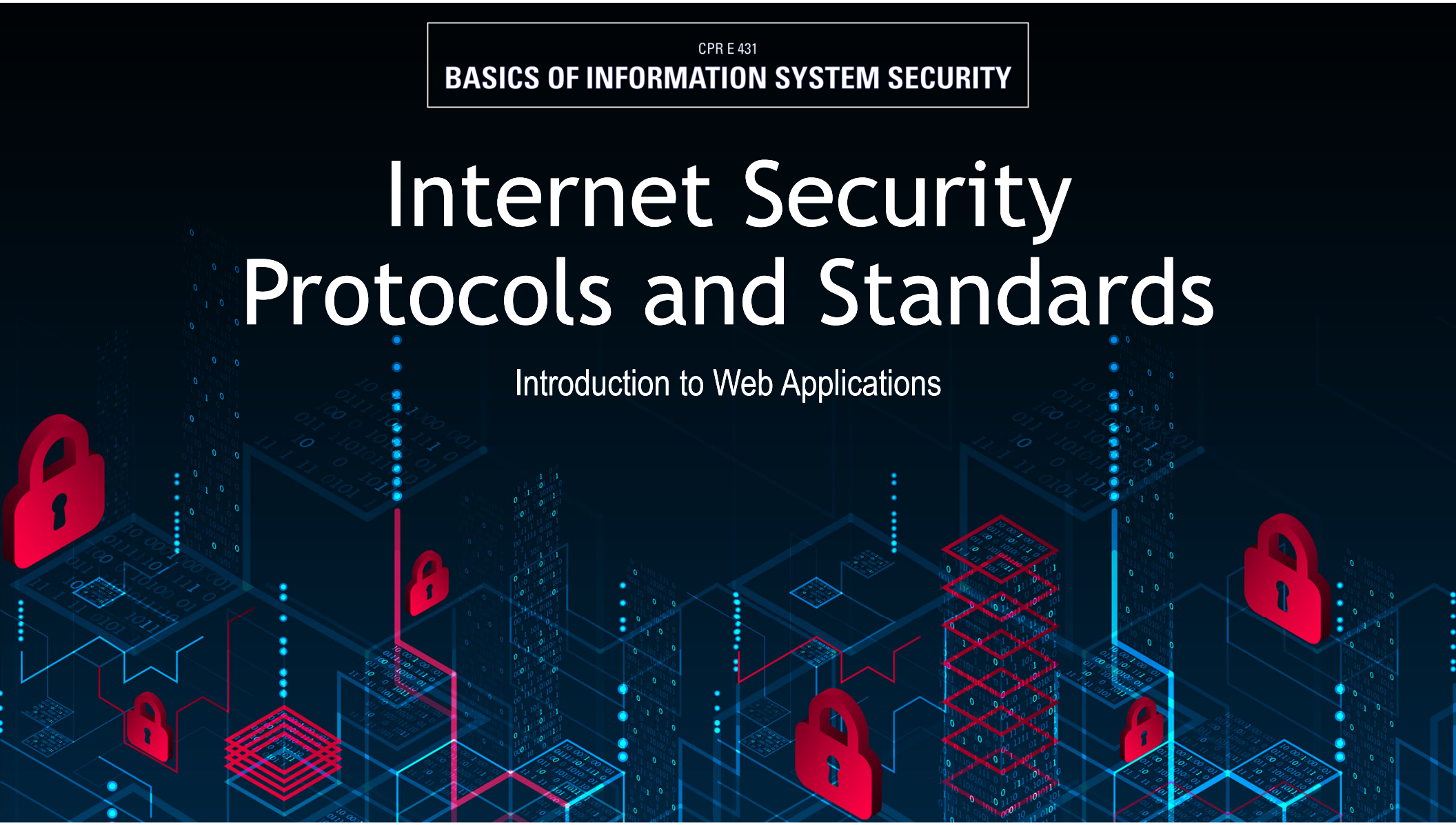
CPR E 431

BASICS OF INFORMATION SYSTEM SECURITY

Internet Security Protocols and Standards

Introduction to Web Applications



Video summary

- What Are Web Applications?
- Web Browsing (HTTP)
- HTTP Messages
- HTTP Applications

Web Applications

- A web application is a computer program that utilizes web browsers and web technology to perform tasks over the Internet.

- Web applications use a combination of server-side scripts (PHP) to handle the storage and retrieval of the information, and client-side scripts (JavaScript and HTML) to present information to users. This allows users to interact with the company using online forms, content management systems, shopping carts and more.

How a Web Application Works?

1. **User** triggers a request to the **web server** over the **Internet**, either through a web browser or the application's user interface

2. **Web server** forwards this request to the appropriate **web application server**

3. **Web application server** performs the requested task – such as querying the **database** or processing the data – then generates the results of the requested data

4. **Web application server** sends results to the **web server** with the requested information or processed data

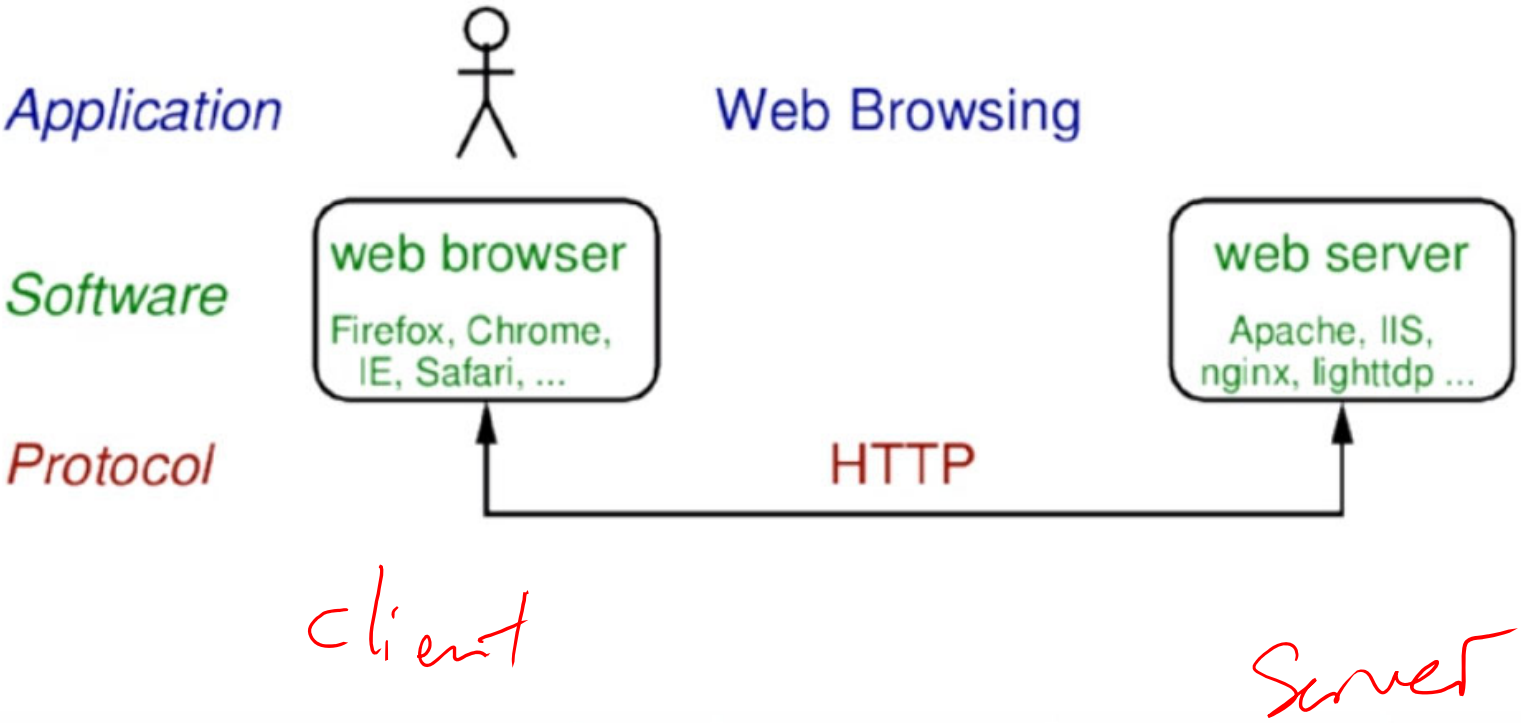
5. **Web server** responds back to the client with the requested information that then appears on the user's display

