6.9 Explores some applications on the Internet

Domain Name System (DNS)

The domain name system (DNS) connects URLs with their IP address. The HTTP protocol uses the services of DNS to identify the matching web addresses of given URLs. With DNS, it's possible to type words instead of a string of numbers into a browser, allowing people to search for websites and send emails using familiar names. When you search for a domain name in a browser, it sends a query over the internet to match the domain with its corresponding IP. Once located, it uses the IP to retrieve the website's content. Most impressively, this whole process takes just milliseconds.

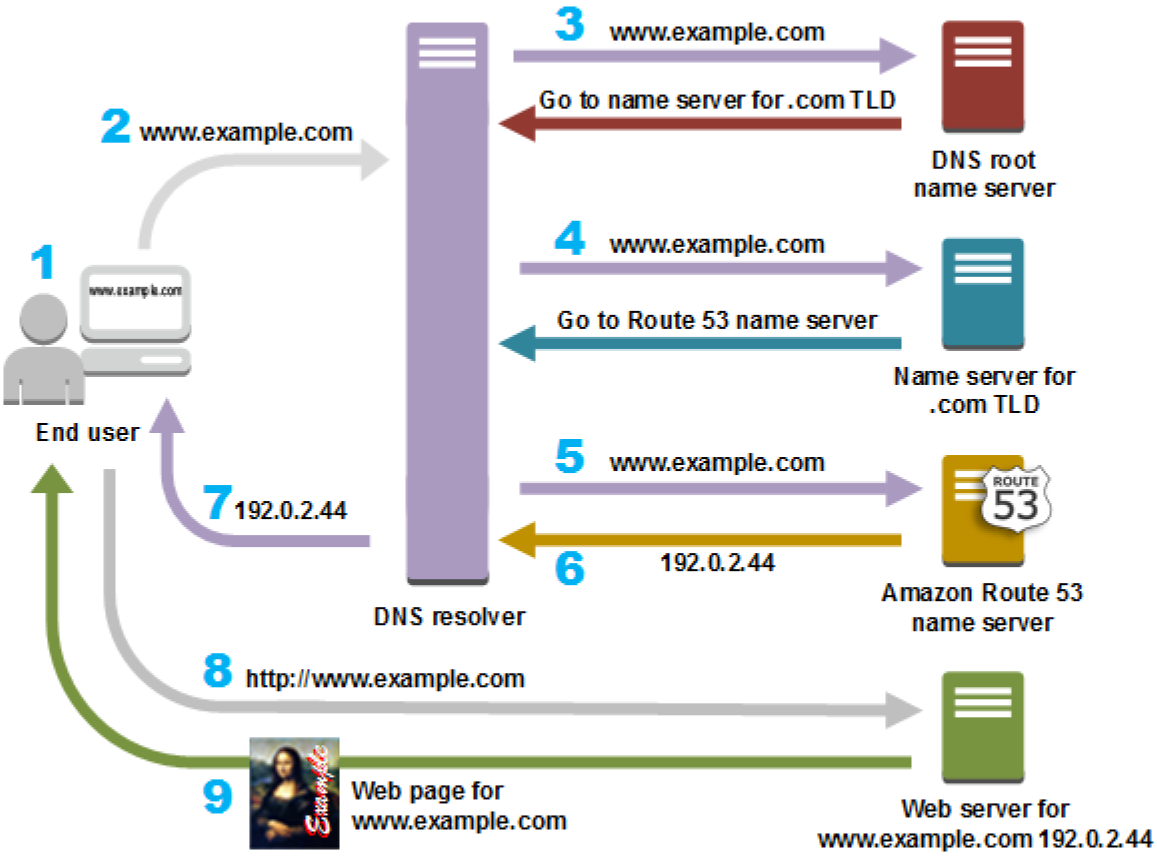
DNS is often likened to the internet's version of a telephone book. To call someone, you must first find their telephone number. To do so you look up a contact name, similarly, DNS converts email addresses and websites humans read into computer-readable, numerical IP addresses.

Everything that connects to the internet - websites, tablets, laptops, mobile phones, Google Home, internet thermostats, and refrigerators has an IP address. An internet protocol address by its full name is a unique string of numbers that identifies each digital device to communicate via the World Wide Web.

