



HUSTEF

HUNGARIAN SOFTWARE TESTING FORUM



Google Core Web Vitals: Mobilising and Testing Front-End Performance in Microservices



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JOHN LEWIS
PARTNERSHIP

Isabelle Cosar - Product Engineer/Quality Engineer

JOHN LEWIS

WAITROSE

Agenda

1

Introductions
to myself, my
company & its
operating model

2

The Google Core
Web Vitals (CWV),
key Front-End
Performance
metrics

3

Engaging and
mobilising service
teams with the
CWV

4

Example of
monitoring,
measuring and
testing the CWV



Who am I

French

Product Engineer / Quality Engineer (QE) at John Lewis Partnership - partner since 2019

25 years' experience in QE, mostly in London, UK. Focus on NFT

Led Non-Functional Testing in Financial Services

Moved into delivery 3 years ago, into a service team

Profile



Isabelle Cosar

Ed

Product Engineer - QE in Team Content (JL) - Lead #comm-testing and Champion #comm-browserstack & Percy

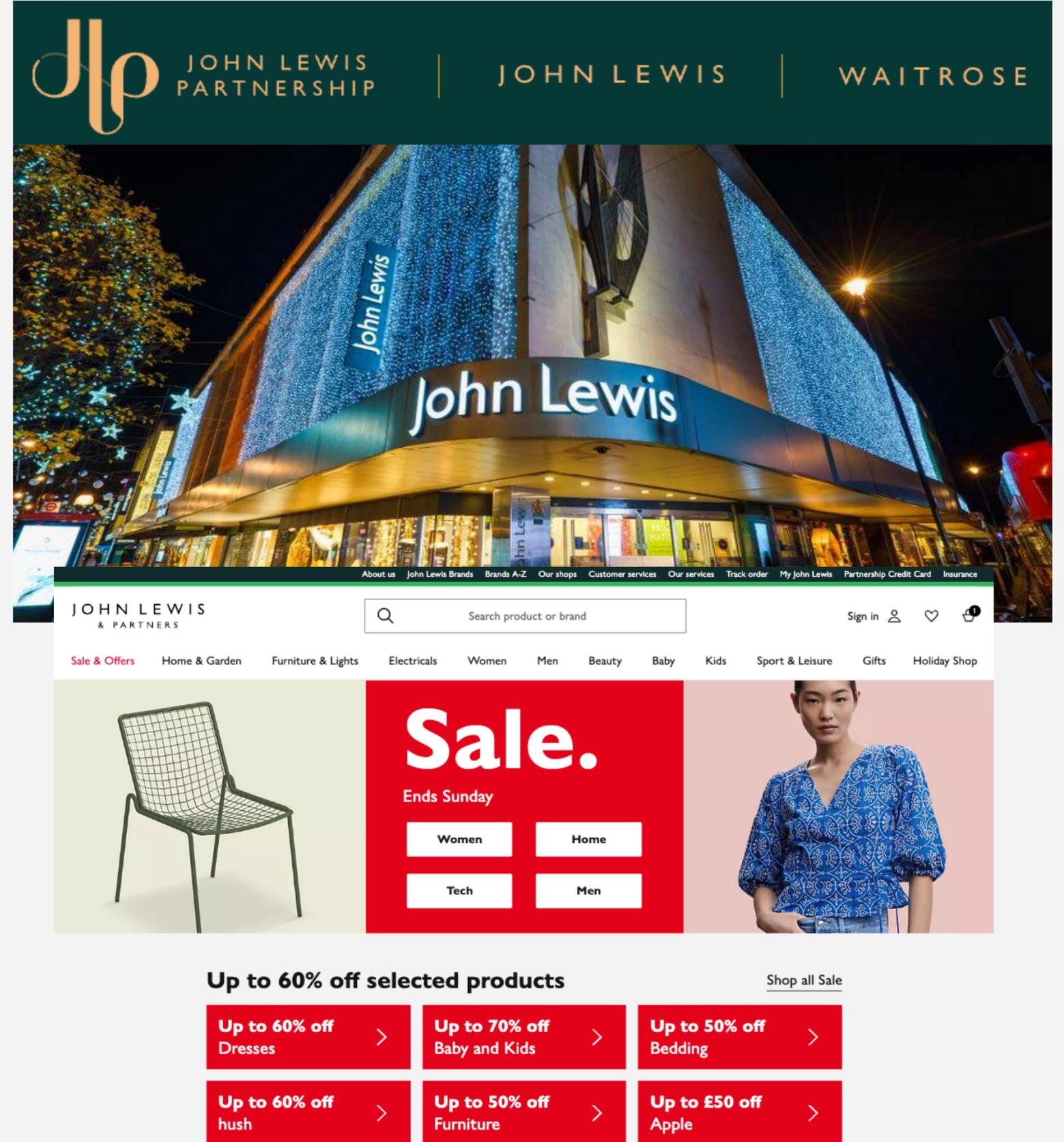
Izabel

<https://www.linkedin.com/in/isabelle-cosar/>

John Lewis

John Lewis is one of the largest British Department Store chain founded in 1864 and part of the John Lewis Partnership.

John Lewis has a modern custom-built e-commerce platform hosted on Google Cloud with a microservice based architecture and based on the **You Build It You Run It** operational model (DevOps).



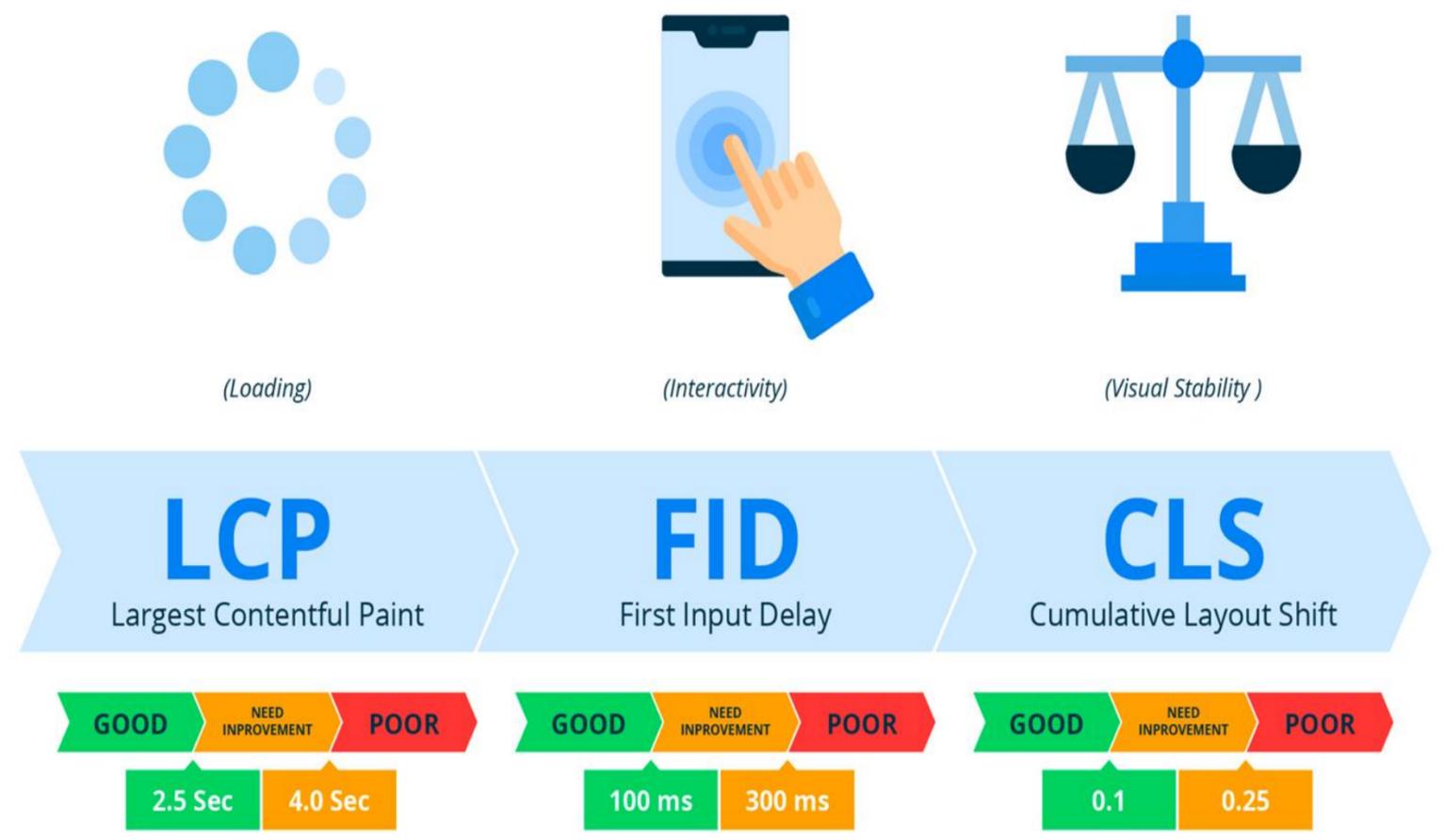
2 Google Core Web Vitals (CWV)



They are set of 3 specific page speed and user interaction measurements that have become **THE REFERENCE** to assess the loading speed, interactivity, and visual stability of a web page. The measurements evolve over time.

