http://tweakyourbiz.com/management/files/Lets-Network-297x300.jpg

Lesson 1: Basics of Computer Networks

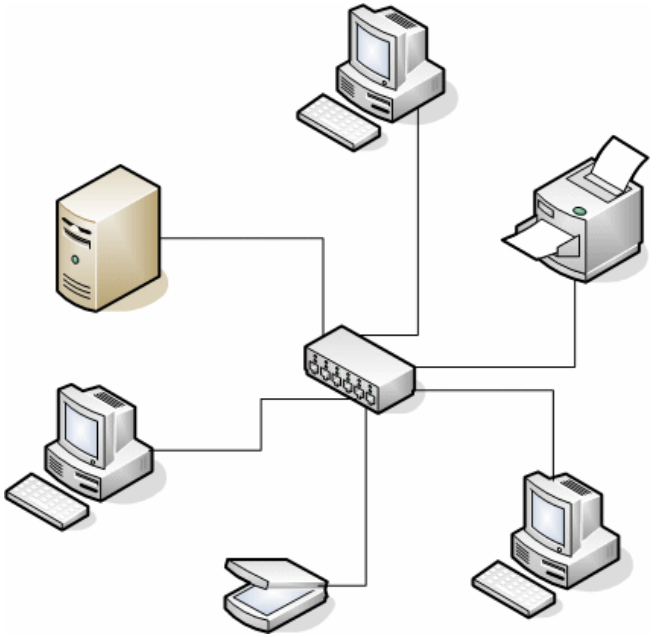
Definition of a Computer Network

- Two or more computers connected in such a way that they can share resources

http://jlmdevelopment.com/wp-content/uploads/2013/01/computer_network2.jpg

Network Resources

- A resource may be
  -  A file
  -  A folder
  -  A printer
  -  A disk drive
  - – Or just anything else that exists on a computer
  - – Some data!!



http://communities.intel.com/servlet/JiveServlet/showImage/38-14293-78999/client_net.jpg

Pros & Cons of Networking

Pros:

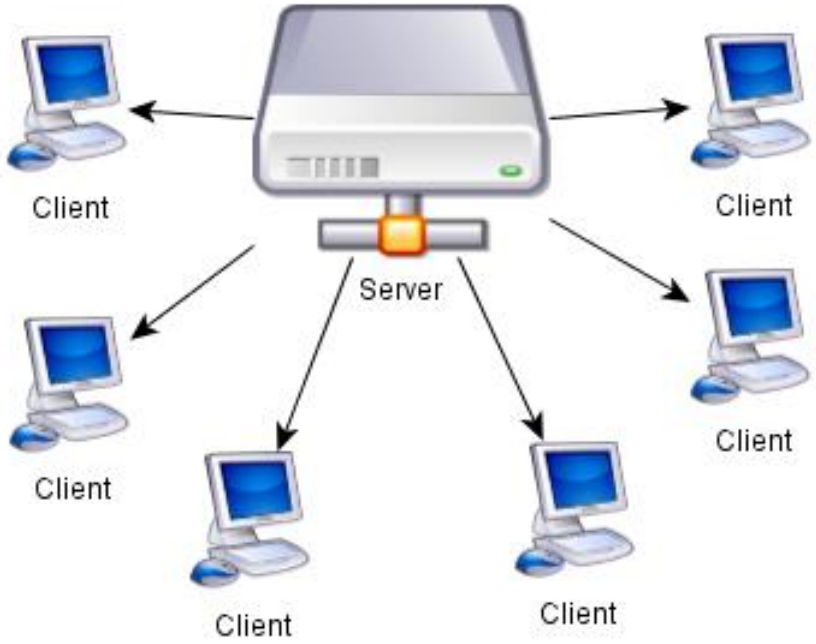
- Connectivity and communication
- Data sharing
- Hardware sharing
- Internet access
- Data security and management
- Performance enhancement and balancing
- Entertainment

Cons:

- Network hardware, software and setup costs
- Hardware and software management and administration costs
- Undesirable sharing
- Illegal or undesirable behavior
- Data security concerns

