



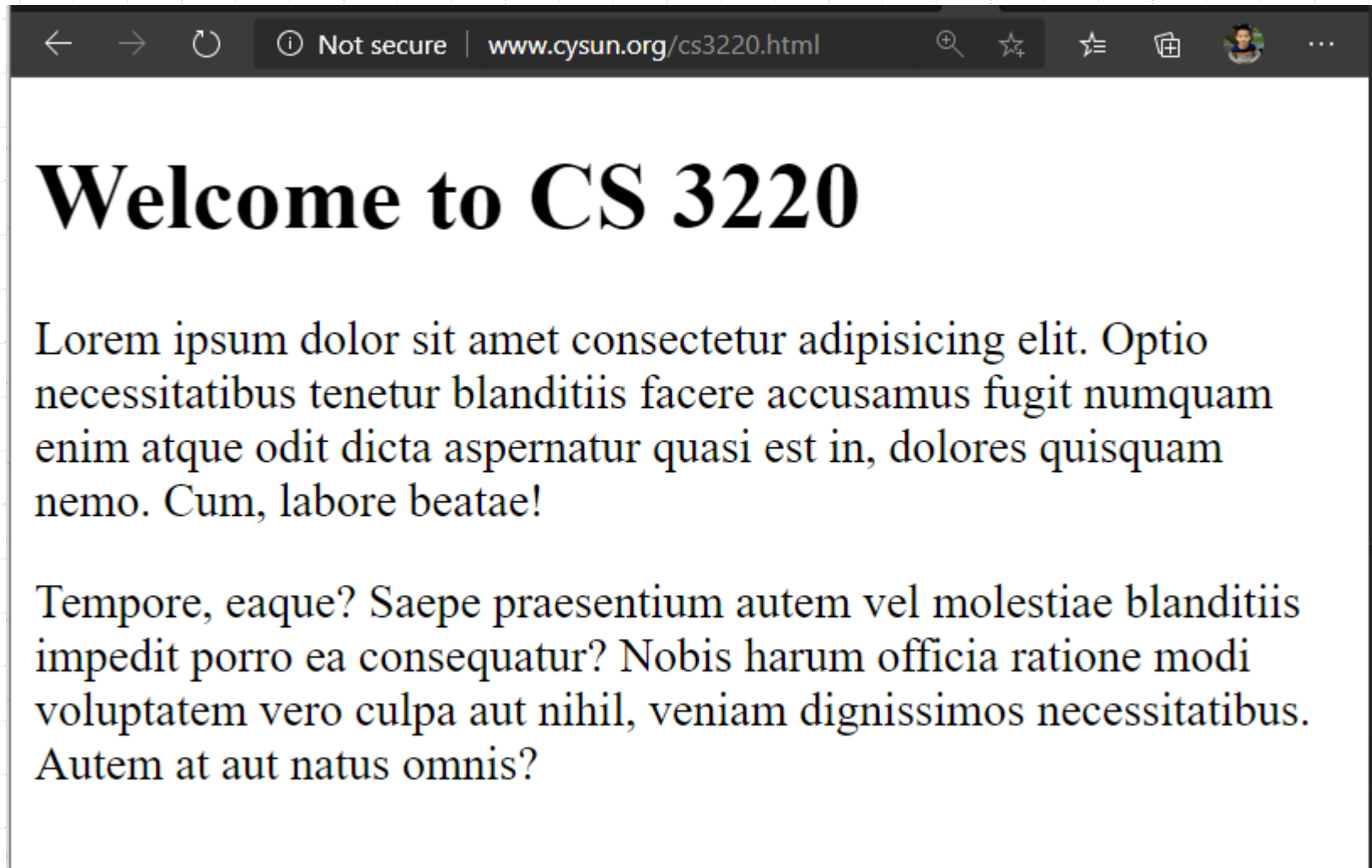
CS3220 Web and Internet Programming

Introduction to Web Application Development

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Browsing the Web



Uniformity of a v

<http>

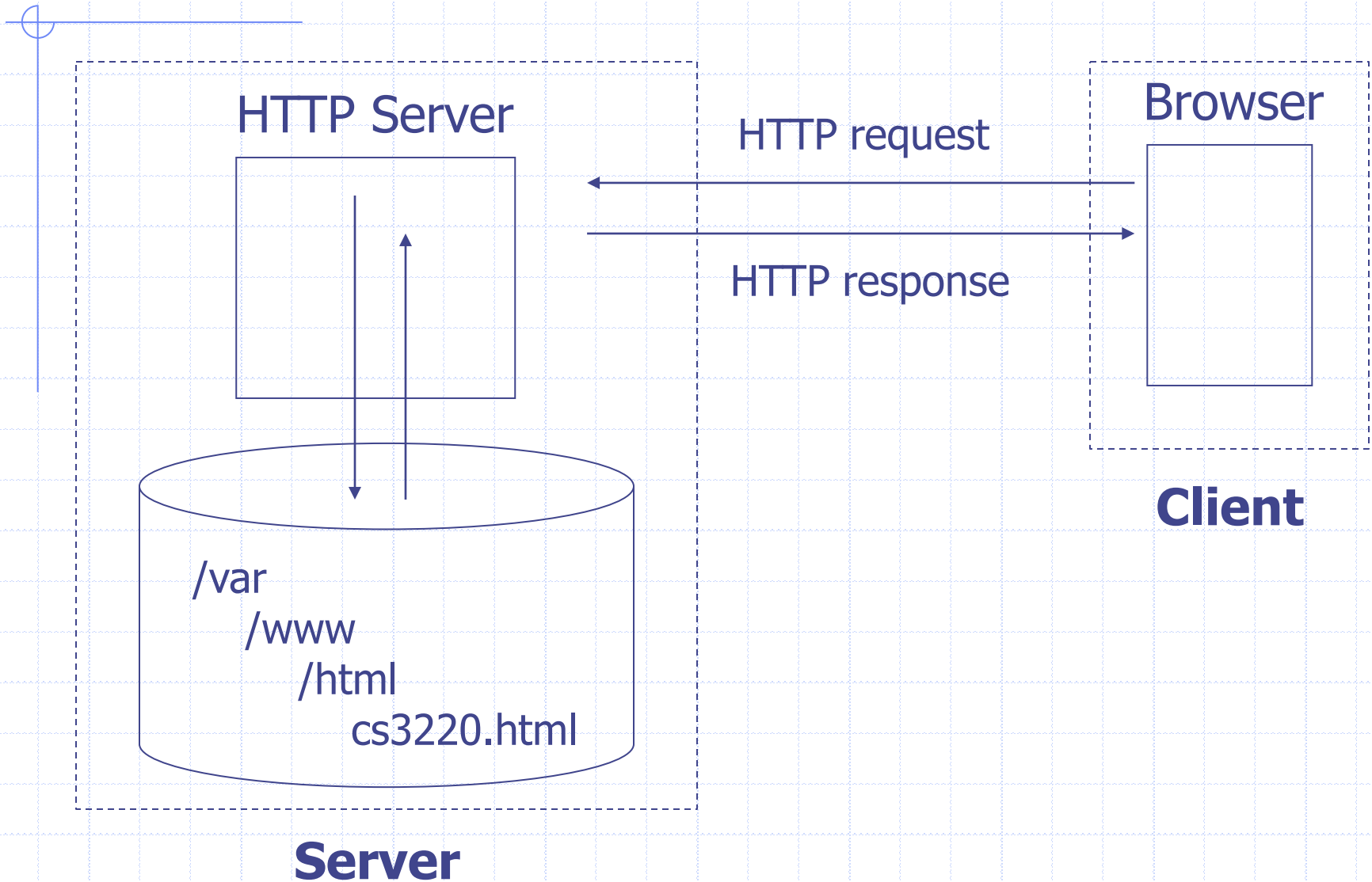
❖ Uniform Resource Locator – the *address* of a web resource



The diagram illustrates the components of a URL: `http`, `://`, `www.cysun.org`, and `/cs3220.html`. Each component is underlined. Below the underlines, three vertical arrows point upwards to the respective parts: the first arrow points to `http`, the second arrow points to `www.cysun.org`, and the third arrow points to `/cs3220.html`. Below these arrows are the labels: "Protocol" under the first arrow, "Host name or IP address of the server" under the second arrow, and "Path" under the third arrow.

