

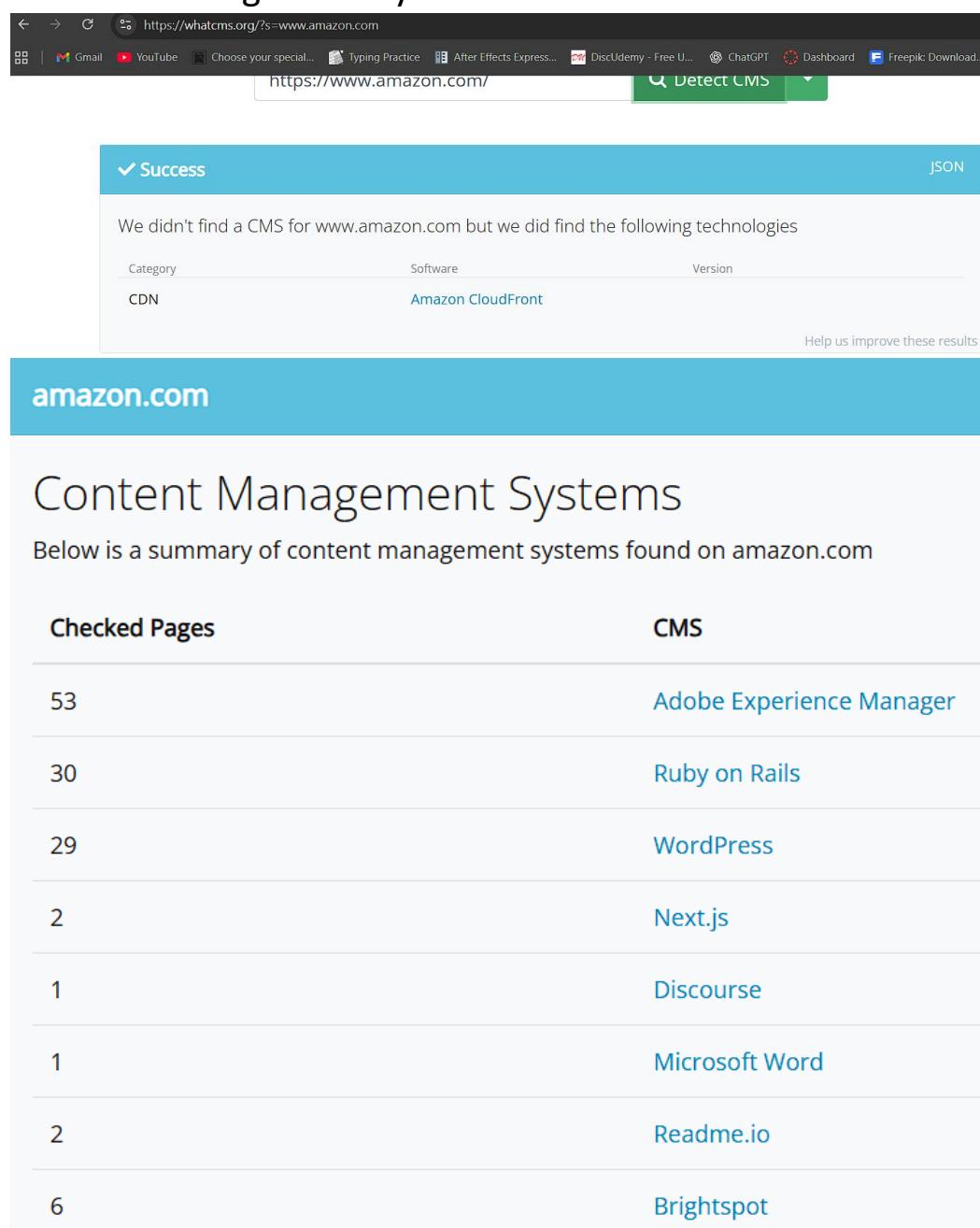
## 2.2.2.1. Website Selection & Technology Analysis (6 points)

Select and analyze three websites from different domains:

Required Categories:

### 1. E-commerce Platform: Amazon

- Complete homepage URL: <https://www.amazon.com/>
- Server location: **23.214.210.134 United Kingdom (GB)**
- Technology stack identification:
  - Content Management System:



The screenshot shows the results of a CMS detection tool for the website <https://www.amazon.com/>. The interface has a green header bar with the text "Success" and a "JSON" button. Below this, it says "We didn't find a CMS for www.amazon.com but we did find the following technologies". A table lists one technology found: "Category" (CDN), "Software" (Amazon CloudFront), and "Version". At the bottom, there's a link to "Help us improve these results".

