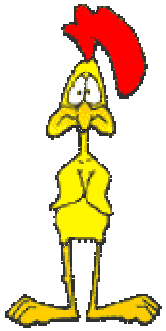
EC201 – WEB TECH. I
INTRODUCTION

Falak Nawaz

Prerequisites

- Programming and problem solving skills
- Database concepts and SQL commands

Get ready for extensive coding and web programming assignments



Course Material

- Recommended Books
  - HTML For Dummies, 5th Edition. By Ed. Tittel
  - Hugh E. Williams, David Lane (2004): Web Database Applications with PHP and MySQL (2nd Edition); O' Reilly Press
  - Chris Bates (2006): Web Programming: Building Internet Applications (3rd Edition); Wiley Publishing

Supplementary References

- Eve Andersson, Philip Greenspun, and Andrew Grumet (2006): Software Engineering for Internet Applications; MIT Press.
- Brad Bulger, Jay Greenspan, and David Wall (2004): MySQL/PHP Database Applications (2nd Edition); Wiley Publishing
- Danny Goodman (2007): JavaScript and DHTML Cookbook (2nd Edition); O'Reilly Press
- Patrick Lynch and Sarah Horton (2002): Web Style Guide (2nd Edition); Yale University Press.
- Microsoft Developer Network: HTML and DHTML Reference
- W3Schools http://www.w3schools.com
- PHP HomePage http://www.php.net
- PHP Freaks http://www.phpfreaks.com
- http://www.howstuffworks.com
- http://www.whatis.com

Always a BEST resource for Beginners

Course Calendar

- **Section 01**
- 01. Introduction: Fundamental Internet and WWW concepts, W3C standards
- 02. HTML Basics: Web page, hypertext, mechanism of tags, hyperlinks
- 03. Advance HTML: Forms, frames, embedded objects
- 04. Cascading Style Sheets: Levels, selectors, style elements
- 05. Web Graphics: Color palettes, image manipulation in Photoshop, Flash animations
- **Section 02**
- 06. Web Scripting: JavaScript basics, objects, events, functions
- **One Hour Test 01**
- 07. Dynamic HTML: Advance JavaScript, DHTML, combining JavaScript, CSS and DOM, cross browser compatibility issues

Course Calendar…

- **Section 03**
- 08. Server-side Scripting: Introduction to PHP,
- 09. Configuration PHP & Apache web server
- 10. PHP Basics: Variables, program control, built-in functions
- 11. Advance PHP: Form processing, session management, cookies
- 12. MySQL: Introduction, configuration and setup
- **One Hour Test 02**
- **Project Proposal Submission**
- 13. PHP/MySQL Integration

Course Calendar…

- **Section 04**
- 14. Debugging, error management, performance, and user activity analysis, web application vulnerabilities
- **Advance client-side scripting**
- 15. Jquery Concepts
- 16. Ajax for PHP
- **Semester Project Presentations**
- **Final Exam**

Grading Policy

- 30% OHTs (2 one hour tests of 15% each)
- 40% Final Exam
- 15% Project
- 10% Assignments (Class/Lab)
- 5% Quizzes

Plagiarism

- Collaboration and group wok is encouraged for lab work and for discussing assignments.
  - Each student is required to submit his/her own contribution(s).
  - Your writings must be your own thoughts.
- Downloading code (segments) from the internet and presenting them as your own is considered plagiarism.
- Cheating and plagiarism will not be tolerated!

