Client-Server Relationship

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Introduction

Journey of the Request

Me
Typed the URL in the browser.

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Called DNS to find the IP. Send a request to get data from the IP.

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Routes the request to the respective IP.

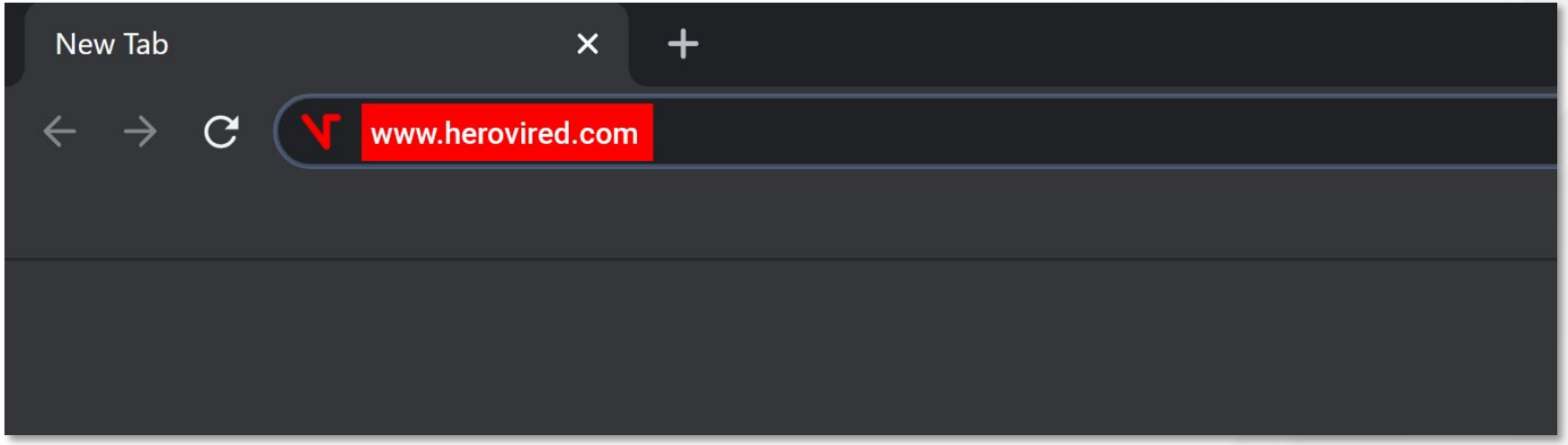
Server
Gets the request and sends an HTML back as response.

Browser
Displays the HTML.

