

DATA VISUALIZATION WITH PROMETHEUS, GRAFANA, AND OBSERVABLE PLOT

BUSINESS ANALYTICS DAY
APRIL 14, 2022

PRESENTED BY

REUBEN CUMMINGS
PRESIDENT—NEREVU GROUP, LLC





REUBEN CUMMINGS

FOUNDER & PRESIDENT
AT NEREVU GROUP

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LIVE

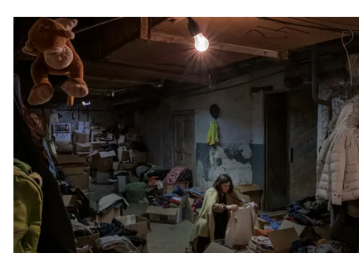
Russia Positions Thousands of Troops for Major Assault on East

- Satellite images, including pictures of an eight-mile-long convoy, confirm the movement of Moscow's military might for a new offensive in the Donbas region.
- "Mariupol is destroyed," President Volodymyr Zelensky said. "There are tens of thousands of dead."
- After meeting with President Vladimir Putin, the Austrian chancellor described feeling "pessimistic" about the future of the war. Here's the latest.

See more updates 9+

Bucha's Month of Terror

We documented dozens of killings of civilians and interviewed scores of witnesses to uncover Russian atrocities in Ukraine.



No More 'Have a Nice Day': Lviv Learns to Live With War

Ukraine's cultural capital, the western city of Lviv, is trying to adjust to being on the fringes of war and at the center of massive displacement.

The next big battle in the war, in Ukraine's east, is likely to look very different, experts said.

Daniel Berezhulak for The New York Times

President Biden urged Prime Minister Narendra Modi to not increase India's reliance on Russian oil and gas.

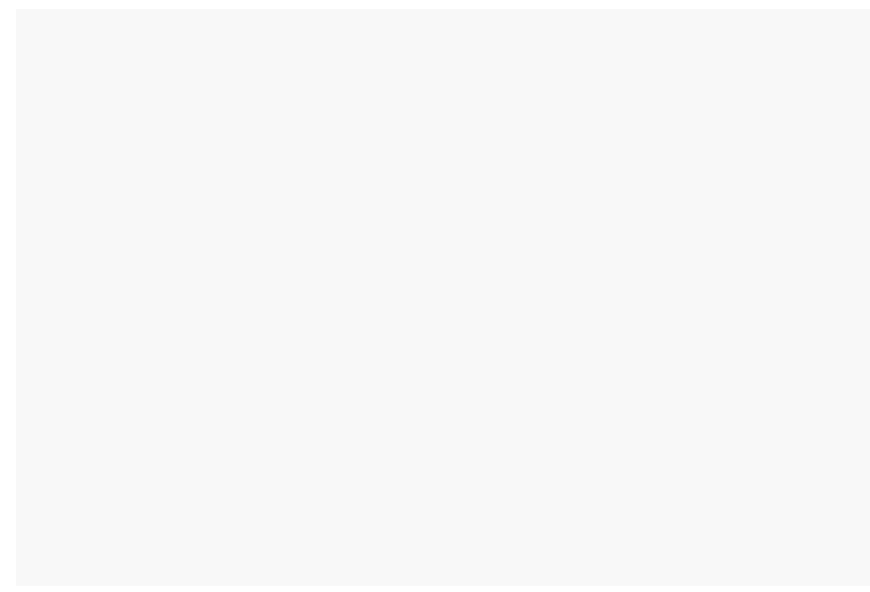
The U.S. is weighing a shift towards supporting the International Criminal Court as it investigates Russian atrocities.

A benefit concert for Ukraine was canceled in Vienna over concerns about a Russian-based ensemble it was to feature.

DAILY BUSINESS BRIEFING
Companies are sharing the financial hits they took after withdrawing from Russia. Get the latest business news.
See more headlines 9+

As Remote Work Becomes Permanent, Can Manhattan Adapt?

