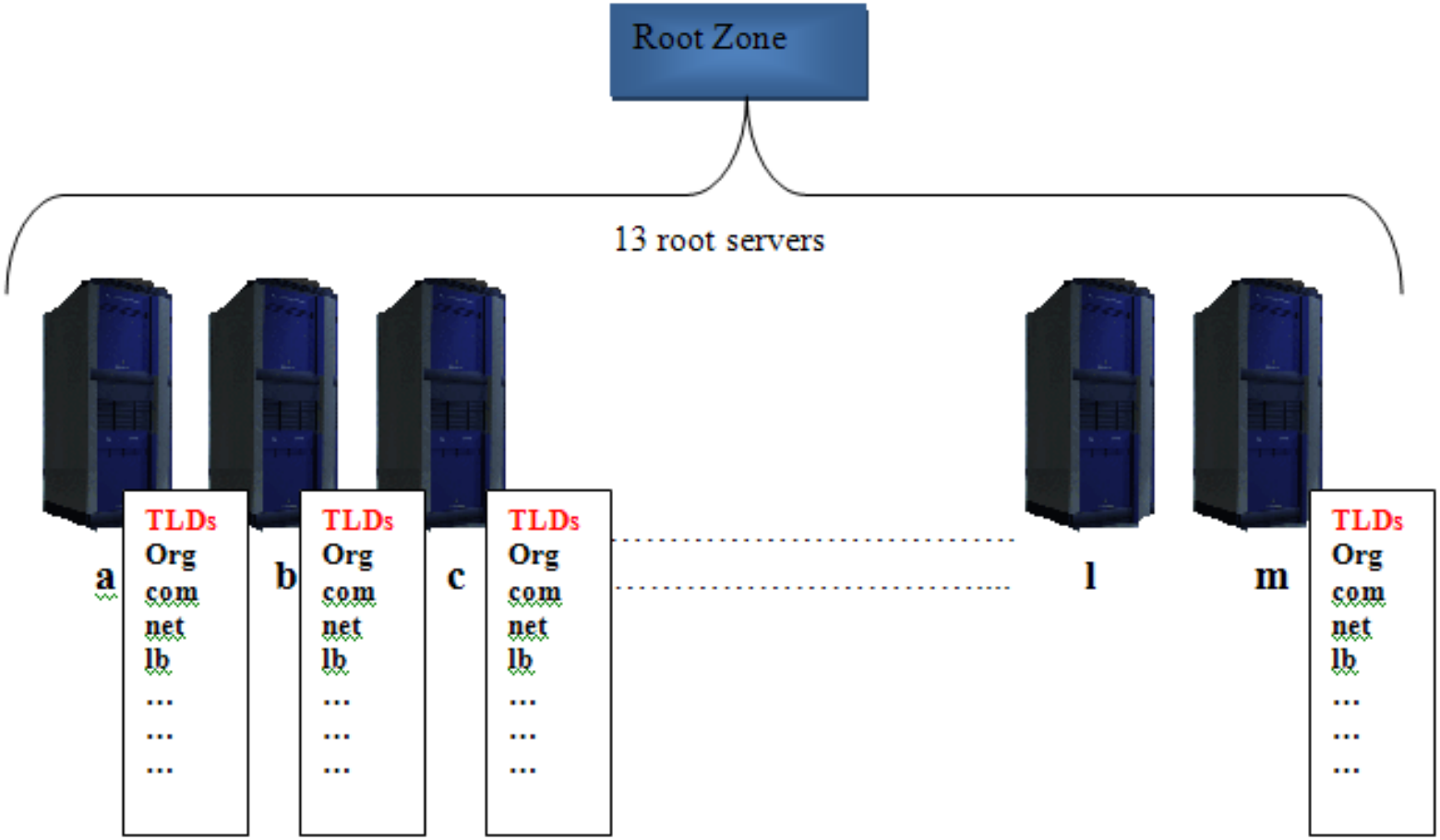
Domain Name System

Presented by
Hana Khayat
hkhayat@cisco.com

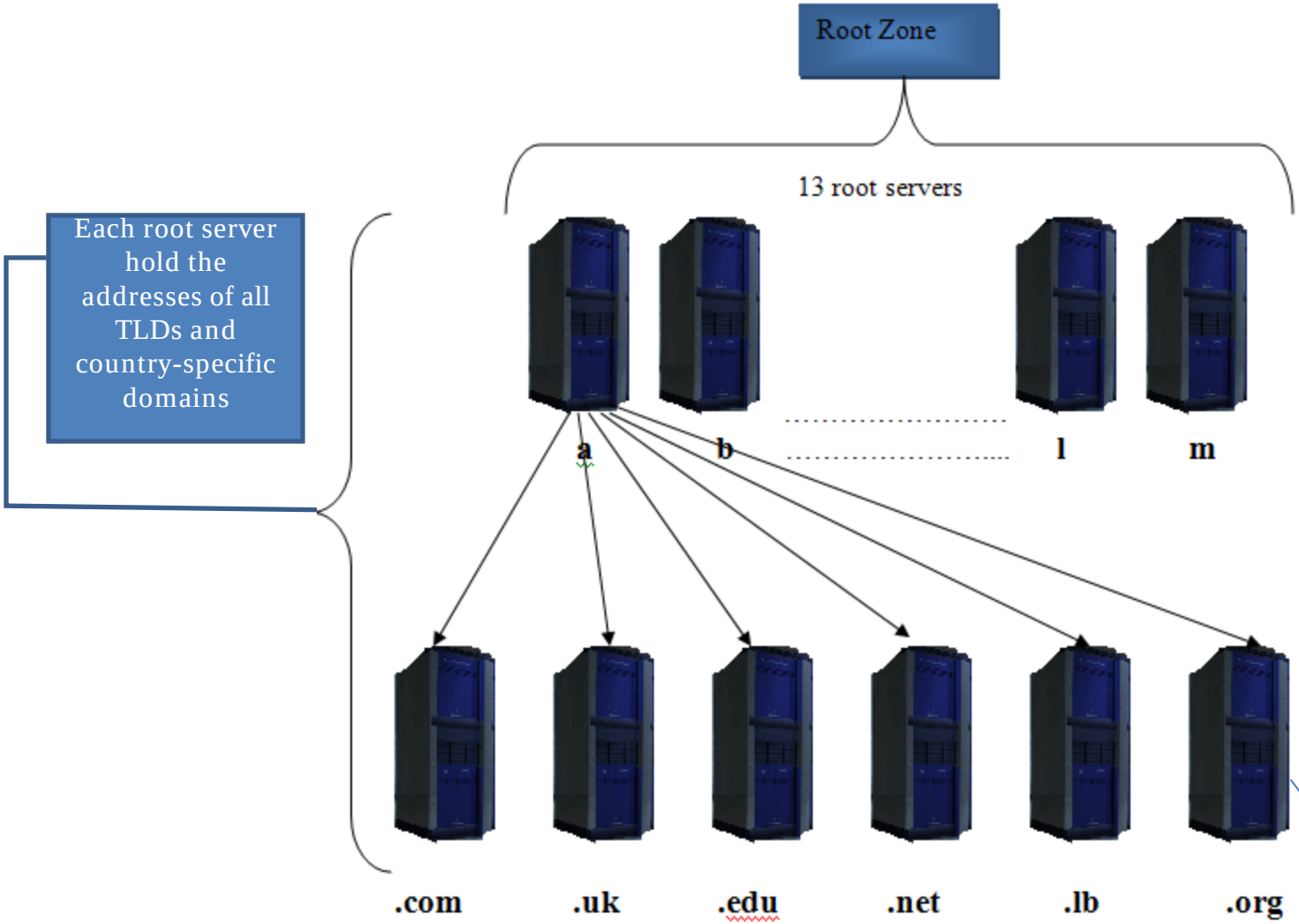
PARTNERSHIP FOR LEBANON



Thirteen root servers are accommodated within the root zone, all containing a list of addresses for top-level domain authoritative servers such as org, com, net... These root servers are officially classified as a.root-servers.net, b.root-servers.net … all to m.root-servers.net.