Client-Server Model

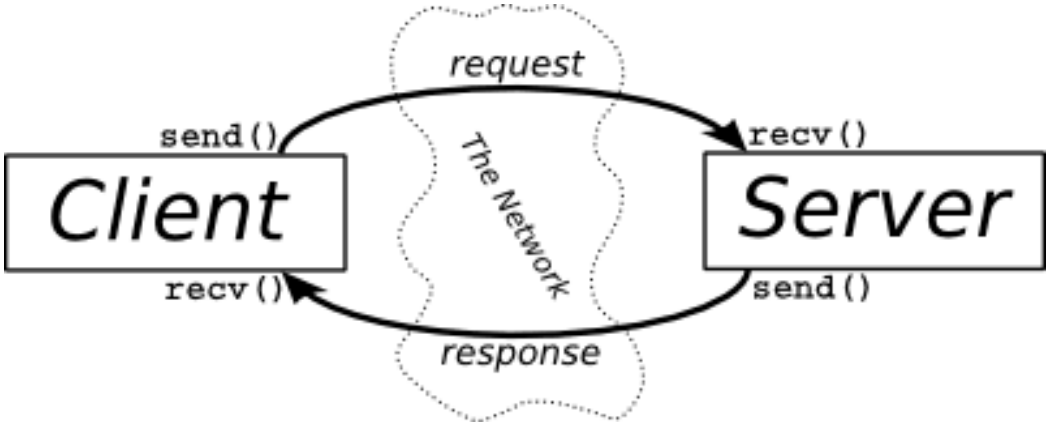
- Server and Client



http://www.herlemann-it-loesungen.de/bilder/client_server.png

How Client-Server Model Works?

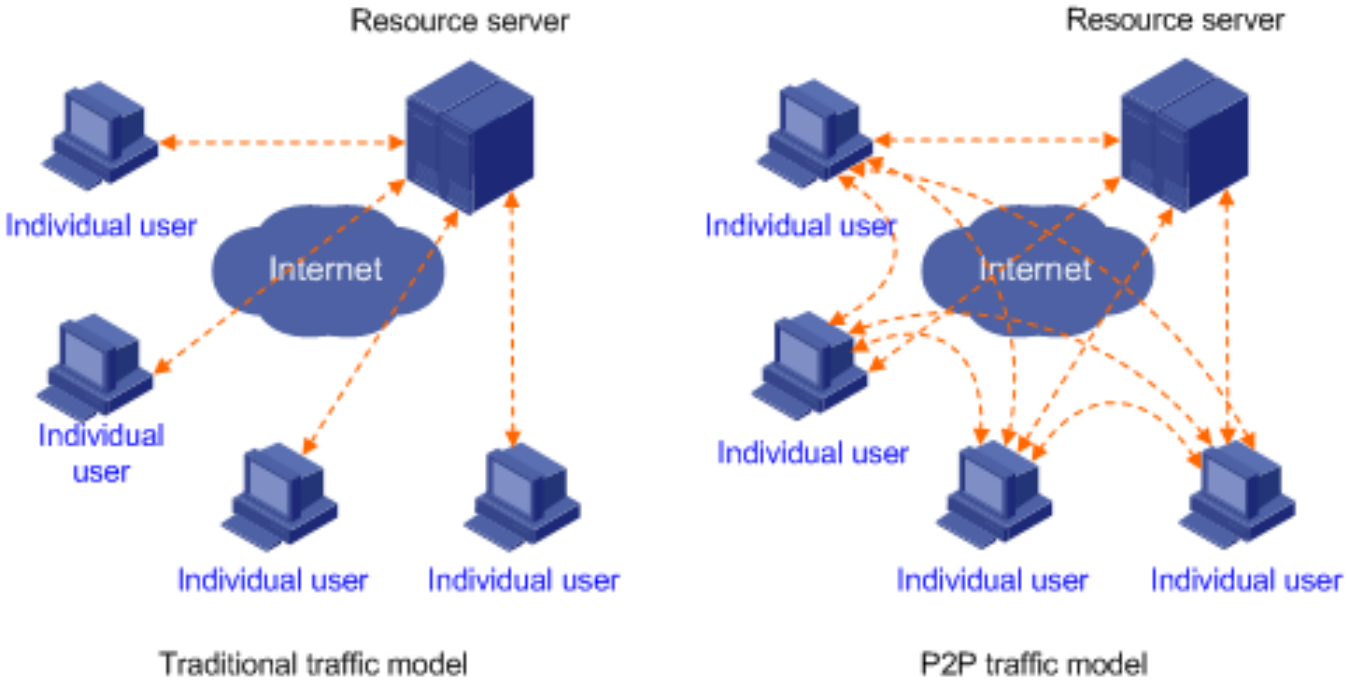
- Simple two steps:
  - First, the client requests for some resource
  - Then, the server responses



