Domain Name System

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Outline

- Requirement
  - Authoritative DNS Server
  - Resolver
- Grading

Requirement

In this homework, you are requested to build a series of DNS servers.

Which includes:

- An authoritative DNS Server
- A resolver

Authoritative DNS Server (60%)

- You should set:
  - IP: 192.168.$ID.53
  - FQDN: ns1.$ID.nasa
- And the server should implement:
  - the zone resolution of $ID.nasa
  - Reverse zone resolution
  - Not resolve any other records outside of your designated zone
  - DNSSEC
    - Use debug tool to submit your DS records
    - Collect your DS record values and join them, to submit
    - Algo. 13 (ECDSAP256SHA256) is **required**.

  Note: Root server at 192.168.254.3

Authoritative DNS Server (60%)

- You should add the following records
  - Zone $ID.nasa
    - whoami A 10.113.$ID.1
    - dns A 192.168.$ID.153
    - ns1 A 192.168.$ID.53

- About DS Record:
  - Upload format:
  - DS,DS,DS,...   (multiple DS record split by ,)
  - DS = tag algorithm digestType digest (split by whitespace)
    - e.g.
    - 9721 13 2 80B11E8F0DB9324EBC83CAFB5DF60A29BF23E2AE3E6D62243A86867FA67B8110
  - Note: You should ensure there is no unnecessary whitespace existed

Resolver (40%)

- You should set:
  - IP: 192.168.$ID.153
  - FQDN: dns.$ID.nasa
- And the server should implement:
  - Resolves nasa. from root server recursively
  - Resolves others from Cloudflare DNS Server (1.1.1.1)
  - Provide **DoH、 DoT** functionality

  Note: The judger uses this server as its resolver while judging! If your resolver is not working, most checkpoints will fail.

Resolver (40%)

- About DoH and DoT:
  - DoT endpoint: tls://dns.$ID.nasa
  - DoH endpoint: https://dns.$ID.nasa/dns-query
  - The certificate could be obtained from NASAOJ debug tools

Grading

- Authoritative DNS (60%)
  - Forward (20%)
  - Reverse (15%)
  - Public Check (10%)
  - DNSSEC (15%)
- Resolver (40%)
  - Domain name resolution (20%)
  - DoH (10%)
  - DoT (10%)

Attention

- Your work will be scored by Online Judge system
  - Only the **LAST** submission will be scored
  - Late submission will **NOT** be accepted
- **ALWAYS BACKUP** your system before submission, as we may do malicious actions
- Make sure everything works after reboot
- Due date: 2025/03/27 Thur. 23:59:59

Help

- Join NCTUNASA google group
  - If you have any question, you can post your problem in this group, TAs and Students will help you.
  - https://groups.google.com/g/nctunasa
- UNIX 常見指令教學
  - https://it.cs.nycu.edu.tw/unix-basic-commands
- How To Ask Questions The Smart Way
  - https://github.com/ryanhanwu/How-To-Ask-Questions-The-Smart-Way