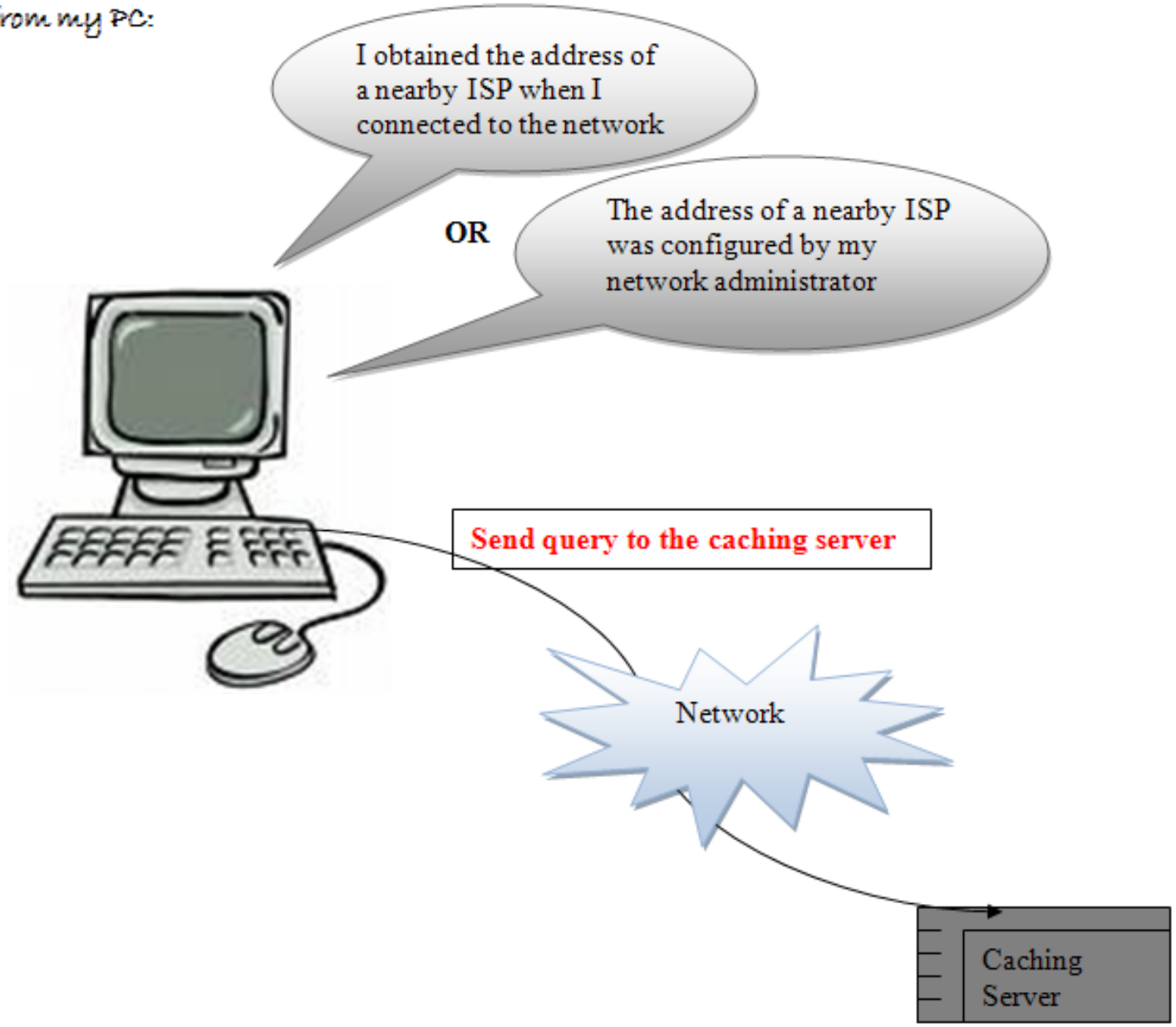
Note: TLD = Top level Domain

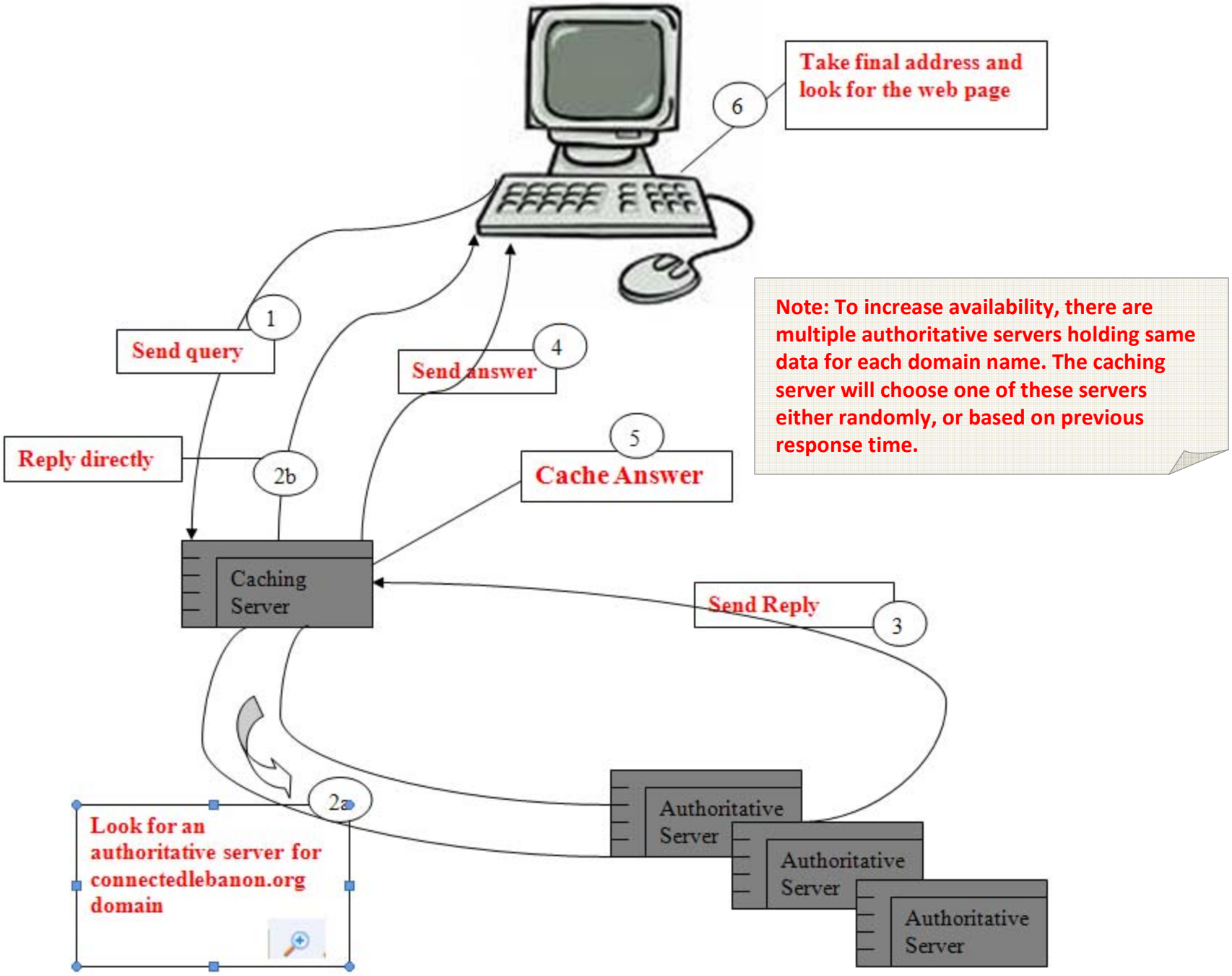