Thanks to DNS, there is no need to maintain an address book of IP addresses. Every time you use a domain name, the DNS service locates the website and translates the name into its corresponding IP address. Alphabetic domain names are easier to remember than IP address numbers, so when you type www.google.com into a web browser, you only have to remember the URL.

STEP1
YOU TYPE IN CISCO.COM
IN YOUR BROWSER
STEP2
REPLY: HERE IS THE
IP ADDRESS OF CISCO.COM
DNS

The following diagram gives an overview of how recursive and authoritative DNS services work together to route an end user to your website or application.



1. A user opens a web browser, enters www.example.com in the address bar, and presses Enter.

2. The request for www.example.com is routed to a DNS resolver, which is typically managed by the user's Internet service provider (ISP), such as a cable Internet provider, a DSL broadband provider, or a corporate network.

3. The DNS resolver for the ISP forwards the request for www.example.com to a DNS root name server.

4. The DNS resolver for the ISP forwards the request for www.example.com again, this time to one of the TLD name servers for .com domains. The name server for .com domains responds to the request with the names of the four Amazon Route 53 name servers that are associated with the example.com domain.

5. The DNS resolver for the ISP chooses an Amazon Route 53 name server and forwards the request for www.example.com to that name server.

6. The Amazon Route 53 name server looks in the example.com hosted zone for the www.example.com record, gets the associated value, such as the IP address for a web server, 192.0.2.44, and returns the IP address to the DNS resolver.

7. The DNS resolver for the ISP finally has the IP address that the user needs. The resolver returns that value to the web browser. The DNS resolver also caches (stores) the IP address for example.com for an amount of time that you specify so that it can respond more quickly the next time someone browser to example.com.

8. The web browser sends a request for www.example.com to the IP address that it got from the DNS resolver. This is where your content is, for example, a web server running on an Amazon EC2 instance or an Amazon S3 bucket that's configured as a website endpoint.

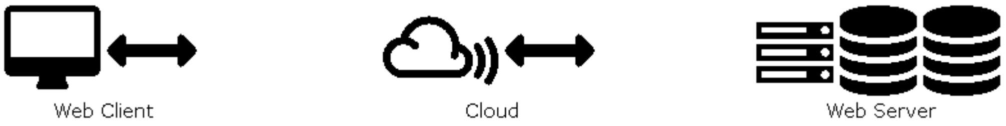
9. The web server or other resource at 192.0.2.44 returns the web page for www.example.com to the web browser, and the web browser displays the page.

Hypertext Transfer Protocol (HTTP)

HTTP is an application layer protocol for distributed, collaborative, and hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web.

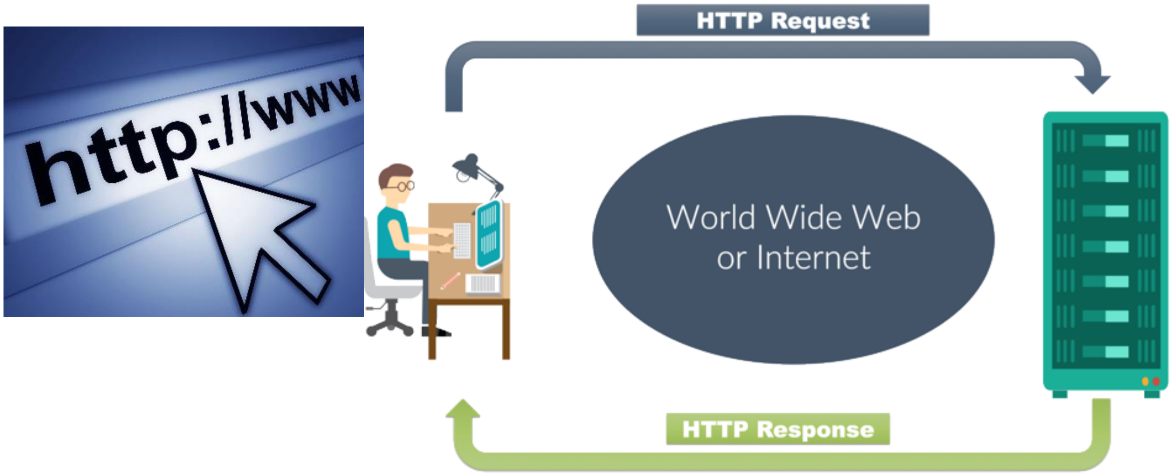
WWW is about communication between web clients and servers. Communication between client computers and web servers is done by sending HTTP Requests and receiving HTTP Responses.

