CPSC 471: Computer Communications

Applications

Figures from Computer Networks: A Systems Approach, version 6.02dev (Larry L. Peterson and Bruce S. Davie)

DNS – Domain Name System

- An infrastructure service
- Translates host names into host addresses
  - Host addresses easy for routers to understand
  - Host names easy for humans to understand

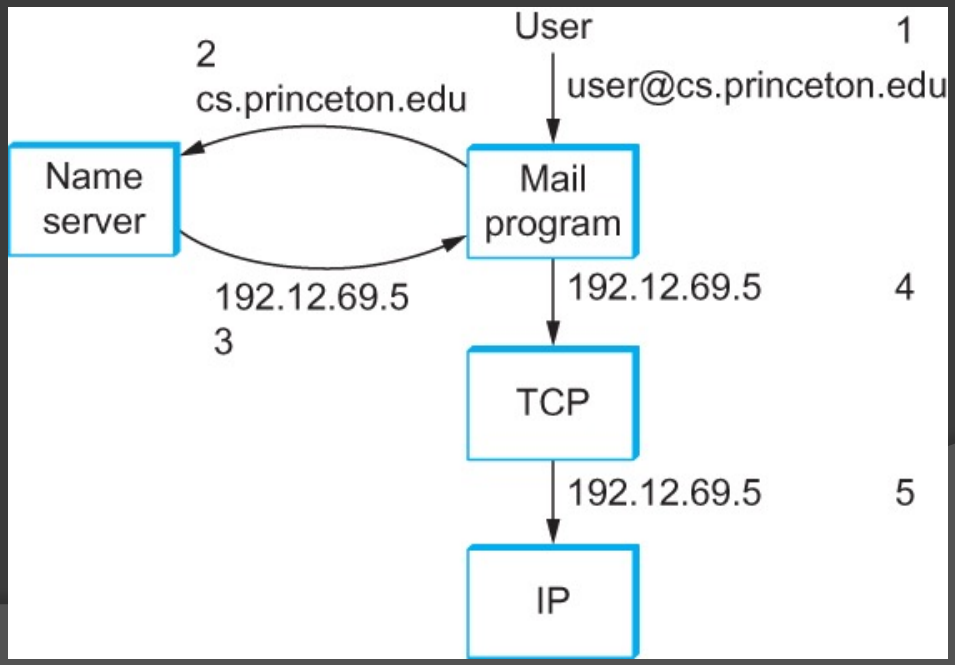


Figure 229

The DNS Name Space (aka Domain Hierarchy)

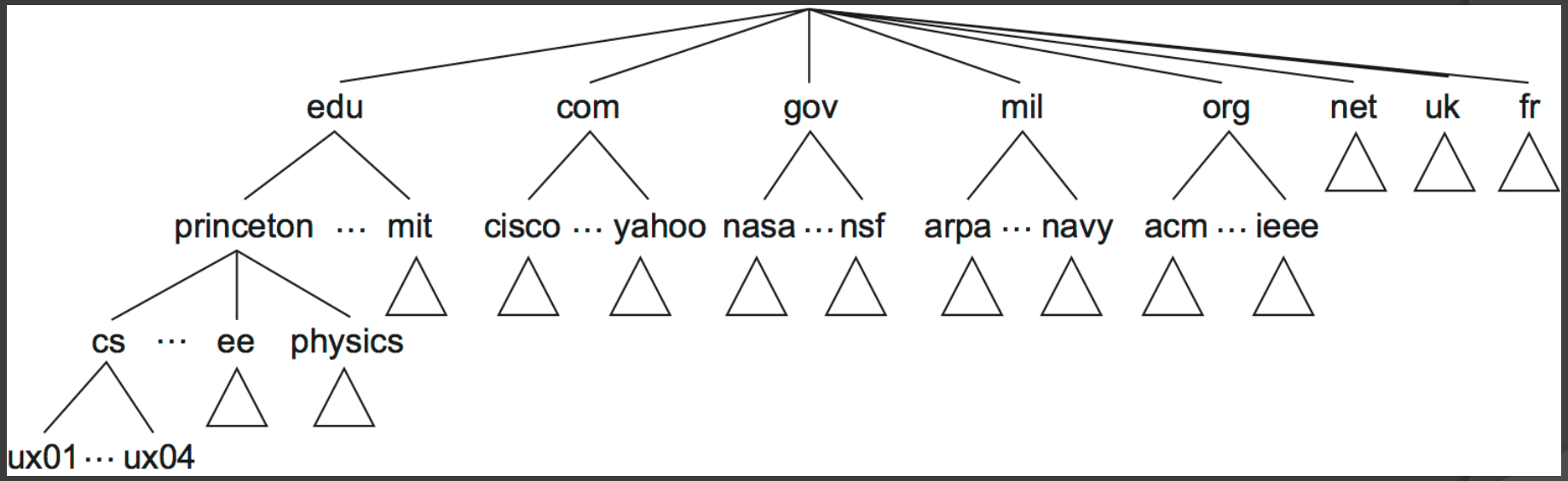


Figure 230

Domain Hierarchy Partitioned into Zones (Name Servers)

