Council of European National
Top-Level Domain Registries

DoH!

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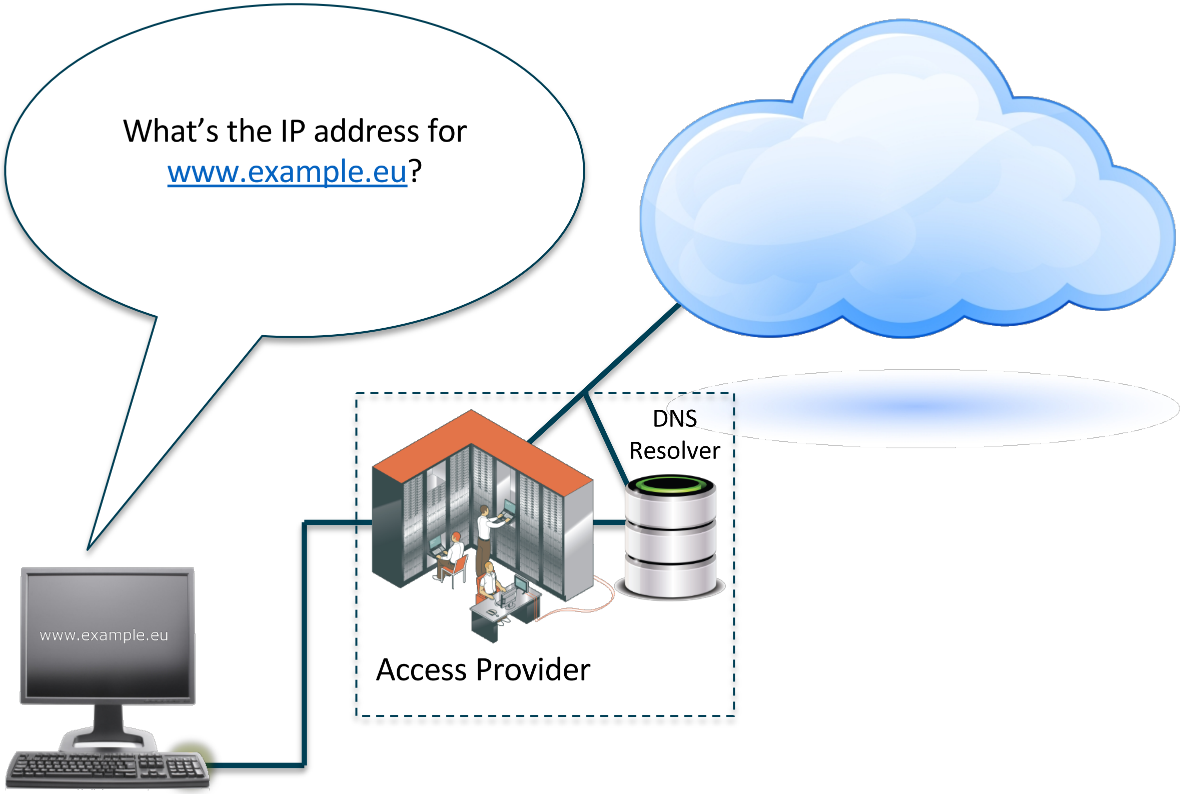
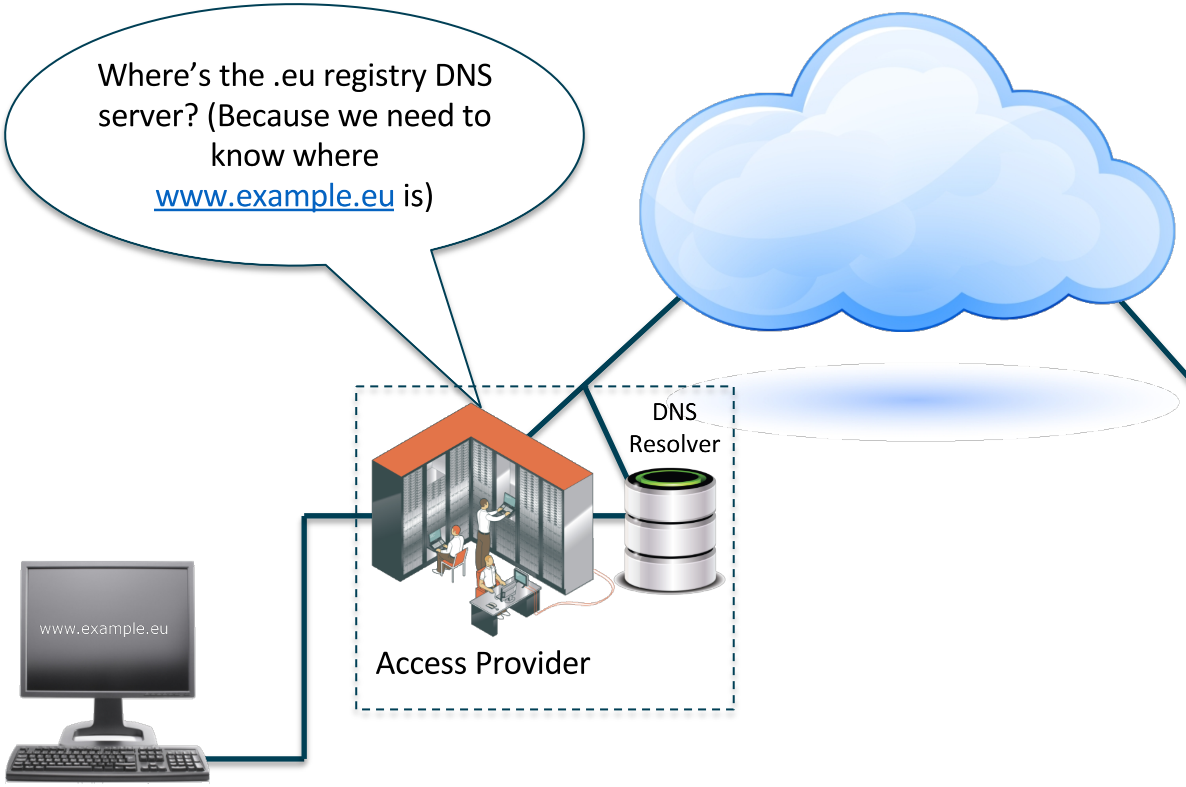
Who knows what DoH is?