http://www.beej.us/guide/bgnet/output/html/multipage/cs-120-3.334.png

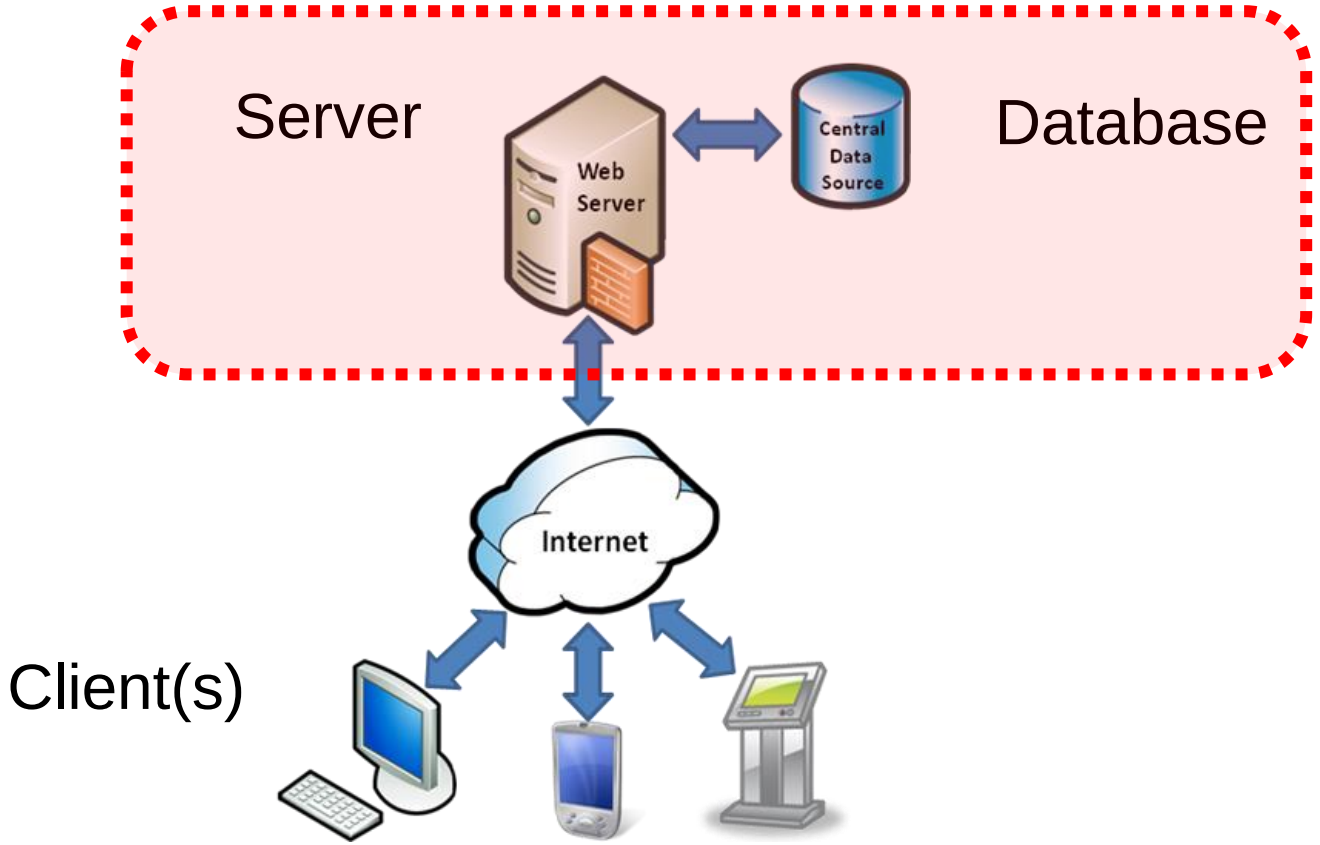
A Generalized Model

- When a client has some resources, it may become a server for other clients



http://www.h3c.com/portal/res/200810/10/20081010_677622_image001_617700_57_0.png

3-Tier Model for Data



http://i.msdn.microsoft.com/bb887608.figure1(en-us).png

- As a developer, we focus on the server & database

What Is a Protocol?

