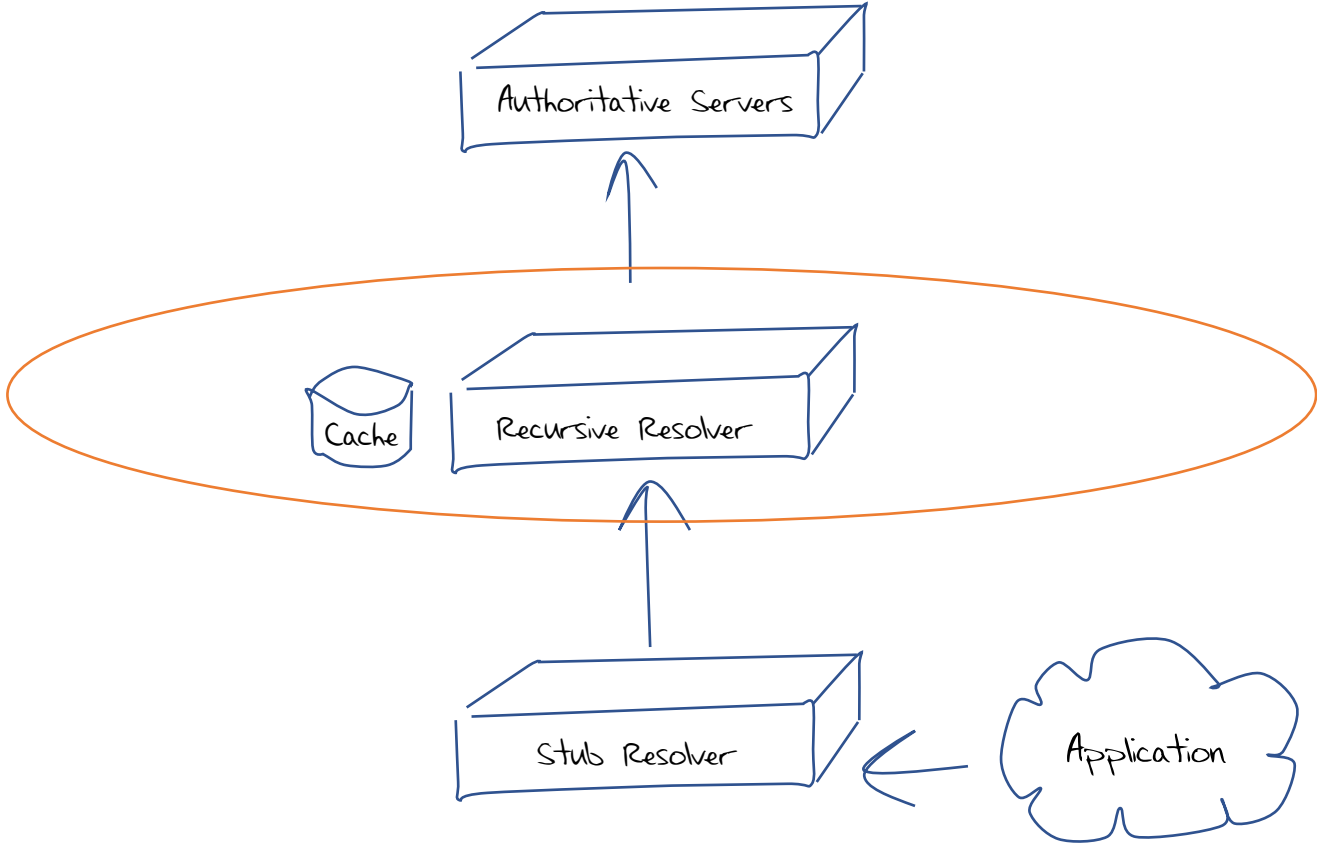


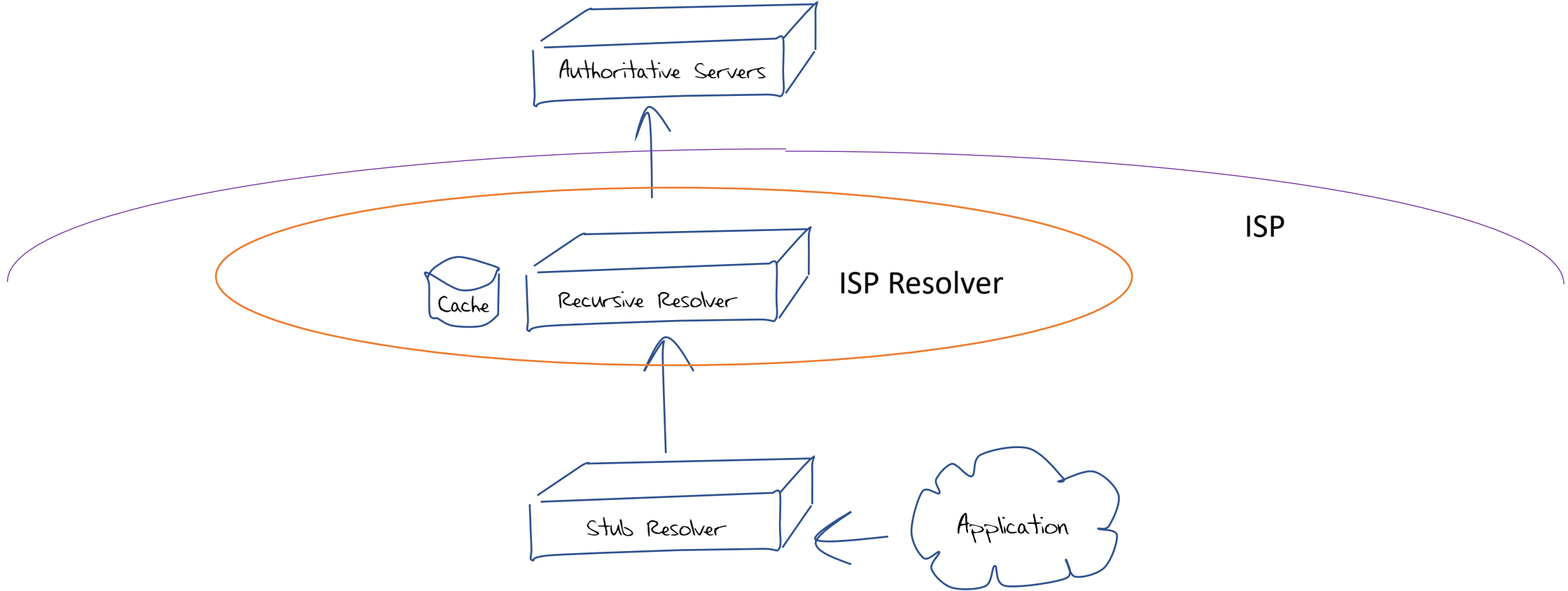
The DNS Resolver Landscape

Geoff Huston AM
Chief Scientist, APNIC

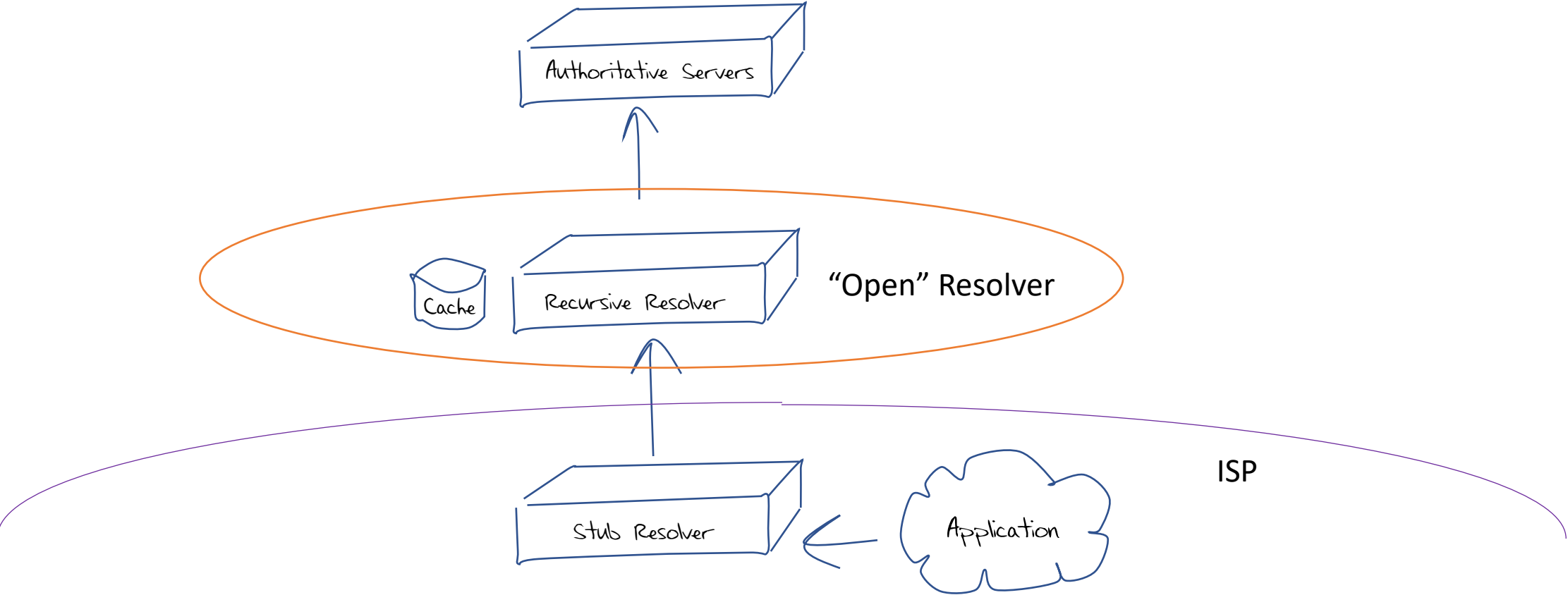
DNS System Architecture



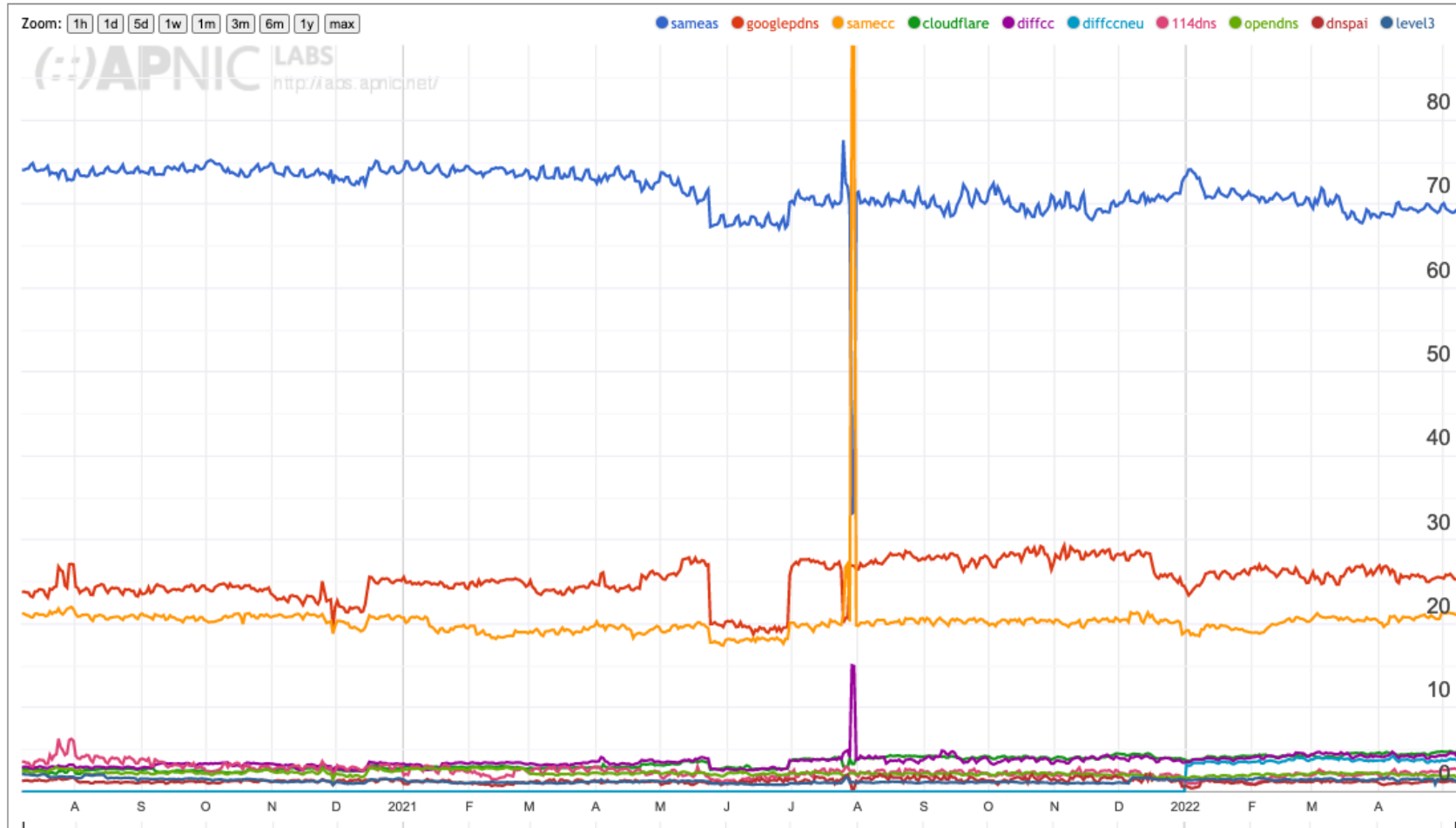
DNS System Architecture



DNS System Architecture



Use of Resolvers

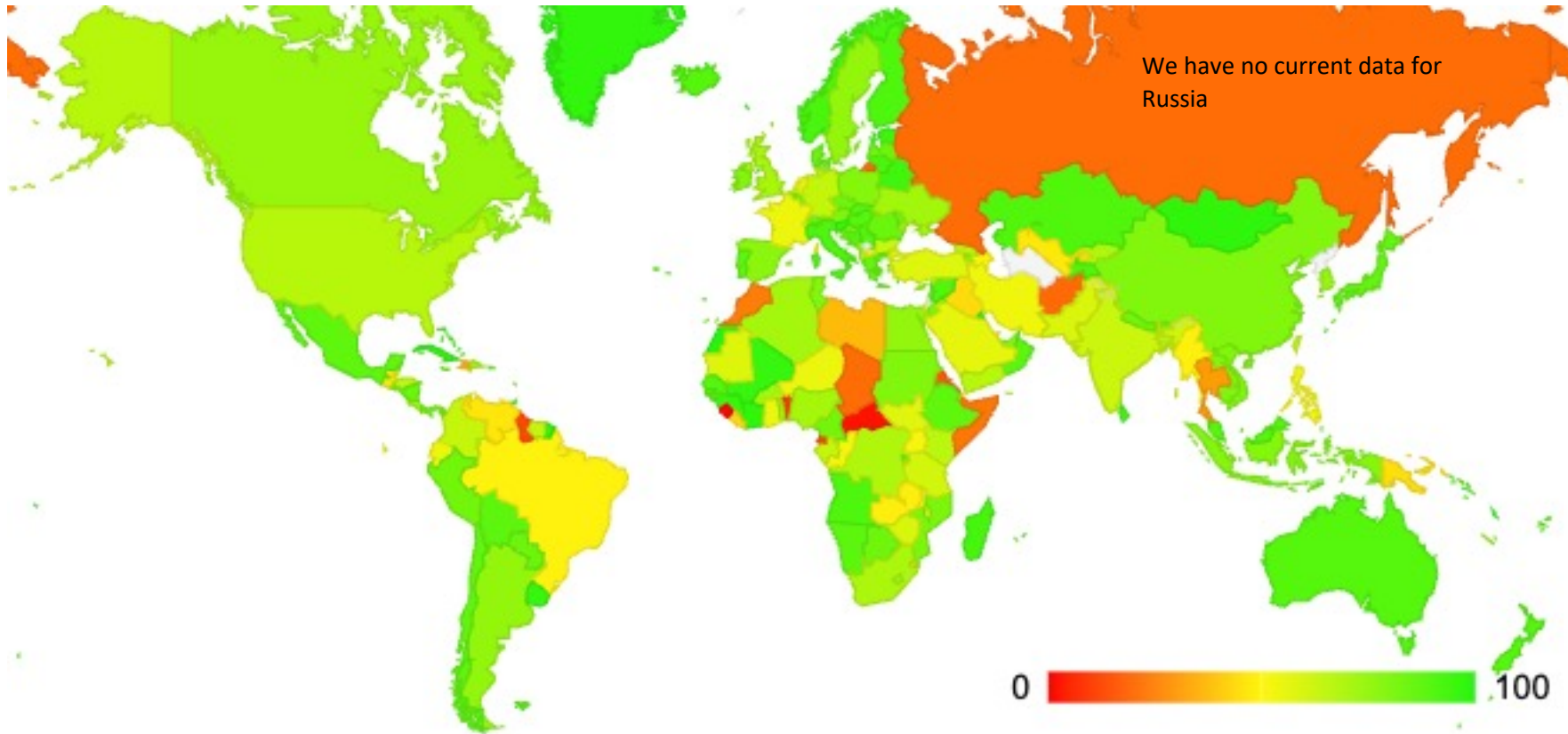


