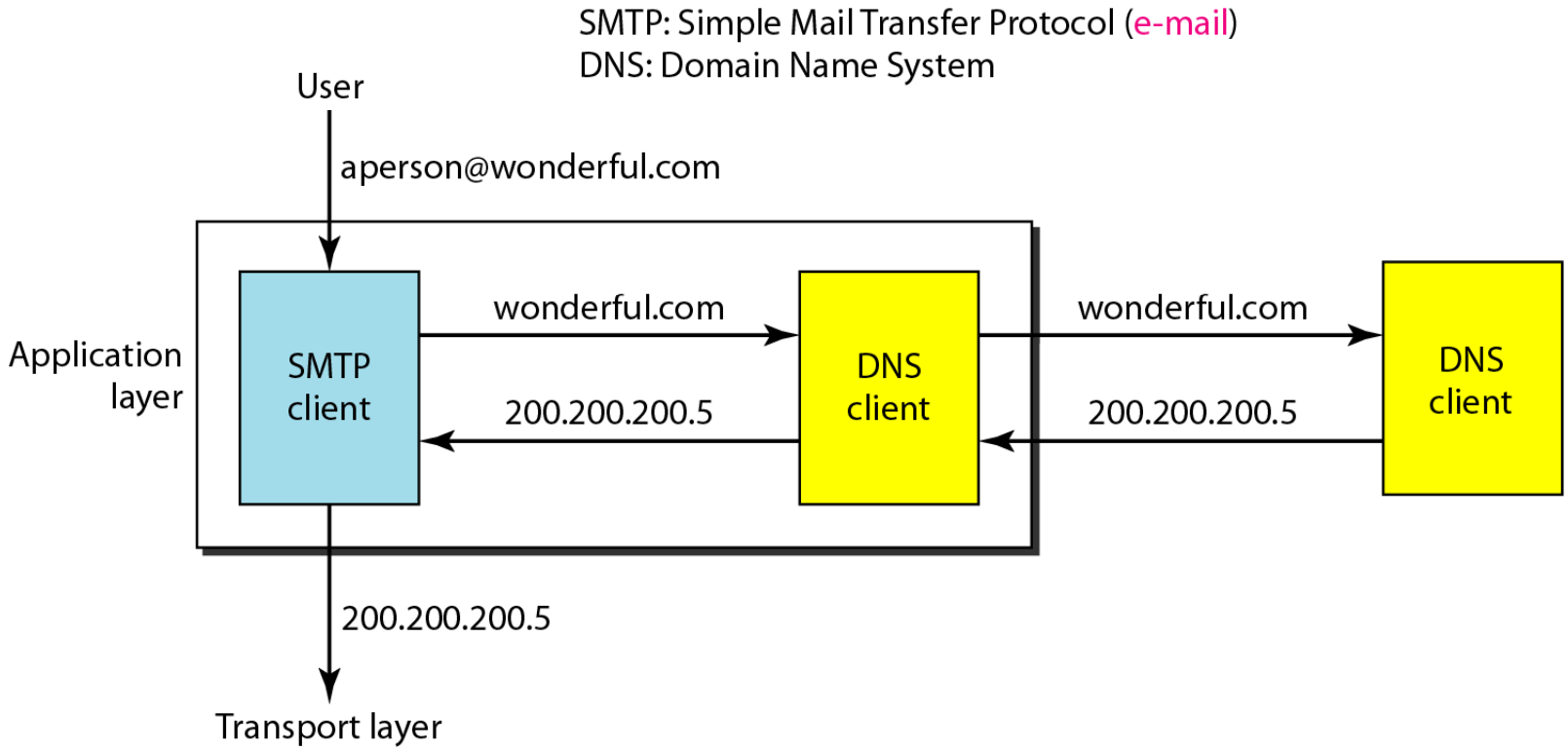
Data Communications and Networking Fourth Edition

Forouzan

Chapter 25

Domain Name System

Figure 25.1 *Example of using the DNS service*



25-1 NAME SPACE

To be unambiguous, the names assigned to machines must be carefully selected from a name space with complete control over the binding between the names and IP addresses.

Topics discussed in this section:

Flat Name Space

Hierarchical Name Space

25-2 DOMAIN NAME SPACE

To have a hierarchical name space, a domain name space was designed. In this design the names are defined in an inverted-tree structure with the root at the top. The tree can have only 128 levels: level 0 (root) to level 127.

Topics discussed in this section:

Label
Domain Name
Domain

Figure 25.2 *Domain name space*

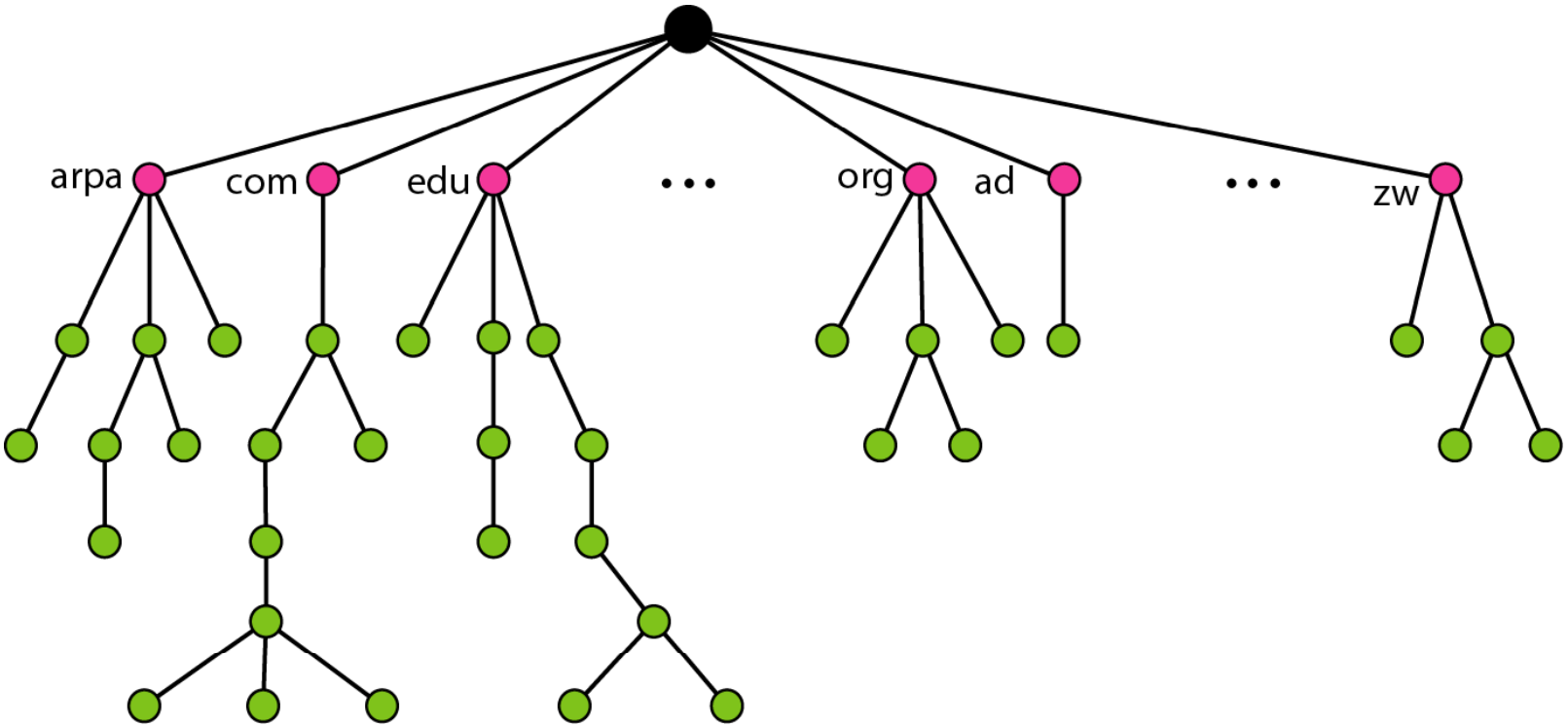


Figure 25.3 *Domain names and labels*

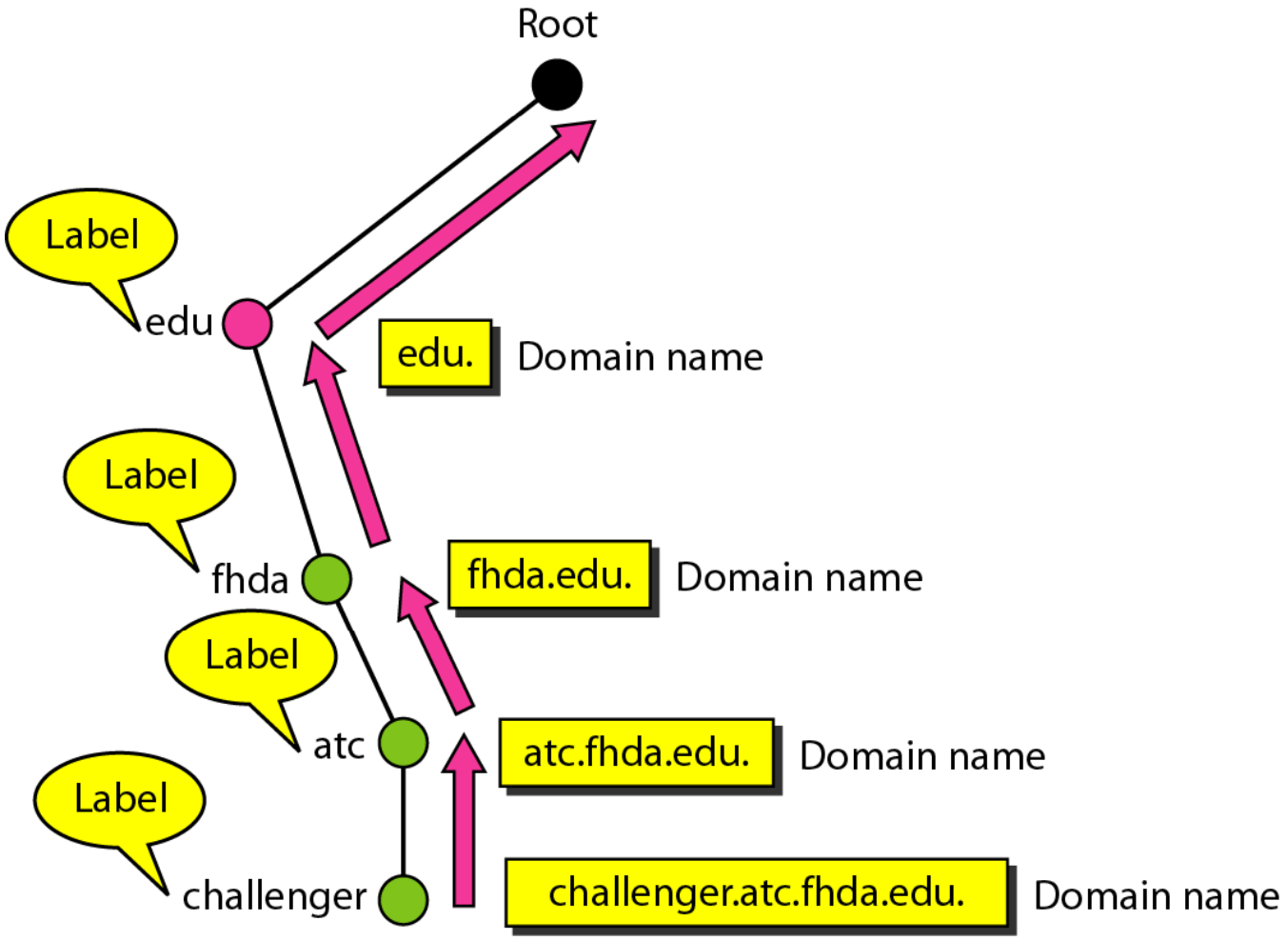


Figure 25.4 *FQDN and PQDN*

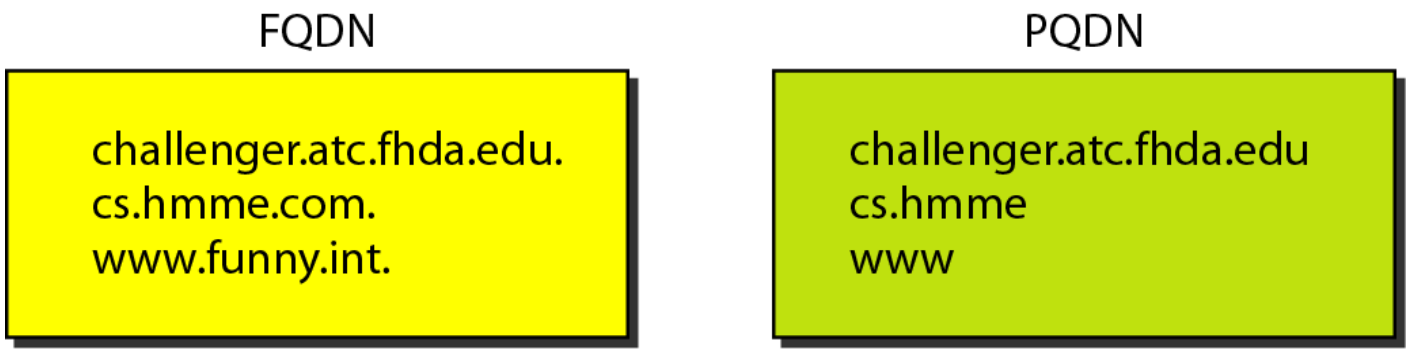
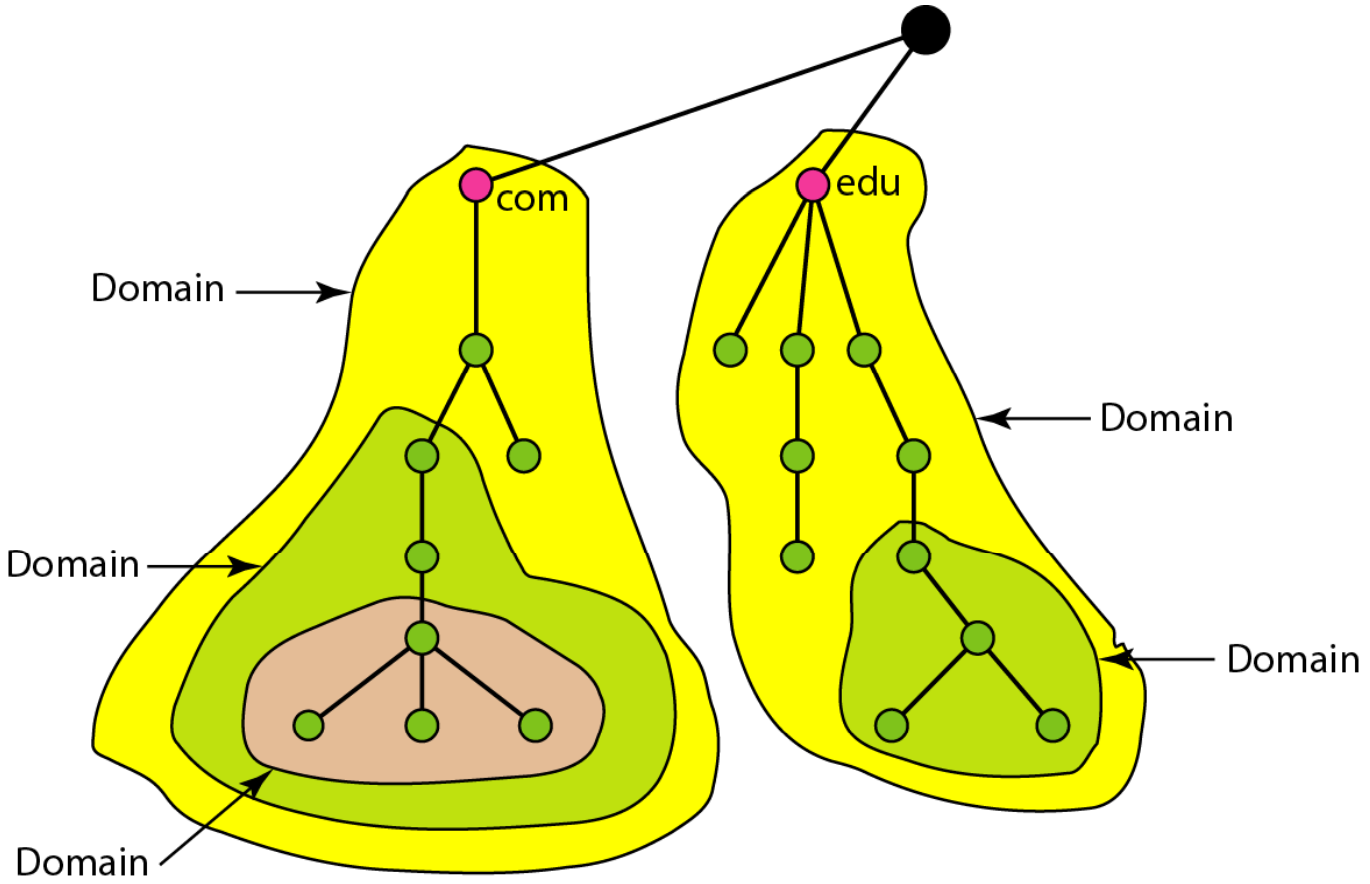


Figure 25.5 *Domains*



25-3 DISTRIBUTION OF NAME SPACE

The information contained in the domain name space must be stored. However, it is very inefficient and also unreliable to have just one computer store such a huge amount of information. In this section, we discuss the distribution of the domain name space.

