DNS

DNS – Domain Name Service

- This lecture is based closely on ZyTrax excellent “DNS For Rocket Scientists” found at: http://www.zytrax.com/books/dns/
- The DNS Graded lab is probably the most difficult activity in this course.

What Does DNS Do?

1. A DNS translates (or maps) the name of a resource to its physical IP address - typically referred to as forward mapping

2. A DNS can also translate the physical IP address to the name of a resource - typically called reverse mapping.

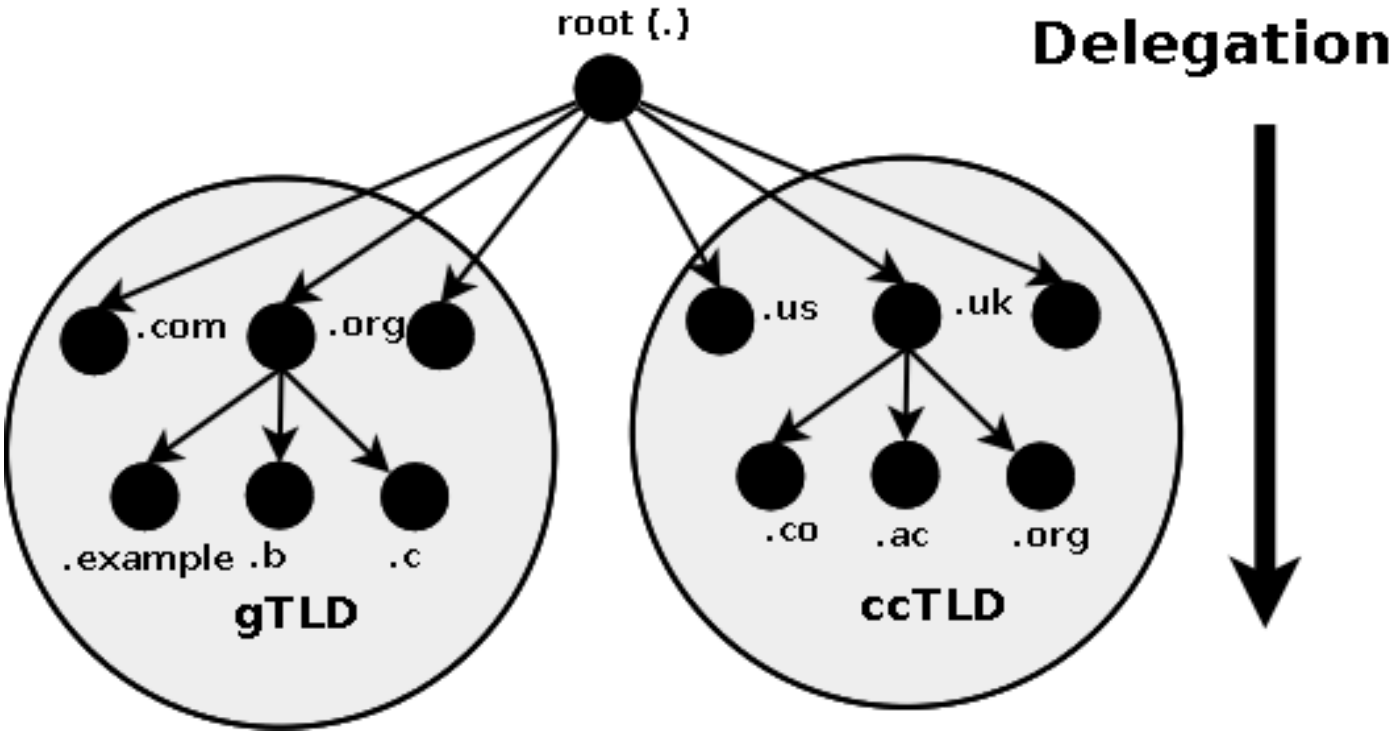
Why bother?

Can’t we just use a hosts file?

