# Servers on the Internet

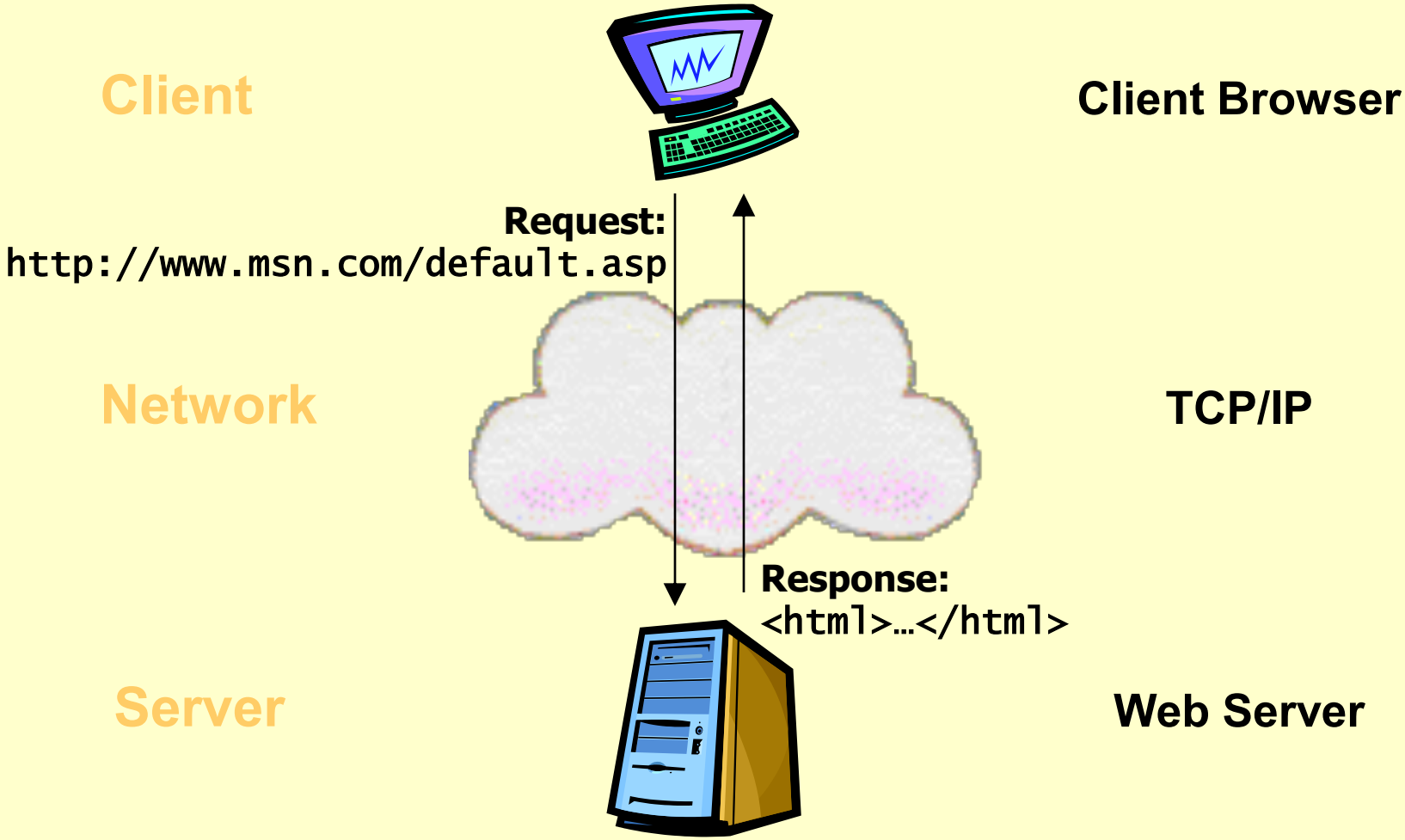
- HTTP - HyperText Transport Protocol
- FTP - File Transport Protocol
- Gopher - Text and Menus
- NNTP - Network News Transfer Protocol
- DNS - Distributed Name Service
- telnet - log into a remote computer
- Web services
  - coming soon to a web server near you