DNS is hierarchical and distributed



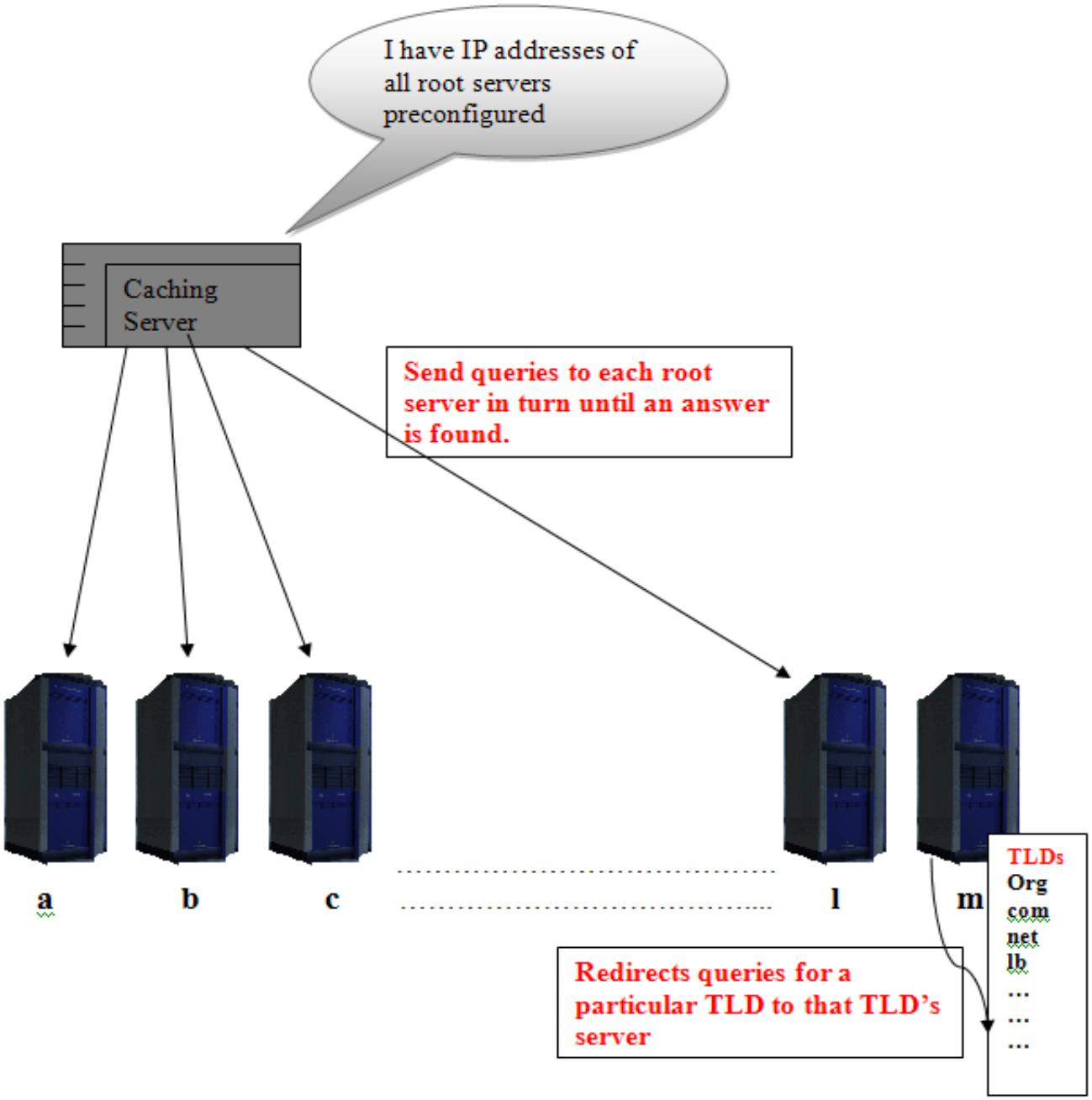
Note: name server for .org hold information about domains within .org only (about connectedlebanon.org and not about conncetedlebanon.net)