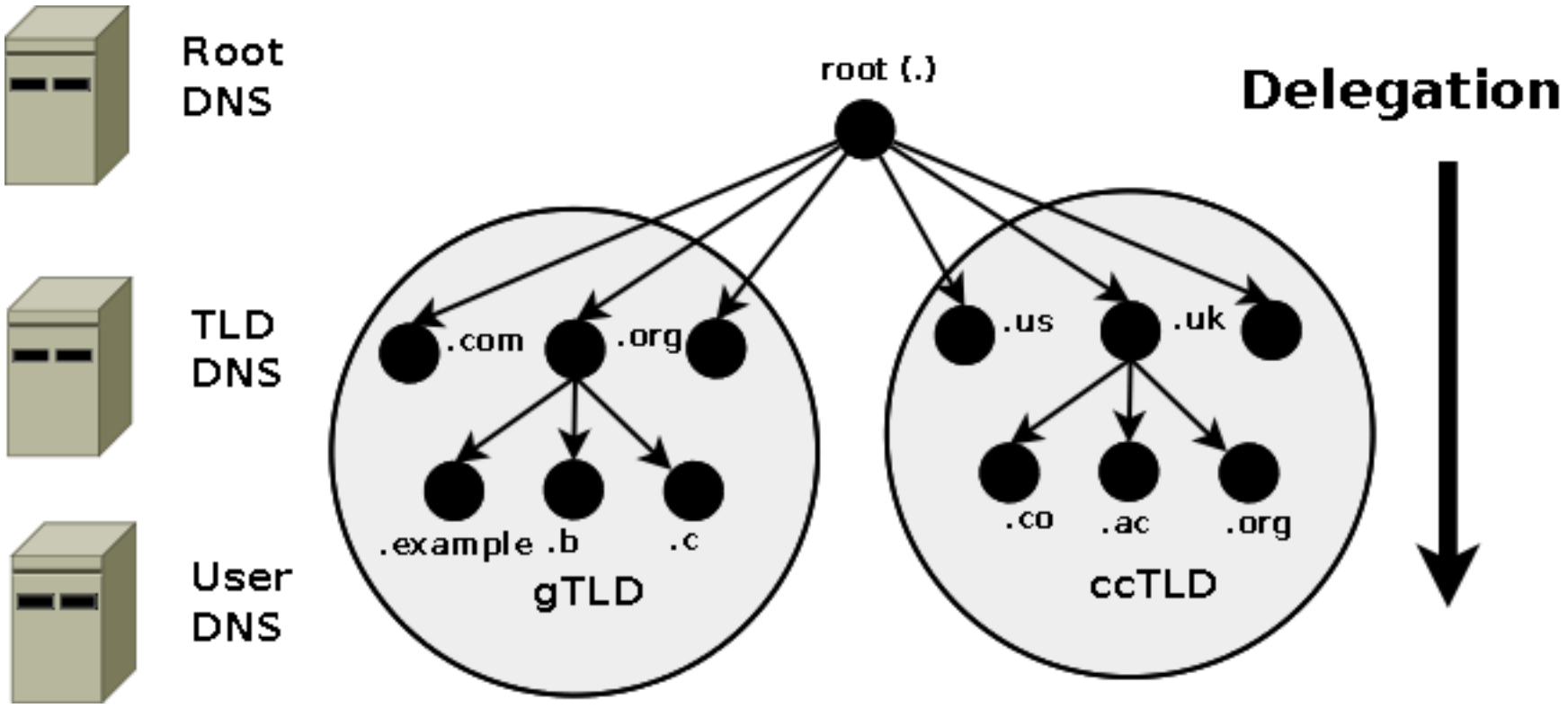
Three Needs:

1. The need for a hierarchy of names
2. The need to spread the operational loads on our name servers
3. The need to delegate the administration of our Name servers

Domain Structure Delegation



DNS mapped to Domain Delegation



Zones and Zone Files

Zone files contain Resource Records that describe a domain or sub-domain. The format of zone files is an IETF standard defined by RFC 1035. Almost any sensible DNS software should be able to read zone files.