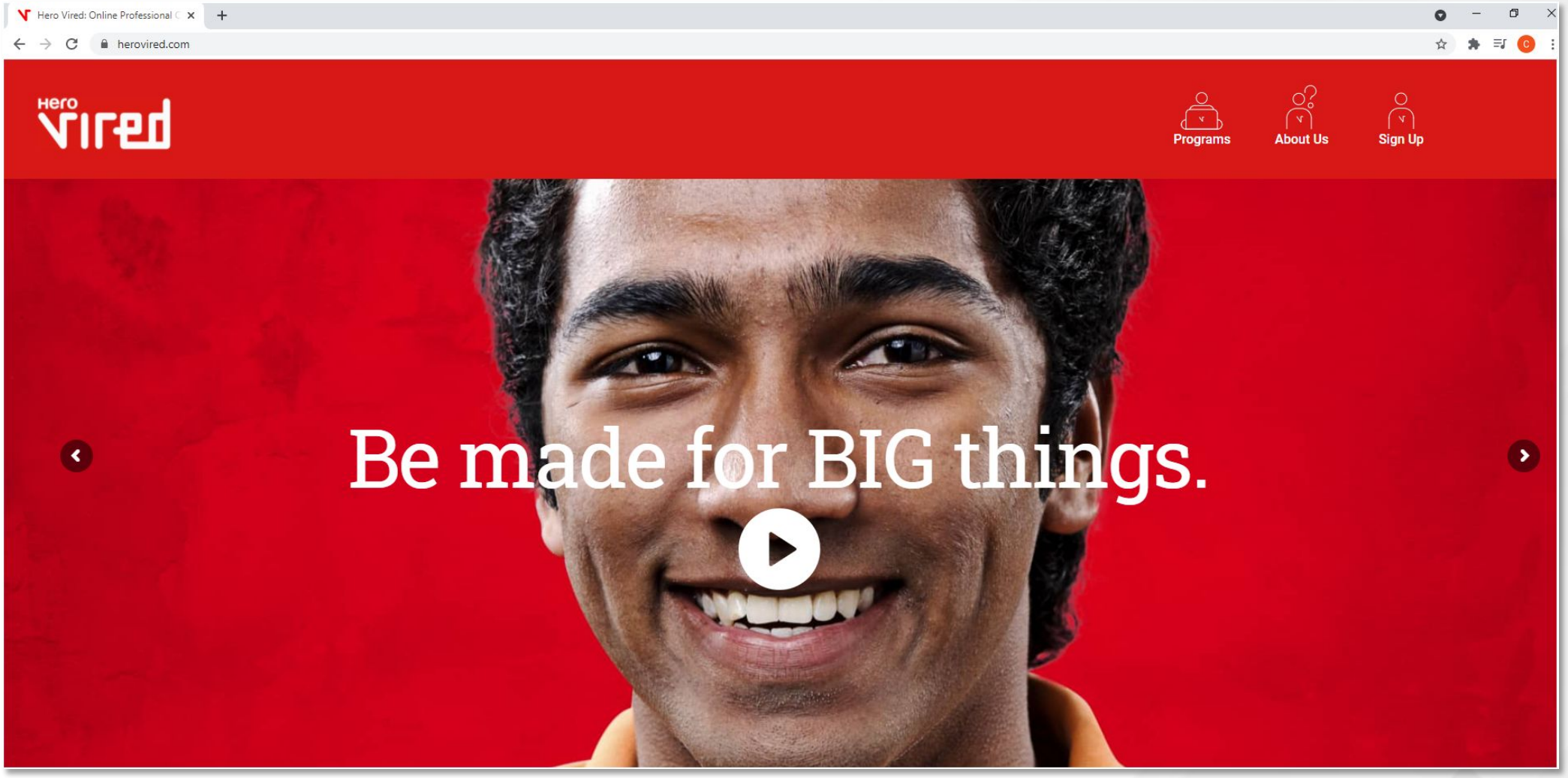
Hero

Introduction

- Launch the browser on your desktop/laptop.
- In the URL or address bar, enter: www.herovired.com
- What happens next?

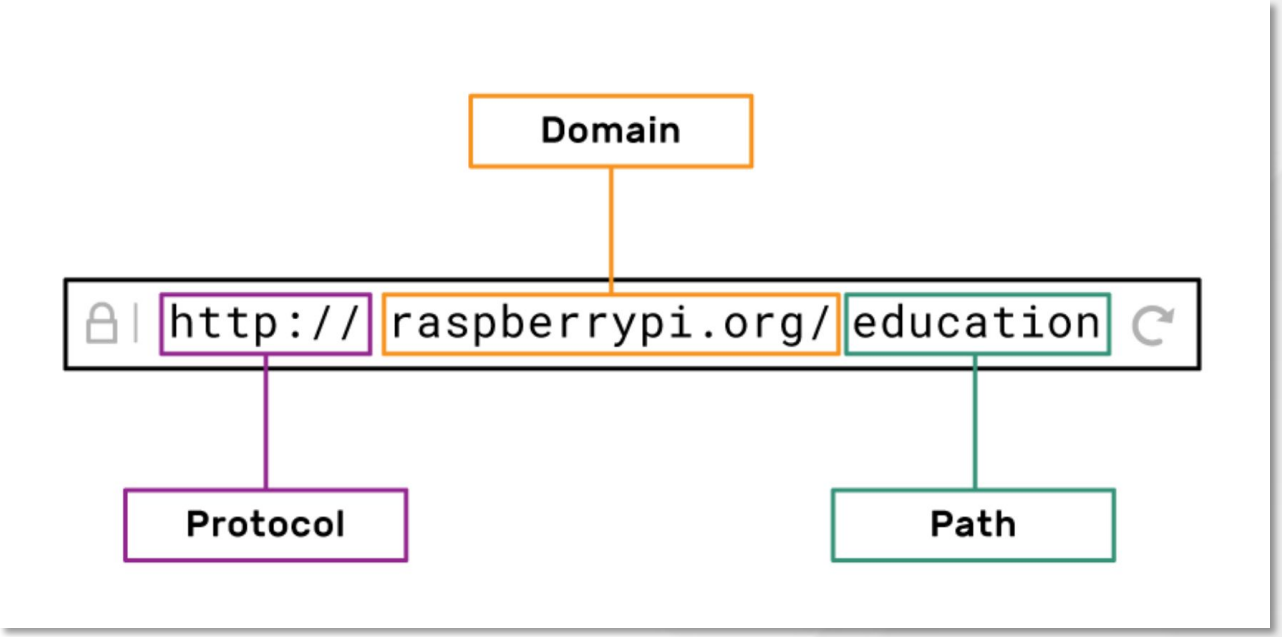


You Get this Page. But How?



What is Herovired.com?

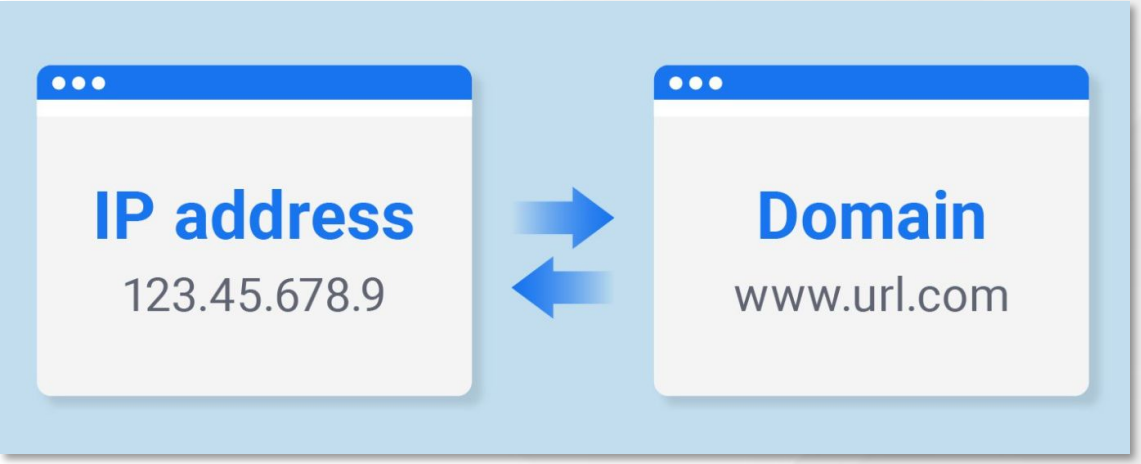
- We are asking the browser to connect to herovired.com and get us data from there. The browser is going to make a request to the Hero Vired server.
- The address that you typed on the browser window is called a Uniform Resource Locator (URL).
- As the name suggests this name is unique.
- The .com part is called the domain extension.