# HyperText Markup Language (HTML)

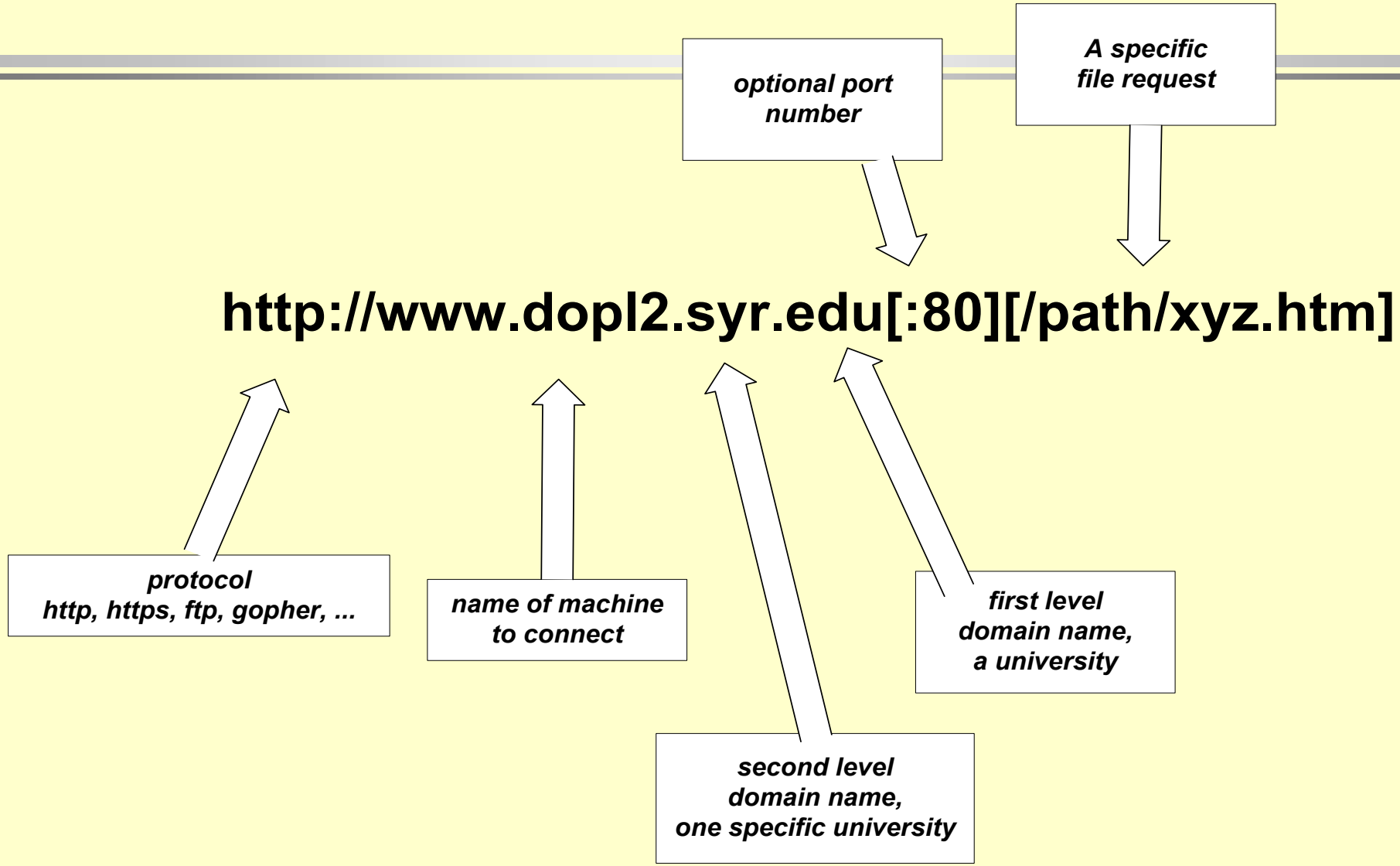
- The markup language used to represent Web pages for viewing by people
  - Designed to display data, not store/transfer data
- Rendered and viewed in a Web browser
- Can contain ***links*** to images, documents, and other pages
- Not extensible – uses only tags specified by the standard
- Derived from Standard Generalized Markup Language (SGML)
- HTML 3.2, 4.01, XHTML 1.0