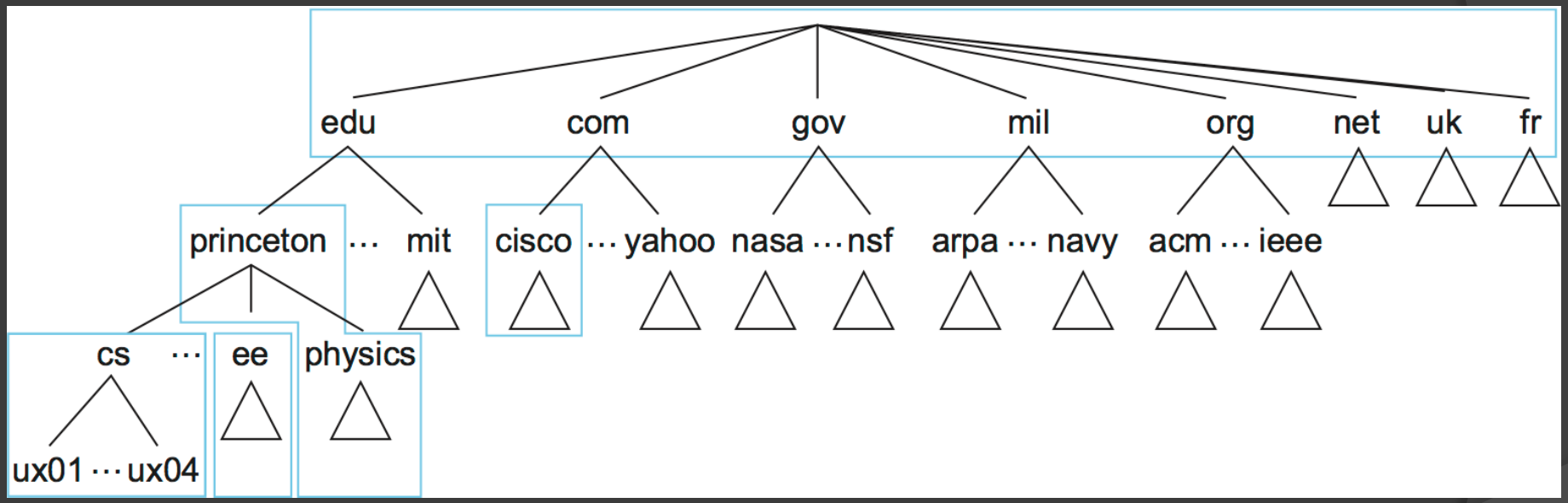


Figure 231

Hierarchy of Name Servers

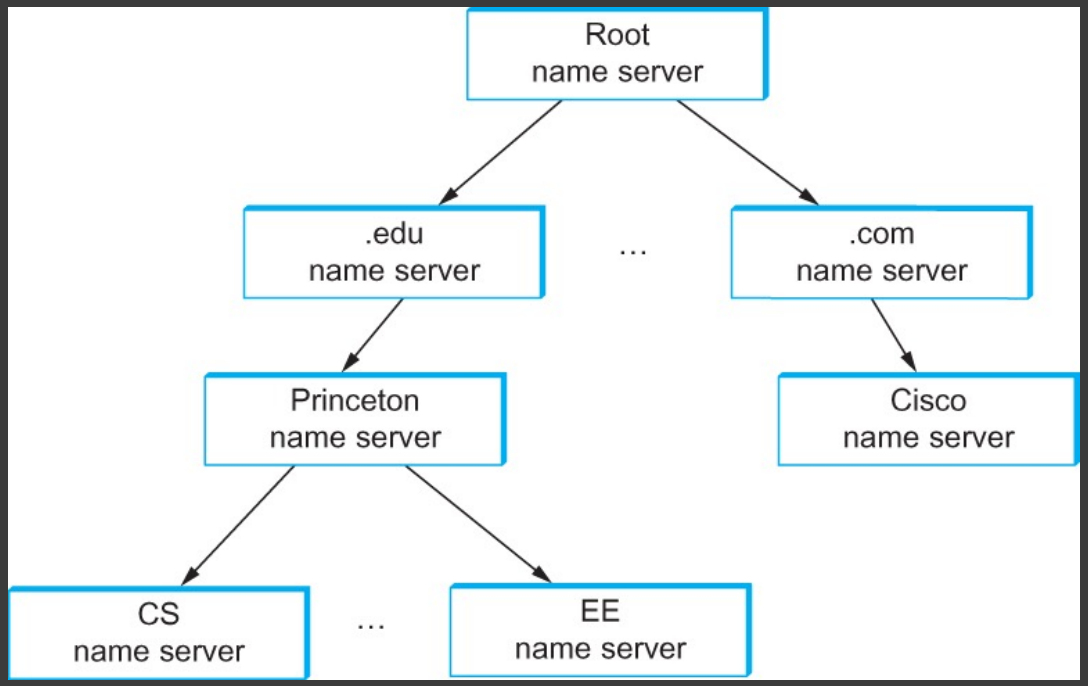


Figure 232

Name Resolution

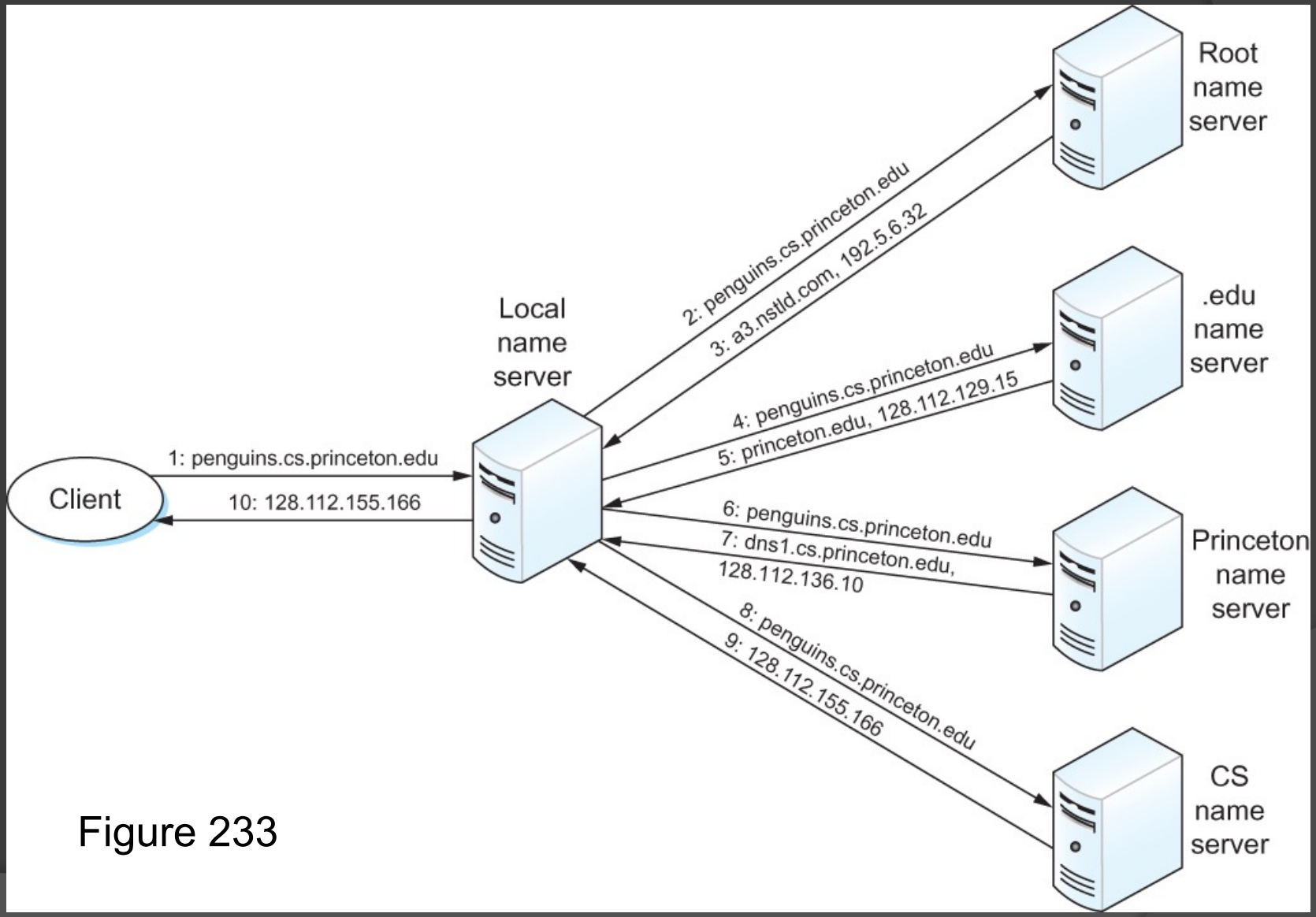


Figure 233

Electronic Mail

- Message Formats
- MIME
- Message Transfer
  - SMTP – Simple Mail Transfer Protocol
- Mail Reader
  - POP3 – Post Office Protocol version 3
  - IMAP – Internet Message Access Protocol

MIME – Multipurpose Internet Mail Extensions

- Problems with international languages:
  - Languages with accents (e.g., French, German)
  - Languages in non-Latin alphabets (e.g., Hebrew, Russian)