Category	Software	Version
CDN	Amazon CloudFront	

**amazon.com**

## Content Management Systems

Below is a summary of content management systems found on amazon.com

Checked Pages	CMS
53	Adobe Experience Manager
30	Ruby on Rails
29	WordPress
2	Next.js
1	Discourse
1	Microsoft Word
2	Readme.io
6	Brightspot

- Frontend frameworks:

## Programming languages



[Python](#)

- Identify using browser DevTools: javascript

- Initial measurements:

328 requests	7.2 MB transferred	9.8 MB resources	Finish: 10.77 s	DOMContentLoaded: 1.45
312 requests	7.1 MB transferred	9.6 MB resources	Finish: 4.40 s	DOMContentLoaded: 1.72 s
280 requests	3.2 MB transferred	5.8 MB resources	Finish: 8.06 s	DOMContentLoaded: 2.50

- Page load time: 10.77s, 4.40s, 8.06s average: 7.74s
- Total page size: 9.8MB, 9.6MB, 5.8MB average: 8.4MB
- Transferred size: 7.2MB, 7.1MB, 3.2MB average: 5.83MB
- Number of HTTP requests: 328, 312 ,280 requests average: 306.67
- Number of images, scripts, stylesheets:
- Img: 263/328 , 259/312, 238/280 average: 0.827

263 / 328 requests	5,733 kB / 7,170 kB transferred	5,587 kB / 9,760 kB resources	Finish: 10.77 s
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259 / 312 requests	5,734 kB / 7,129 kB transferred	5,557 kB / 9,571 kB resources	Finish: 5.26 s
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238 / 280 requests	3,279 kB / 4,461 kB transferred	3,132 kB / 6,934 kB resources	Finish: 10.40 s
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- Scripts: 30/328 , 25/312, 22/280 average: 0.083

30 / 328 requests	869 kB / 7,170 kB transferred	2,168 kB / 9,760 kB resources	Finish: 10.77 s
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25 / 312 requests	844 kB / 7,129 kB transferred	2,097 kB / 9,571 kB resources	Finish: 5.26 s
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22 / 280 requests	835 kB / 4,461 kB transferred	2,086 kB / 6,934 kB resources	Finish: 10.40 s
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- Stylesheets: 10/328 , 8/312, 8/280 average: 0.028