Topics discussed in this section:

Hierarchy of Name Servers
Zone
Root Server
Primary and Secondary Servers

Figure 25.6 *Hierarchy of name servers*

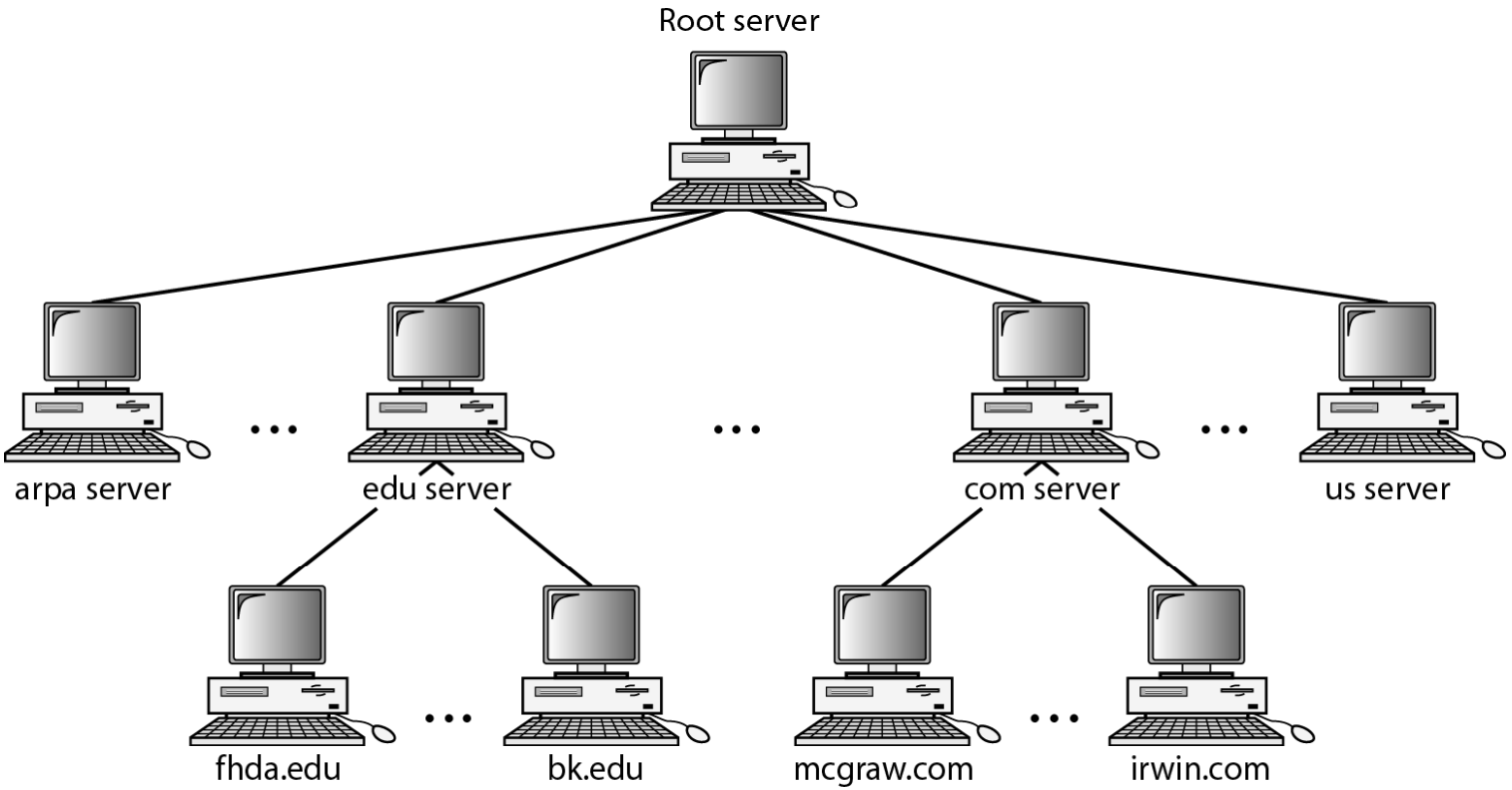
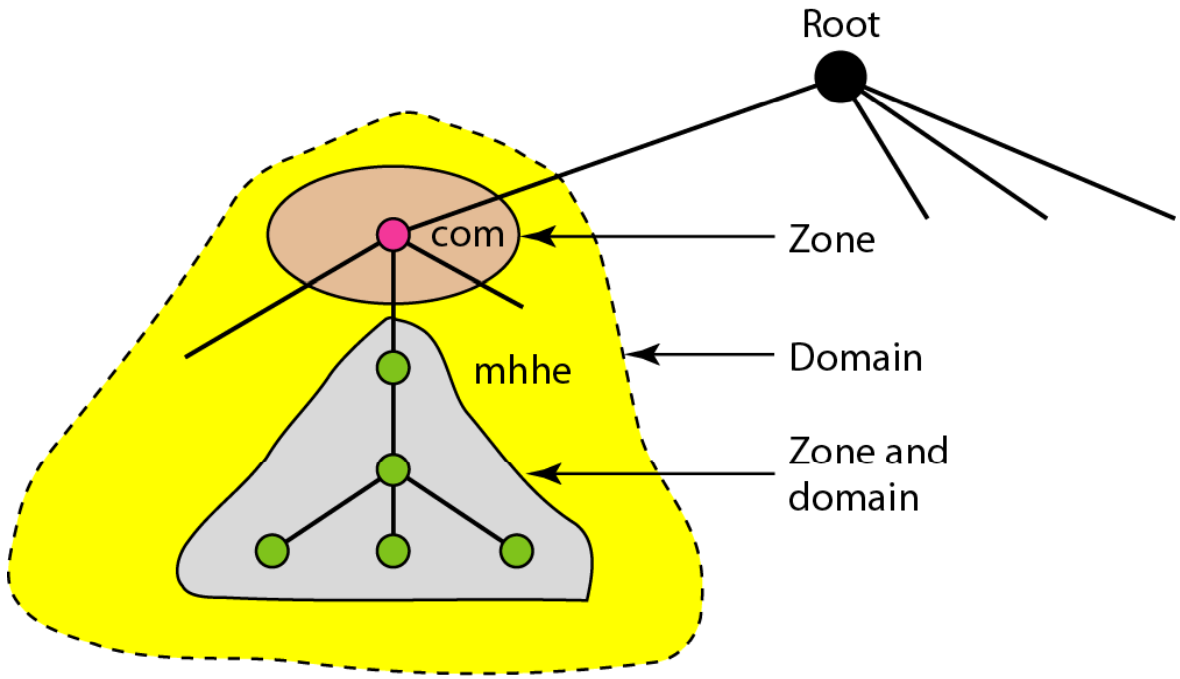


