

Brian Louis Ramirez – `performance.sync()` in Amsterdam – 2024-11-13

Needle(s) in the Haystack(s)

Working Together to Find Performance Problems Using RUM





ABShop

Tests

Products



Cotton keeps you cool in the summer



New prints for the season

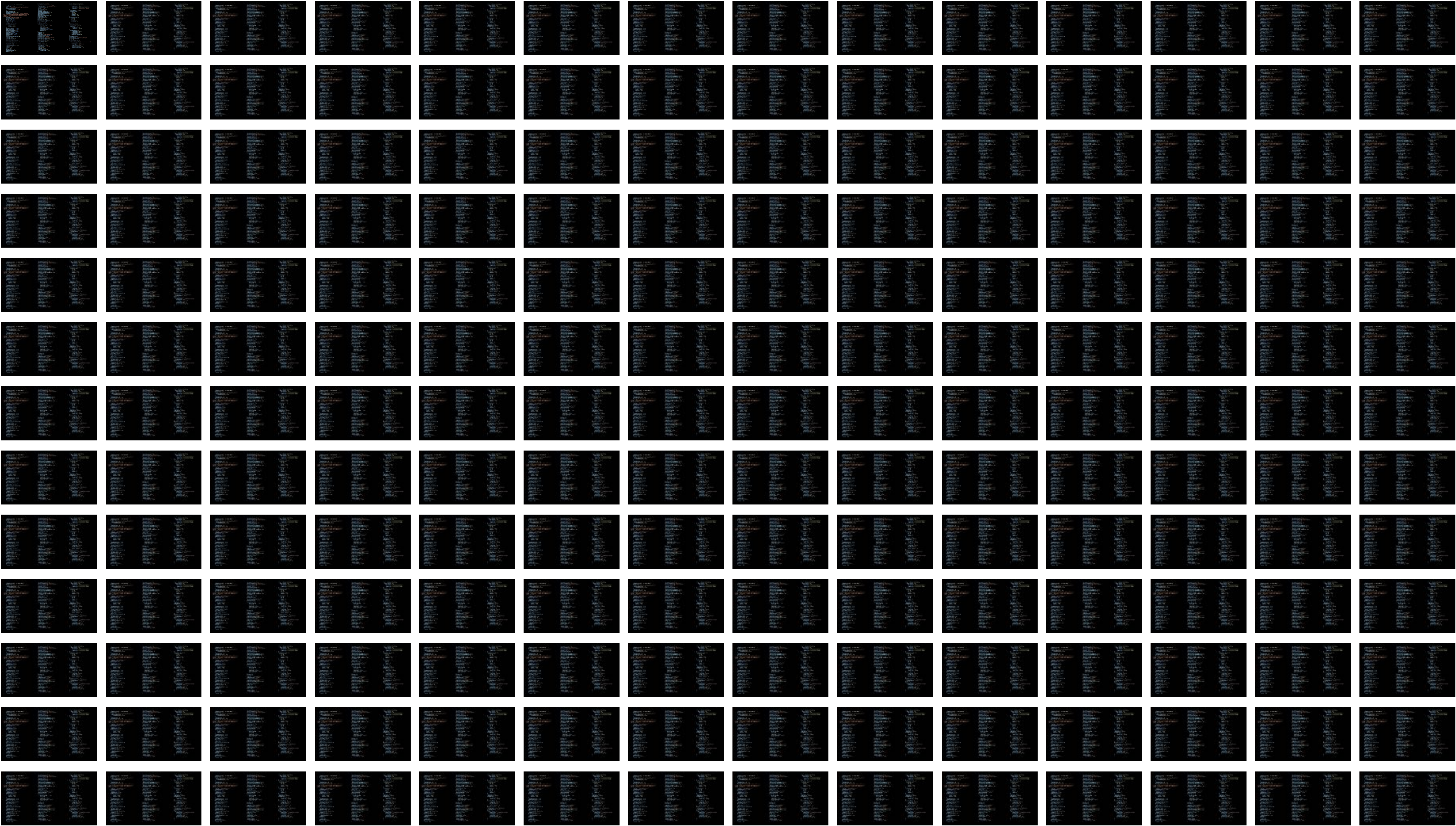


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  "navigationStart": 1730814750295,
  "testGroup": "A",
  "piId": "9ShK1JgenvWAncaSlq7qgnTkboCEHSgY",
  "customPiDimensions": {
    "isPreRendered": "true"
  },
  "sessionIndex": 0,
  "snippetExecution": 283,
  "userAgent": "Mozilla/5.0 (Linux; Android
8.0.0; SM-G955U Build/R16NW) AppleWebKit/537.36
(KHTML, like Gecko) Chrome/116.0.0.0 Mobile
Safari/537.36",
  "testId": "100vs0_2024_09_24",
  "responseSource": "Edge",
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  "disabled": false,
  "swSupported": true,
  "skSupported": true,
  "screenResolution": {
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    "height": 2960
  },
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  "pageTypeEnabled": true,
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  "inIFrame": false,
  "supportsTouch": true,
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  "unload": 113,
  "unloadDuration": 0,
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  "domainLookupDuration": 0,
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  "events": [],
  "variation": "mobile",
  "applicationState": "running",
  "responseCause": "ReloadCacheMode",
  "cdnBackendTime": 6,
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  "hhFetchEvent": 5,
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  "redirectList": [],
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    "saveData": false,
    "slowConnection": false,
    "protocol": ""
  },
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  "ramInfo": 8,
  "pageType": "pdp:PageValue",
  "lowBatteryInfo": false,
  "assetSource": "Edge",
  "assetCause": "ReloadCacheMode",
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  "domInteractive": 924,
  "originTTFB": 745,
  "load": 2173,
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  "domComplete": 2172,
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  "lcpType": 255,
  "lcpAttribution": {
    "renderDelay": 3361
  },
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  "clsAttribution": {
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    "loadState": "dom-content-loaded"
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  "lClsElement": {...},
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    "width": 720,
    "height": 1296
  },
  "lClsShiftCur": {
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    "y": 0,
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    "height": 0
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  "domCssRules": 22771,
  "pageWeight": {
    "navigation": 0,
    "resources": 419760
  },
  "incidentData": {
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    "clickCount": 1,
    "lastScrollY": 0,
    "maxScrollDepth": 0
  },
  "hostResources": {...},
  "unloadType": "visibilityChange",
  "clickedElements": [...],
  "inp": 64,
  "inpAttribution": {
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    "eventTime": 6873,
    "eventType": "pointer",
    "inputDelay": 11,
    "processingTime": 19,
    "presentationDelay": 33
  }
}
```

```
{
  "navigationStart": 1730814750295,
  "testGroup": "A",
  "piId": "9ShK1JgenvWAncaSlq7qgnTkboCEHSgY",
  "customPiDimensions": {
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  "sessionIndex": 0,
  "snippetExecution": 283,
  "userAgent": "Mozilla/5.0 (Linux; Android
8.0.0; SM-G955U Build/R16NW) AppleWebKit/537.36
(KHTML, like Gecko) Chrome/116.0.0.0 Mobile
Safari/537.36",
  "testId": "100vs0_2024_09_24",
  "responseSource": "Edge",
  "firstLoad": false,
  "disabled": false,
  "swSupported": true,
  "skSupported": true,
  "screenResolution": {
    "width": 1440,
    "height": 2960
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  "documentVisible": true,
  "pageTypeEnabled": true,
  "devicePixelRatio": 4,
  "inControlGroup": false,
  "inIFrame": false,
  "supportsTouch": true,
  "prerendered": false,
  "split": 1,
  "secureConnectDuration": 0,
  "unload": 113,
  "unloadDuration": 0,
  "domainLookup": 4,
  "domainLookupDuration": 0,
  "connect": 4,
  "connectDuration": 0,
  "response": 46,
  "responseDuration": 134,
  "request": 4,
  "fetch": 4,
  "ttfb": 46,
  "workerStart": 3,
  "navigationType": 0,
  "events": [],

  "variation": "mobile",
  "applicationState": "running",
  "responseCause": "ReloadCacheMode",
  "cdnBackendTime": 6,
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  "hhBlacklistHandler": 5,
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  "assetTTFB": 40,
  "redirectList": [],
  "fcp": 374,
  "firstPaint": 374,
  "firstContentfulPaint": 374,
  "resourceTimings": [...],
  "noIndex": false,
  "networkInfo": {
    "effectiveType": "4g",
    "rtt": 50,
    "downlink": 10,
    "saveData": false,
    "slowConnection": false,
    "protocol": ""
  },
  "cpuInfo": 8,
  "ramInfo": 8,
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  "lowBatteryInfo": false,
  "assetSource": "Edge",
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  "domContentLoaded": 994,
  "domContentLoadedDuration": 139,
  "domInteractive": 924,
  "originTTFB": 745,
  "load": 2173,
  "loadDuration": 2,
  "domComplete": 2172,
  "lcpCandidates": [...],
  "lcp": 3408,
  "lcpType": 255,
  "lcpAttribution": {
    "renderDelay": 3361
  },

