P3. For the application layer: DNS and HTTP. For the transport layer: UDP for DNS and TCP for HTTP.

P4. A. The URL is gaia.cs.umass.edu/cs453/index.html.

B. HTTP 1.1

C. Persistent connection

D. gaia.cs.umass.edu

E. Netscape 7,2. It’s needed because different browsers can interpret web pages

differently.

P5. A. Yes because of the server response **OK** and response code **200**. The reply was provided on Tue, 07 Mar 2008 12:39:45 GMT.

B. It was last modified on Sat, 10 Dec 2005 18:27:46 GMT.

C. There are 3874 bytes in the document.

D. The first 5 bytes are <!doc. Yes (Keep-Alive).

P7. The total time taken to get the IP address is RTT1 + RTT2 + … RTTn. Once the IP address is known, RTT0 takes place to setup TCP connection, and another to request and receive the object. Then the total time elapsed is 2RTT0 + RTT1 + RTT2 + … + RTTn.

P22. Given F = 15 Gbits = 15360 Mbits, us = 30 Mbps, di = 2 Mbps, N1 = 10, N2 = 100, N3 = 1,000, u1 = 30 Kbps = .29 Mbps, u2 = 700 Kbps = .68 Mbps, and u3 = 2 Mbps. For client-server architecture, the minimum is denoted by . For P2P architecture, the minimum is denoted by . Using these two equations, our charts look like this:

|  |  |
| --- | --- |
| Client-Server Architecture | |
| 10 peers | 5120 |
| 100 peers | 7680 |
| 1,000 peers | 7680 |

|  |  |
| --- | --- |
| P2P Architecture | |
| 10 peers | 512 |
| 100 peers | 512 |
| 1,000 peers | 512 |

P27. A. Since the files are mixed in, the server will need to store *N* *N* or N2 files since there will be *N*2combinations.

B. Since the servers sends the audio and video separately, the server will store *N* + *N* or 2*N* files since there will be *N* files for audio and *N* files for video.