Registering them in the **RIPE Database**
- Keeping the registry up-to-date

The Big Picture



The legitimate holder
(the RIPE NCC, LIR, etc.)
registers their assignments,
(sub)-allocations, and ASNs.

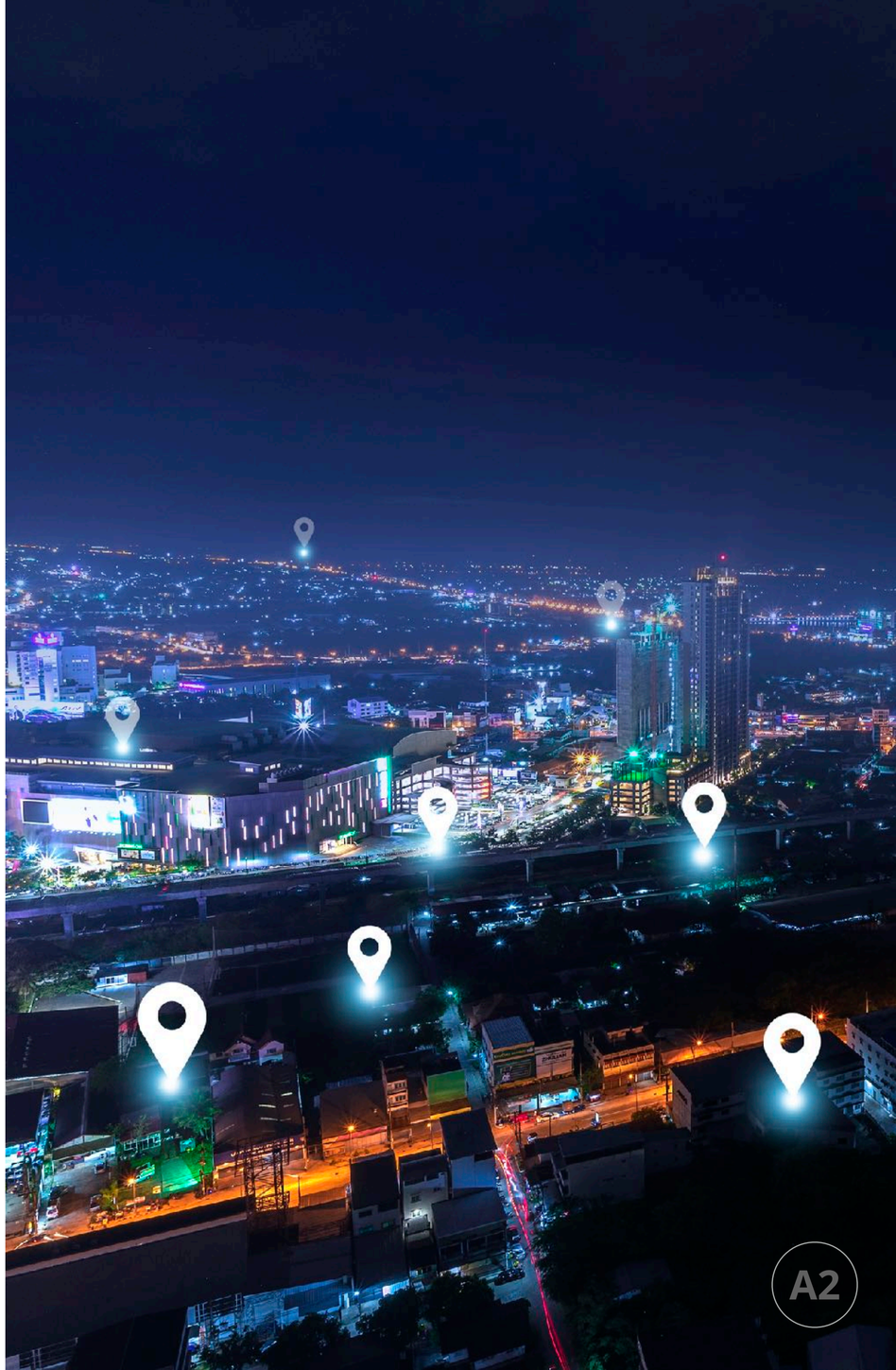
Other Internet users or ISPs
can query who is the legitimate
holder of a resource.

Can AS 3333 announce 193.0.0.0/24?

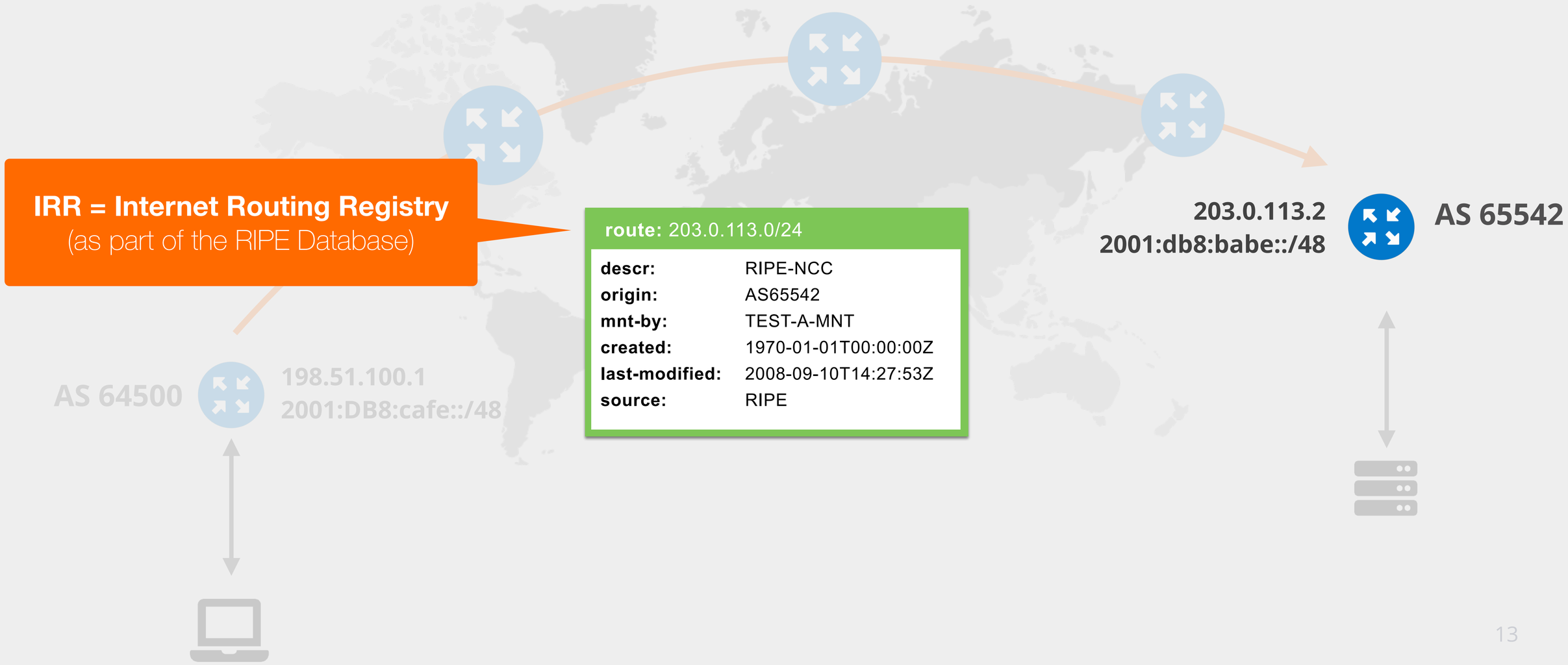
- **AS 3333** is assigned to the ORG-RIEN1-RIPE
- **193.0.0.0/24** is also assigned to ORG-RIEN1-RIPE

Please choose the correct answer.

1 min.



The prefix holder can create a ROUTE object!



For legitimate prefix holders…

Why is registering ROUTE objects **important** for the stability of the Internet?

Hint: which AS is allowed to announce **2001:67c:64::/48**?

Please choose your answer, and type in the answer for BONUS in the chat window.

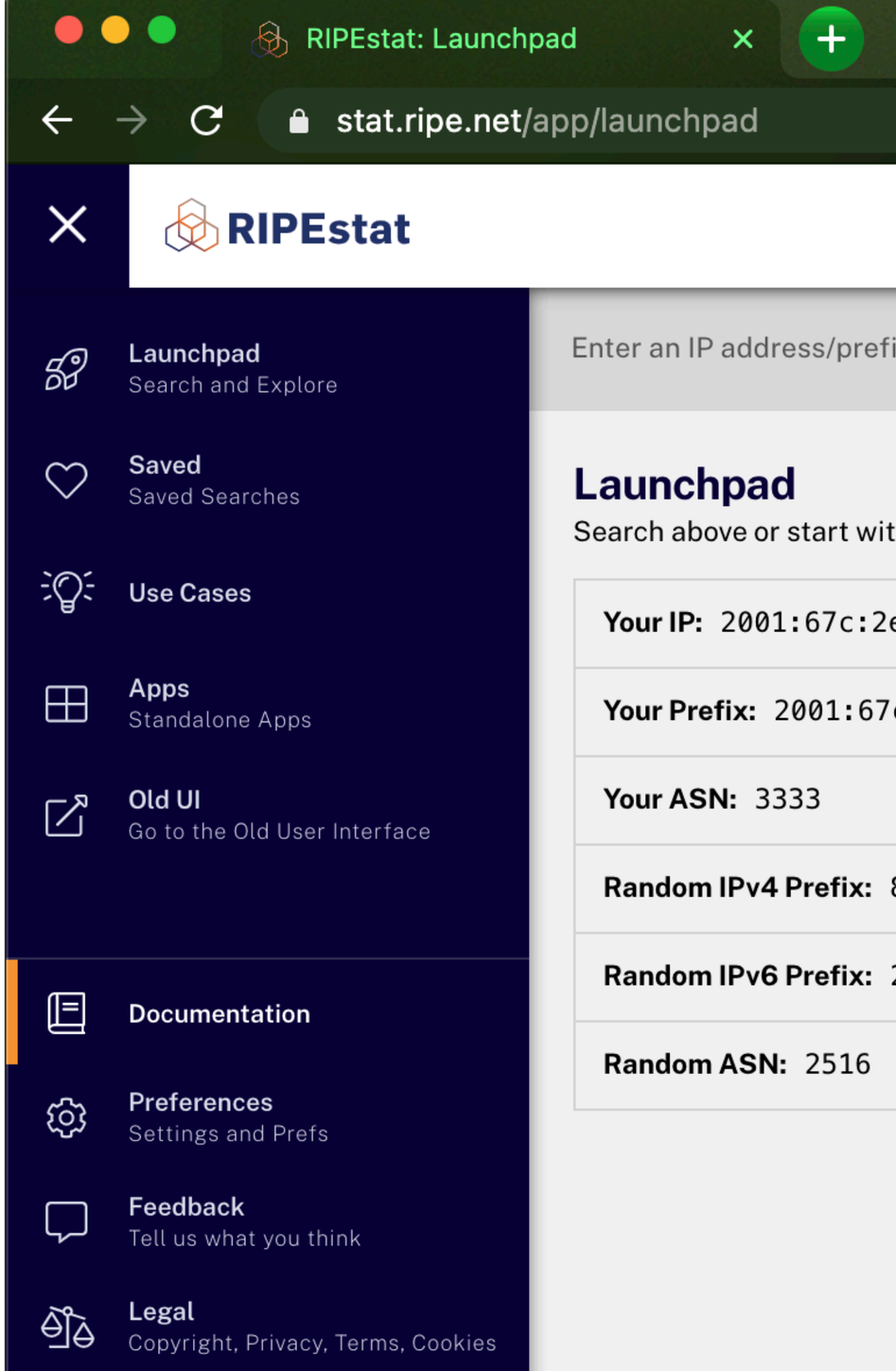
1 min.