We use them as a standard to measure and improve our Front-end / Client-side Performance for our e-commerce website.

Core Web Vitals



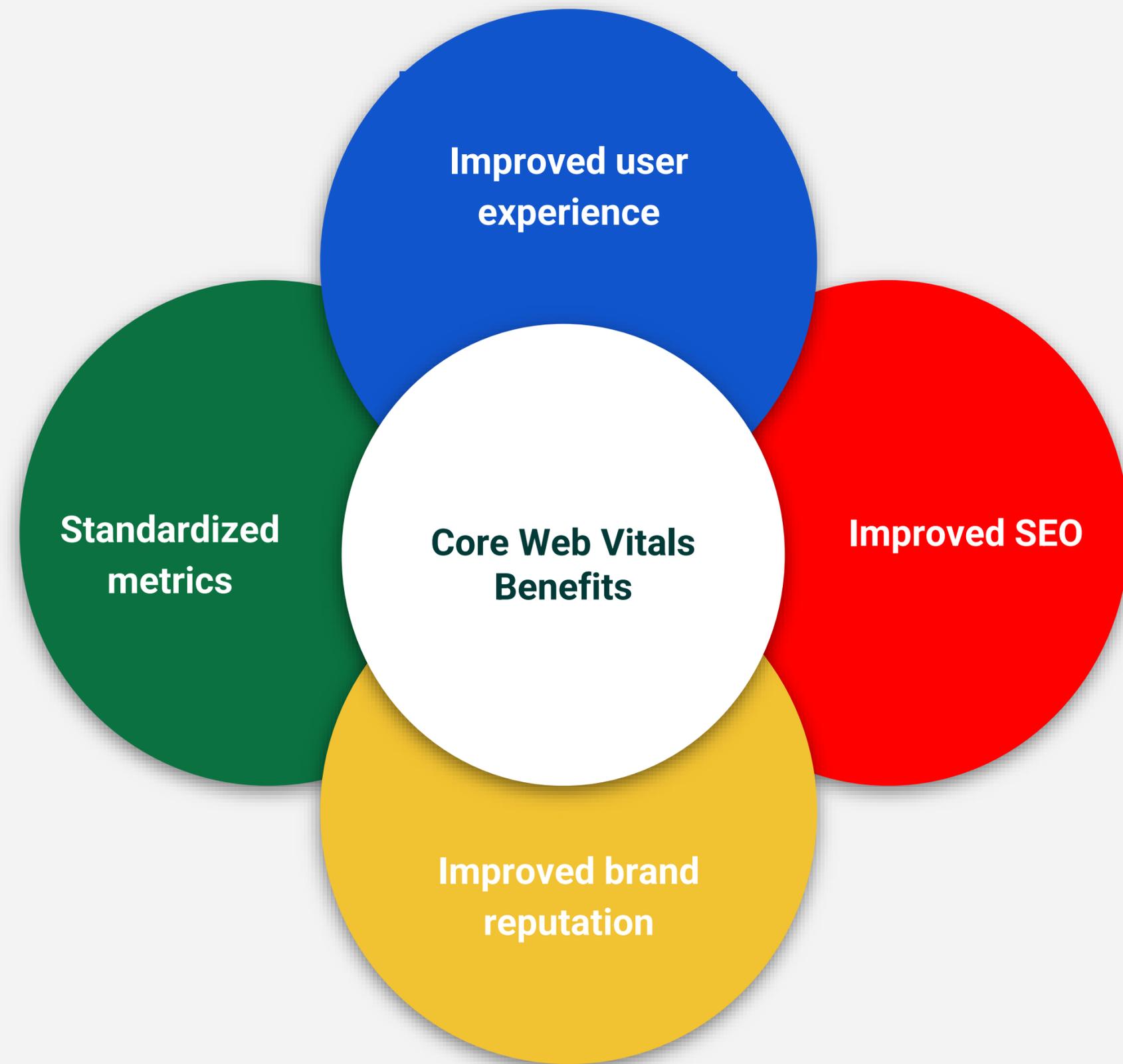
<https://web.dev/vitals/>
<https://web.dev/learn-core-web-vitals/>

2 The importance of CWV

Overall, optimizing for Core Web Vitals helps website owners improve the user experience, increase traffic and revenue, and stay ahead of the competition in search rankings.

We use them as a standard to measure and improve our Front-end / Client-side Performance for our e-commerce website.

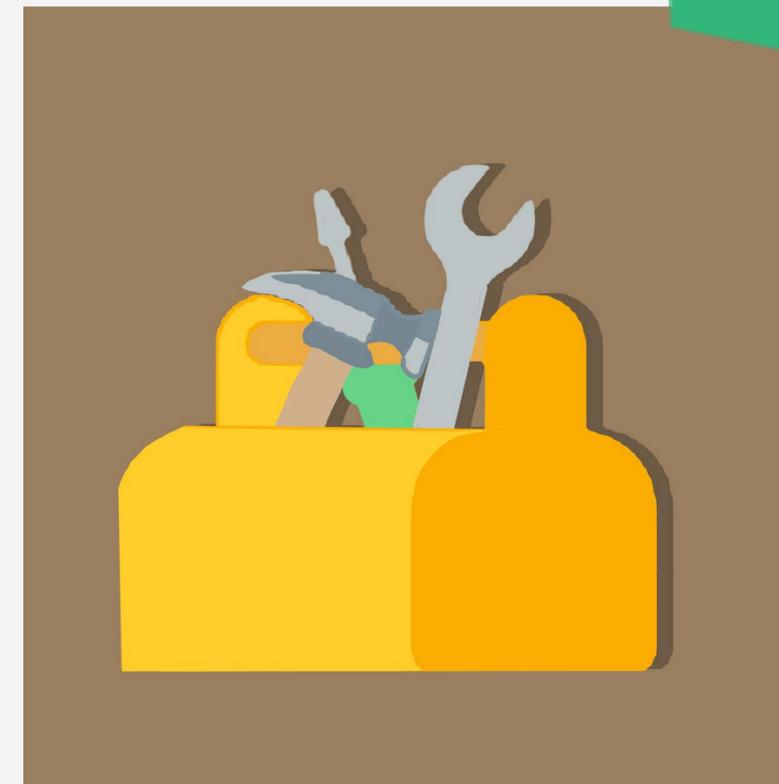
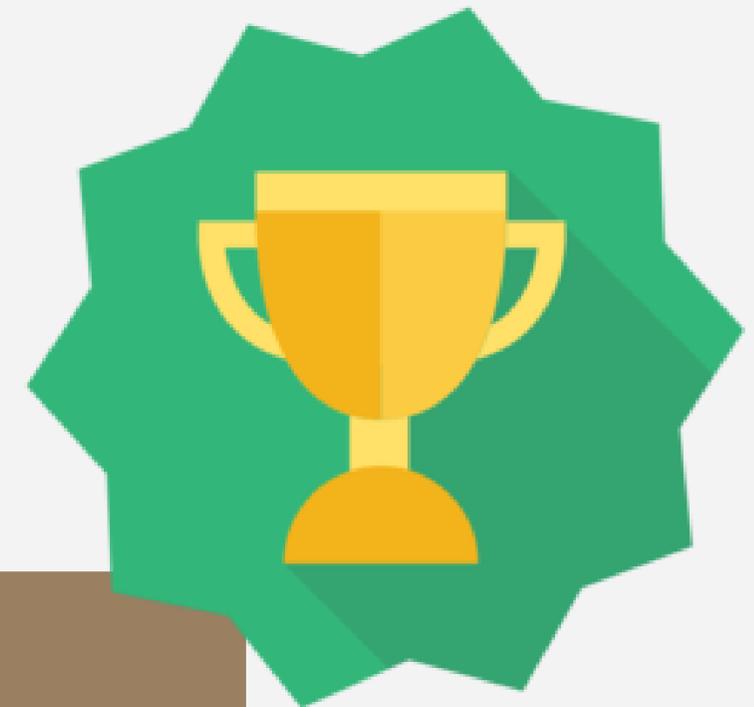
I will explain in part 3 and 4 how we measure the CWV at JLP.