DNS Queries

The major task carried out by a DNS server is to respond to queries (questions) from a local or remote resolver or other DNS acting on behalf of a resolver. A query would be something like 'what is the IP address of fred.example.com'.

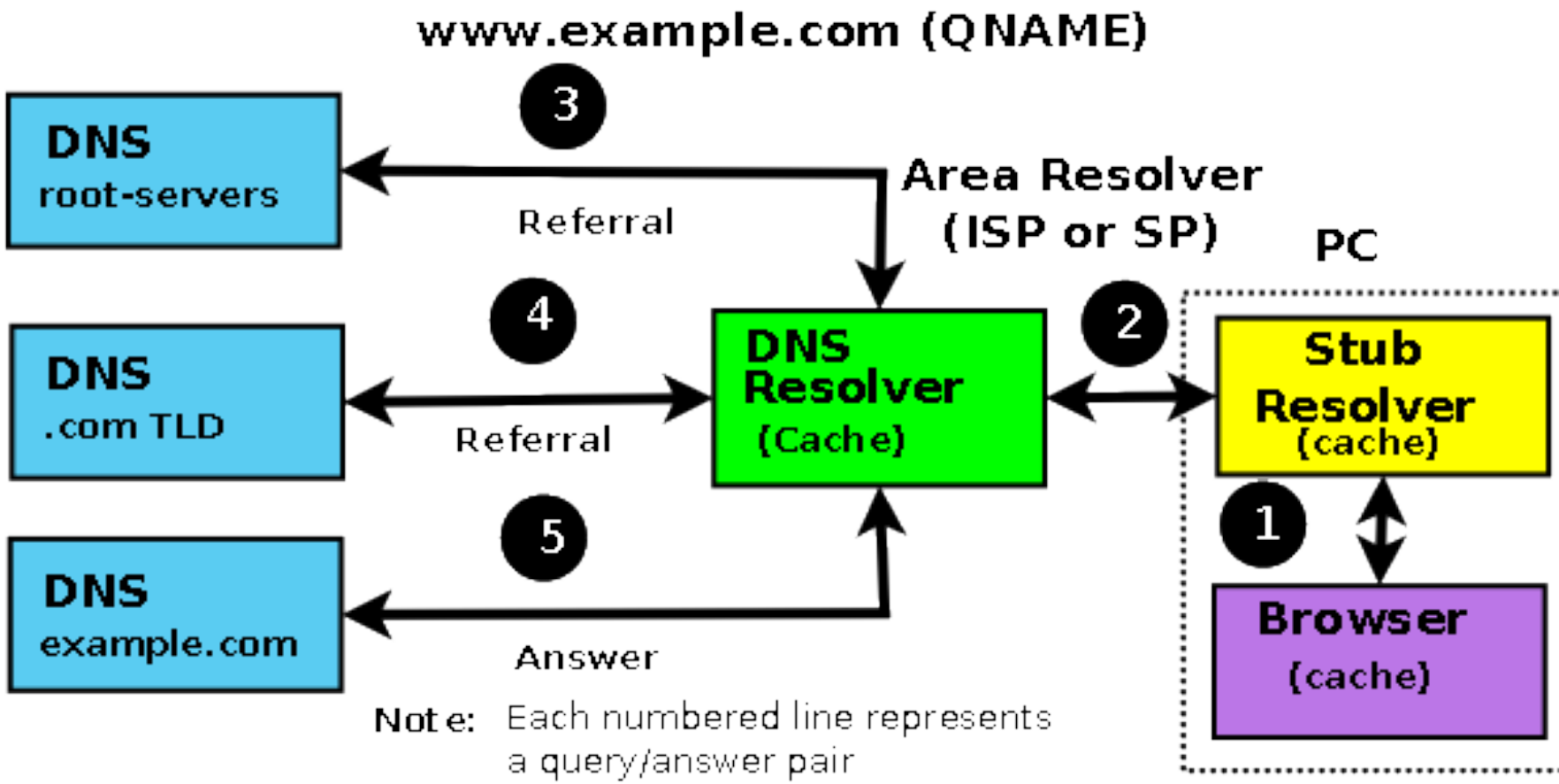
Three types of queries

1. A recursive query - the complete answer to the question is always returned. DNS servers are not required to support recursive queries.

