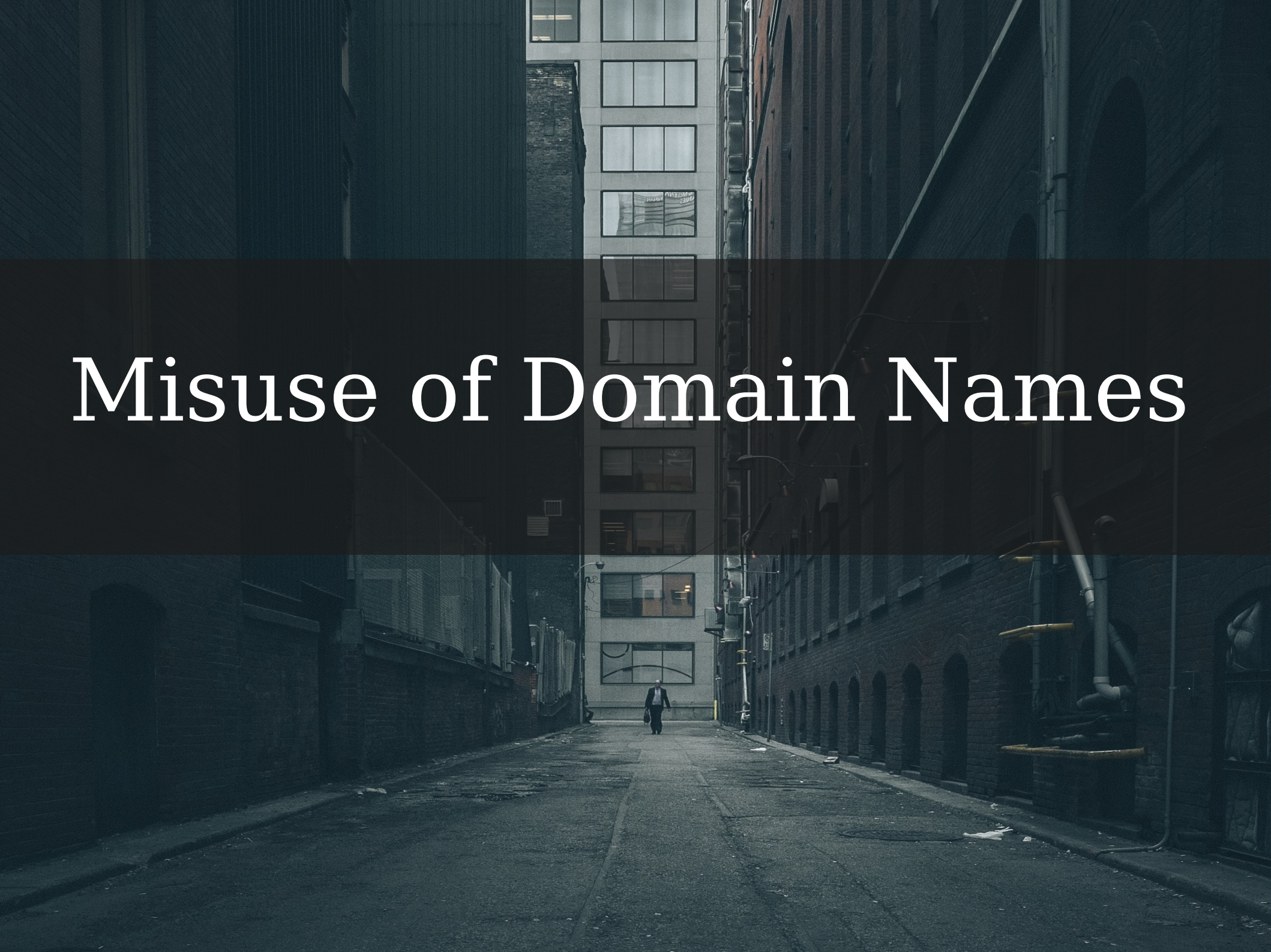
SIDEKICK

Suspicious Domain Classification

Master Thesis
at SIDN
by Moritz Mueller

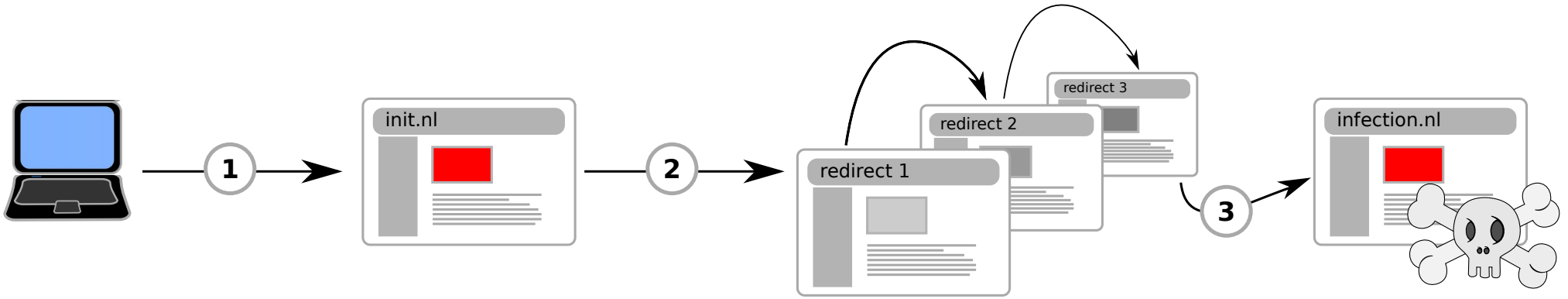
Agenda

- Misuse of Domain Names
- Malicious domains in .nl
- Malicious Domain Characteristics
- What does SIDEKICK do?
- Outlook