3

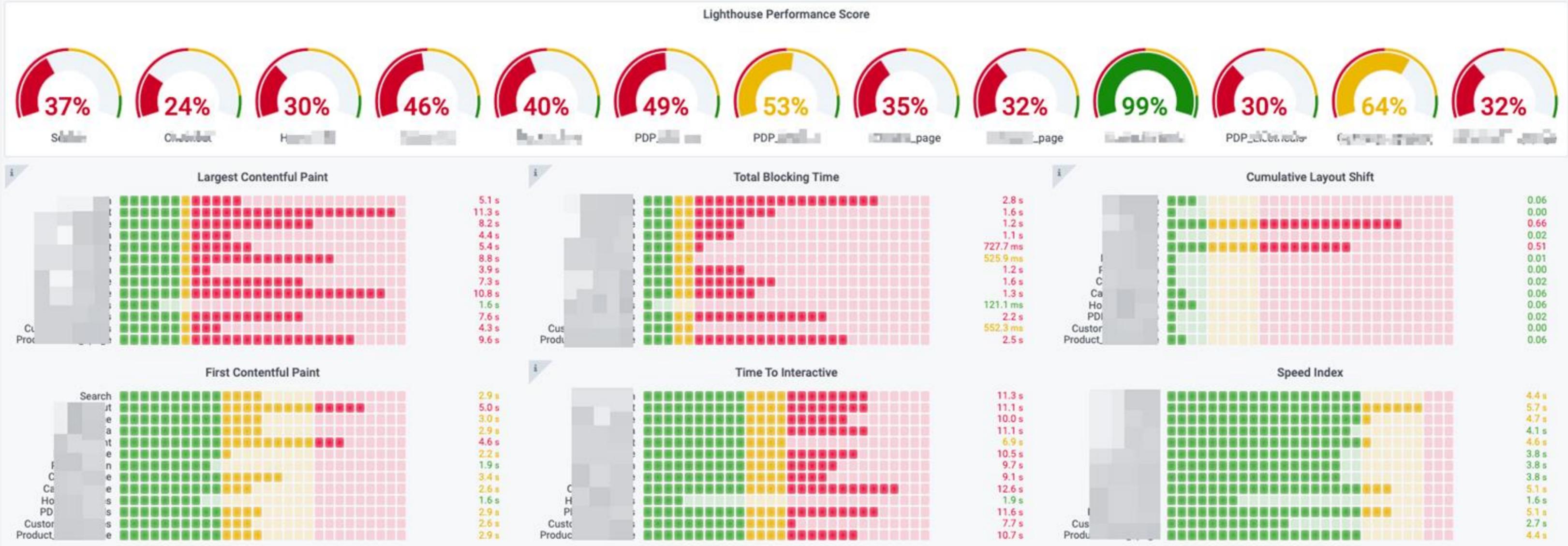
How our teams were engaged with CWV by the platform team

1. Communicating
2. Challenging
3. Supporting with custom tools to test and monitor



3

Challenging: FE Performance Leaderboard



3

Tooling

1. Sitespeed for testing (Initially)
2. WebPageTest for Testing & Monitoring
3. CWV Production Monitoring
4. Notifications of negative changes in each Microservice Slack channel

Sonic Performance Monitor APP 11:01

Hi team-, according to the [Chrome User Experience Report](#), 1 (100%) out of the 1 most popular urls for the Homepage [content-app (production)] pages is currently passing the Core Web Vitals assessment for mobile and 1 (100%) is passing for desktop.

For mobile, out of the 1 pages tested using [Page Speed Insights](#)...

- 1 page (100%) is passing the [LCP](#) audit (last week, 1 page was tested with 1 page / 100% passing).
- 1 page (100%) is passing the [FID](#) audit (last week, 1 page was tested with 1 page / 100% passing).
- 1 page (100%) is passing the [CLS](#) audit (last week, 1 page was tested with 1 page / 100% passing).

For desktop, out of the 1 pages tested using [Page Speed Insights](#)...

- 1 page (100%) is passing the [LCP](#) audit (last week, 1 page was tested with 1 page / 100% passing).
- 1 page (100%) is passing the [FID](#) audit (last week, 1 page was tested with 1 page / 100% passing).
- 1 page (100%) is passing the [CLS](#) audit (last week, 1 page was tested with 1 page / 100% passing).

More information about what pages were tested and the direction in which your Core Web Vitals metrics are trending can be found using this [Grafana dashboard](#) .

Sonic Performance Monitor APP 07:06

Hi #team-! Here's a summary of the [latest webpage test results](#) from `prod` for `content - Homepage`. There are 13 metrics that might have a problem, but these may critically influence CWV:

`cumulative_layout_shift`: 0.3 (28 day avg: 0.018, z-score: 4.2, change: 1561%).

content - Homepage (17 kB) ▾



5 replies Last reply 5 days ago



3

Key challenges faced & actions taken

1. Getting traction

2. Teams to get involved in a **continuous** way

3. The tooling had to evolve over time to be more adequate to the teams' WoW (Ways of Working) and to provide more accurate data.



4 Real life Example

Starting point: Production issue with CWV

- 1. Detection: Alerting
- 2. RCA: Observability & temporary workaround
- 3. Fixing, Testing & Redeploying