URL & IP Addresses

URL and IP Address

- Every URL resolves to an IP address.
- An IP address is a unique address assigned to a server that is connected to the Internet.
- It has a 4-part numbering, where each number can be any number from 0 to 255.
- For example:
- [0…255].[0…255].[0…255].[0..255]
- Herovired.com is a web application that resides on a server identified by this IP.



Find the IP Address of HeroVired.com

- Open the command prompt (cmd) in Windows. For Linux users, open a terminal.
- Type: ping herovired.com
- "**ping**" is a utility that **checks** the **server status**.
- You will get the IP address of herovired.com.

IP addresses may be different at times. This is to ensure load balancing of the network.

Difference between Public & Private IP Addresses

Public and Private IP Addresses

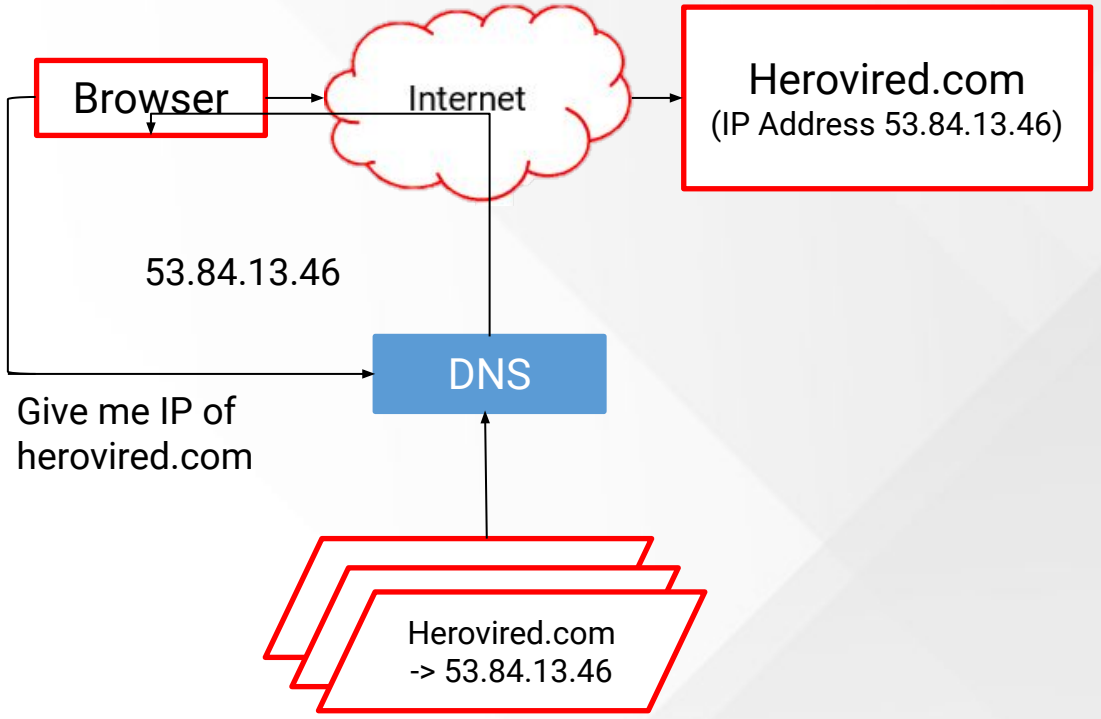
- Every machine connected to a network will have an IP address.
- Check your IP
  - Most likely it will be 192.168.1.1
  - I also have the same IP – isn't it supposed to be unique?
- A public IP is the one that is available over the Internet and that is unique on the Internet.
- Can my private IP clash with a public IP? The private IP ranges are:
  - 10.0.0.1 - 10.255.255.255
  - 172.16.0.0 - 172.32.255.255
  - 192.168.0.0 - 192.168.255.255
- 127.0.0.1 is a special IP identified with the domain name localhost. As the name suggests, it refers to the current machine. So, every machine to itself can be identified by this IP or name.

So, Who Maps the URL to the IP Address?

Working of DNS

Domain Name Server (DNS)

- Domain Name Server or DNS is a group of special servers that resolve a name to an IP address.
- The primary domain name server that you are connected to is part of your Internet Service Provider (ISP).
- Sometimes a DNS may not know all the names of all the servers in its domain, but it will know other servers who can resolve that name.