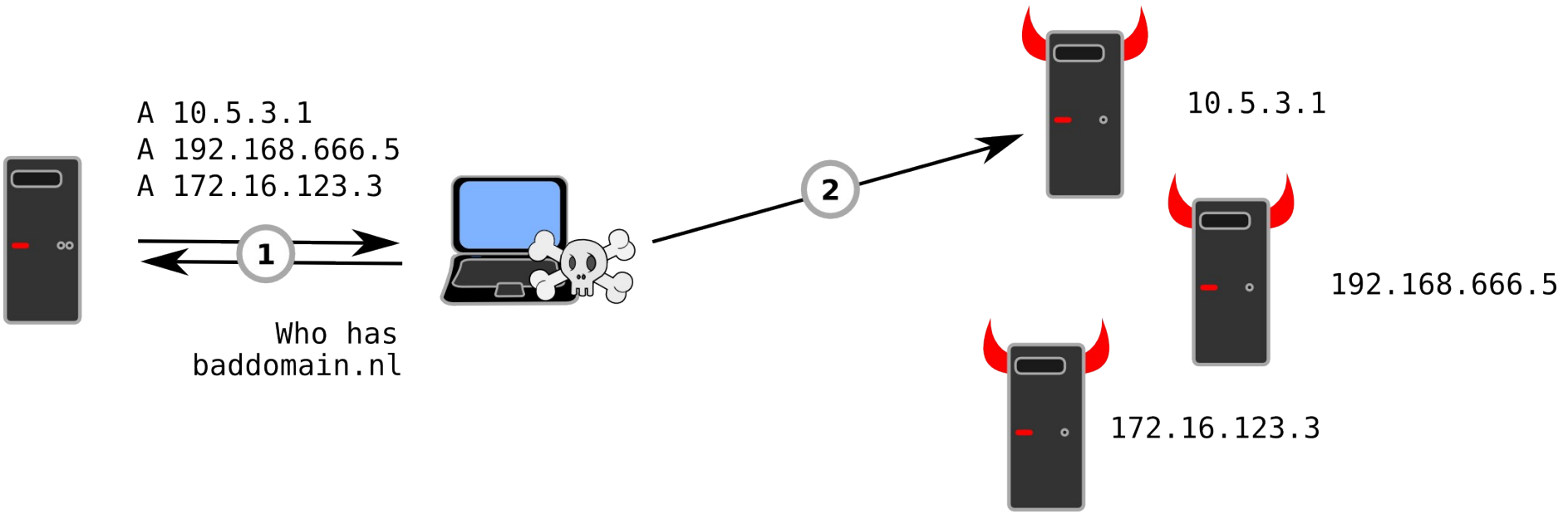
Misuse of Domain Names

Redirection, Exploitation, Infection



Exploit Kit Infection Chain

Command and Control



C&C Address Resolution and Communication

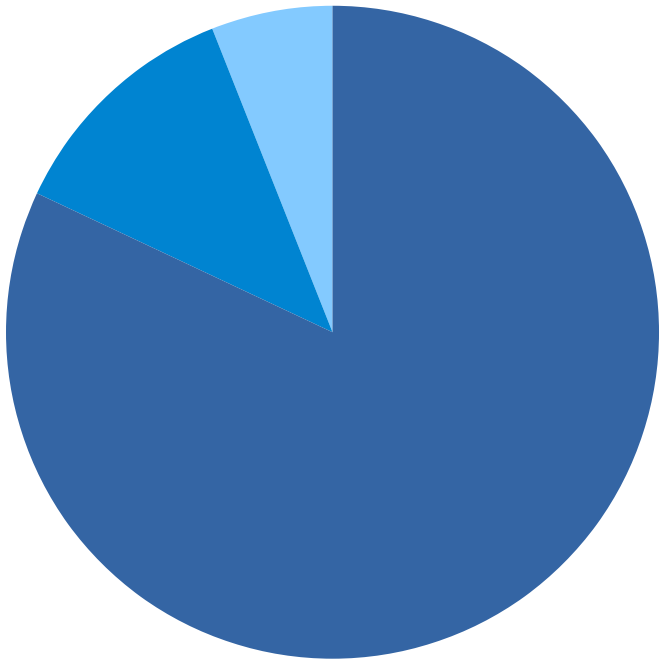
Motivation for SIDN

TRUST

REPUTATION

OVERAL INTERNET SECURITY

Phishing

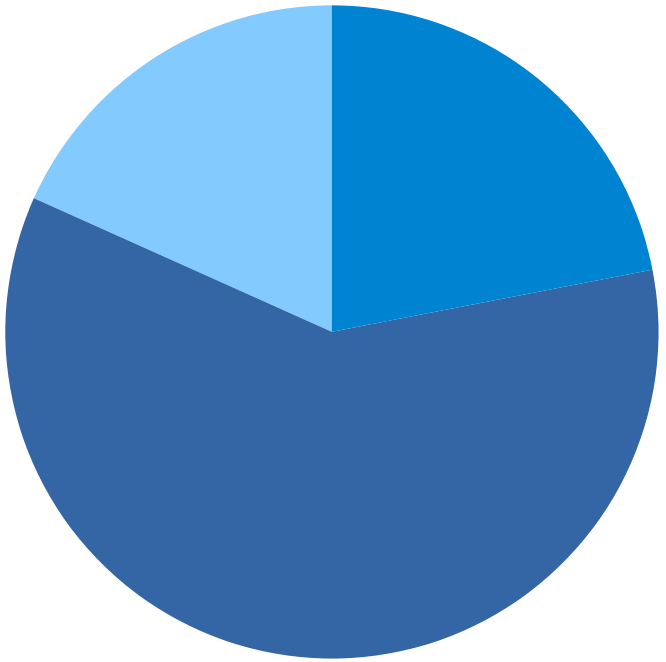