Clients are often browsers (Chrome, Edge, Safari), but they can be any type of program or device. Servers are most often computers in the cloud.



Communication between clients and servers is done by requests and responses:

- A client (a browser) sends an HTTP request to the web
- A web server receives the request
- The server runs an application to process the request
- The server returns an HTTP response (output) to the browser
- The client (the browser) receives the response

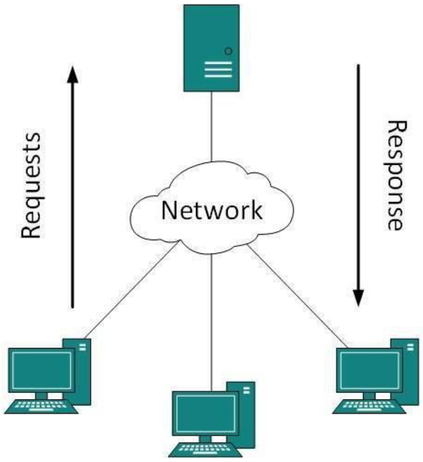


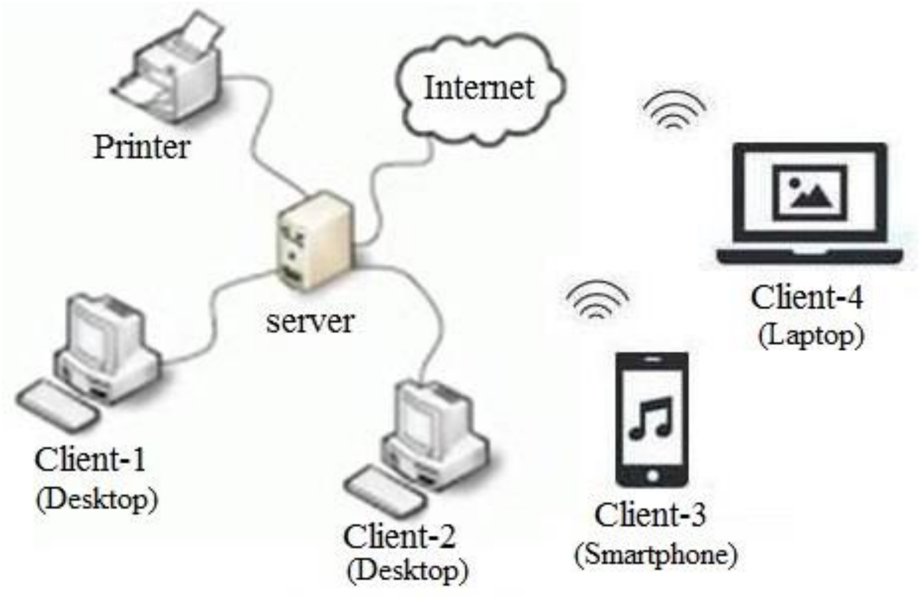
Client Server model

The client–server model is a distributed application structure that partitions tasks or workloads between the providers of a resource or service, called servers, and service requesters, called clients.

It is not the type of machine, size of the machine, or its computing power which makes it server; it is the ability of serving request that makes a machine a server.

A system can act as Server and Client simultaneously. That is, one process is acting as Server and another is acting as a client. This may also happen that both client and server processes reside on the same machine.





Client Server Architecture

Reference

Teachers Guide 2017

https://www.namecheap.com/dns/what-is-dns-domain-name-system-definition/

https://aws.amazon.com/route53/what-is-dns/

https://www.w3schools.com/whatis/whatis_http.asp

https://www.verisign.com/en_US/website-presence/online/how-dns-works/index.xhtml

https://www.tutorialspoint.com/data_communication_computer_network/client_server_model.htm