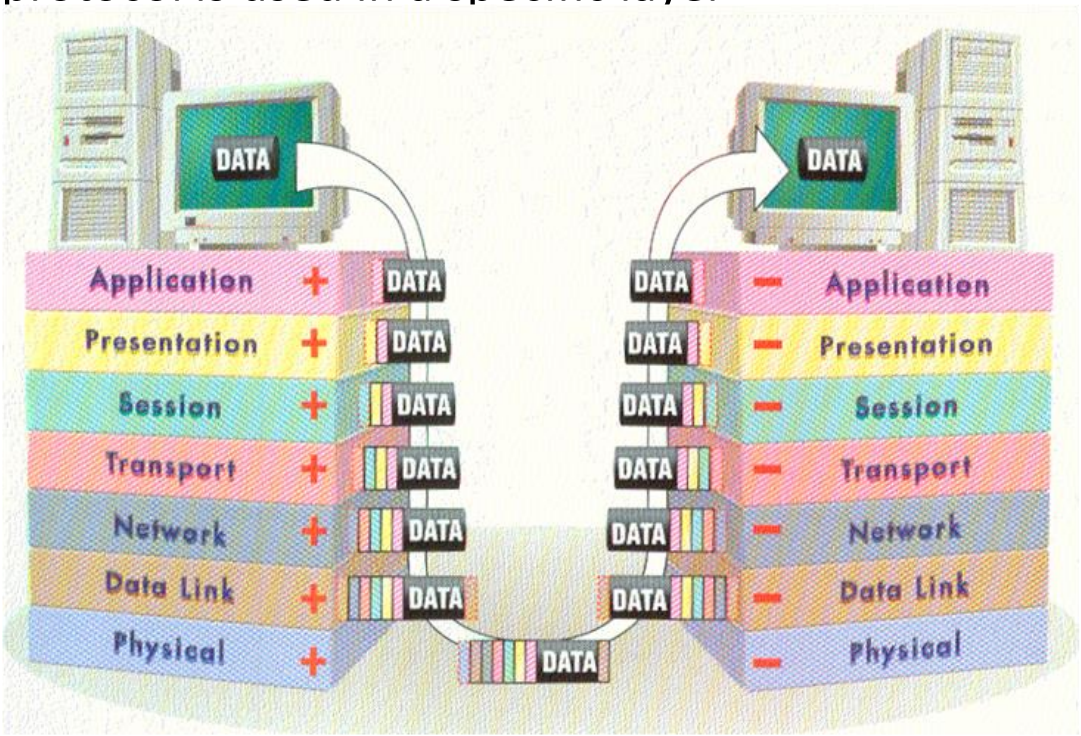
- We have seen that the client and server carry on a machine-to-machine conversation

- A network protocol is the set of rules governing a conversation between a client and a server
  - One of the most common and known protocols is HTTP