  - Languages without alphabets (e.g., Chinese, Japanese)
- Messages containing:
  - Images
  - Audio
  - Video

Message Transfer

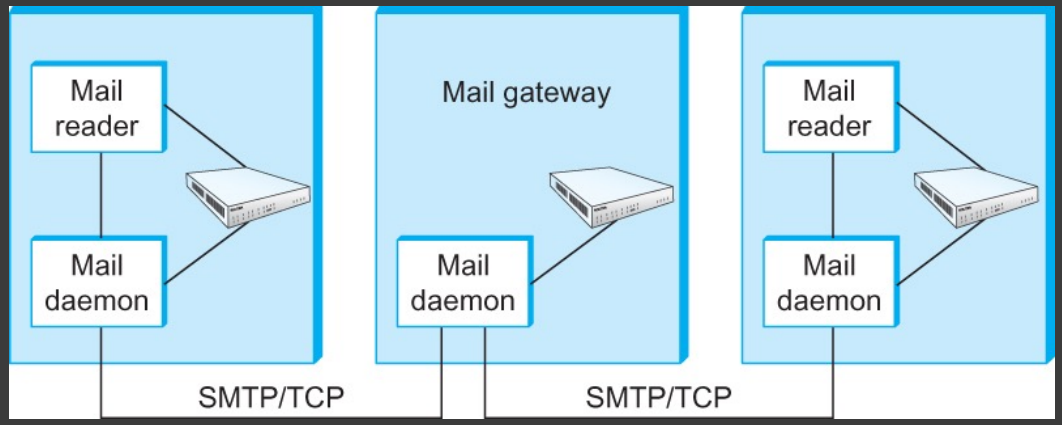


Figure 216

The World Wide Web

- Architectural Overview
- URLs
- HTTP – HyperText Transfer Protocol

Architecture: Client/Server

- Client runs a browser as a process
- Server may be:
  - Multithreaded
    - One front end for handling requests/replies
    - Multiple processing threads
  - A server farm
    - One machine acts as the front end
    - Separate processing nodes (machines)

HTTP Behavior

HTTP 1.0

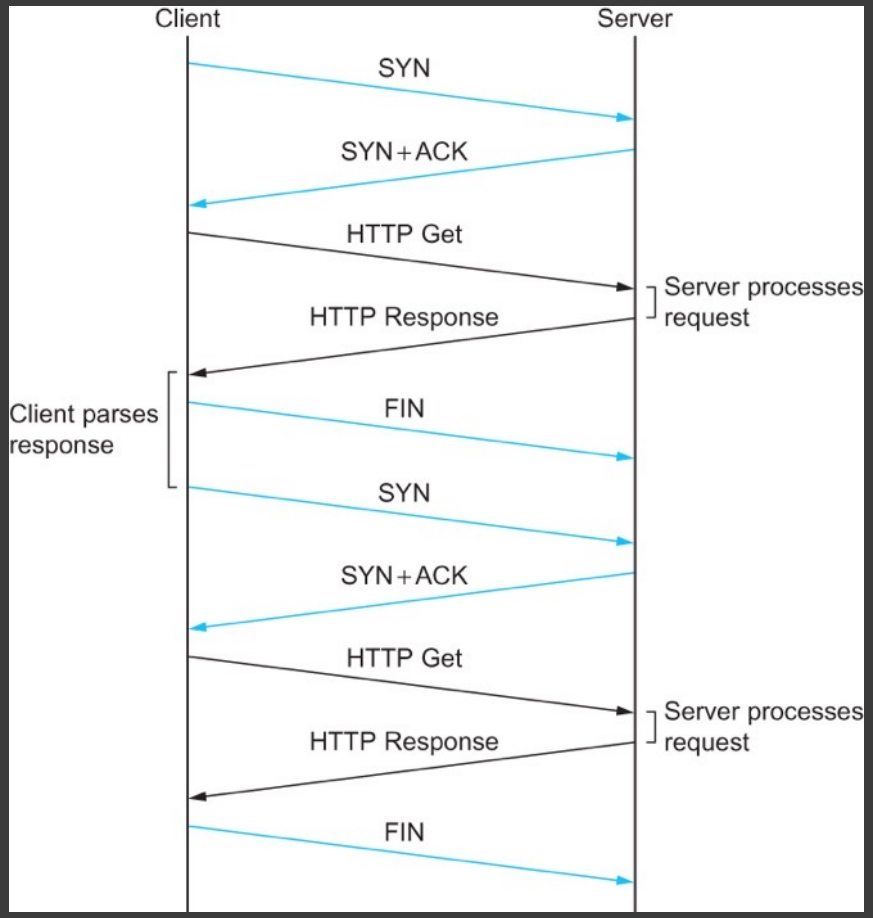


Figure 219

HTTP 1.1

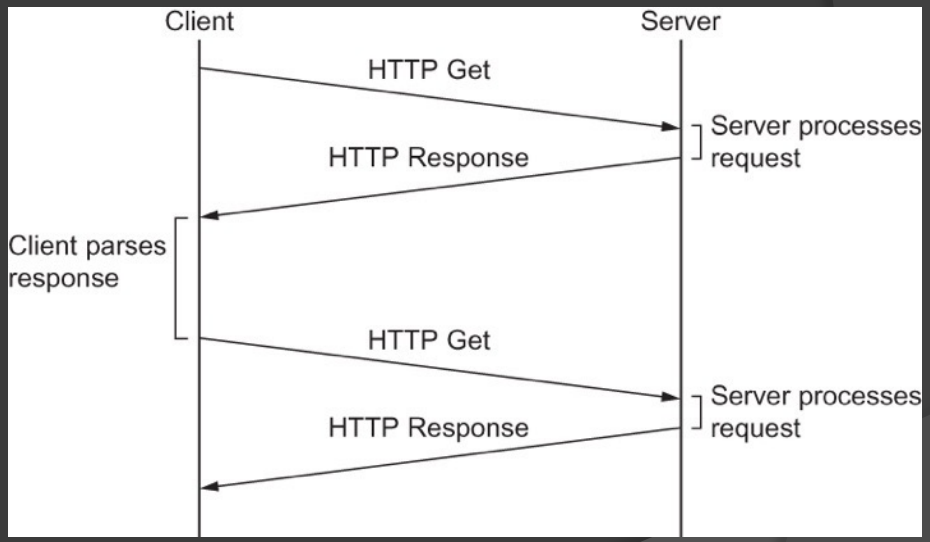
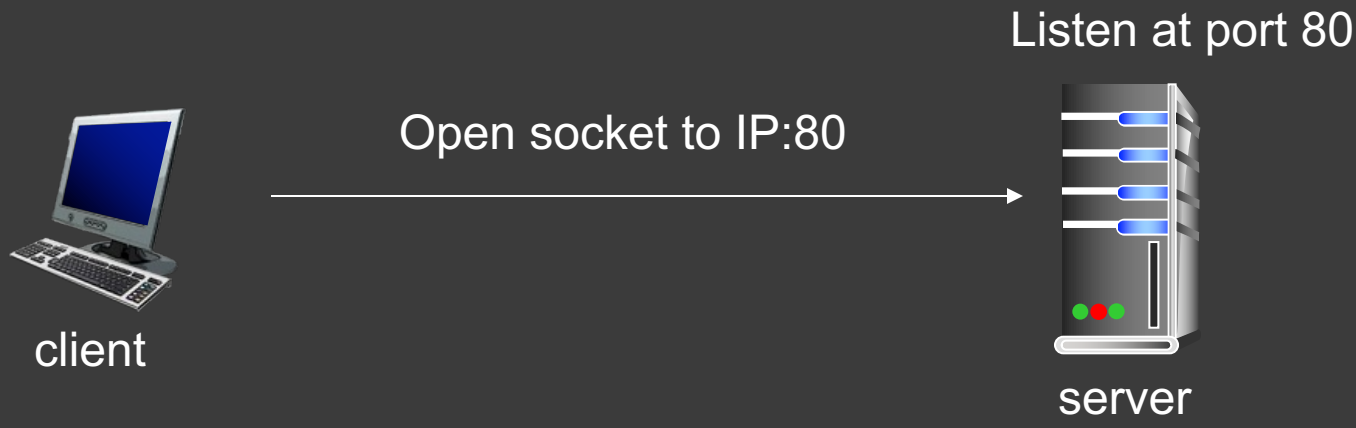