A3

Let’s investigate a prefix

Which network shall we investigate?

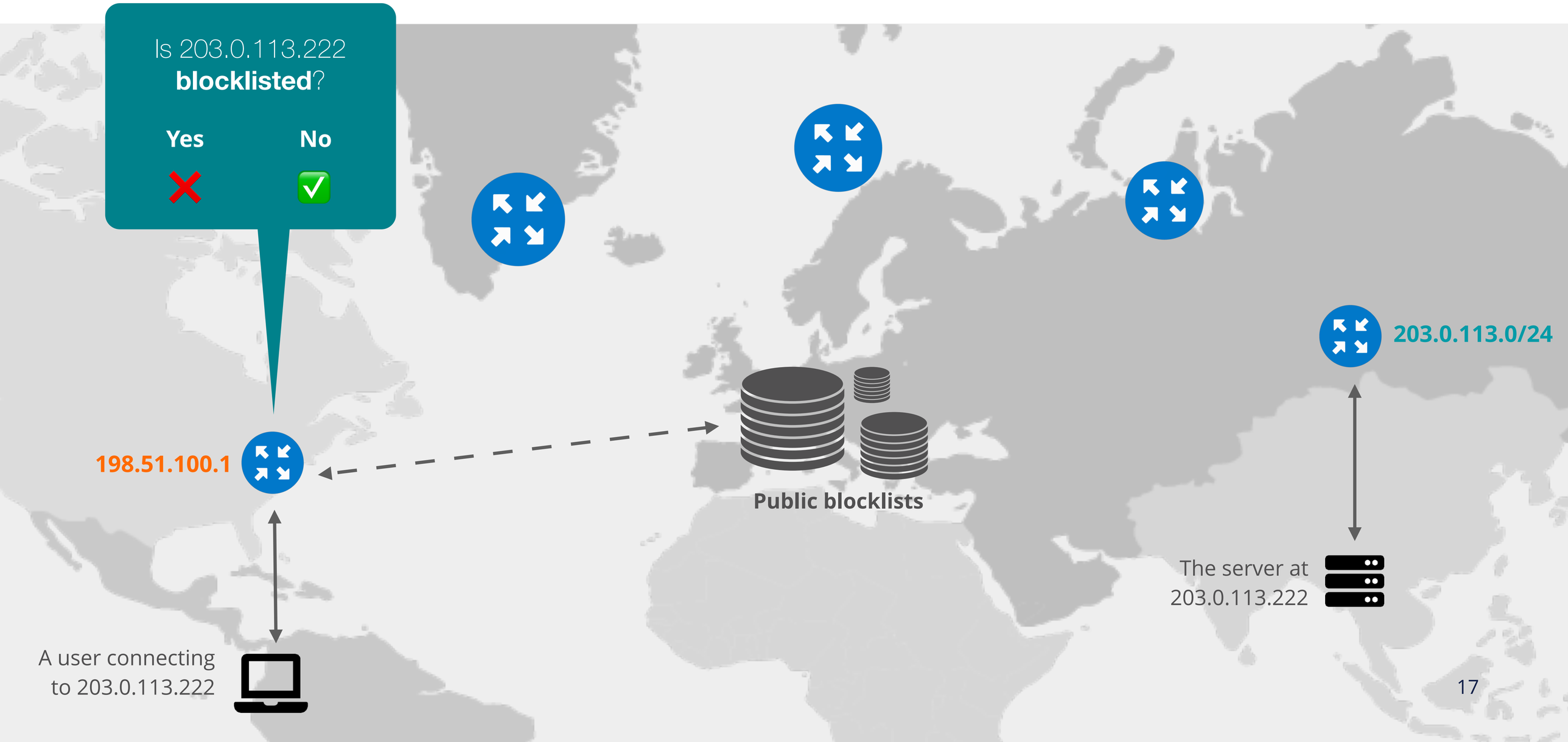
Demo



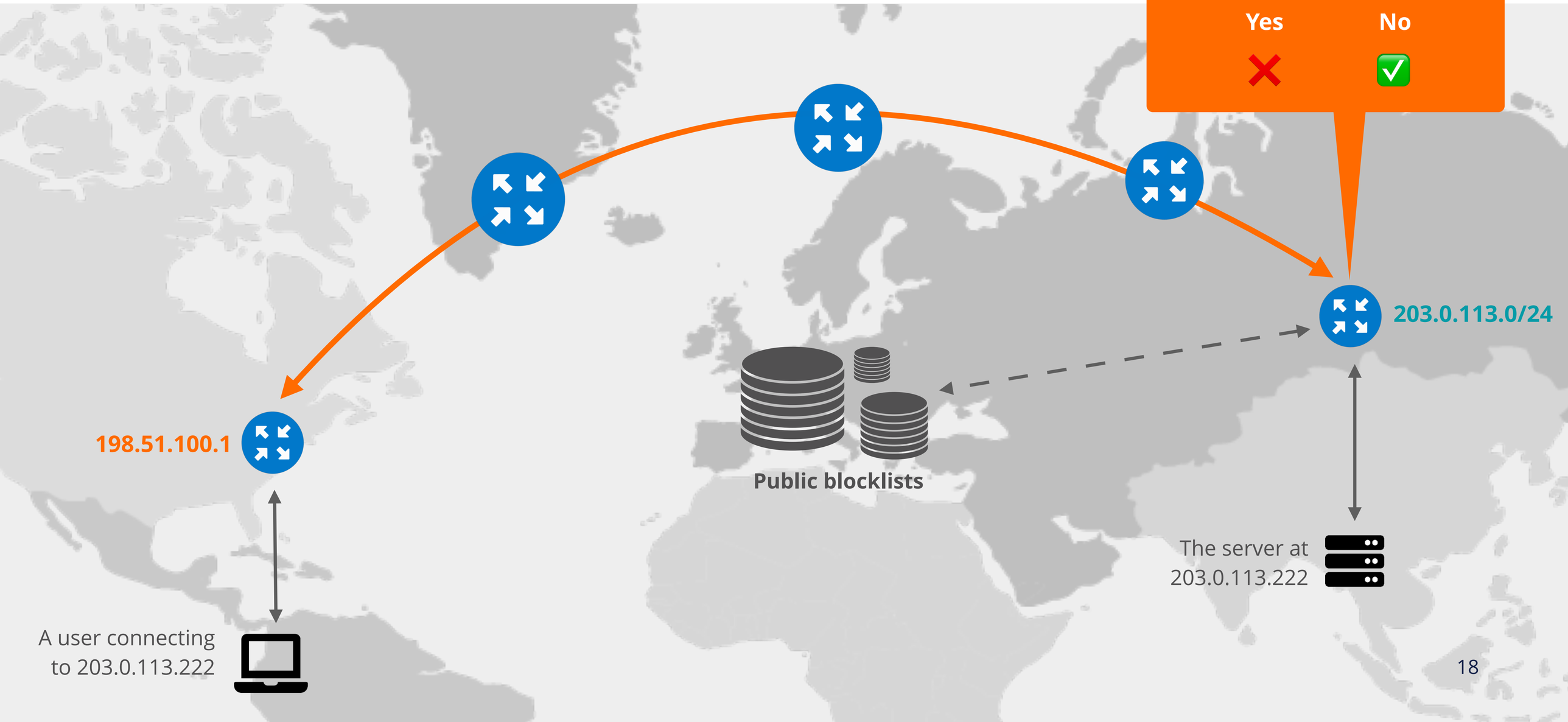
Our Focus: Blocklisting

Section 2 of 9

IP Blocklisting in Action



IP Blocklisting in Action



Tell us your experience

Have you ever **blocklisted anybody**, or were blocklisted **yourself**?

Please choose your answer, or type it in the chat window

1 min.