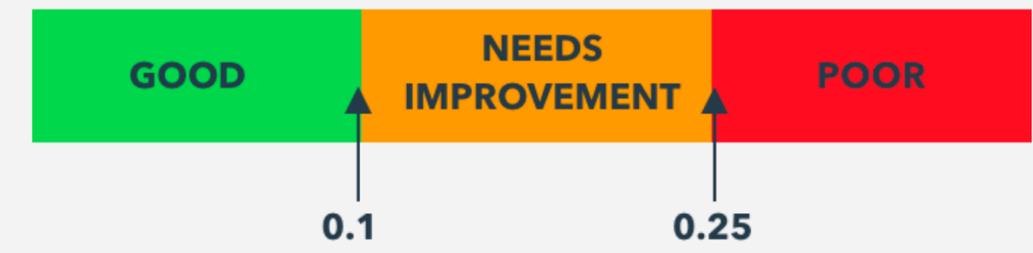
The Homepage



Cumulative Layout Shift
0.302

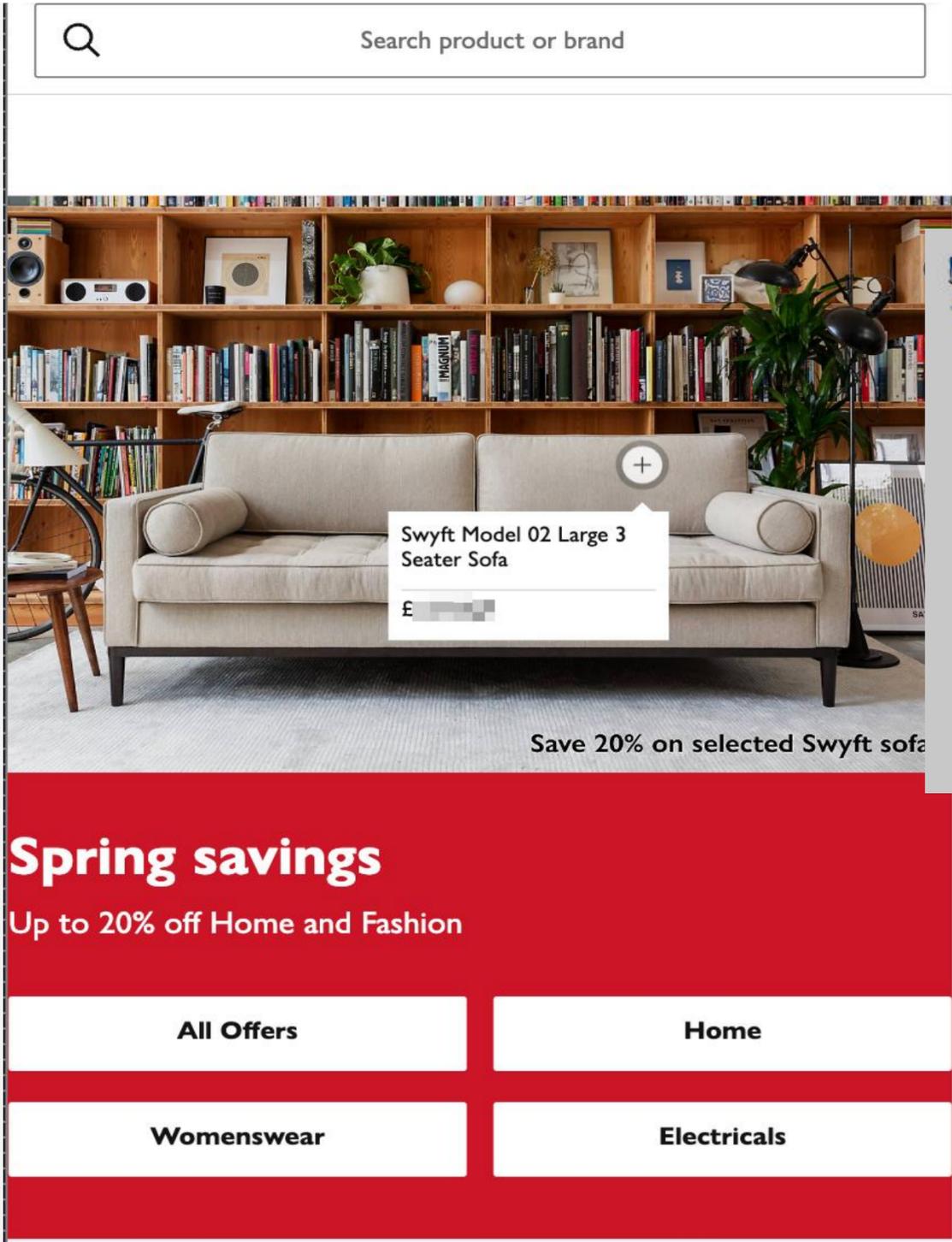
(Visual Stability)
CLS

Cumulative Layout Shift



Detection

Starting point: Production CWV issue on the HomePage



Alert generated in Slack by the WebPageTest tool from the platform team

Sonic Performance Monitor APP 07:06

Hi #team [redacted] Here's a summary of the [latest webpagetest results](#) from `prod` for `content - Homepage`. There are 13 metrics that might have critically influence CWV:

cumulative_layout_shift: 0.3 (28 day avg: 0.018, z-score: 4.2 **change: 1561%**).

content - Homepage (17 kB)

5 replies Last reply 5 days ago

4

Alert in our service alert channel in Slack

Alert generated in Slack by the WebPageTest tool from the platform team

svc-content

4 replies Last reply

April

Sonic Performance Monitor APP 07:06

Hi #team-! Here's a summary of the [latest webpagetest results](#) from `prod` for `content - Homepage`. There are 13 metrics that might have a problem, but these may critically influence CWV:

`cumulative_layout_shift`: 0.3 (28 day avg: 0.018, z-score: 4.2, change: 1561%).

content - Homepage (17 kB)

Page load timings

6 s
4 s
2 s
0 ms

26/03 28/03 30/03 01/04

— ttfb — fcp — lcp — dcl — fully_loaded

5 replies Last reply

Thread # svc-content

score: 4.2, change: 1561%).

content - Homepage (17 kB)

Page load timings

6 s
4 s
2 s
0 ms

26/03 28/03 30/03 01/04

— ttfb — fcp — lcp — dcl — fully_loaded

5 replies

Sonic Performance Monitor APP 5 months ago

Something seems to be wrong with these metrics. There may be a problem, please take a look?

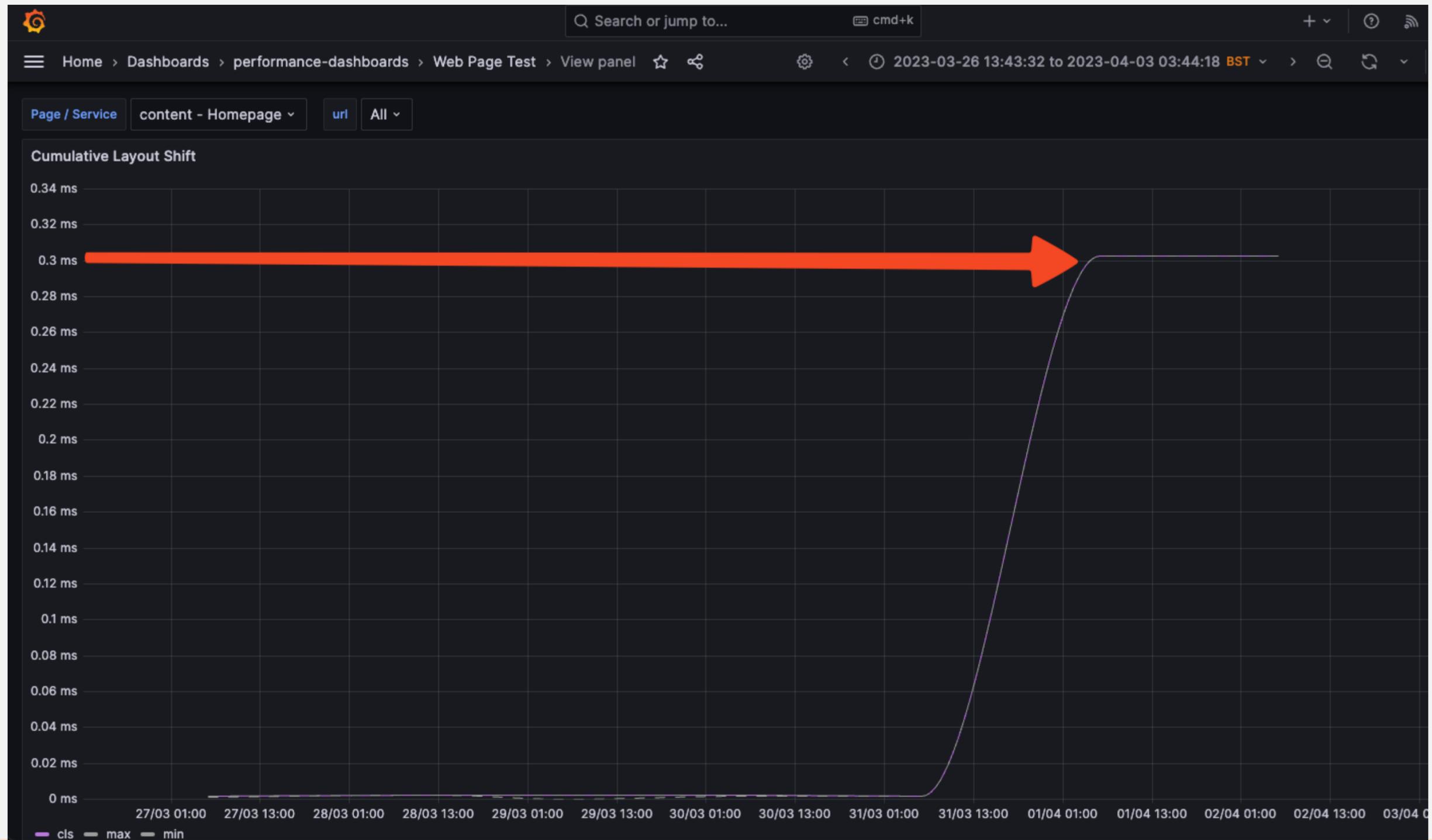
`cumulative_layout_shift`: 0.3 (28 day avg: 0.018, z-score: 4.2, change: 1561%).



**+1561% increase in the CLS !!
Score: 0.3**

4

I double checked on the WebPageTest tool dashboard



4

I checked for more details in the WebPageTest tool provided by the platform team

URL: <https://www.johnlewis.com/> DATE: 02/04/2023, 06:12:58

Webpage Performance Test Result

content - Homepage SETTINGS: PIXEL2 v107 Test Location More Share

View: **Details** Tools: Export Re-Run Test



Requests Details

Use this page to explore the metric timings and request waterfall for any run of your test.

