DNS4EU

Co-funded by the European Union

DNS4EU
Public Service

LinuxDays 2025 / IT25

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Project name: DNS4EU and European DNS Shield.
This project is co-funded by the European Union.

DNS4EU Consortium

Project Leader

CZ **Whalebone**

Consortium members

- CZ CZ.NIC
- CZ Czech Technical University Prague
- BE Time.lex
- DE deSEC
- HU HUN-REN
- IT ABI Lab Centro di Ricerca e Innovazione per la Banca
- PL Naukowa i Akademicka Sieć Komputerowa
- RO Directoratul Național de Securitate Cibernetică

Associated partners

- BG Ministry of Electronic Governance
- CZ CESNET
- FI F-Secure
- PT Centro Nacional de Cibersegurança

DNS4EU Timeline

- Technology, Security and standards compliance designs
- EU Backend deployment
- Research extension
- Reaching out to new operators and governments

- Regional Threat Intelligence exchange setup
- Legislation and Security requirements compliance achieved

- Discoverability
- Attracting end-users
- Scaling the deployments as needed

- Sustainability and continuous service improvement


DNS4EU Public Service

Public Resolvers Distribution

DNS4EU Public Service

Tailored Protection for All Ages

- Five filtering options
- Guard against malicious content, adult content, and unwanted ads

Privacy & GDPR Compliance

- Private data anonymized
- EU-based infrastructure
  - Fully aligned with GDPR and EU-level privacy standards

In service

- **Launched** on June 17th 2025
  - 90 000 users onboarded (60 million queries per hour)

DNS4EU Public Service: Options

27%

Unfiltered resolution

86.54.11.100

Looking for fast, reliable and anonymized resolution service.

36%

Protective resolution

86.54.11.1

Avoid any access to websites with fraudulent or malicious content.

3%

Protective + Child protection

86.54.11.12

Avoid access to websites inappropriate to children like sexual content, violence or drugs on top of the protective functionality.

9%

Protective + Child + Ad blocking

86.54.11.11

Avoid access to websites inappropriate to children + hide the advertisement.

25%

Protective + Ad blocking

86.54.11.13

Hide the advertisement on the websites and in the applications on top of the protective functionality.

Public Resolvers Comparison

Feature	DNS4EU	Google	Cloudflare	Quad 9	AdGuard *(commercial)*
DNSSEC	Yes	Yes	Yes	Yes	Yes
DNS over HTTPS/TLS	Yes	Yes	Yes	Yes	Yes
DNS over QUIC	Q4/2025	No	No	No	Yes
Private data anonymization	Yes	*No*	*No*	Yes	No
Filtering options	Pure Protective Child protection Advertisement	Pure	Pure Protective Child protection	Pure Protective	Pure Protective Child protection Advertisement

Threat Intelligence

DNS4EU threat intelligence

Industry standard

- Public and community data sourcing
- Proprietary threat intelligence, threat feed licenses
- Other partnerships, e.g. abuse operators
- Threat hunting by security experts

Telco market leadership

- Telco fraud prevention teams
- Telco crowdsourcing

DNS4EU Consortium

- Consortial partners
- MISP integration with national CERTs & NSCSs
- R&D with academia (CVUT, NASK)
- Reports from DNS4EU community