With more companies adopting hybrid work, New York City's economy, which relies on commuters and full office buildings, faces an uncertain future.



Hiroko Masuike/The New York Times

LIVE

Philadelphia to Reinstate Indoor Mask Mandate

The decision makes Philadelphia the first major city in the U.S. to do so this spring as cases rise, fueled by the BA.2 subvariant. Get pandemic updates.

See more updates 7+

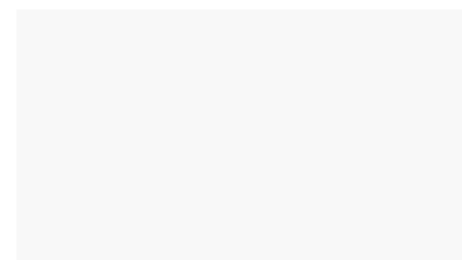
A company claimed its experimental drug halved the death rate among critically ill Covid patients.



Cases rising fastest P.R. D.C. R.I. N.J. **Other trackers** County lookup Global vaccinations

Twitter Grapples With an Elon Musk Problem

Mr. Musk, Twitter's biggest shareholder, is free to buy more stock in the company and could use the platform against itself. Some employees are dismayed.



Opinion

CHARLES A. KUPCHAN

Putin's War in Ukraine Is a Watershed. Time for America to Get Real.

PETER COY

Globalization Isn't Over. It's Changing.

GAIL COLLINS AND BRET STEPHENS

Is Trump the Democrats' Secret Weapon?

MONICA SIMPSON

To Be Pro-Choice, You Must Have the Privilege of Having Choices

ELIZABETH RUSH

I Would Have Never Bought This Home if I Knew It Flooded

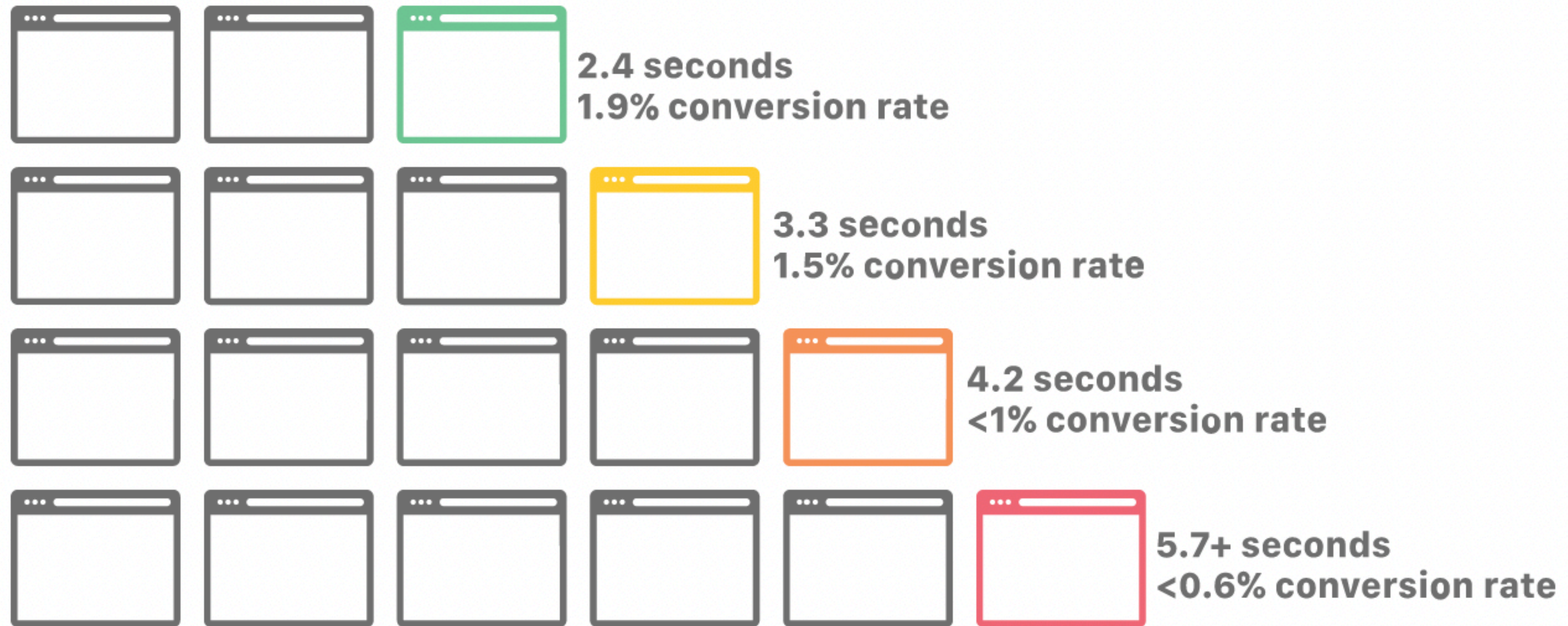
JAY CASPIAN KANG

In Defense of Email

WEBPAGE PERFORMANCE

HOW LONG DOES YOUR WEBPAGE TAKE TO LOAD?





PAGE SPEED EFFECT ON CONVERSION RATE

SOURCE: [CLOUDFLARE.COM](https://www.cloudflare.com/learning/performance/page-speed-effect-on-conversion-rate/)

“

How can we measure
performance?

Prometheus - Monitoring system x +

prometheus.io

Prometheus DOCS DOWNLOAD COMMUNITY SUPPORT & TRAINING BLOG Search

From metrics to insight

Power your metrics and alerting with the leading

Elements Console Sources Network Performance Memory Application Security Lighthouse Recorder

5:22:33 PM - prometheus.io

https://prometheus.io/

Metric	Score
Performance	95
Accessibility	87
Best Practices	100
SEO	92
PWA	-

Performance

95

Values are estimated and may vary. The [performance score is calculated](#) directly from these metrics. [See calculator.](#)

▲ 0-49 ■ 50-89 ● 90-100

LIGHTHOUSE - CHROME DEVTOOLS



From metrics to insight

Power your metrics and alerting with the

Console

Sources

Network

Performance

Memory

Application

Security

Lighthouse

Recorder



prometheus.io



us.io/



Performance



Accessibility



Best



SEO



PWA

LIGHTHOUSE - CHROME DEVTOOLS

web.dev/measure/

https://prometheus.io/ SWITCH URL RUN AUDIT

Audited on: Apr 11, 5:23 PM [View Report](#)

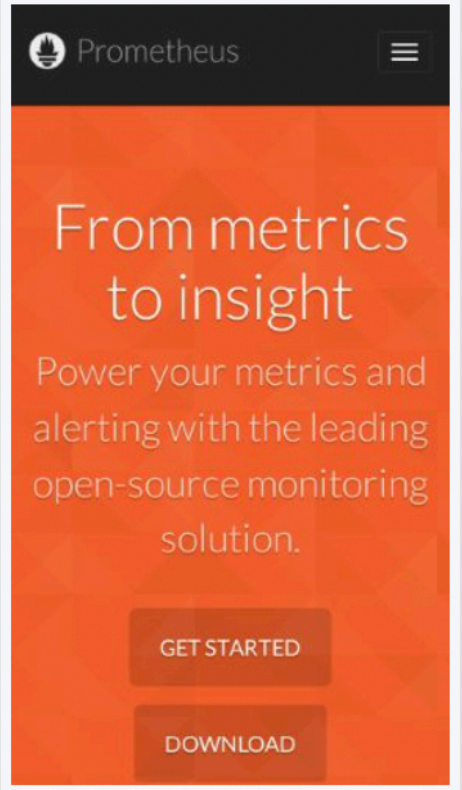
Metric	Score
Performance	78
Accessibility	87
Best Practices	100
SEO	92

Performance

78

Values are estimated and may vary. The [performance score is calculated](#) directly from these metrics. [See calculator.](#)

▲ 0-49 ■ 50-89 ● 90-100



PAGESPEED INSIGHTS - WEB.DEV/MEASURE

“

There's got to be a
better way!