1.923 domains

- one week or younger
- between one week and one year
- one year or older

Age of .nl phishing domains

Botnets



82 domains

Sinkhole

Other Sources

Quarantainenet

Known Botnet Domains

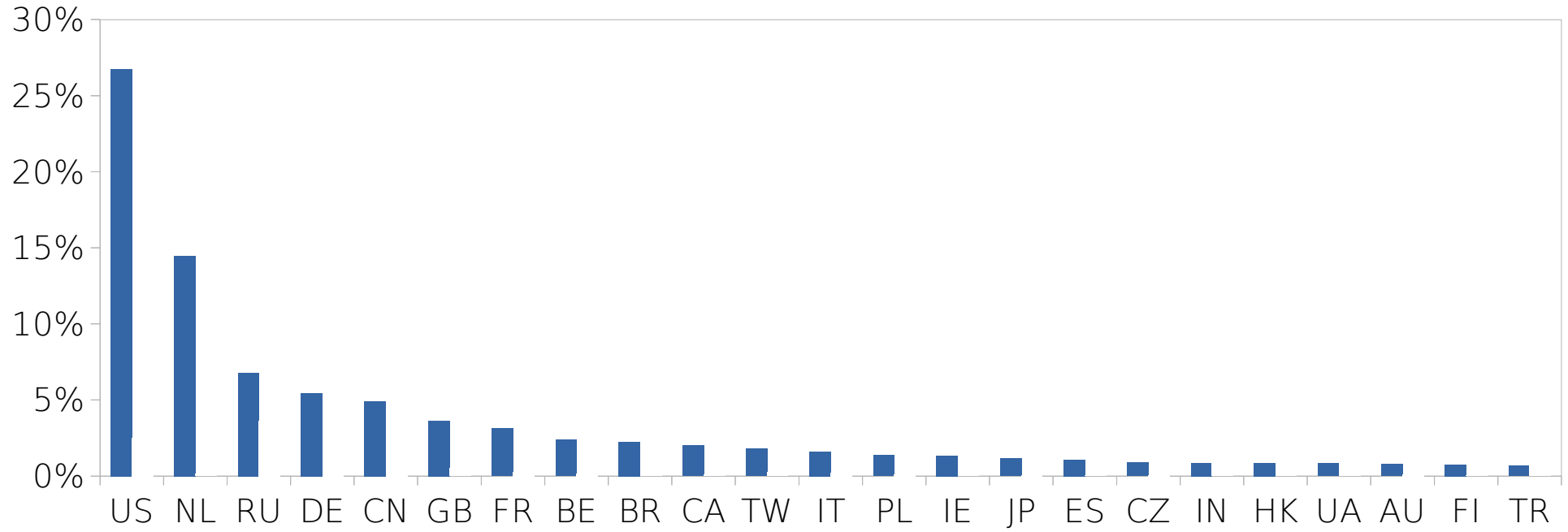

Malicious Domain
Characteristics

Geographic Characteristics

95,5 % Dutch registrants