Council of European National
Top-Level Domain Registries

Today: Operating System asks Access Provider for IP address of www.example.eu



Today: DNS Resolver asks Root Name Server for IP of a DNS server for .eu


Where's the .eu registry DNS server? (Because we need to know where www.example.eu is)
DNS Resolver
www.example.eu
Access Provider
Root Name Server

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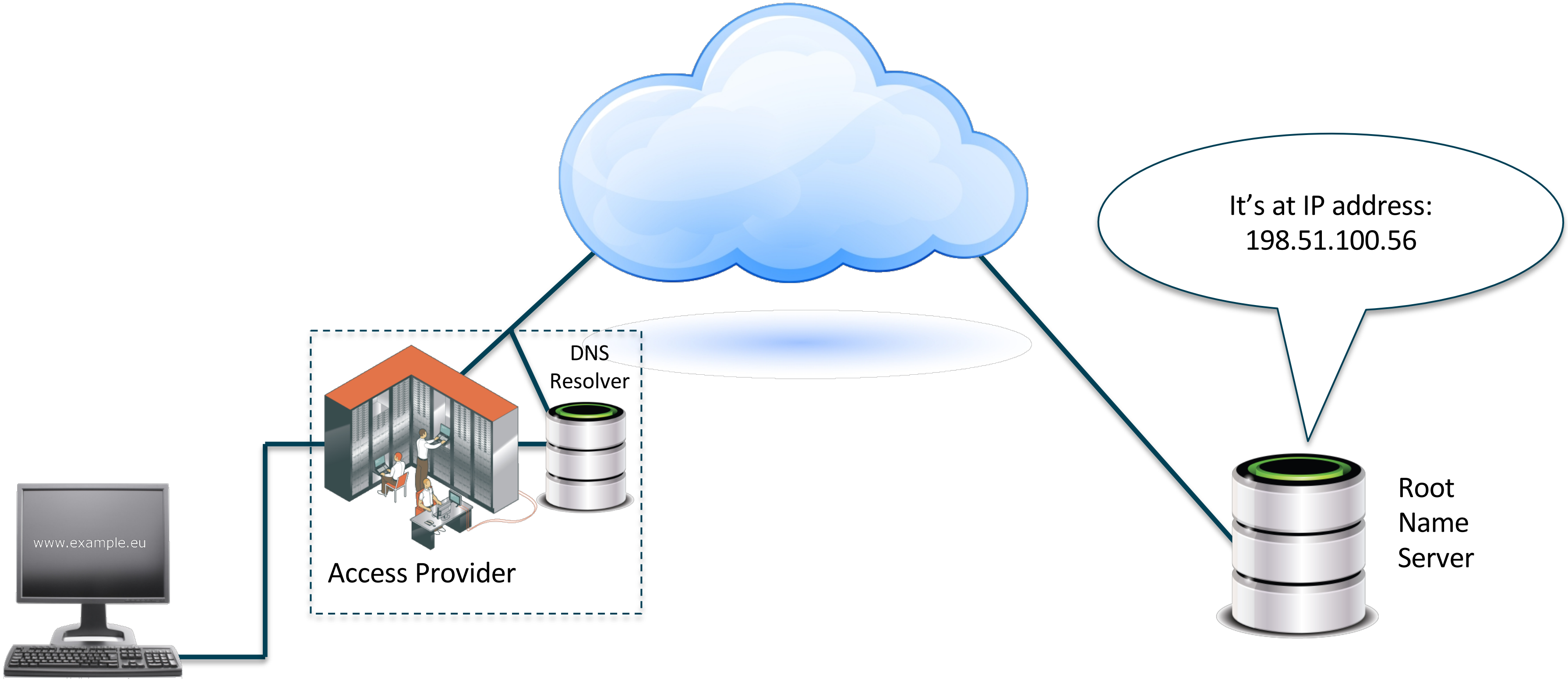
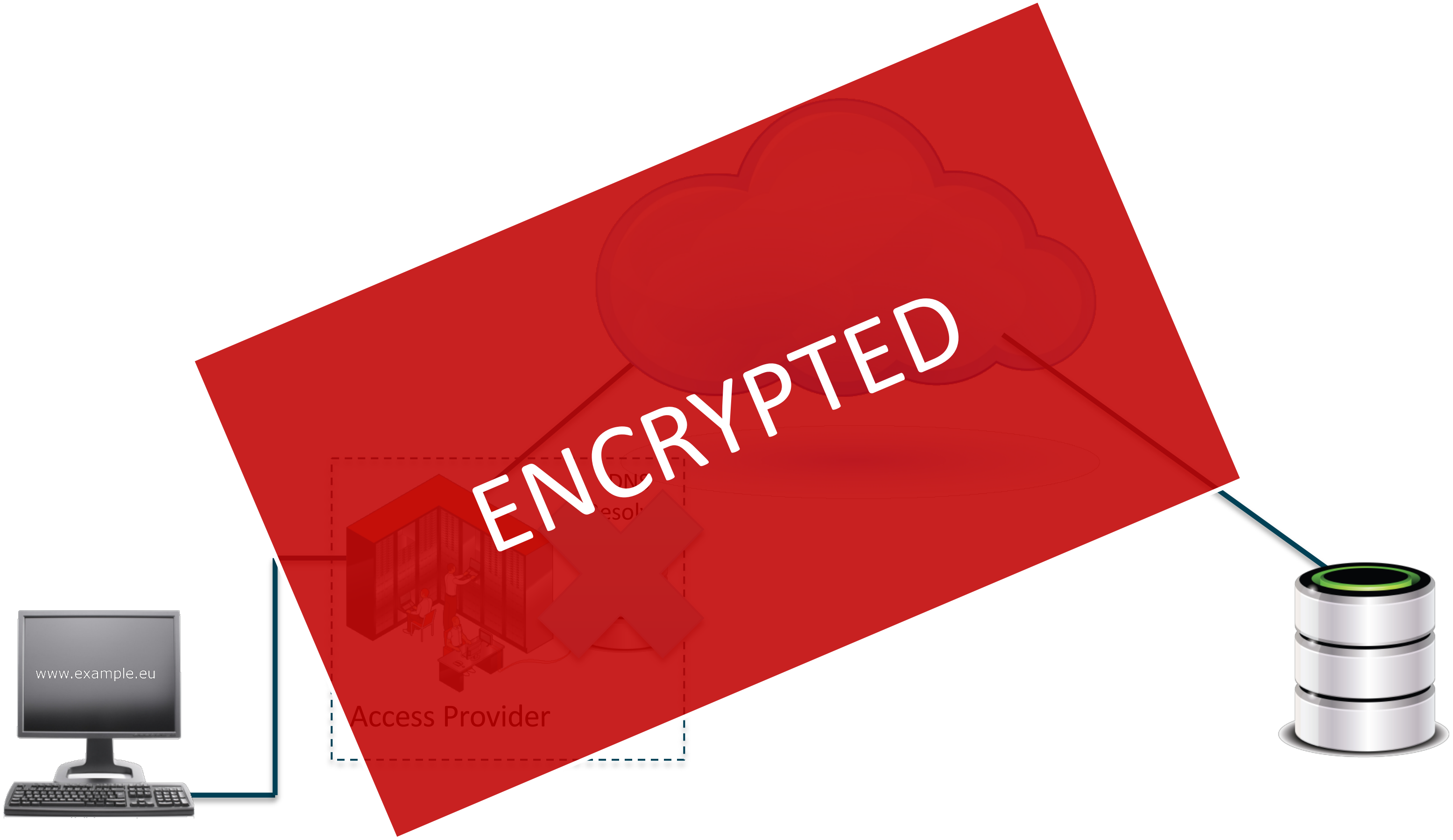