http://static.baza.farpost.ru/v/1337755530582_bulletin

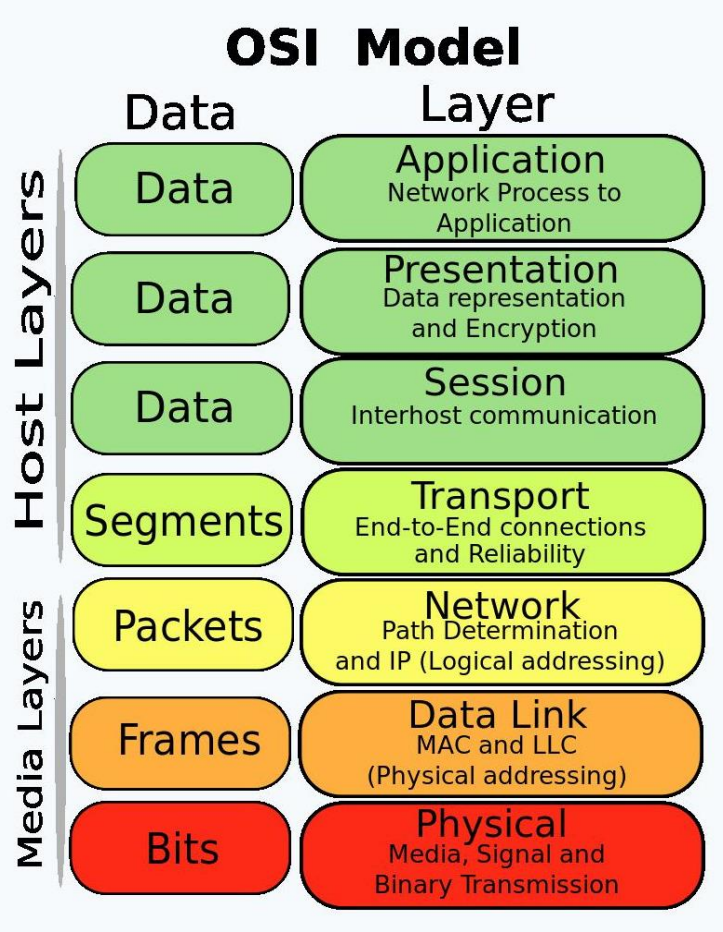
Open System Interconnection Reference Model

- When transmitting data, there are seven layers handling different parts of the job
  - Each protocol is used in a specific layer



http://ccna-routingswitching-ciscochamp.netai.net/web_images/encapsulation3.png

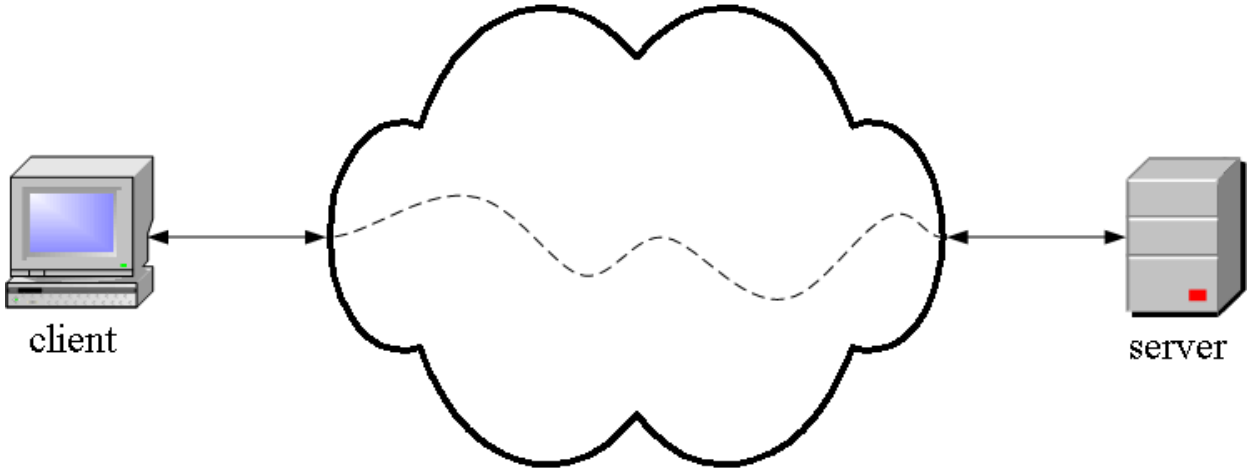
Application Layer Is the Boss



- The application program says: Send this request to the server -- I don't care how you do it or whether it goes over phone lines, radio, or anything else about the details
- Just send the message, and let me know when it arrives or if it cannot be delivered for some reason
  - The lower layers are used for communication between a client & a server

https://www.lifewire.com/thmb/iJuUS8YlwA5MjcbMYeHss2b5fPU=/1365x1024/smart/filters:no_upscale()/OSImodel-8d93f19d50e543348f82110aa11f7a93.jpg