  "cls": 0.9126544913493255,
  "clsAttribution": {
    "shiftTime": 1184,
    "shiftValue": 0.8756756756756757,
    "loadState": "dom-content-loaded"
  },
  "lClsElement": {...},
  "lClsShiftPrev": {
    "x": 0,
    "y": 184,
    "width": 720,
    "height": 1296
  },
  "lClsShiftCur": {
    "x": 0,
    "y": 0,
    "width": 0,
    "height": 0
  },
  "domSize": 3648,
  "domCssRules": 22771,
  "pageWeight": {
    "navigation": 0,
    "resources": 419760
  },
  "incidentData": {
    "timeOnPage": 8215,
    "clickCount": 1,
    "lastScrollY": 0,
    "maxScrollDepth": 0
  },
  "hostResources": {...},
  "unloadType": "visibilityChange",
  "clickedElements": [...],
  "inp": 64,
  "inpAttribution": {
    "eventTarget": "#usercentrics-root",
    "eventTime": 6873,
    "eventType": "pointer",
    "inputDelay": 11,
    "processingTime": 19,
    "presentationDelay": 33
  }
}
```





A needle in a haystack

idiom

Something that is impossible or extremely difficult to find, especially because the area you have to search is too large



Brian Louis Ramirez
Web Performance Engineer



carhartt.
WORK IN PROGRESS

BEFORE SPEED KIT

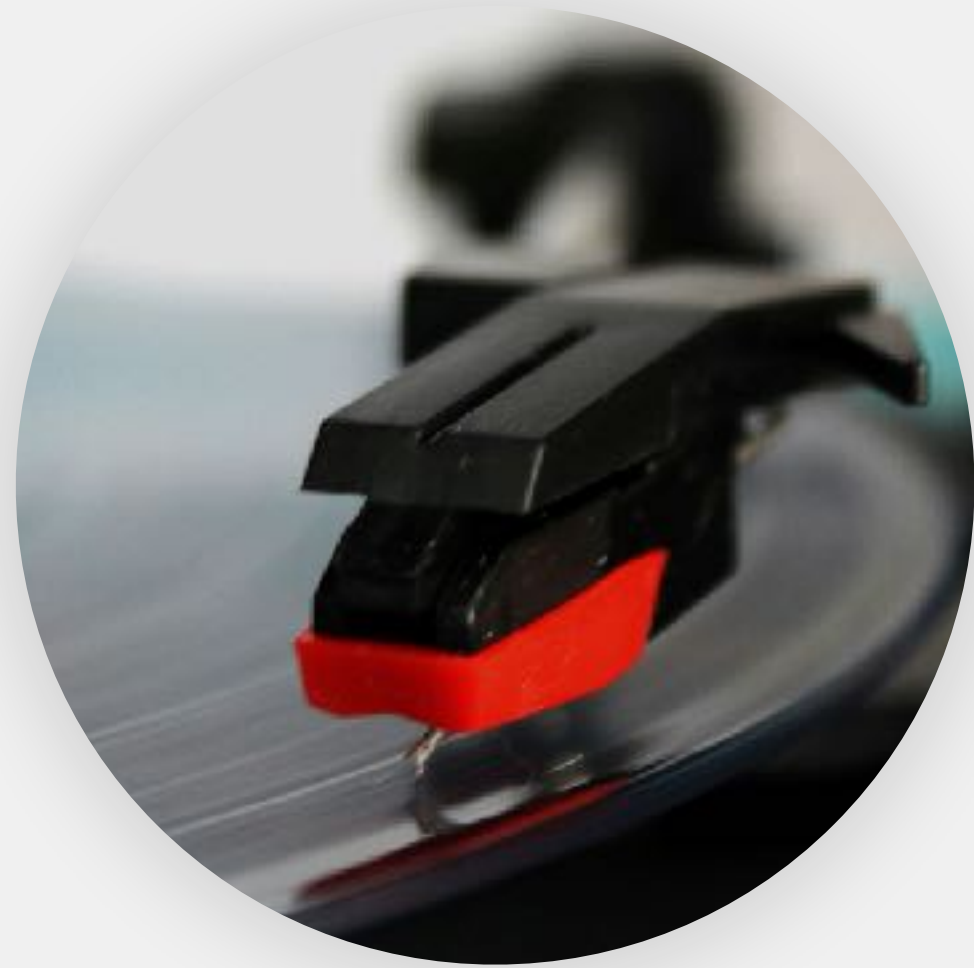
carhartt.
WORK IN PROGRESS

AFTER SPEED KIT





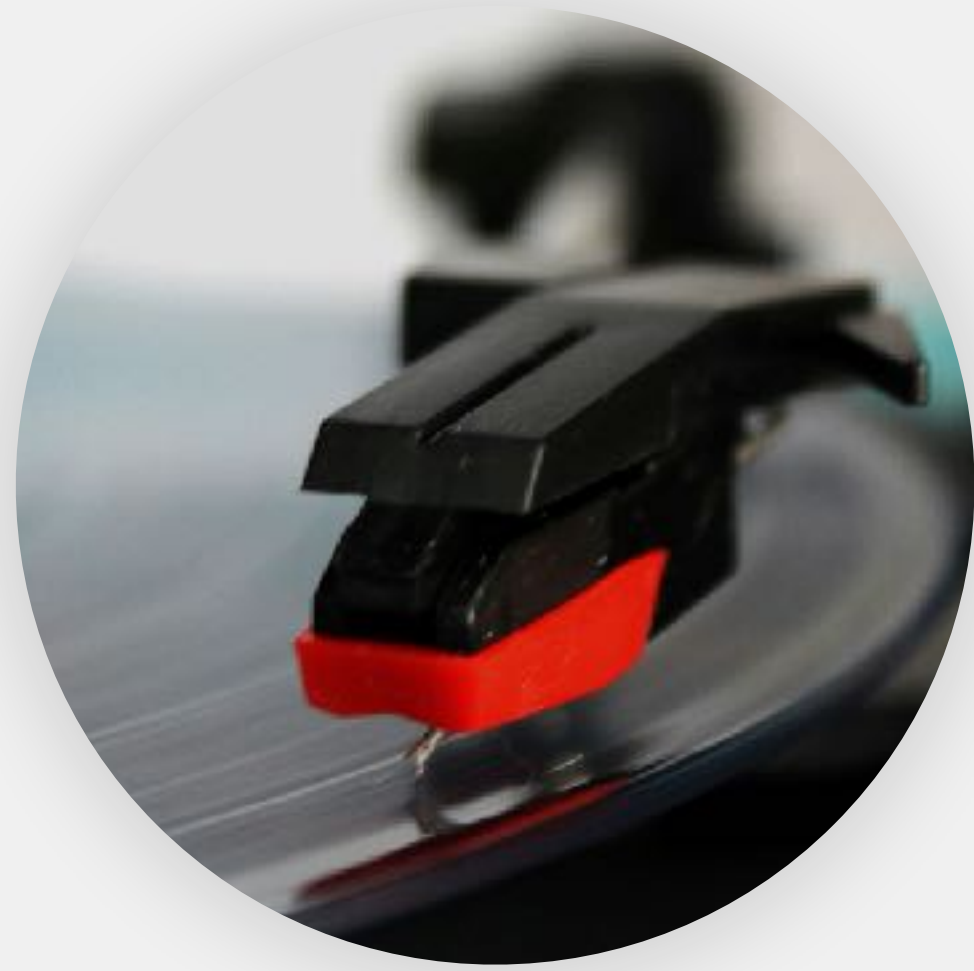
Needles: What we're looking for



Functionality

- Is Speed Kit on?
- Is Speed Kit accelerating pages?

Needles: What we're looking for



Functionality

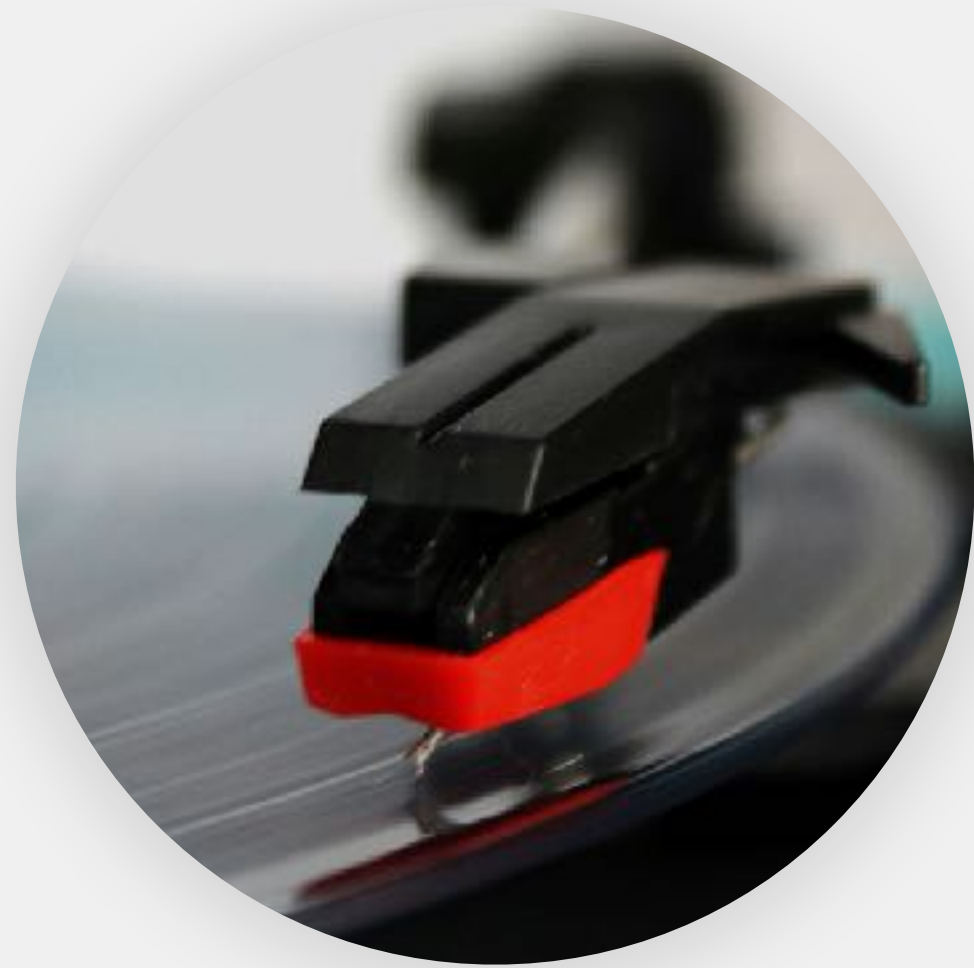
- Is Speed Kit on?
- Is Speed Kit accelerating pages?



Incidents

- Crashes
- Missing functionality
- Visual inconsistencies

Needles: What we're looking for



Functionality

- Is Speed Kit on?
- Is Speed Kit accelerating pages?



Incidents

- Crashes
- Missing functionality
- Visual inconsistencies



Regressions

- Perf metrics
- Business KPIs

Haystacks: Where we're looking



Aggregations

