

Chapter 2: outline

2.1 principles of network applications

2.2 Web and HTTP

2.3 electronic mail

- SMTP, POP3, IMAP

2.4 DNS

2.5 P2P applications

2.6 video streaming and content distribution networks

2.7 socket programming with UDP and TCP

Web and HTTP

Related Standards and RFCs

- Related RFCs
 - RFC 1945: Hypertext Transfer Protocol, HTTP/1.0
 - RFC 2616: Hypertext Transfer Protocol, HTTP/1.1
 - RFC 3986: Uniform Resource Identifier (URI): Generic Syntax
 - RFC 1738: Uniform Resource Locators (URL)
- Web Pages
 - World Wide Web Consortium (W3C): <http://www.w3.org/>
 - The Internet Archive: www.archive.org

Obsoleted by: [7230](#), [7231](#), [7232](#), [7233](#), [7234](#), [7235](#)

Updated by: [2817](#), [5785](#), [6266](#), [6585](#)

Network Working Group

Request for Comments: 2616

Obsoletes: [2068](#)

Category: Standards Track

DRAFT STANDARD

Errata Exist

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RFC 2616

<https://tools.ietf.org/html/rfc2616>

Hypertext Transfer Protocol -- HTTP/1.1

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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Abstract

The Hypertext Transfer Protocol (HTTP) is an application-level protocol for distributed, collaborative, hypermedia information systems. It is a generic, stateless, protocol which can be used for

Web and HTTP

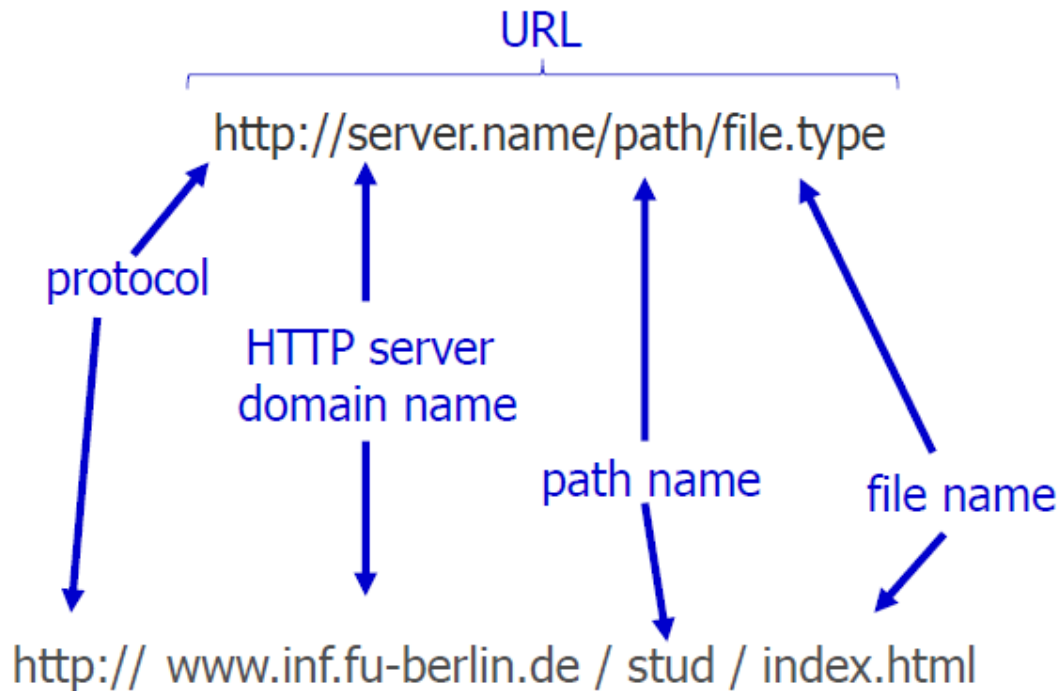
First, a review...

- *web page* consists of *objects*
- object can be HTML file, JPEG image, Java applet, audio file,...
- web page consists of *base HTML-file* which includes *several referenced objects*
- each object is addressable by a *URL*, e.g.,