# Internet Technologies

## WWW Architecture



# Address Resolution



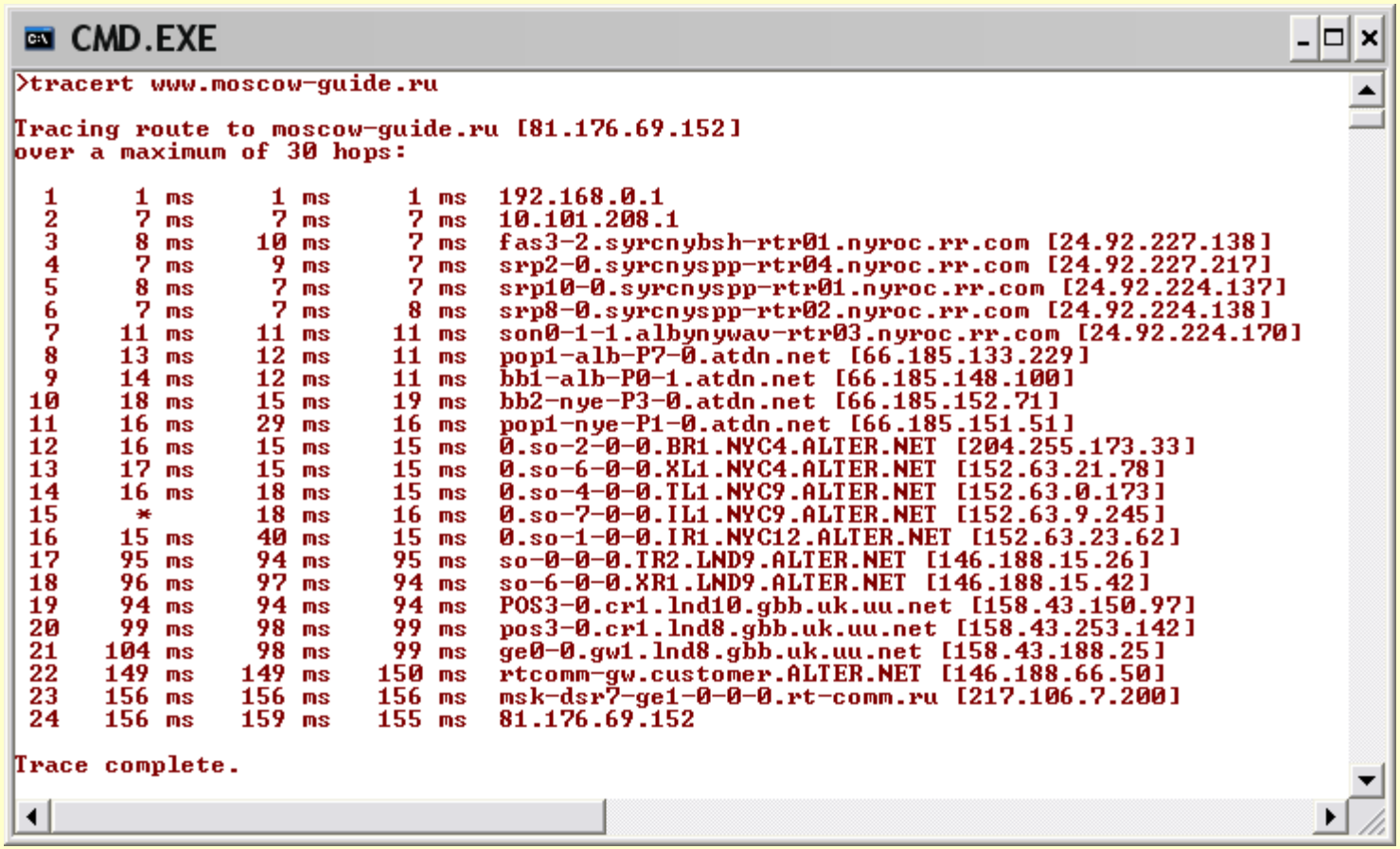
# HTTP Protocol

- Client/Server, Request/Response architecture
  - You request a Web page
    - e.g. `http://www.msn.com/default.asp`
    - HTTP request
  - The Web server responds with data in the form of a Web page
    - HTTP response
    - Web page is expressed as HTML
  - Pages are identified as a Uniform Resource Locator (URL)
    - Protocol: `http`
    - Web server: `www.msn.com`
    - Web page: `default.asp`
    - Can also provide parameters: `?name=Leon`