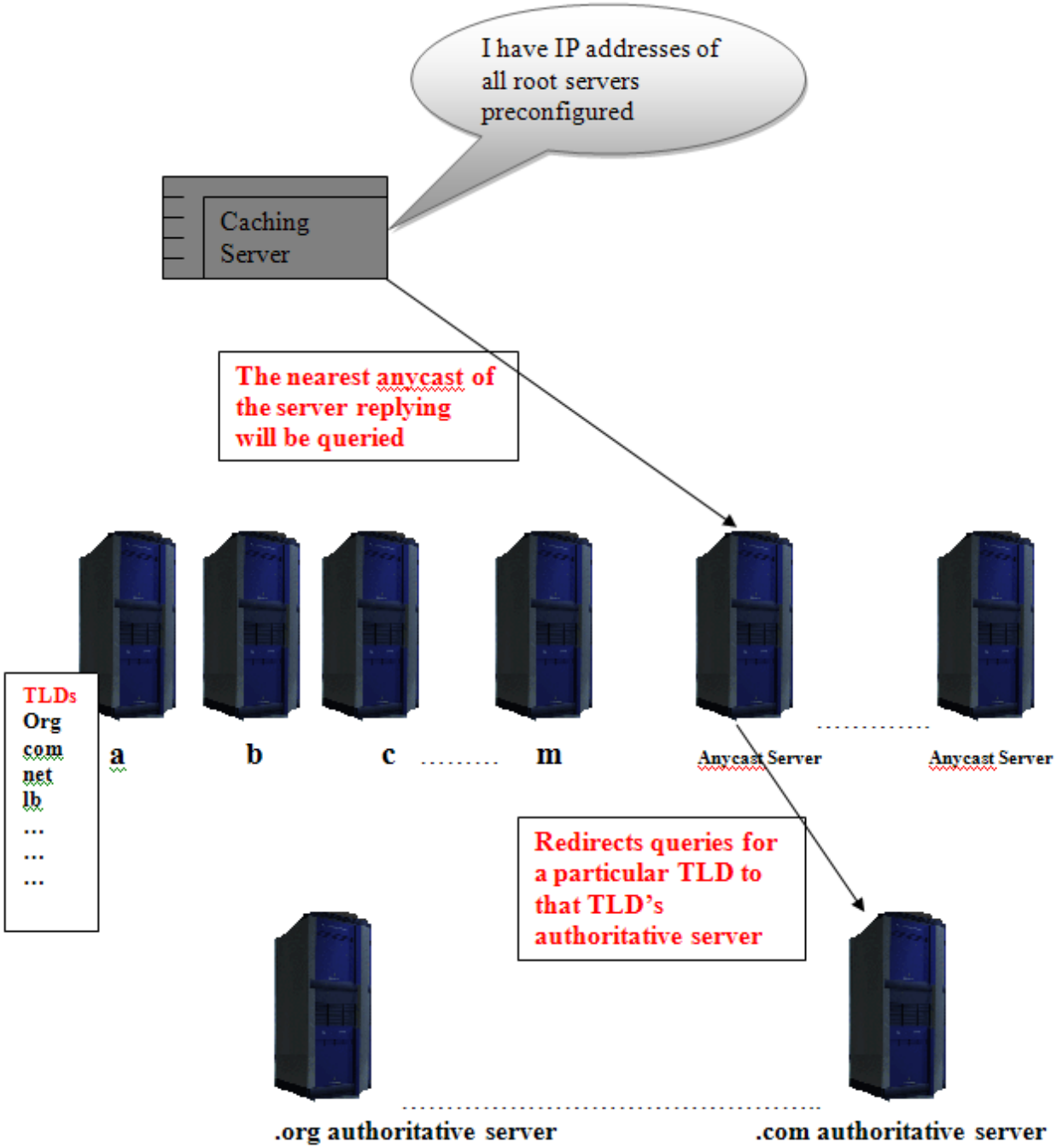
Starting from my PC:




Take final address and look for the web page
6
Send query
1
Send answer
4
Reply directly
2b
5
Cache Answer
Caching Server
Send Reply
3
2a
Look for an authoritative server for connectedlebanon.org domain
Authoritative Server
Authoritative Server
Authoritative Server
Note: To increase availability, there are multiple authoritative servers holding same data for each domain name. The caching server will choose one of these servers either randomly, or based on previous response time.

To retrieve an address, the root server should be looked up first:




I have IP addresses of all root servers preconfigured
Caching Server
The nearest anycast of the server replying will be queried
TLDs
Org
com
net
lb
…
…
…
a
b
c
m
Anycast Server
Anycast Server
Redirects queries for a particular TLD to that TLD's authoritative server
.org authoritative server
.com authoritative server

Originally: Root servers located all in USA

Vr xuf h=#Dq| f dvwqj #dqg#kh#ur r whuyhuv#Ydqf r xyhu/#F dqdgd#F DQQ#P hhwqj

Now: > 112

Vr xuf h#Dq| f dvwqj #dqg#wkh#ur r whuyhuv#Ydqf r xyhu#F dqdgd#LF DQQ#P hhwqj

Anycasting

Why?

