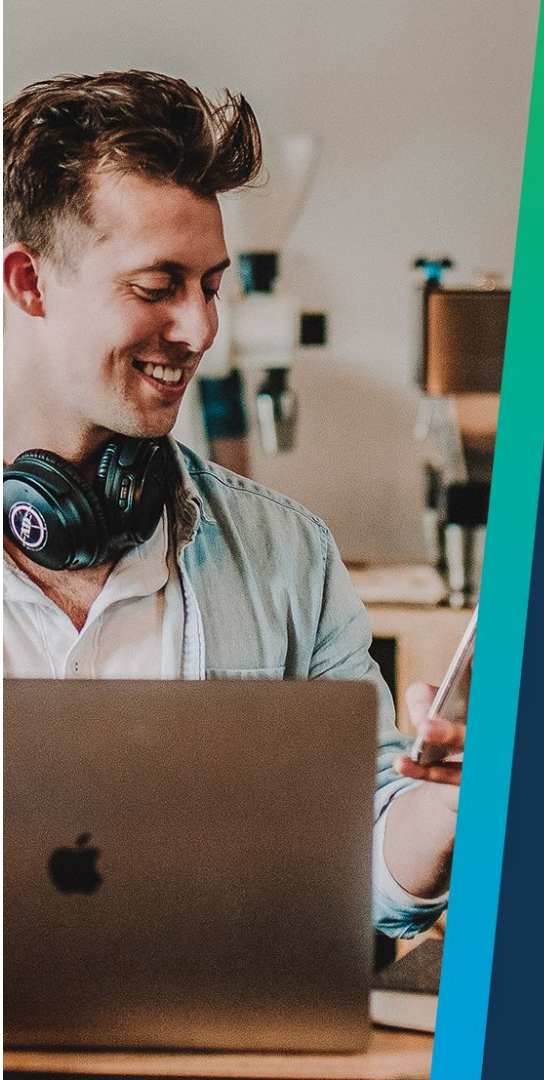


Data Science Bootcamp

Hyperiondev

Application Layer and Client-Server Architectures: HTTP and SSH

Welcome

Your Lecturer for this session

Liano Naidoo

Lecture – Housekeeping

- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment - please engage accordingly.
- No question is daft or silly - **ask them!**
- There are Q/A sessions midway and at the end of the session, should you wish to ask any follow-up questions.
- You can also submit questions here: hyperiondev.com/sbc4-cs-questions
- For all non-academic questions, please submit a query: www.hyperiondev.com/support
- Report a safeguarding incident: hyperiondev.com/safeguardreporting
- We would love your feedback on lectures: https://hyperionde.wufoo.com/forms/zsgv4m40ui4i0g/

Previously:

Discussed what Networking is and explored the 7 Layers of the OSI Model :)

Using the email example, we covered how data can move to and from layers 1 and 7.

Objectives

- Define Client-Server Architecture and explain its role in modern networking.
- Define Client-Server Architecture and its characteristics.
- Understand the HTTP protocol and its significance in the World Wide Web.
- Understand the SSH protocol and its role in remote access.
- Compare and contrast HTTP and SSH protocols.
- Identify when to use HTTP and when to use SSH.

Application Layer Recap

- Responsible for enabling end-user programs to interface with the network, the Application Layer is a crucial component of networking.

- The topmost layer, the Application Layer, is in charge of offering services to user applications

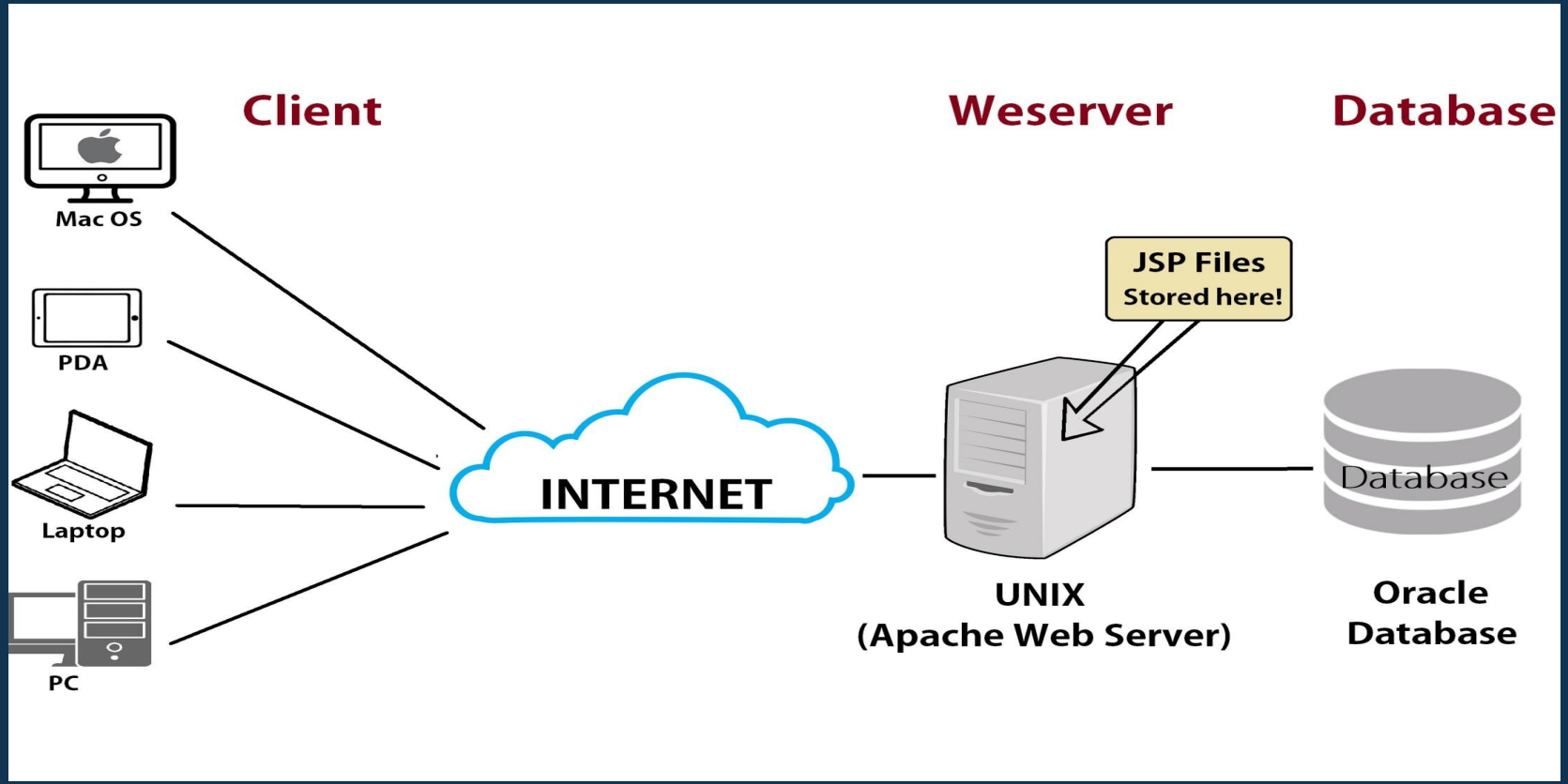
Client-Server Architecture

- A network application (sometimes known as a client-server model), that divides workloads and tasks between clients and servers that are housed on the same system or are connected via a computer network.

- Workstations, PCs, and other devices belonging to several users are frequently connected to a central server through the Internet or another network using client-server architecture.

- The server responds to the client's request for data by accommodating it and returning the requested data packets to the user.

Client-Server Architecture



https://www.informationq.com/what-is-a-web-server/

Client-Server Types

- 1-tier Architecture
- 2-tier Architecture
- 3-tier Architecture
- n-tier Architecture

Protocol

“A standard procedure for regulating data transmission between computers.”

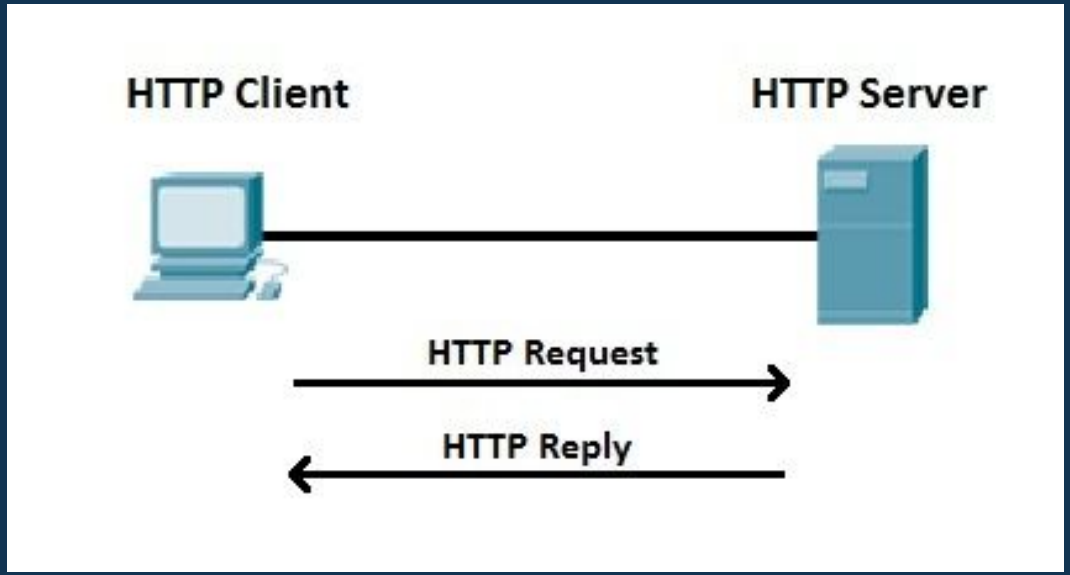
- A protocol is a set of instructions for formatting and processing data in networking.
- Computers have a common language known as network protocols.
- Even though the software and hardware used by the computers in a network may be very dissimilar, the use of protocols allows them to communicate with one another.

Questions and Answers

Questions around Client-Server Architecture and Protocols

HTTP Protocol

- HTTP, or Hypertext Transfer Protocol, is the protocol that web browsers and servers use to interact with one another.
- HTTP is a stateless protocol, which means it does not keep track of prior transactions between the client and the server.
- Because of this absence of state, web servers can manage a huge number of concurrent client requests.
- HTTP is critical to the World Wide Web because it is the protocol that allows users to browse and interact with web pages.