Whalebone in-house research

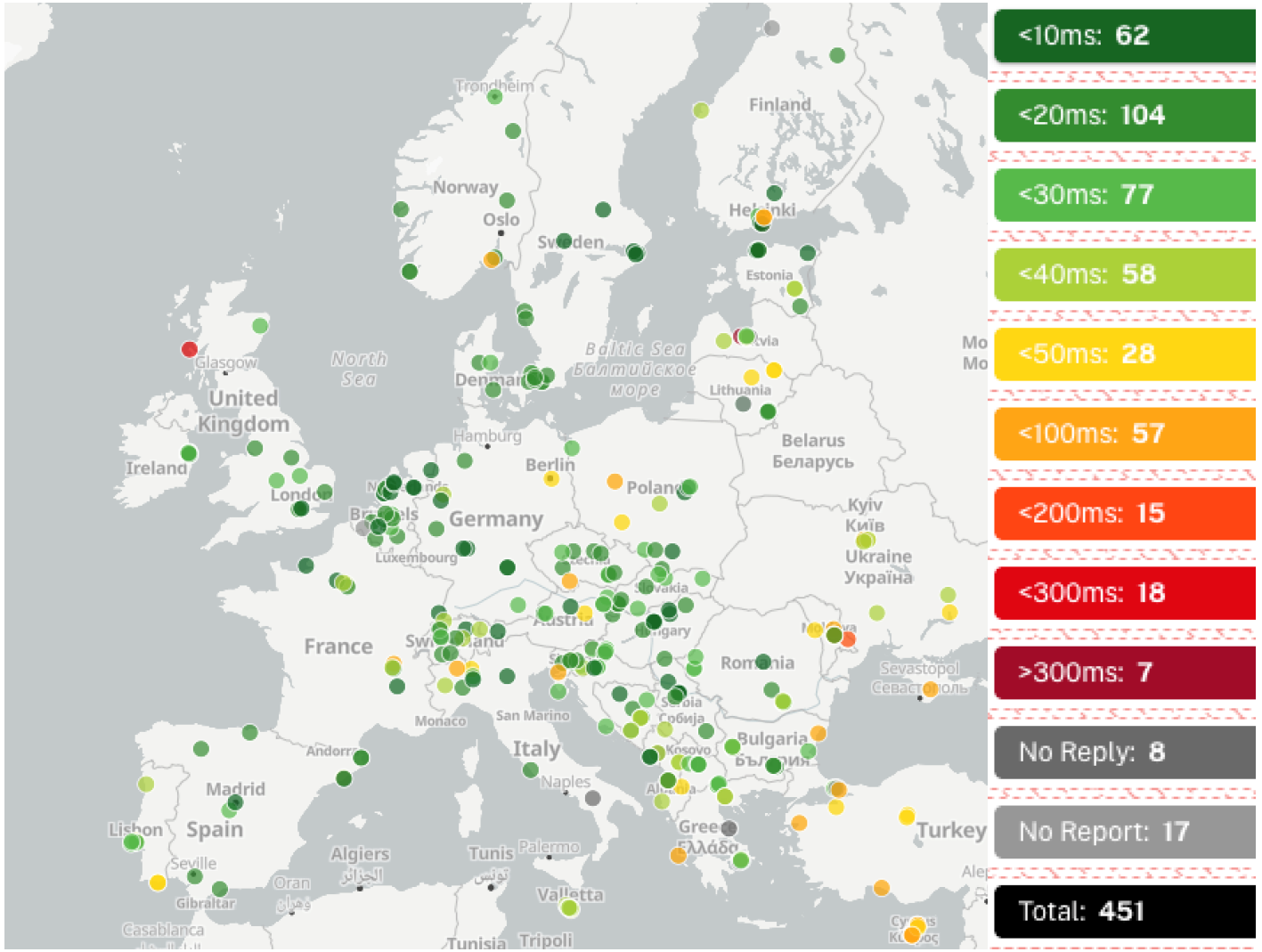
For Commercial offerings

- Agent for malicious domain prediction and early detection
- Whalebone Virtual Analyst
- Whalebone DNS tunnel detection
- Network Traffic Analyzer
- Whalebone DGA Sonar
- Regional Security