`www.someschool.edu/someDept/pic.gif`

host name

path name

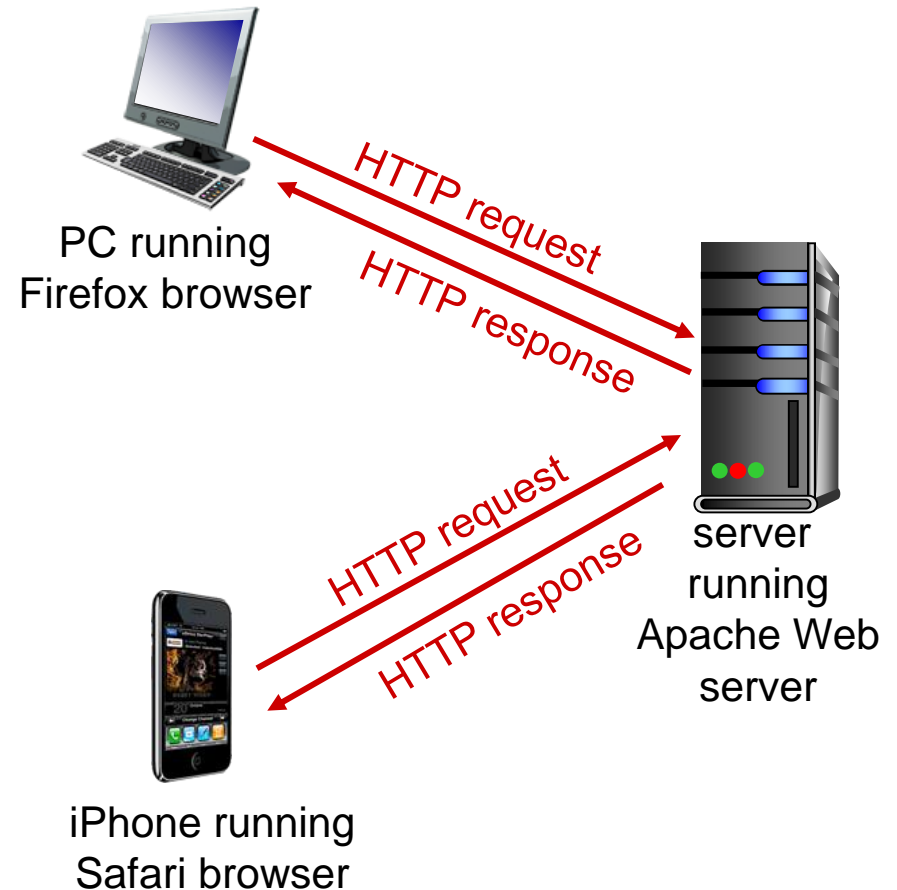


<http://bit.ly/2VWMMH0>

HTTP overview

HTTP: hypertext transfer protocol

- Web's application layer protocol
- client/server model
 - **client**: browser that requests, receives, (using HTTP protocol) and "displays" Web objects
 - **server**: Web server sends (using HTTP protocol) objects in response to requests



HTTP overview (continued)

uses TCP:

- client initiates TCP connection (creates socket) to server, port 80
- server accepts TCP connection from client
- HTTP messages (application-layer protocol messages) exchanged between browser (HTTP client) and Web server (HTTP server)
- TCP connection closed

HTTP is “stateless”

- server maintains no information about past client requests

aside

protocols that maintain “state” are complex!

- past history (state) must be maintained
- if server/client crashes, their views of “state” may be inconsistent, must be reconciled

HTTP connections

non-persistent HTTP

- at most one object sent over TCP connection
 - connection then closed
- downloading multiple objects required multiple connections