Introduction

- Fundamental Internet and WWW concepts

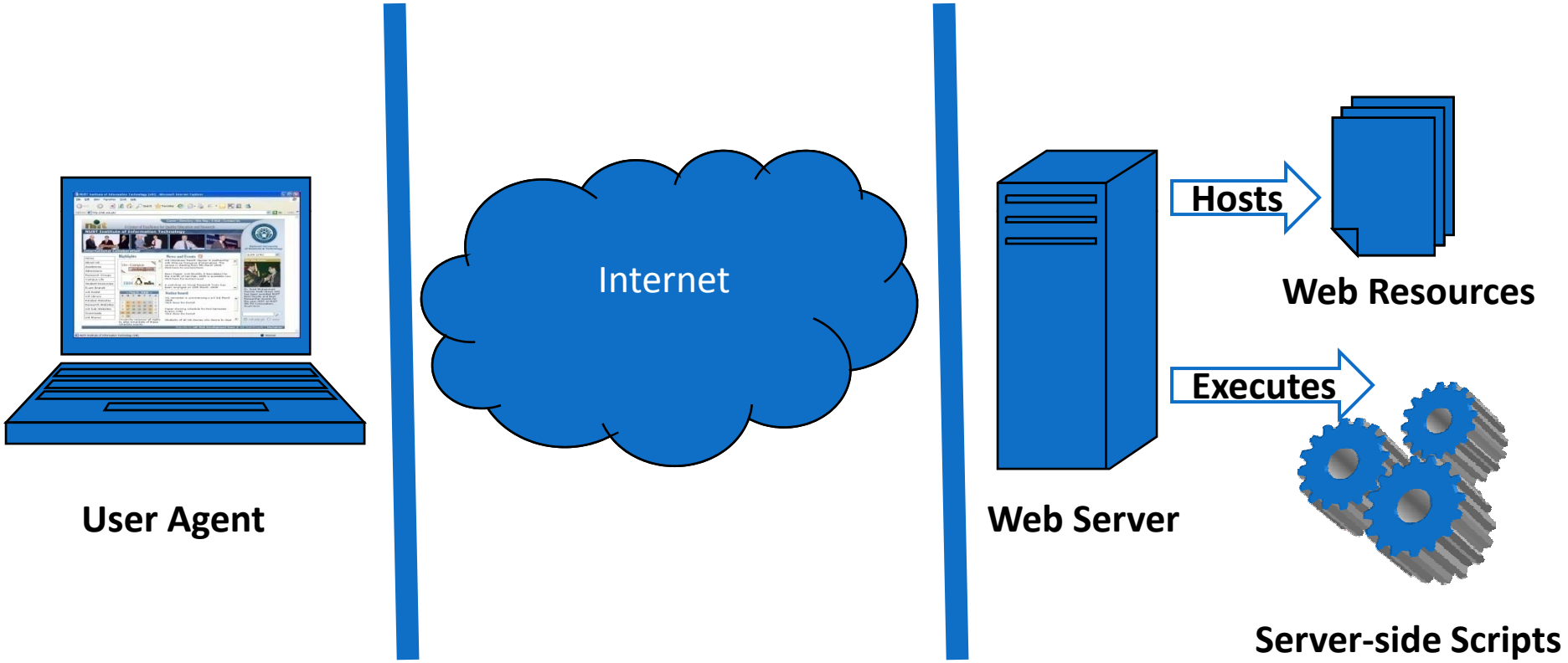
Internet vs. WWW

- The Internet
  - Interconnected computer networks
  - TCP/IP Protocol Stack
    - Physical, Data link, Network, Transport, **Application**
    - HTTP, FTP, IMAP4, IRC, POP3, SMTP, SNMP, TELNET, RPC, SOAP…
- The Web
  - Interconnected hypertext documents (and other resources)
  - One of the service/application of the Internet

The World Wide Web (Timeline)

- 1945 – Associative Trails by Vannevar Bush
- 1965 – Hypertext by Ted Nelson
- 1986 – SGML Standard ISO 8879 (Charles Goldfarb)
- 1989 – HTML by Tim Berners-Lee
- 1991 – Launch of the Web at CERN
- 1994 – W3 Consortium
- 1998 – Google
- 2004 – Web 2.0
- 200x – Semantic Web

Client-Server Web Architecture



Web Browser vs. Web Server

- Web Server
  - Hosts web resources
    - Static: usually doesn't change
    - Dynamic: created on demand (e.g. **C**ommon **G**ateway **I**nterface)
  - Understanding of HTTP
  - Apache HTTP Server, Internet Information Server (IIS)

- Web Browser (Client)
  - Renders web pages
  - Netscape Navigator/Mozilla Firefox
  - Internet Explorer, Safari, Opera, and many others

How Web Server works?

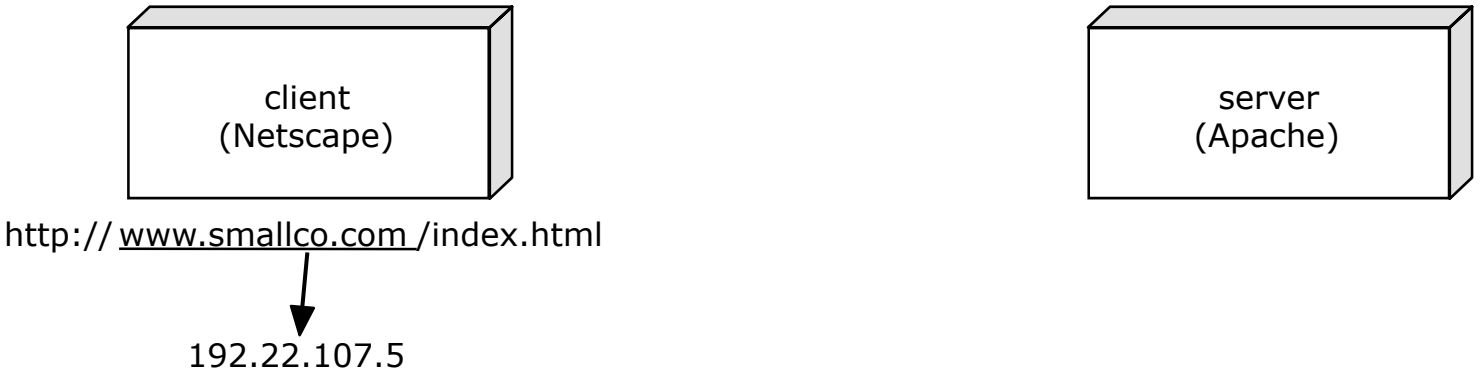
- Duties
  - Listen to a port
  - When a client is connected, read the HTTP request
  - Perform some lookup function
  - Send HTTP response and the requested data