- Meaningful metrics
- Browser support
- Significant diffs

Haystacks: Where we're looking



Aggregations

- Meaningful metrics
- Browser support
- Significant diffs



Websites

- Tech differences
- Content changes
- Marketing campaigns

Haystacks: Where we're looking



Aggregations

- Meaningful metrics
- Browser support
- Significant diffs



Websites

- Tech differences
- Content changes
- Marketing campaigns



Tooling

- Tracking differences
- RUM updates
- Bots
- Processing times



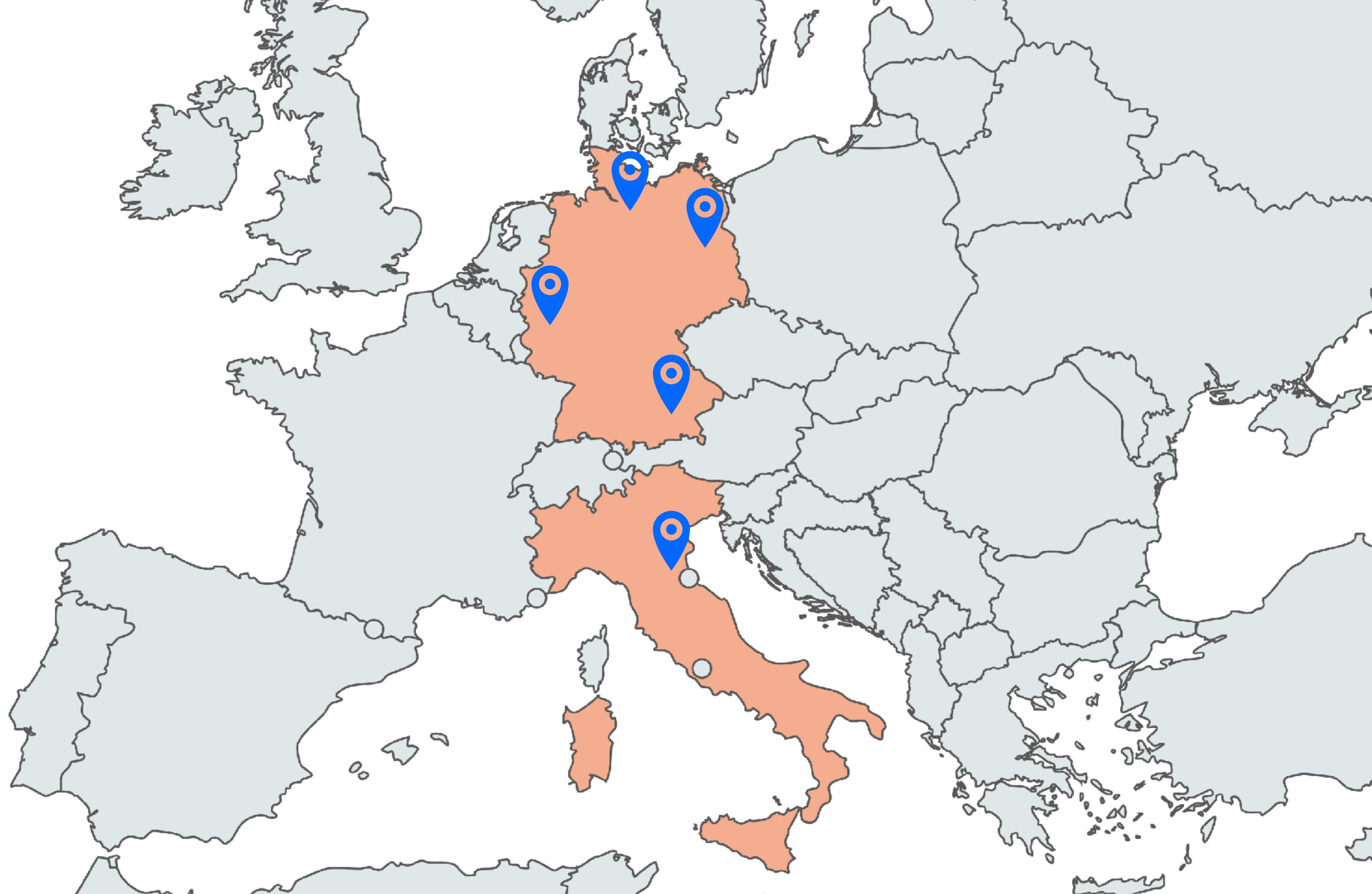
Objective

Monitor customer websites for incidents and regressions



A black and white photograph of a rural scene. In the foreground, several people are working with large haystacks. One person is standing on a haystack in the background, while others are on the ground, some using tools like pitchforks. A wooden cart or machine is visible in the middle ground. The scene is set in a field with trees in the background.

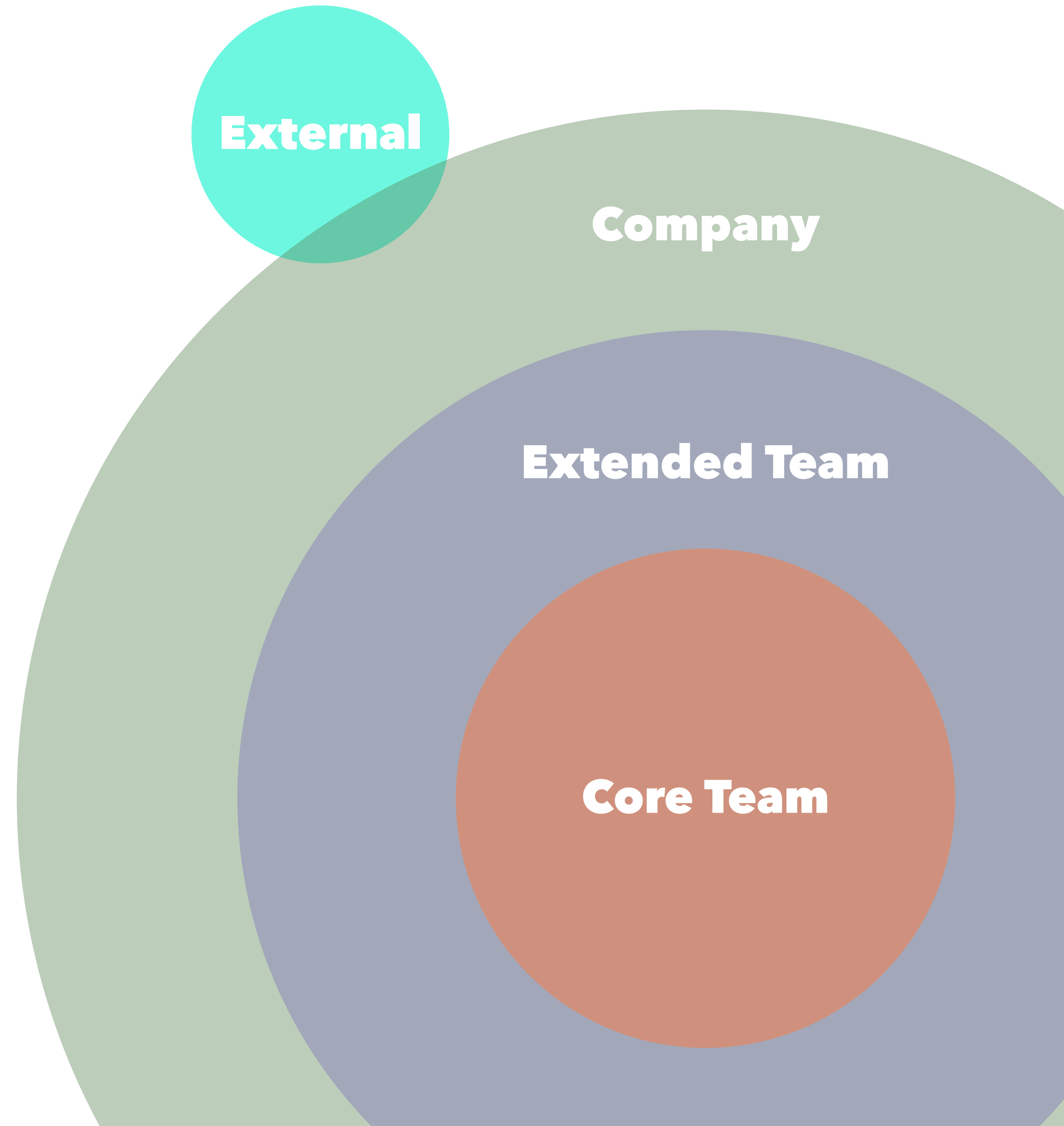
**Many hands
make light work**



Collaboration

One core team with outside input

- Daily sync
- Kanban board
- Pair-programming
- ● Weekly updates
- ● Strategy alignment
- ● Presentation & Feedback
- ● Ideation



Meet - Celebrate
PLAYING

https://meet.google.com/ojs-vtvu-kfj?authuser=brian.ramirez@baqend.com

120%

(Presenting, annotating)

eu.hex.tech/baqend/hex/66e78d3e-3ca7-4acc-a311-ecb49a251524/draft?app_referrer=WORKSPACE_SEARCH&view=notebook

HEX

Conversion & Segment Analysis (updated June, 24)

and (
 json_extract_scalar(element_at(filter(events, e -> e.action = 'data'), 1).label, '\$.deviceType') <> 'app'
 or json_extract_scalar(element_at(filter(events, e -> e.action = 'data'), 1).label, '\$.deviceType') is null
 -- No app traffic
 and userid not in (select userid from onbehalf_sessions)
 group by 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
