

DNS Resolution in the EU

OCTO 032

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About OCTO-032

Goals

Provide reliable measurement of DNS public resolver usage within the EU.

Non-Goals

Express an opinion about reliance on public resolvers.

<https://www.icann.org/en/system/files/files/octo-032-01mar22-en.pdf>

How to Measure DNS Resolver Usage?

- DNS resolver operators do not provide statistics
 - Need external measurement system
 - Beware of selection bias!
 - Need very large number of measurements of a daily basis
- Partnership with APNIC labs

What to measure?

- X% of what?
 - Resolver that you use
 - Resolvers that see you
- Query multiplications...
- Study Perimeter: EU, Focus: consumers

List of Public Resolvers

114 DNS

AliDNS

Alternate DNS4

Baidu DNS

CleanBrowsing

Cloudflare (commonly called 1.1.1.1)

Comodo Secure DNS

CNNIC SDNS

DNS PAI

DNSPod

DNS.Watch

Oracle Dyn

Free DNS

Freenom World

Google Public DNS

(commonly called 8.8.8.8)

Green Team DNS

Hurricane Electric DNS

Level 3

Neustar

One DNS

OpenDNS

Open NIC

puntCAT

Quad9

SafeDNS

TWNIC Quad 101

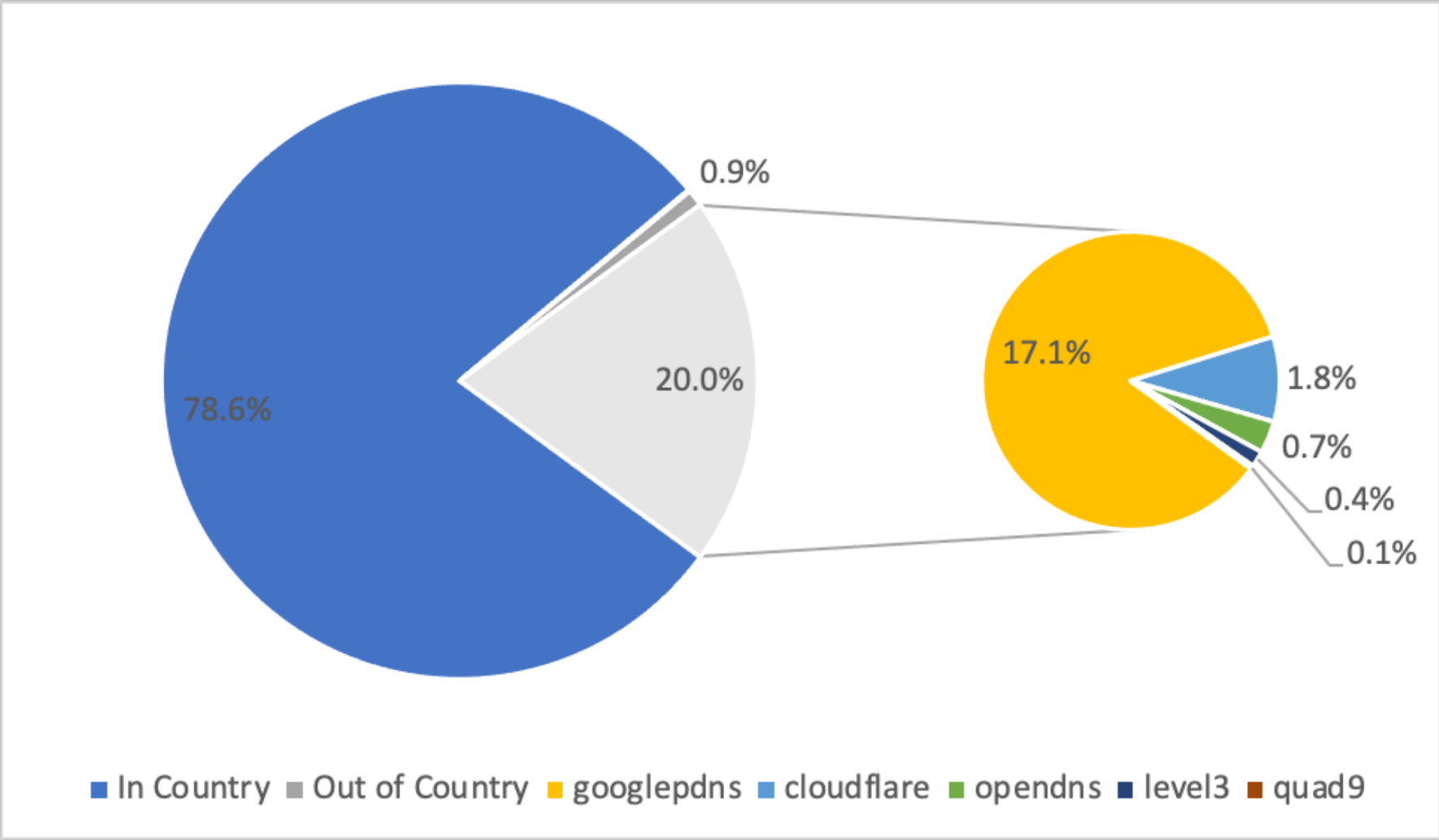
(101.101.101.101)