Serving a Page

- User of client machine types in a URL

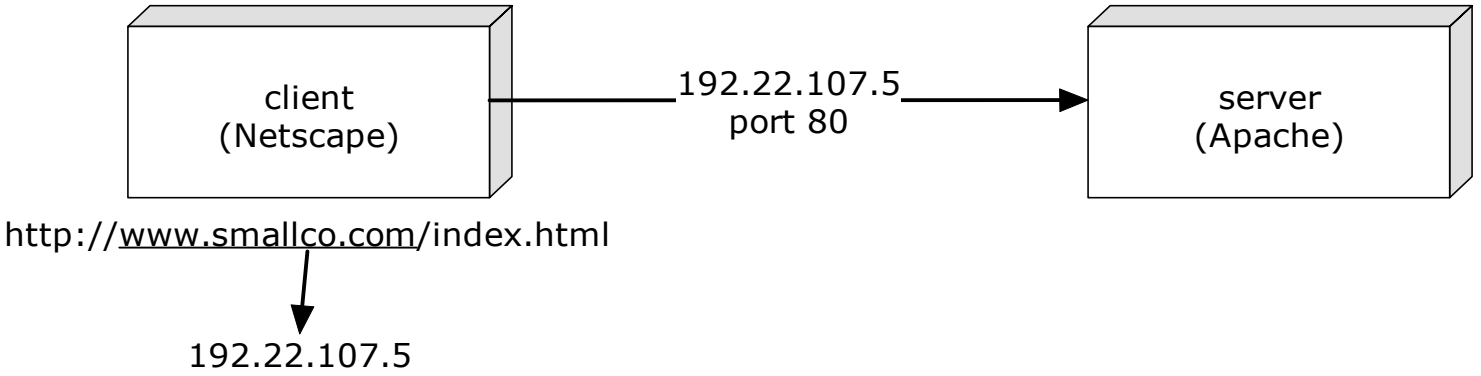
Serving a Page

- Server name is translated to an IP address via DNS



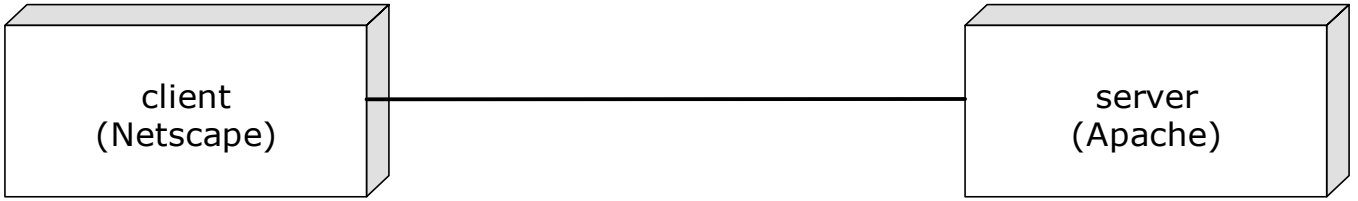
Serving a Page

- Client connects to server using IP address and port number



Serving a Page

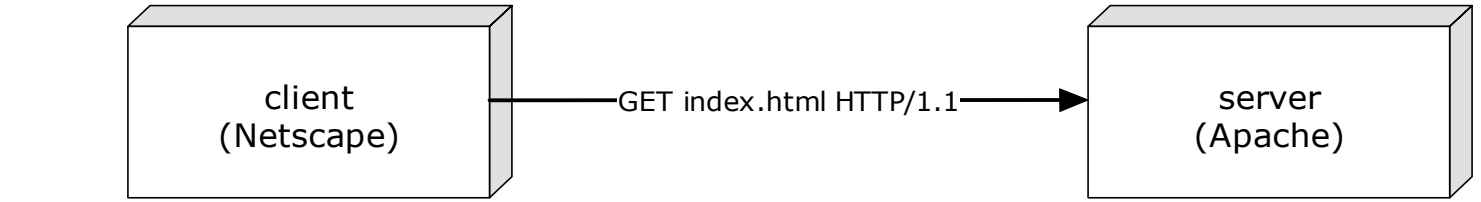
- Client determines path and file to request