Prometheus

DOCS DOWNLOAD COMMUNITY SUPPORT & TRAINING BLOG

Search

From metrics to insight

Power your metrics and alerting with the leading open-source monitoring solution.

GET STARTED DOWNLOAD

The Prometheus Team strongly condemns Russia's illegal invasion of Ukraine. Please consider donating to a humanitarian aid organization such as [Aktion Deutschland Hilft](#) or [Care in Action](#) to provide relief.

Search or jump to... Pulls Issues Marketplace Explore

foomo / **pagespeed_exporter** Public

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Code Issues 6 Pull requests Actions Projects Wiki

master Go to file Add file Code

smartinov Merge pull... ✓ on Jul 13, 2021 122

.github	chore: update procedures	2 years ago
collector	Fixed CLS parse that alw...	9 months ago
example	Add new timing metrics	2 years ago
handler	Change of PrometheusTi...	2 years ago
helm	comments on values file	2 years ago
.dockerig...	feat: update project to g...	3 years ago
.gitignore	chore: prepare makefile f...	3 years ago
.travis.yml	chore: update procedures	2 years ago
Dockerfile	feat: update project to g...	3 years ago
LICENSE	Initial commit	5 years ago
Makefile	feat: fix issues with metri...	3 years ago
README....	Fix pushGateway options	2 years ago
VERSION	Add initial exporter husk	5 years ago

About Prometheus pagespeed exporter

docker go lang metrics speedtest prometheus prometheus-exporter pagespeed lighthouse pagespeed-exporter google-pagespeed-metrics

Readme MIT License 183 stars 8 watching 29 forks

Releases 6

v2.1.4: Merge pull requ... Latest on Jul 13, 2021

+ 5 releases

PROMETHEUS + PAGESPEED EXPORTER



PROMETHEUS



PROMETHEUS.IO



PROMETHEUS

- ▶ Time series DB

PROMETHEUS.IO



PROMETHEUS

- Time series DB
- Open source

PROMETHEUS.IO



PROMETHEUS

- Time series DB
- Open source
- Single node

PROMETHEUS.IO



PROMETHEUS

- Time series DB
- Open source
- Single node
- Pull based

PROMETHEUS.IO



PROMETHEUS

- ▶ Time series DB
- ▶ Open source
- ▶ Single node
- ▶ Pull based
- ▶ Alerting

PROMETHEUS.IO



PROMETHEUS

- Time series DB
- Open source
- Single node
- Pull based
- Alerting
- REST API

PROMETHEUS.IO



PROMETHEUS

- Time series DB
- Open source
- Single node
- Pull based
- Alerting
- REST API
- Queryable

PROMETHEUS.IO

PAGESPEED EXPORTER



Google



PageSpeed Insights

[GITHUB.COM/FOOMO/PAGESPEED_EXPORTER](https://github.com/foomo/pagespeed_exporter)

PAGESPEED EXPORTER

- Prometheus Exporter

The Google logo, consisting of the word "Google" in its characteristic multi-colored font (blue, red, yellow, blue, green, red).

PageSpeed Insights

[GITHUB.COM/FOOMO/PAGESPEED_EXPORTER](https://github.com/foomo/pagespeed_exporter)



PageSpeed Insights

PAGESPEED EXPORTER

- Prometheus Exporter
- Open source

[GITHUB.COM/FOOMO/PAGESPEED_EXPORTER](https://github.com/foomo/pagespeed_exporter)

The Google logo, consisting of the word "Google" in its characteristic multi-colored font (blue, red, yellow, blue, green, red).