Uncensored DNS

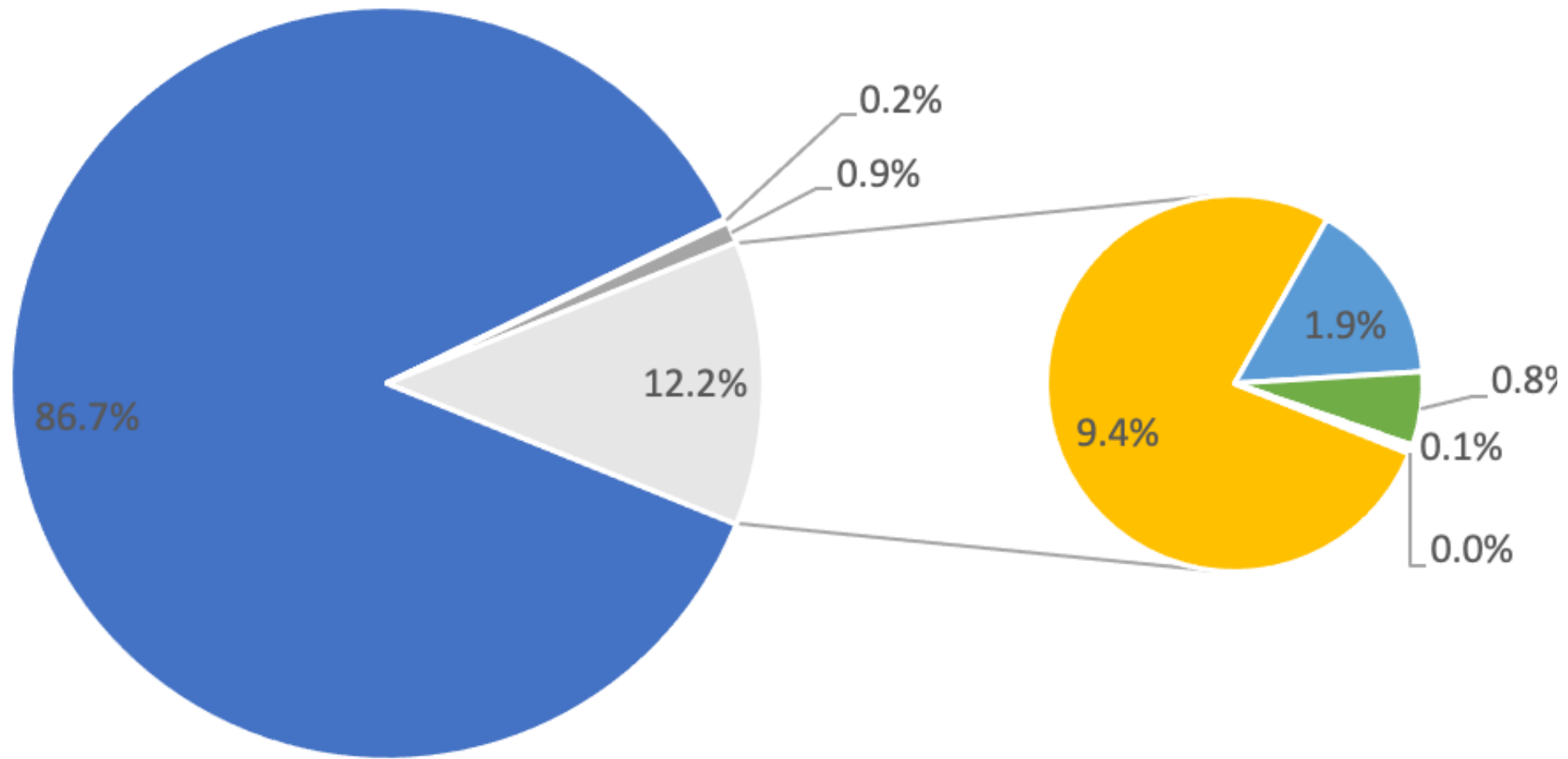
Verisign Open DNS

Yandex DNS