http://www.smallco.com/index.html

Serving a Page

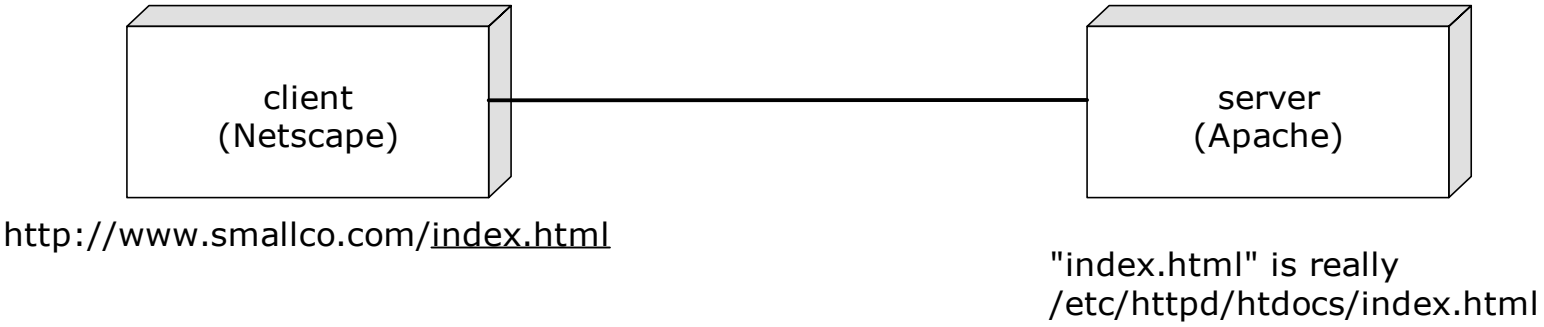
- Client sends HTTP request to server



http://www.smallco.com/index.html

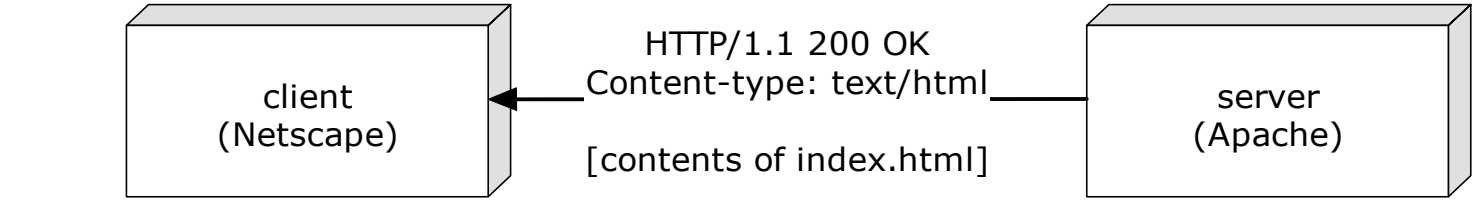
Serving a Page

- Server determines which file to send



Serving a Page

- Server sends response code and the document



http://www.smallco.com/index.html

HTTP Response Status Codes

200 OK
204 No Content
301 Moved Permanently
400 Bad Request
401 Unauthorized
404 Not Found
500 Internal Server Error

Serving a Page

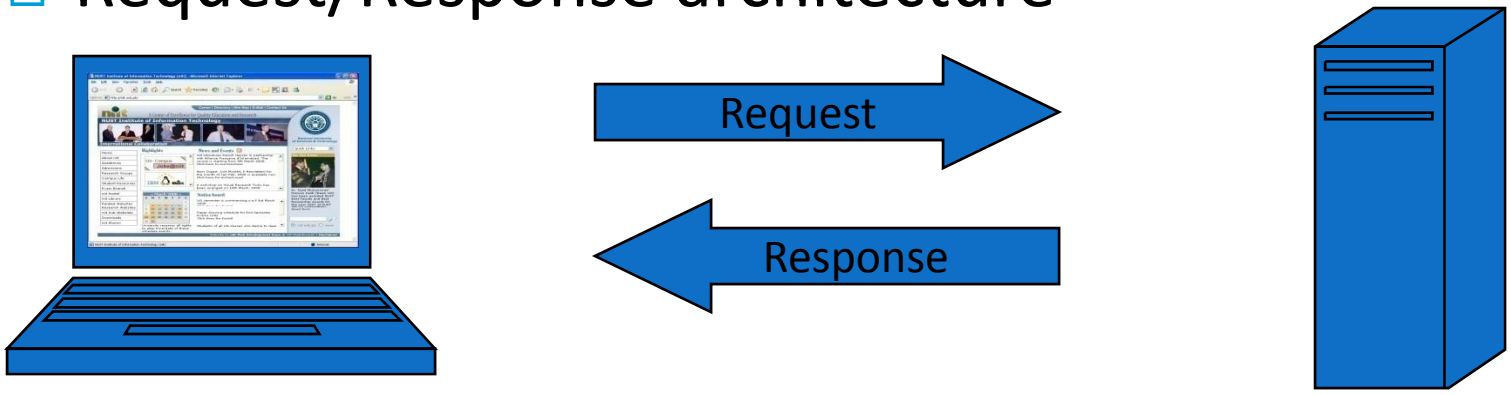
- Connection is broken

Hypertext Transfer Protocol (HTTP)

- HTTP is…
  - Designed for document transfer
  - Generic
    - not tied to web browsers exclusively
    - can serve any data type
  - Stateless
    - no persistent client/server connection

Hypertext Transfer Protocol (HTTP)