Observed Metrics (Run number 4)

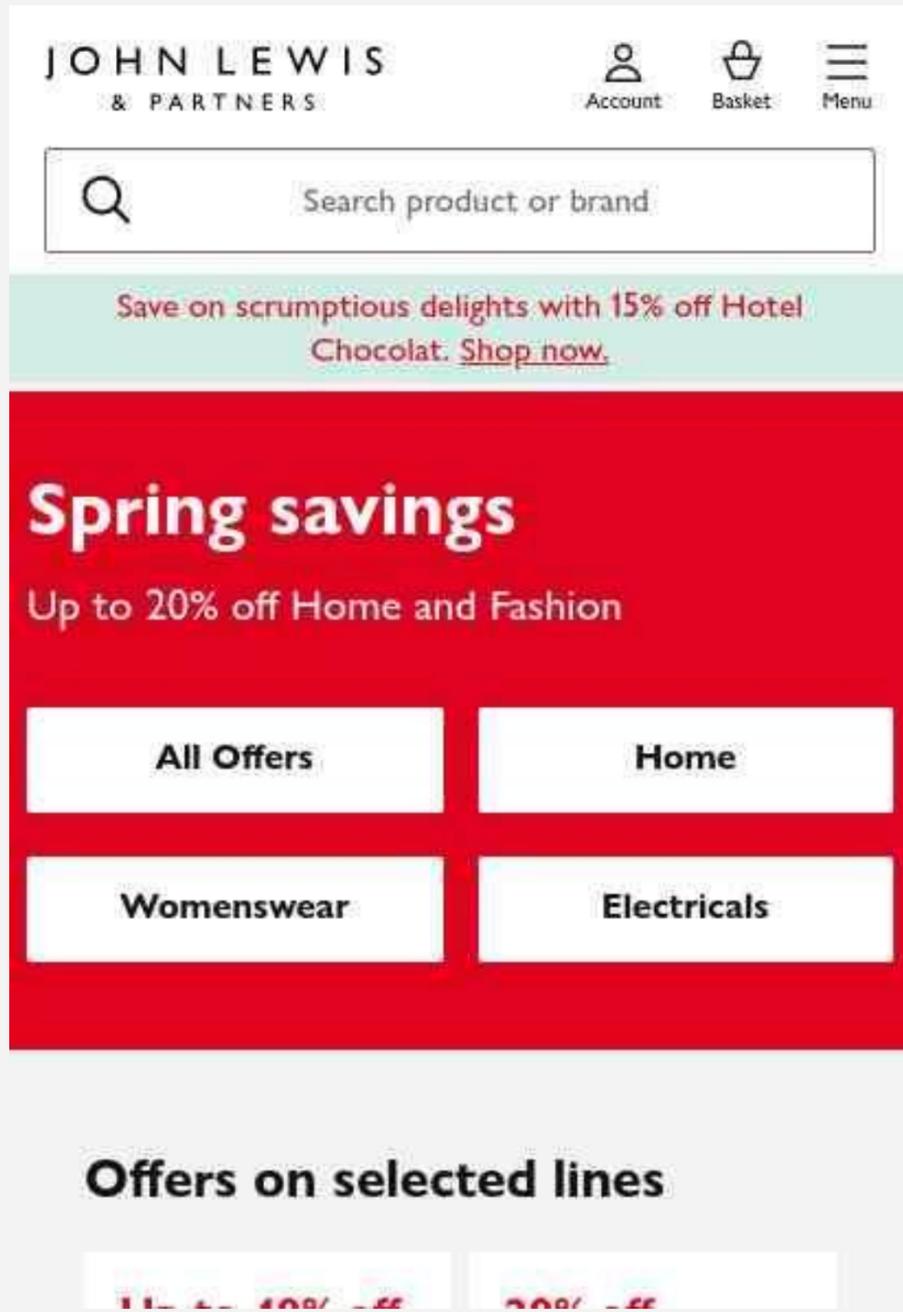
View run details: [Run 1 \(Repeat View\)](#), [Run 2 \(Repeat View\)](#), [Run 3 \(Repeat View\)](#), [Run 4 \(Repeat View\)](#), [Run 5 \(Repeat View\)](#)

FIRST VIEW ([RUN 4](#))

First Byte	Start Render	FCP	Speed Index	LCP	CLS	TBT	DC Time	DC Requests	DC Bytes	Time	Requests	Total Bytes
.192s	.500s	.510s	.898s	1.171s	.302	≥ .550s	4.387s	256	4,327 KB	5.346s	279	4,428 KB

4

I ran some manual visual check in the HomePage



47% loaded



100% loaded

4 I got confirmation with Lighthouse from the Dev tools (Chrome/Edge)

The screenshot displays the Chrome DevTools interface with the Lighthouse performance report open. The page being tested is a website featuring a sofa advertisement. The Lighthouse report shows a performance score of 21. The metrics section lists several performance indicators:

- First Contentful Paint: 1.5 s
- Total Blocking Time: 3,100 ms
- Largest Contentful Paint: 11.6 s
- Cumulative Layout Shift: 0.312

The 'Cumulative Layout Shift' metric is highlighted with a red box, and a red arrow points to it from the right side of the report.

4

I got more details on the RCA from Lighthouse

The image shows a Lighthouse audit report for 'Avoid large layout shifts'. On the left, a screenshot of a website features a sofa and a 'Spring savings' banner. A tooltip identifies a block: `div.cms-grid-col--d40e4.aem-kit-col.cms-grid-col-md-7--d2994.undefined.cms-grid-md...` with dimensions 540 x 300. An annotation 'The block responsible for the shift' points to this block. Below the banner, four buttons ('All Offers', 'Home', 'Womenswear', 'Electricals') are shown shifting. An annotation 'The shifting blocks' points to these buttons. On the right, the Lighthouse interface shows the 'Avoid large layout shifts' audit with 5 elements found. A table lists the top contributors to CLS:

Element	CLS Contribution
<code>div.cms-grid-col--d40e4.aem-kit-col.cms-grid-col-md-7--d2994.undefined.cms-grid-md-hide--9ca17.cms-grid-col-lg-6--64a64.cms-grid-lg-hide--fa93a.container-containerComponent--69aa2.container-makeClassStronger--e9539.cms-grid-disable-gutters--280f6</code>	0.161
<code>div.cms-grid-col--d40e4.aem-kit-col...<div class="cms-grid-col--d40e4 aem-kit-col cms-grid-col-md-7--d2994 undefined cms-gri..." data-test="container"></code>	0.149

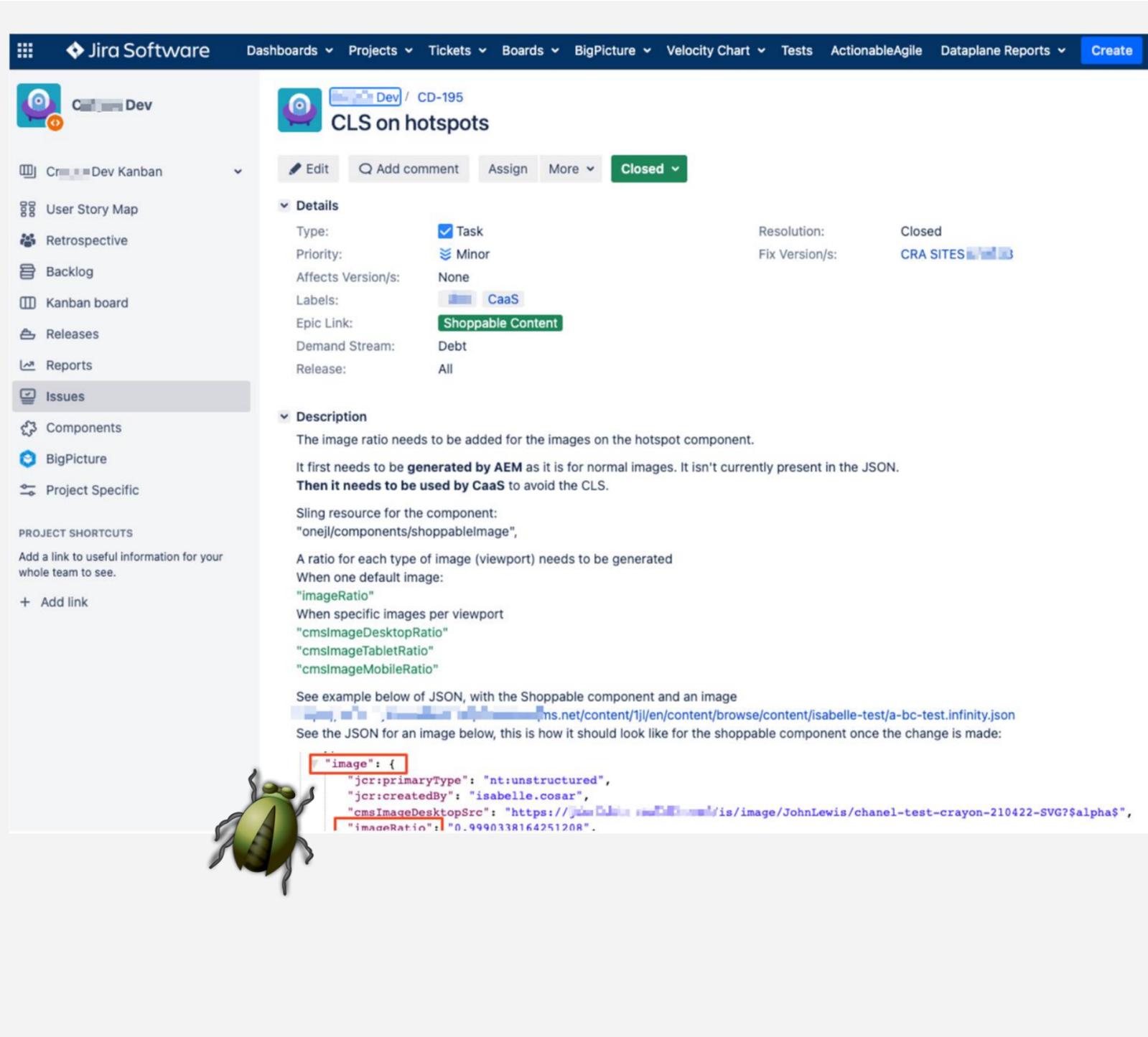
The 'CLS Contribution' column is highlighted with a red box. The 'Show audits relevant to:' filter is set to 'CLS'.