World View

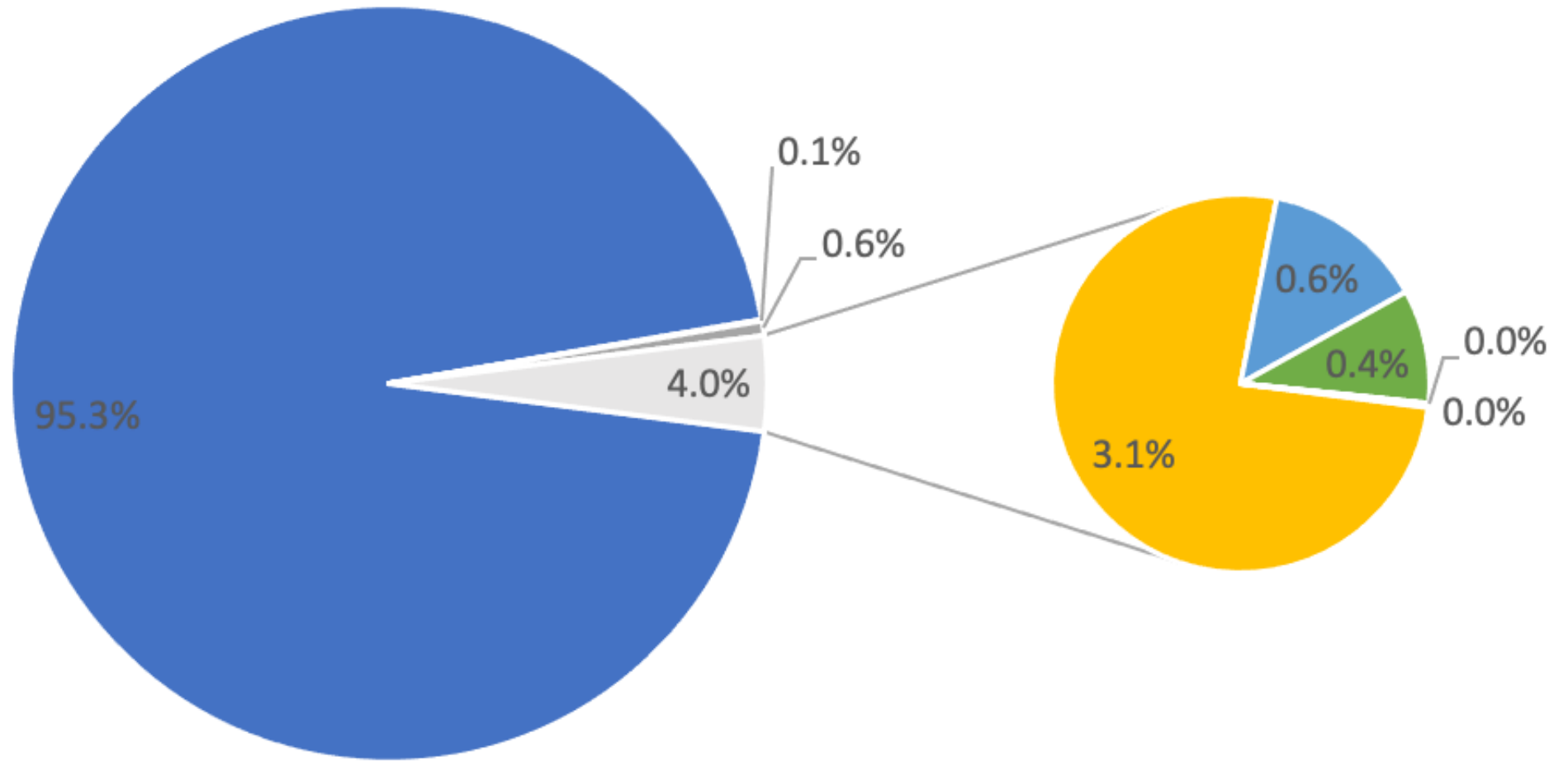


EU View



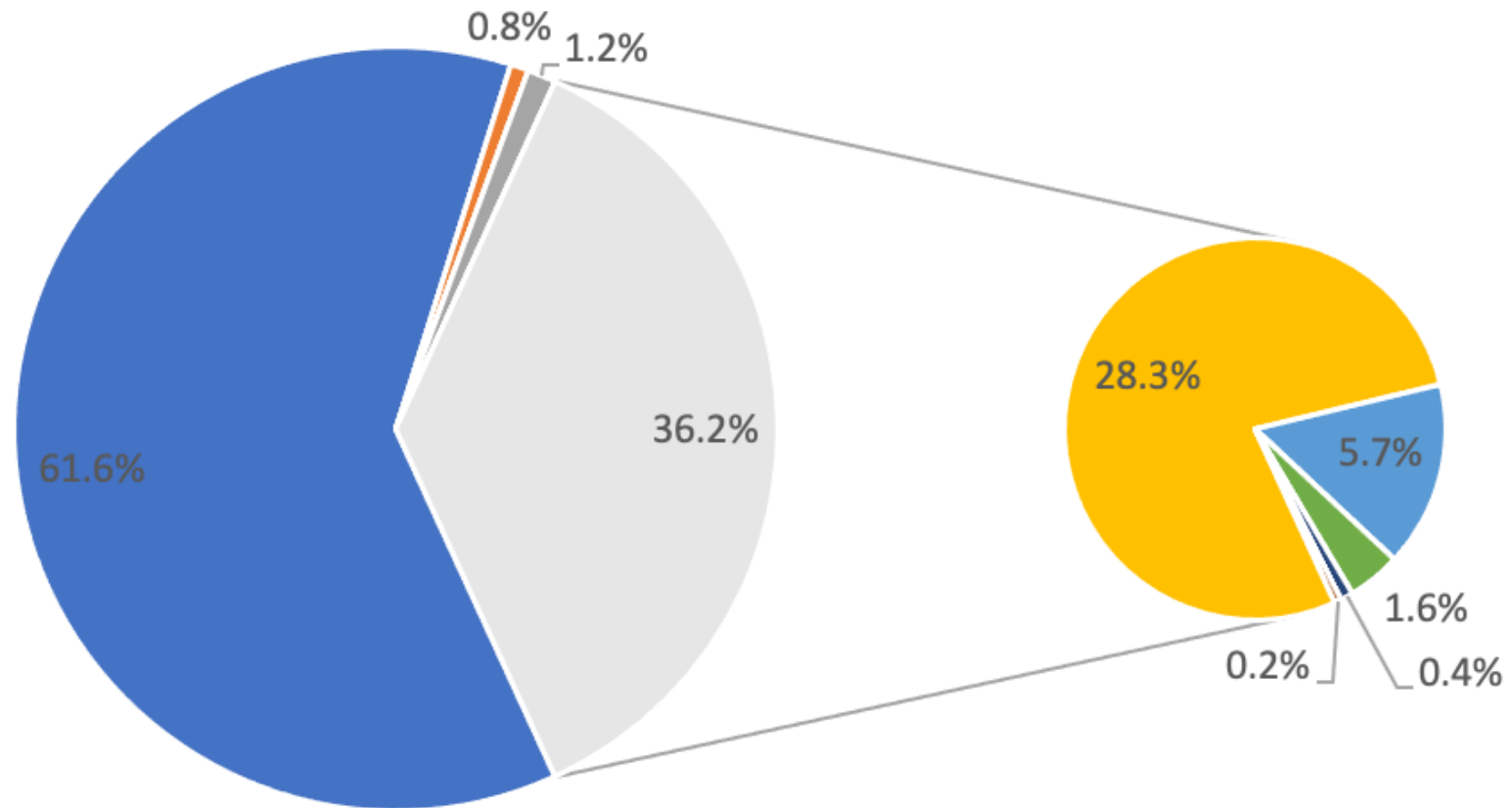
■ In Country ■ In EU ■ Out EU ■ googlepdns ■ cloudflare ■ opendns ■ level3 ■ quad

