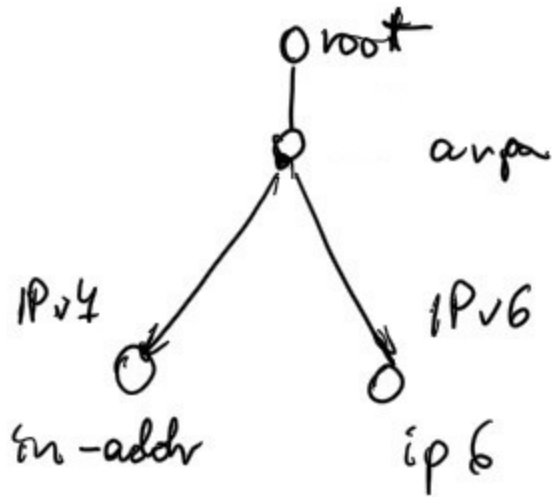


IP → domain name ?



the tails of domains → responsible for lookup → in-addr.arpa.
ip6.arpa.

192.0.2.147

→ from general information

→ to more detailed

147.0.0.0 → to more detailed.

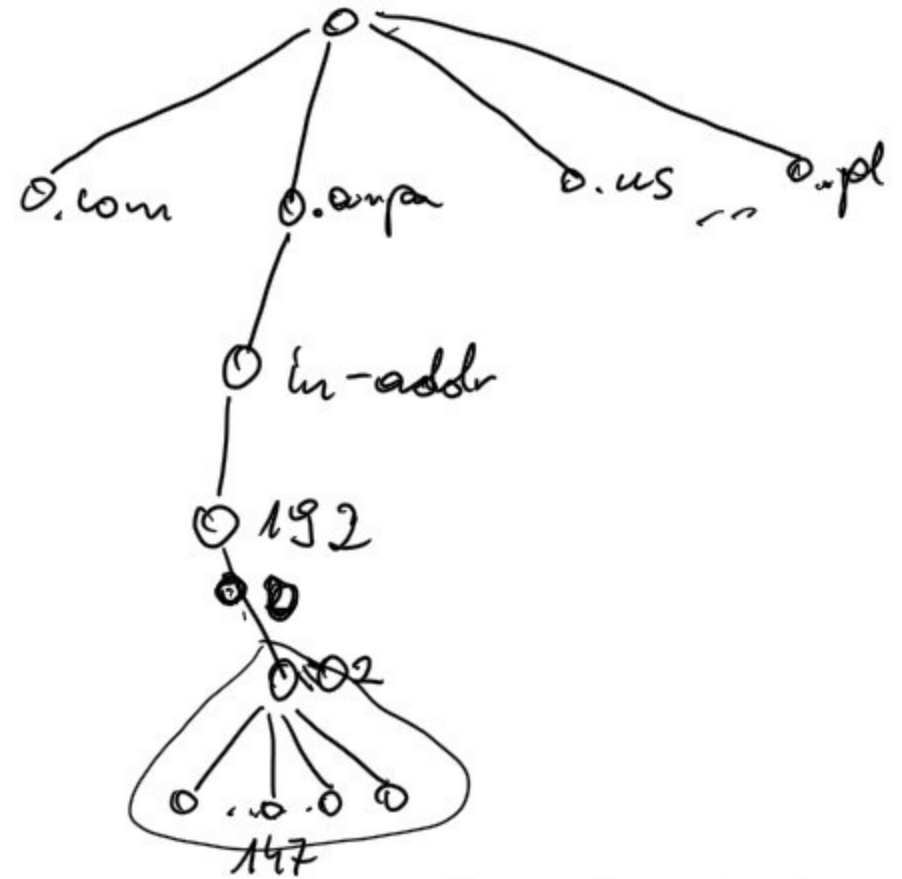
← from general

← from general

So the nodes in the tree are organized in reverse order

147.0.0.0, 192.0.2.0, in-addr.arpa.

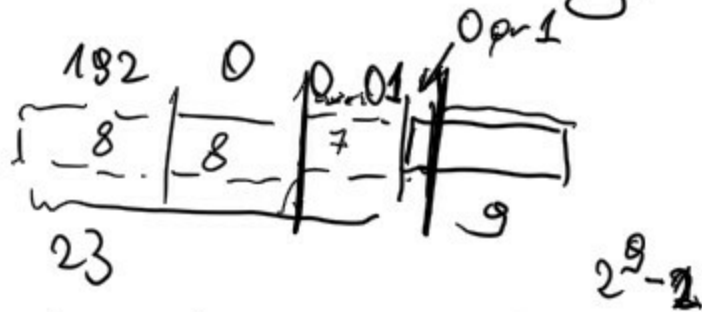
This corresponds to the tree:



So in the case of netmask /24 it is easy to organize the hierarchy.