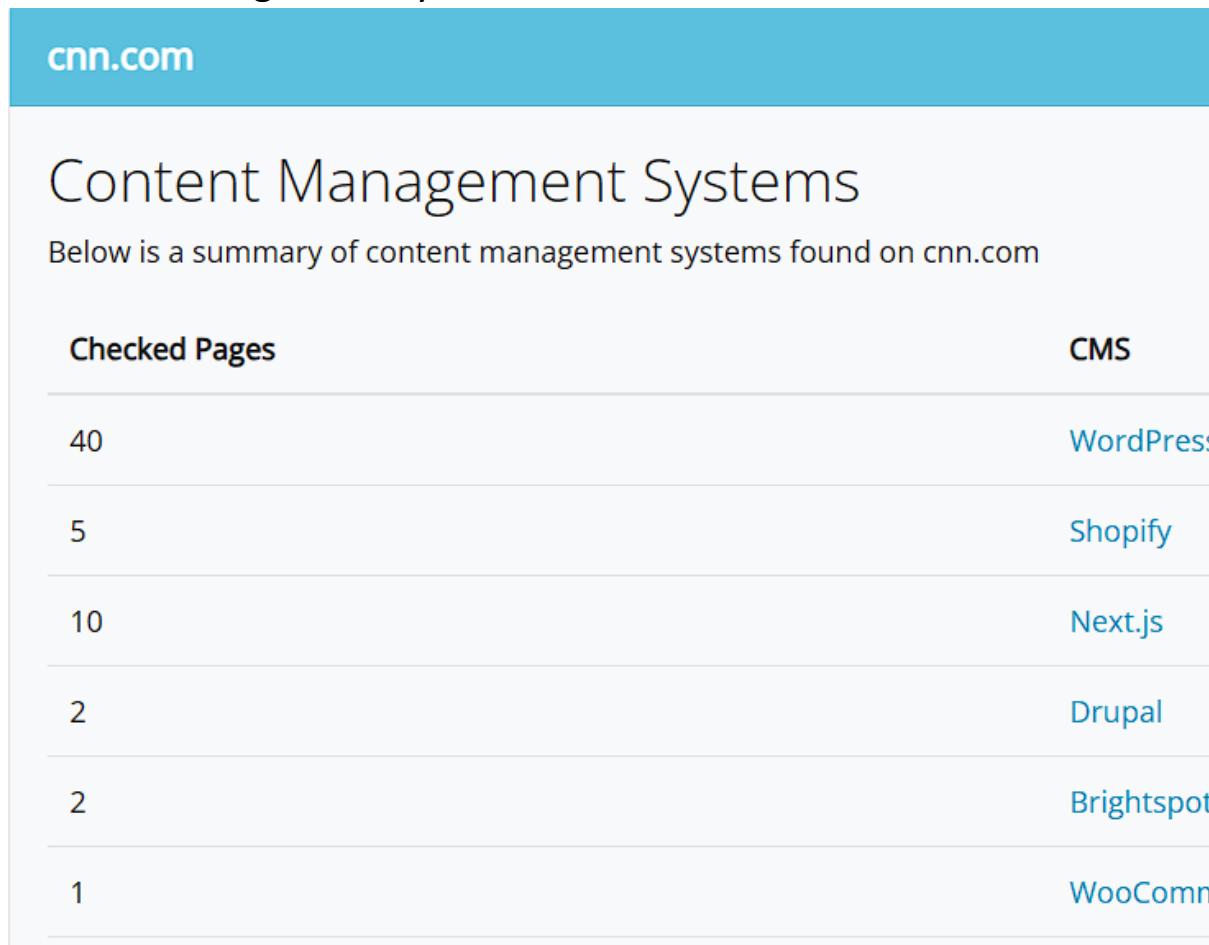
10 / 328 requests	122 kB / 7,170 kB transferred	982 kB / 9,760 kB resources	Finish: 10.77 s
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8 / 312 requests	110 kB / 7,129 kB transferred	901 kB / 9,571 kB resources	Finish: 5.26 s
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8 / 280 requests	109 kB / 4,461 kB transferred	901 kB / 6,934 kB resources	Finish: 10.40 s
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## 2. News/Media Outlet: CNN:

- Complete homepage URL: <https://edition.cnn.com/>
- Server location: **151.101.3.5 Canada (Montreal)**
- Technology stack identification:
  - Content Management System:



- Frontend frameworks:

### JavaScript frameworks



- Identify using browser DevTools: javascript

- Initial measurements:

195 requests	10.6 MB transferred	25.1 MB resources	Finish: 10.84 s	DOMContentLoaded: 1
200 requests	16.9 MB transferred	32.6 MB resources	Finish: 10.53 s	DOMContentLoaded: 1
198 requests	12.4 MB transferred	26.9 MB resources	Finish: 11.33 s	DOMContentLoaded: 1

- Page load time: 10.84s, 10.53s, 11.33s average: 10.90s

- Total page size: 25.1MB, 32.6MB, 26.9MB average:28.2MB
- Transferred size: 10.6MB, 16.9MB, 12.4MB average:13.3MB
- Number of HTTP requests: 195, 200 ,198 requests average:197.67
- Number of images, scripts, stylesheets:
- Img: 71/195 , 73/200, 72/198 average:0.364

71 / 195 requests	2,699 kB / 16,860 kB transferred	2,658 kB / 32,648 kB resources	Finish: 1
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73 / 200 requests	3,073 kB / 17,233 kB transferred	3,029 kB / 33,020 kB resources	Finish: 1
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72 / 198 requests	2,700 kB / 16,862 kB transferred	2,658 kB / 32,649 kB resources	Finish: 1
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- Scripts: 68/195 , 68/200, 68/198 average:0.344

68 / 195 requests	6,640 kB / 16,860 kB transferred	17,806 kB / 32,648 kB resources	Finish: 1
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68 / 200 requests	6,640 kB / 17,233 kB transferred	17,806 kB / 33,020 kB resources	Finish: 1
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68 / 198 requests	6,641 kB / 16,862 kB transferred	17,806 kB / 32,649 kB resources	Finish: 1
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- Stylesheets: 9/195 , 9/200, 9/198 average:0.046