Large Consumer ISP (B2C) View



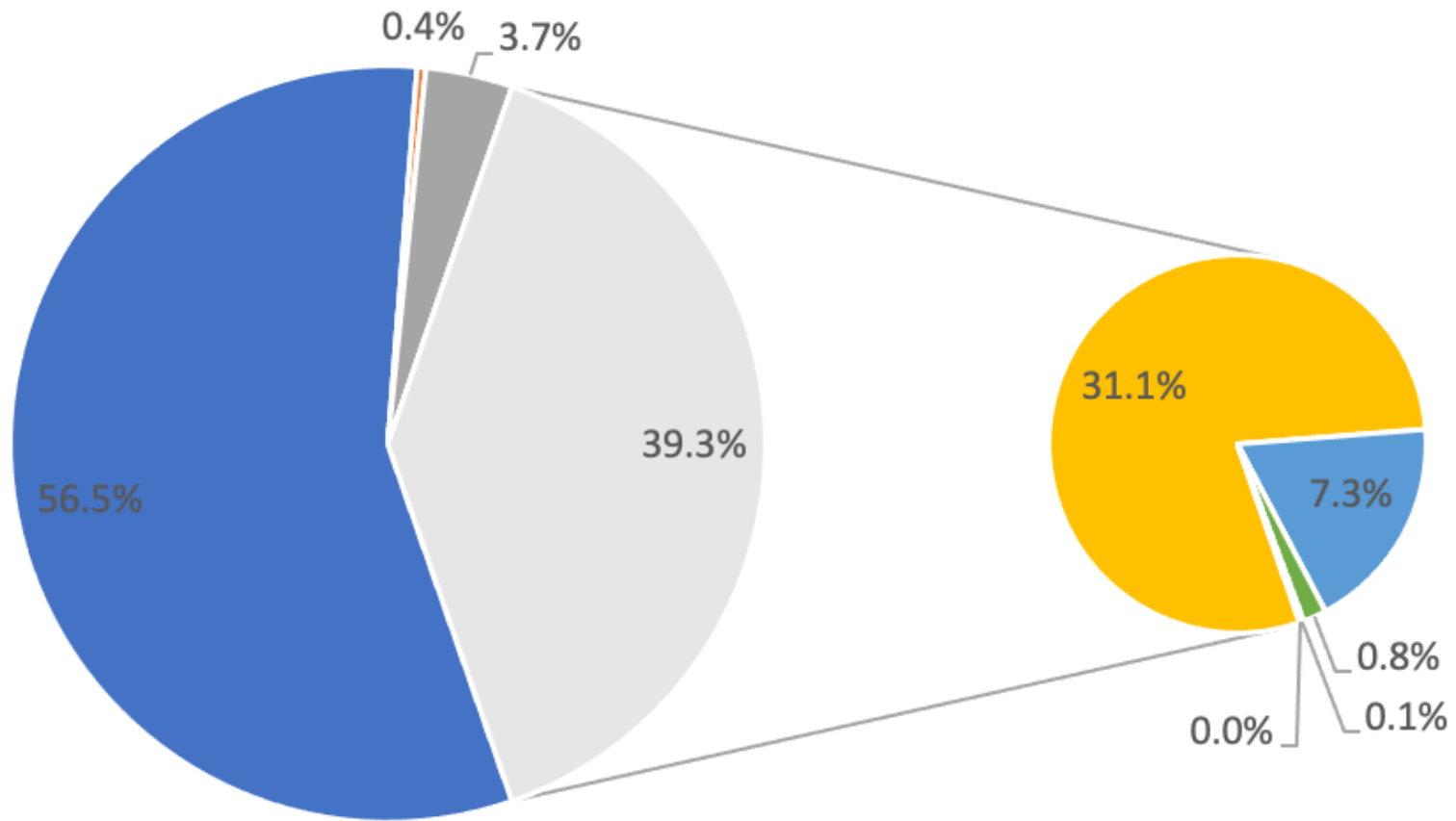
■ In Country ■ In EU ■ Out EU ■ googlepdns ■ cloudflare ■ opendns ■ level3 ■ quad

Small Consumer ISP (B2C) View



■ In Country ■ In EU ■ Out EU ■ googlepdns ■ cloudflare ■ opendns ■ level3 ■ quad9

B2B View



■ In Country ■ In EU ■ Out EU ■ googlepdns ■ cloudflare ■ opendns ■ level3 ■ quad9

Observations

- There are clear differences in public-resolver usage
- Overall, EU < ROW
- Large consumer ISP provide their own DNS resolution and their customers are using it: **96%**

Consumers are typically NOT changing the default DNS configuration

- Small consumer ISP tend to offload DNS resolutions to public resolvers such as Google DNS and Cloudflare.
- Businesses tend to rely a lot on the same public resolvers.
-> This needs to be explored more.

Engage with ICANN



Thank You and Questions

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