What is DoH

- DNS over HTTPS
- It’s a protocol (in an RFC standard) that allows resolving a domain name in a different way than we are used to
  - Rather than your ISP (or company) resolver, your browser will take care of resolving a domain name.
  - Your browser will work with a selected service provider (e.g. 1.1.1.1) to answer those queries.
  - Only a few organisations can provide robust reliable resolving services to the whole world.
  - Browsermarket: Chrome 64.63% + Internet Explorer 10.49% + Firefox 9.83% + Edge 4.3% + Safari 3.79% = 93.04%

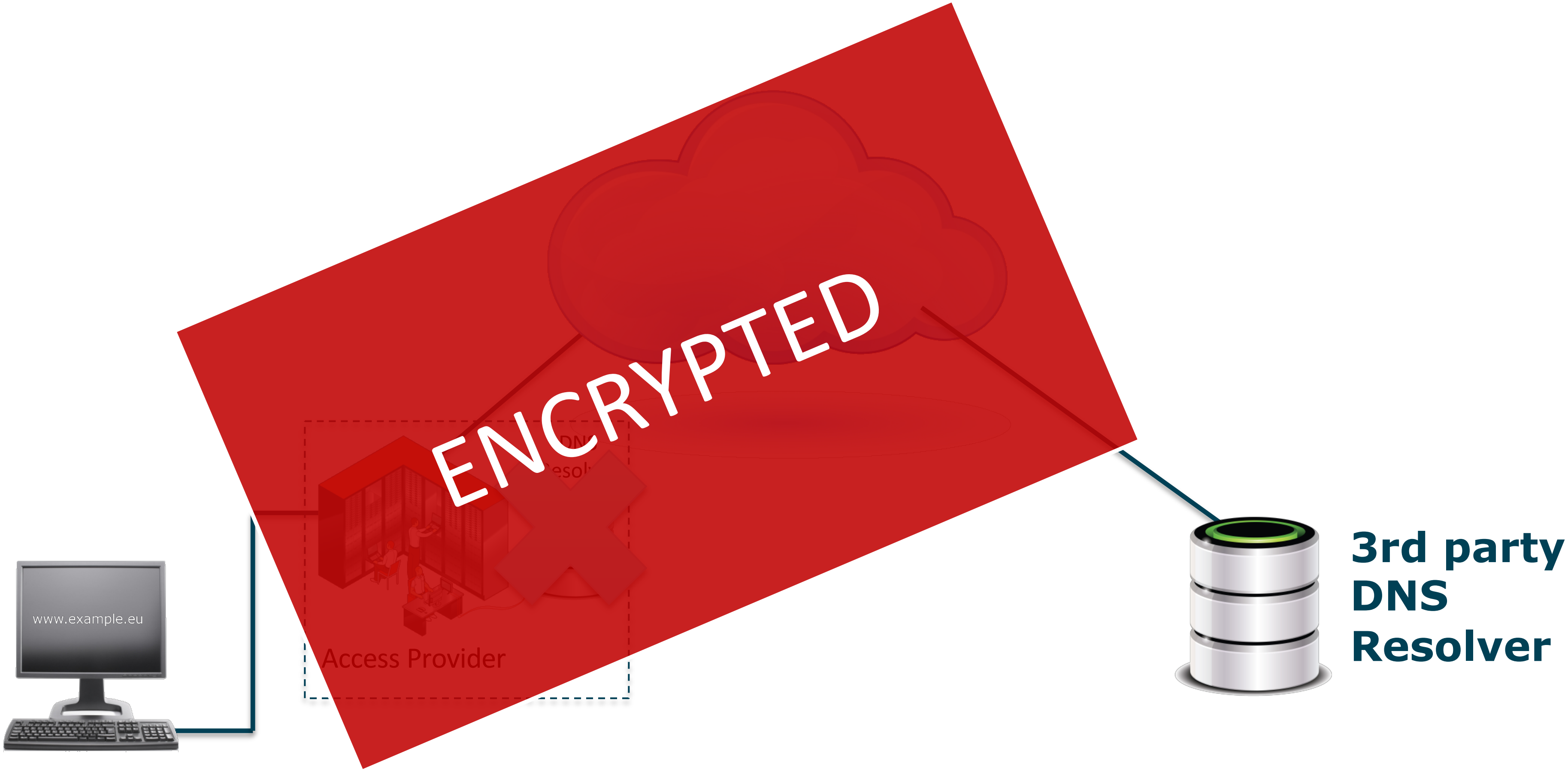
    (Source: NetApplications.com © 2017)

