Passive DNS
Using the DNS for fun and profit

Alexandre Dulaunoy

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DNS protocol in 3 slides   DNS and Security?   DNS and Security - Quick Workshop   Bibliography   Q and A

Domain Name Space and Structure

Domain Name Space and Structure 1/3

- The domain name space is structured in a tree.
- The DNS root zone is at the top and provide information on how to reach top-level domains (ccTLD, gTLD).
- Security is limited and DNSSEC is not currently largely deployed.

Name Servers Roles 2/3

- Authoritative name server
  - Give answers about domain name configured by the local name administrator.
- Recursive and caching name server
  - They recursively lookup domains by querying and caching to/from authoritative name server.
- It's recommended to keep separated the authoritative name server from the recursive name server.

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DNS Protocol

DNS Protocol 3/3

```
▽ Queries
  ▽ scribe.twitter.com: type A, class IN
      Name: scribe.twitter.com
      Type: A (Host address)
      Class: IN (0x0001)
▽ Answers
  ▷ scribe.twitter.com: type CNAME, class IN, cname api.twitter.com
  ▷ api.twitter.com: type A, class IN, addr 128.242.250.157
  ▷ api.twitter.com: type A, class IN, addr 199.59.148.30
  ▷ api.twitter.com: type A, class IN, addr 199.59.148.32
  ▷ api.twitter.com: type A, class IN, addr 128.242.245.189
▷ Authoritative nameservers
```

- DNS uses UDP or TCP over port 53. The core element for the DNS procotol is the RR (Resource Record). Each record is composed of various fields: NAME, TYPE, CLASS, TTL, RDLENGTH and RDATA.

DNS and Security?

- Everyone relies on DNS on Internet even malware.
- Can we monitor DNS passively to discover malware infection or limiting its impact?
  - First passive DNS implemented in 2004 by Florian Weimer.
  - Discovering of malware fast-flux domains, malicious domains/IP, hijacked domains...
  - Privacy is critical when doing passive DNS.

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- From simple DNS monitoring (tshark -n -Tfields -e dns.qry.name port 53) to dnscap (https://github.com/adulau/dnscap).
- Can you use the DNS queries/answers for network forensic analysis (use the initial pcap file)?
- How to abuse DNS? DNS (cache, query) poisoning

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Q and A

- Thanks for listening.
- adulau@foo.be