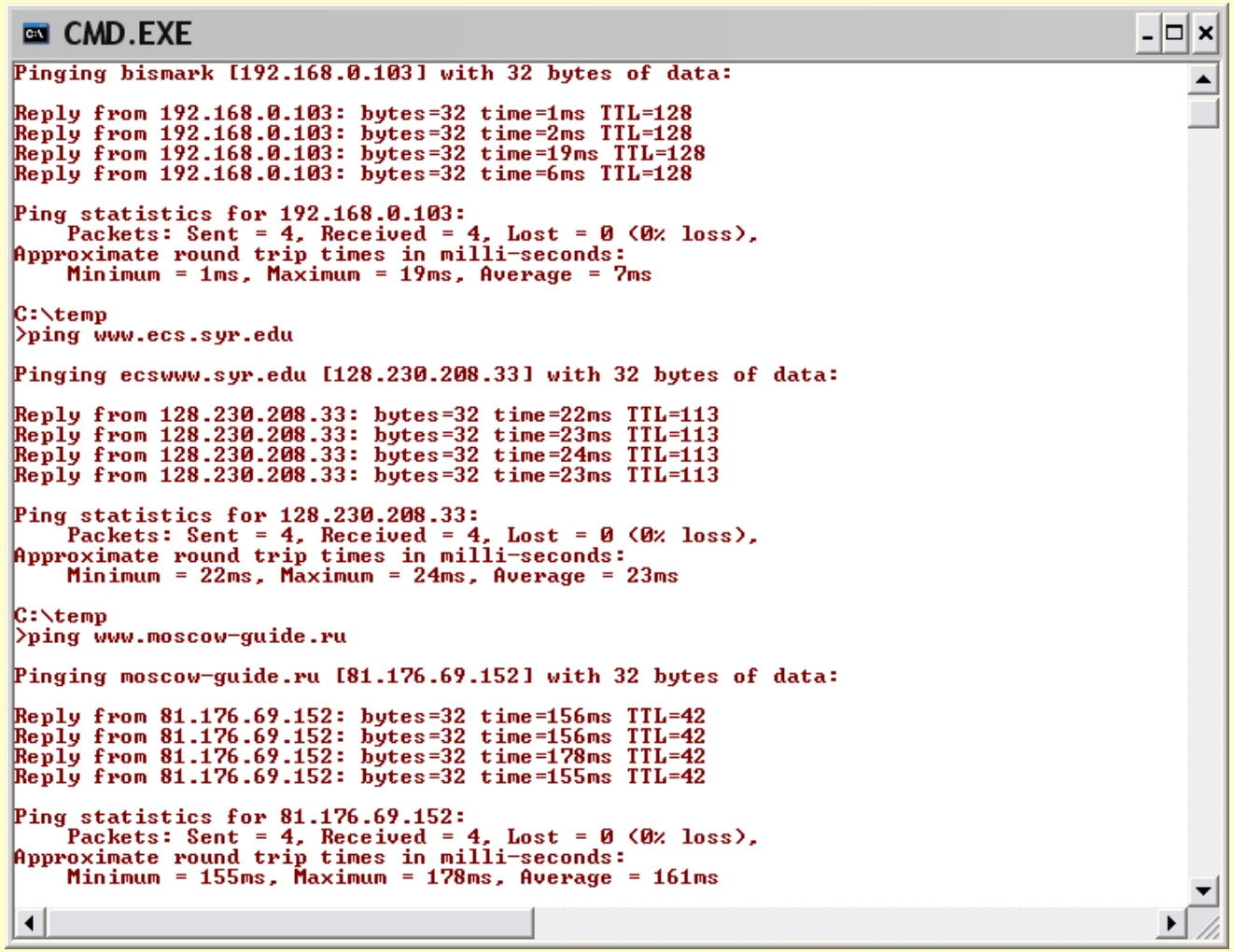
# Typical HTTP Transaction

- Client browser finds a machine address from an internet Domain Name Server (DNS).
- Client and Server open TCP/IP socket connection.
- Server waits for a request.
- Browser sends a verb and an object:
  - GET XYZ.HTM or POST form
  - If there is an error server can send back an HTML-based explanation.
- Server applies headers to a returned HTML file and delivers to browser.
- Client and Server close connection.
  - It is possible for the client to request the connection stay open – requires design effort to do that.

# Tracing HTTP Message with Tracert



# Pinging Various URLs



# Programming the Web

- Client-Side Programming
  - JavaScript
  - Dynamic HTML
  - .Net controls

- Server-Side Programming
  - ASP script
  - Server components
  - C# code-behind
  - ADO
  - Web controls used on ASPX pages
  - Web services

# Web Processing Models

- ***HyperText Transfer Protocol (HTTP)***
  - Universal access
  - HTTP is a "request-response" protocol specifying that a client will open a connection to server then send request using a very specific format. Server will respond and then close connection.
- ***HyperText Markup Language (HTML)***
  - Web of linked documents
  - Unlimited scope of information content
- ***Graphical Browser Client***
  - Sophisticated rendering makes authoring simpler
- ***HTML File Server***
  - Using HTTP, Interprets request, provides appropriate response, usually a file in HTML format
- ***Three-Tier Model***
  - Presentation, application logic, data access

# Programming the Web
## Client-Side Code

- What is client-side code?
  - Software that is downloaded from Web server to browser and then executes on the client
- Why client-side code?
  - Better scalability: less work done on server
  - Better performance/user experience
  - Create UI constructs not inherent in HTML
    - Drop-down and pull-out menus
    - Tabbed dialogs
  - Cool effects, e.g. animation
  - Data validation

# Programming the Web
## Server-Side Code

- What is server-side code?
  - Software that runs on the server, not the client
  - Receives input from
    - URL parameters
    - HTML form data
    - Cookies
    - HTTP headers
  - Can access server-side databases, e-mail servers, files, mainframes, etc.
  - Dynamically builds a custom HTML response for a client