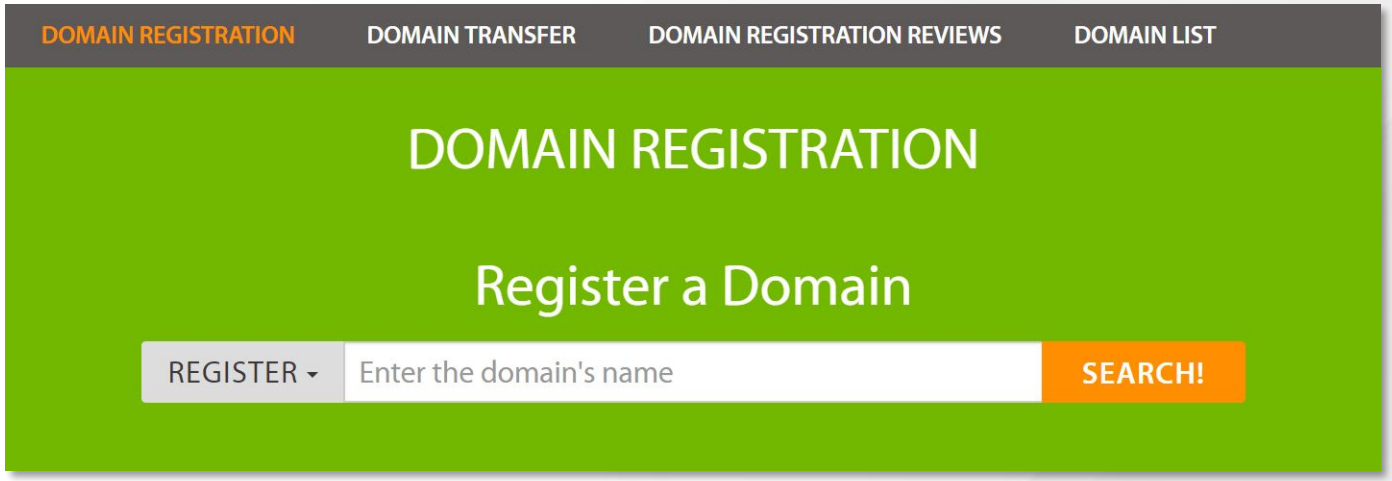
DNS Details

- All domain names on the Internet are registered with Internet Assigned Numbers Authority (IANA)

- This is the controlling body that controls the IP address and maps a domain name to an IP address.

DNS Details

- When we buy a domain name, we usually do it through a domain name provider like godaddy.com, aws.amazon.com, wordpress.com etc.
- Eventually, these companies will register the domain with IANA.
- Only when it is registered with IANA, can this name be usable on the Internet and an IP address be associated with it.



DNS Details

- Note that certain domain extensions have been allocated for certain purposes. These extensions have a controlling authority.
- For example, the .in extension is managed by VSNL.
- So, for any website with a .in extension, the authoritative domain name server is the VSNL DNS.

What Does the Internet Cloud Do?

Click on icon
to view additional
content

How Routers Work

What is a Trace Routing?

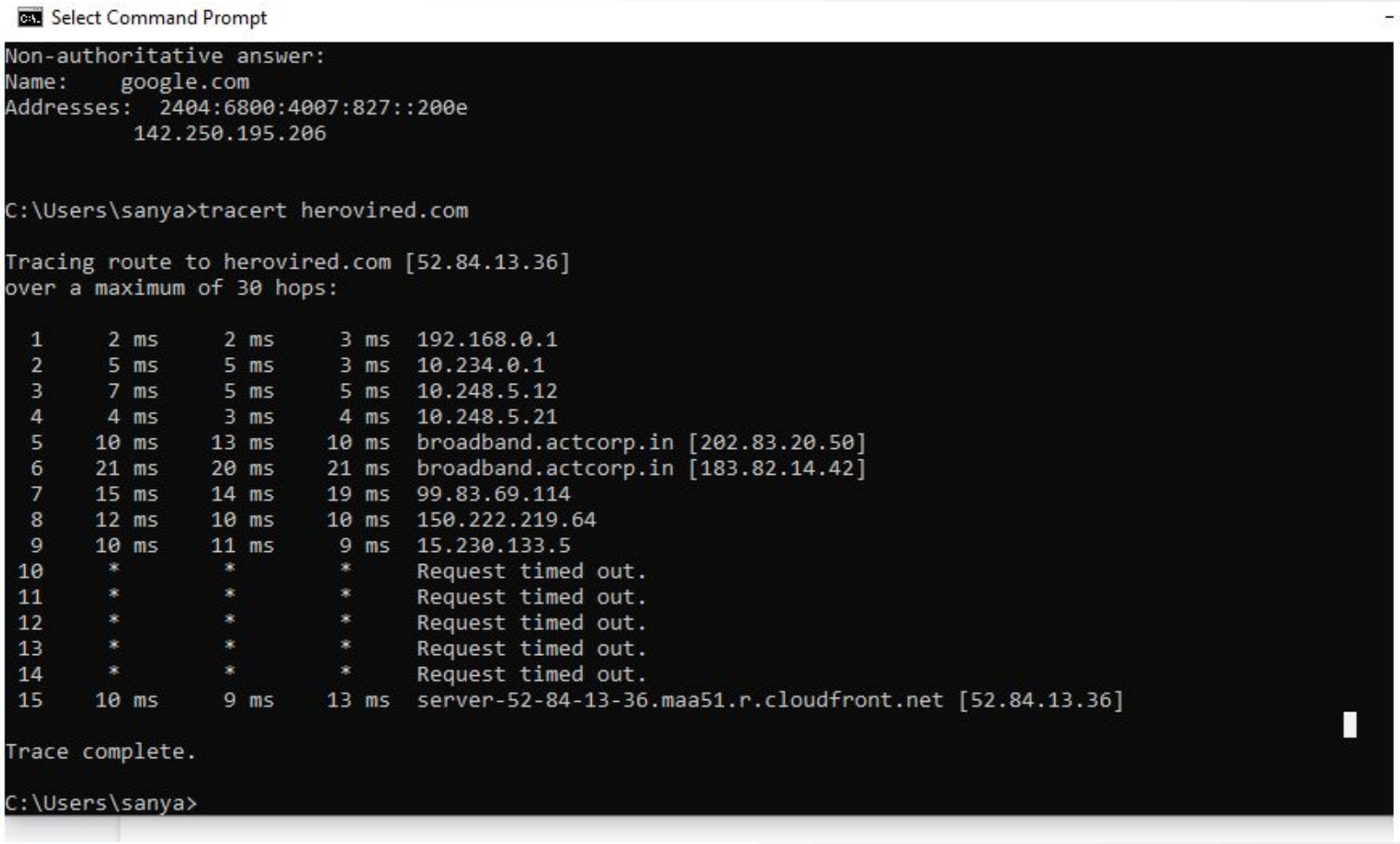
- A network packet is a unit of data carried by a packet-switched network.

Check the Path Travelled

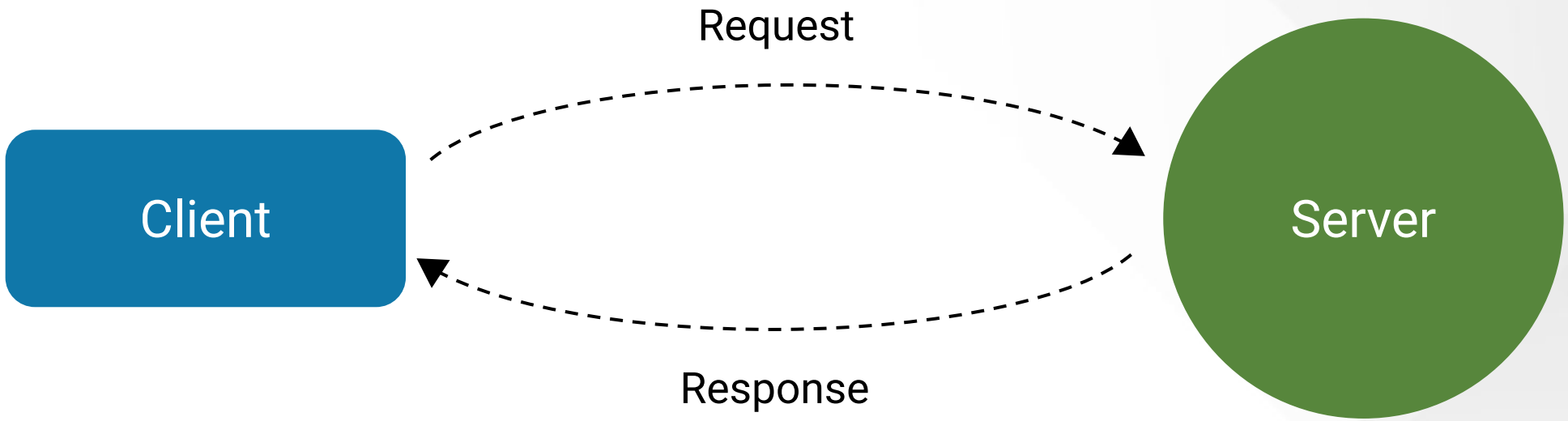
- As a request passes from one router to the next, it forms a path.
- To check the routers in the path of my request to herovired.com, use the command: tracert herovired.com
- On a Linux computer, use the command: traceroute herovired.com

Check the Path Travelled

- My request travelled from my computer via broadband.actcorp.in which is my service providers router.
- The last router that it hit before reaching the herovired server is 52-84-13-36.maa51.r.cloudfront.net.
- Some of the intermediate routers timed out. Sometimes these routers stop trace requests for security reasons.



