DNS

What it is, How it’s used, how it’s attacked and How it’s defended

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GCDA

- 20 years Information Security
- Currently Practice Director Data Analytics at GuidePoint Security
- Presenter
  - Multiple SANS Summits from 2015-2019
  - BlackHat 2020, BSidesCharm 2019, BSidesDC 2019, Derbycon 2016
- Blog at www.shadowtrackers.net/blog
- Mentor for SEC555
- Christian, Father, Husband, Geek, Scout Leader who enjoys woodworking, sci-fi, fantasy, home networking

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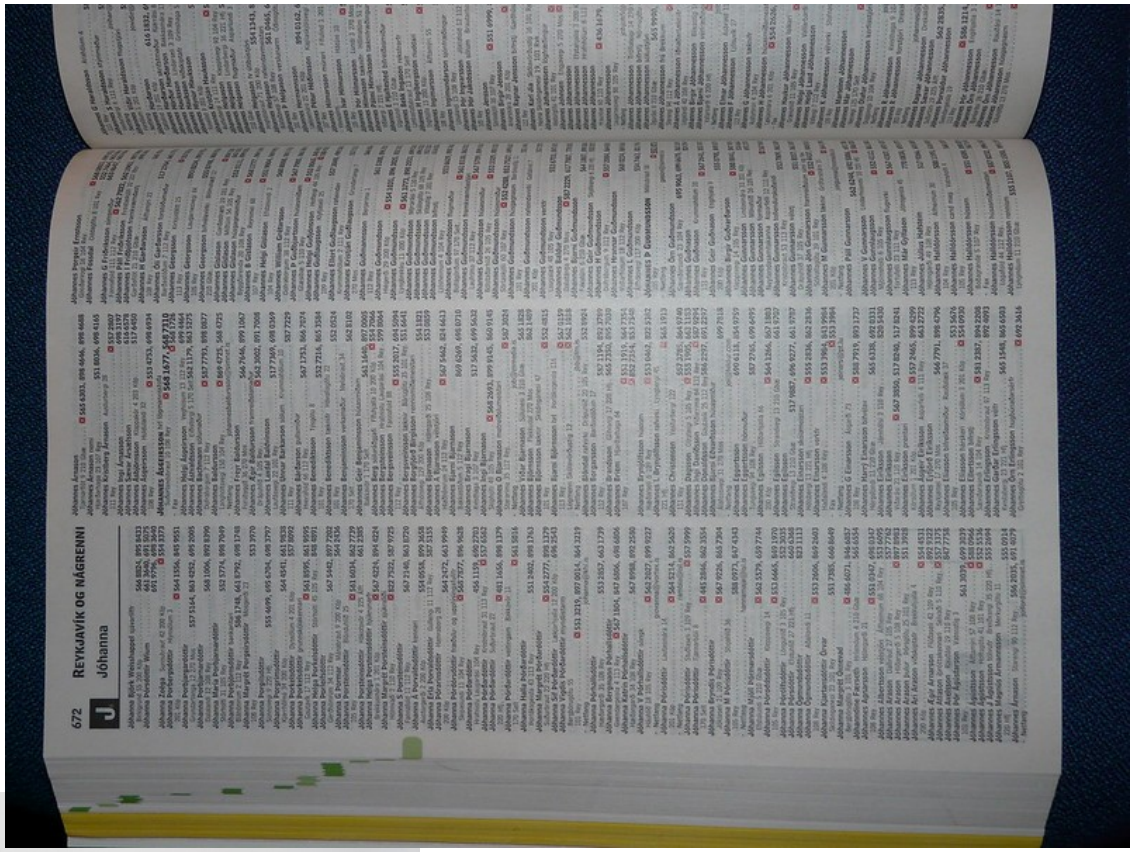

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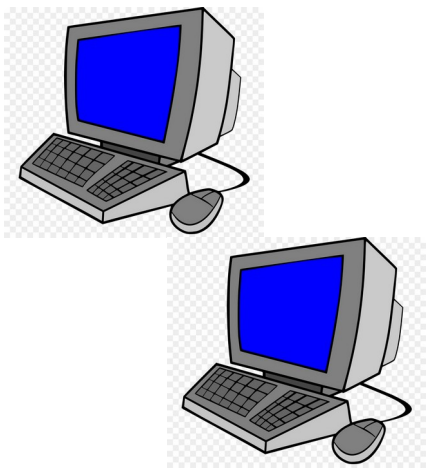