Figure 25.7 *Zones and domains*



Note

A primary server loads all information from the disk file; the secondary server loads all information from the primary server.

When the secondary downloads information from the primary, it is called zone transfer.

25-4 DNS IN THE INTERNET

DNS is a protocol that can be used in different platforms. In the Internet, the domain name space (tree) is divided into three different sections: generic domains, country domains, and the inverse domain.

Topics discussed in this section:

Generic Domains
Country Domains
Inverse Domain

Figure 25.8 *DNS IN THE INTERNET*

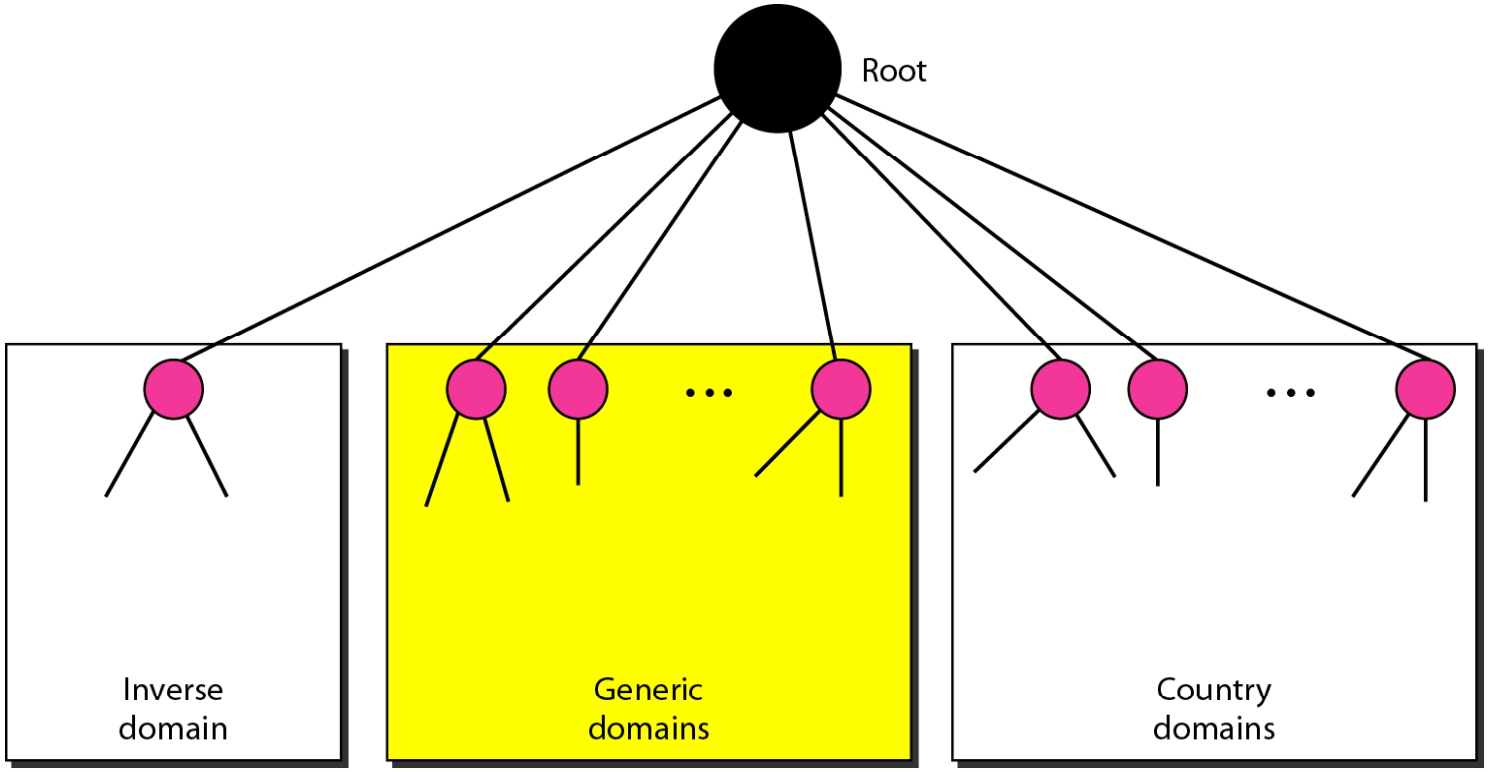


Figure 25.9 *Generic domains*

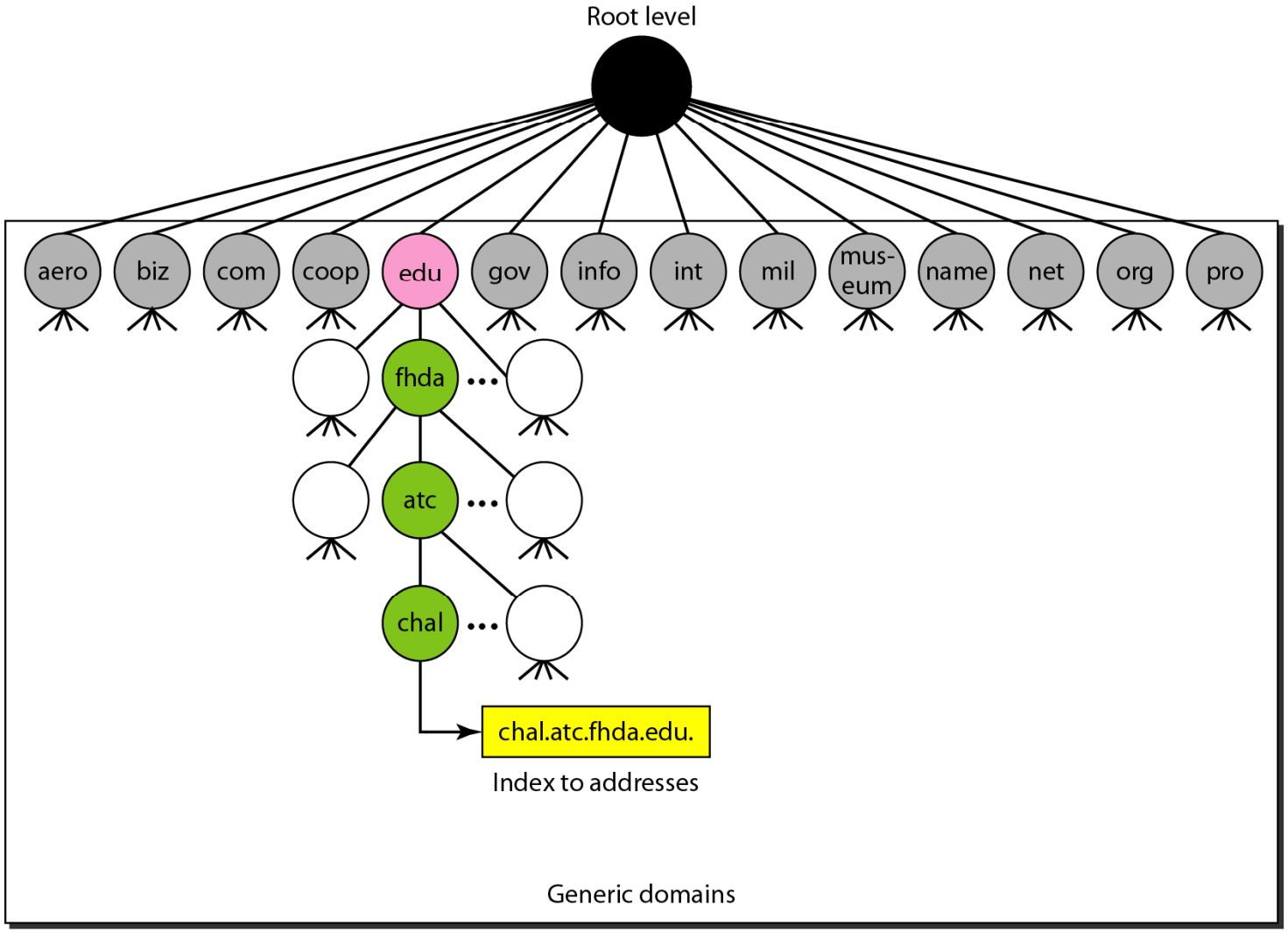


Table 25.1 *Generic domain labels*

Label	*Description*
aero	Airlines and aerospace companies
biz	Businesses or firms (similar to "com")
com	Commercial organizations
coop	Cooperative business organizations
edu	Educational institutions
gov	Government institutions
info	Information service providers
int	International organizations
mil	Military groups
museum	Museums and other nonprofit organizations
name	Personal names (individuals)
net	Network support centers
org	Nonprofit organizations
pro	Professional individual organizations