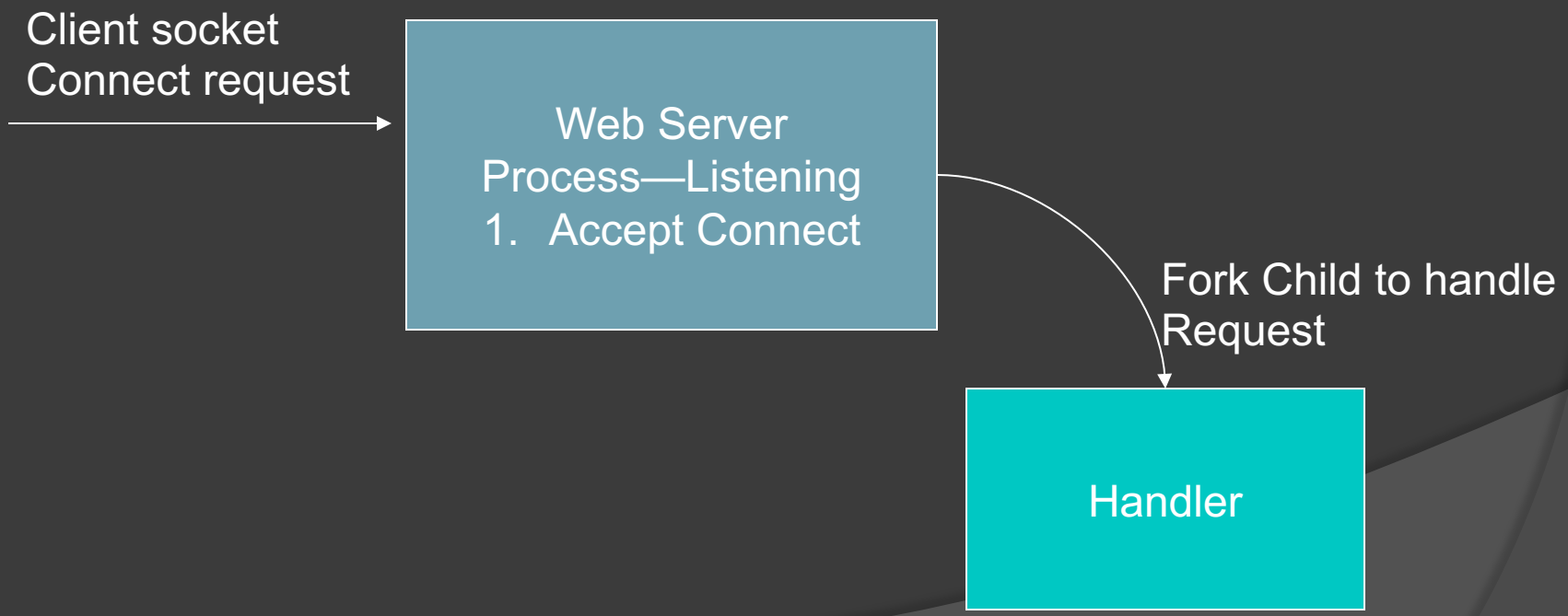
Figure 220

Anatomy of a Web Request

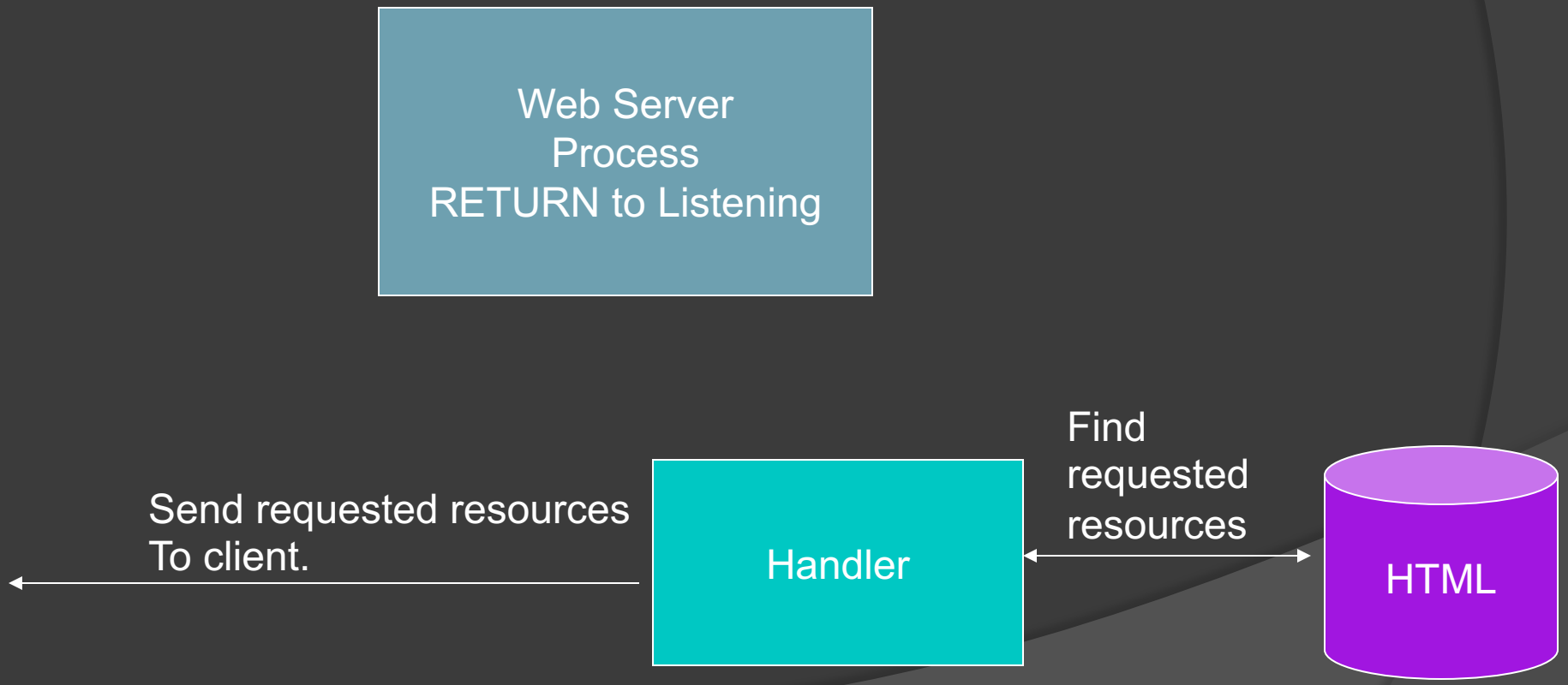


The remainder of this presentation is from Dr. Victor Valgenti, Washington State University, CptS 455, Fall 2012

Anatomy of a Web Request (cont.)