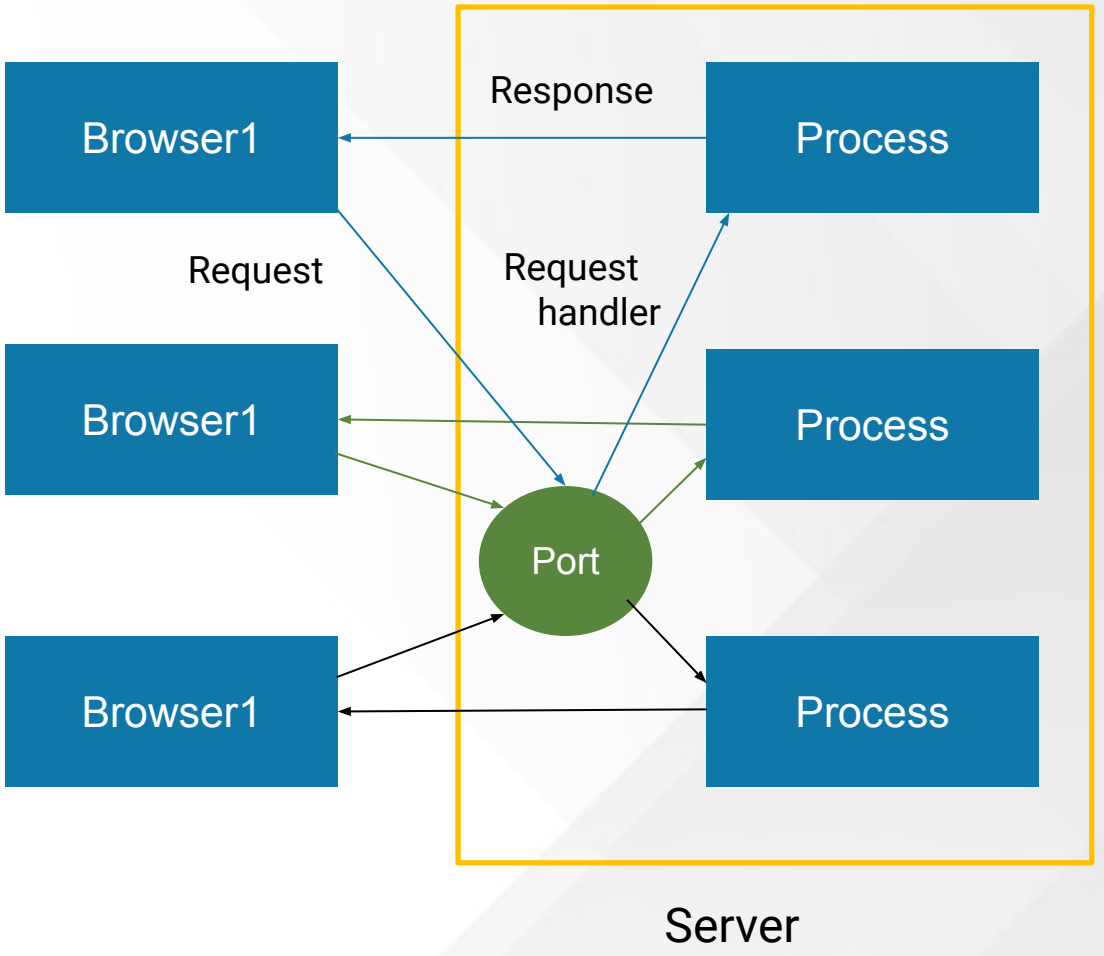
My Request Reached the Server... What Next?



Functions of a Port

The Server is Listening

- A web server is essentially waiting for requests to turn up on a port.
- A port is a communication endpoint defined by a number.



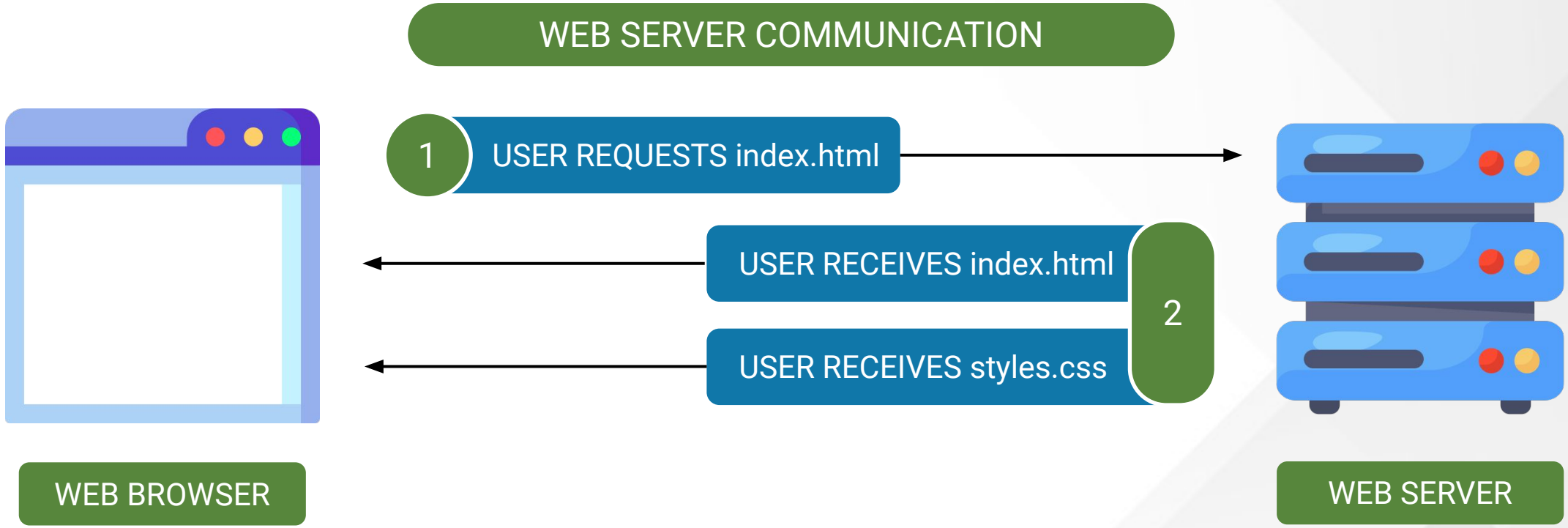
Ports

- Ports are a logical concept to define an endpoint.
- When a server starts, it listens to a port for requests - often called the bind port.
- Browsers will connect to this port to exchange information with the server.
- Standard Ports are listed in the table.
- In HTTP, ports can be appended to the URL with a : (colon) E.g. http://herovired.com:80
- If the server is running on a standard port, the port number need not be explicitly specified.
- The ugly side of port: security.