Blocklists can be private and public

1. Administrators have full control over a **private blocklist** (e.g. ACLs)
2. **Public blocklists** have different policies for how IPs/ASNs are added and removed

We're going to focus on **PUBLIC** blocklists

SPAMHAUS

spamcop.net

invaluement

CBL COMPOSITE BLOCKING LIST

SBL Advisory

XBL Advisory

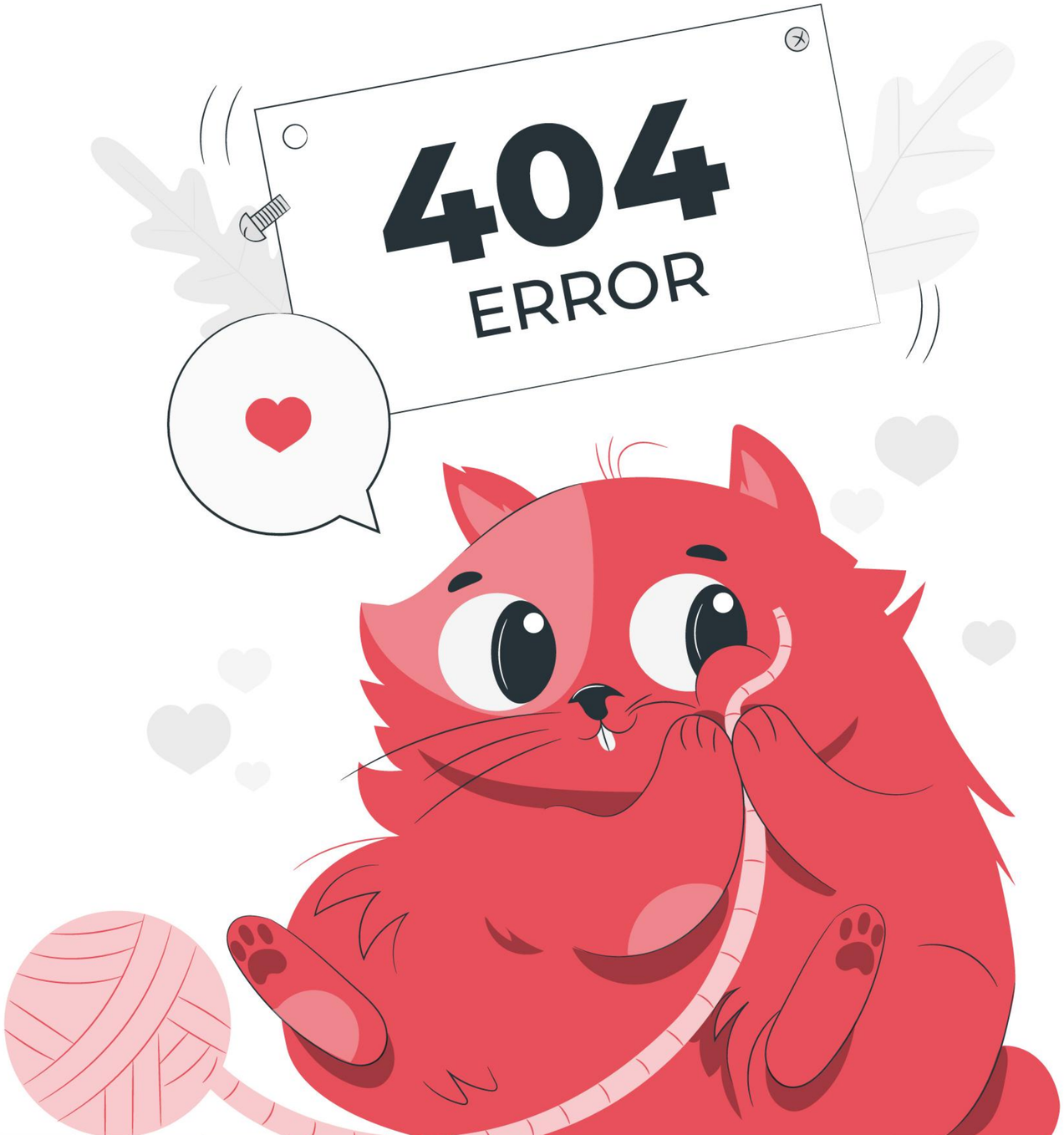
Return Path

Barracuda

Passive Spam Block List (**PSBL**)

.. and many more

So… How somebody might end up on a blocklist?



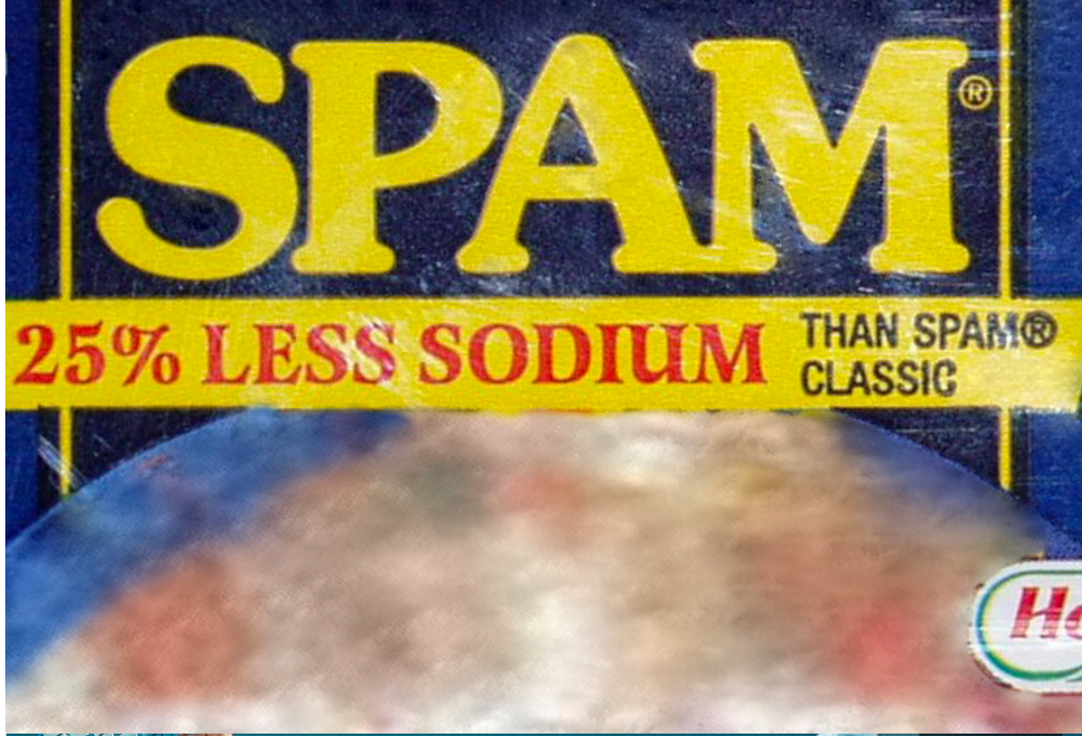
Reason #1: Spam

Section 3 of 9

What is Spam?

There are many names for **unsolicited** messages sent **in bulk by email**:

- Email **spam**
- **Junk** emails
- **UBE** = Unsolicited Bulk Email



Why spamming is unacceptable

- **Interferes** with the operation of the Internet
- Creates **unwanted traffic** for the recipients
- Creates **support overhead** for ISPs

There is no global framework regulating spamming.

What would you do?

You’re a system administrator of a small company with no extra budget to spend on IT.

One day, your colleagues start receiving **dozens of weird emails** from a foreign prince asking you for help to retrieve his fortune.

What would you do?

Please choose your answers, or type them in the chat window

1 min.

But the prince might have spoofed the sender’s IP address…

How would you check who is the **legitimate holder** of an IP address?

Please choose the correct options.

1 min.

A6

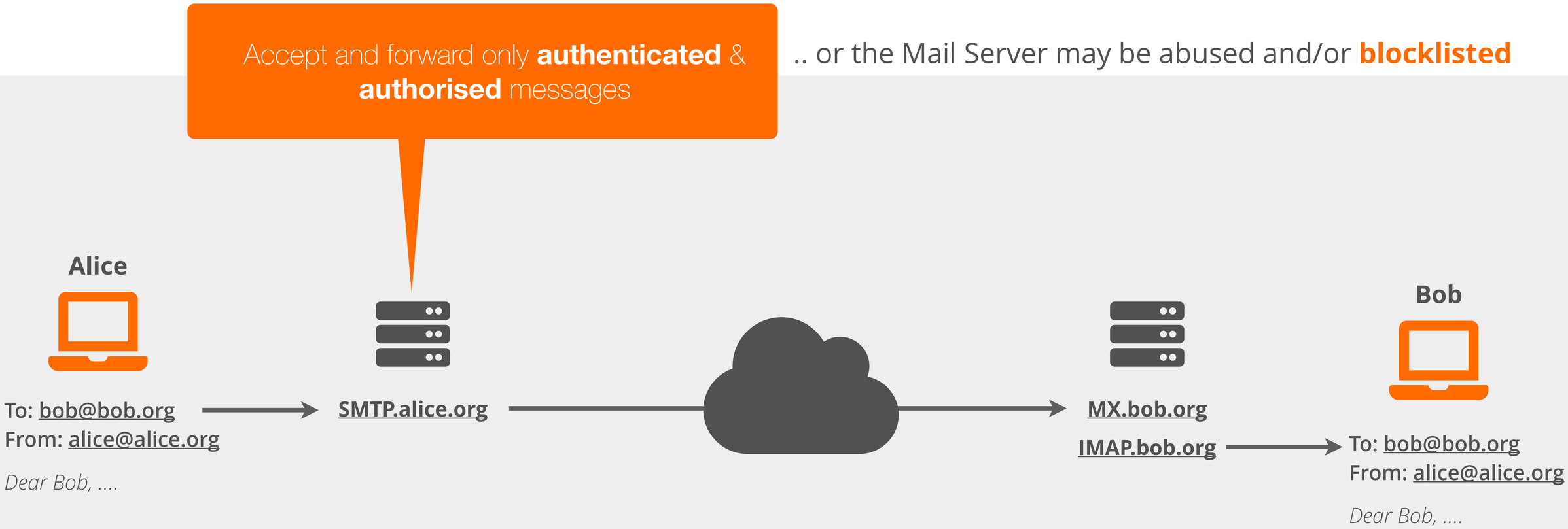
Reason #2: Misconfigurations

Section 4 of 9

Can wrongdoing be unintentional?

Open Mail Relay: anybody can abuse it!