9 / 195 requests	48.0 kB / 16,860 kB transferred	263 kB / 32,648 kB resources	Finish: 16.70
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9 / 200 requests	48.0 kB / 17,233 kB transferred	263 kB / 33,020 kB resources	Finish: 11.19
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9 / 198 requests	48.0 kB / 16,862 kB transferred	263 kB / 32,649 kB resources	Finish: 12.70
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### 3. Educational Institution: Coursera:

- Complete homepage URL: <https://www.coursera.org/>
- Server location: **18.164.116.69 United States (Ashburn)**
- Technology stack identification:
  - Content Management System:

The screenshot shows the Coursera.org homepage with the title "Content Management Systems". Below it is a summary table:

Checked Pages	CMS
21	WordPress
6	Gatsby
36	Contentful
1	Octopress

- Frontend frameworks:

The screenshot shows the Coursera.org homepage with the title "Programming languages". Below it is a summary table:

JavaScript frameworks
TS TypeScript 50% sure
JSS JSS
GraphQL GraphQL
Emotion Emotion
Node.js Node.js

- Identify using browser DevTools: javascript , react

- Initial measurements:

136 requests	2.8 MB transferred	6.9 MB resources	Finish: 6.29 s	DOMContentLoaded: 1.20 s
125 requests	2.7 MB transferred	6.6 MB resources	Finish: 3.92 s	DOMContentLoaded: 1.45 s
89 requests	2.3 MB transferred	6.1 MB resources	Finish: 4.01 s	DOMContentLoaded: 1.80 s

- Page load time: 6.29s, 3.92s, 4.01s average: 4.74s
- Total page size: 6.9MB, 6.6MB, 6.1MB average: 6.53MB
- Transferred size: 2.8MB, 2.7MB, 2.3MB average: 2.6MB
- Number of HTTP requests: 136, 125, 89 requests average: 116.67
- Number of images, scripts, stylesheets:
- Img: 75/136, 75/125, 41/89 average: 0.537

75 / 136 requests	989 kB / 2,846 kB transferred	946 kB / 6,868 kB resources	Finish: 6.61 s
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75 / 125 requests	989 kB / 2,740 kB transferred	946 kB / 6,613 kB resources	Finish: 3.92 s
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41 / 89 requests	523 kB / 2,273 kB transferred	500 kB / 6,167 kB resources	Finish: 4.25 s
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- Scripts: 32/136 , 31/125, 31/89 average:0.277

32 / 136 requests	1,696 kB / 2,846 kB transferred	5,157 kB / 6,868 kB resources	Finish: 6.61 s
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31 / 125 requests	1,605 kB / 2,740 kB transferred	4,914 kB / 6,613 kB resources	Finish: 3.92 s
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31 / 89 requests	1,605 kB / 2,273 kB transferred	4,914 kB / 6,167 kB resources	Finish: 4.25 s
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- Stylesheets: 3/136 , 2/125, 2/89 average:0.020