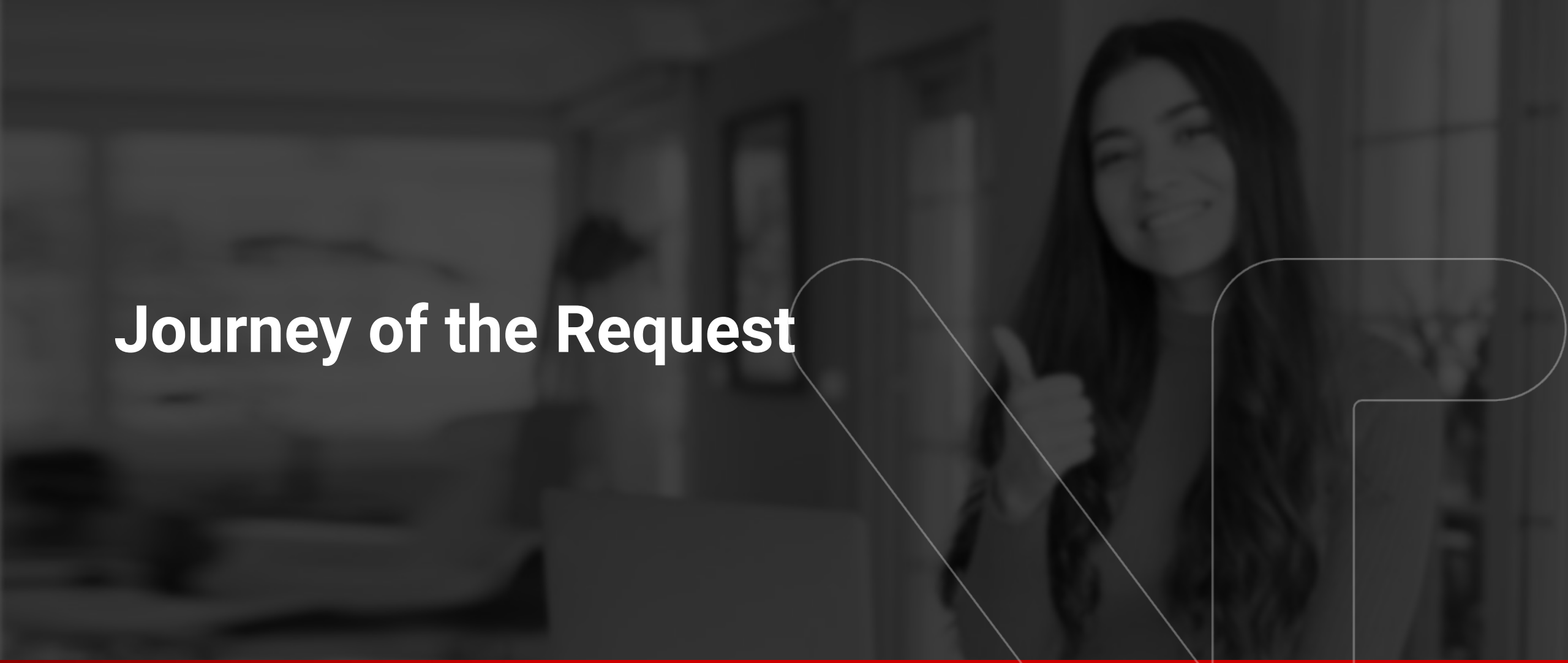
Port	Protocol	Usage
80	http	Web
22	ssh	For connecting to a remote machine
20,21	ftp	File transfer
25	smtp	Emails
114	sftp	Secured file transfer
443	https	Secured web

The Server is Listening

- The Server then takes the request, processes it, and sends a response.
- The response in most cases is an HTML document.