Figure 25.10 *Country domains*

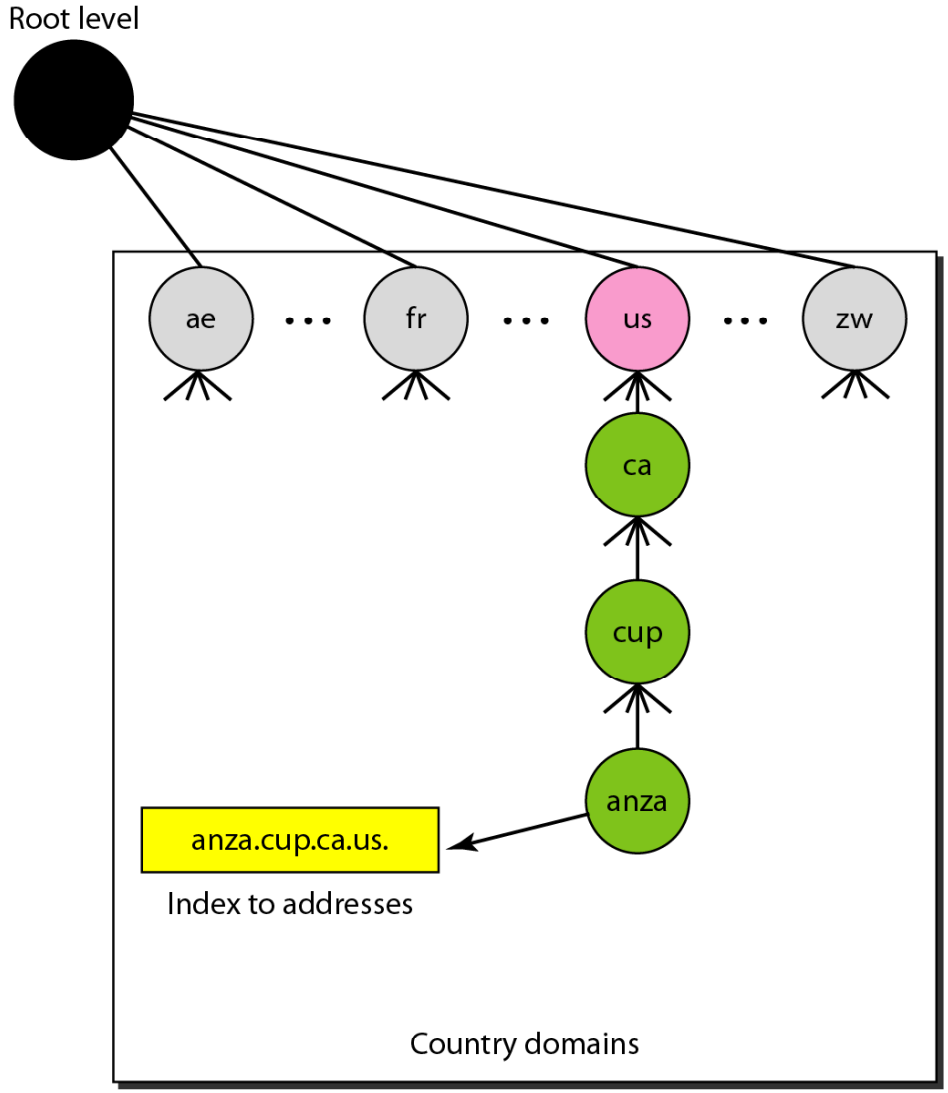
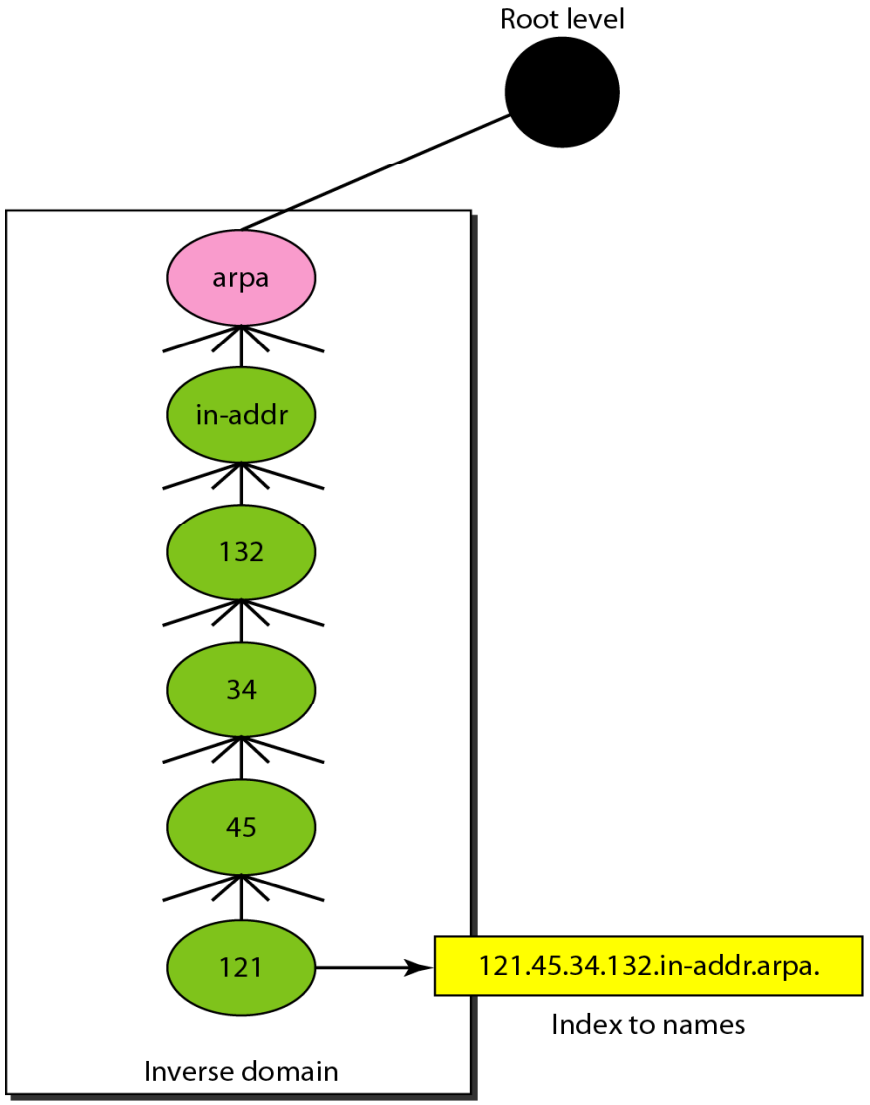


Figure 25.11 *Inverse domain*



25-5 RESOLUTION

Mapping a name to an address or an address to a name is called name-address resolution.

Topics discussed in this section:

Resolver
Mapping Names to Addresses
Mapping Addresses to Names
Recursive Resolution
Caching