- Open Mail Relays are NOT recommended by RFC 5321 (which defines SMTP)



Reason #3: Malware and Botnets

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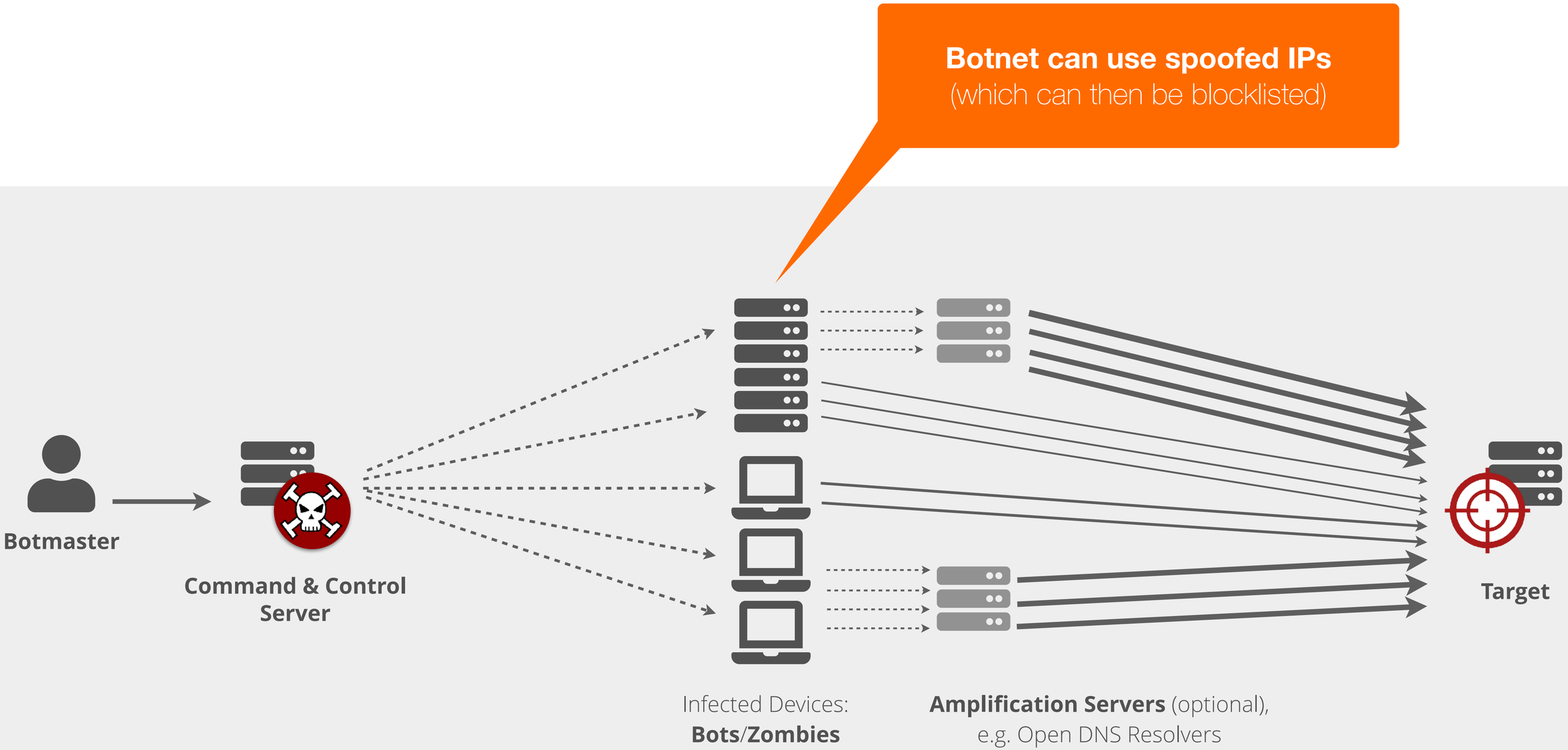
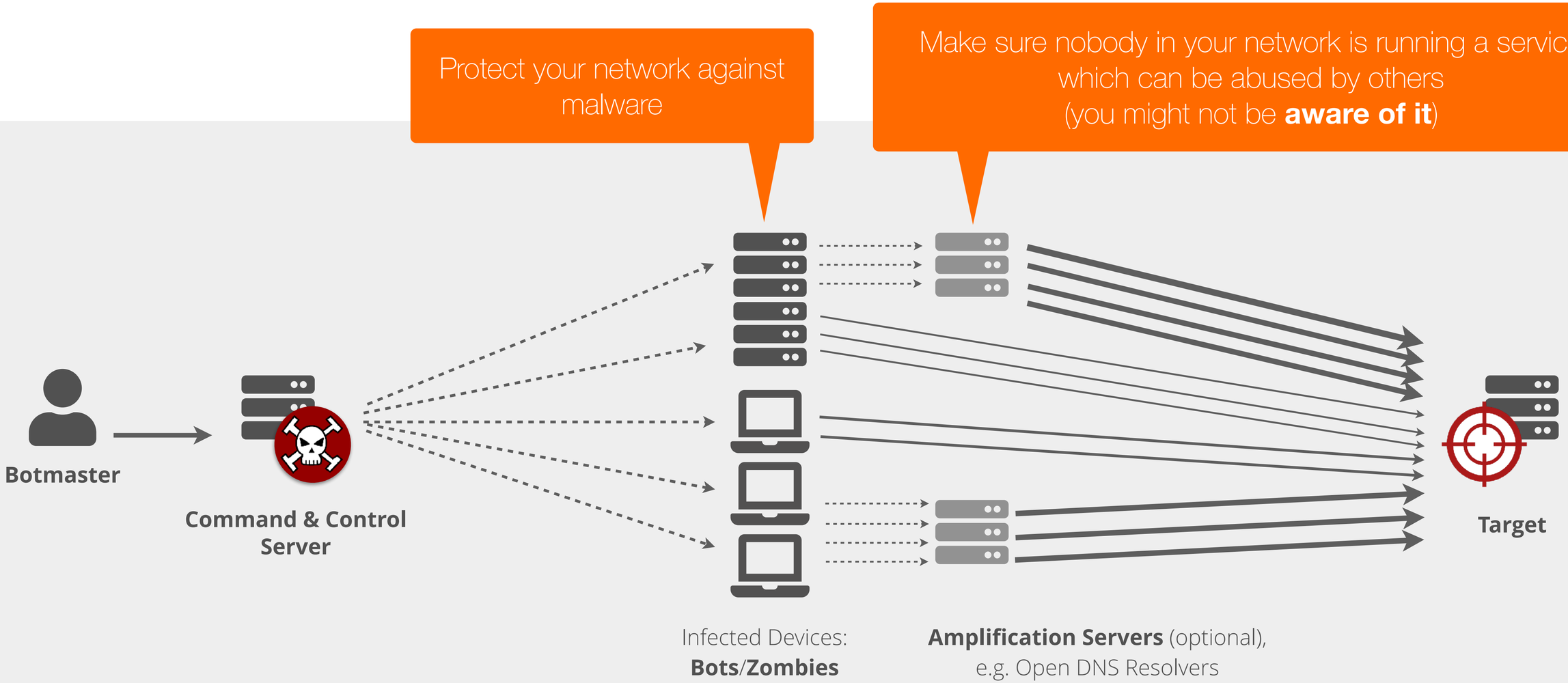
What is a botnet?



How to avoid being blocklisted?



What would you do..

.. if you were an ISP, and one of your customers insisted on running a service that could be **abused** by others?

Please choose your answer, or type in your answer in the chat widow

1 min.

```
⌥⌘1                    telnet
telnet ◂ -zsh

Last login: Wed May 19 15:15:52 on ttys000
user@computer-pro ~ % telnet smtp.example.com 25
Trying 192.168.100.25.
Connected to smtp.example.com.
Escape character is '^]'
220 smtp.example.com ESMTP Sendmail 8.12.9/8.12.9; Wed, 19 May 202
```

A7

Reason #4: Unwanted content, service or software

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Example: Open Mail Relay

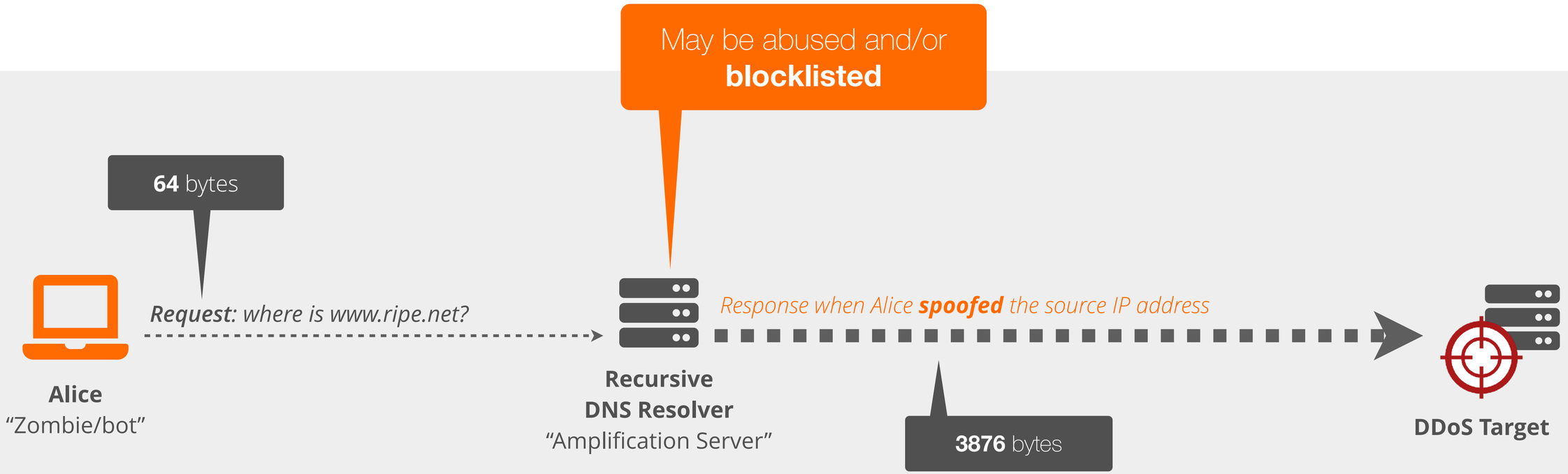
- .. is an SMTP server which allows **anybody** on the Internet to send emails through it

Can be abused by spammers!