What does it look like?



3rd party DNS Resolver

What does it look like?



Why the change?

- DoH hides DNS traffic in HTTPS traffic, making it unblockable.
- Some well known security and privacy issues with regular DNS resolving have been unaddressed for 3 decades
  - Clear text queries
  - (wo)Men-in the middle attacks
- DoH provides answers by encrypting DNS requests and responses and securing the path between user and DNS resolver

Who likes it?

- Users (Art. 19) cautiously positive: more privacy
- Pirates and journalists in oppressive regimes: no blocking
- Browser vendors: more control
- Selected resolvers: more juicy data (even though they will remove PII after 24 hours and will never ever ever use or sell data)

Who hates it?

- Users that don’t like a central control point or users that trust their local ISP more than a third party (foreign) resolver
- ISPs:
  - losing control over network traffic
  - Losing juicy user data
  - Losing ability to stop abusive traffic
- Some DNS service providers: losing control and data (and business)
- Probably (if they realise the impact) law enforcement: losing data available in their jurisdiction
- Probably (if they realise the impact) Courts: who to send blocking order to?
- Organisations like Internet Watch Foundation or those providing parental control tools

Who worries?

- CERTS:
  - Security (no visibility) and privacy (non-EU resolver?) concerns
  - Technical issues (e.g. resolving local names for a company's intranet)

Unresolved questions

- What impact would it have on user experience?
  - Would a Firefox user see the same thing as a Chrome user?

    Knock, knock. "Who's there?" - "The end of internet universality."
  - Will DoH be a baked-in resolving method or will users be able to choose between DoH and old-fashioned DNS resolution?
  - Will browsers hardcode resolvers in their software?
  - What would be the impact of a German court order sent to e.g. US-based resolver for a Belgian user?

- How will this change the balance of power in the DNS industry?
  - What if the resolvers disregard (voluntary!) standards?
  - What happens to ICANN if a handful of resolvers could decide to shape the rootzone as they see fit (e.g. adding .amazon)?

Impact on ccTLDs

- Limited **<u>on a technical level</u>**
  - Probably a decreased query load.
  - Need to be watchful things like TTL are respected by the resolvers, but limited power to enforce that.
  - Should make the DNS a little faster (even though tests have shown that a particular resolver is slower in responding to queries for content that are not in that resolver's cloud).
- Main impact: political/policy: the balance in the ecosystem will be affected

Any questions?

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What is DoT

- DNS over TLS
- It’s a protocol (in an RFC standard) that allows resolving a name in a different way than we are used to
- The goal of the method is to increase user privacy and security by preventing eavesdropping and manipulation of DNS data.
- Similar to DoH but easier to block as it has a dedicated port
    - (DoH blocking would block all website traffic)
- Still a race between DoH and DoT but browsers will be calling the winner very soon. (and it is unlikely to be DoT)