What about network /23 ?

a subnetwork is allocated on non-octet boundaries, so how to reflect this in the hierarchy?



Let's consider for example

192.0.2.0/23

This network is composed of two /24 networks:

192.0.2.0/24

192.0.3.0/24

So we have two reverse domains corresponding to these two networks

2.0.192.in-addr.arpa.

3.0.192.in-addr.arpa.

OK, we have two nodes describing the subnet.

But for the network /25 a more complex case must be encoded:

In our example 192.0.2.0/25



If we try to represent in the corresponding reverse domain as

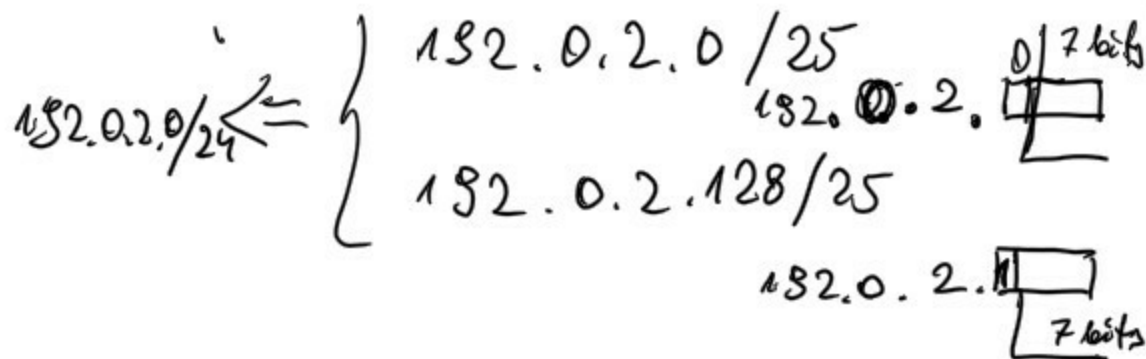
2.0.192.in-addr.arpa.

this (in fact 192.0.2.0/24) would encompass

our network, but also the network

192.0.2.128/25

why?



And the latter might belong to a different organization and be administered by someone else.

To address the problem for 192.0.2.0/25 a different reverse domain is defined:

0/25.2.0.192.in-addr.arpa

↑ fourth octet of the address

OK, what about mapping a particular address in the form 192.0.2.185

which corresponds to the reverse name:

185.2.0.192.in-addr.arpa query?

to the zone?

The solution uses so called canonical names (CNAME) So CNAME record is created individually for each IP address in the zone, to enable delegation of subsets of records to different zone administrators.

2.0.192.in-addr.arpa IN SOA dns.
ipam.worldwide.com

0/25 IN NS dns.A1.ipam.worldwide.com
IN NS dns.A2.ipam.worldwide.com

1 IN CNAME 1.0/25.2.0.192.in-addr.com

2 IN CNAME 2.0/25.2.0.192.in-addr.com

...

127 IN CNAME 127.0/25.2.0.192.in-addr.com

128/25 IN NS dns.B1.ipam.worldwide.com
IN NS dns.B2.ipam.worldwide.com

129 IN CNAME 129.128/25.2.0.192.in-addr.
.arpa.

130 IN CNAME 130.128/25.2.0.192.in-addr.
.arpa

...

254 IN CNAME ~

and we follow the path with the
resulting canonical name and query

dns.B1.ipam.worldwide.com

and the Name Server will
find the entry:

185.128/25.2.0.192.in-addr.arpa IN PTR

public17.pwr.edu.pl

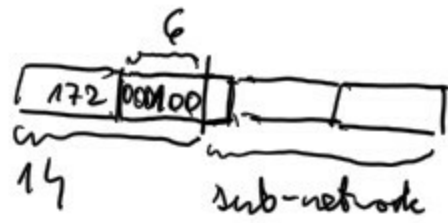
For networks with masks 19-15
/17-23

domain also DNAME records can
be used e.g.

172.16.0.0/14 can be configured

within the 172.in-addr.arpa
zone.

172.16.0.0/14



$$16 = 2^4 = (10000)_2$$

172.in-addr.arpa. zone file

16/14.172.in-addr.arpa IN NS dns1.blah.com

16/14.172.in-addr.arpa IN NS dns2.blah.com

16.172.in-addr.arpa IN DNAME 16.16/14.172.in-addr.arpa

17.172.in-addr.arpa IN DNAME 17.16/14.172.in-addr.arpa

18 ~~~~

19.172.in-addr.arpa IN DNAME 19.16/14.172.in-addr.arpa

and we are looking for DN of 172.18.45.94. So this IP will be

translated into reverse name

94.45.18.172.in-addr.arpa.

and we get domain alias in the server holding the zone

172.in-addr.arpa.

and dns1.blah.com will answer

via Name Server responsible for that subdomain, which can answer the query.

DNS Message Format:

DNS - transmitted over UDP using port 53

DNS message fields:

