

A decorative network diagram in the top-left corner, featuring a complex web of interconnected nodes and lines. Some nodes are highlighted with blue circles, and others with solid blue dots.

Web Security

A decorative network diagram in the bottom-right corner, similar to the one in the top-left, with interconnected nodes and lines, some highlighted with blue circles and others with solid blue dots.

Web Fundamentals


The Web: I'm not going to define this. You know what it is.

Web Fundamentals

A decorative network diagram in the top right corner, featuring a complex web of interconnected nodes and lines, rendered in a light gray color.

The Web: I'm not going to define this. You know what it is.

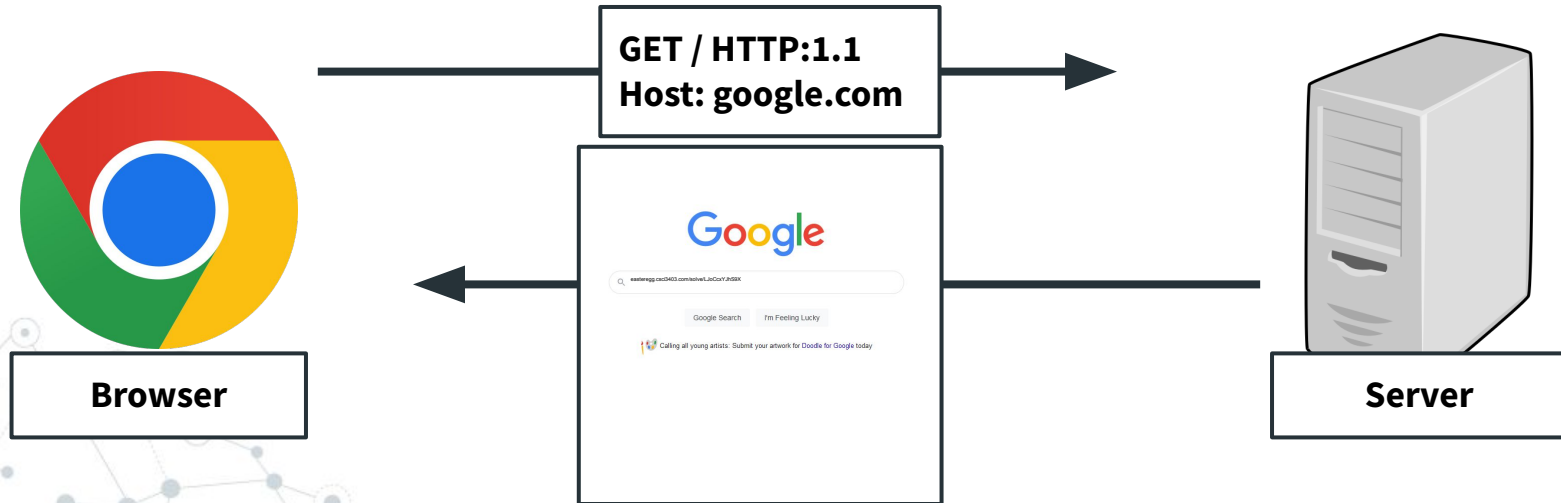
That being said, it is specifically **websites**, not other internet-connected things like games or IoT toasters.

A decorative network diagram in the bottom left corner, featuring a complex web of interconnected nodes and lines, rendered in a light gray color.

Web Fundamentals

Web browser: Requests websites and renders them visually

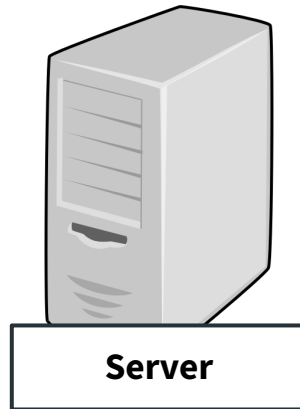
Web server: Responds to web client requests



Web Fundamentals

Web servers

- ◎ Normally have a **public** IP address
- ◎ Web server code can be written in any language
 - Common ones: PHP, Java, Python