Figure 25.12 *Recursive resolution*

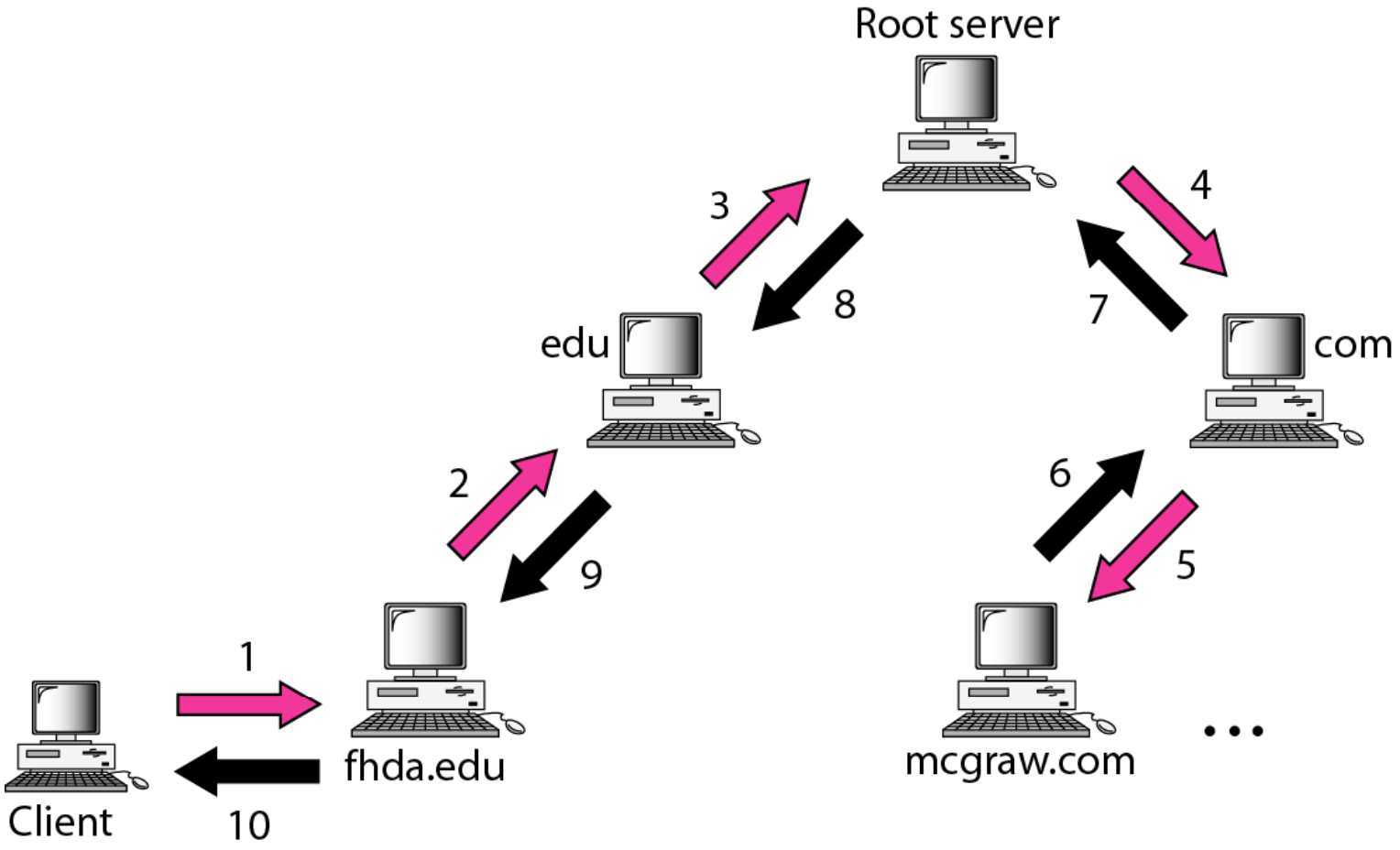
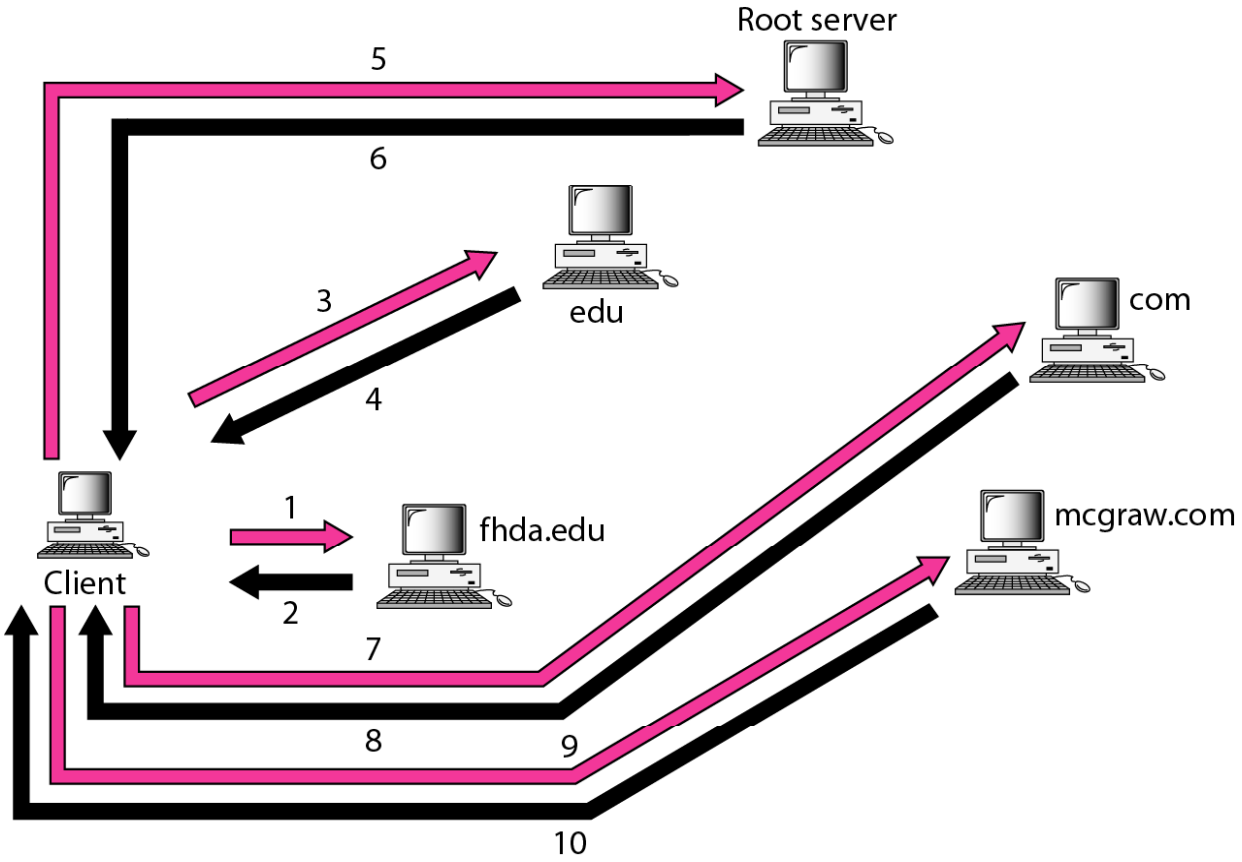


Figure 25.13 *Iterative resolution*



Note

DNS can use the services of UDP or TCP using the well-known port 53.