Protocol	Host name or IP address of the server	Path
<u>http</u>	<u>:// www.cysun.org</u>	<u>/cs3220.html</u>

How The Web Works



HTTP

- ◆ HyperText Transfer Protocol
- ◆ Specifies how the client and the server communicate with each other, i.e. *requests* and *responses*

From Path to File

◆ NGINX Configuration in `sites-available/default`

```
root /var/www/html/cysun
```



Map the `root` path in URL to a folder on disk

HTML

◆ HyperText Markup Language

```
<html>  
  <head><title>CS3220</title></head>  
  <body>  
    <h2>Welcome to CS3220!</h2>  
  </body>  
</html>
```

Access Static Web Content

1. User specify a URL
2. Based on the URL, browser sends an HTTP request to a server
3. Based on the path component of the URL, server locates a file on disk and send it back to the client in an HTTP response
4. Browser displays the file

*The file (a.k.a. web page) must be pre-created and cannot be changed based on the user request → **static***

Browser and HTTP Server

◆ Browser

- Chrome
- Edge
- Safari
- Firefox
- ...

◆ HTTP Server

- NGINX
- Apache
- Internet Information Server (IIS)
- ...

More About URL ...

◆ Other protocols

https://www.cysun.org/cs3220.html



An encrypted version of HTTP to protect data sent over the internet.

file:///C:/CS3220/cs3220.html



When you use browser to open a file on your hard drive.

... More About URL ...

◆ Port number and default port number

`http://www.cysun.org:8080/cs3220.html`



There are usually multiple software services running on the same physical server. Each software service is identified by a *port number* they "listen" to. When a request comes in, the system can decide which service should handle it based on the port number.

Each network protocol has a default port numbers. The default port of HTTP is 80.

... More About URL ...

◆ Directory listing and directory index

`http://www.cysun.org/`



Most HTTP servers are configured to map a path to a folder to a file inside the folder (e.g. index.html).



`http://www.cysun.org/index.html`

... More About URL

◆ User directory URL mapping

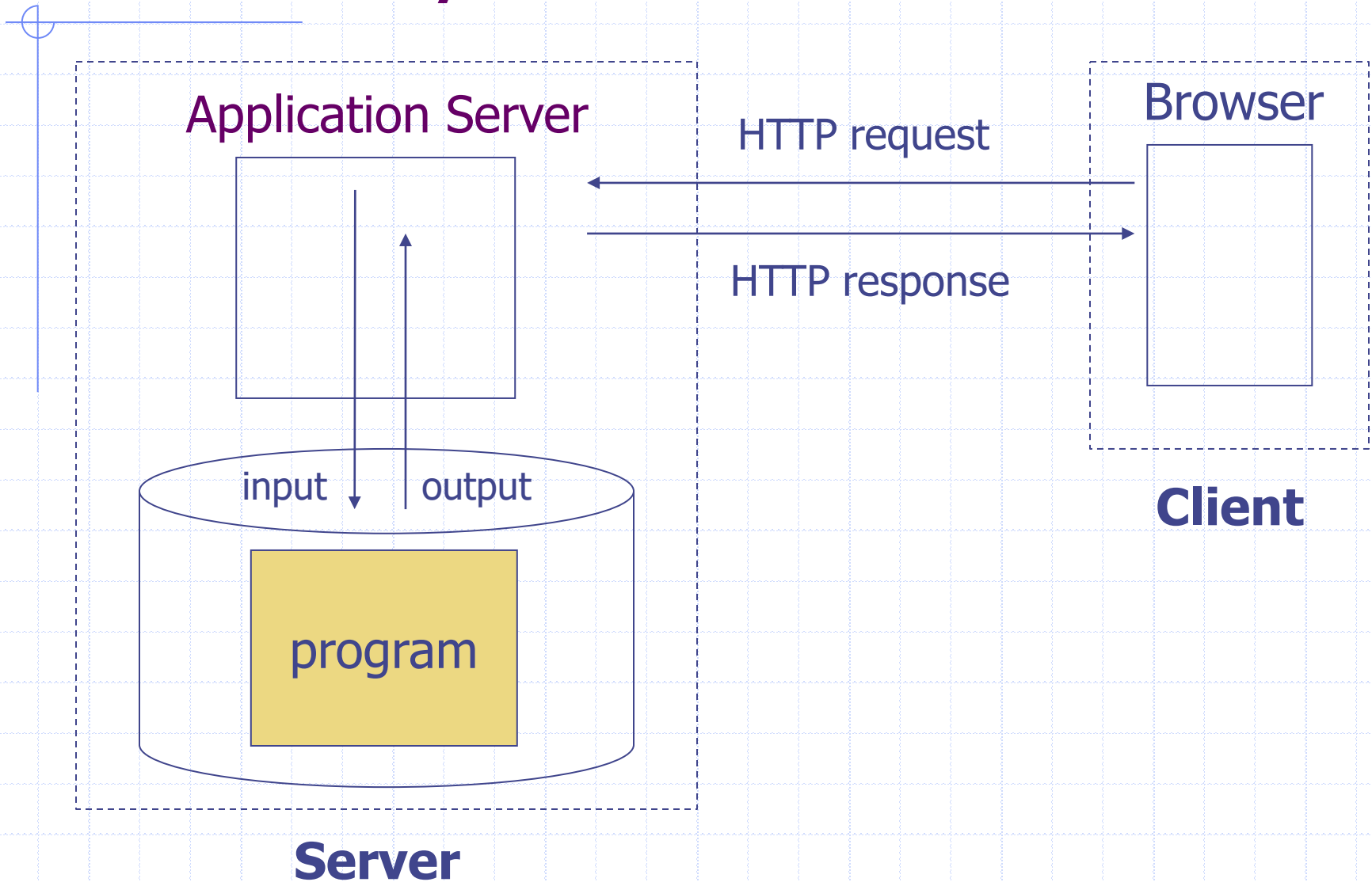
`http://cs3.calstatela.edu/~cysun/index.html`

~<username> maps to a folder (e.g. public_html) under the home folder of the user

Dynamic Content

- ◆ Web search results
- ◆ Shopping cart
- ◆ ...
- ◆ Anything that need to be generated *on the fly* based on user request