- Application layer communication between Web Servers and Client Browsers
- Request/Response architecture




```
GET /faculty/dean.html HTTP/1.1
Host: www.niit.edu.pk
User-agent: Mozilla Firefox 2.0 (Win32)
Accept: text/html
```

```
HTTP/1.1 200 OK
Server: Apache/1.3.27
Content-Length: 936
Content-Type: text/html

Bla, bla, blaa
```

Hypertext Transfer Protocol (HTTP)

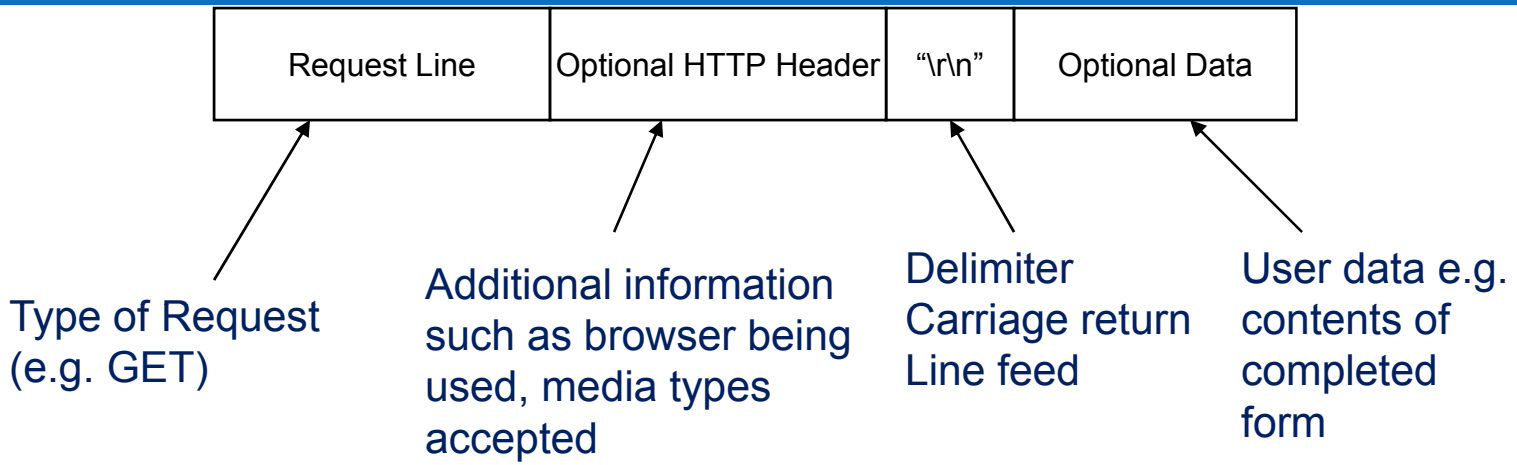
- MIME
  - Multipurpose Internet Mail Extensions
  - Standards for encoding different media types in a message
  - Originally developed for emailing files and messages in different languages

GET /faculty/dean.html HTTP/1.1
Host: www.niit.edu.pk
User-agent: Mozilla Firefox 2.0 (Win32)
Accept: text/html, text/plain, image/gif, audio/au

HTTP/1.1 200 OK
Server: Apache/1.3.27
Content-Length: 936
Content-Type: text/html, text/plain, image/gif, audio/au
Bla, bla, blaa