Examples of Web Applications

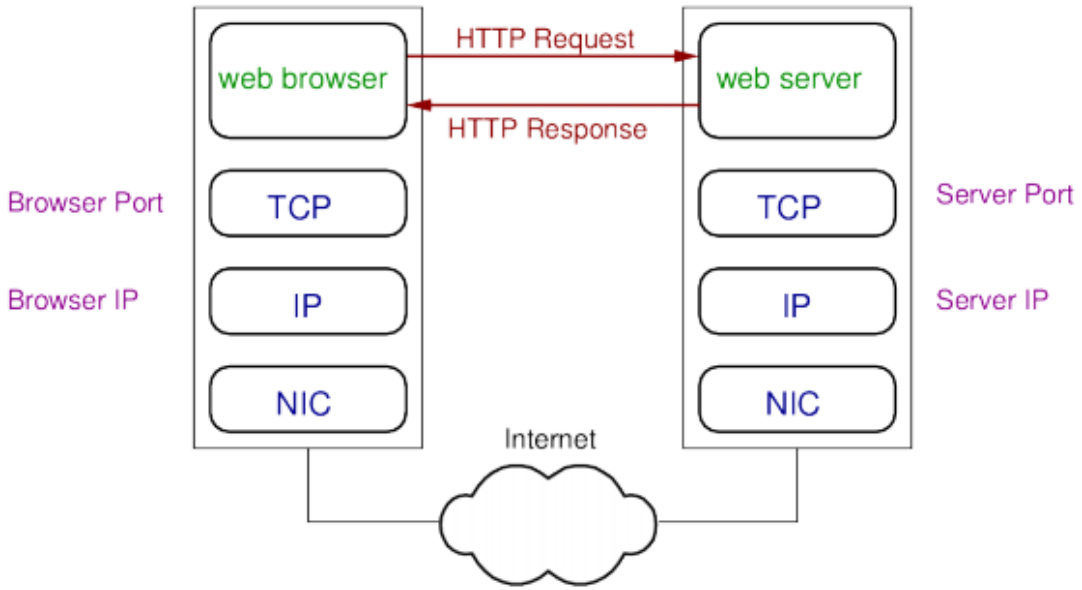
- Web applications include online forms, shopping carts, word processors, spreadsheets, video and photo editing, file conversion, file scanning, and email programs such as Gmail, Yahoo and AOL. Popular applications include Google Apps and Microsoft 365.

- Google Apps for Work has Gmail, Google Docs, Google Sheets, Google Slides, online storage and more. Other functionalities include online sharing of documents and calendars.

Web Browsing



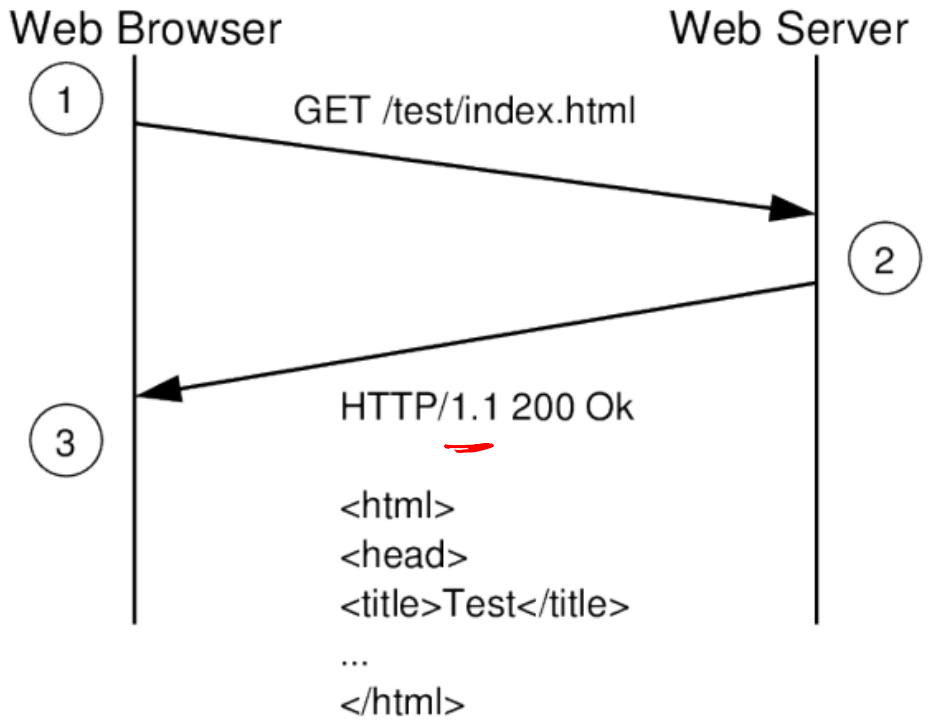
Web Browsing with HTTP



Web Access with Hypertext Transfer Protocol

- HTTP is a request/response protocol for web browsing
- HTTP is stateless; no dependence between a request and previous request
- User Agent (client) sends HTTP Request message
- Server responds with HTTP Response message
- Default server port number: 80

HTTP Example



HTTP Request Messages

- Start line: `Method URL Version`
- Methods:
  - GET: retrieve the resource at the specific URL
  - HEAD: same as GET, except do not return message body (only header)
  - OPTIONS: retrieve options available for resource or server
  - POST: asks server to accept and process the attached data at the resource
  - ...
- Version: version of HTTP, e.g. HTTP/1.0, HTTP/1.1

HTTP Response Messages

- Start line: `Version StatusCode StatusReason`
- Status Codes and Reasons:
  - 100: Continue (the client should continue with its request)
  - 200: OK (the request succeeded)
  - 301: Moved Permanently (the requested resource has a new URL)
  - 304: Not Modified (resource hasnt changed since last request, client should use cached copy)
  - 401: Unauthorized (request must include user authentication)
  - 403: Forbidden (request was understood, but server refuses to process it)
  - 404: Not Found (server cannot find resource at requested URL)
  - 503: Service Unavailable (server currently unable to handle request, e.g. server is too busy)