persistent HTTP

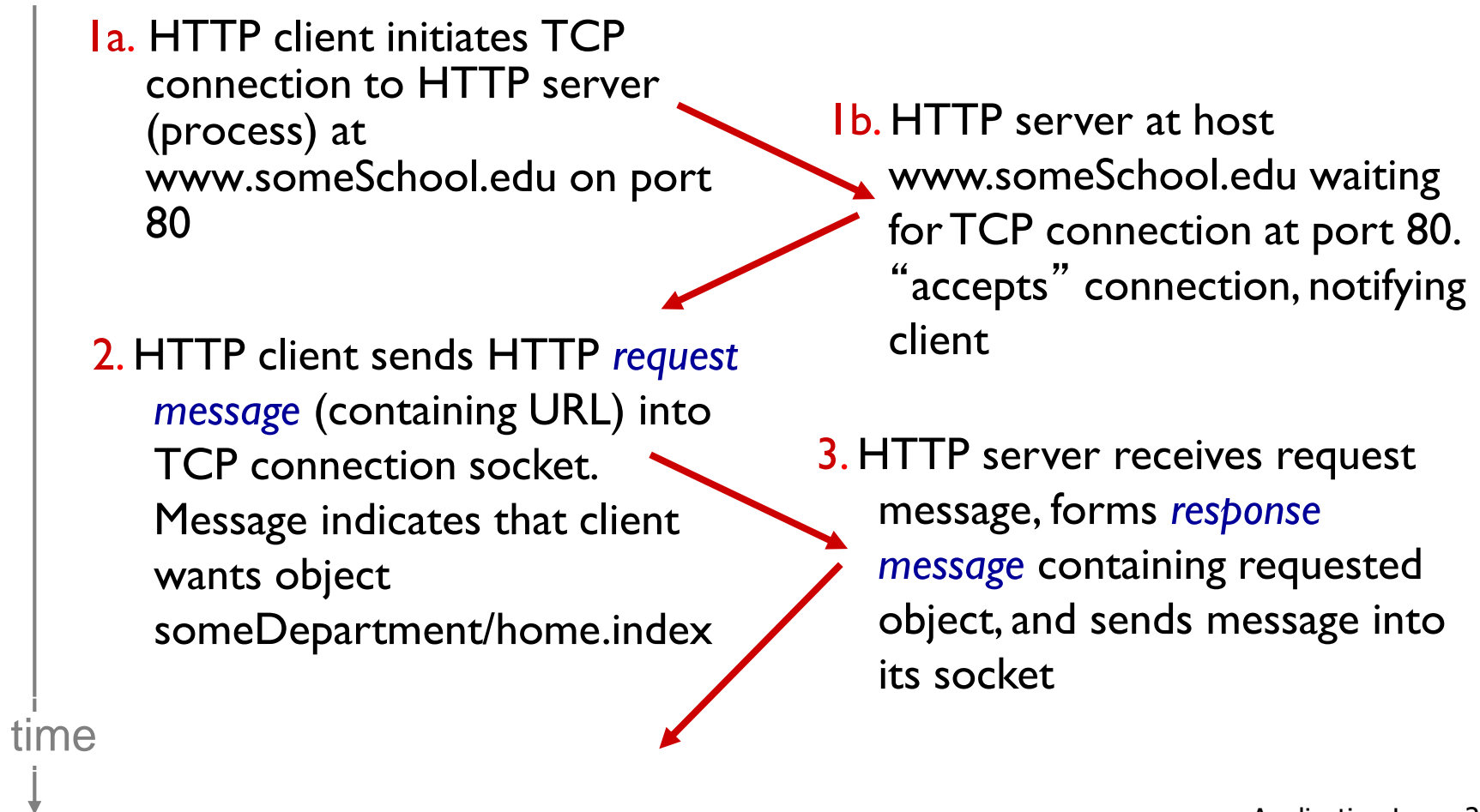
- multiple objects can be sent over single TCP connection between client, server

Non-persistent HTTP

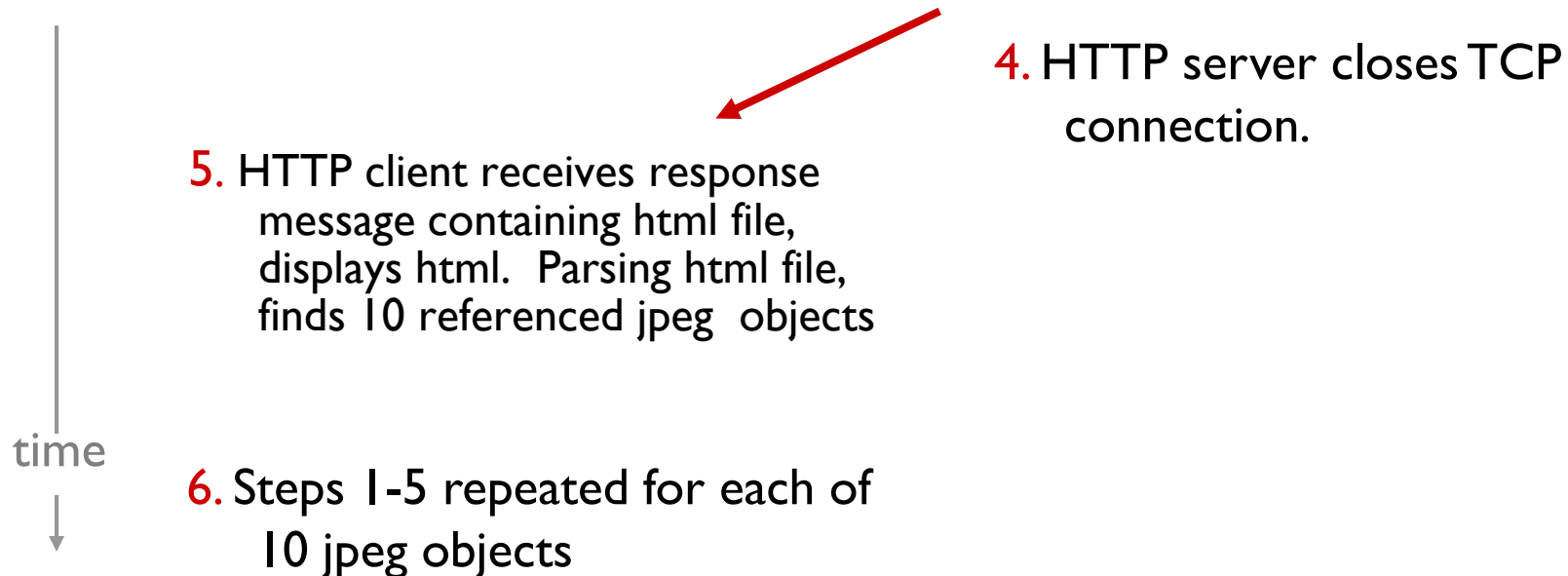
suppose user enters URL:

`www.someSchool.edu/someDepartment/home.index`

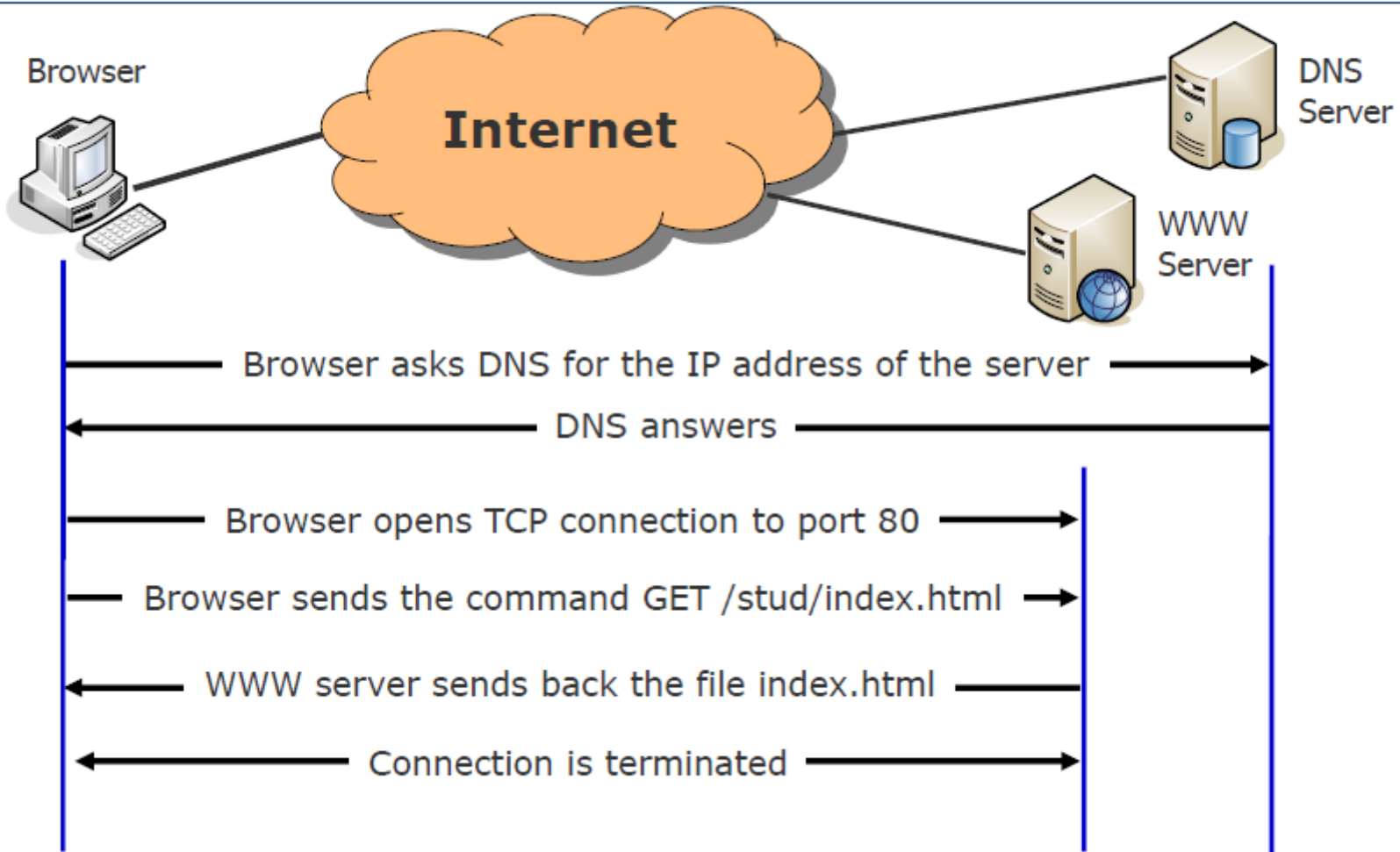
(contains text,
references to 10
jpeg images)