68% of users direct their DNS queries to the ISP-operated recursive resolvers

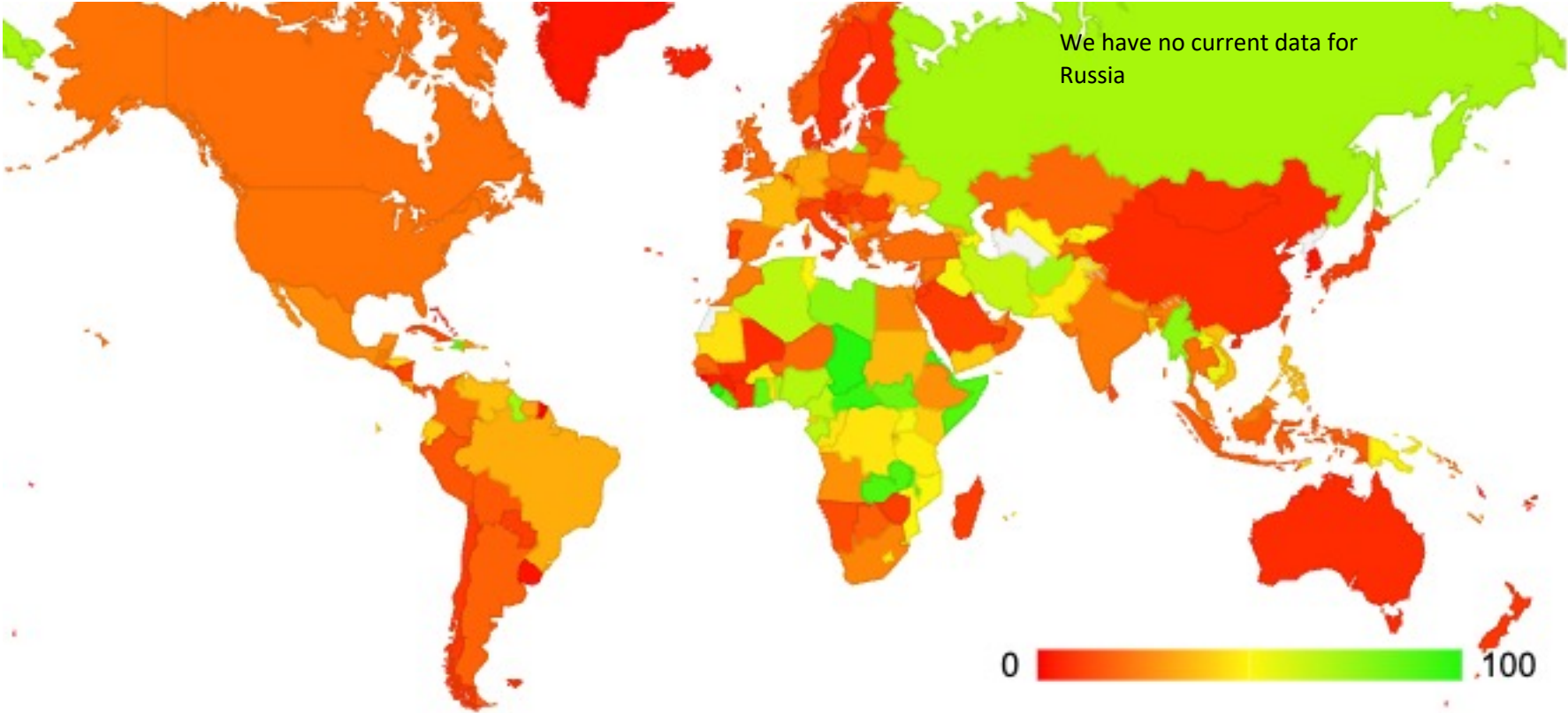
25% of users direct their DNS queries to Google's open resolver service

20% of users direct their DNS queries in in-country DNS

Use of ISP Resolver



Use of Google's DNS Service



Why use an Open DNS Resolver?

- It's often faster (a busier cache is a better cache!)
- It's often more reliable
- It supports DNS over TLS and DNS over HTTPS
- It performs DNSSEC validation
- It does not filter DNS responses in any way

But

- It requires a customisation of the device / local network
- Unless you use TLS there are many more opportunities for eavesdropping and manipulation

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- It (*Many enterprise networks use open DNS resolvers*)
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Why use the ISP resolver?

- It can provide better content steering – leading to faster content
- It requires no customisation of the device / local network

But

- It may perform local DNS filtering
- It may be used for in-country meta-data collection
- Less opportunity for third party eavesdropping and manipulation

Why use the ISP resolver?

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Most retail customers use ISP resolvers

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DNS Forwarders

- Sometimes its not so straightforward as one or the other
- ISPs sometimes forward all their queries to one or more open DNS resolvers and don't operate their own DNS resolution service
 - To the customer it looks like the ISP's service
 - But the ISP can pouh the cost of operating this service on to the Open Resolver service