WWW – HTTP Request messages

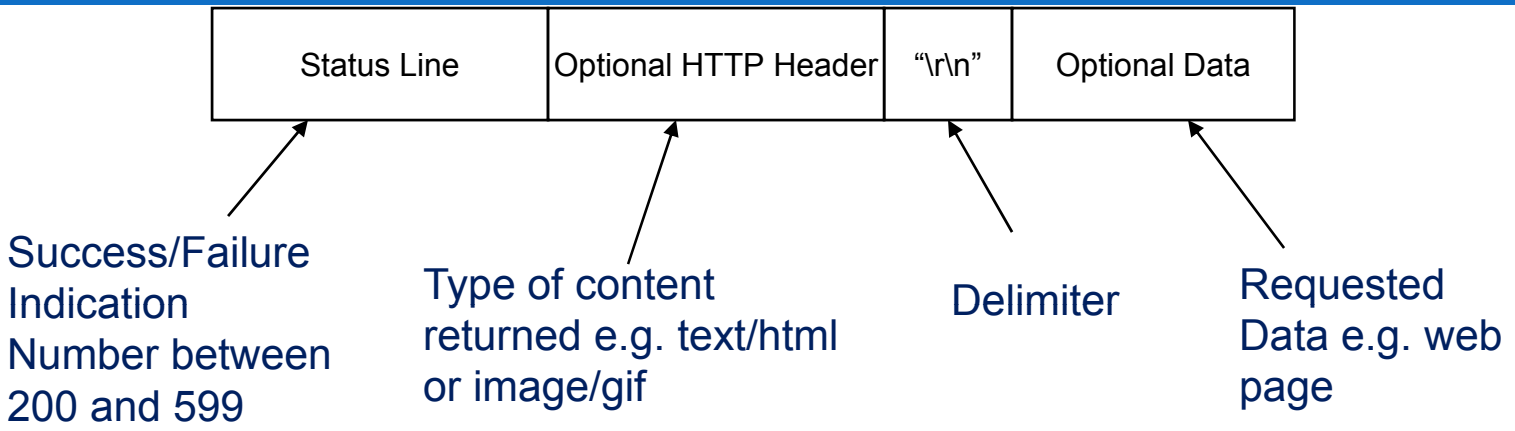
– HTTP Request messages are sent from client to server.



– There are a number of valid HTTP Request messages
  - **Get** – Used to request a web page from a web server
  - **Head** – Return the header of a web page, used by search engines to test the validity of hyperlinks
  - **Post** – Used to send data (e.g. results of registration form) to a web server
  - **Put / Delete** – Not typically implemented by browsers.

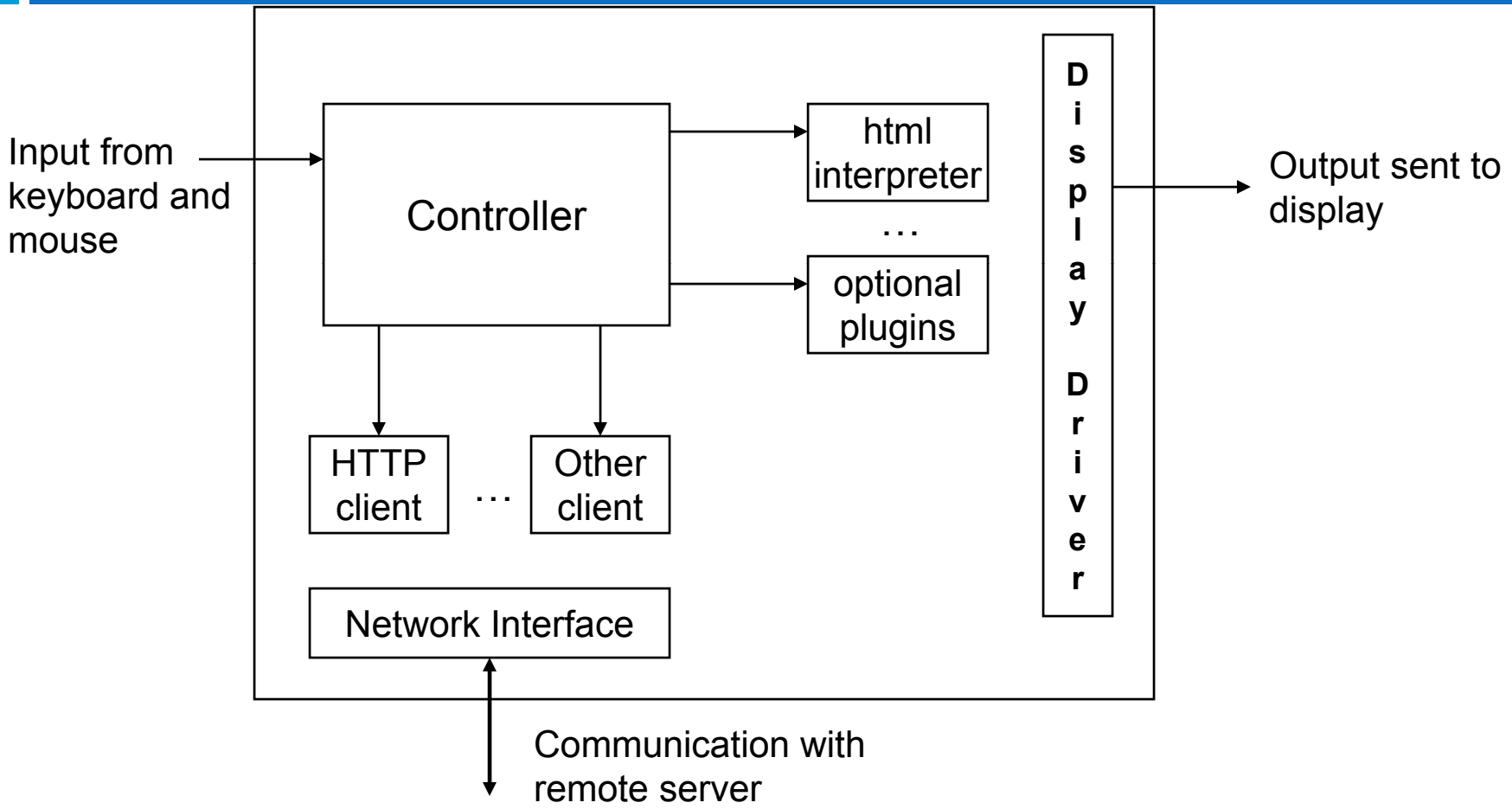
WWW – HTTP Response messages

– HTTP Response messages are sent from server to client.