- NOT recommended by RFC 5321 (defines SMTP)
- .. a valid reason for the server to be **blocklisted**

Example: Open Recursive DNS Resolver

- Can be used in a DNS amplification attack
- There are some public DNS servers: **1.1.1.1**, **8.8.8.8**, **2001:4860:4860::8888**

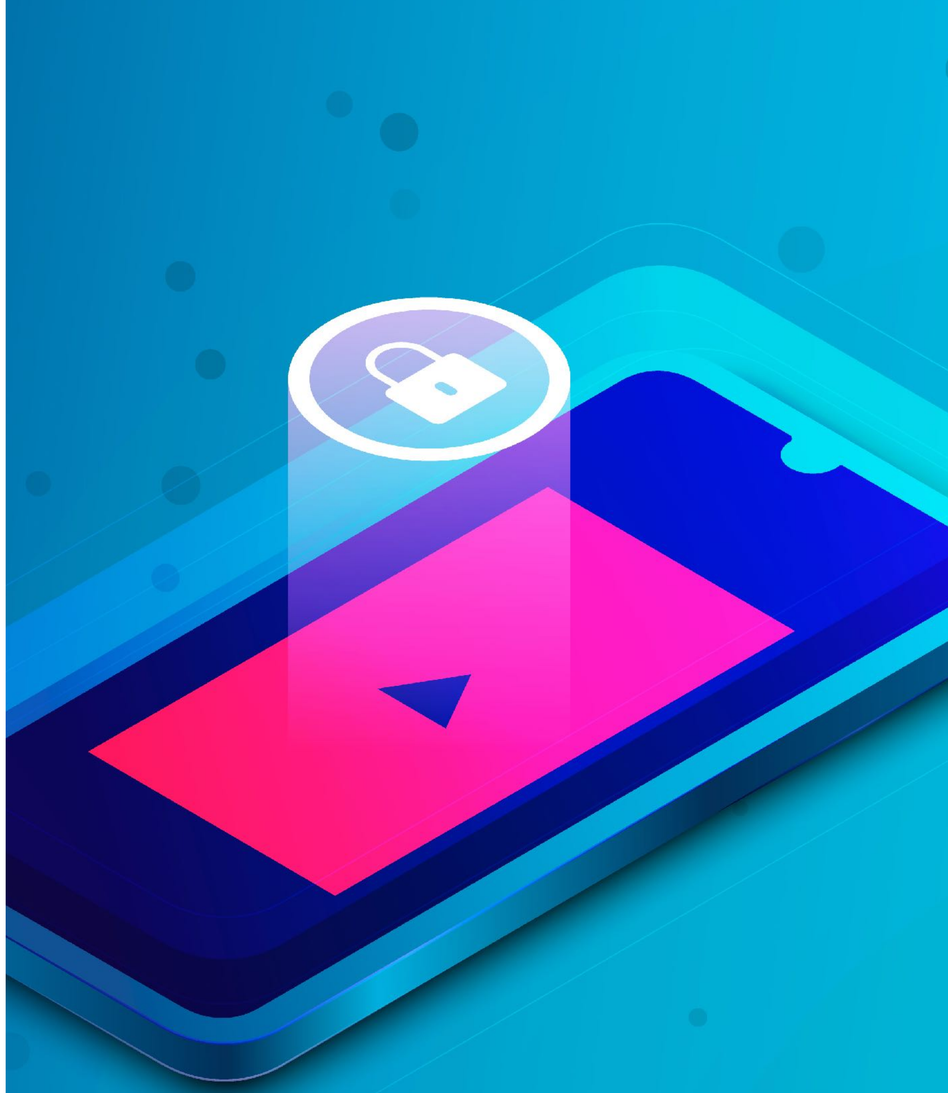


What can an ISP/LIR do...

.. to prevent IPs from being **blocklisted** due to undesirable content or services?

Please choose your answer, and share with us your experience in the chat window.

3 min.



Reason #5: IP prefix’s history

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You received a prefix …. there’re 2 options:

… all IPv4 prefixes come from **recycled** space

or

… as a receiving LIR you might want to **investigate the prefix** before signing off the transfer

Previous holder’s actions may lead to your IP’s being **blocklisted**

How IP addresses are quarantined at the RIPE NCC

Step 1: **De-registration** → all related RIPE Database objects deleted, ROAs cleared

Step 2: **Quarantine** → for six months or as long as the space is globally routed

Step 3: **Allocation to a new LIR**

What exactly the RIPE NCC is doing during de-registration:
https://www.ripe.net/manage-ips-and-asns/resource-management/quarantine-for-returned-internet-number-resources

Resource Quality Assurance before re-allocating IP prefixes:
https://www.ripe.net/manage-ips-and-asns/resource-management/ripe-ncc-resource-quality-assistance

Use RIPEstat for transfers

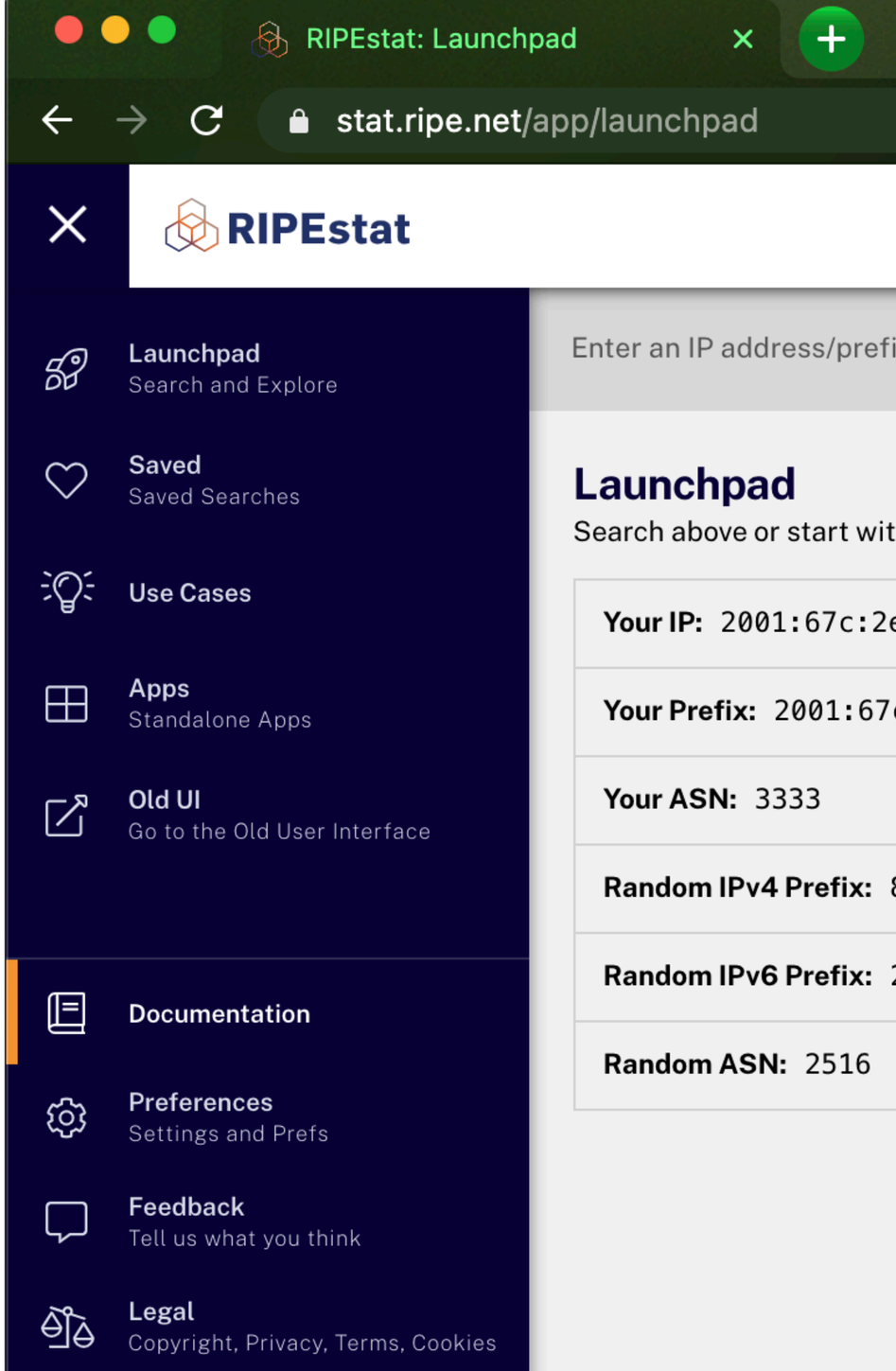
One of the services to use when investigating **the previous usage** of a prefix or ASN:

- Who was the legitimate holder in the past?
- Who was announcing the prefix in the past?

...