),
data2 as (
 select testgroup,
 date,
 browser,
 device,
 returningUser,
 asn_name,
 -- country_cdn,
 os,
 -- browser_version,
 -- locale,
 -- medium,
 -- source,
 -- campaign,
 -- session_length,
 -- conversion_size,
 had_back_forward,
 had_reload,
 -- entry_pagetype,
 converted,
 added_to_cart,
 nav_checkout,
 logged_in,
 last_payment_method,
 count(distinct sessionid) as nb_sessions,
 slice(array_agg(sessionid ORDER BY random()), 1, 5) AS sessionid_sample
 from data
 group by 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14)
select *
from data2

dataframe_6 = sql_cell(source=query, data_connection_name="Athena", cast_decimals=True)
filename = df_to_csv_and_upload(dataframe_6, app, file_format='feather')
Uploaded on_2024-11-07.feather.
typing hextoolkit pandas feather sql_cell query dataframe_6 filename

Python 3.9 (Medium) 67 cells

SQL

Python

Markdown

Table

Chart

Pivot

Single value

Inputs

Data

More

4:35 PM | Celebrate

Microphone

Video

CC

Smiley

Screen

Hand

More

Phone

Paul Basnier

Andrea Verlicchi

Fabian Krumbholz

Brian Ramirez

Andi
Scre...

HEX

Microphone

Video

CC

Smiley

Screen

Hand

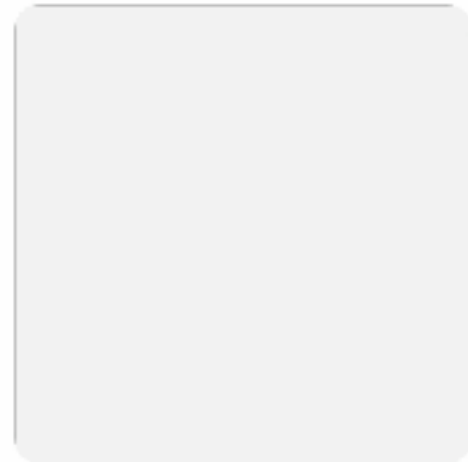
More

Phone

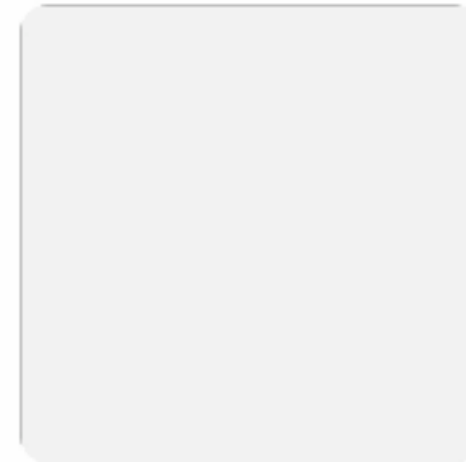
PROCESS



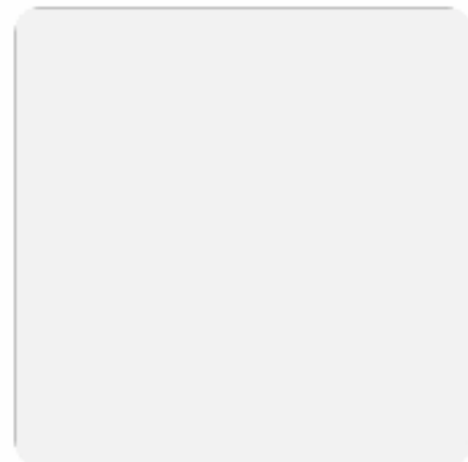
All products



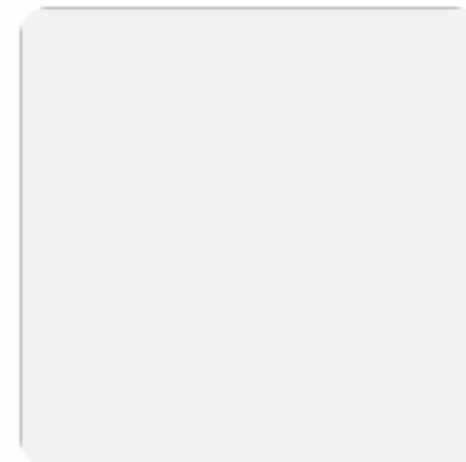
Slides
25 EUR



Sweatpants
35 EUR



Men's T-shirt
40 EUR

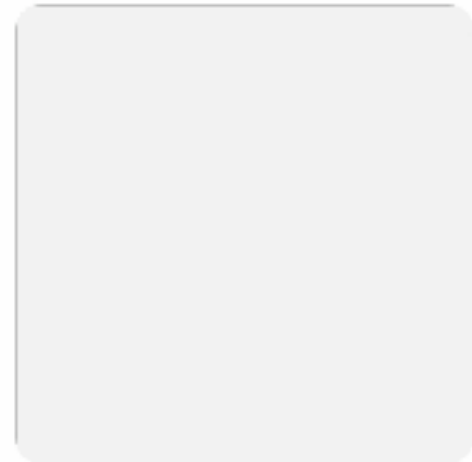


ABShop

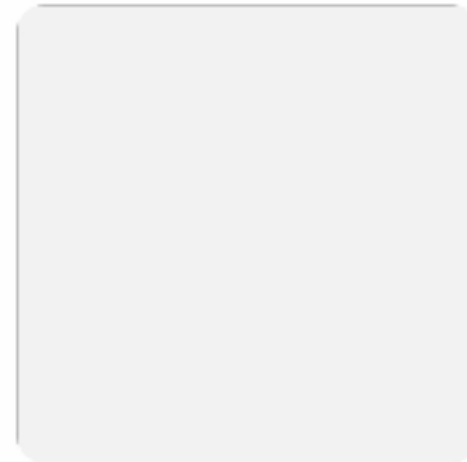
Tests

Products

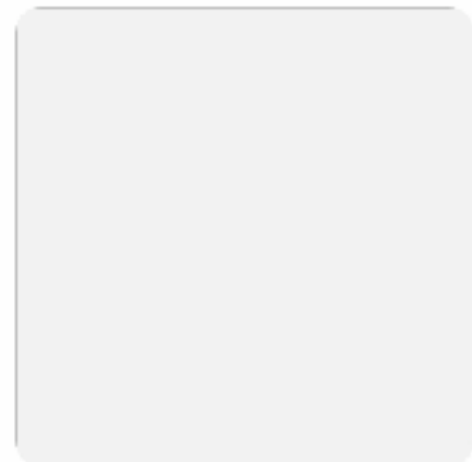
All products



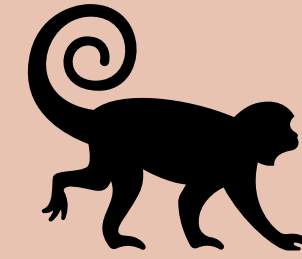
Slides
25 EUR



Sweatpants
35 EUR



Men's T-shirt
40 EUR



Behavior

- Shorter sessions
- Lower ATC, CVR
- Clicks



Performance

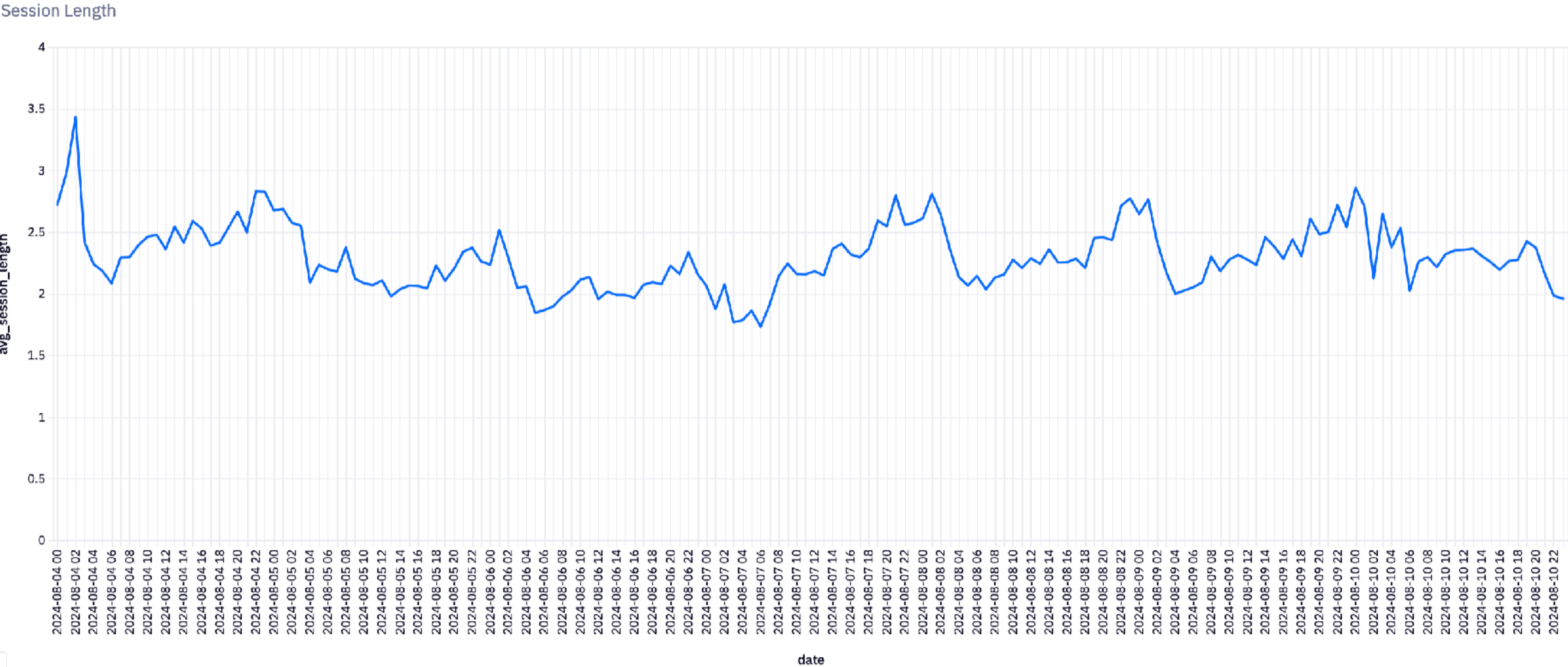
- CWV
- Supporting metrics
- Custom timings



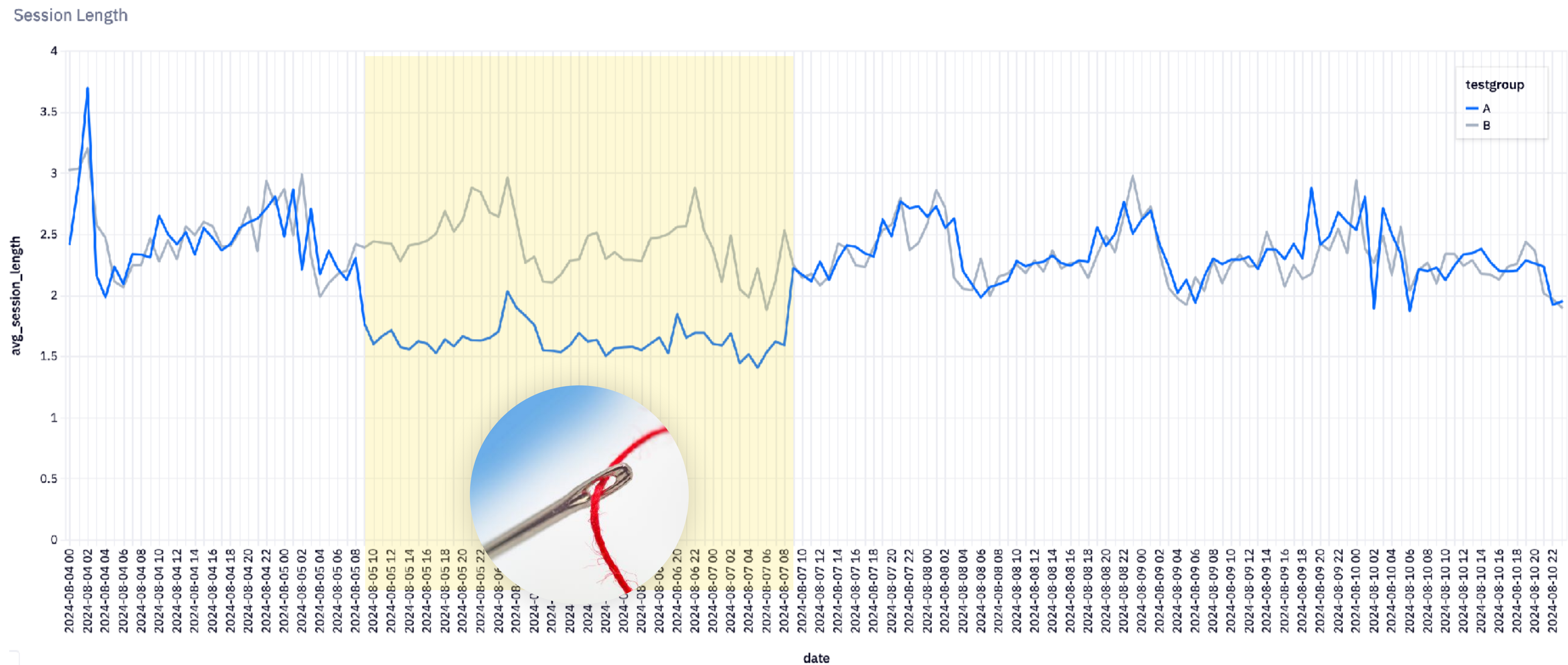