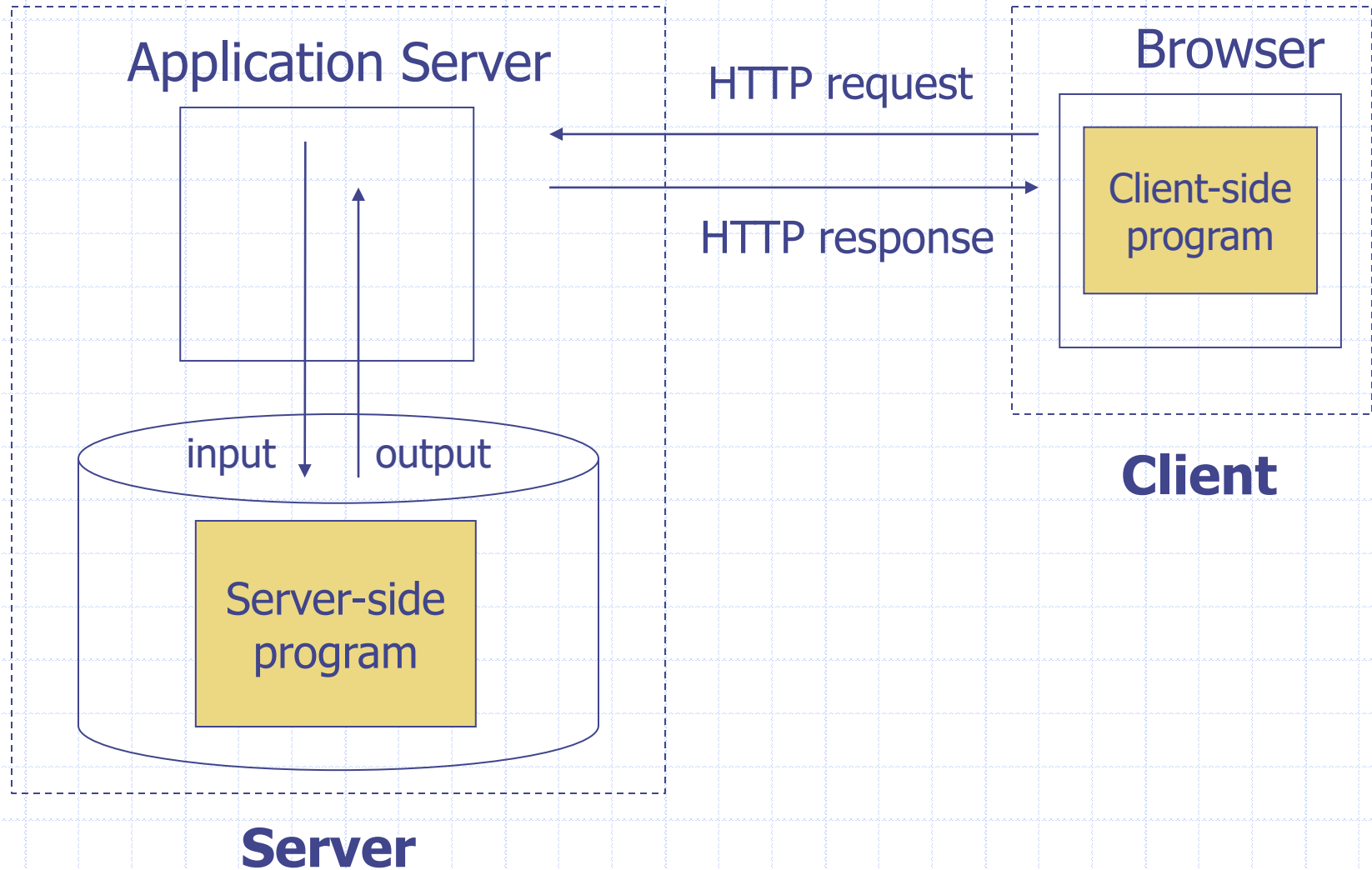
Deliver Dynamic Content



A Little Terminology

- ◆ HTTP Server
- ◆ Application Server
 - Servlet Container
- ◆ Web Server

Web Application



Server-side Technologies

◆ CGI

◆ Java

◆ ASP.NET

◆ PHP

◆ JavaScript (Node.js)

◆ Ruby

◆ Python

old

mainstream

other

Client-side Technologies

- ◆ HTML, CSS (Cascading Style Sheets)
- ◆ JavaScript
- ◆ Java Applet
- ◆ Rich Internet Application (RIA) technologies
 - JavaFX
 - Adobe Flex and Flash
 - Microsoft Silverlight

Advantages of Web Applications

- ◆ Low publishing and distribution costs
- ◆ Potentially large user base
- ◆ Centralized administration
 - No client-side installation
 - Professional maintenance and security
 - Easy data backup
 - Easy upgrade
- ◆ Easy user collaboration
- ◆ Available anywhere, anytime
- ◆ Piracy proof

Web Applications Are Important

- ◆ Replace desktop applications (and more)
 - Google Docs, MS Office Live
- ◆ Take traditional businesses to larger audience
 - Amazon, Netflix
- ◆ Open up new opportunities
 - Facebook, Twitter, Youtube