But there is **NO GUARANTEE**
that no changes will be detected after the transfer,
or after you just finished investigating

Demo



Questions

How to prevent IPs and ASNs from being blocklisted

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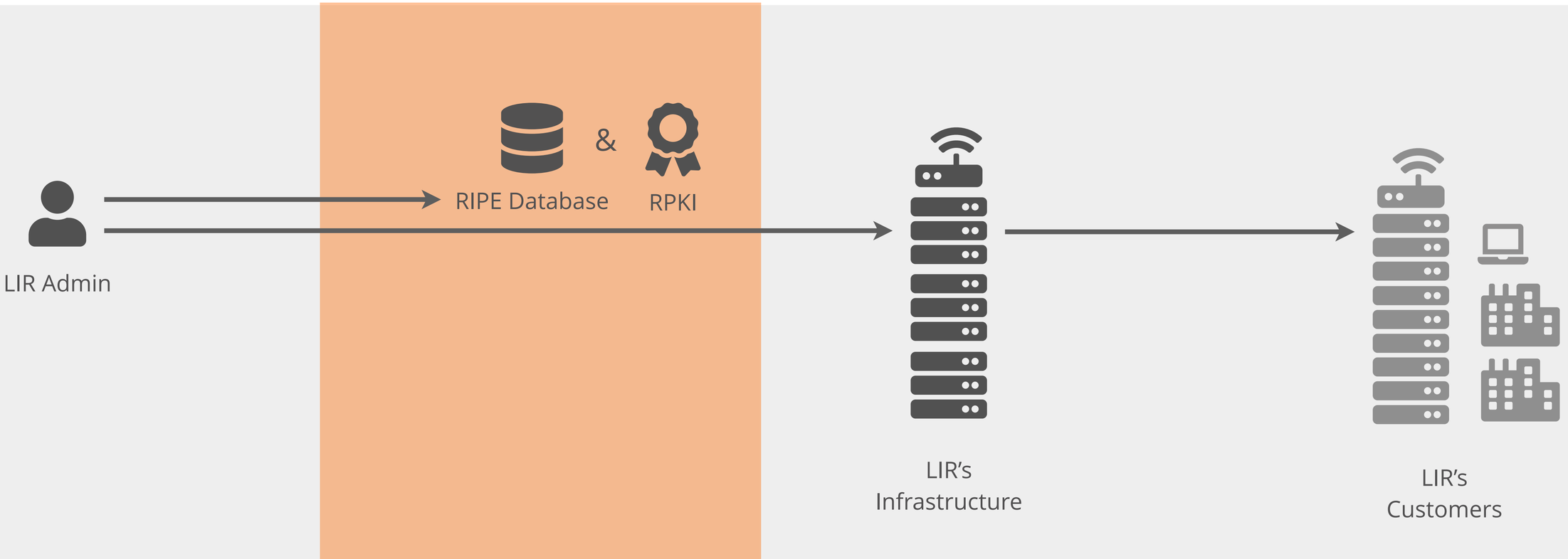
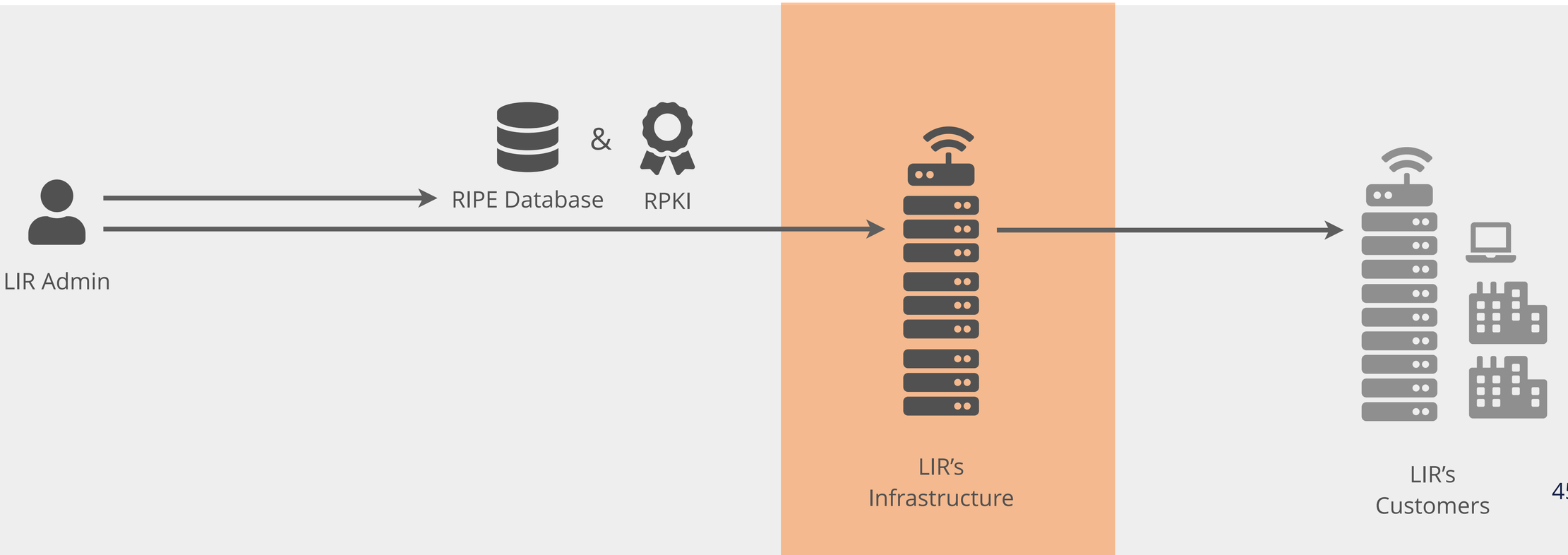
1. Know your infrastructure and customers

- Separate prefixes used for different services/networks/customers
- Separate the LIR’s prefix from the customer’s resources



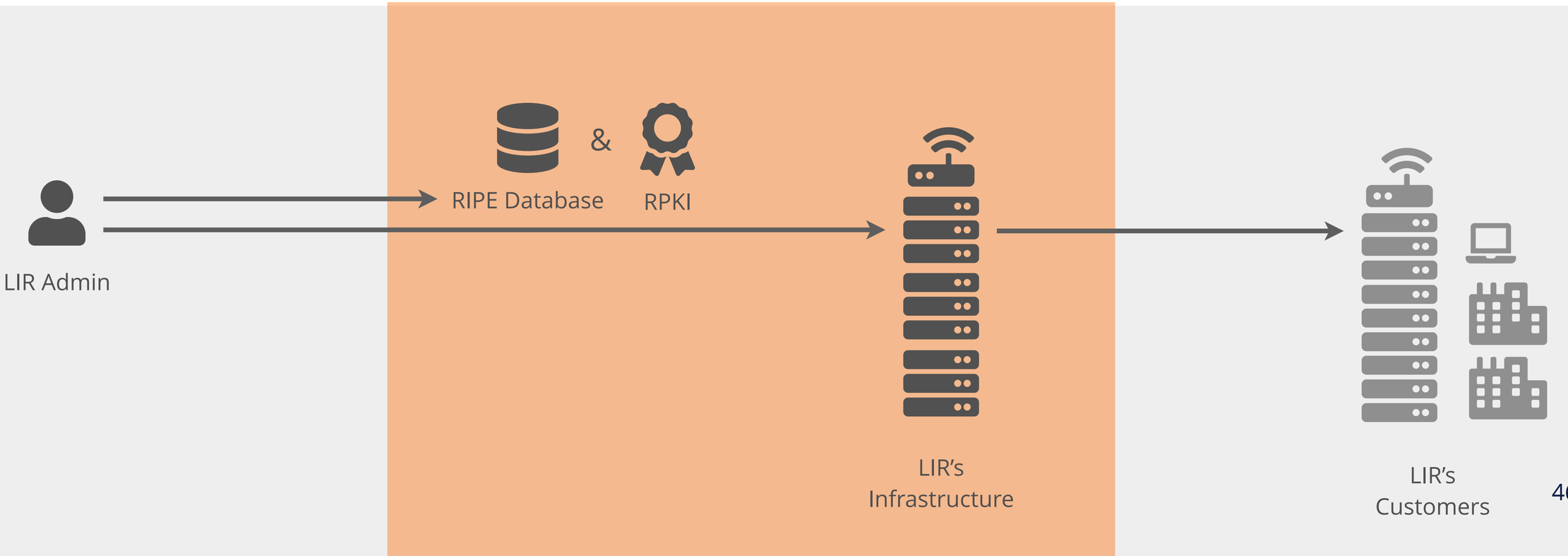
2. Implement proper security measures

- Follow RFC 5321 for mail servers
- Do not operate open DNS resolvers if possible
- Implement measures against amplification attacks, e.g. response rate-limiting



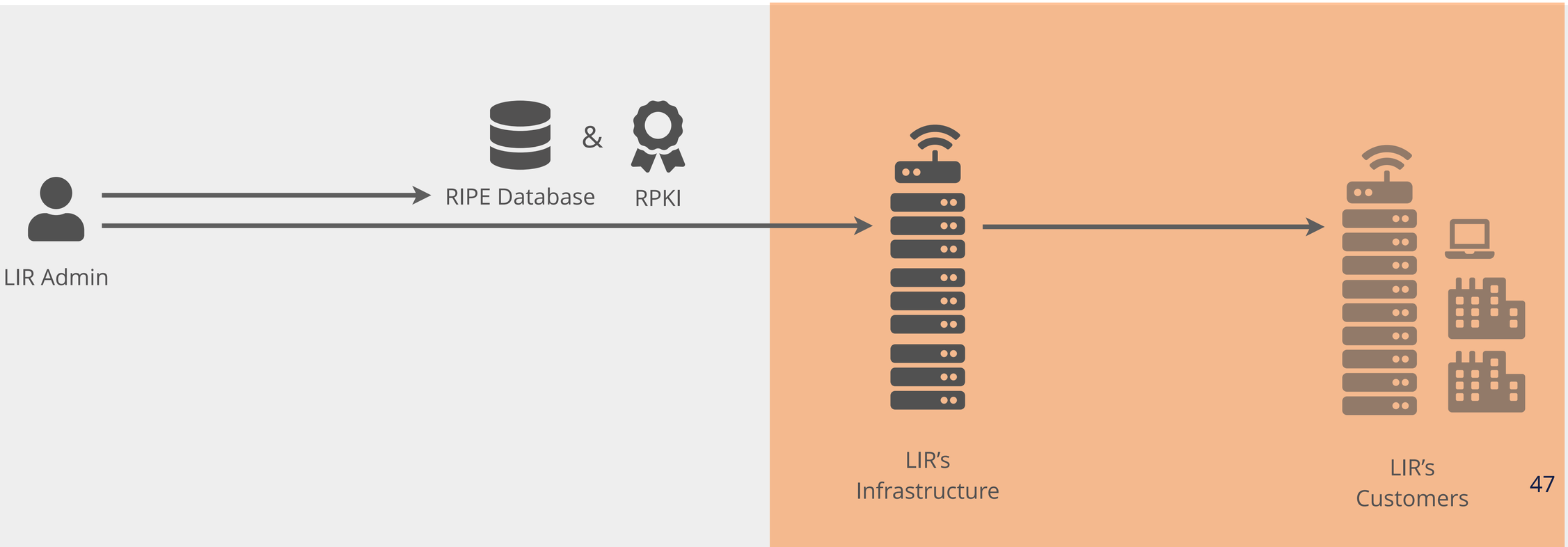
3. Prevent address space hijacking

- Maintain RIPE Database objects and keep them **up-to-date**
- Create **ROAs** for your prefixes
- Detect spoofed IP addresses in the ingress traffic: implement **BCP-38**