– The Status Line gives information about the success of the previous HTTP Request
  - **200 – 299** Success
  - **300 – 399** Redirection – Document has been moved
  - **400 – 499** Client Error – Bad Request, Unauthorised, Not found
  - **500 – 599** Server Error – Internal Error, Service Overloaded

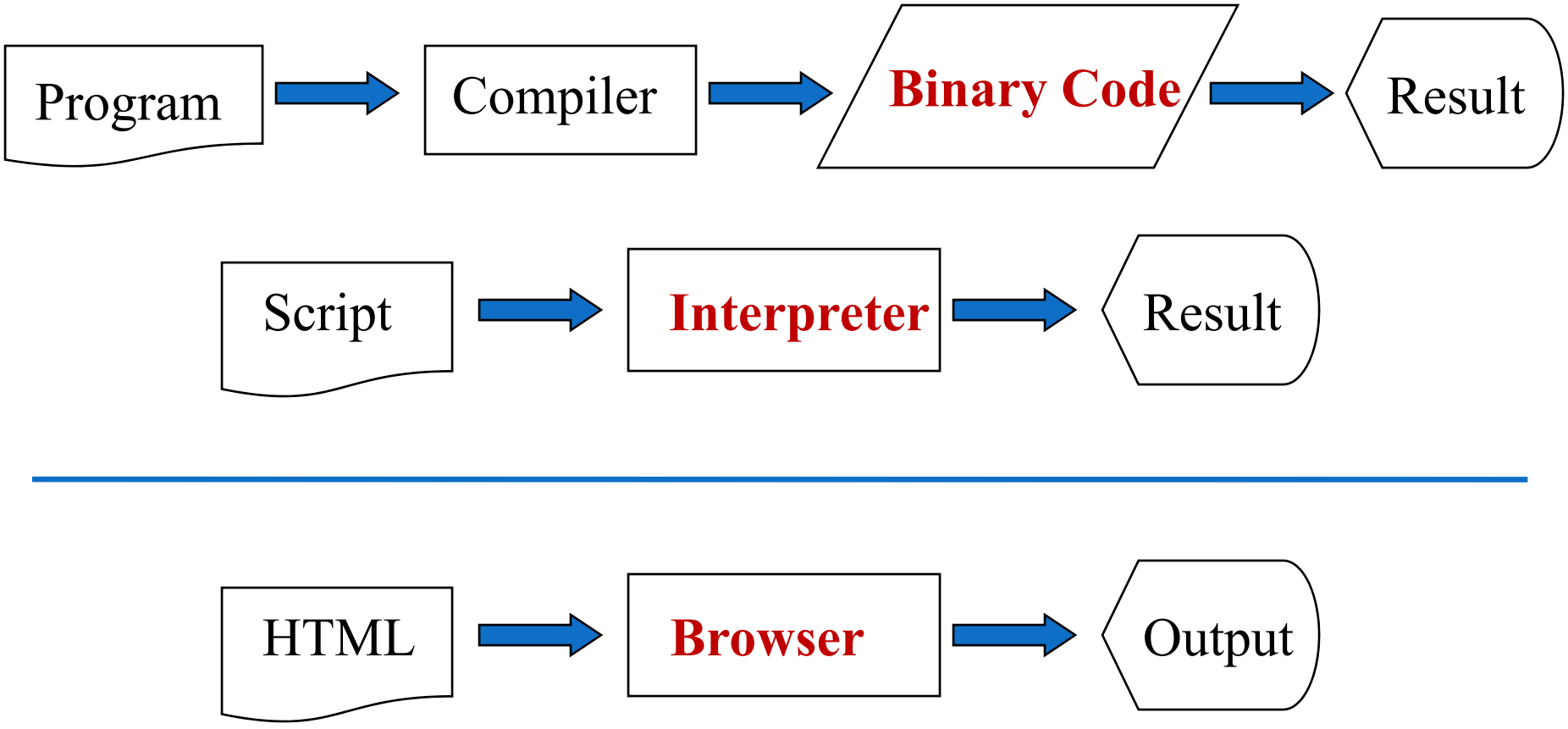
WWW – Browser Architecture



WWW – Browser Architecture

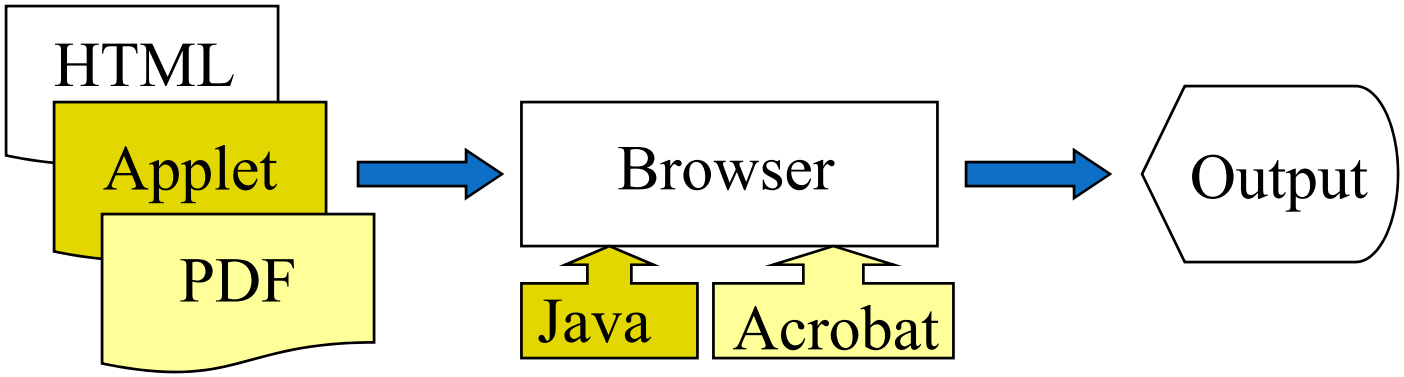
- Browser has more components than a server
  - **Display driver** for painting screen.
  - **HTML interpreter** for formatting HTML documents.
  - **Plugins** to display different content (e.g., Shockwave or Real Audio content, PDF)
  - **HTTP client** to fetch HTML documents from WWW server.
  - **Other clients** for other protocols (e.g., ftp, mail)
  - **Controller** also must accept input from the computer user through the mouse or keyboard.

Programs vs. Scripts



Browsers and Plug-ins

- A *plug-in* is an adapter which lets browsers work with non-HTML
  - e.g. Java VM: Java applets
  - e.g. Acrobat: PDF files



Internet Address

- Numbers vs. Names
  - 202.125.157.196 vs. niit.edu.pk
  - Addressing the HTTP server
    - http://niit.edu.pk
    - Default port = 80
- Internet names
  - Top Level Domains: .com, .net, .org, .tv, .info
  - Country Prefixes: .uk, .pk, .ae, .au, .fr

IP addresses

- IP addresses can be
  - permanent also called ***static*** or
  - temporary also known as ***dynamic***
- If you connect via dial-up then most likely you will be assigned a temporary IP address
- If you have computer on a corporate network then most likely it has a static IP address, although most companies use DHCP more and more to distribute IP address
  - good when people use laptops a lot and move around
  - ***DHCP stands for Dynamic Host Configuration Protocol***

Domain Names and Address Resolution

- To connect from computer A to computer B an IP address is required
- Usually people do not use IP addresses directly to access other computers
- As a rule names like **www.niit.edu.pk** are used because they are easier to remember
- ***Domain Name Service or DNS*** distributed database is used to map names to IP addresses

DNS: Domain Name Service

- DNS is a distributed database of computers' names and their corresponding IP addresses
- DNS servers are used to host the DNS database and software to use it
- Since the DNS database is too large to be stored on any specific computer only a subset of the database is usually kept on any DNS server
- The job of the DNS server is to map the name to an IP address
- If the DNS server can not resolve the domain request (because it does not have it in its part of the database) then it redirects the request to a different DNS server

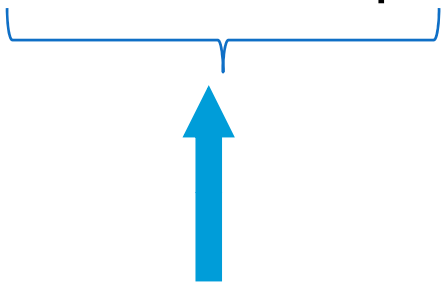
Universal Resource Location (URL)

http://www.niit.edu.pk:80/bicse-2b/Courseoutline.html

Protocol (Scheme)

Universal Resource Location (URL)

http://www.niit.edu.pk:80/bicse-2b/Courseoutline.html



Host Name

Universal Resource Location (URL)