3 / 136 requests	9.4 kB / 2,846 kB transferred	46.0 kB / 6,868 kB resources	Finish: 6.61 s
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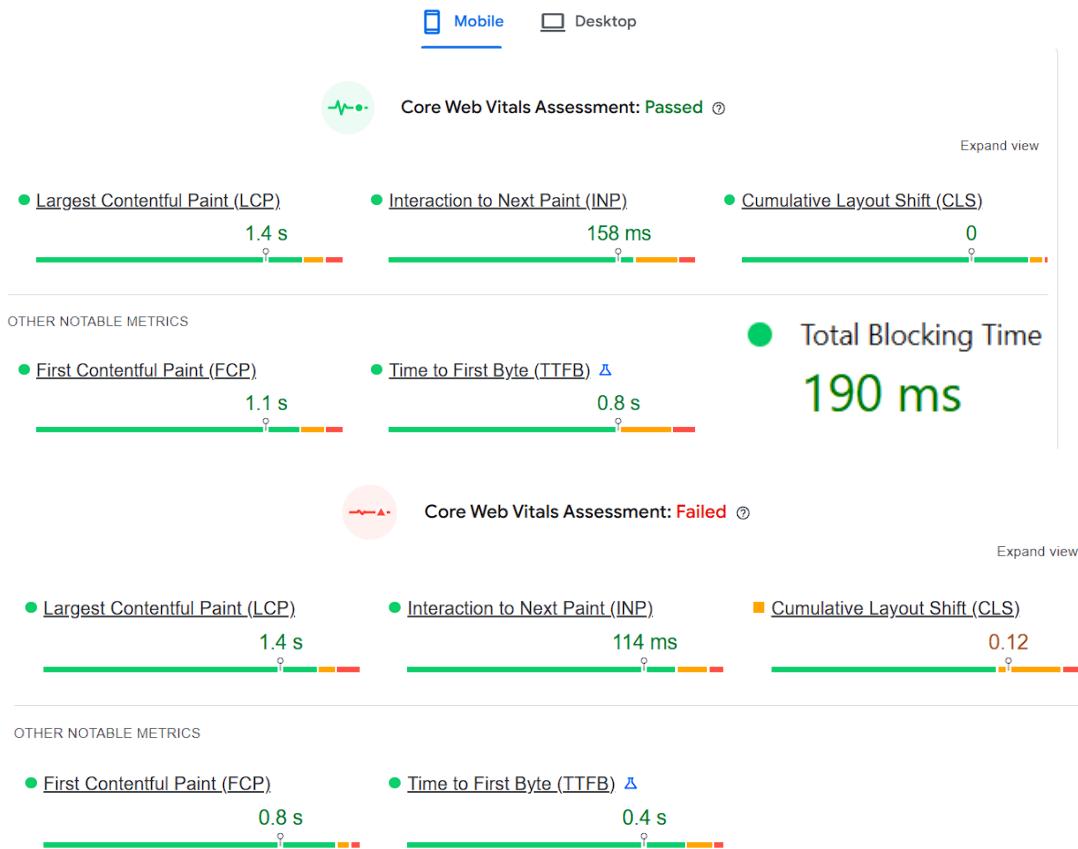
2 / 125 requests	9.0 kB / 2,740 kB transferred	45.3 kB / 6,613 kB resources	Finish: 3.92 s
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- 2 / 89 requests | 9.0 kB / 2,273 kB transferred | 45.3 kB / 6,167 kB resources | Finish: 4.25 s |

## 2.2.2.2. Core Web Vitals Measurement & Analysis (10 points):

### 1. E-commerce Platform: Amazon

- Complete homepage URL: <https://www.amazon.com/>

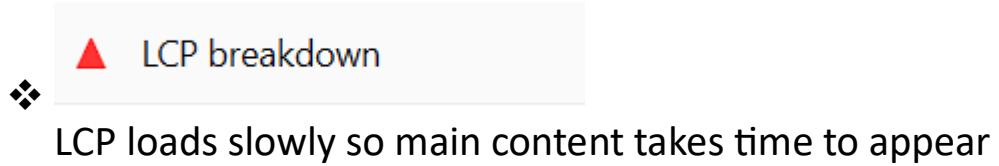


- Largest Contentful Paint (LCP): 1.1s mobile , 1.4s desktop
- Interaction to Next Paint (INP): 158ms mobile , 114ms desktop
- Cumulative Layout Shift (CLS): 0 mobile , 0.12 desktop