4

I discussed with my team then raised a bug ticket

Problem & fix: the image wasn't passing its ratio to the browser

- Passing the image ratio/size to the browser helps improve CLS by providing the browser with advance knowledge of the image's aspect ratio before it finishes loading
- Allocation of Space: When the browser knows the size of the image in advance & it can allocate the necessary space for the image while the page is loading. By reserving the appropriate space, the browser ensures that other elements on the page are not displaced when the image finally loads.



The screenshot shows a Jira Software interface for a bug ticket titled "CLS on hotspots" (ID: CD-195). The ticket is in a "Closed" state. The details section shows it is a "Task" with a "Minor" priority, labeled "CaaS", and associated with the "Shoppable Content" epic link. The description explains that the image ratio needs to be added to the JSON for the hotspot component, generated by AEM, and used by CaaS to avoid CLS. It provides a Sling resource path and lists the required JSON fields: "imageRatio", "cmsImageDesktopRatio", "cmsImageTabletRatio", and "cmsImageMobileRatio". A code snippet shows the JSON structure with "imageRatio" highlighted in red. A green beetle icon is overlaid on the bottom right of the screenshot.

4 The Hero got immediately replaced by a standard image component passing its ratio to the browser

Thread

Lottie Beadle 3 days ago
@A... @... - please can you remove the hotspot from the hero banner (I think it's only on mobile at the moment), we believe it's causing huge CLS issues. @Isabelle Cosar FYI

11 replies

A... 3 days ago
Hey @Lottie B... Ah I see. Sure. I wanted to check with Isabelle about the current CLS issue. Removing the Hotspot now

Isabelle Cosar 3 days ago
From Desktop & tablet too please @A... (edited)

Isabelle Cosar 3 days ago
And the hotspot wasn't working on desktop as the URL also needed to be repeated on the desktop tab btw @A...

A... 3 days ago
Sure I will. Oh I see! I wasn't aware. Thanks for letting me know

Isabelle Cosar 3 days ago
No worries and you are right @A... the shoppable component was causing the high CLS as we have not implemented the image ratio for it as we have for most of the other images component. This means the browser doesn't know the size of that component before loading it and can't reserve the space for it before loading...

URL: <https://www.johnlewis.com/> DATE: 04/04/2023, 06:14:25

Webpage Performance Test Result

content - Homepage SETTINGS: PIXEL2 v107 Test Location More Share

View: Details Tools: Export Re-Run Test

Requests Details

Use this page to explore the metric timings and request waterfall for any run of your test.

Observed Metrics (Run number 2)

View run details: [Run 1 \(Repeat View\)](#), [Run 2 \(Repeat View\)](#), [Run 3 \(Repeat View\)](#), [Run 4 \(Repeat View\)](#), [Run 5 \(Repeat View\)](#)

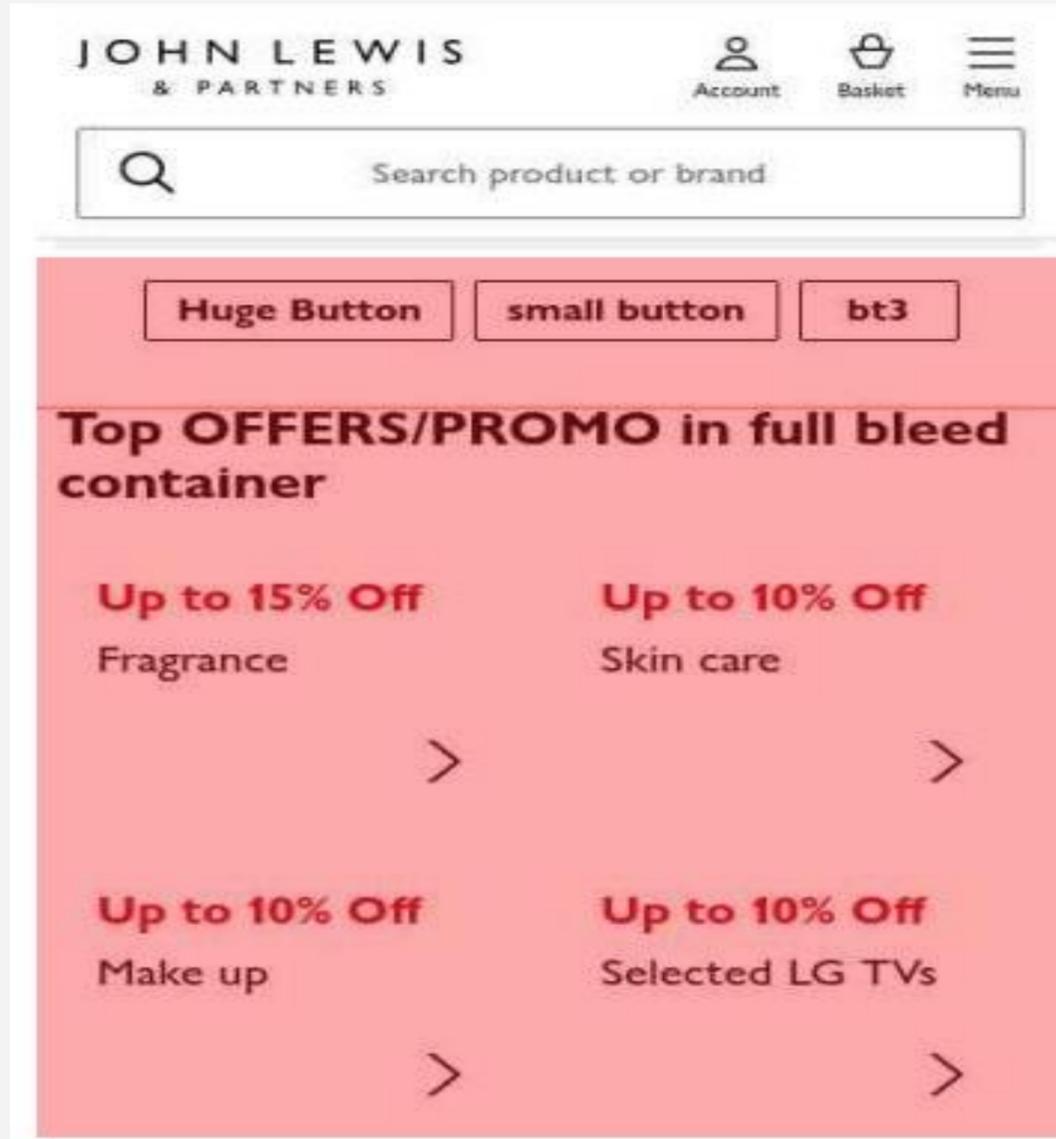
FIRST VIEW (RUN 2)

First Byte	Start Render	FCP	Speed Index	LCP	CLS	TBT	DC Time	DC Requests	DC Bytes	Time	Requests	Total Bytes
.208s	.500s	.494s	.765s	.811s	.001	≥ .480s	3.822s	257	4,311 KB	4.479s	279	4,413 KB

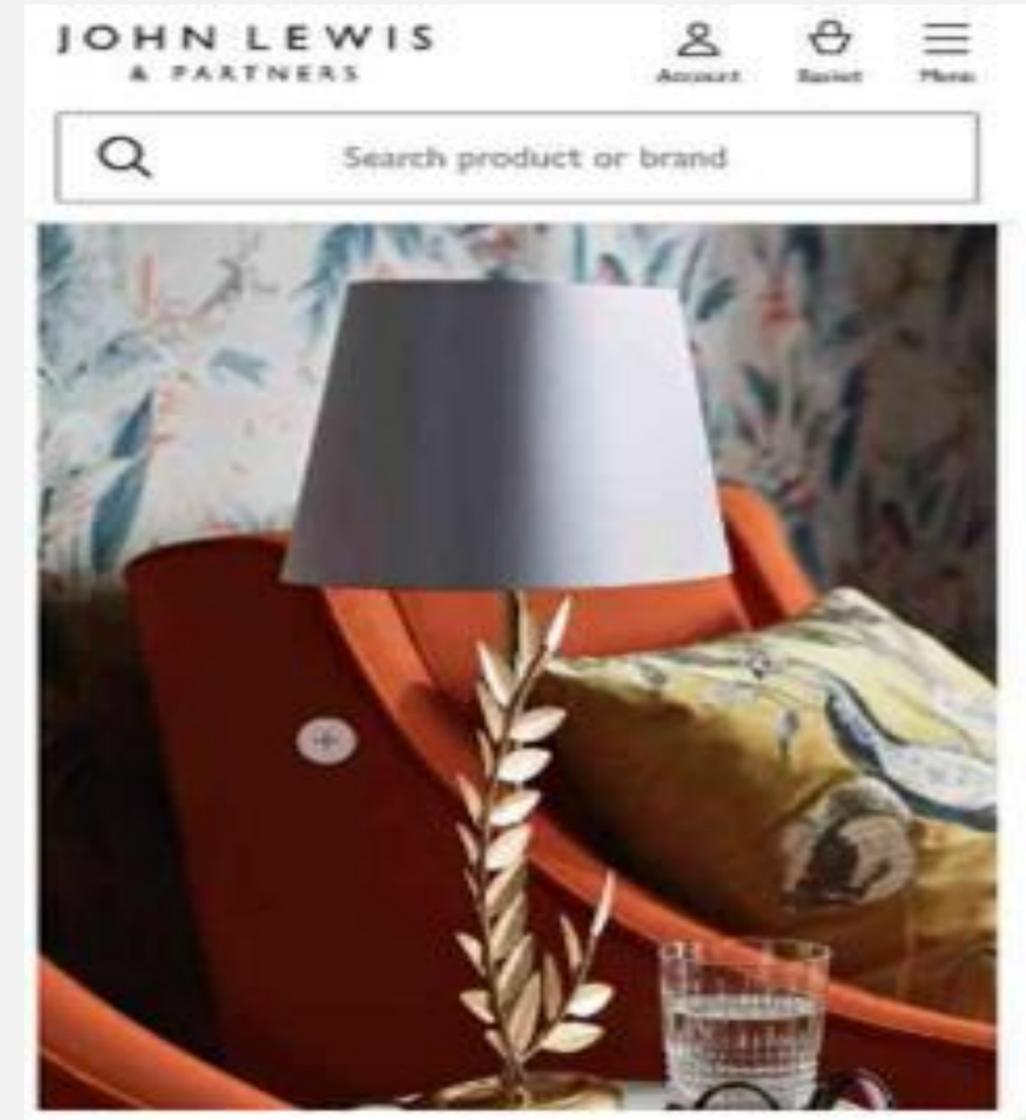


4

I created a baseline test page in our test environment, monitored by WebPageTest



47% loaded



100% loaded

.....

4

A fix was deployed in the test environment and the CLS disappeared. CLS score = 0!!



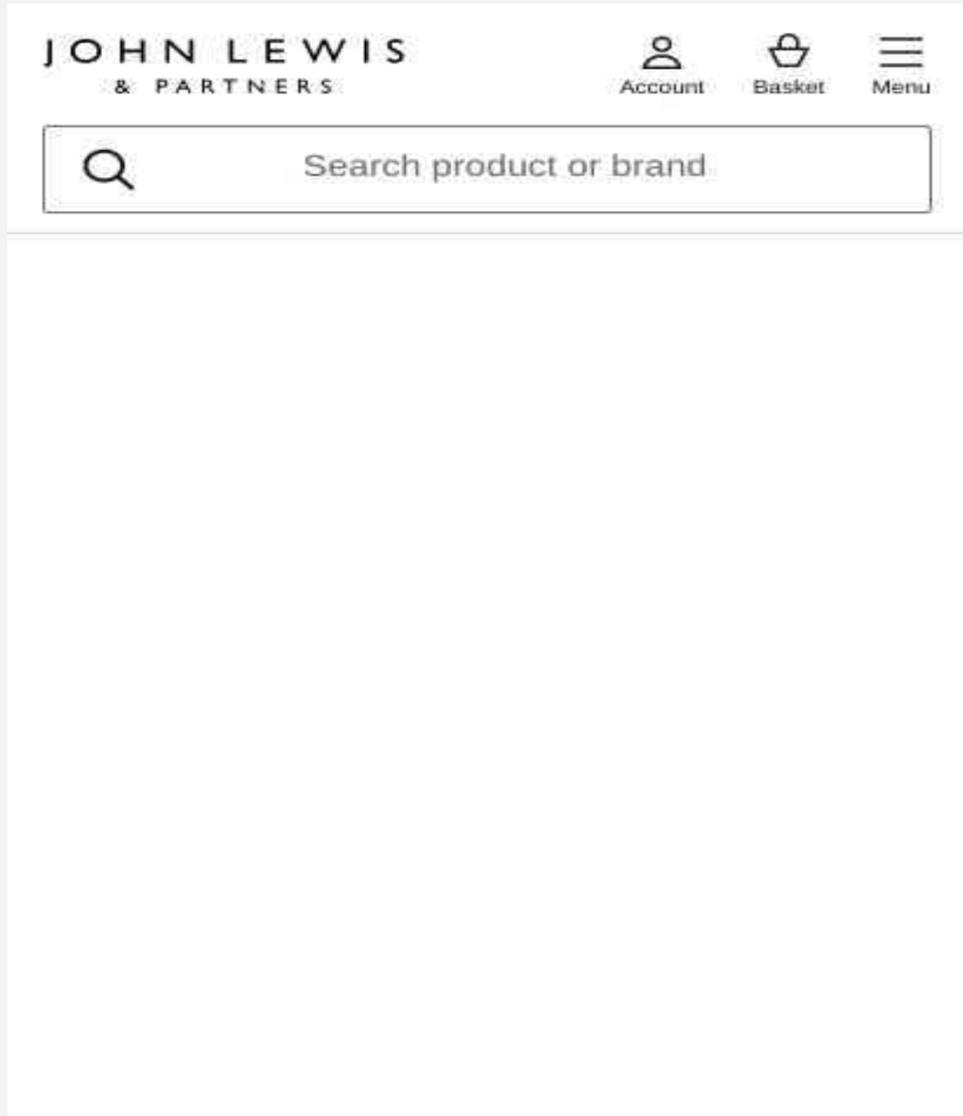
Baseline test page deployed in test on 10/5