Technical

- Network
- Navigation timings
- SW timings

Pages per Session



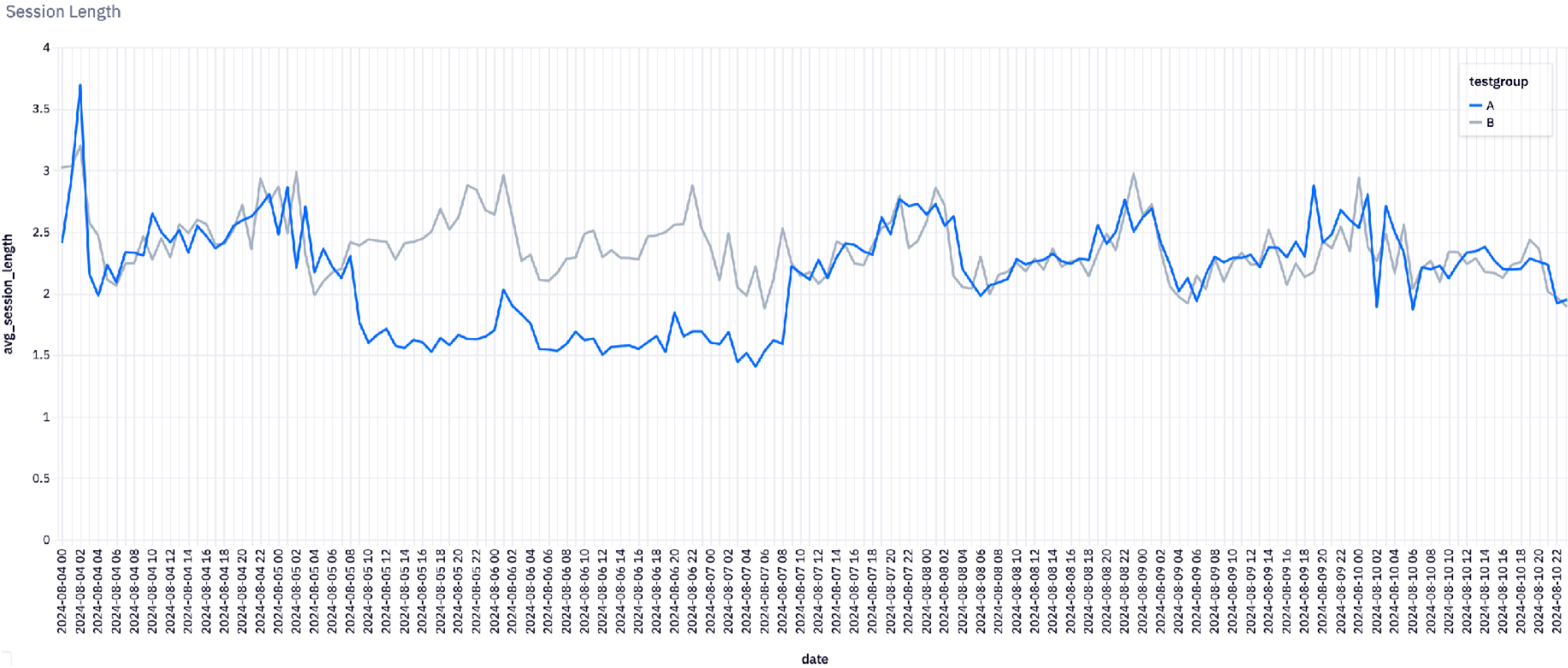
Pages per Session



A/B tests are perfect for spotting issues...

A

B



ABShop

Tests

Products

All products



Slides
25 EUR



Sweatpants
35 EUR



Men's T-shirt
40 EUR



Hoodie
90 EUR



ABShop

Tests

Products

All products



Slides
25 EUR



Sweatpants
35 EUR



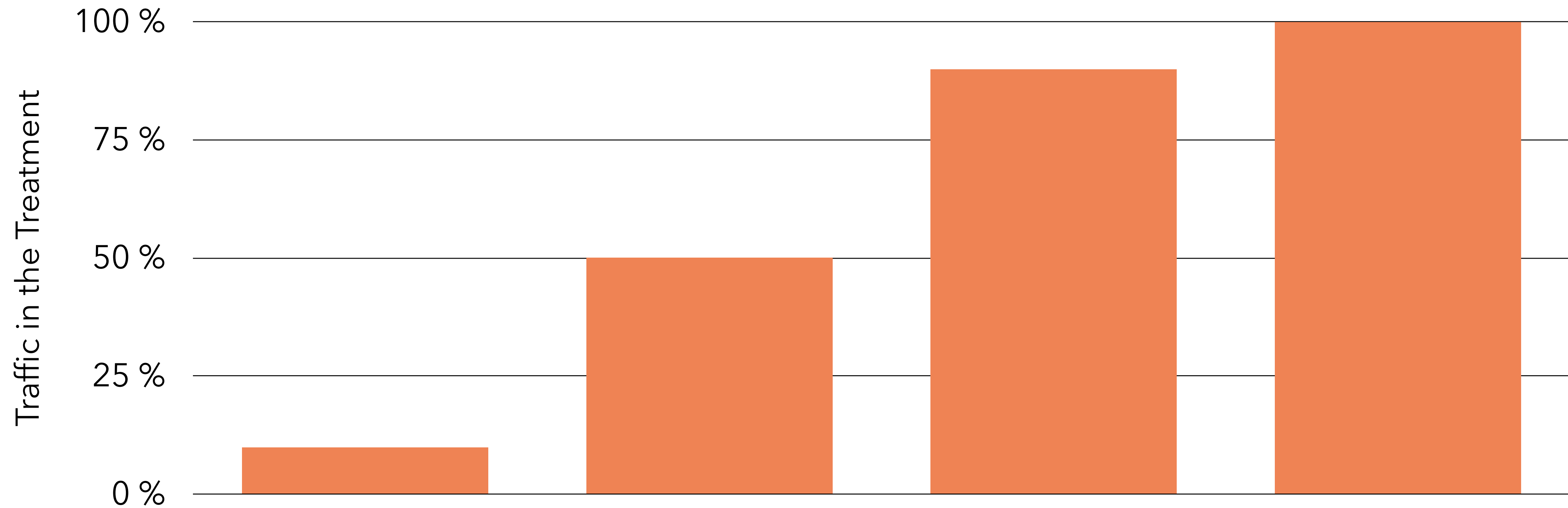
Men's T-shirt
40 EUR



Hoodie
90 EUR

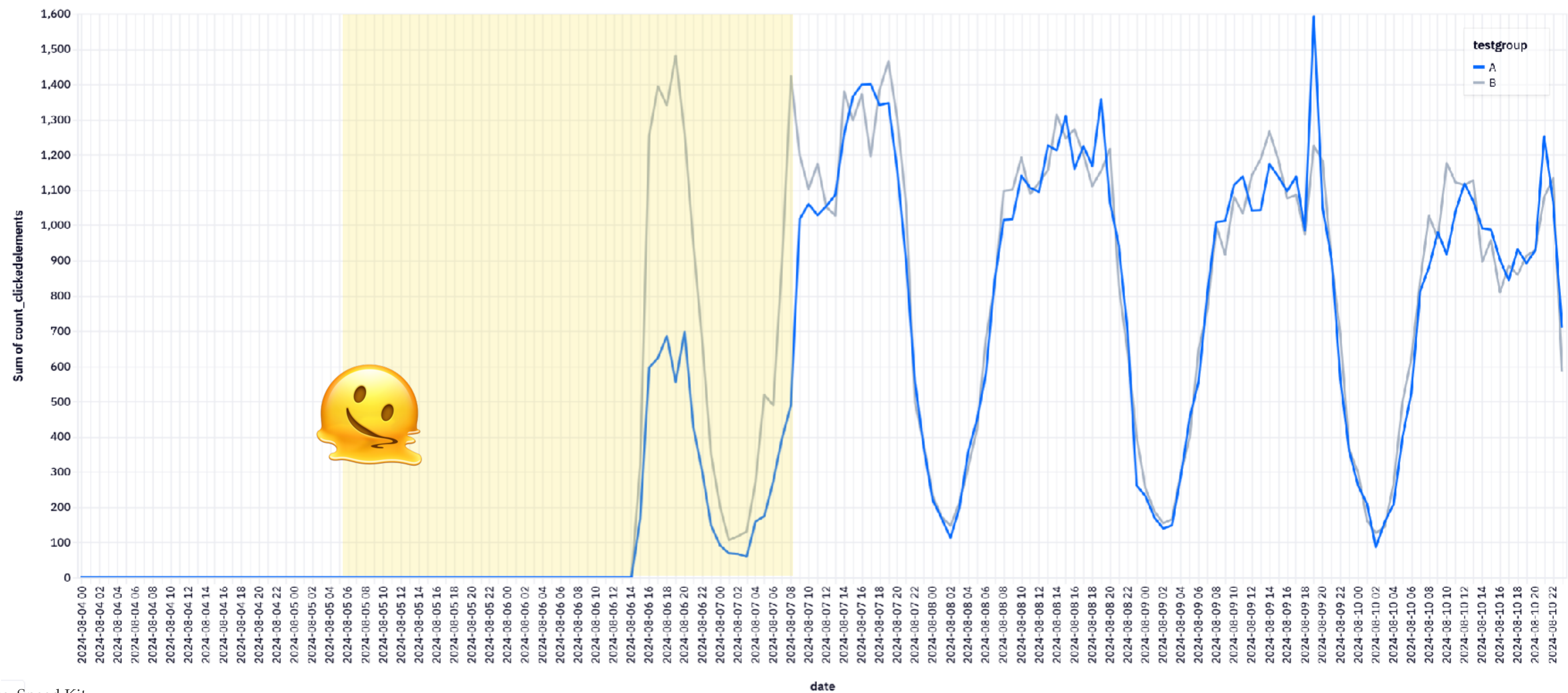


...but A/B tests don't last forever.



Clicks

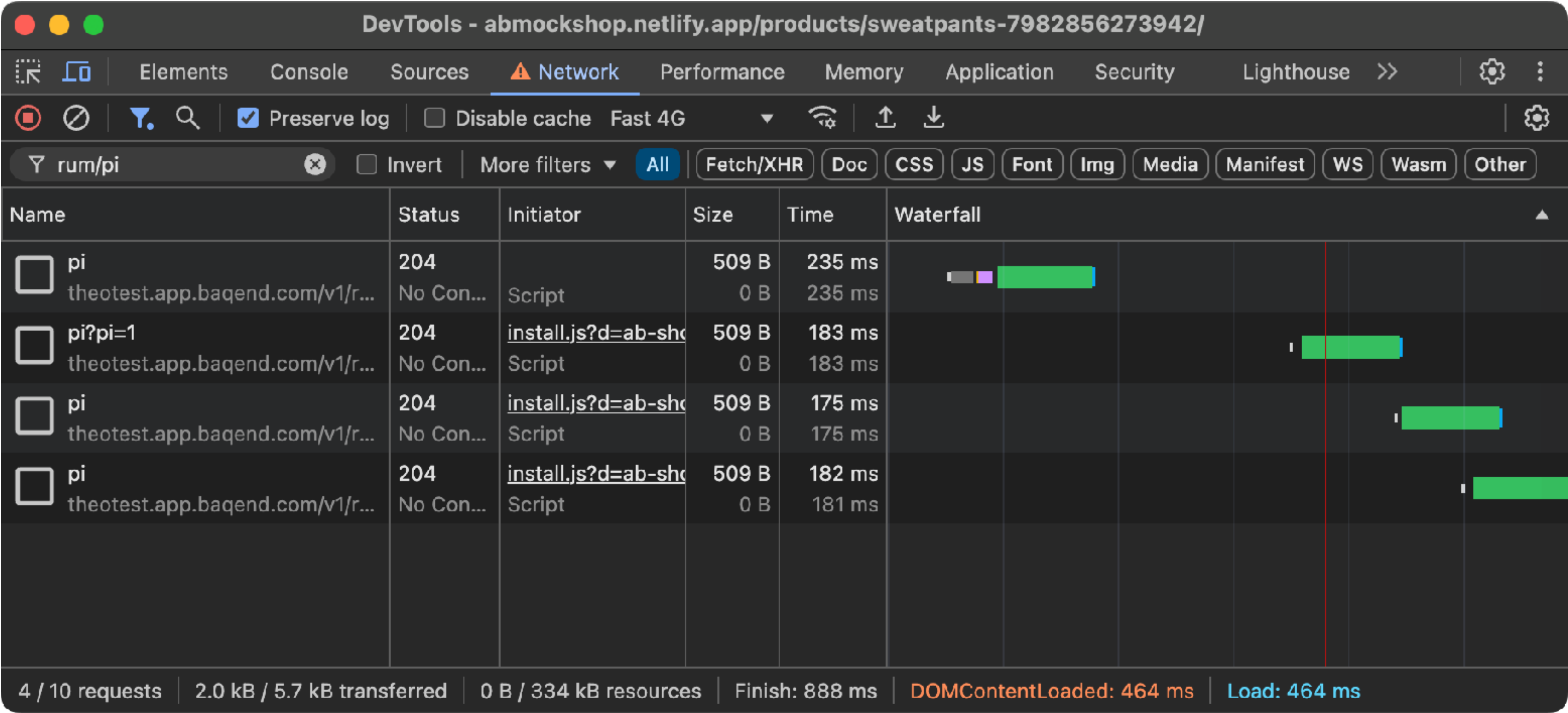
Count of Clicked Elements

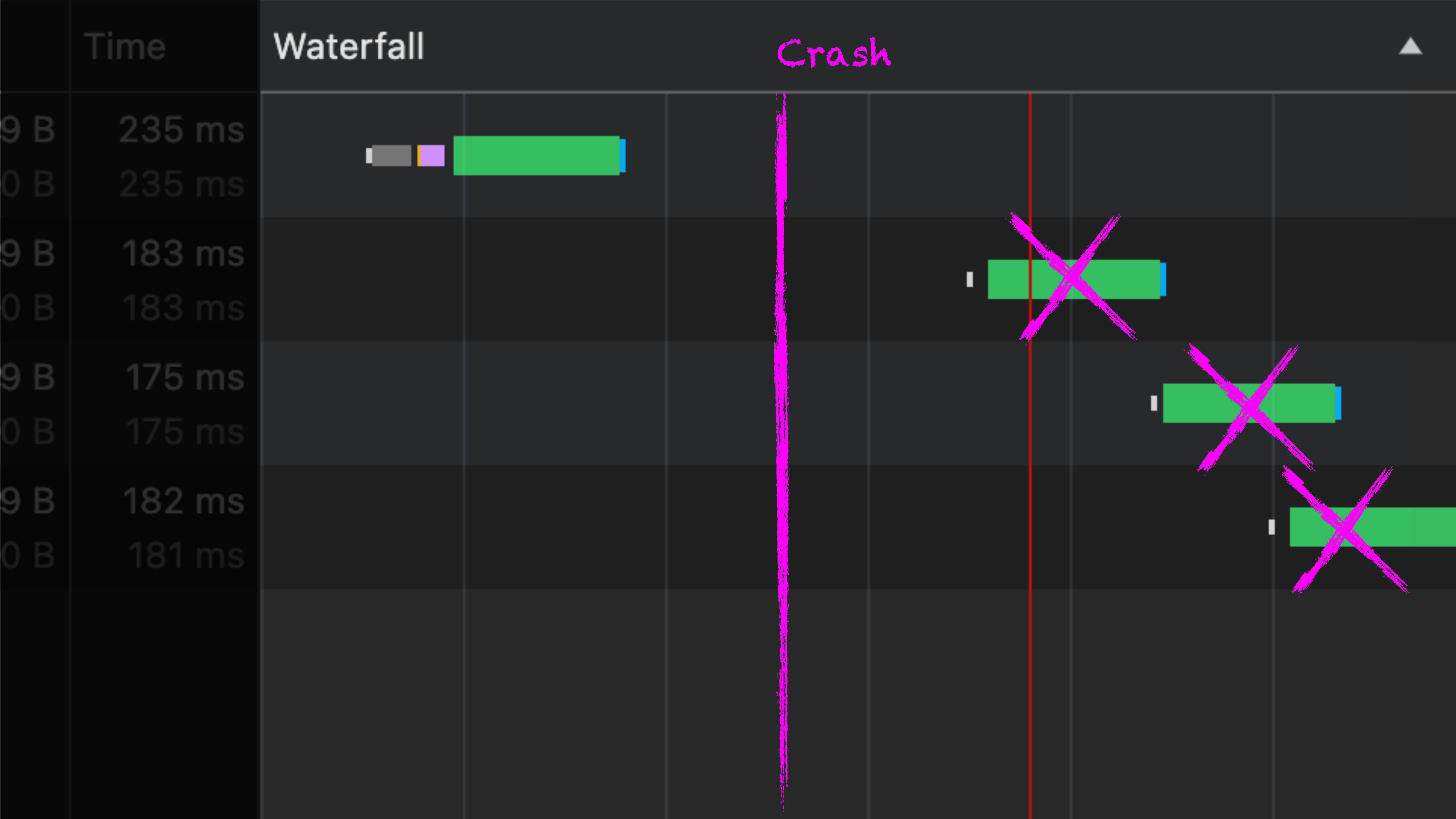


A man wearing a dark striped shirt, a cap, and gloves is standing on a large, golden-brown haystack. He is throwing a handful of straw into the air, and some straw is visible falling back down. The background is a clear, light blue sky. The text "The haystack may shift under your feet" is overlaid in large, white, bold letters across the center of the image.

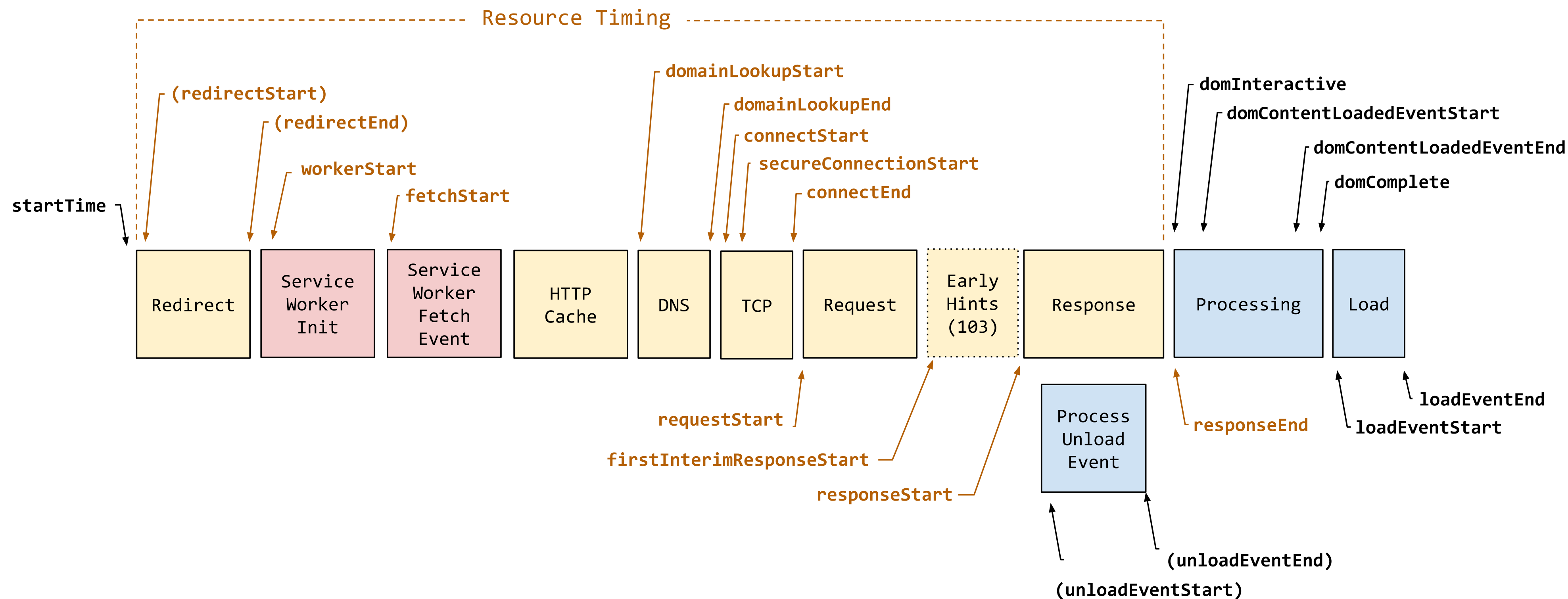
**The haystack may shift
under your feet**

Debugging tracking beacons

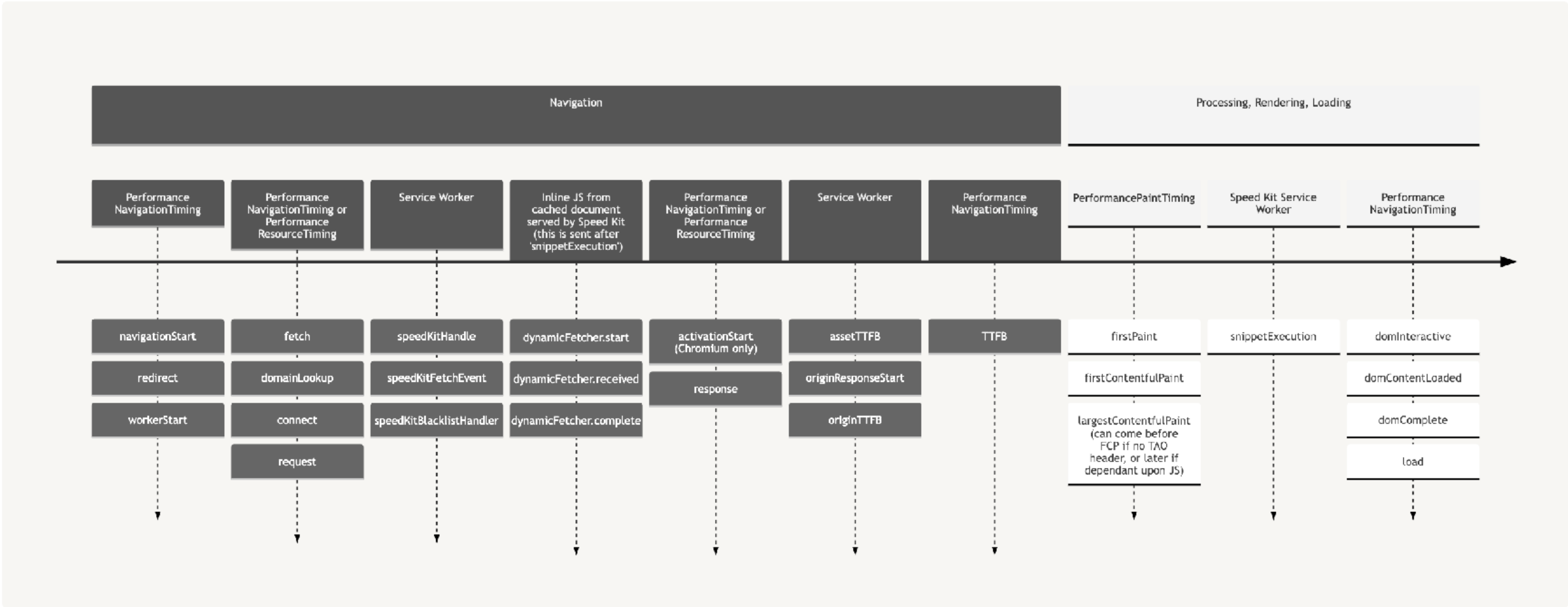




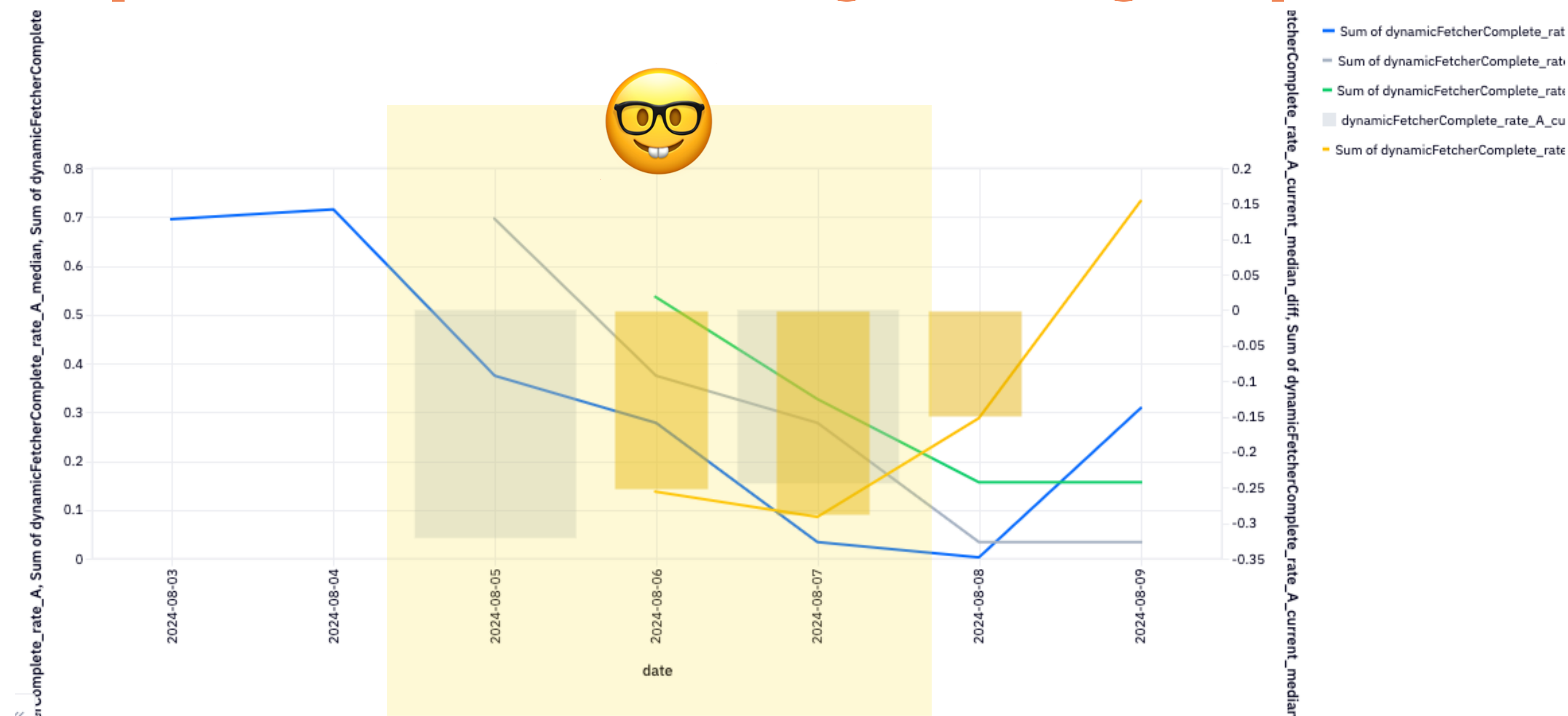
Comparing to Resource and Navigation Timings



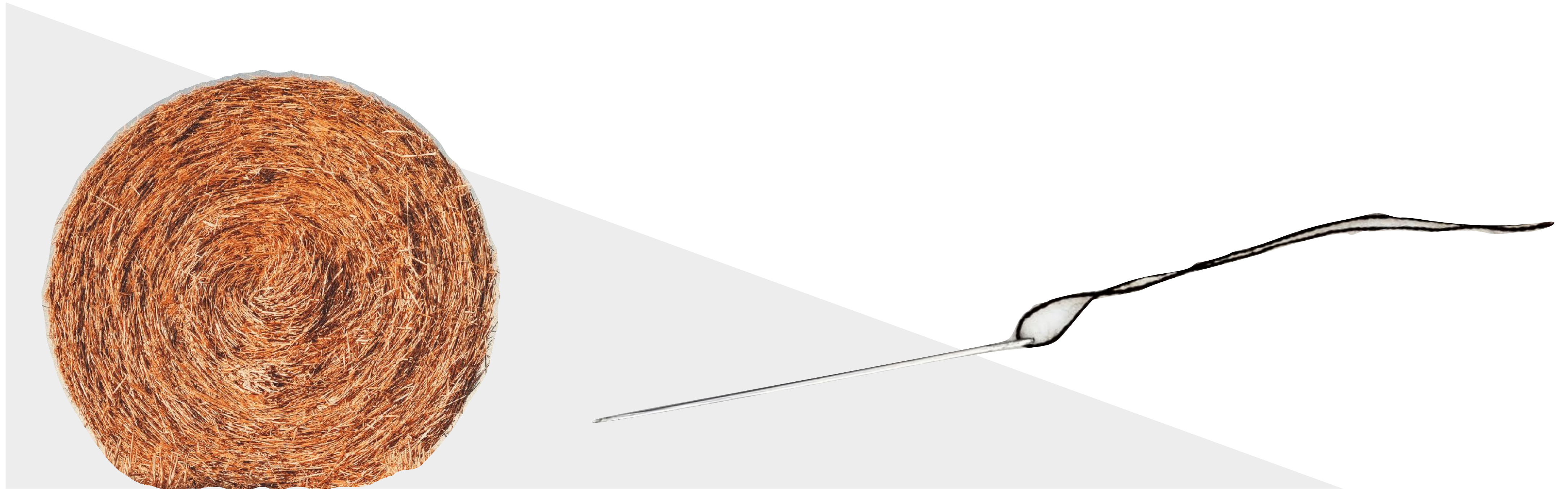
Comparing Custom Timings



Completion Rates in a single test group



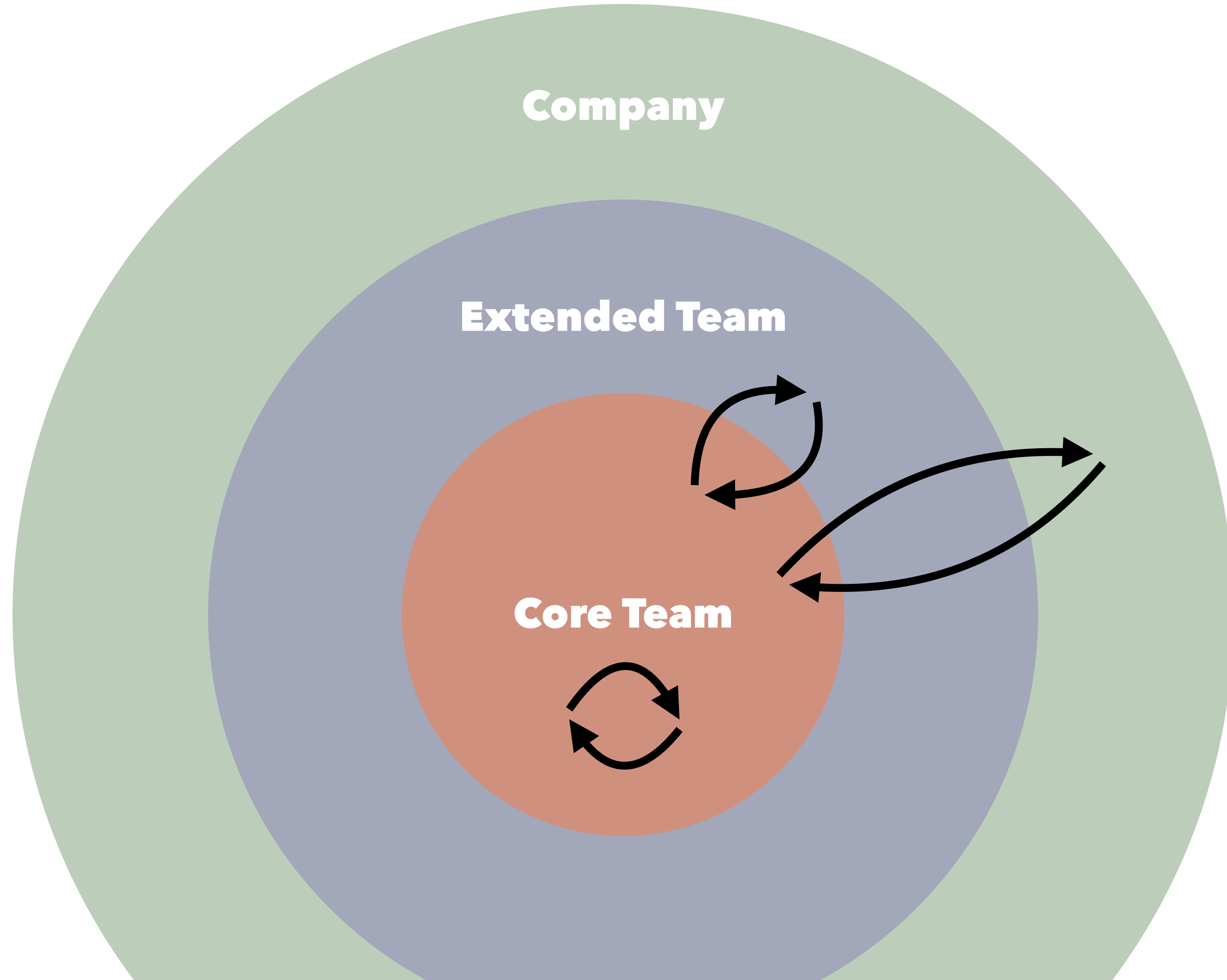
Don't start by sifting through the haystack...



...Start with the needle.

Start with specific incidents to determine the best indicators.





Burn the Straw Man

All customers – Speed Guard SANDBOX – 2024-08-29

Published 20 secs ago by Brian Ramirez

[Alerts](#)
[User Metrics](#)
[Performance Metrics](#)
[About](#)

Incident

None specified

Alerts

ALERTS

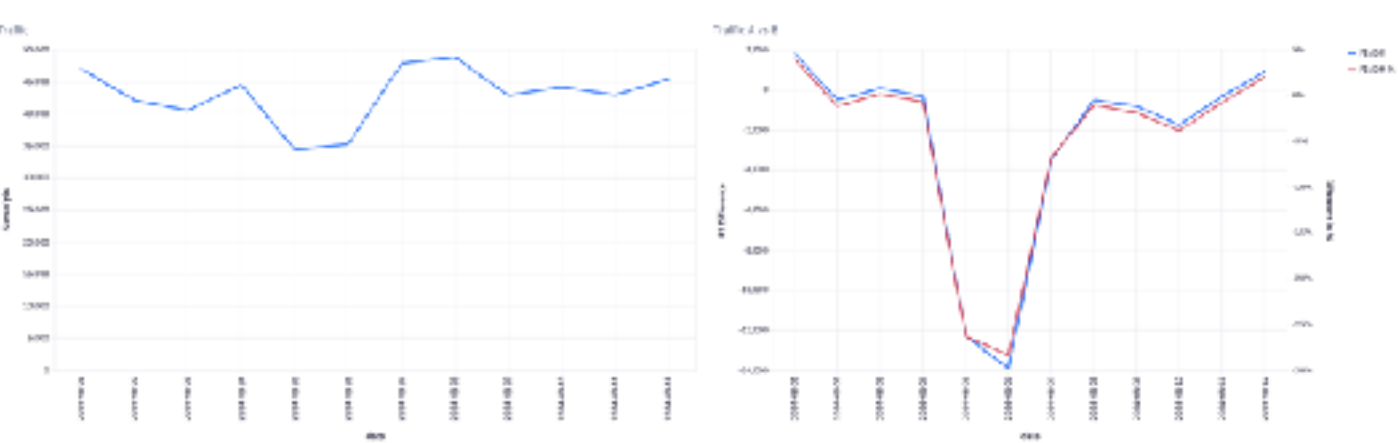
[illegible]