2. An Iterative (or non-recursive) query - where the complete answer MAY be returned or a referral provided to another DNS. All DNS servers must support Iterative queries.

3. An Inverse query - where the user wants to know the domain name given a resource record. Reverse queries were poorly supported, very infrequent and are now obsolete (RFC 3425).

Recursive and Iterative Queries

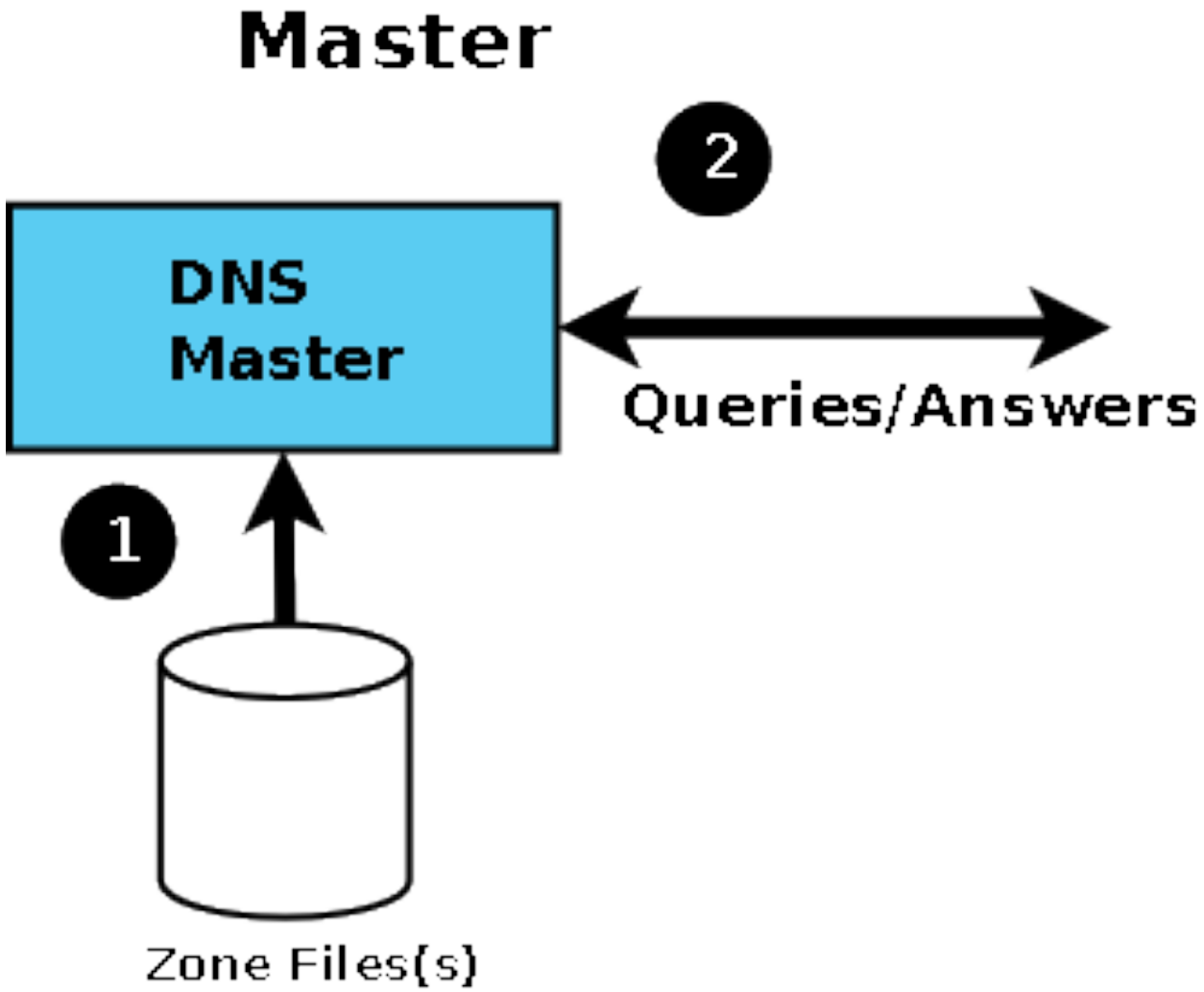


Item (2) is a Recursive Query - one question gives one complete answer
Items (3), (4) and (5) are Iterative queries which may return either a Referral or an answer