Fix deployed in test on 16/5

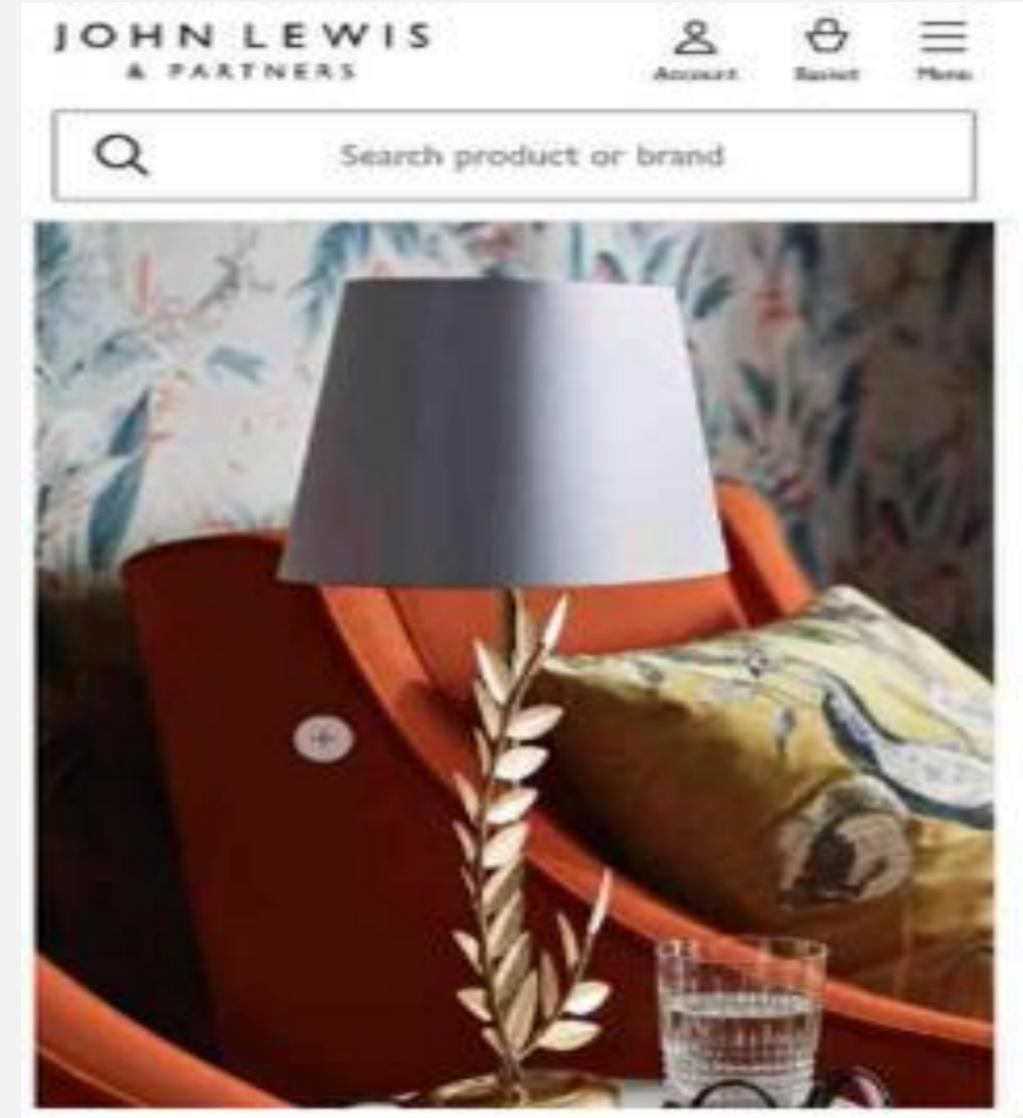


4

Now the page first loads a blank space quickly replaced by the hotspot component and not causing any shift in the page



47% loaded



100% loaded

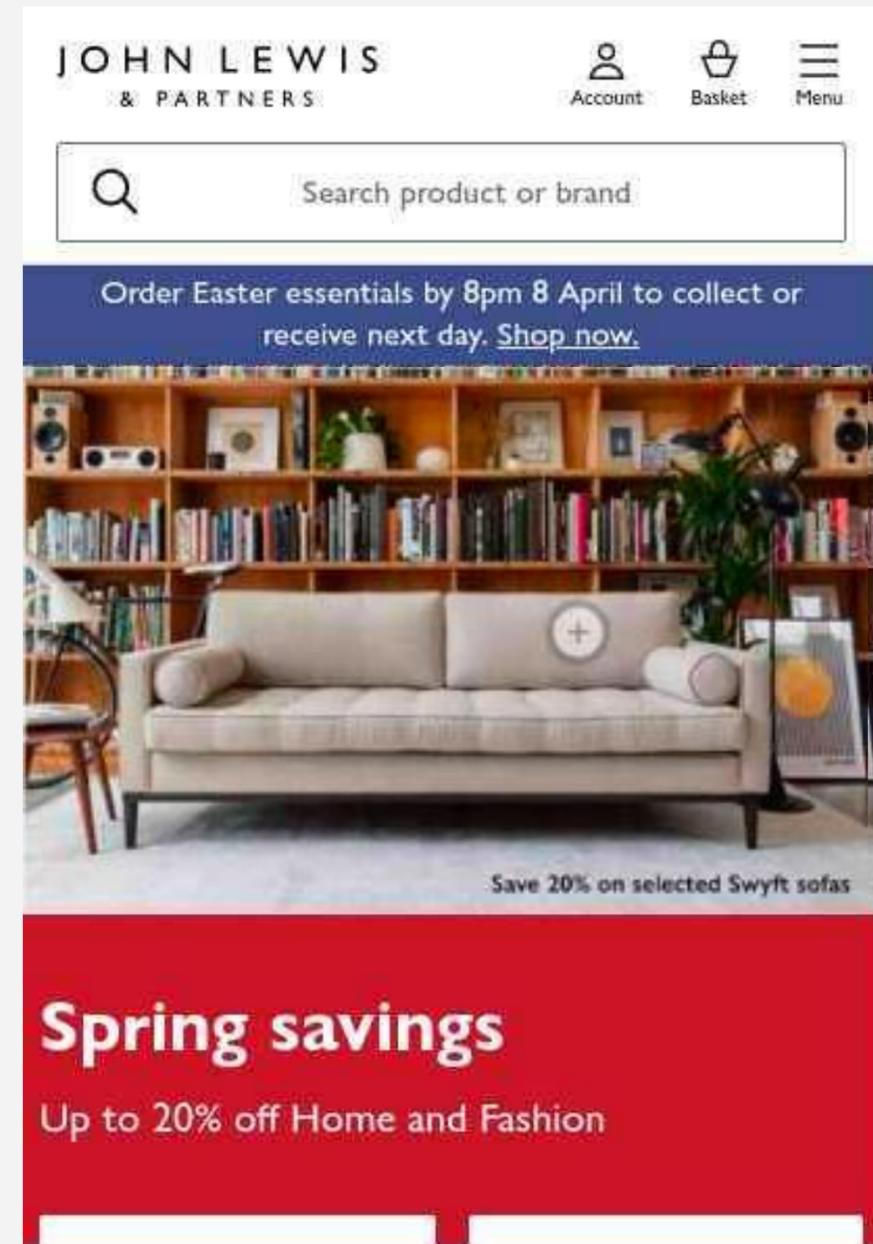
.....

4

And this is what it did on the HomePage in Production



47% loaded



100% loaded

.....

4

Confirmed by testing in production with a Web Vitals Chrome extension/plugin



The screenshot displays a Chrome browser window with a website and a Web Vitals extension overlay. The website shows a search bar and a product image of a sofa. The extension overlay, titled 'Metrics', shows the following data:

Metric	Value	Status
Largest Contentful Paint	2.391s	Good
Cumulative Layout Shift	0.000	Good
First Input Delay	Waiting for input...	Pending
Interaction to Next Paint	Waiting for input...	Pending
First Contentful Paint	2.359s	Needs Improvement
Time to First Byte	2.093s	Poor

The Chrome console shows the following logs for the Web Vitals Extension:

- [Web Vitals Extension] LCP 2391 ms (good)
- [Web Vitals Extension] FCP 2359 ms (needs-improvement)
- [Web Vitals Extension] TTFB 2093 ms (poor)
- [Web Vitals Extension] CLS 0.00 (good)

Confirmed by the WebPageTest tool



Observed Metrics (Run number 2)

View run details: [Run 1 \(Repeat View\)](#), [Run 2 \(Repeat View\)](#), [Run 3 \(Repeat View\)](#), [Run 4 \(Repeat View\)](#), [Run 5 \(Repeat View\)](#)

FIRST VIEW ([RUN 2](#))

First Byte	Start Render	FCP	Speed Index	LCP	CLS	TBT	DC Time	DC Requests	DC Bytes	Time	Requests	Total Bytes
.208s	.500s	.494s	.765s	.811s	.001	≥ .480s	3.822s	257	4,311 KB	4.479s	279	4,413 KB

Visual Page Loading Process ([Explore](#))



Bootstrap_start	snaptr	generated-content-percent	generated-content-size	domInteractive	domContentLoaded	loadEvent
0.312s	2.575s	1.080	8.510	1.097s	1.589s - 1.594s (0.005s)	3.811s - 3.881s (0.070s)

Amy
Questions