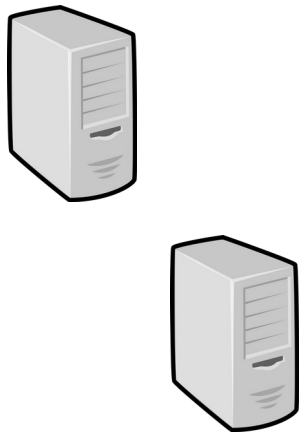

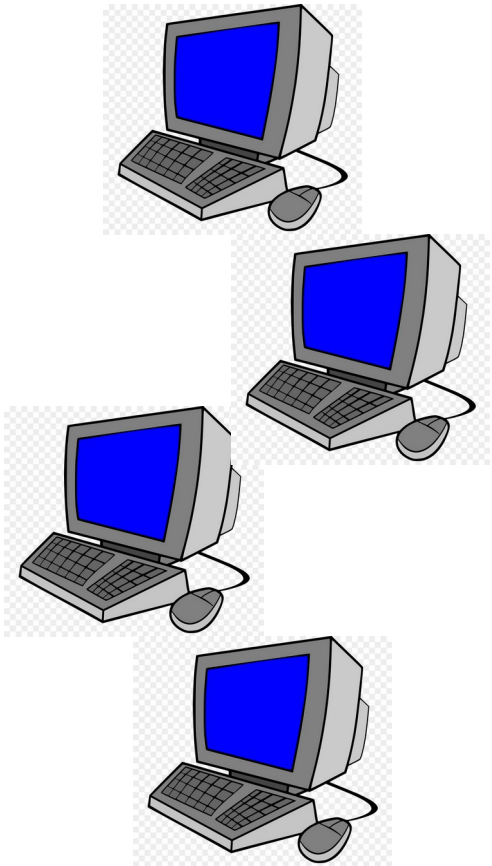

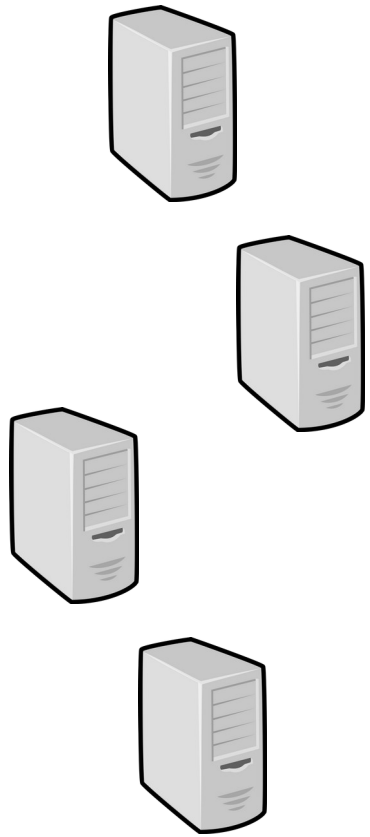

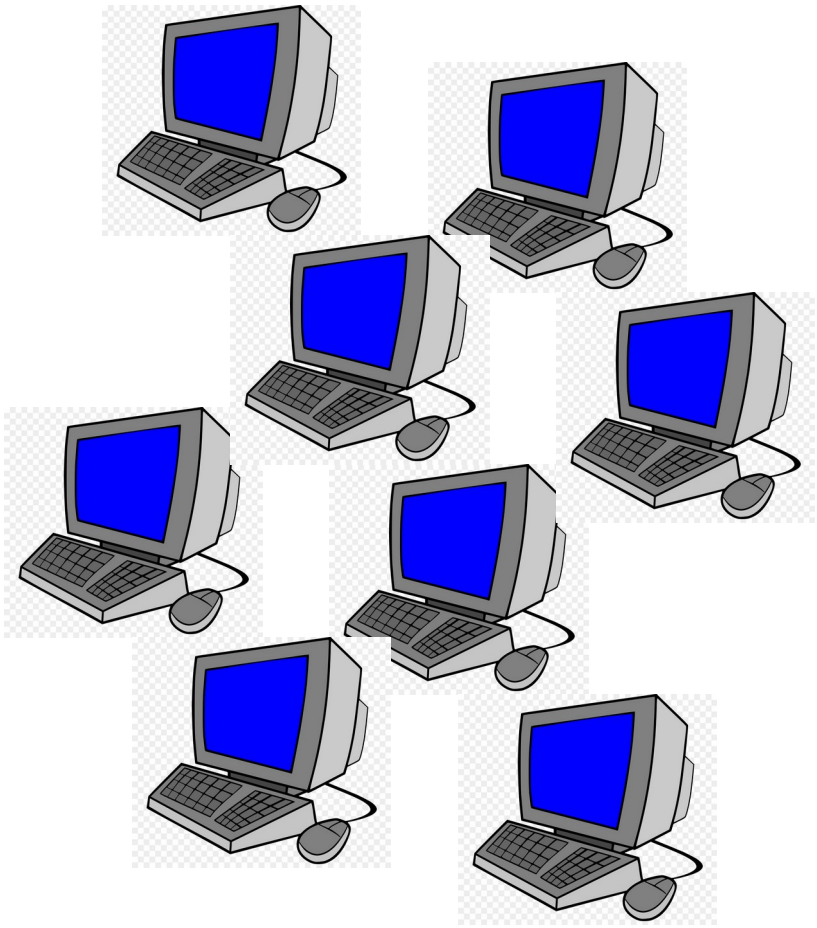

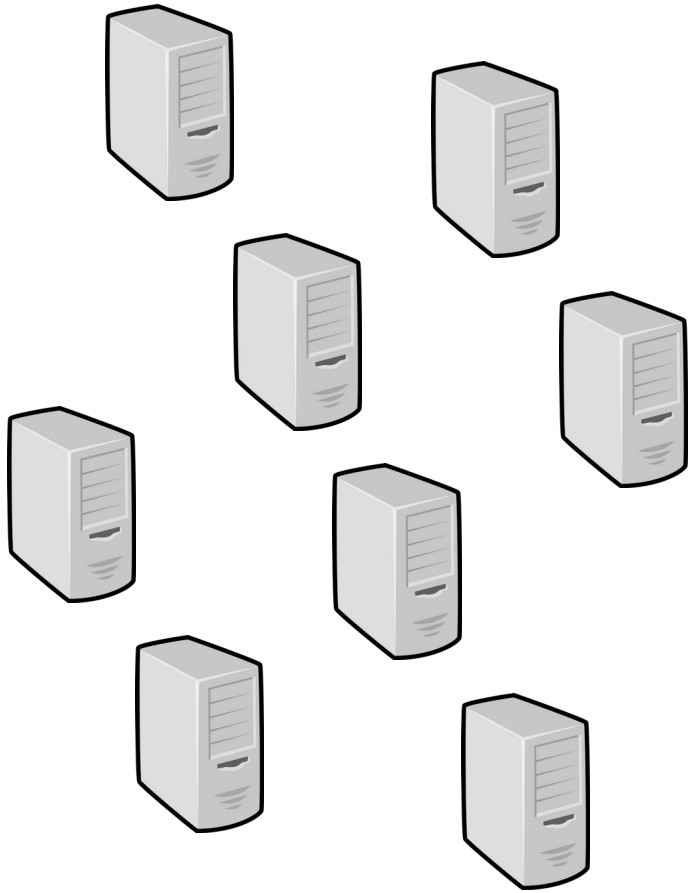

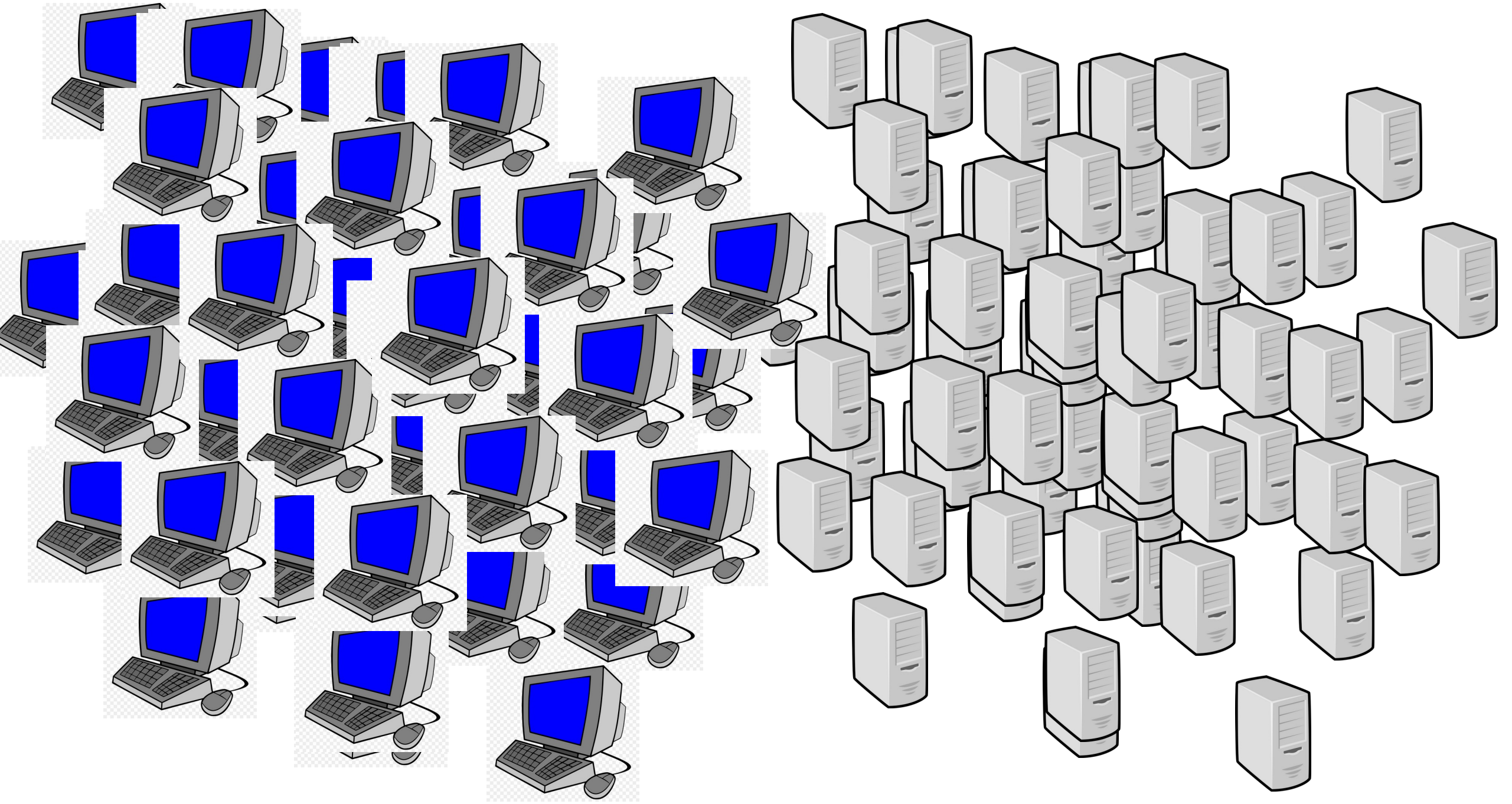

Domain Name Server - DNS

- Elizabeth Feinier and Jon Postal, two pivotal people who built and maintained early directory services.
- RFC 882 and 883 in 1983
- Superseded by RFCs 1034 and 1035 in 1987
- Berkeley Internet Name Domain, BIND, which is the application that acts as authoritative name servers for domains and as resolvers for queries released in 1985
- Uses UDP and TCP port 53
- Largely unchanged in 35 years

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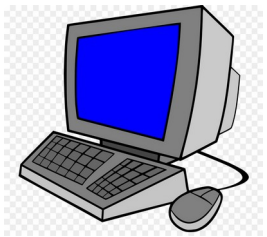
ROOT
“.”