	Mobile	Desktop
LCP	1.1s	1.4s
INP	158ms	114ms
CLS	0	0.12

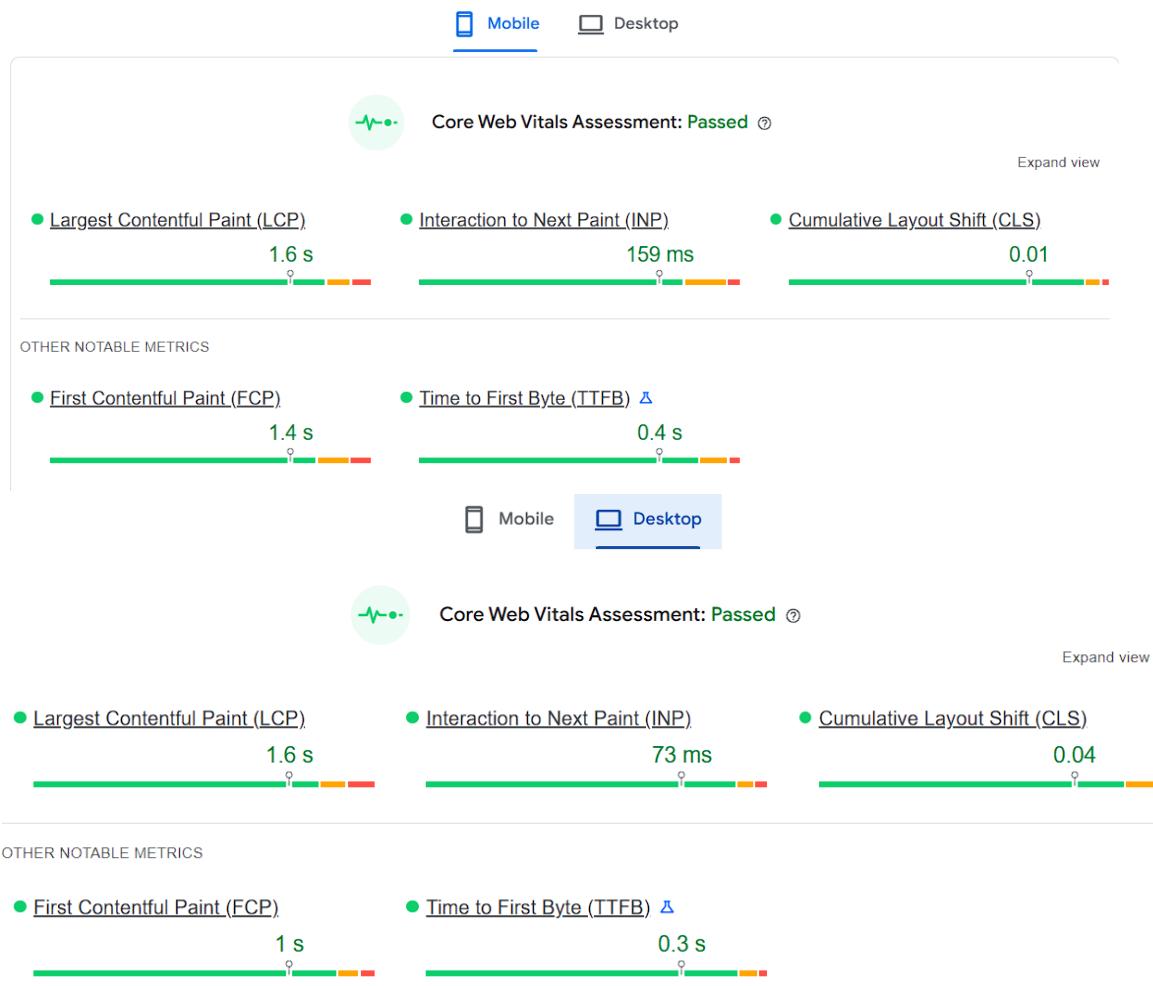
- Identify top 3 issues flagged by Lighthouse for each site:

- ❖ **▲ Render blocking requests — Est savings of 1,330 ms**
- ❖ **Slows initial rendering and LCP**
- ❖ **▲ Font display — Est savings of 30 ms**
- ❖ **Text renders slower than fonts load**



## 2. News/Media Outlet: CNN

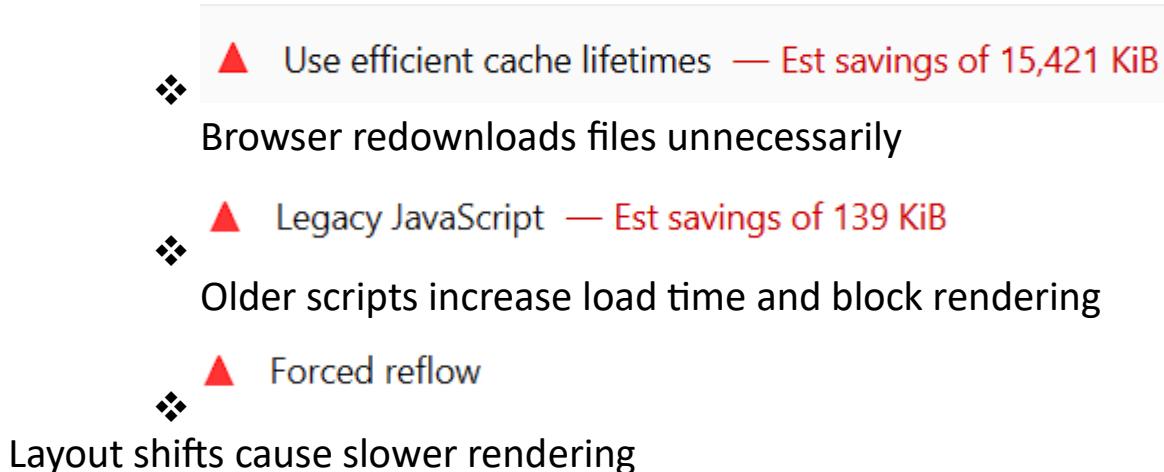
Complete homepage URL: <https://edition.cnn.com/>