```
date      2024-08-04
app       ██████████
device    Desktop
browser    Edge
Name: 74, dtype: object
4 Triggers:
avg_pis_per_session_below_p99_diff < -0.3: -0.6211058734920201
ttfb_p75_A_current_median_diff < -50: -175.0
firstcontentfulpaint_p75_A_current_median_diff < -100: -223.0
largestcontentfulpaint_p75_A_current_median_diff < -200: -216.0
```

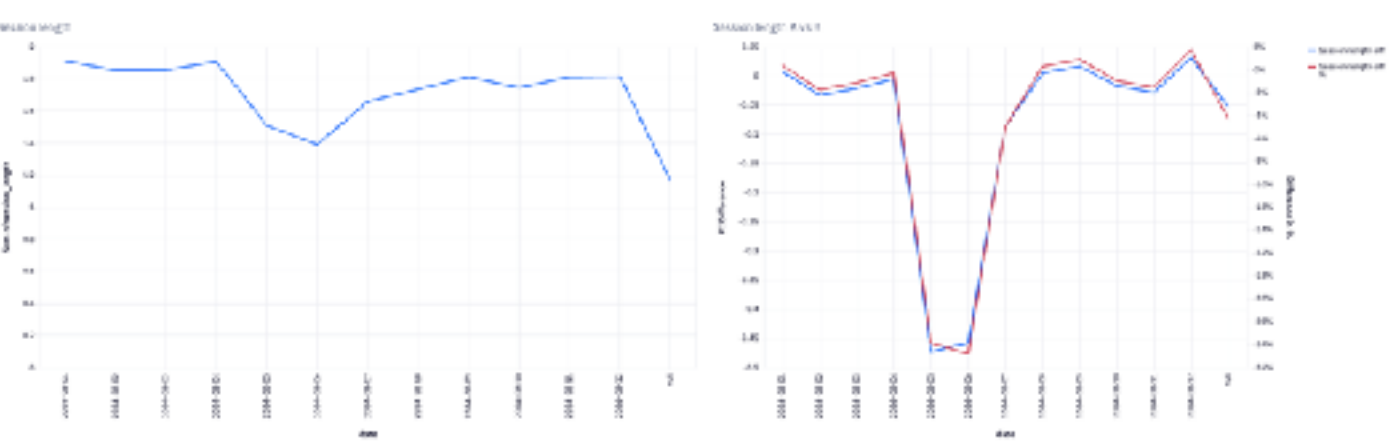
```
date      2024-08-05
app       ██████████
device    Mobile
browser   Safari
Name: 91, dtype: object
4 Triggers:
avg_pis_per_session_below_p99_diff < -0.3: -0.6047732845387763
avg_pis_per_session_below_p99_A_current_median_diff < -0.2: -0.5418323088879466
dynamicFetcherComplete_rate_A_current_median_diff < -0.2: -0.32087726202032124
speedKitFetchEvent_rate_A_current_median_diff < -0.2: -0.3242600144991466
```

date 2024-08-06
app

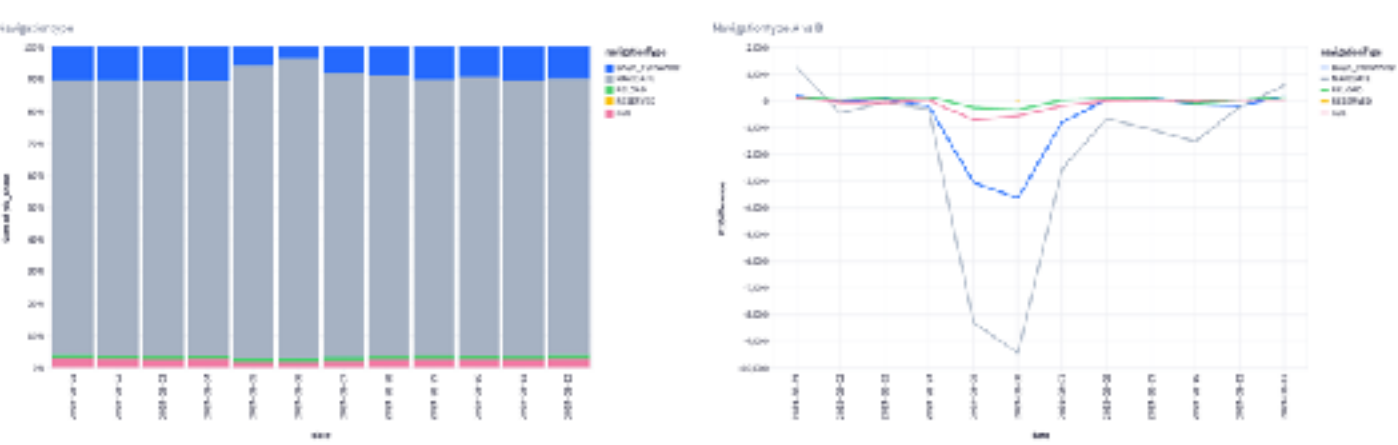
Traffic



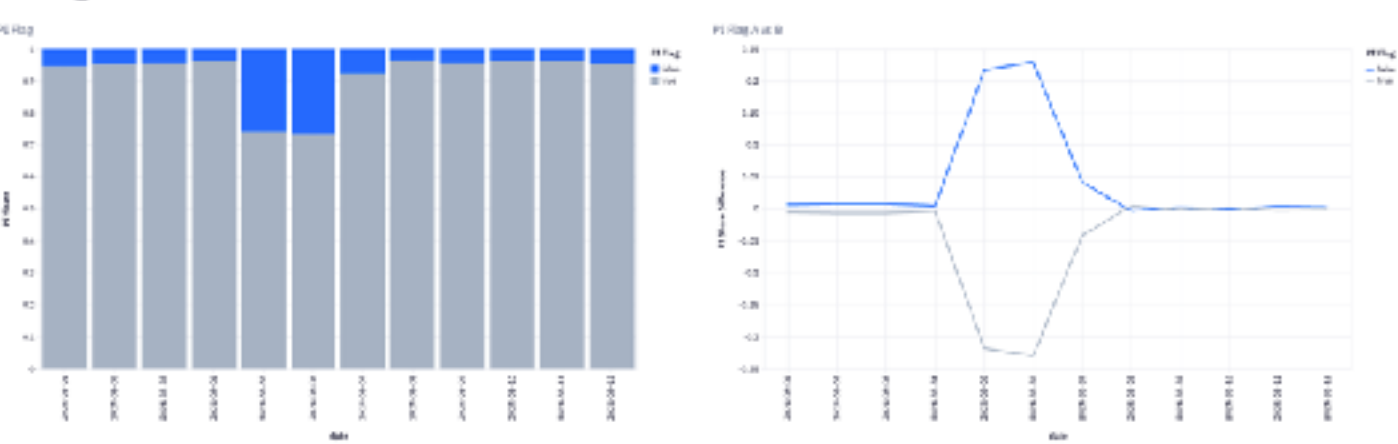
Session length



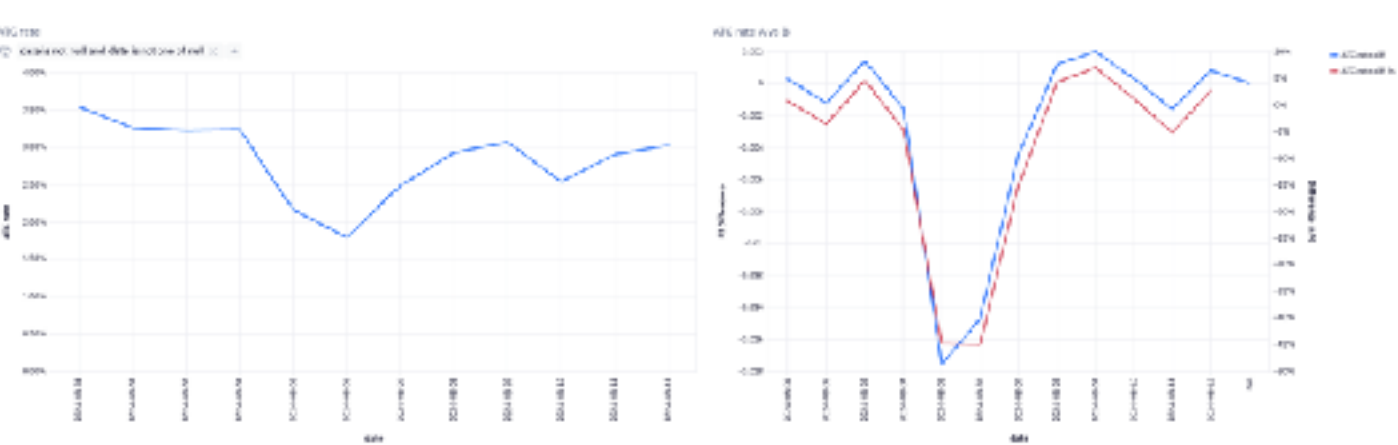
Navigationtype

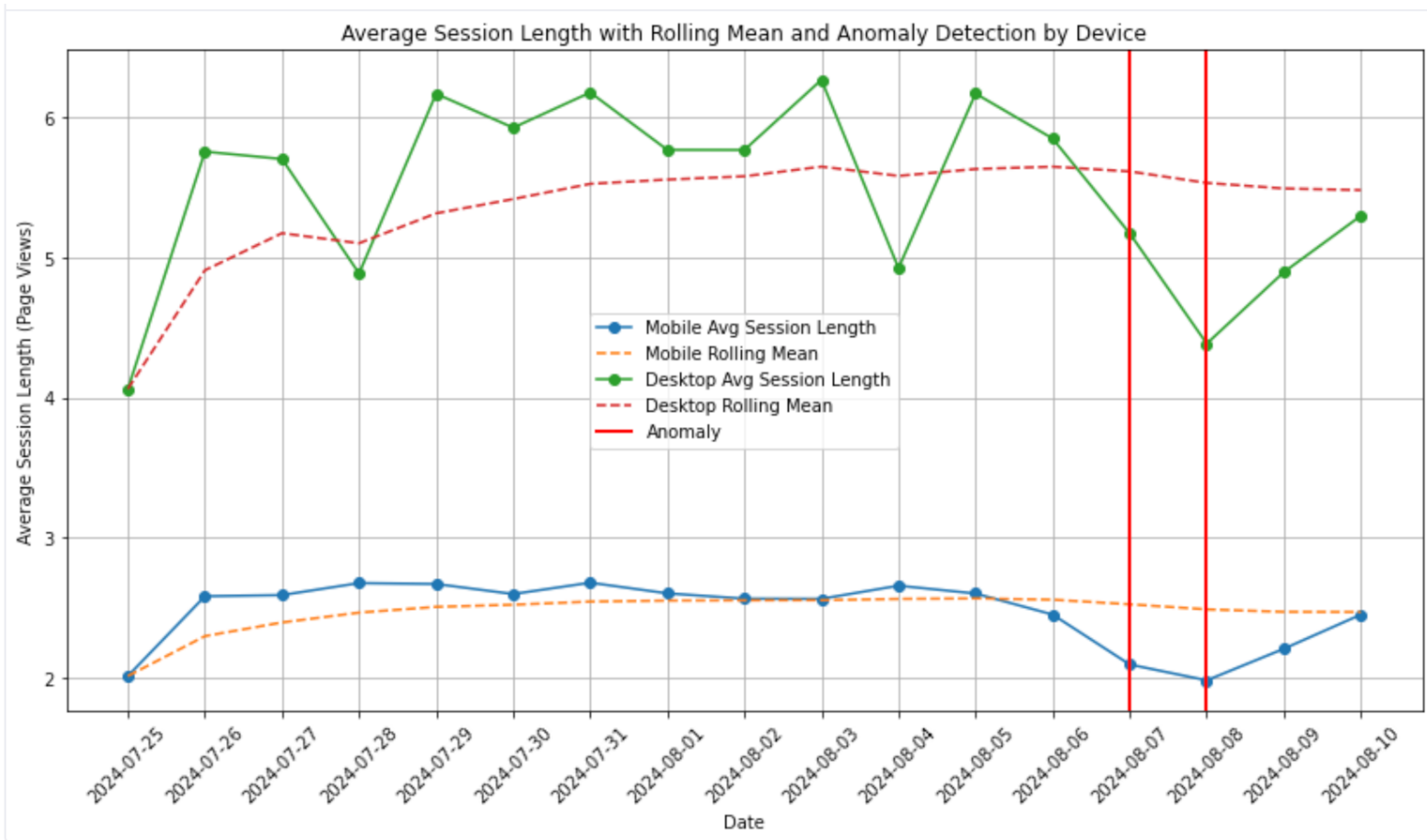


PI Flag



Add to cart

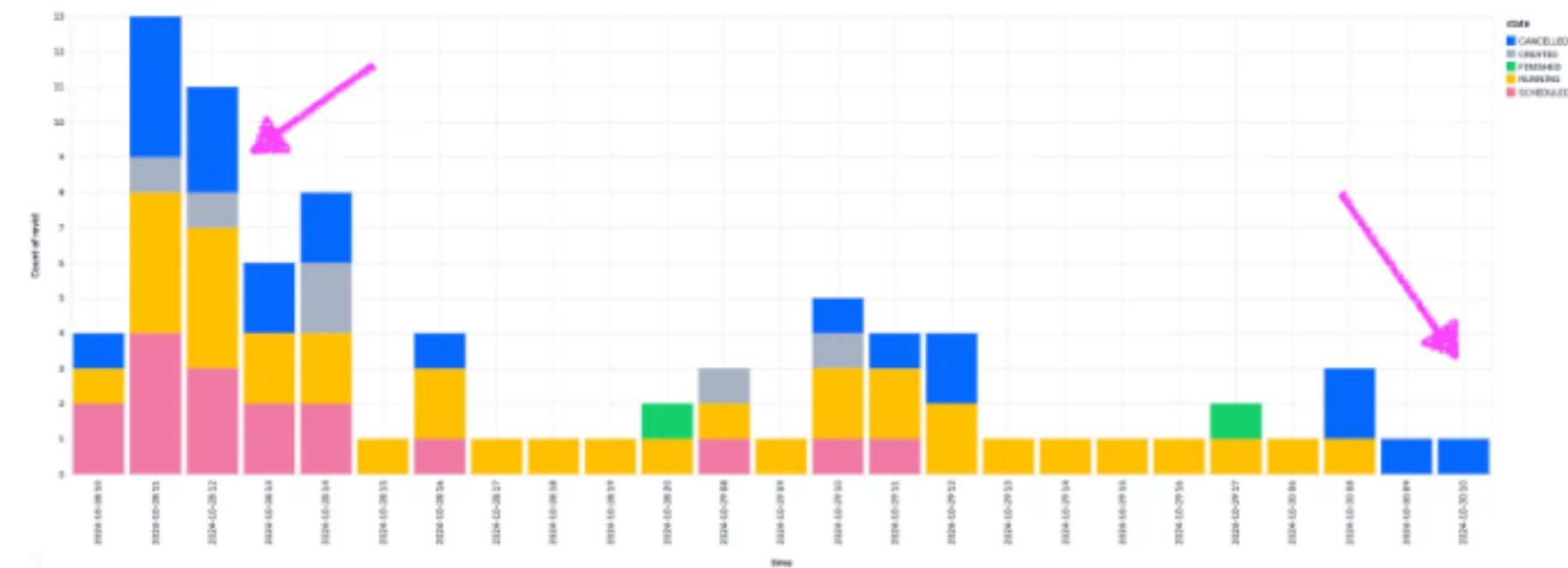




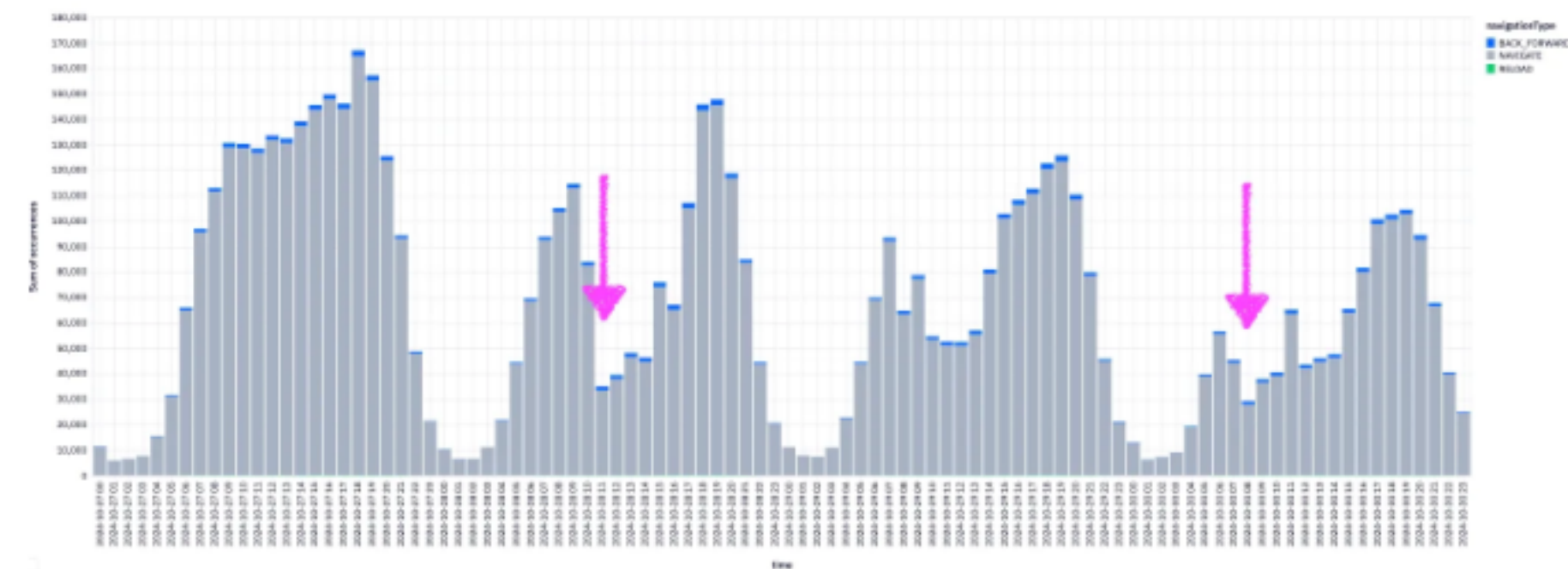
Findings

<https://eu.hex.tech/baqend/hex/bf7c41c9-b8f1-405e-8e63-1cb438b96490/draft/logic>

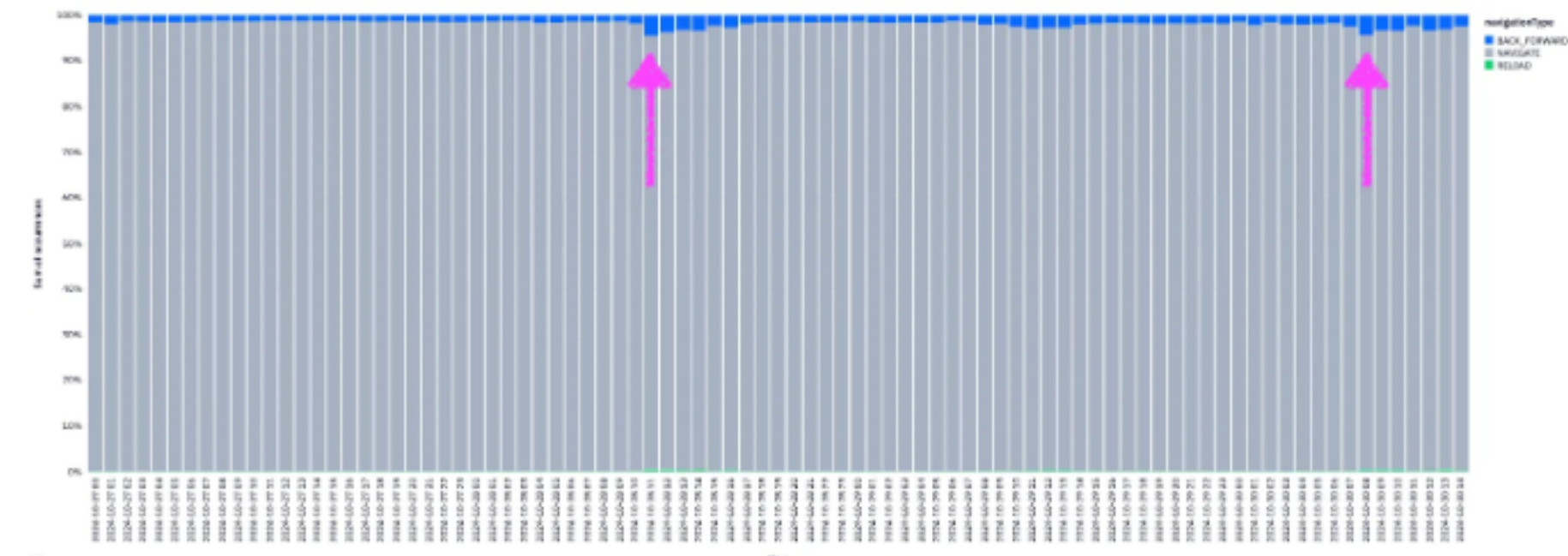
- There were deployments during the anomaly 2024-10-28 11, but not on anomaly 2024-10-30 08

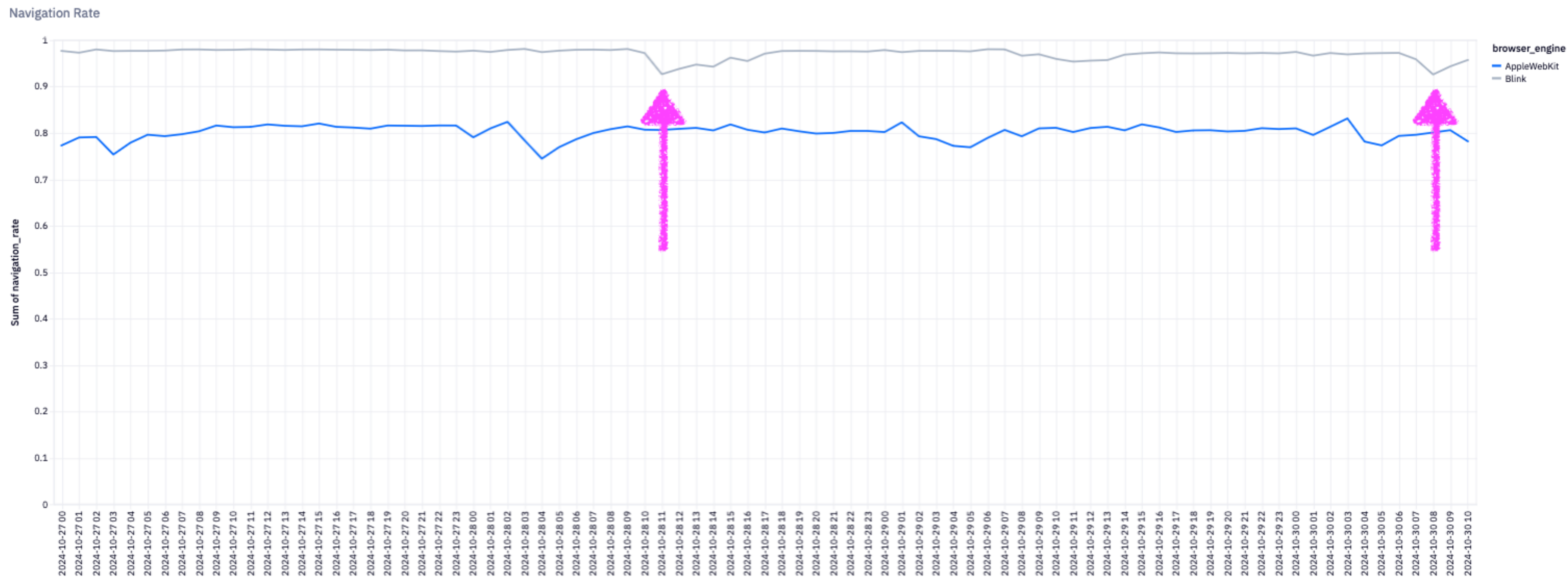


- Traffic was relatively low during the two reported anomalies.



- While the reported anomaly was for *Navigation Rate*, the relative percentage of Back-Forward navigations increased.





A large, rectangular haystack made of golden-brown hay, stacked in neat layers. It stands in a flat, brown field under a bright blue sky with scattered white clouds. A strip of green grass and a dark asphalt road are visible in the foreground.

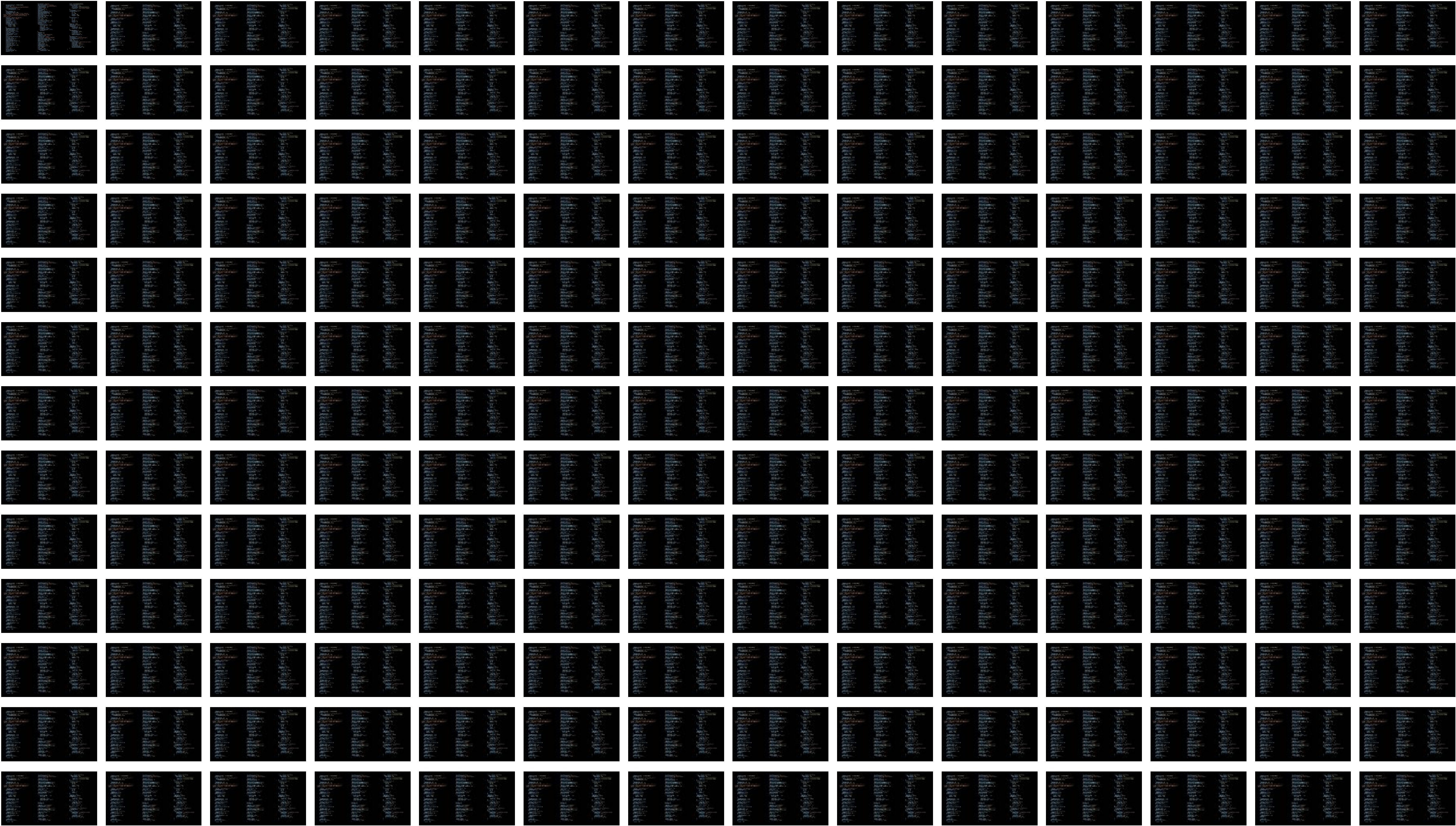
**Make sure the
haystacks
are big enough**

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  "snippetExecution": 283,
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8.0.0; SM-G955U Build/R16NW) AppleWebKit/537.36
(KHTML, like Gecko) Chrome/116.0.0.0 Mobile
Safari/537.36",
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    "height": 2960
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  "devicePixelRatio": 4,
  "inControlGroup": false,
  "inIFrame": false,
  "supportsTouch": true,
  "prerendered": false,
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  "cdnPop": "FRA",
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  "assetCause": "ReloadCacheMode",
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    "inputDelay": 11,
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    "presentationDelay": 33
  }
}
```

```
{
  "navigationStart": 1730814750295,
  "testGroup": "A",
  "piId": "9ShK1JgenvWAncaSlq7qgnTkboCEHSgY",
