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Naming and the Domain Name System

Geert Jan de Groot

RIPE NCC

<GeertJan.deGroot@ripe.net>

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The problem of naming

People don't like to remember numbers

- info.ripe.net is easier to remember than 193.0.0.195
- System administrators sometimes need to change IP numbers

Naming is the mechanism to bind names to IP addresses and vice versa

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What is being named

Naming is for humans:

- hosts

  ... you can telnet to info.ripe.net

- mailboxes

  ... send mail to ncc@ripe.net

- organisations

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Naming using lists

One can simply make a list....

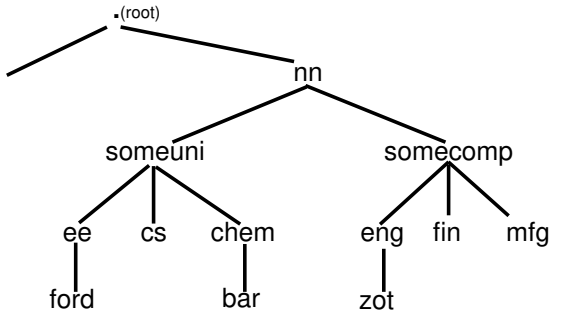
```
192.0.2.1    mercedes
192.0.2.2    ford
192.0.2.3    renault
192.0.2.4    volvo
```

But.. maintaining such a list for the whole Internet in one place is impossible!

- As the network grows, so will the number of changes
- Every site must obtain a fresh copy of the masterfile frequently (and still always outdated)
- As the list grows, so are the chances of name conflicts

Hierarchical name tree

An hierarchy allows for delegation of responsibility and autonomy of each area




```
ford.ee.someuni.nn     zot.eng.somecomp.nn
bar.chem.someuni.nn
```


Domain Name System

Domain Name System is a client-server protocol

- client asks server for information

Servers only know part of the naming tree

- if a nameserver gets a request which it does not have data for, it asks other nameservers using the same server-client protocol

DNS is based on caching

- answers collected are cached for limited time (time-to-live)

Types of DNS servers

Primary server

- Gets its data from a ‘zone file’

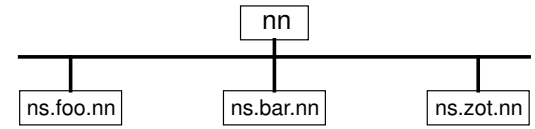
Secondary nameserver

- Copies zone-data from primary nameserver (refreshes frequently)
- Secondary provides backup / load sharing

Caching nameserver

- Find & ask other nameservers (primary and secondary)
- Caches data it received earlier

Nameserver interaction




```
pri: foo.nn                    sec: foo.nn
sec: bar.nn     pri: bar.nn
                sec: zot.nn    pri: zot.nn
```

Ask foo.nn for
ftp.foo.nn -> direct answer (primary)
ftp.bar.nn -> direct answer (secondary)
ftp.zot.nn -> asks nn, finds ns.bar.nn and ns.zot.nn, asks either one

Primary / secondary / cache is per zone!

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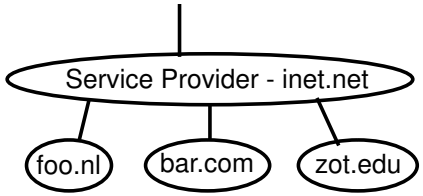
Naming is not routing



Service provider uses inet.net, but customers do not need to be something.inet.net!

Naming is organisational, not technical

The Domain Name System is independent of actual network topology!

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Common Top Level Domain names

- COM Commercial organisations
- EDU Educational institutions
- NET Major network organisations (not users)
- INT International organisations (e.g. NATO)
- GOV US government
- MIL US military
- ORG Other organisations
- ARPA Old ARPANET (obsolete)
- country code Countries according to ISO-3316 (FR, JP, DE, BR)

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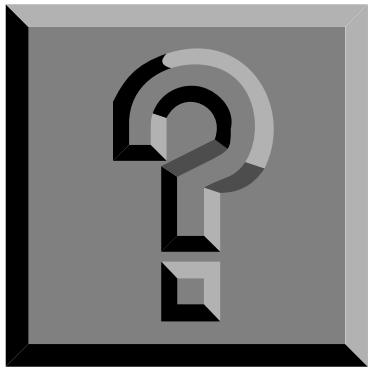
Questions?