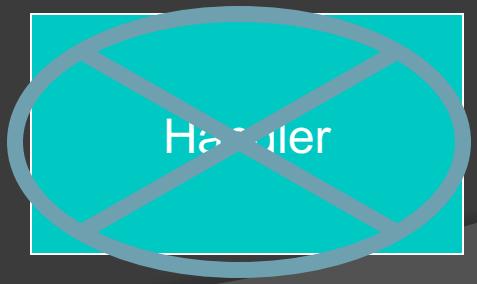


Anatomy of a Web Request (cont.)



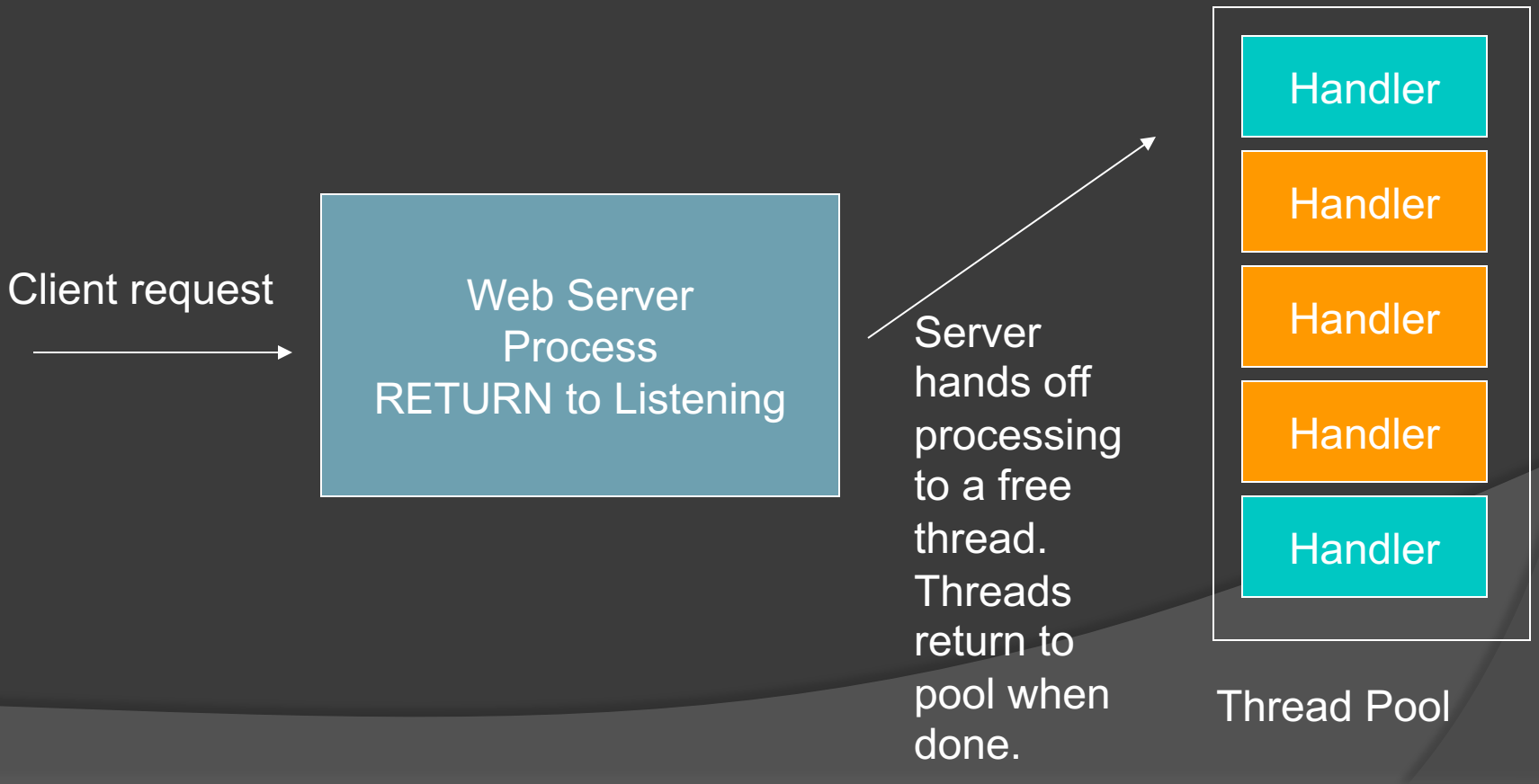
Anatomy of a Web Request (cont.)