.com, .net, .horse

Google.com,
amazon.com
,
irs.gov,
company.net



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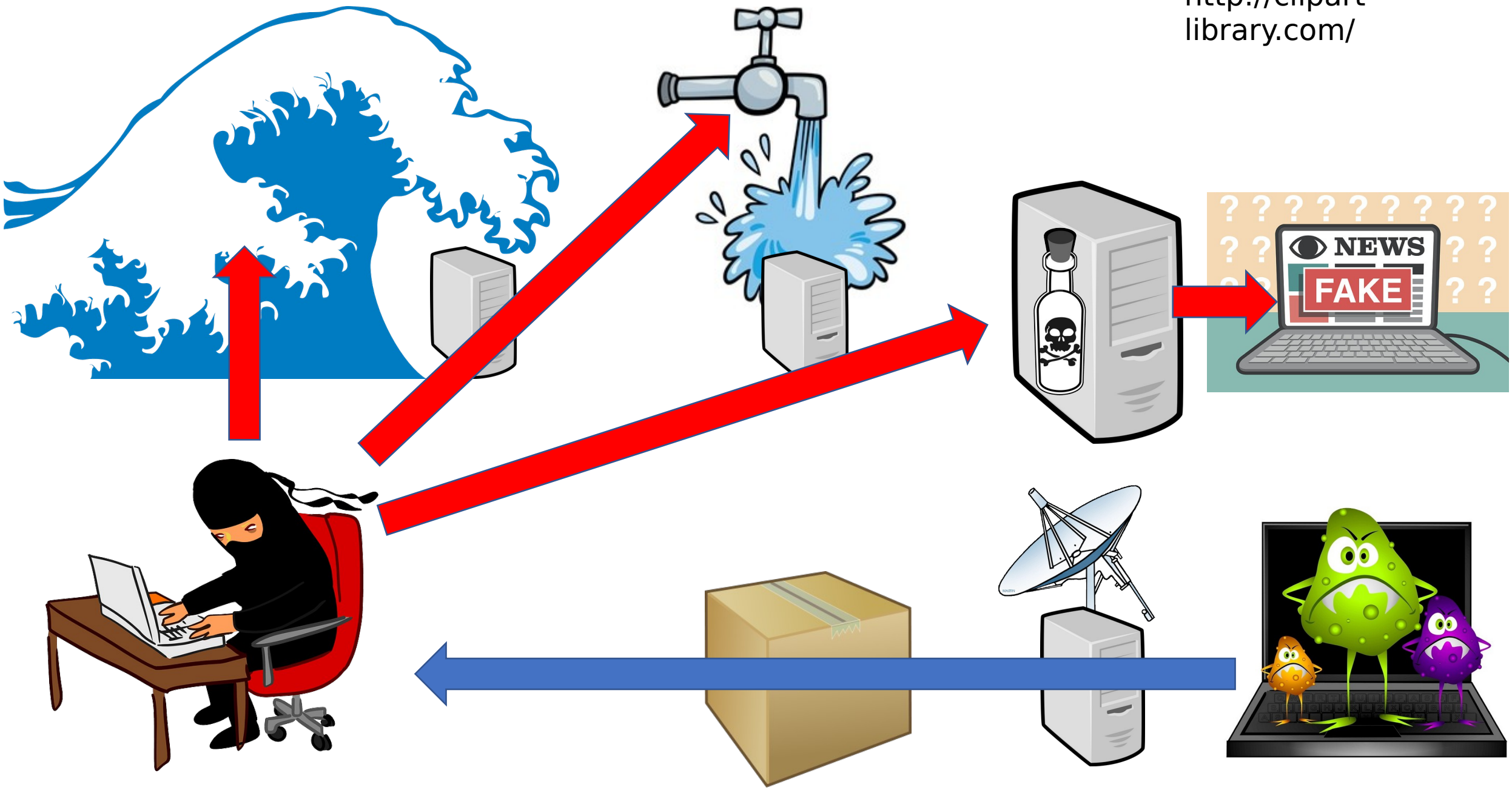

How to Protect?

- Split resolver and authoritative DNS servers
- Block all DNS traffic not going to your own DNS
- Patch DNS server, OS and DNS application
- Limit access to DNS server
- Strong authentication to DNS server
- Monitor DNS traffic
- DNSSEC