  "customPiDimensions": {
    "isPreRendered": "true"
  },
  "sessionIndex": 0,
  "snippetExecution": 283,
  "userAgent": "Mozilla/5.0 (Linux; Android
8.0.0; SM-G955U Build/R16NW) AppleWebKit/537.36
(KHTML, like Gecko) Chrome/116.0.0.0 Mobile
Safari/537.36",
  "testId": "100vs0_2024_09_24",
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  "inIFrame": false,
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  "secureConnectDuration": 0,
  "unload": 113,
  "unloadDuration": 0,
  "domainLookup": 4,
  "domainLookupDuration": 0,
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  "request": 4,
  "fetch": 4,
  "ttfb": 46,
  "workerStart": 3,
  "navigationType": 0,
  "events": [],

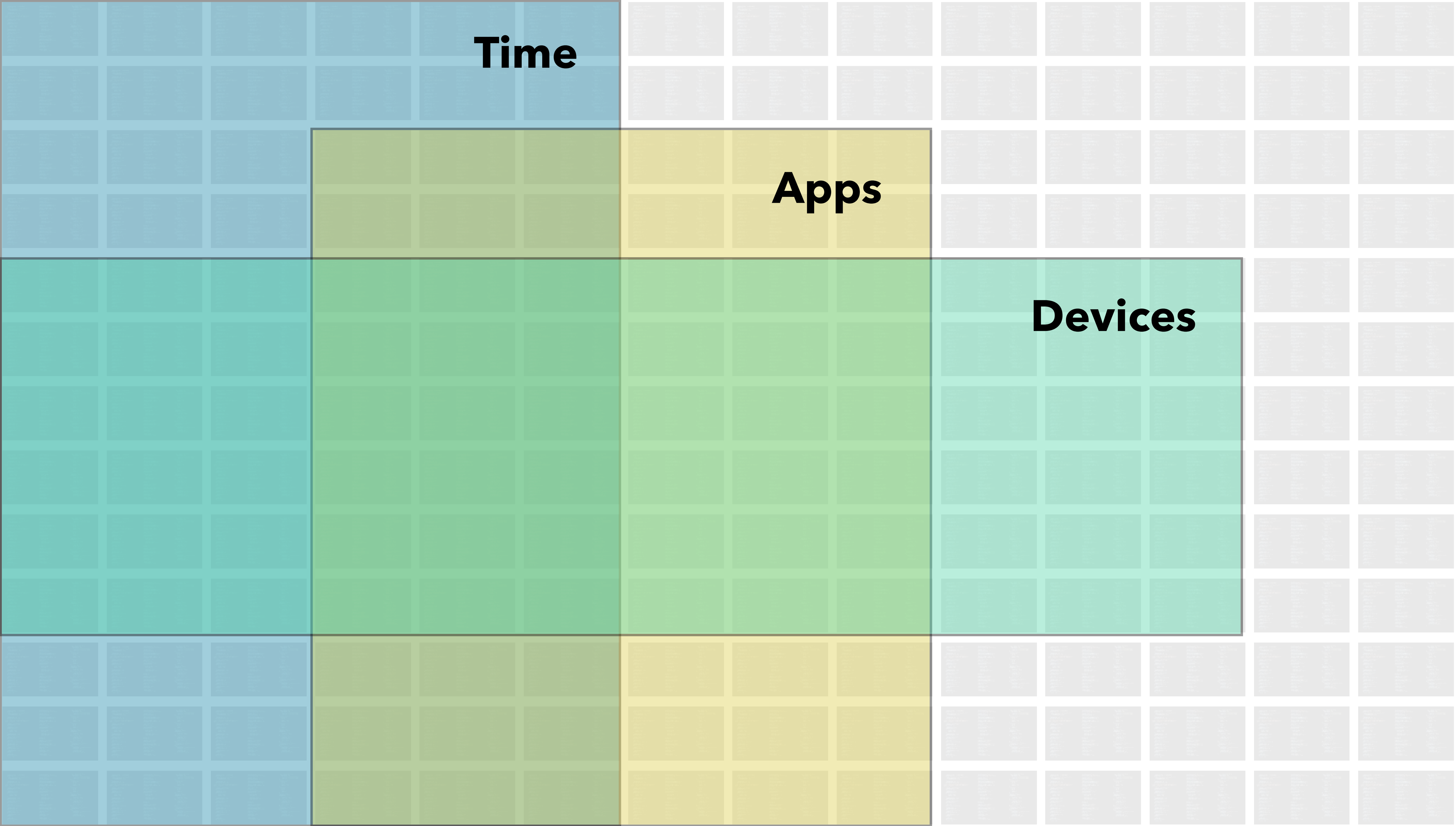
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  "applicationState": "running",
  "responseCause": "ReloadCacheMode",
  "cdnBackendTime": 6,
  "cdnPop": "FRA",
  "hhFetchEvent": 5,
  "hhHandle": 5,
  "hhBlacklistHandler": 5,
  "hhDisabledPageHandler": 5,
  "hhHandleDuration": 42,
  "hhFetchCall": 1,
  "hhFetchCallDuration": 40,
  "assetTTFB": 40,
  "redirectList": [],
  "fcp": 374,
  "firstPaint": 374,
  "firstContentfulPaint": 374,
  "resourceTimings": [...],
  "noIndex": false,
  "networkInfo": {
    "effectiveType": "4g",
    "rtt": 50,
    "downlink": 10,
    "saveData": false,
    "slowConnection": false,
    "protocol": ""
  },
  "cpuInfo": 8,
  "ramInfo": 8,
  "pageType": "pdp:PageValue",
  "lowBatteryInfo": false,
  "assetSource": "Edge",
  "assetCause": "ReloadCacheMode",
  "domContentLoaded": 994,
  "domContentLoadedDuration": 139,
  "domInteractive": 924,
  "originTTFB": 745,
  "load": 2173,
  "loadDuration": 2,
  "domComplete": 2172,
  "lcpCandidates": [...],
  "lcp": 3408,
  "lcpType": 255,
  "lcpAttribution": {
    "renderDelay": 3361
  },

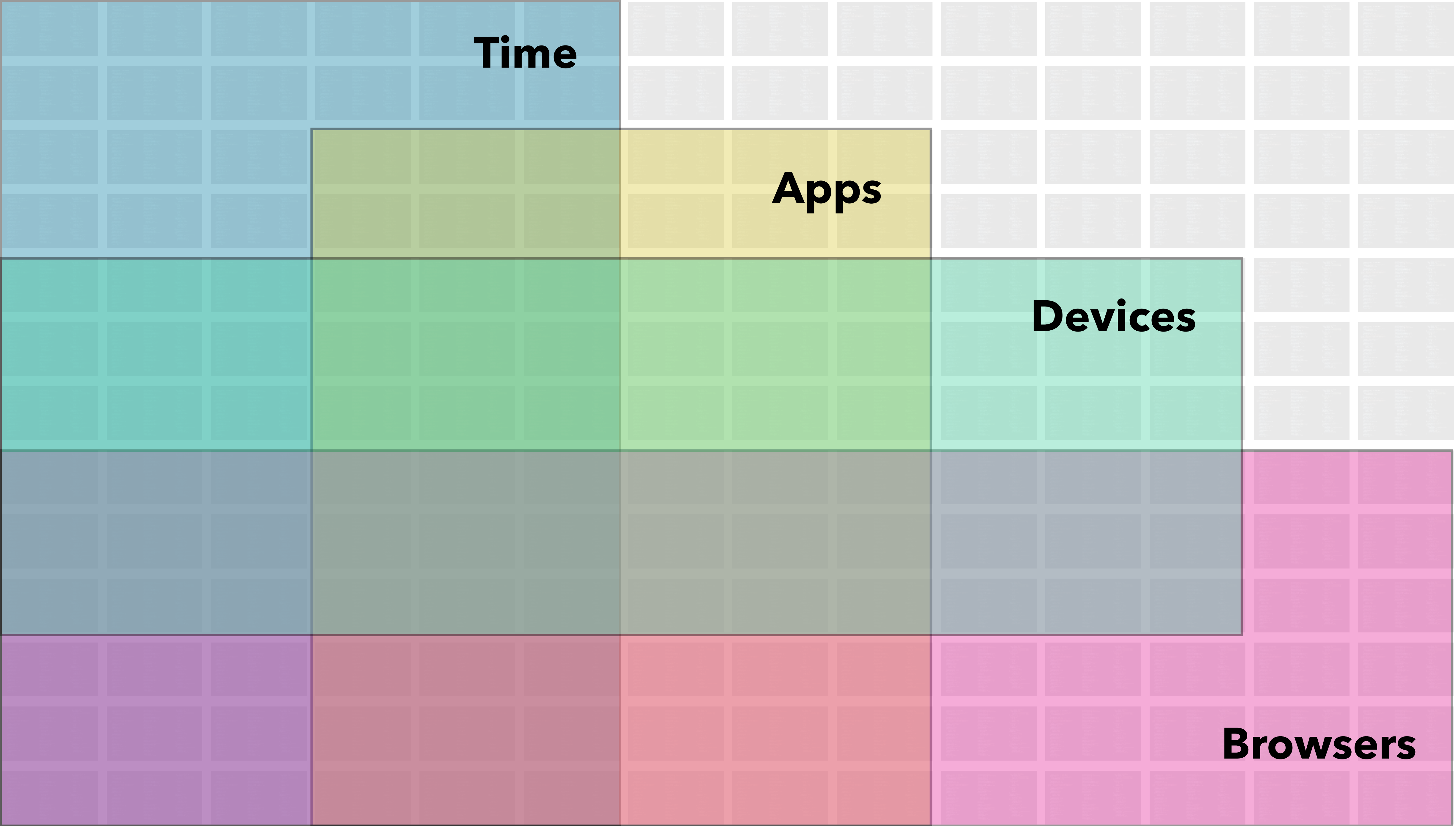
  "cls": 0.9126544913493255,
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    "shiftTime": 1184,
    "shiftValue": 0.8756756756756757,
    "loadState": "dom-content-loaded"
  },
  "lClsElement": {...},
  "lClsShiftPrev": {
    "x": 0,
    "y": 184,
    "width": 720,
    "height": 1296
  },
  "lClsShiftCur": {
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  },
  "domSize": 3648,
  "domCssRules": 22771,
  "pageWeight": {
    "navigation": 0,
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  },
  "incidentData": {
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    "clickCount": 1,
    "lastScrollY": 0,
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  },
  "hostResources": {...},
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  "clickedElements": [...],
  "inp": 64,
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    "eventTime": 6873,
    "eventType": "pointer",
    "inputDelay": 11,
    "processingTime": 19,
    "presentationDelay": 33
  }
}
```