Journey of the Request



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Hero

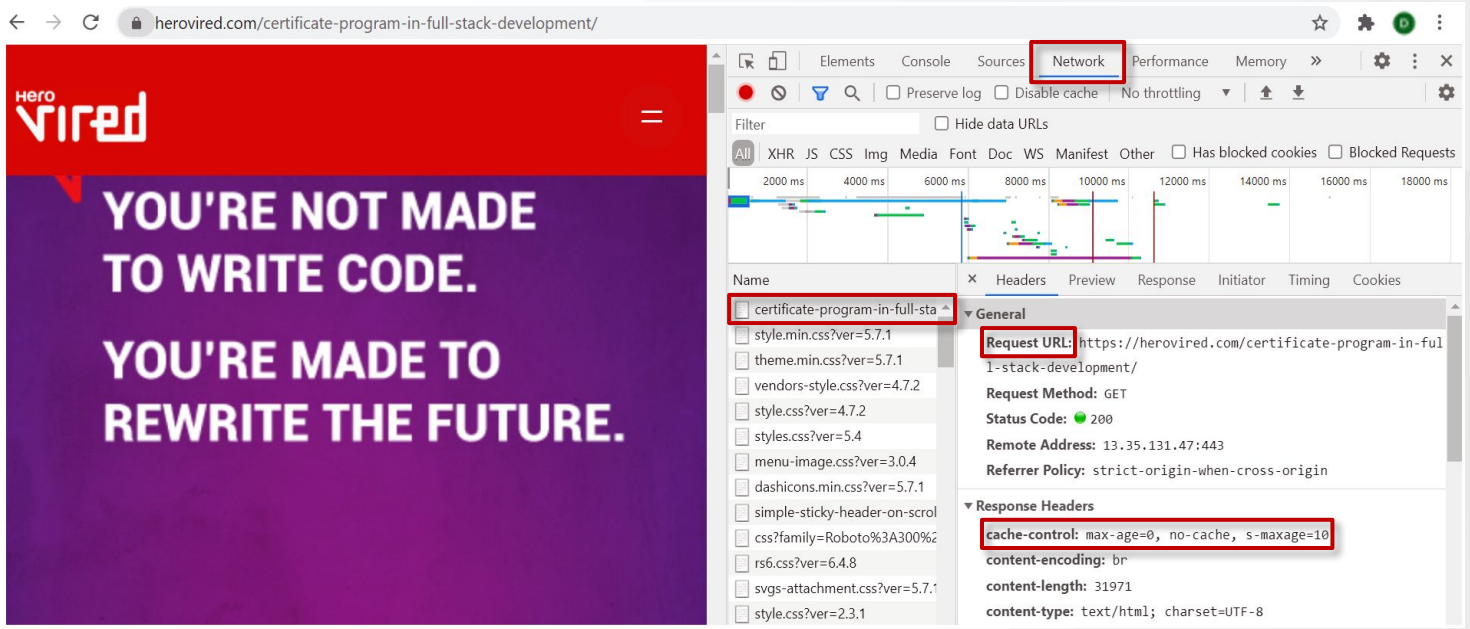
Coding in HTML

Hyper Text Transfer Protocol (HTTP)

- HTTP is an acronym for Hyper Text Transfer Protocol.
- A protocol, as the name suggests, is a contract, a common language.
- It's the protocol that is used for web requests.
- Among other things it defines:
  - How a request should be made.
  - How a response should be sent.
  - Standard codes – like 200 success, 404 not found etc.
- HTTPS is secured http.
- In this protocol, the request and response are the same, but they are encrypted using special algorithms.
- Why is it required?

HTTP in Action

- Open Chrome browser.
- Press F12.
- Open the site: https://herovired.com/certificate-program-in-full-stack-development/
- Ensure Network tab is selected.
- Next ensure Headers is Selected.
- Once you have looked at the Request, move to the Response tab.



Hyper Text Markup Language (HTML)

- Hyper Text Markup Language is a language that browsers understand and have standards they follow to display content.
- Here an important concept is called “Rendering”. Documents in HTML are rendered by the browser in a visually pleasing and user-friendly format.

```
<!DOCTYPE html>
<html lang="en-US">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0, maximum-scale=1, user-scalable=no

    <meta name='robots' content='index, follow, max-image-preview:large, max-snippet:-1, max-video-preview:
```

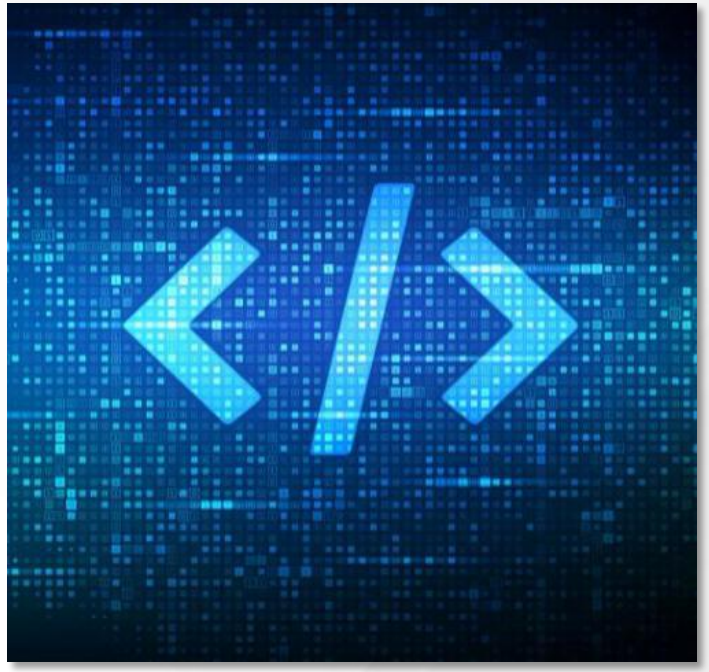
Hero

HTML

- Another powerful feature of the HTML is its ability to **link documents using hyperlinks.**
- Open the herovired.com page.
- Right click and “View page source.”

HTML Code Template

- The HTML code starts with <html> and ends with </html>
- The code has sections: <head></head>, <body></body>
- Launch Notepad on your computer.
- Create a file using Notepad and call it “First.html”



HTML Code Template

- Type the following code in your Notepad application:

```
<html>

    <body> add your name </body>

</html>
```

- Save it on the desktop and open with your browser.

Recap

- URL & IP Addresses
- Public & IP Addresses
- DNS
- How Routers work
- Function of a Port
- Journey of a Request
- Coding in HTML

Thank You!