Latency

14ms

average latency measured by Perfops



DDoS Attack

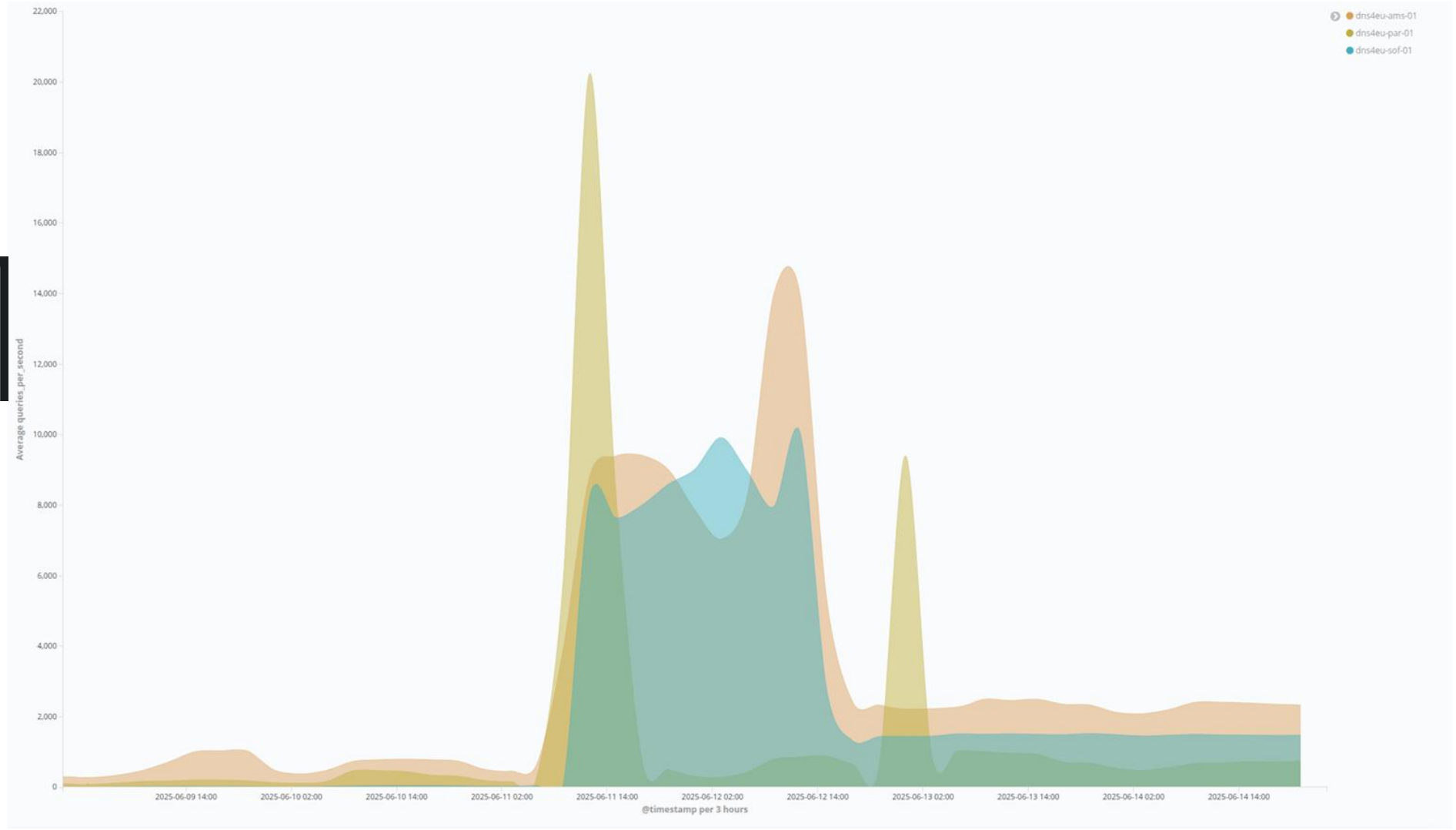
- After stakeholders launch
- Coming on randomly generated AWS domains:
  - *.aws.com
- Sources from USA, Canada and Netherlands
  - Mostly from /24 IP ranges so not a true DDoS
  - Registered by IT-infra companies in United Arab Emirates
- Partially mitigated by rate-limiting
- Operatively mitigated by IP restrictions
- One resolver down for a short time

DDoS Attack Timeline

11/06 - 12:10 - Attack spotted to Paris, Amsterdam, Sofia
11/06 - 16:00 - Blocking attackers with firewall in Paris and Sofia
12/06 - Amsterdam and Sofia still under attack
12/06 - 15:30 - Traffic rate-limited also with firewall to offload knot resolver as Sofia ran out of memory - potential memory leak
19/06 - Attack was stopped

DDoS Attack Timeline

source_ip	ams_ratelimited
[redacted]	1774282
[redacted]	23900
[redacted]	17038
[redacted]	12236
[redacted]	12079
[redacted]	5533



Configuration & Operational Challenges

- Advertisement filtering
  - Containing tracking domains
- Disabling bypass
  - Users with shared IP address
- Rate-limiting
  - 128 clients per public IP address → 1000 queries per second
- Anycast
  - Costly 1st-tier peering centers
  - BGP communities and local preferences
- Cache size
  - Set to 100MB by default, increased to 1GB
- Domain prefetch
  - Enabled for frequently visited domains
  - Prediction vs *Expiring*
- Using XDP type listener
  - Performance boost
  - Cimcurventing network stack

Feedback & Observations

- Ad-blocking resulting in limited or non-functional experience:
  - onet.pl, web.de, gmx.net
  - Magenta TV
- ISP leverages the service as additional added-value service
  - (against Terms of Use)
- Legal blocking discussions
- How much EU is in DNS4EU?
  - Our reply on cybernews

Most Frequent Support Questions

Can you add fully qualified records?

Yes, PTR records are already added.

Can you add iOS configuration profiles?

Yes, we are working on it.

How can I test the protective DNS actually works?

We have introduced test.joindns4.eu page

Can you provide CA to avoid certificate mismatch on warning page?

Yes, we advice to be cautious about the consequences.

Will you add DNS4EU as secure resolver to Chromium browser?

Yes, we are working on it.

www.joindns4.eu

www.knot-resolver.cz

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