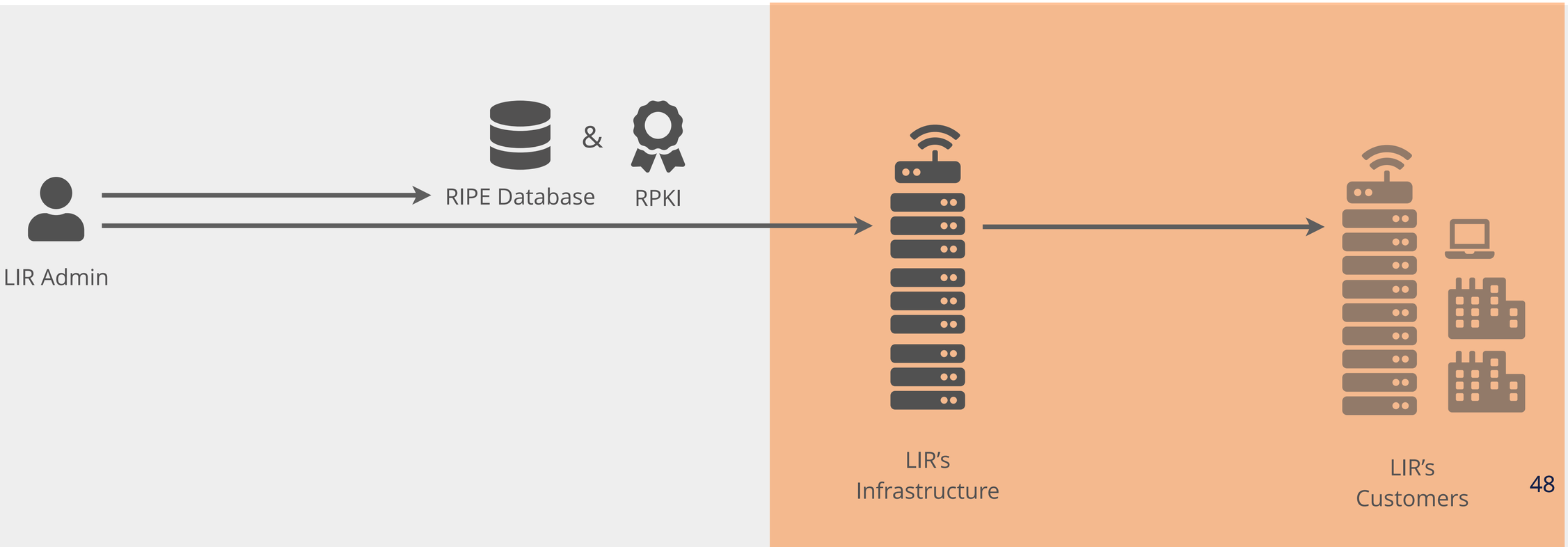
4. Investigate the prefix

- Investigate how the prefix was used in the past before assigning it to a critical service



5. Monitor your reputation

- **Monitor** how your prefixes are used
- Look for **abnormalities** in the traffic



How to prevent your IPs from being blocklisted:

What is **the most important** measure?

Please choose an option or type in your answer in the chat window.

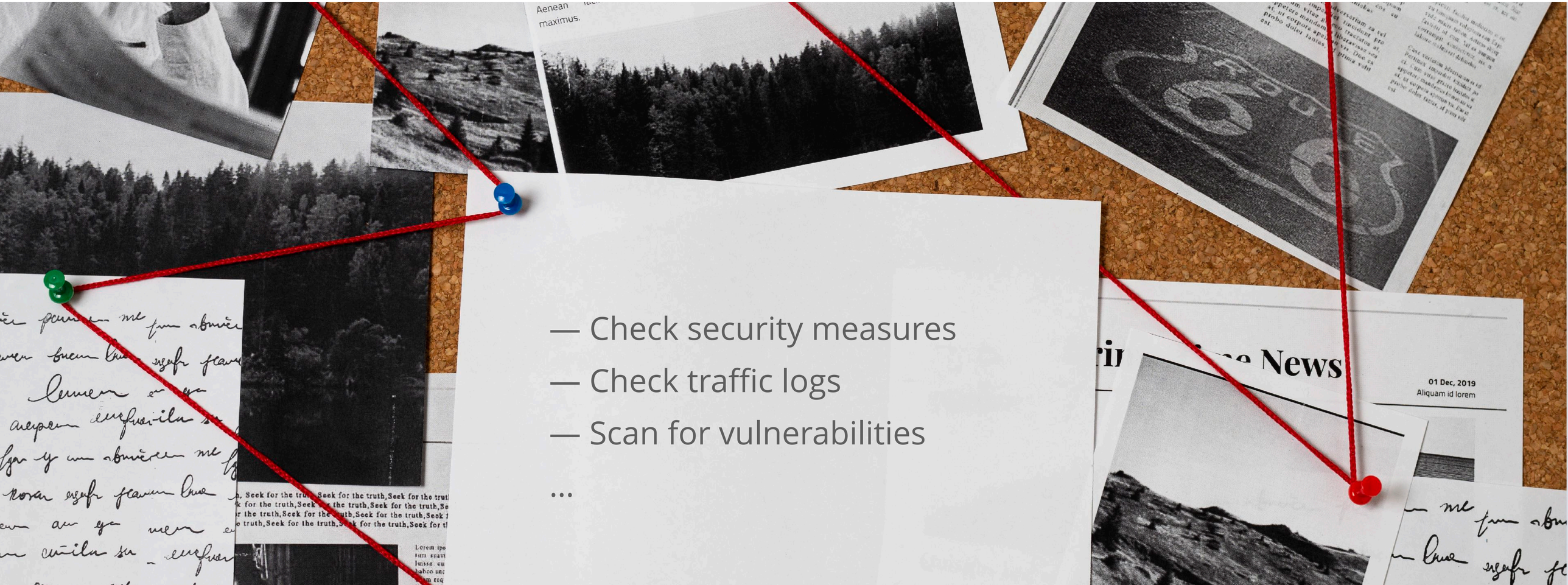
1 min.

How to remove IPs and ASNs from blocklists

Section 9 of 9

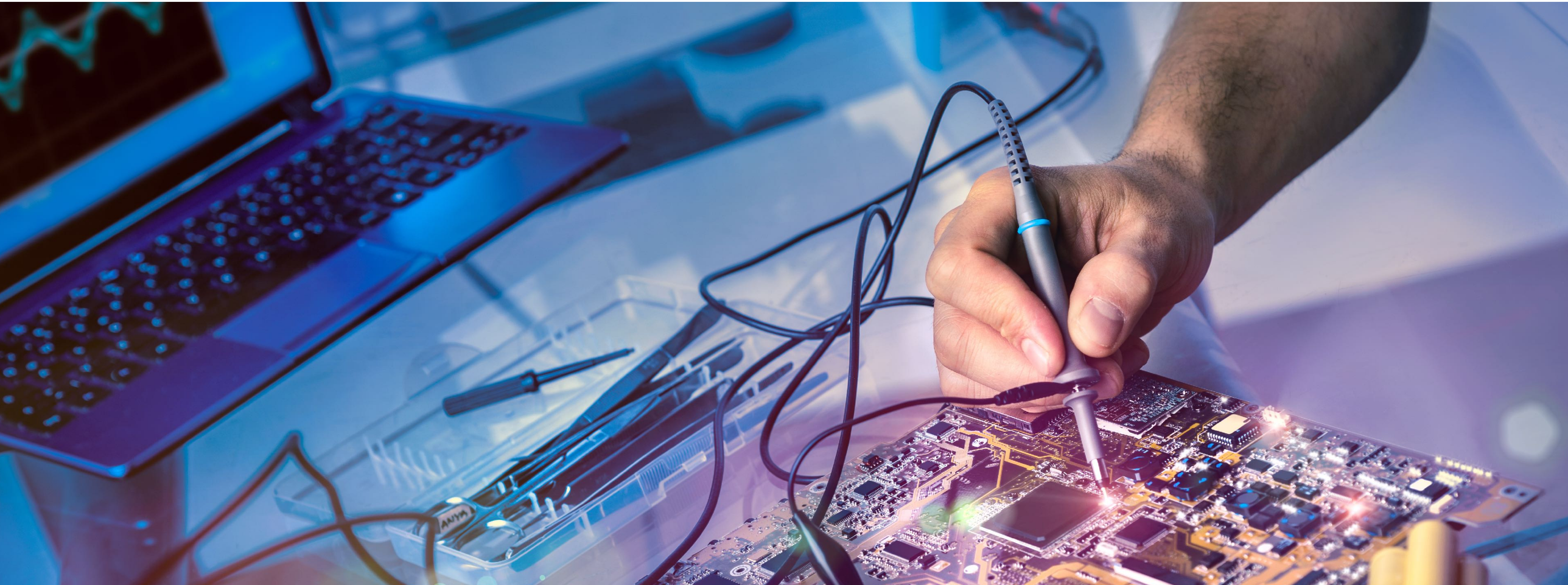
1. Don’t panic, investigate first

Find out **where** you’re blocklisted, and **for what**.



2. Take care of the reasons and contact blocklists

Remove malware, fix misconfiguration, etc, and **explain** to blocklists what was done.



How to remove your IPs from public blocklists:

What is **the most challenging** thing to do?

Please choose an option or type in your answer in the chat window.

1 min.

