LIS565 Lecture 7

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Reading

Comer, chapter 24

Albitz and Liu, chapter 1, 2

RFC 1034 and 1035

Structure

Definition

A host name associates a human-friendly name with an IP address.

Example:

trabbi.liu.edu = 148.4.16.229

Finding an IP for a name is called a name lookup. The reverse is a reverse lookup.

Name anatomy

Names are a sequence of labels, separated by dot.

Names may contain letters, numbers and hyphens. They may not start with a hyphen.

Names solve from right to left, contrary to addresses, that resolve from left to right.

Purpose

Allows to keep constant name for

- changing machines
- changing the location of the machine.

Makes it easier for humans to remember access points to services.

History

In the 70s, one single file `HOSTS.TXT` was maintained at SRI-NIC, downloaded frequently by all hosts on the Internet.

Problems

- traffic and load
- name collisions
- consistency

1984, Paul Mockapetris releases RFC822 and RFC883 that describe the Domain Name System DNS.

First implementation software called JEEVES.

DNS

- distributed database
- client server architecture
- general purpose
- hierarchical structure
- independent of physical structure

top level domains

com	commercial organizations
edu	educationan institutions (4-year)
gov	government institutions
mil	millitary groups
net	major network organizations
org	other organizations
int	international organizations
arpa	arpa domain
ISO 3166 country code	countries

Now there are some new ones.

BIND

BIND (Berkeley Internet Name Domain) is an implementation of the Domain Name System (DNS) protocols and provides an openly redistributable reference implementation of the major components of

- a Domain Name System server (named)
- a Domain Name System resolver library
- tools for verifying the proper operation of the DNS server the Domain Name System, including:

Two flavours

- version 4
- version 8

Current: BIND Version 9.1.3 (Released July 3, 2001)

resolution

Each client must know about at least one DNS server.

Two types of queries by a client

- recursive
- iterative

Each server must know about at least one server in the upper level.

Resoltution works buttom-up rather than top-down, like in the phone system.

caching

When there is a request, the server checks if it is authoritative. If it is, it returns the answer.

If not, it checks if the answer is cached, sends the answer flagged "non-authoritative". It can also then return the IP address of the authoritative server.

When authorities respond, they include a TTL in seconds, after which the cached answer expires.

resource types

A	IP address	32-bit IP address
CNAME	canonical name	canonical domain name for an alias
HINFO	CPU & OS	CPU and OS data
MX	mail exchange	preference and name of host that accepts ma
NS	name server	
PTR	pointer	alias for a domain
SOA	start of authority	metarecord for the server

the openlib.org domain

```
openlib.org. IN SOA wotan.liu.edu. tkrichel.wotan.liu.edu. (
             2001111300         ; Serial
             10800              ; Refresh after 3 hours
             3600               ; Retry after 1 hour
             640800             ; Expire after 1 week
             86400              ; Minimum ttl of 1 day
)

openlib.org.            IN      NS     wotan.liu.edu.
; primary server, the one which holds the authoritative info (this file)

openlib.org.            IN      NS      utserv.mcc.ac.uk.
; secondary servers -- if they are willing to be. At least one is nessesary.

openlib.org.            IN      A       131.227.9.154
; this is the name of the host (A), not the zone. (Different name spaces!)
; Note, this line resolves the link in the first NS record
www.openlib.org.        IN      A       131.227.9.154
amf.openlib.org.        IN      A       131.227.9.154
; for example









trabbi.openlib.org.     IN      A       24.46.24.170
ns.openlib.org.         IN      A       148.4.2.231
oai.repec.openlib.org.         IN      A       148.4.16.230
www.uk.openlib.org.     IN      A       131.227.9.154
; two more hosts; note, this does not mean the 'uk.openlib.org' zone exists

; mail record
openlib.org.         IN      MX       1         wotan.liu.edu.


trabbi.openlib.org.     IN      TXT       "hello world"
```

whois openlib.org

```
Krichel, Thomas (OPENLIB3-DOM)
   720, Northern Boulevard
   Brookville, NY 11548-1300
   US
   Domain Name: OPENLIB.ORG
   Administrative Contact, Technical Contact, Billing Contact:
      Krichel, Thomas  (BYUXUEBSTI)  tkrichel@LIU.EDU
      720, Northern Boulevard
      Brookville, NY  11548-1300
      US
      +1-516 299 2843 +1-516 299 4168
   Record last updated on 10-Nov-2001.
   Record expires on 25-Jun-2006.
   Record created on 25-Jun-1999.
   Database last updated on 15-Nov-2001 06:21:00 EST.
   Domain servers in listed order:
   NS.OPENLIB.ORG               148.4.2.231
   UTSERV.MCC.AC.UK             130.88.200.6
```