HTTP Headers

- Date: data and time of message generation
- Host: domain name of host of resource (means relative URLs can be used)
- Accept-Charset, Accept-Encoding, Accept-Language: indicate the character sets, encodings and languages that client can accept
- Authorization: include user credentials (e.g. username, password) if authorization is required
- User-Agent: indicates information about the client (user agent), e.g. web browser

HTTP Applications

- Plain, static web pages: HTML, images and other files served to browser
- But many applications use dynamic content
  - Content server to browse changes depending on request
  - Provides interactive, tailored content
  - Client-side: JavaScript, Flash, Silverlight, Java
  - Server-side: CGI, ASP, PHP, Coldfusion, Java, ...
  - Content stored in databases

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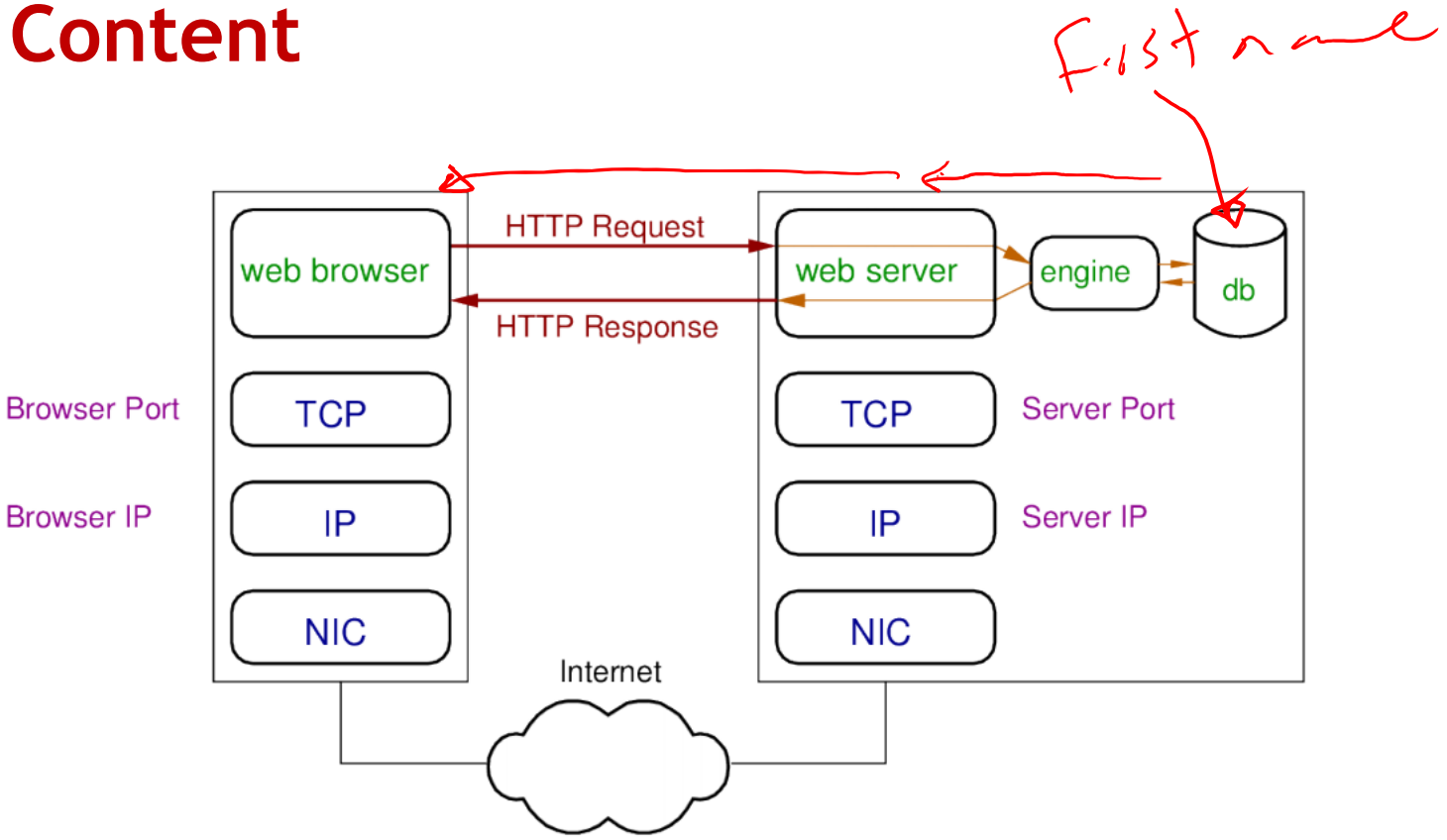
Dynamic Content



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