IMPOSING RISK AND CONSEQUENCES ON CYBER ADVERSARIES

Domain Name System (DNS) and The Onion Router (TOR)

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DNS Primer

DNS – What is it?

- DNS: “Domain Name System”
- Maps names of servers on the Internet to numeric IP addresses
- Works similarly to the way phone directories map names to phone numbers

Phone Book

J. Doe 202-324-3000

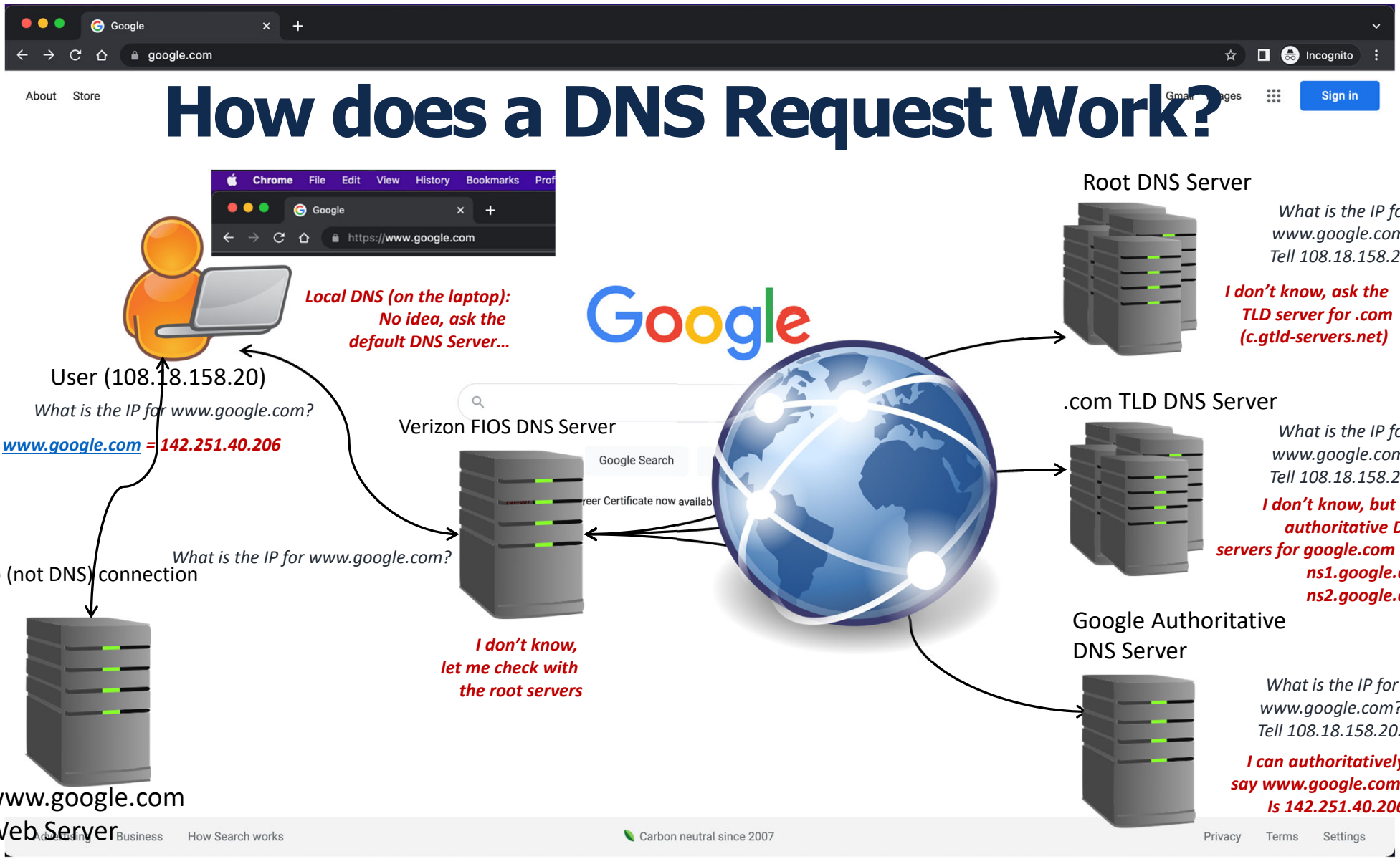
A. Smith 312-555-5555

DNS

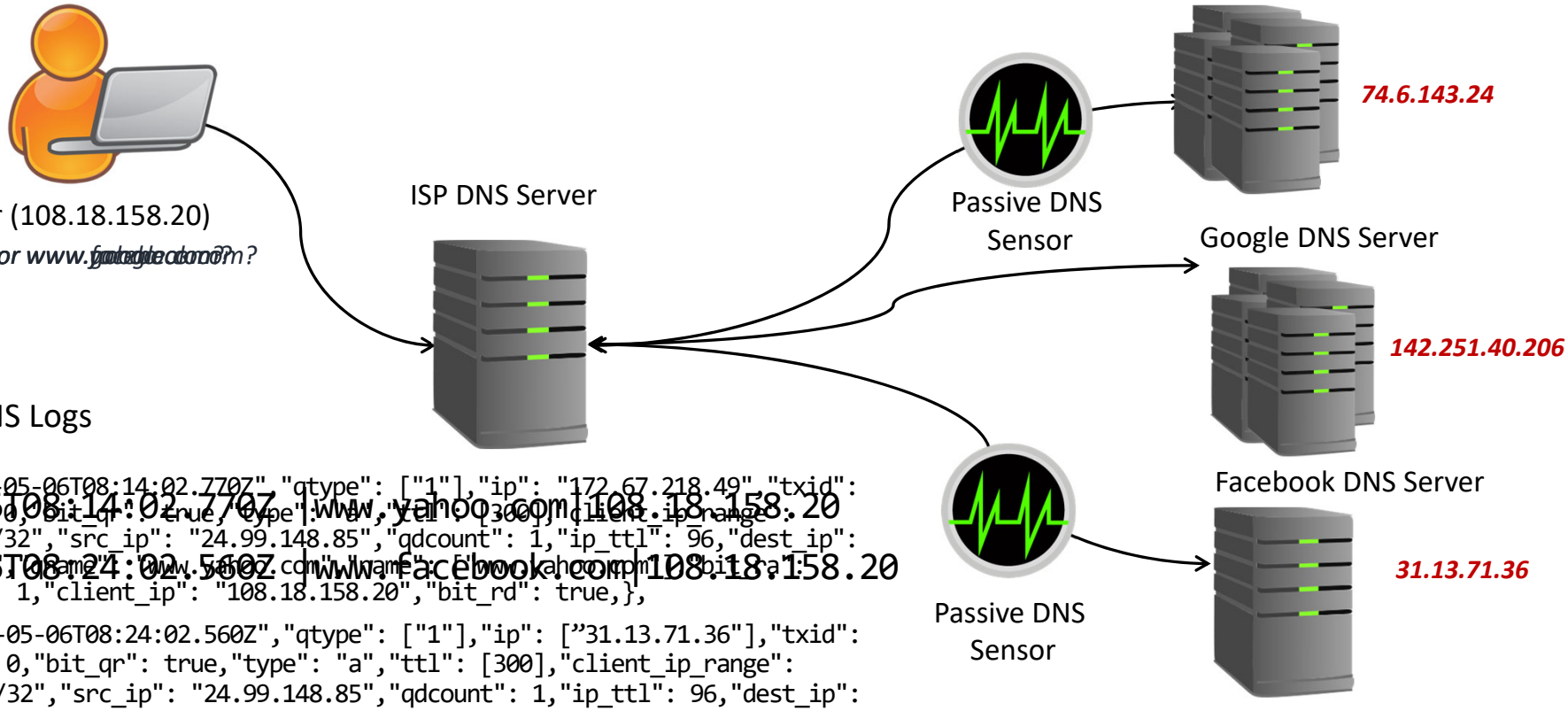
www.google.com 142.251.40.164

www.yahoo.com 74.6.231.20

How does a DNS Request Work?



Passive DNS



Passive DNS Logs

2022-05-06T08:14:02.770Z|www.yahoo.com|108.18.158.20

2022-05-06T08:24:02.560Z|www.facebook.com|108.18.158.20

{"date": "2022-05-06T08:14:02.770Z","qtype": ["1"],"ip": "172.67.218.49","txid": 57016,"rcode": 0,"bit_qr": true,"type": "a","ttl": [300],"client_ip_range": "108.18.158.20/32","src_ip": "24.99.148.85","qdcount": 1,"ip_ttl": 96,"dest_ip": "108.18.158.20","qname": "www.yahoo.com","name": ["www.yahoo.com"],"bit_ra": true,"ancount": 1,"client_ip": "108.18.158.20","bit_rd": true,},

{"date": "2022-05-06T08:24:02.560Z","qtype": ["1"],"ip": ["31.13.71.36"],"txid": 57127,"rcode": 0,"bit_qr": true,"type": "a","ttl": [300],"client_ip_range": "108.18.158.20/32","src_ip": "24.99.148.85","qdcount": 1,"ip_ttl": 96,"dest_ip": "108.18.158.20","qname": "www.facebook.com","name": ["www.facebook.com"],"bit_ra": true,"ancount": 1,"client_ip": "108.18.158.20","bit_rd": true,},

TOR Primer

TOR (The Onion Router)

- Open network designed to enable anonymity on the Internet
  - Operated by the TOR Project, a non-profit internet privacy organization
  - Runs through computers operated by volunteers
- Each connection is routed through a different, random set of computers
  - Often in different countries
- The TOR Project publishes a list of all TOR exit nodes
  - Data is available back to February 2010

Tor Network Basics