- Largest Contentful Paint (LCP): 1.6s mobile , 1.6s desktop
- Interaction to Next Paint (INP): 159ms mobile , 73ms desktop
- Cumulative Layout Shift (CLS): 0.01 mobile , 0.04 desktop

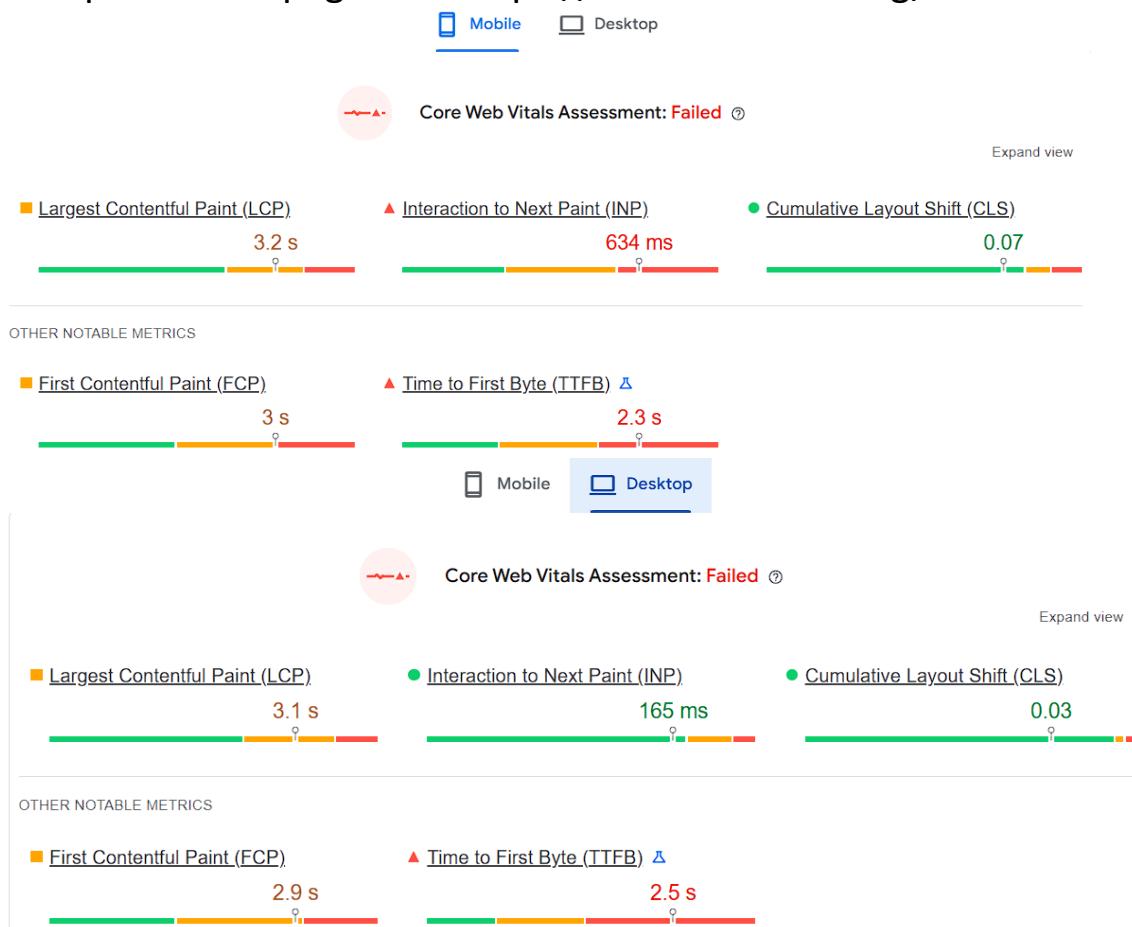
	Mobile	Desktop
LCP	1.6s	1.6s
INP	159ms	73ms
CLS	0.01	0.04

- Identify top 3 issues flagged by Lighthouse for each site:



### 3. Educational Institution: Coursera

- Complete homepage URL: <https://www.coursera.org/>



- Largest Contentful Paint (LCP): 3.2s mobile , 3.1s desktop
- Interaction to Next Paint (INP): 634ms mobile , 165ms desktop
- Cumulative Layout Shift (CLS): 0.07 mobile , 0.03 desktop