Web Fundamentals

Web browsers

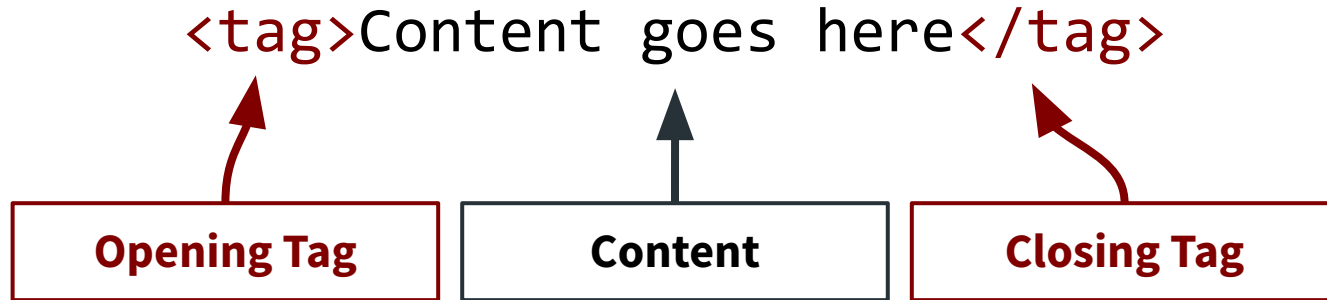
- ◎ Run and display code from the server
- ◎ Must use standard languages: HTML, CSS, JavaScript



Browser

Web Fundamentals

HyperText Markup Language (HTML): Specifies the types of content on a webpage



Web Fundamentals

HyperText Markup Language (HTML): Specifies the types of content on a webpage

```
<a href="google.com">Click me!</a>
```



Optional key/value
attributes

Web Fundamentals

HTML Demo

```
<h1>Example site!</h1>
```

```
<input type="password"></input>
```

```
<input type="text" maxlength="8"></input>
```

```
<button onclick="alert('Clicked!')" disabled>Click me?</button>
```

Web Fundamentals

Cascading Style Sheets (CSS): Specifies the appearance of a webpage

```
<style>
```

```
header {
```

```
    color: green;
```

```
}
```

```
</style>
```

“Style” tag specifies CSS

CSS target

CSS styles

Web Fundamentals

Can also import as a file...

```
<link rel="stylesheet" href="style.css">
```

Web Fundamentals

CSS Demo

```
<h1>Nothing to see here...</h1>
```

```
<secret>Something super secret!</secret>
```

```
<style>
```

```
secret {
```

```
    display: none;
```

```
}
```

```
</style>
```

Web Fundamentals

JavaScript (JS): Complete programming language that can do whatever you want

```
<script>
```

```
  alert('Hello world!');
```

```
</script>
```

Web Fundamentals

JavaScript demo

```
document.onkeypress = e => console.log(e.key)  
document.body.innerHTML = 'Gone!';
```

Web Fundamentals

Q: Is running arbitrary code on every webpage... bad?

Web Fundamentals

Q: Is running arbitrary code on every webpage... bad?

A: Yes!

```
<script>
```

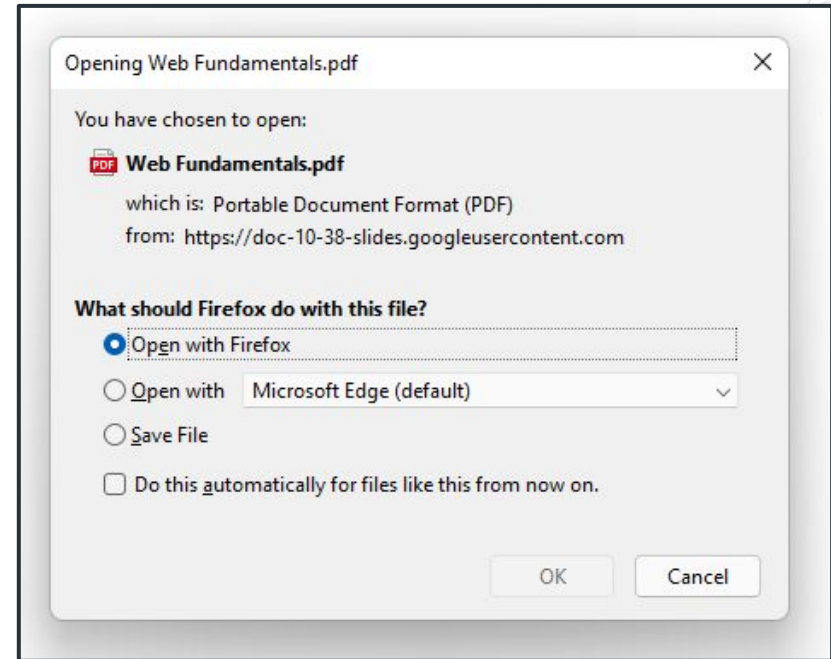
```
delete_everything();
```

```
</script>
```


Web Fundamentals

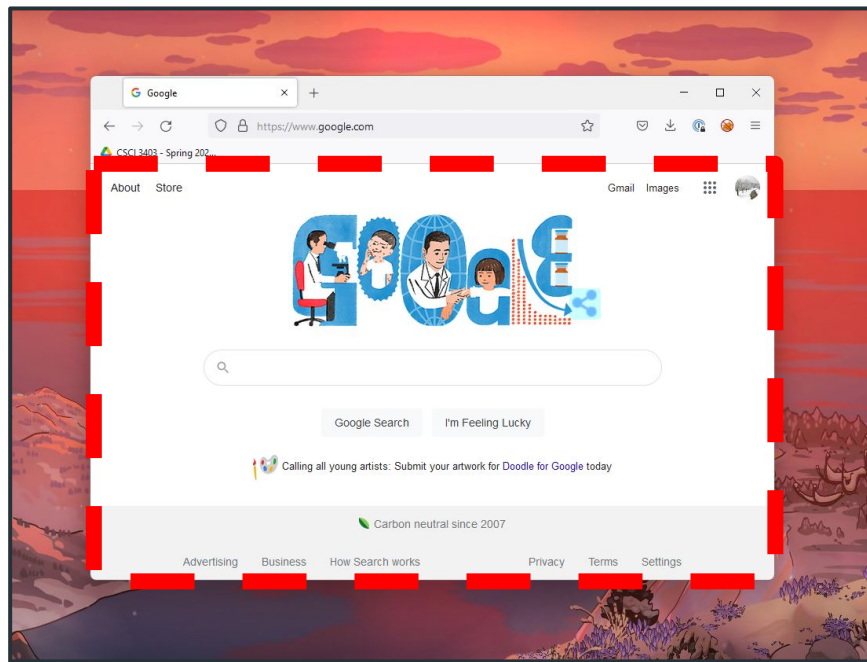
Sandboxing: Cannot access filesystem without human interaction

Files:  No files selected.