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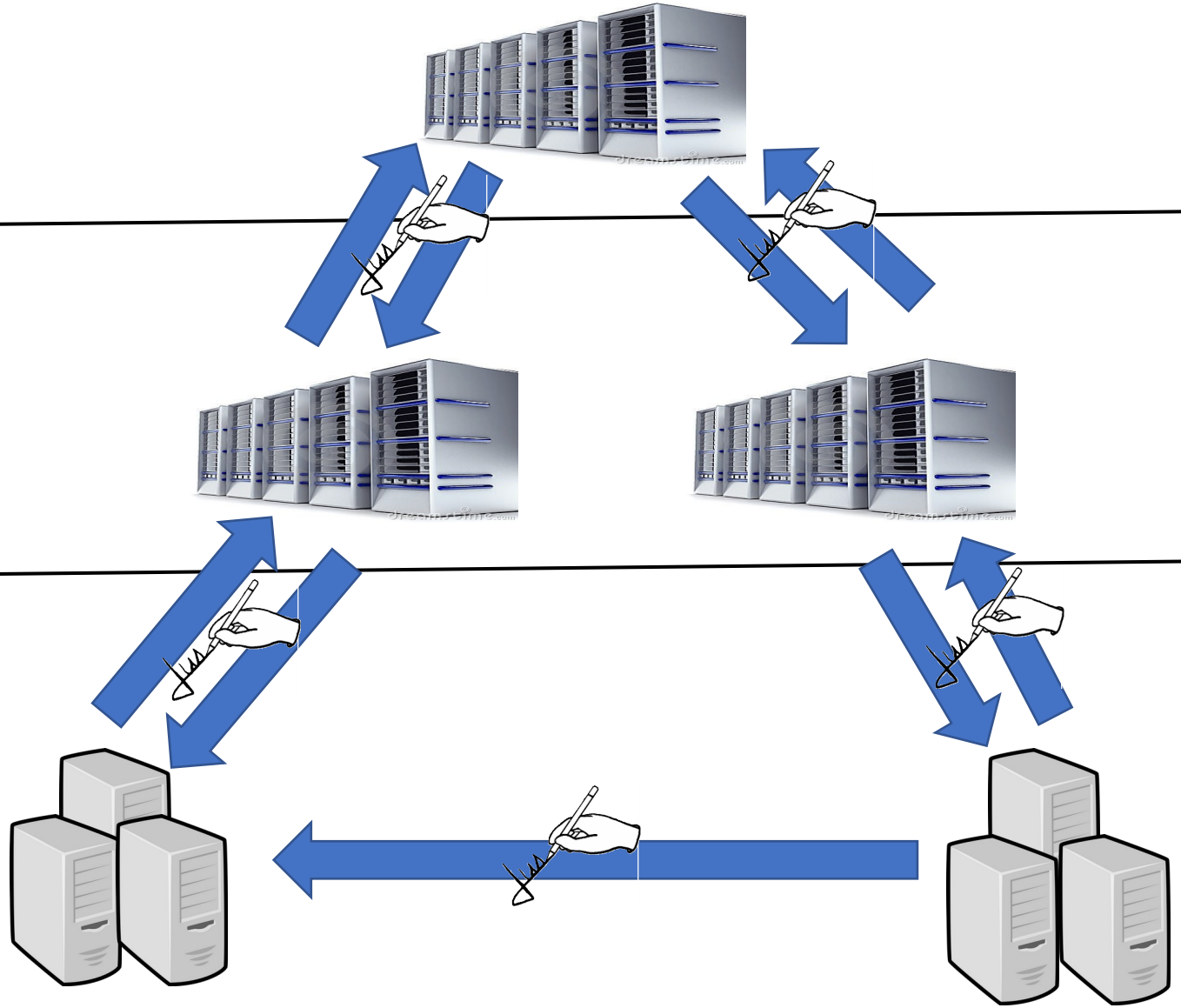

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Privacy?

Not So Much....

Everything is in clear text.....

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NOERROR F F T T 0
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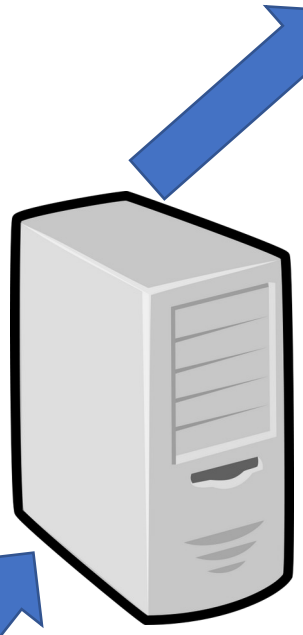

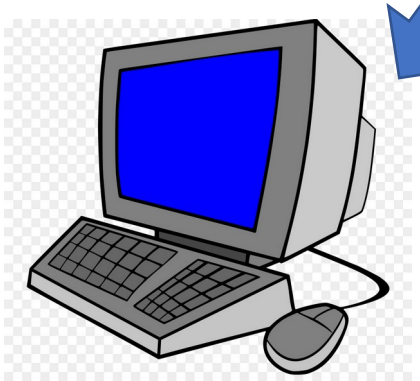

DOT & DOH to the rescue

DOT (DNS over TLS)

- RFC7858 and RFC8310
- Uses port 853,
- Available in Win10,
- Used in Android 9+, IOS has support but not enabled

DOH (DNS over HTTPS)

- RFC8484
- Uses port 443 with TLS
- FF enabled by default
- Available in Chrome, Edge, Opera

Considerations

- DOH is not a panacea
  - Multiple ways information leaks about your session, to say nothing of the actual session
- Using a US based DNS?
  - Subject to national security inquiries

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