IPv6 & DNS: DNSv6

Overview

- How important is the DNS?
- DNS Extensions for IPv6
- DNS Resource Lookup
- Recursive Name Servers Information Discovery
- DNS Service Continuity through IP Networks
- Operational Requirements, Recommendations & Issues
- About IPv6 AAAA *glue* Records in DNS Zones
- IPv6-capable DNS Software

How important is the DNS?

- Need for ***Name Resolution (Lookup)***
  - Name resolution **needed** prior to a TCP/IP communication
  - With Internet **exponential growth**, it became:
    - **impossible to memorize** millions of IP addresses;
    - **impossible to maintain** them in **a centralized flat file** (aka '/etc/hosts') ☹

- ***2 Approaches*** to the DNS : RFC 1034 / RFC 1035
  - ***A Database:*** Stores different types of ***Resource Records*** (RR):
    - **Mainly** IP address(es) **but** other types (NS, MX, PTR, …)
  - ***A TCP/IP Protocol and a Client/server Application:***
    - IPv4 and IPv6; UDP & TCP; port 53
    - **Query** (for a RR) → **lookup** in the DNS **database** → **Response**

➔ Data returned to DNS clients SHOULD NOT depend on the underlying IP version

DNS Extensions for IPv6 Support
RFC 3596 (DS)

- ***Forward lookup*** ('Name → IPv6 Address'):
  - A **new** Resource Record (RR) : **'AAAA'**
    - The **'AAAA'** RR is for IPv6 what the **'A'** RR 'is for IPv4
    - Example:

```
www.afnic.fr.        IN   A       192.134.4.20
                     IN   AAAA    2001:660:3003:2::4:20
```

- ***Reverse lookup*** ('IPv6 Address → Name'):
  - **PTR** RR (pointer) applied to the **new** reverse tree: **ip6.arpa**
    - A dedicated tree with ***nibble*** (4 bits) ***boundaries***
    - ip6.arpa tree is for IPv6 what the in-addr.arpa tree is for IPv4
    - Example:

```
$ORIGIN 1.0.0.0.6.0.0.3.0.6.6.0.1.0.0.2.ip6.arpa.
1.0.0.0.1.0.0.0.0.0.0.0.0.0.0.0   PTR   ns3.nic.fr.
```

DNS AAAA Lookup