http://www.niit.edu.pk:80/bicse-2b/Courseoutline.html

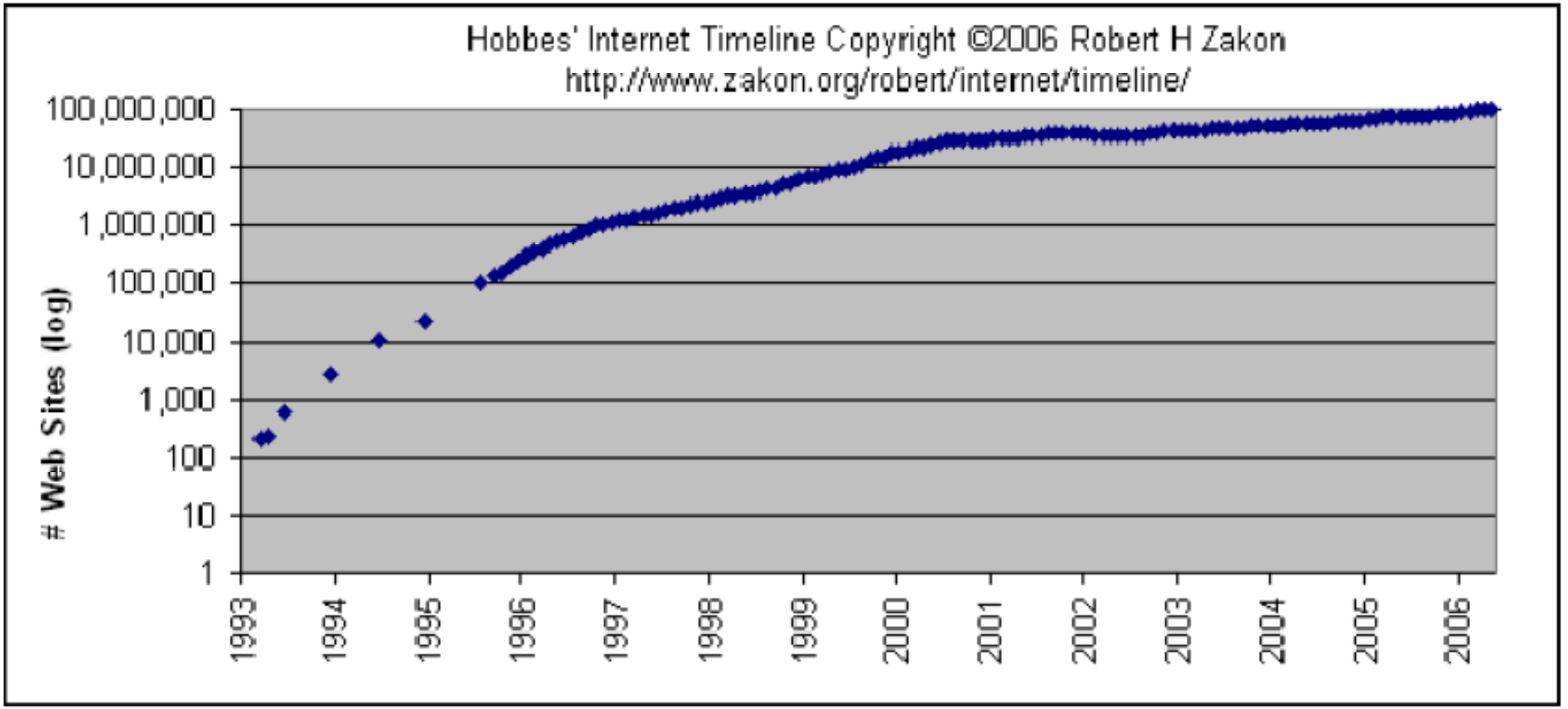
Port

Universal Resource Location (URL)

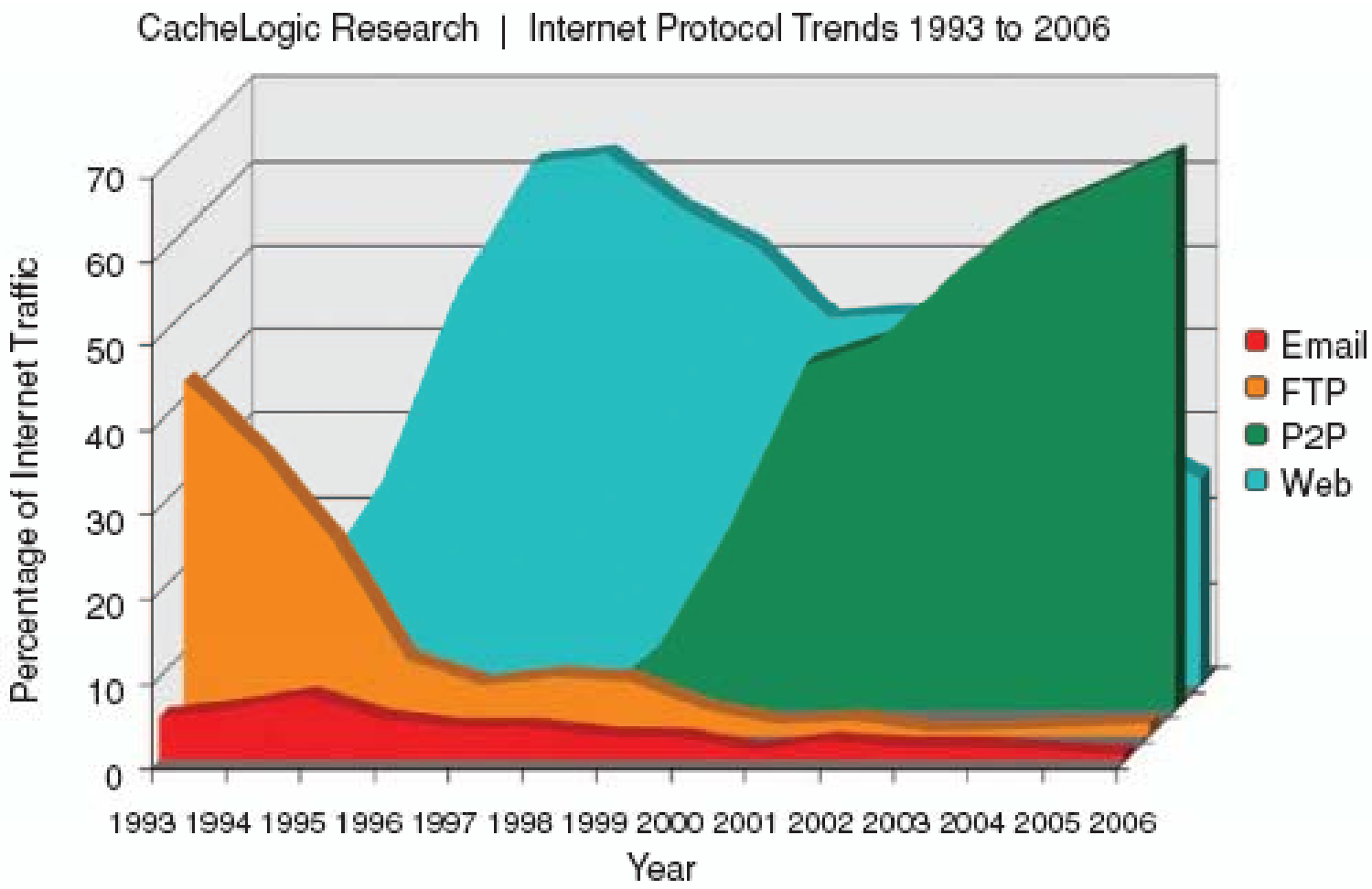
http://www.niit.edu.pk:80/bicse-2b/Courseoutline.html

Path

Web Growth



Internet Protocol Trends



Thanks

- Questions?