HTTP Is an Application Layer Protocol



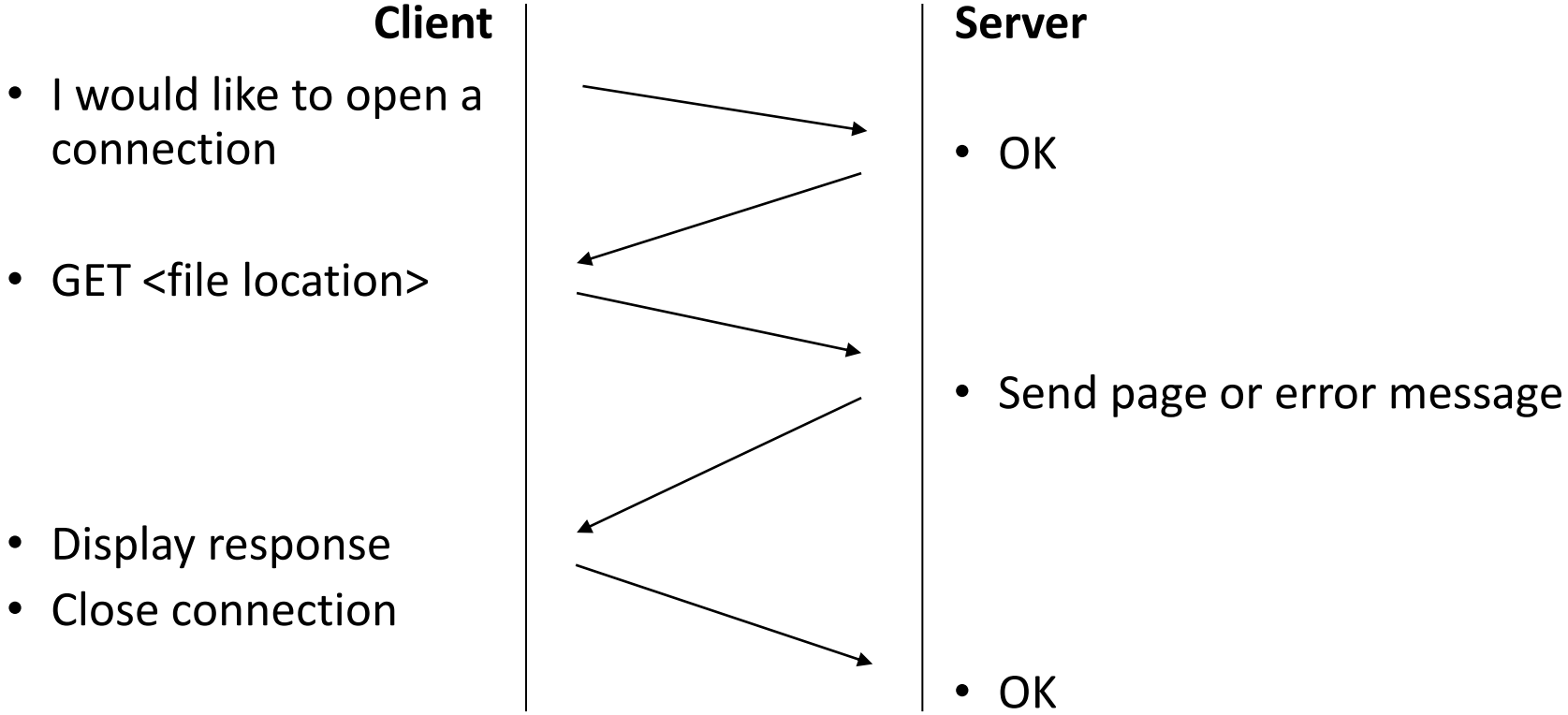
http://bpastudio.csudh.edu/fac/lpress/471/hout/netech/ClServer.gif

- The web client (i.e., a browser) and the web server are application programs
  - Lower layers take care of the communication details

A Simplified Example of HTTP

The message requesting a web page begins with the word “GET” and is followed by a space and the location of a file on the server:

GET /images/logo.gif



Many Application Layer Protocols Are Used on the Internet

Protocol	Application
HTTP: Hypertext Transfer	Retrieve and view web pages
FTP: File Transfer	Copy files between a client and a server
SMTP: Simple Mail Transport	Send email
POP: Post Office	Read email

Concluding Remarks

- The details are only important to developers
- The rules are defined by the inventor of the protocol – may be a group or a single person
- The rules must be precise and complete so programmers can write programs that work with other programs
- The rules are often published as an RFC along with running client and server programs
  - RFC = request for comments


Q&A