Wrap-Up

1. Stay **up-to-date**: sign up for mailing lists
2. **Know** the services you and your customers are providing
3. Implement **security measures** for infrastructure and services
4. Create and update assignments in the **RIPE Database**
5. Prevent address space hijacking: use BGP security measures for your prefixes

Questions

We want your feedback!

What did you think about this session? Take our survey at:

https://www.ripe.net/feedback/ip-blocklisting-basics

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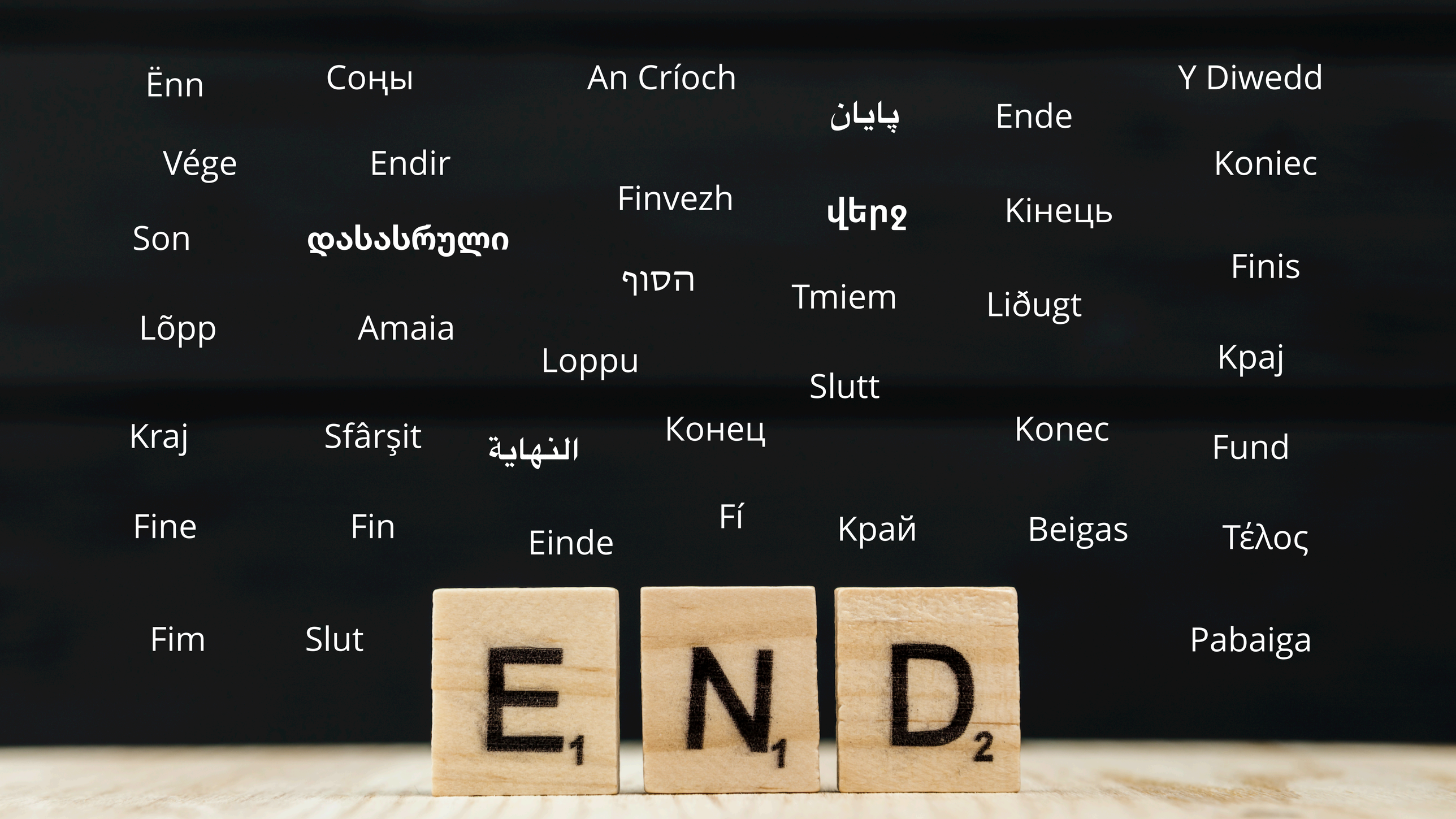
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Konec
Fund
Fine
Fin
Einde
Fí
Край
Beigas
Τέλος
Fim
Slut
Pabaiga
E1 N1 D2

Fighting Spam

Good Practice In Minimising Email Abuse: https://www.ripe.net/publications/docs/ripe-409

The History of Spam: https://www.internetsociety.org/wp-content/uploads/2017/08/History20of20Spam.pdf

Combating Spam: Policy, Technical and Industry Approaches: https://www.internetsociety.org/resources/doc/2012/combating-spam-policy-technical-and-industry-approaches/

Anti-Spam Recommendations for SMTP MTAs: https://datatracker.ietf.org/doc/html/rfc2505

Email Submission Operations: Access and Accountability Requirements (BCP-134): https://datatracker.ietf.org/doc/html/rfc5068

Botnets Prevention

Botnet Remediation Overview & Practices: https://www.internetsociety.org/wp-content/uploads/2017/10/ota_2013_botnet_remediation_best_practices.pdf

Preventing Use of Recursive Nameservers in Reflector Attacks (BCP-140): https://www.ietf.org/rfc/rfc5358.txt

Prevent hijacking

Maintain the RIPE DB objects up-to-date: https://apps.db.ripe.net/db-web-ui/myresources/overview

Create ROAs: https://my.ripe.net/#/rpki

Network Ingress Filtering: Defeating Denial of Service Attacks which employ IP Source Address Spoofing (BCP-38): https://www.rfc-editor.org/info/bcp38

Join the MANRS: https://www.manrs.org/isps/

RIPE NCC procedures

Reusing Recovered Internet Number Resources:
https://www.ripe.net/manage-ips-and-asns/resource-management/quarantine-for-returned-internet-number-resources

Resource Quality Assurance before re-allocating IP prefixes:
https://www.ripe.net/manage-ips-and-asns/resource-management/ripe-ncc-resource-quality-assistance

Useful tools for investigation

RIPEstat Historical Whois: https://stat.ripe.net/widget/historical-whois

RIPEstat Allocation History: https://stat.ripe.net/widget/allocation-history

RIPEstat Routing History: https://stat.ripe.net/widget/routing-history

Transfer Statistics: https://www.ripe.net/manage-ips-and-asns/resource-transfers-and-mergers/transfer-statistics

Anti-Abuse Working Group (WG): https://www.ripe.net/participate/ripe/wg/active-wg/anti-abuse

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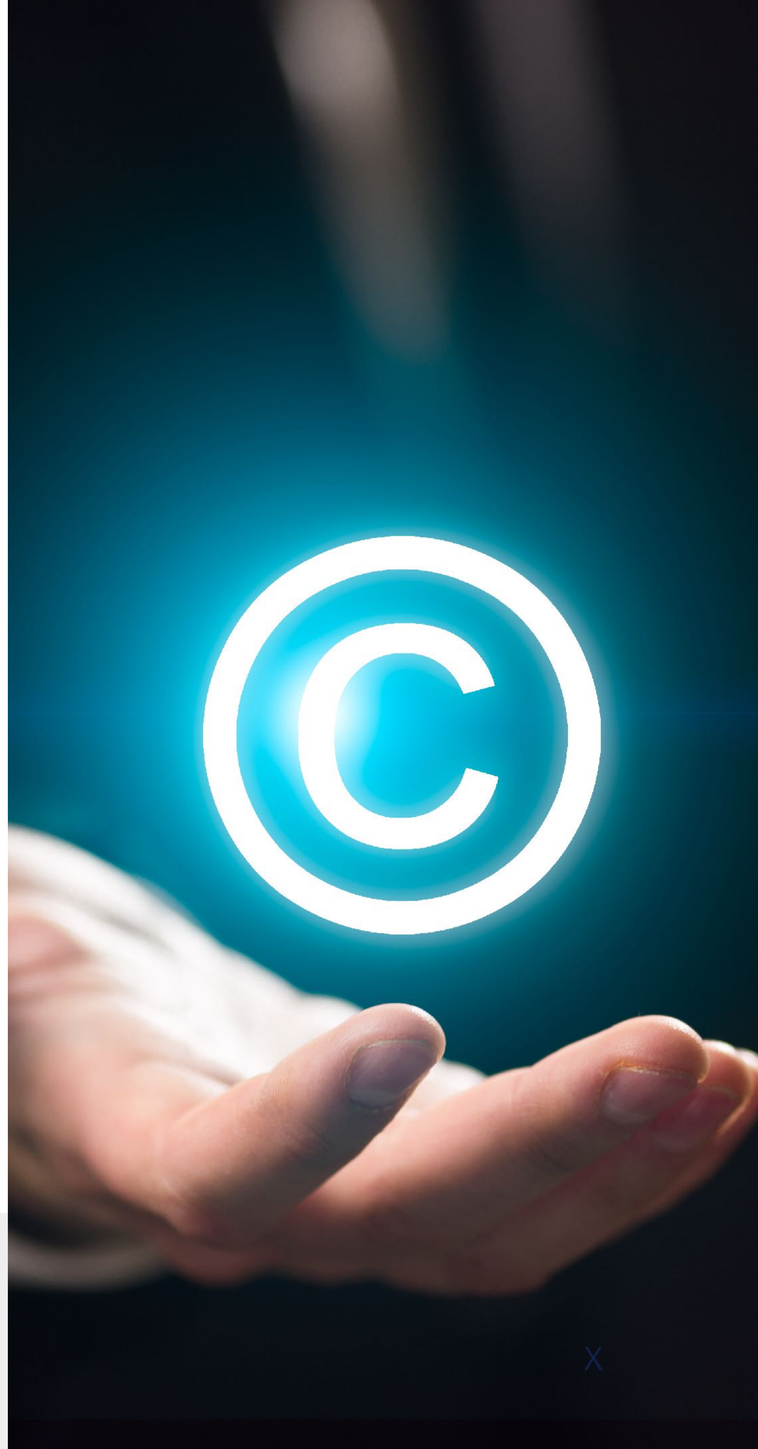

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