Web Server
Process
RETURN to Listening

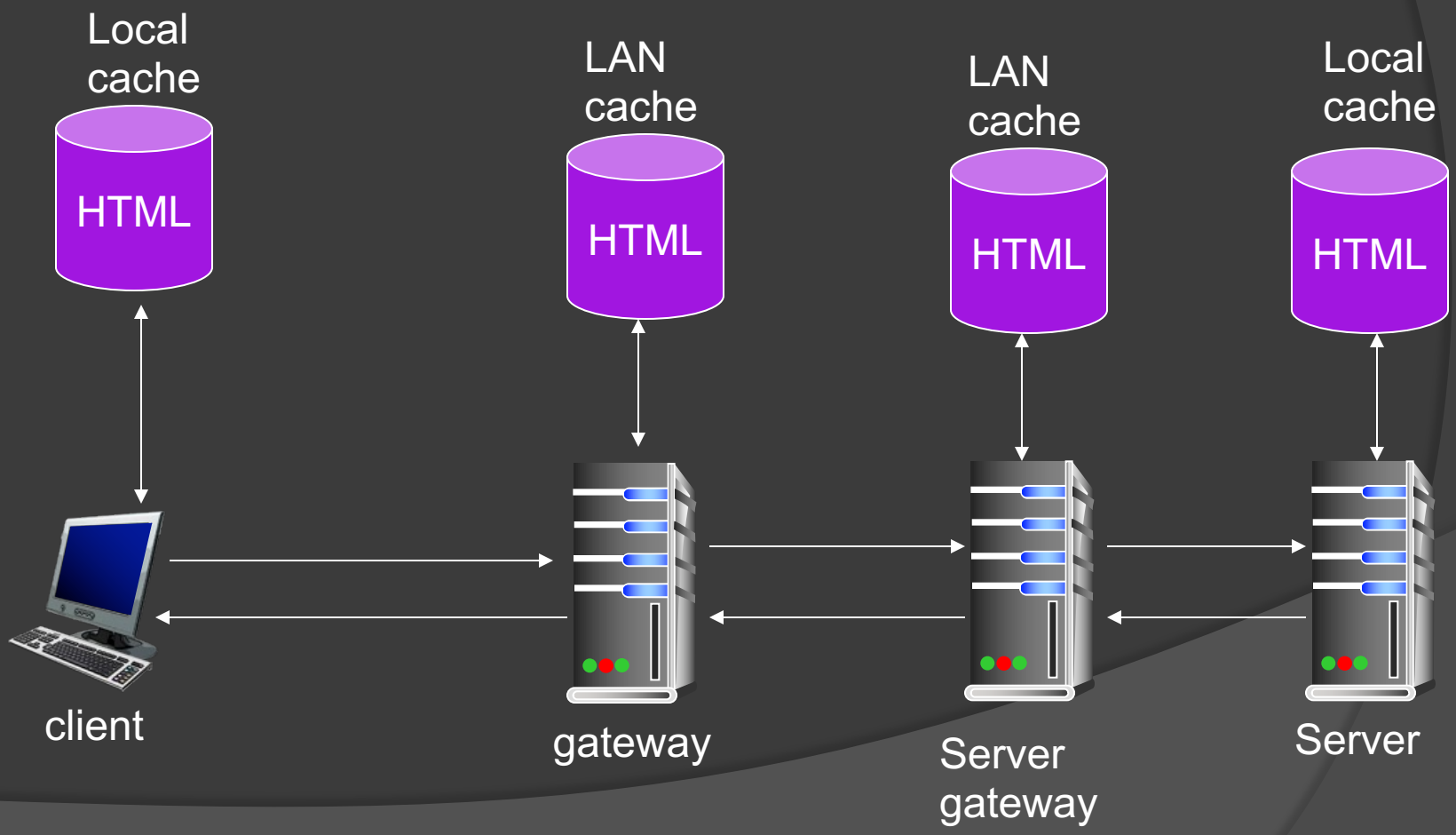


Communication complete.
Child dies.

Anatomy of a Web Request (cont.)