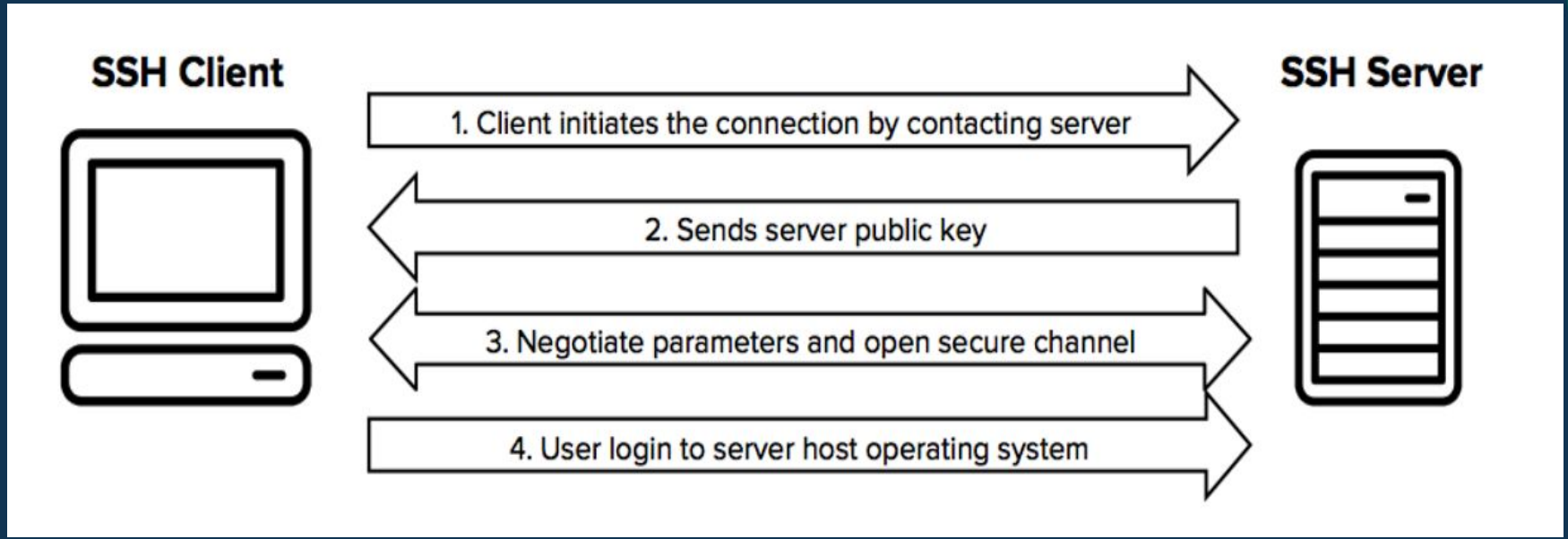


https://study-ccna.com/http-https/

SSH Protocol:

- SSH, or Secure Shell, is a protocol that allows for secure remote access to a computer or server.
- To prevent network assaults, all user authentication, commands, output, and file transfers are encrypted.
- SSH enables users to remotely access and control a device as if they were physically present.
- SSH is a secure protocol, which means that all communication between the client and the server is encrypted, protecting important information.

SSH Protocol:



https://www.ssh.com/hubfs/Imported_Blog_Media/SSH_simplified_protocol_diagram-2.png

HTTP v SSH

HTTP	SSH
Largely utilized for communication between web browsers and servers.	SSH is used for remote device access and control.
Susceptible to eavesdropping and man-in-the-middle attacks.	Establishes a secure, encrypted connection between the client and the server.
(Can be extended to HTTPS. A more secure version that uses an encryption protocol to encrypt communications.)	

Question:

What is the “HTTP” section of a URL called?

Putting it all together

- Client-Server and Application Layer Architectures are critical components of contemporary networking.
- Knowing how these components interact is critical for anybody working with networking.
- HTTP and SSH are two protocols that are important in modern networking, each fulfilling a specific function.
- It is critical to evaluate the security implications of each protocol when determining which to utilize.
- As technology advances, new protocols and architectures will emerge that will further revolutionize the way we communicate and engage with one another across the network.

Questions and Answers

Questions around HTTP and SSH

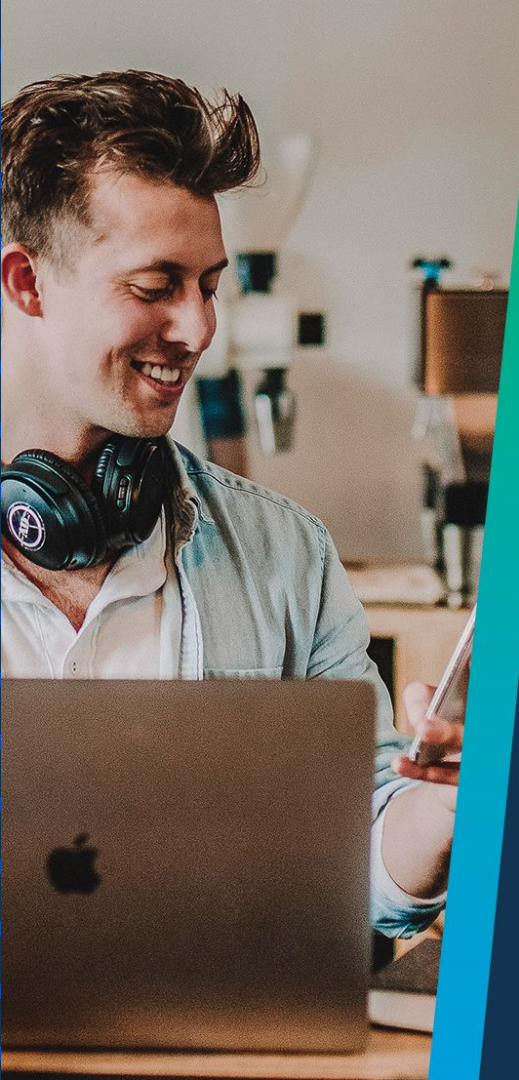
https://www.cloudflare.com/learning/network-layer/what-is-a-protocol/

https://developer.mozilla.org/en-US/docs/Web/HTTP

https://www.ssh.com/academy/ssh

https://www.cloudflare.com/learning/ssl/transport-layer-security-tls/

https://wentzwu.com/2020/08/21/what-osi-layer-does-tls-operate-and-why/



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Thank you for joining us