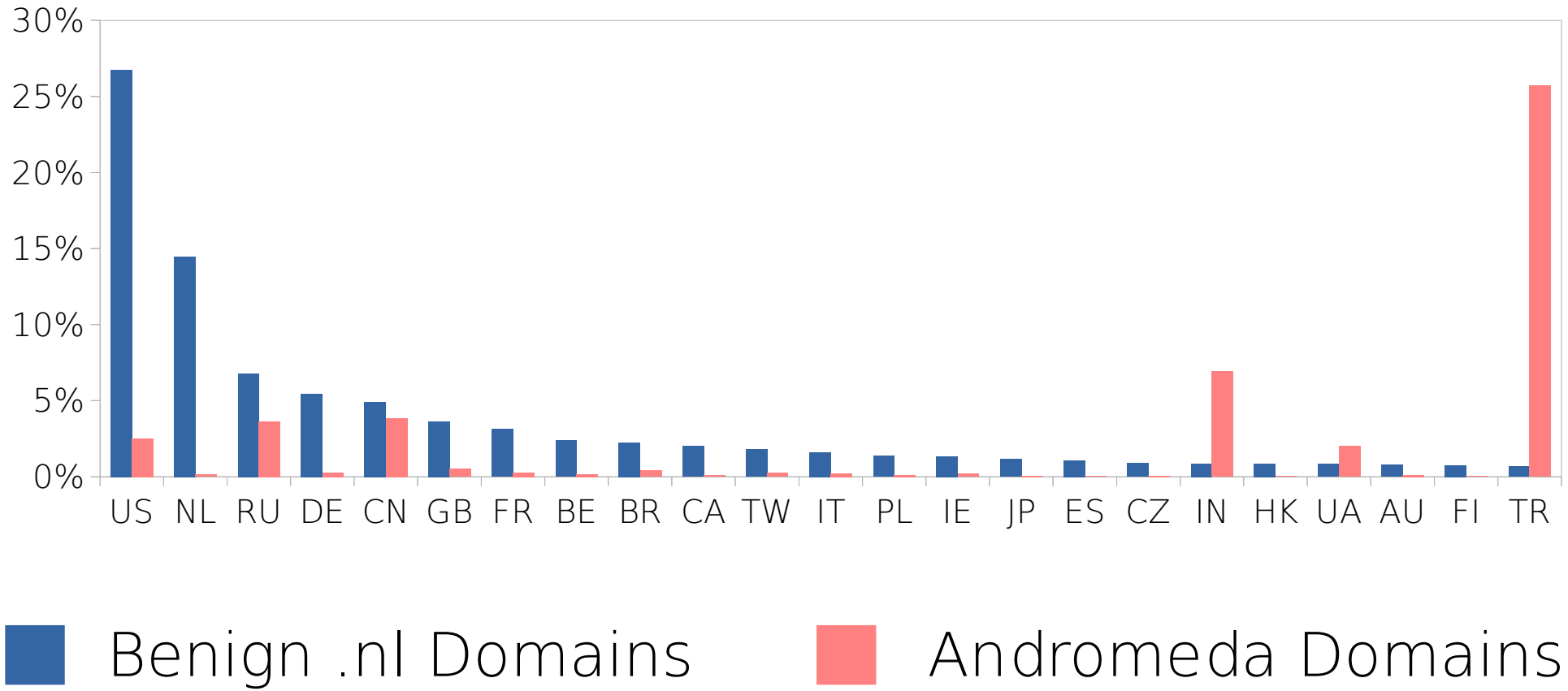
88,5 % Dutch content

Query Origin

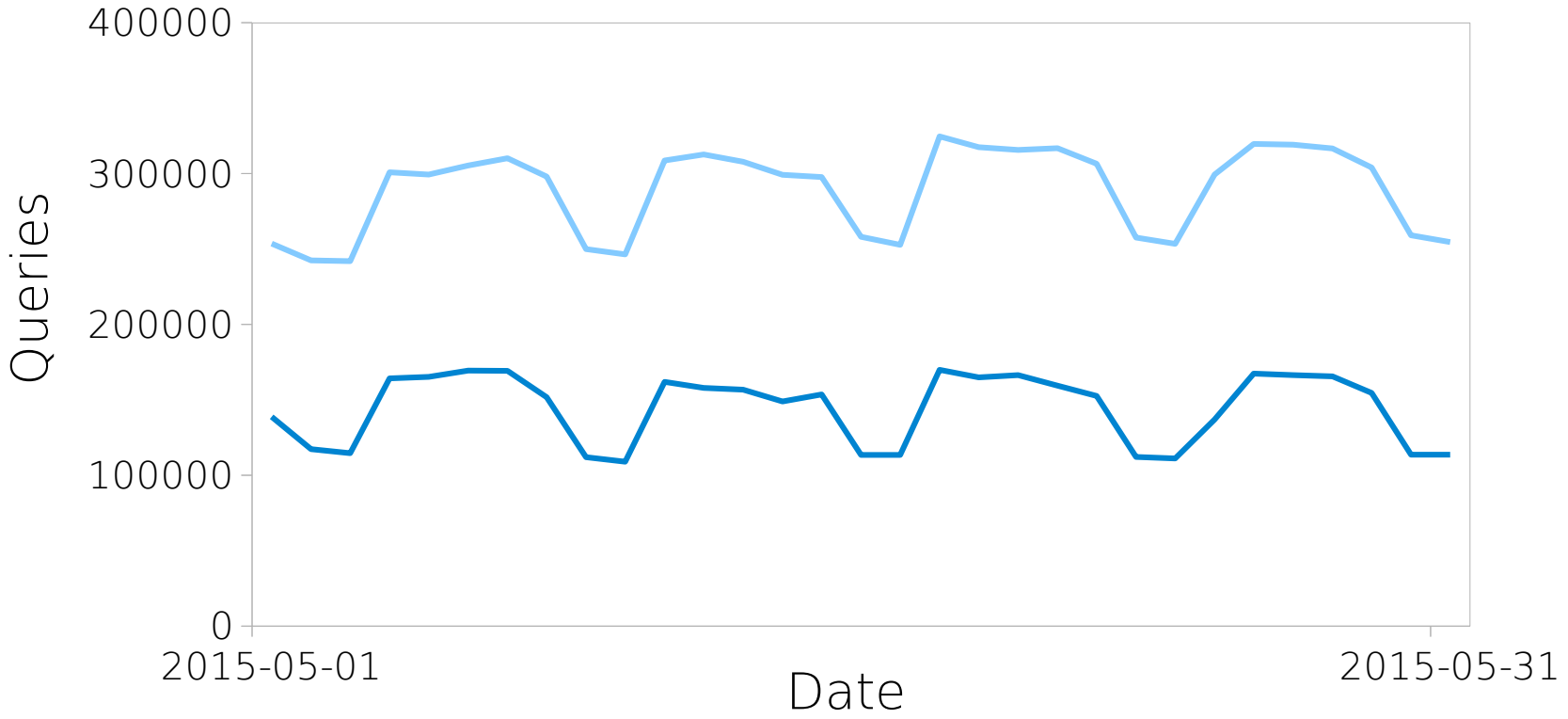


Benign .nl Domains

Query Origin

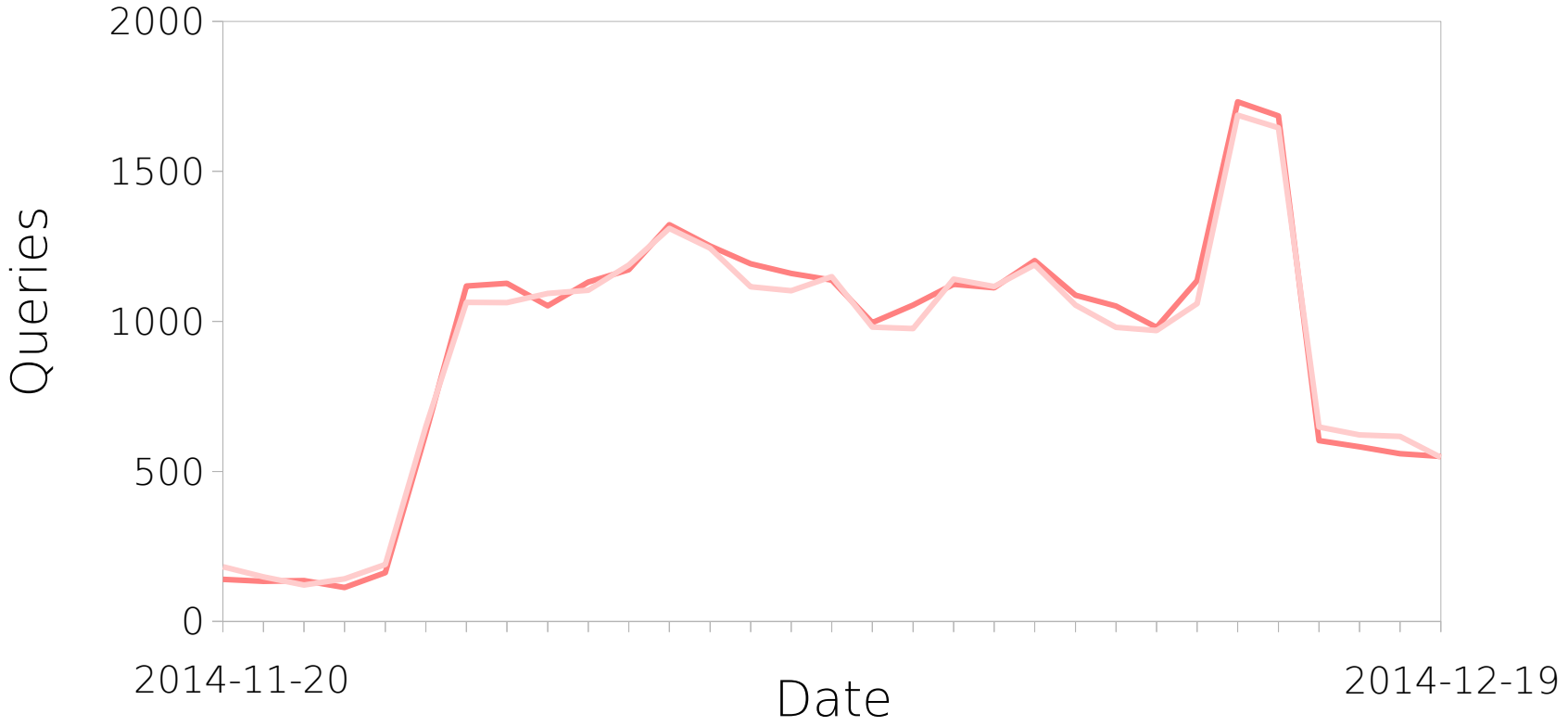


Query Frequency



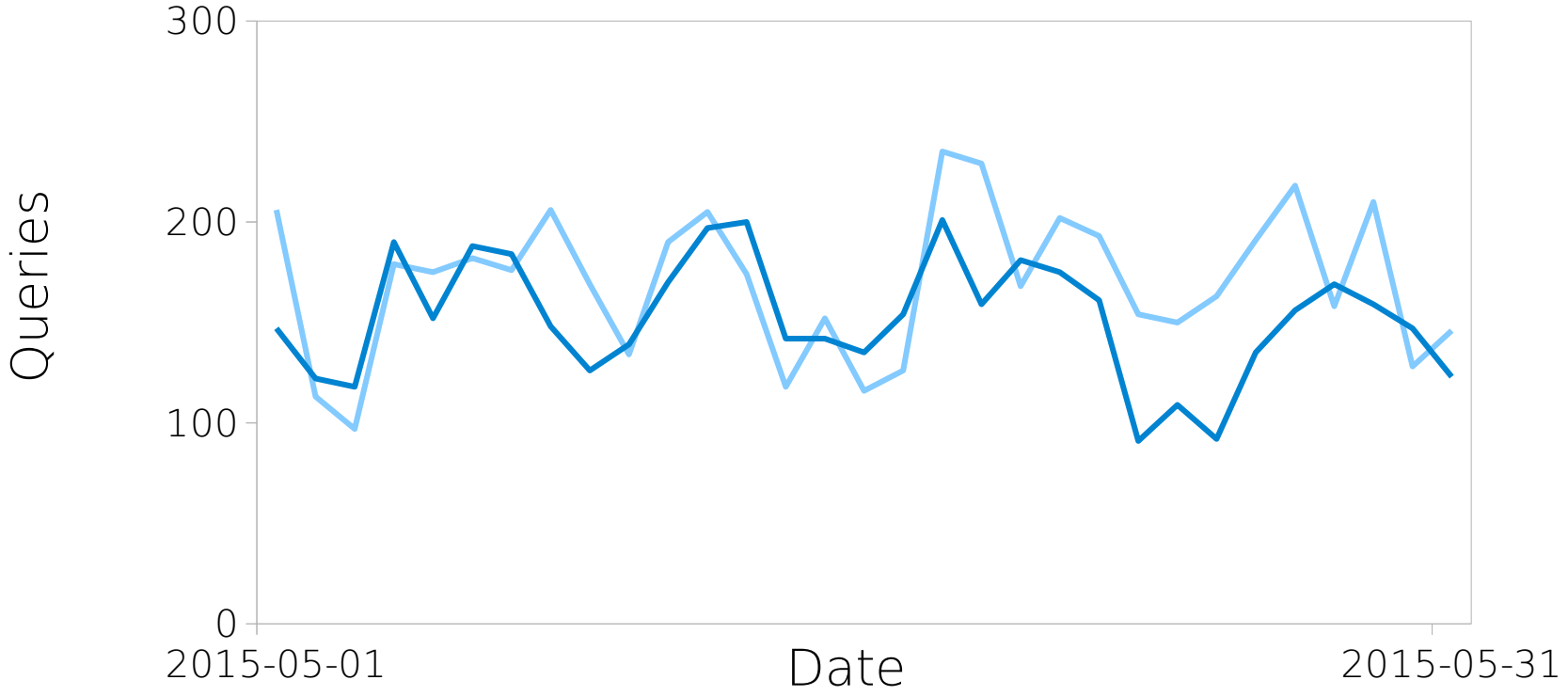
Popular .nl domains

Query Frequency



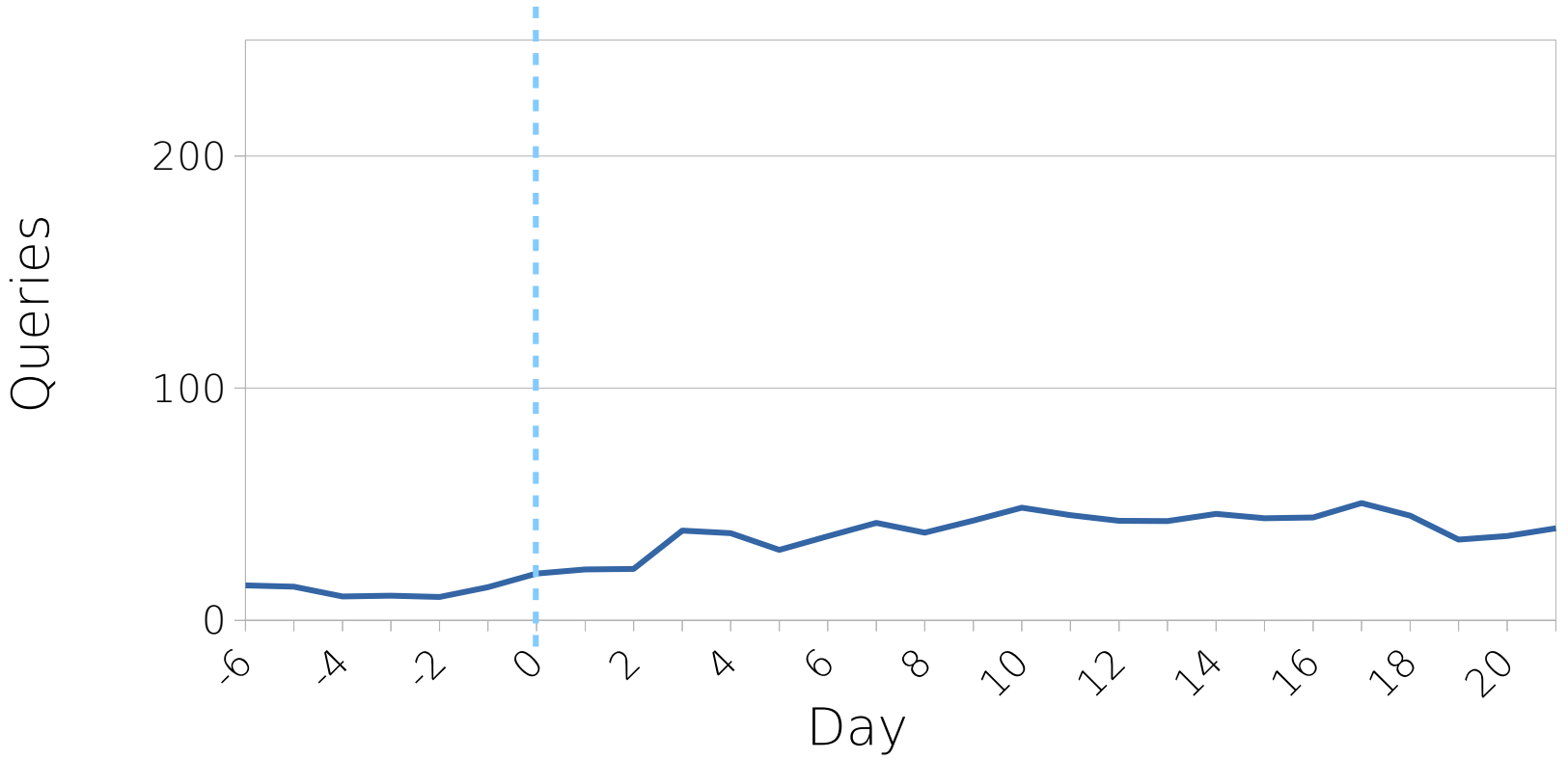