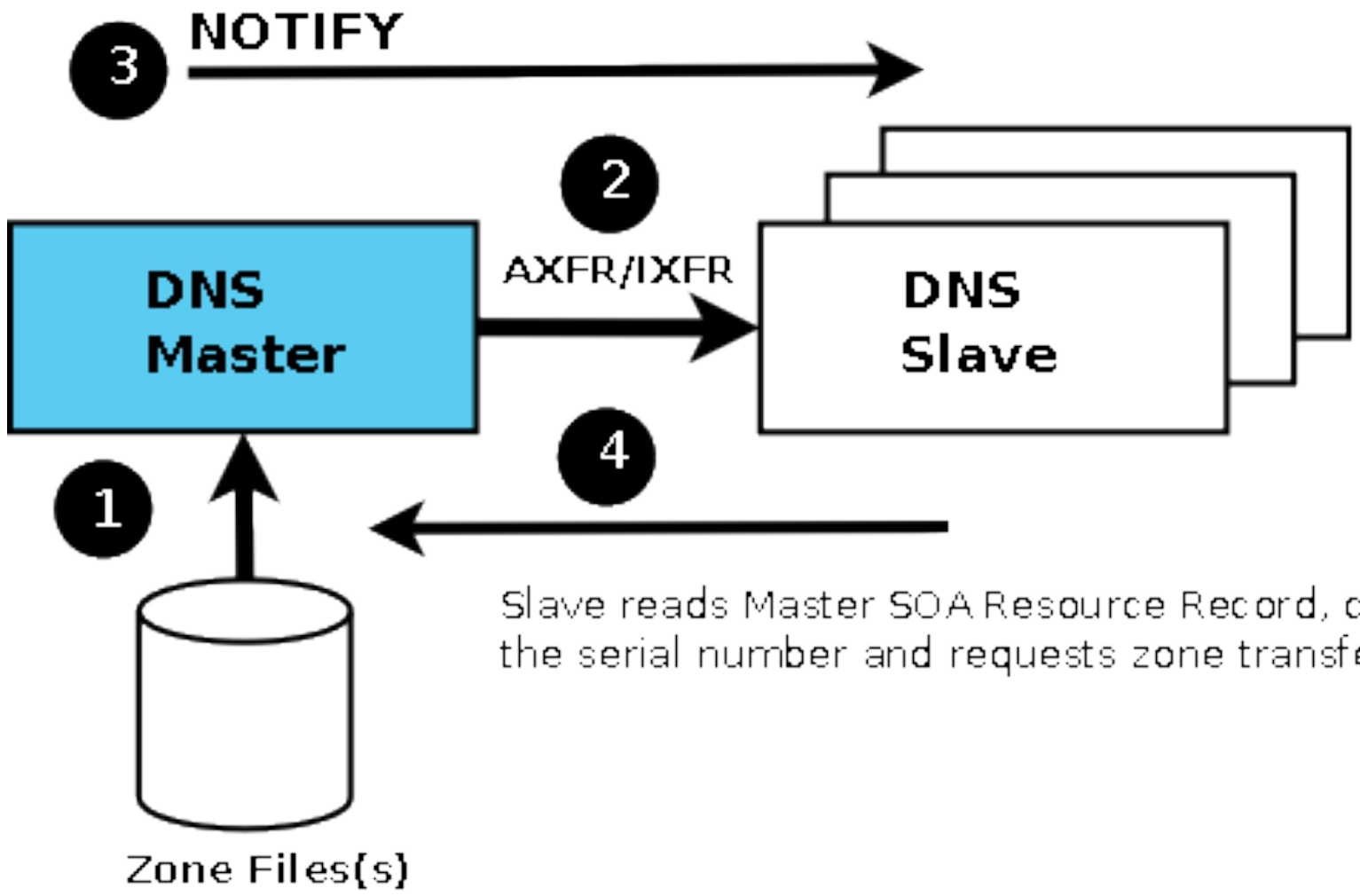
Types of DNS Servers

1. Master (a.k.a. Primary)
2. Slave (a.k.a. Secondary)
3. Caching (a.k.a Resolver)

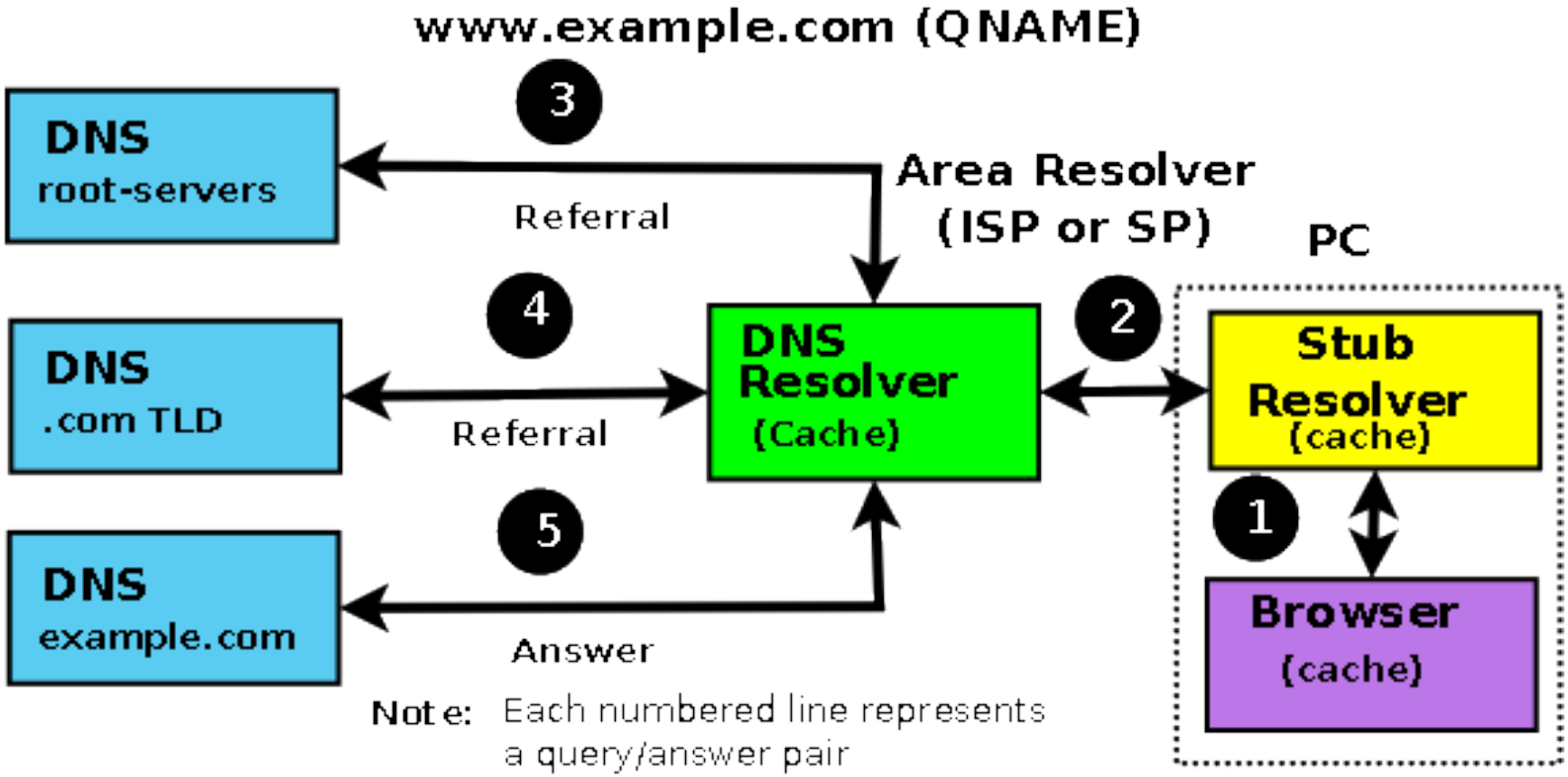
- Primary and Secondary servers offer ‘Authoritative’ answers
- Primary servers get data from Zone file(s)
- Secondary servers get data from Primary servers
- A server can be authoritatve for some zones and caching for others