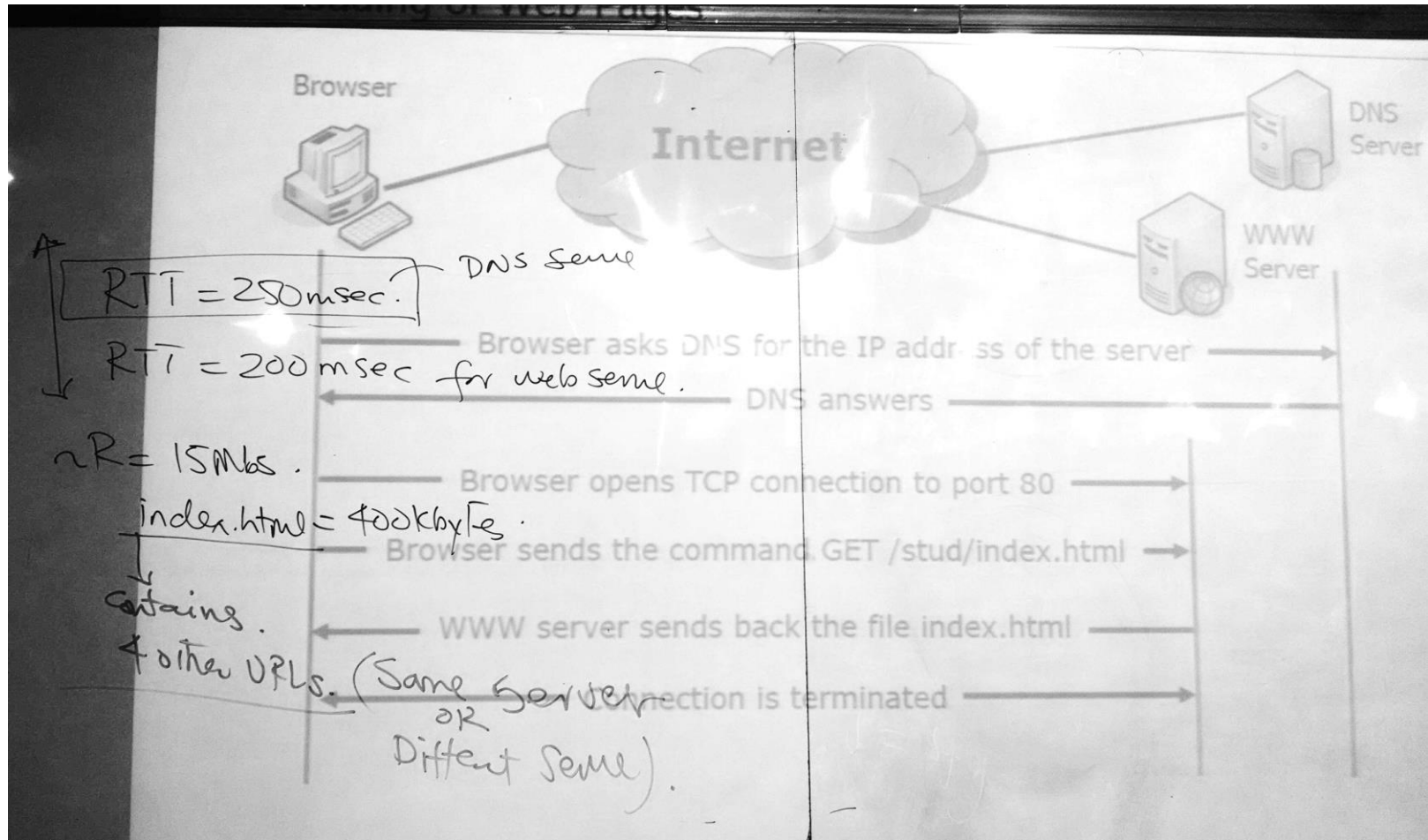


Non-persistent HTTP (cont.)



Loading of Web Pages





1. Calculate total time to transfer index.html given the values
2. Calculate total time to transfer index.html when it contains four other URLs each pointing to resources from different web servers.