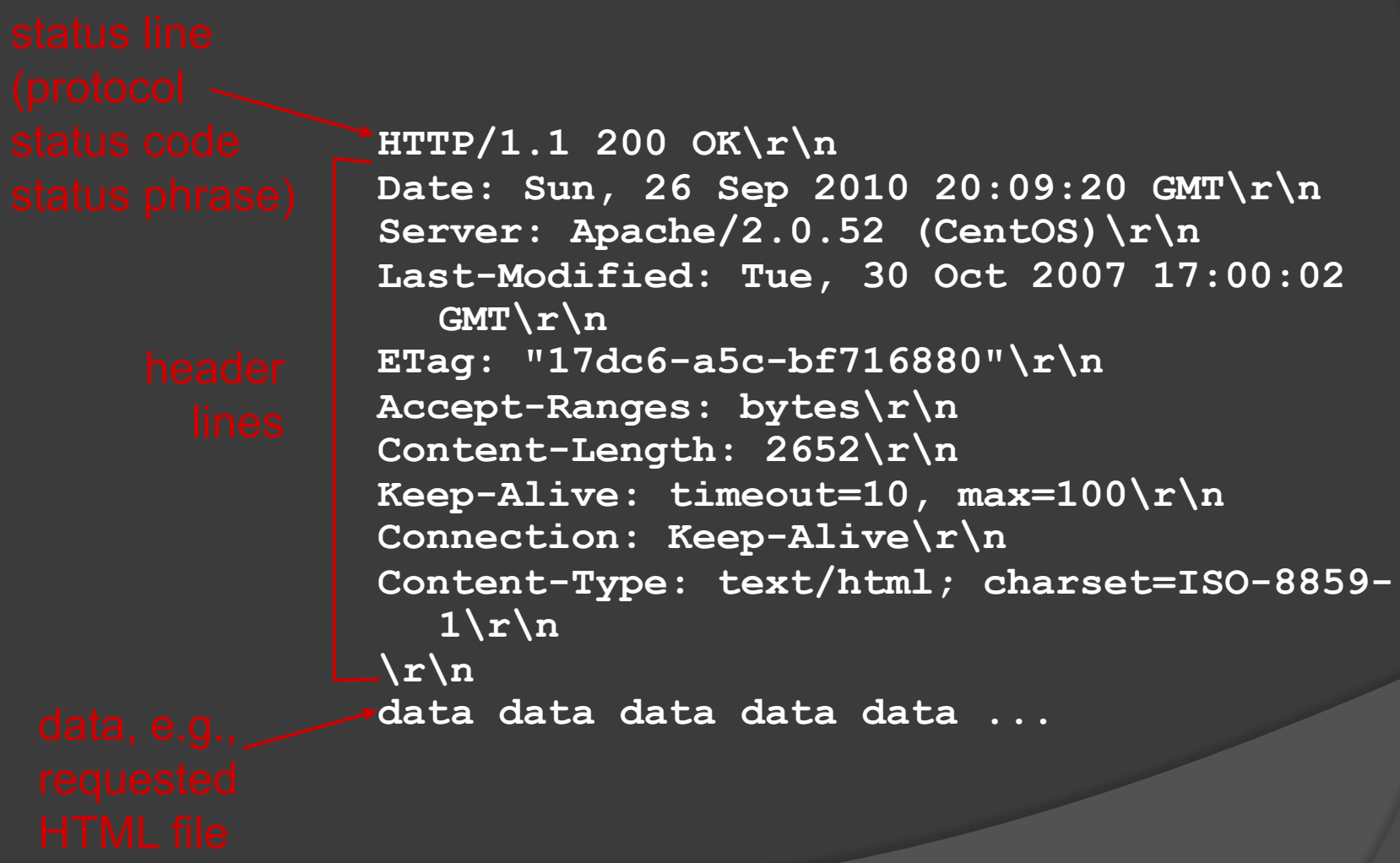


Web Caching

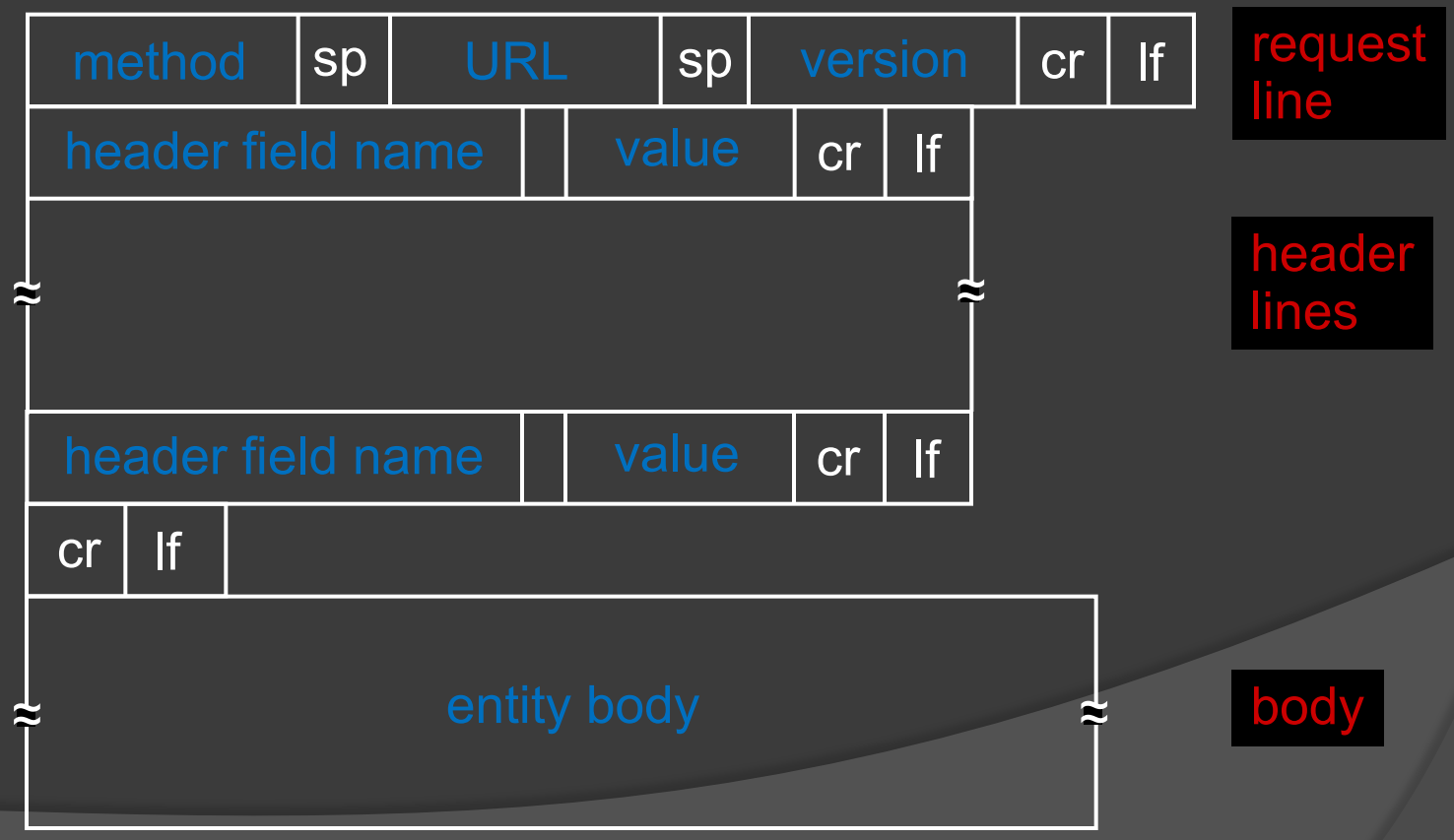

Local cache
HTML
LAN cache
HTML
LAN cache
HTML
Local cache
HTML
client
gateway
Server gateway
Server

HTTP Header Request

HTTP Header Response



HTTP Message format



HTTP Functions And Replies

- Functions
  - GET
    - url ? query
  - POST
    - url
    - Post data
  - HEAD
    - Request headers
  - PUT
    - Move data to server
- Reply Codes
  - 100
    - informational
  - 200
    - OK
  - 300
    - Redirection
  - 400
    - Request Error
  - 500
    - Server Error

RFC 2616