Master
2
DNS
Master
Queries/Answers
1
Zone Files(s)

Master - Slave



Recursive and Iterative Queries



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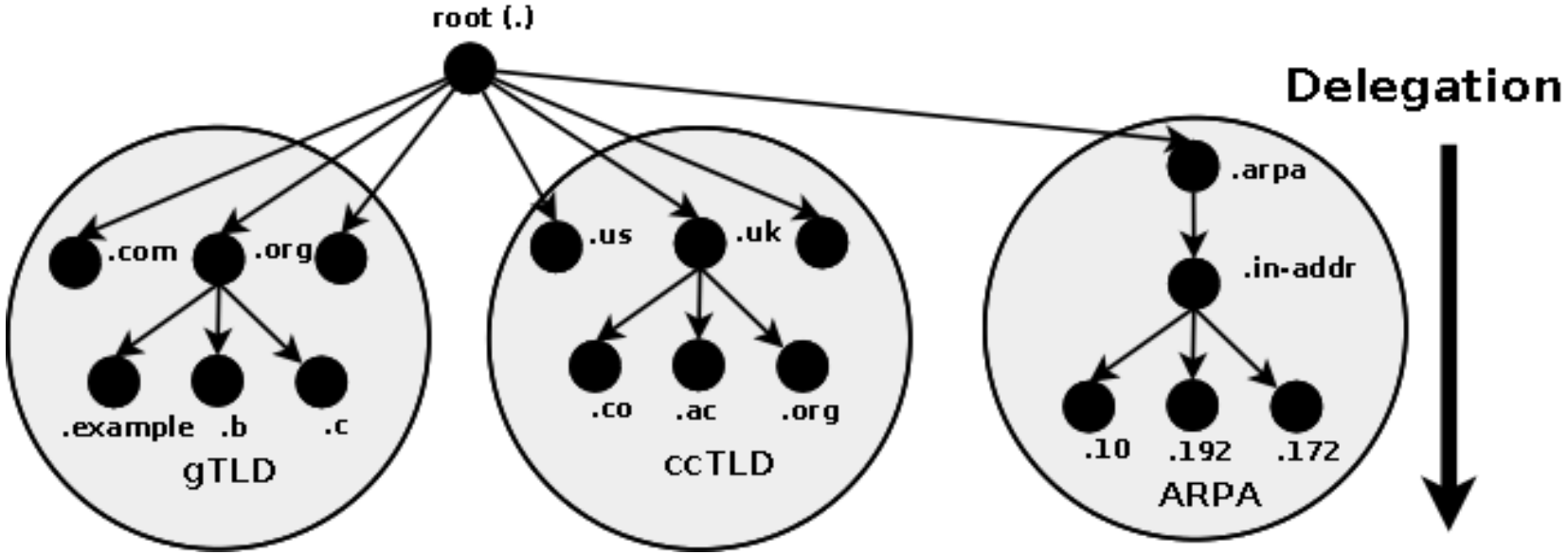
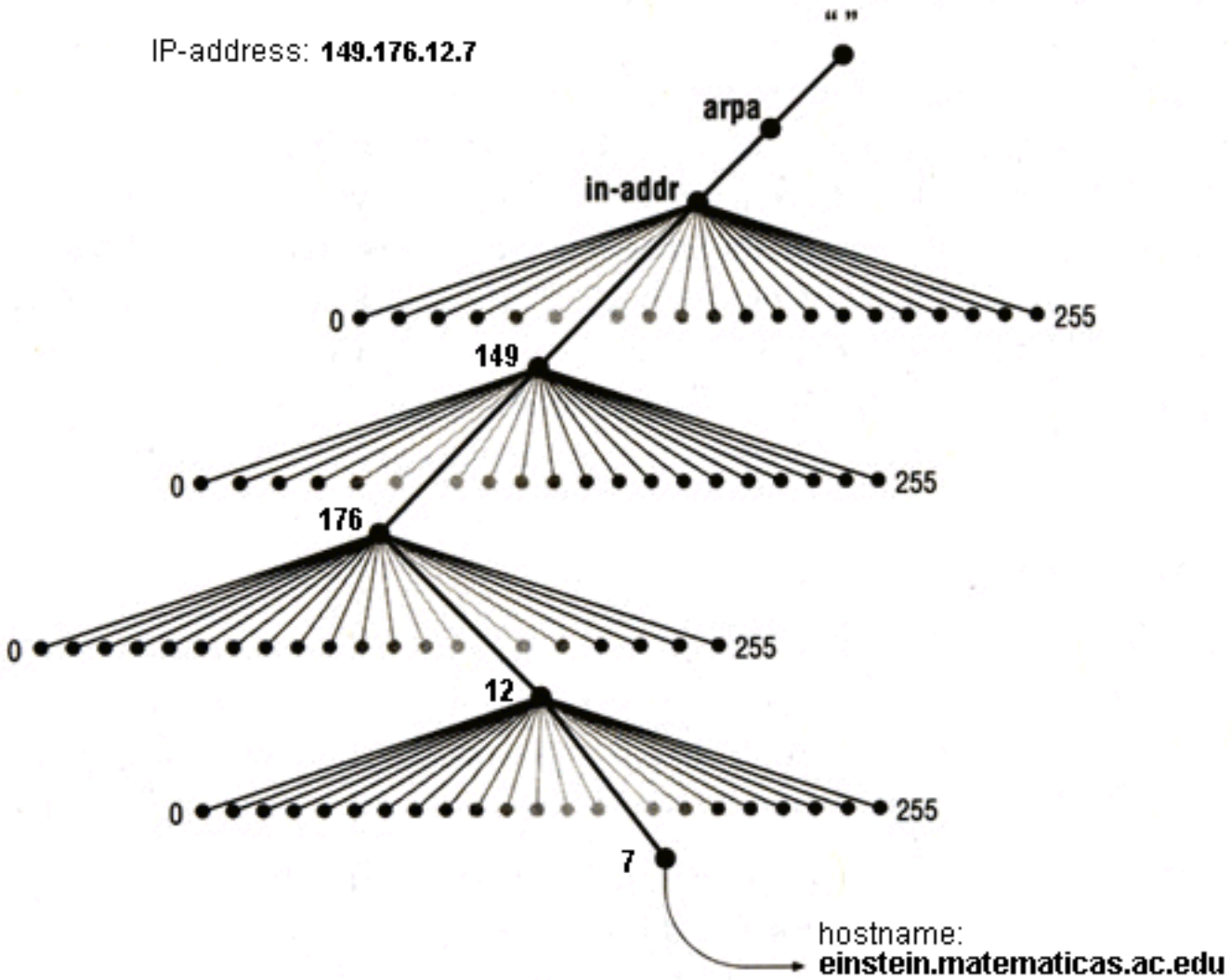
Reverse Mapping

The hierarchy we have seen so far is very good at turning names into IP addresses, but not so good at turning IP addresses into names.

The ‘trick’ is to add a domain **.arpa.in-addr** to handle reverse lookups.





Source: http://www.linuxfocus.org/Russian/May1998/article45.html