Flashback-Botnet domains

Query Frequency



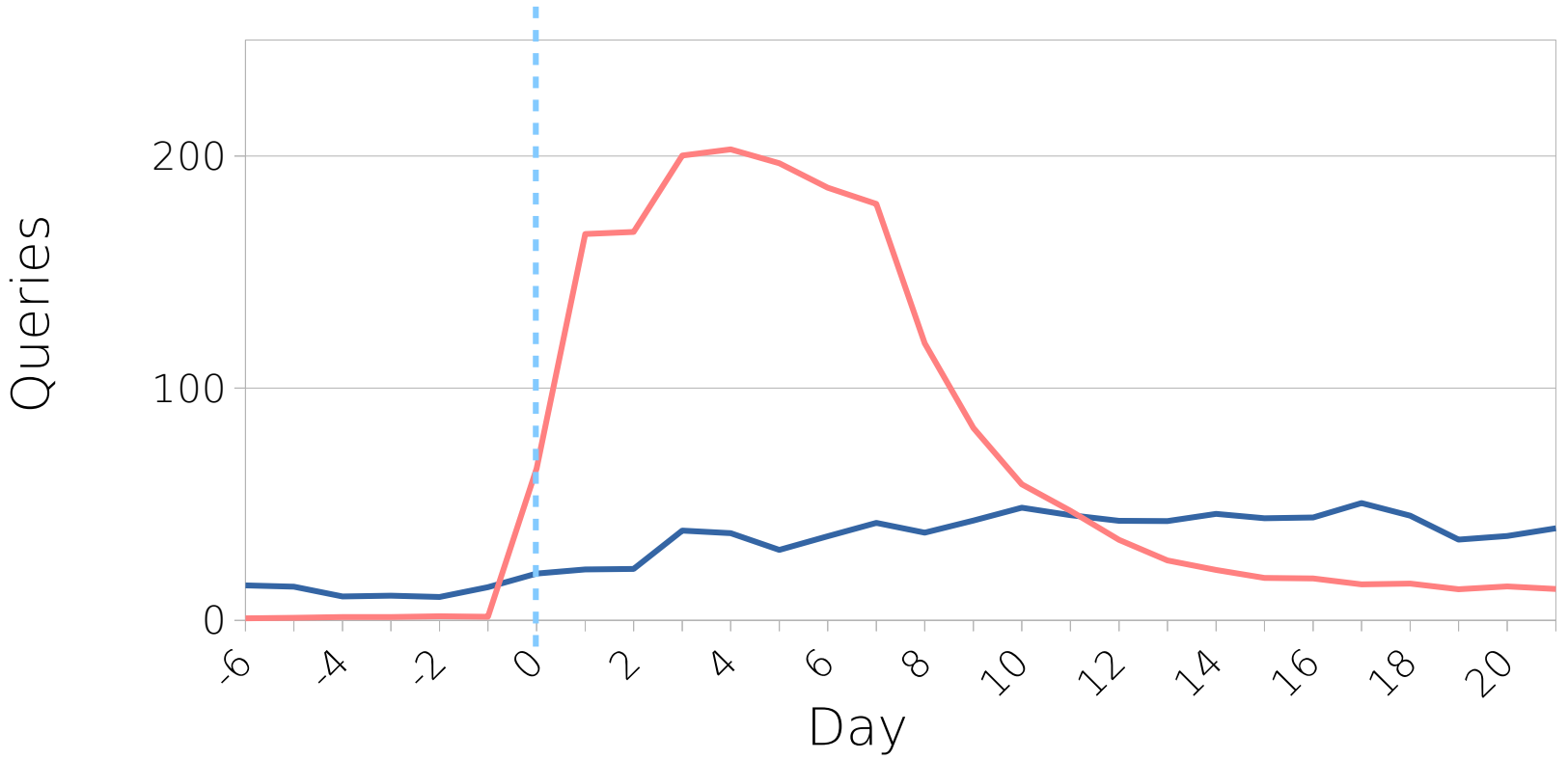
Unpopular .nl domains

Query Frequency



New benign domains

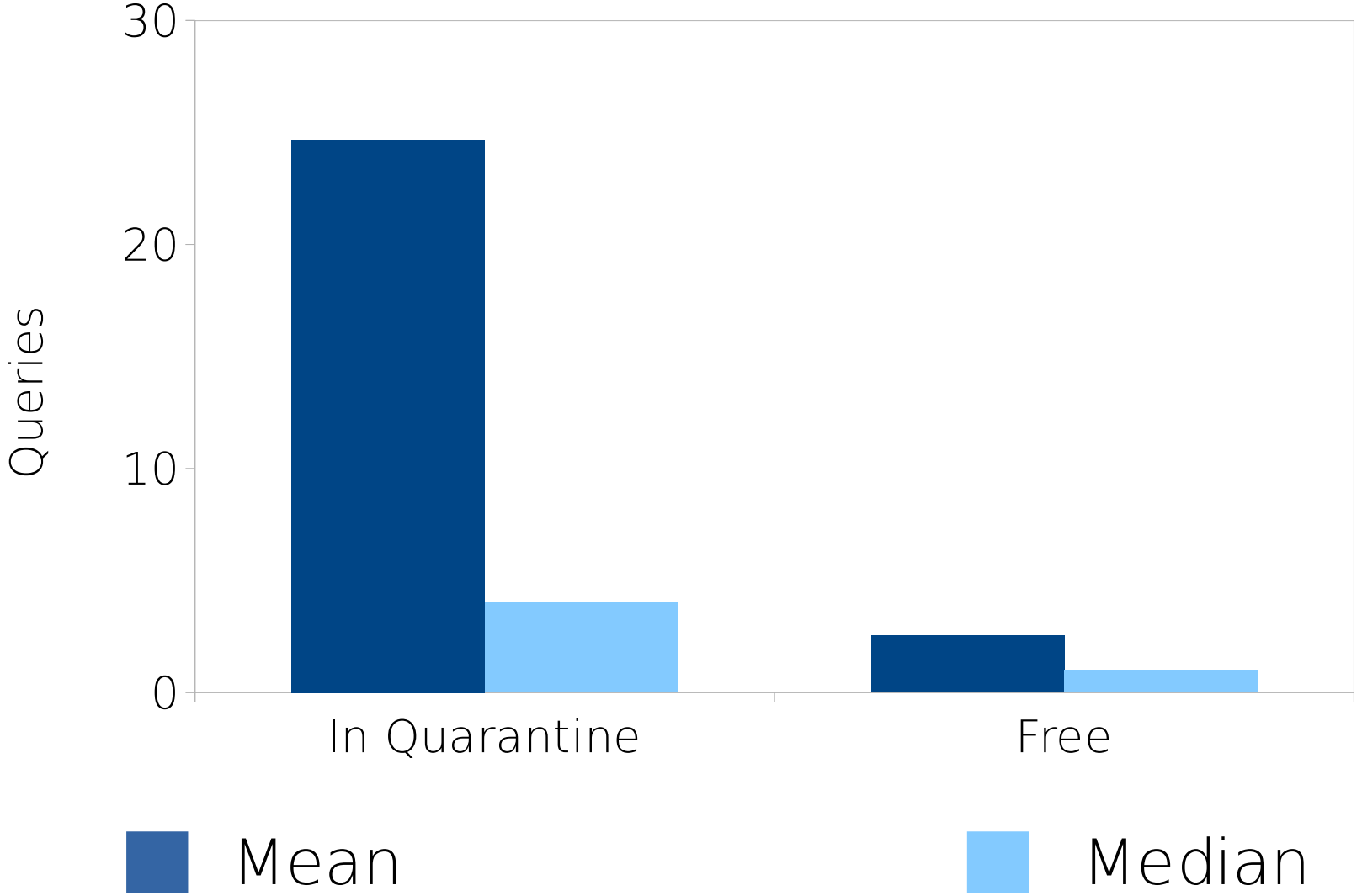
Query Frequency



New benign domains

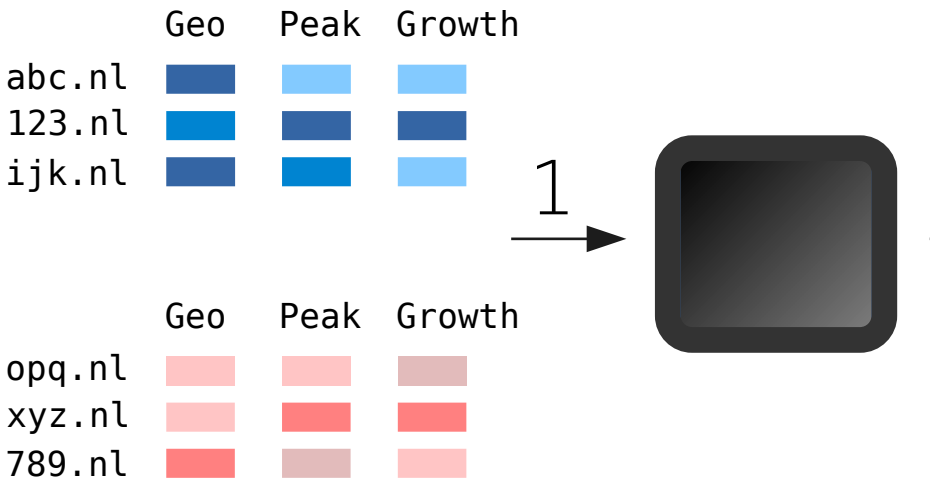
New phishing domains

Domains in Quarantine



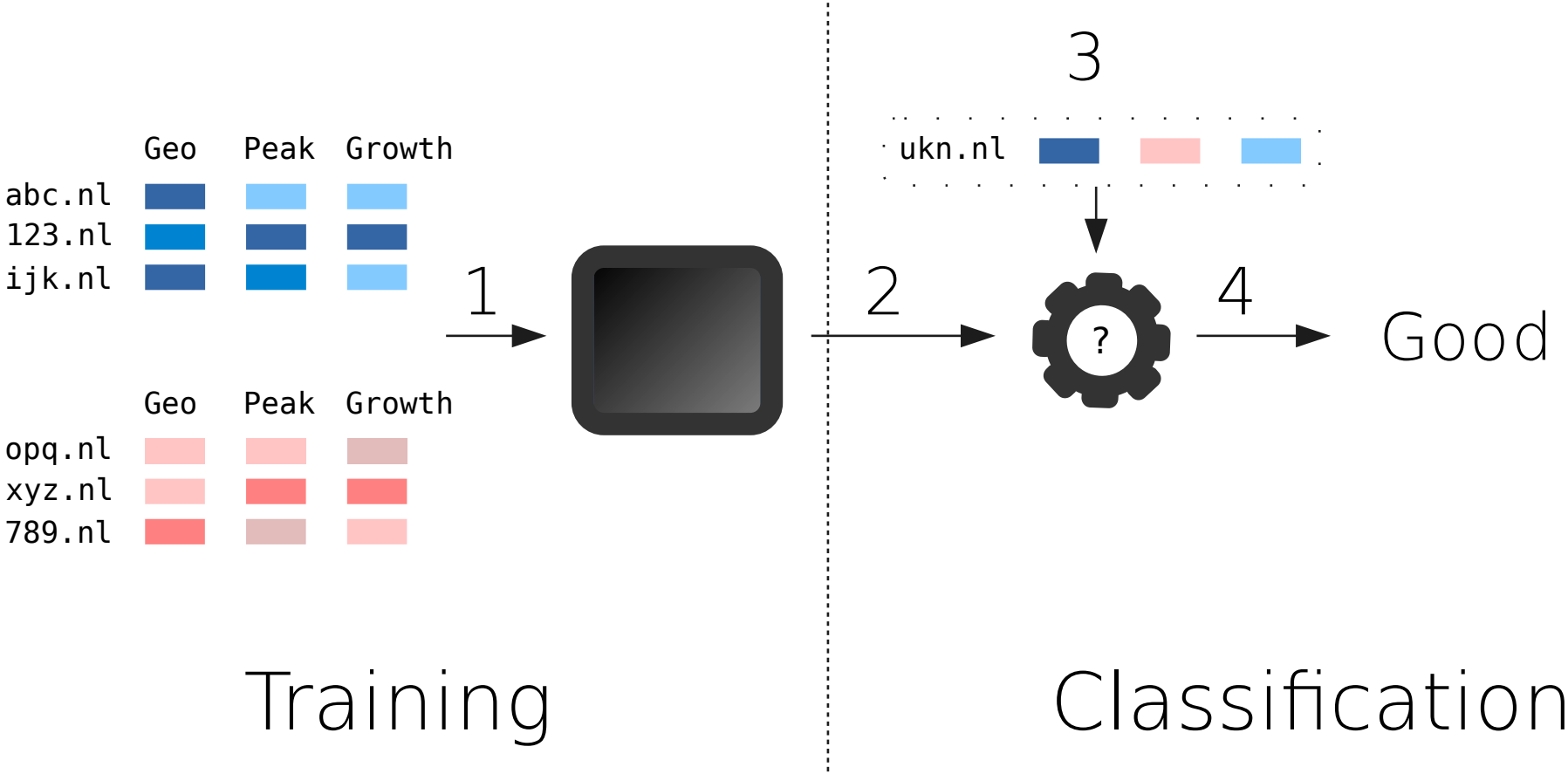
Catching Bad Domains With SIDEKICK

General Approach



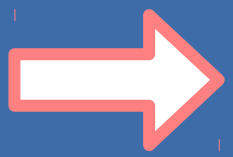
Training

General Approach



SIDEKICK Architecture
New Domains

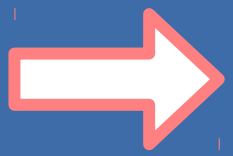
- 61.000 Domains classified
- 33 Malicious domains detected
- False Positive Rate 0,3 %



More domains detected than by professional Phishing Feed

SIDEKICK Architecture
Old Domains

- 1,7 Million Domains Classified
- 14.000 Malicious domains detected



Can't verify suspicious domains


Next Steps

Improvements

- Early Detection
- Additional Features
    - Non-DNS-related sources (Social Media, Search Engines, CMS and Webserver)
    - EDNS Client Subnet Extension
    - Resolver Reputation

Outlook

- Post Detection
  - Block Content
    - Google Safe Browsing, Netcraft
  - Notify (Registrant, Registrar, Web-Hosting-Firm)
- Post Suspicion
  - Cooperation

SIDEKICK

- Based on geographic location and query patterns
- Effective detection of new domains
- Detection of suspicious compromised domains

Thank You For Your Attention