- to distribute load geographically
- to mitigate the effect of distributed denial of service attacks(Invalid TLD are likely subjects for Root query).

Anycasting

Definition

- Multiple hosts sharing same address and providing the same service.

- When a query is transmitted, the router finds out which particular server is the nearest to the client in the anycast group, and sends the IP packet to that one destination.

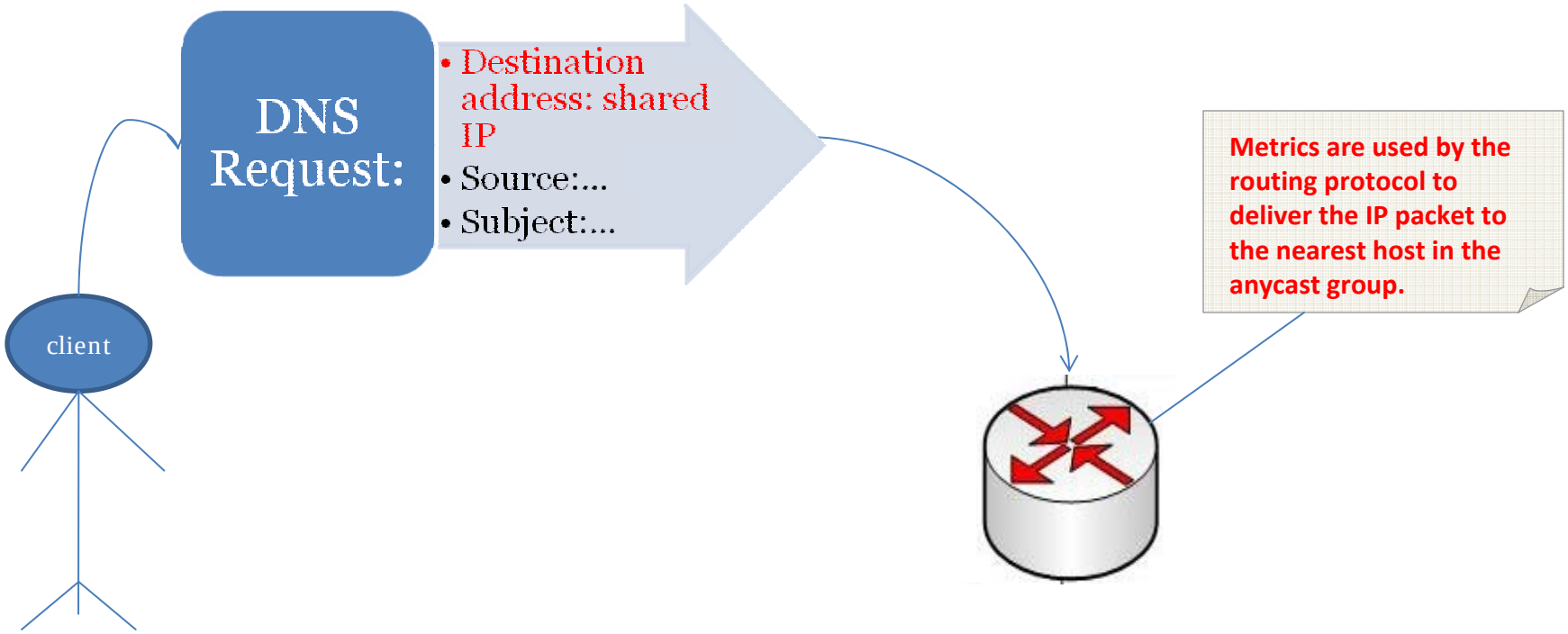
Anycasting

How?

- Anycast addressing is all determined by the routing protocol operational on routers.
- No extra software is required on either the router or the destination servers.
- Nodes sending packets to an anycast address don't necessarily need to know that it is an anycast address.

Anycasting

How?



Thank you