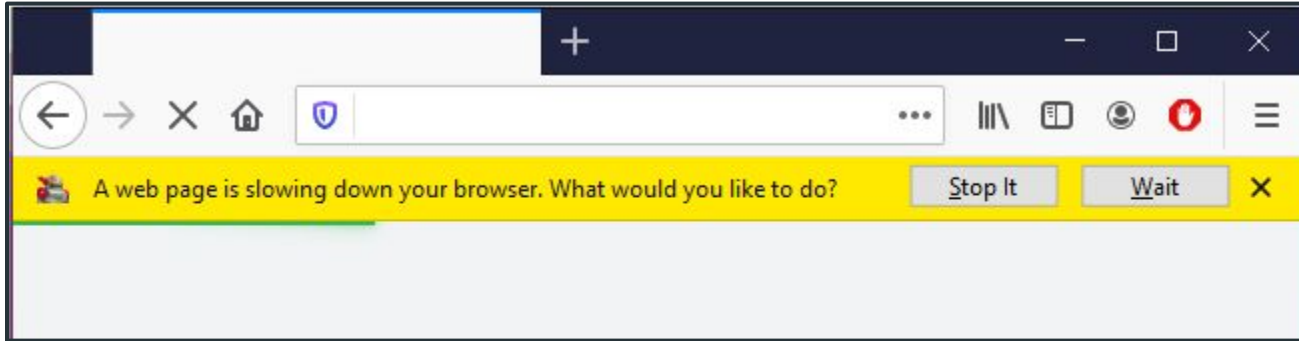
Web Fundamentals

Sandboxing: Constrained within browser window



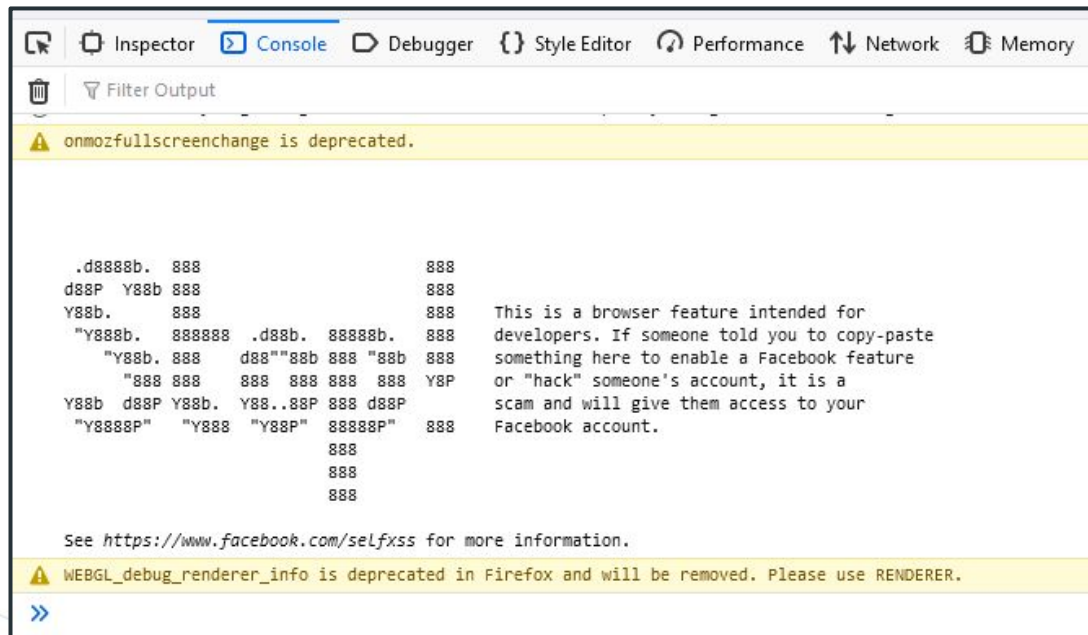
Web Fundamentals

Sandboxing: Excessive computation is throttled



Web Fundamentals

Not sandboxed: Full control over the webpage



Web Fundamentals

Google announces zero-day in Chrome browser – update now!



Paul Ducklin

2 days ago



In the past few days, both [Apple](#) and [Adobe](#) have published software updates to close off zero-day security holes that were already being exploited by attackers.

Remember that a *zero-day exploit* is a security bypass (typically, one that allows Bad Guys to break in and run or implant software of their own choosing) that was discovered and abused by the attackers before the Good Guys found and fixed it.

<https://nakedsecurity-sophos-com.cdn.ampproject.org/c/s/nakedsecurity.sophos.com/2022/02/15/google-announces-zero-day-in-chrome-browser-update-now/amp/>

Recap

HTML: Specifies types of content

CSS: Specifies appearance of content

⦿ Not very important to us

JS: Does literally anything

⦿ VERY important from a security perspective

Questions?