	Mobile	Desktop
LCP	3.2s	3.1s
INP	634ms	165ms
CLS	0.07	0.13

- Identify top 3 issues flagged by Lighthouse for each site:

- ❖ ▲ Improve image delivery — *Est savings of 561 KiB*
  - Large images slow loading, needs compression
- ❖ ▲ Use efficient cache lifetimes — *Est savings of 222 KiB*
  - Browser redownloads files unnecessarily
- ❖ ▲ LCP breakdown
  - LCP loads slowly so main content takes time to appear

### 2.2.2.3. Comparative Analysis & Optimization Strategy:

#### 1. E-commerce Platform: Amazon

- Complete homepage URL: <https://www.amazon.com/>



#### 2. News/Media Outlet: CNN:

- Complete homepage URL: <https://edition.cnn.com/>



#### 3. Educational Institution: Coursera:

- Complete homepage URL: <https://www.coursera.org/>



#### ❖ Create Comparison Table Including:

- + Overall performance scores (0-100)
- + Load time comparison from Page load time in 2.2.2.1. Website Selection & Technology Analysis
- + Core Web Vitals scores
- + Page size and request count from Number of HTTP requests 2.2.2.1. Website Selection & Technology Analysis
- + Performance ranking (1st, 2nd, 3rd place)

	Amazon	CNN	Coursera																																				
Overall performance scores (0-100)	56	25	38																																				
Load time comparison	7.74s	10.90s	4.74s																																				
Core Web Vitals scores	<table border="1"> <thead> <tr> <th></th> <th>Mobile</th> <th>Desktop</th> </tr> </thead> <tbody> <tr> <td>LCP</td> <td>1.1s</td> <td>1.4s</td> </tr> <tr> <td>INP</td> <td>158ms</td> <td>114ms</td> </tr> <tr> <td>CLS</td> <td>0</td> <td>0.12</td> </tr> </tbody> </table>		Mobile	Desktop	LCP	1.1s	1.4s	INP	158ms	114ms	CLS	0	0.12	<table border="1"> <thead> <tr> <th></th> <th>Mobile</th> <th>Desktop</th> </tr> </thead> <tbody> <tr> <td>LCP</td> <td>1.6s</td> <td>1.6s</td> </tr> <tr> <td>INP</td> <td>159ms</td> <td>73ms</td> </tr> <tr> <td>CLS</td> <td>0.01</td> <td>0.04</td> </tr> </tbody> </table>		Mobile	Desktop	LCP	1.6s	1.6s	INP	159ms	73ms	CLS	0.01	0.04	<table border="1"> <thead> <tr> <th></th> <th>Mobile</th> <th>Desktop</th> </tr> </thead> <tbody> <tr> <td>LCP</td> <td>3.2s</td> <td>3.1s</td> </tr> <tr> <td>INP</td> <td>634ms</td> <td>165ms</td> </tr> <tr> <td>CLS</td> <td>0.07</td> <td>0.13</td> </tr> </tbody> </table>		Mobile	Desktop	LCP	3.2s	3.1s	INP	634ms	165ms	CLS	0.07	0.13
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Page size and request count	306.67	197.67	116.67																																				
Performance ranking (1st, 2nd, 3rd place)	2nd	3rd	1 <sup>st</sup>																																				

#### A. Performance Bottleneck Identification:

- 1) Unoptimized images : Images are large and not compressed which increases load time and network usage
- 2) Lack of caching: Browser redownloads files unnecessarily
- 3) Render-blocking resources: Multiple scripts and styles must load before content becomes active so delaying page render happens
- 4) Too many HTTP requests: High number of resource requests cause longer loading sequences

#### B. Concrete Optimization Recommendations:

- 1) Image Optimization: Step 1>Find heavy images, Step 2>Compress images, Step 3>Decrease width/height
- 2) Code Optimization: Step 1>Decrease code size , Step 2>Remove unused code
- 3) Caching Strategy: Step 1>Set cache headers/servers, Step 3>Register a service worker that caches key routes and assets
- 4) Critical Rendering Path: Step 1>Extract critical CSS, Step 2>Make JavaScript load later, Step 3>Load important files early
- 5) Content Delivery: Step 1>Turn on file compression, Step 2>Enable compression in hosting