Time

Time





Time

Apps

Devices

Browsers

Time

Apps

Devices

Segment

Browsers

A person stands on a large, rectangular hay bale in a grassy field. The sun is low on the horizon, creating a warm, golden glow and silhouetting the person and the trees in the background. Several other hay bales are scattered in the distance. The overall mood is peaceful and contemplative.

**Where we
stand now**



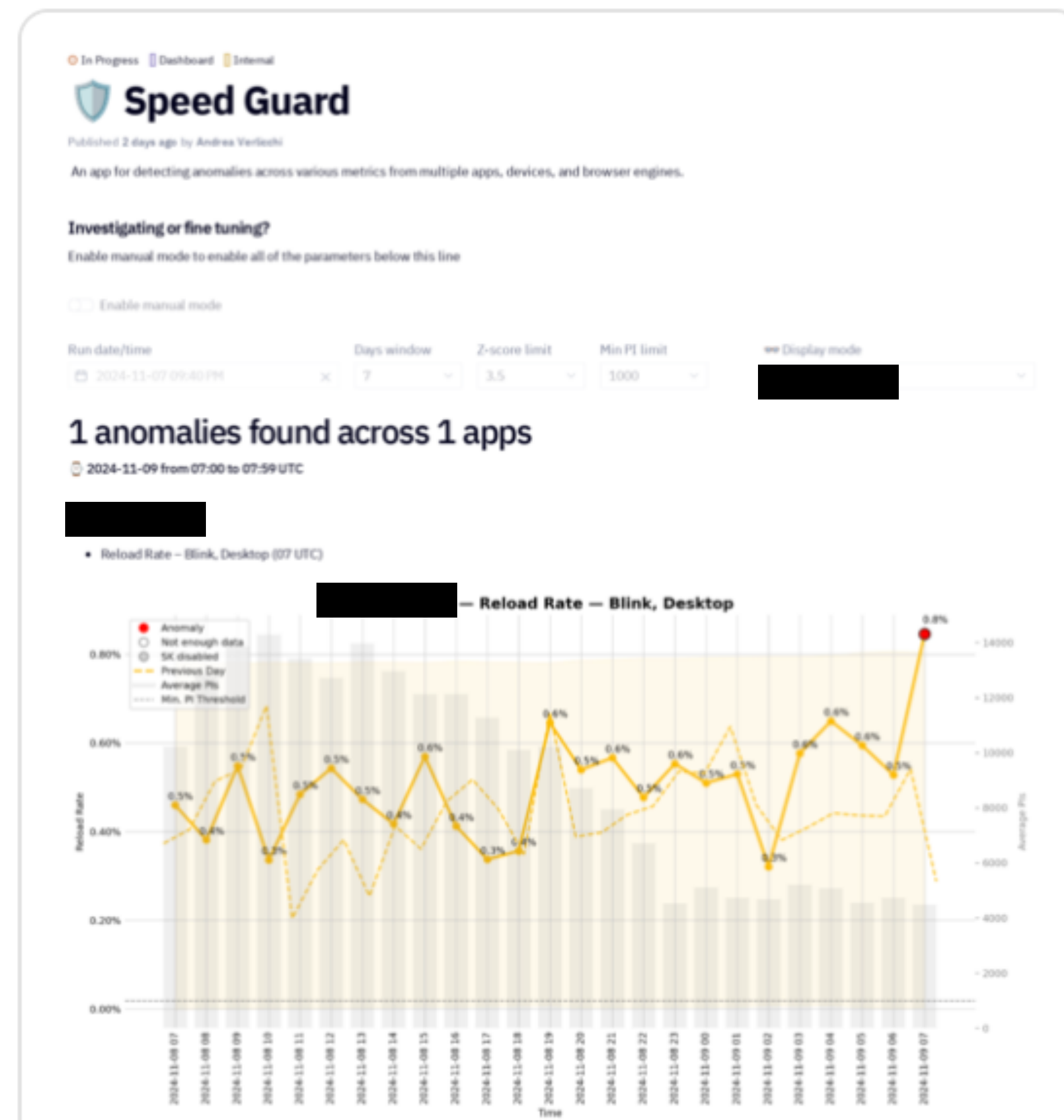
Hex APP 10:44 AM

Anomalies found is 1

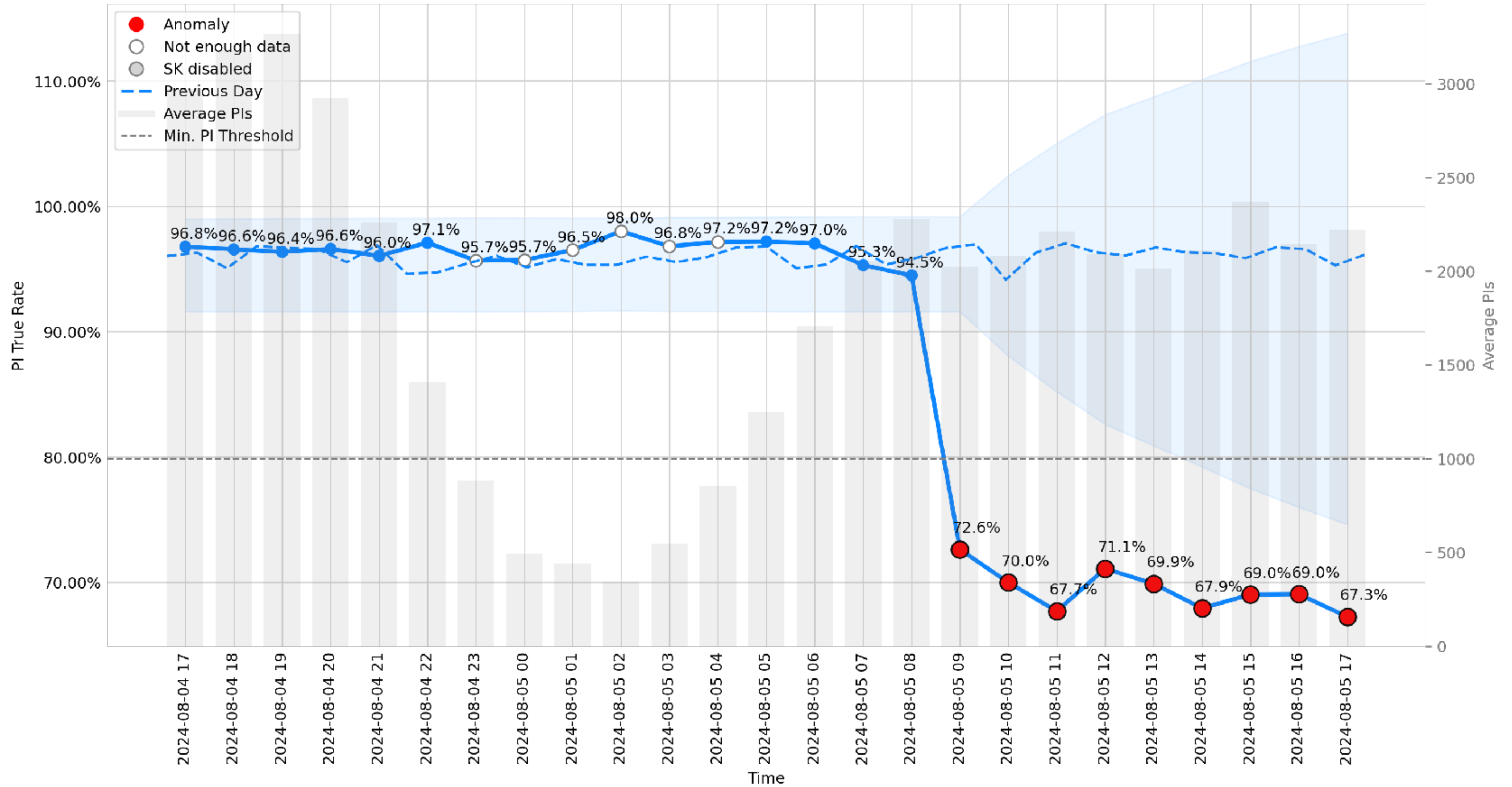
Anomalies found is 1, which is greater than 0.

This notification was triggered by a scheduled run of  Speed Guard.

____Speed_Guard.png ▼



Mobile — PI True Rate — Apple WebKit (Safari, Chrome iOS)



Takeaways

- **Find needles before looking in haystacks**
Use A/B testing and specific incidents to determine identifiers
- **Make sure your haystacks are big enough**
If data is too noisy or spotty, consider larger aggregates
- **Burn the straw man**
Let people tear your work apart – and see what remains standing
- **Sometimes a needle may poke you in the bum**
Embrace serendipity when you share and collaborate with others

Thanks!