PageSpeed Insights

PAGESPEED EXPORTER

- Prometheus Exporter
- Open source
- Calls PageSpeed Insights API

[GITHUB.COM/FOOMO/PAGESPEED_EXPORTER](https://github.com/foomo/pagespeed_exporter)



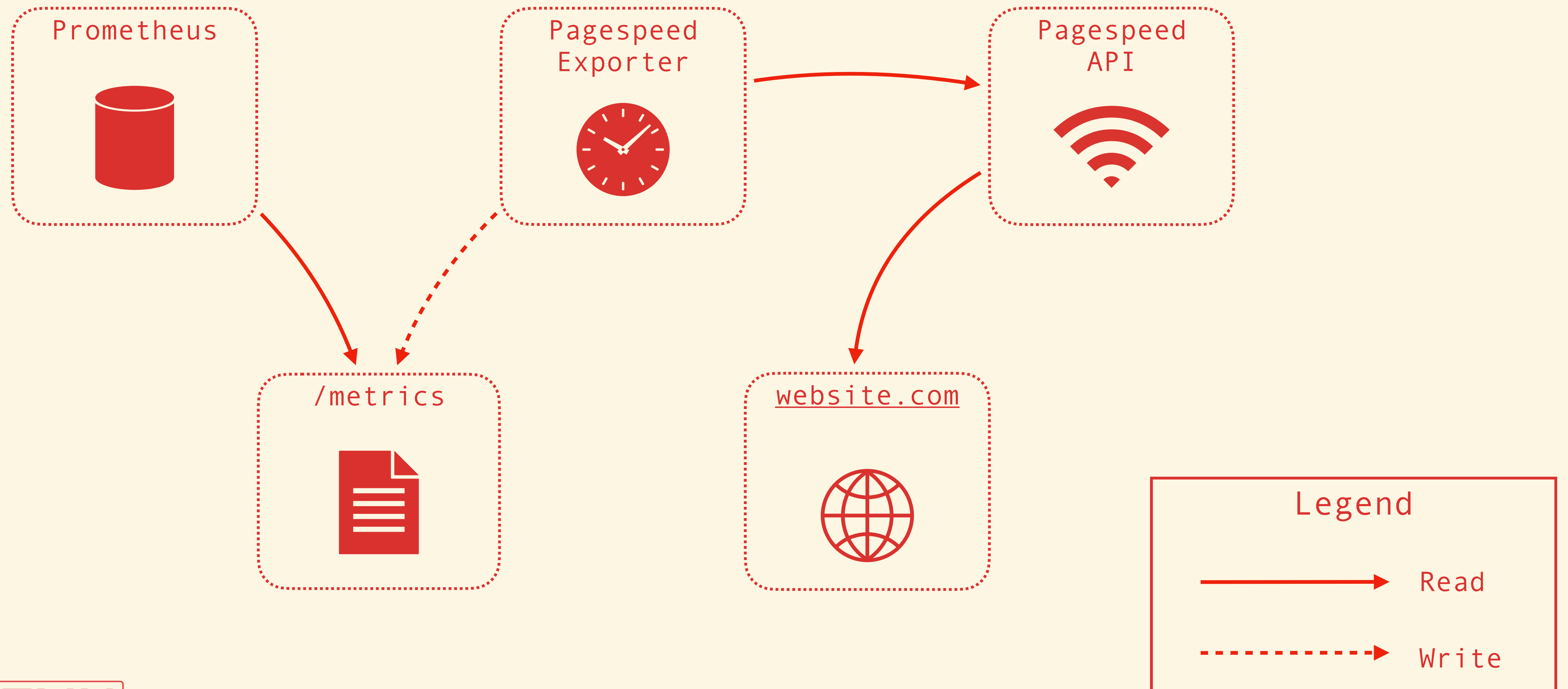
PageSpeed Insights

PAGESPEED EXPORTER

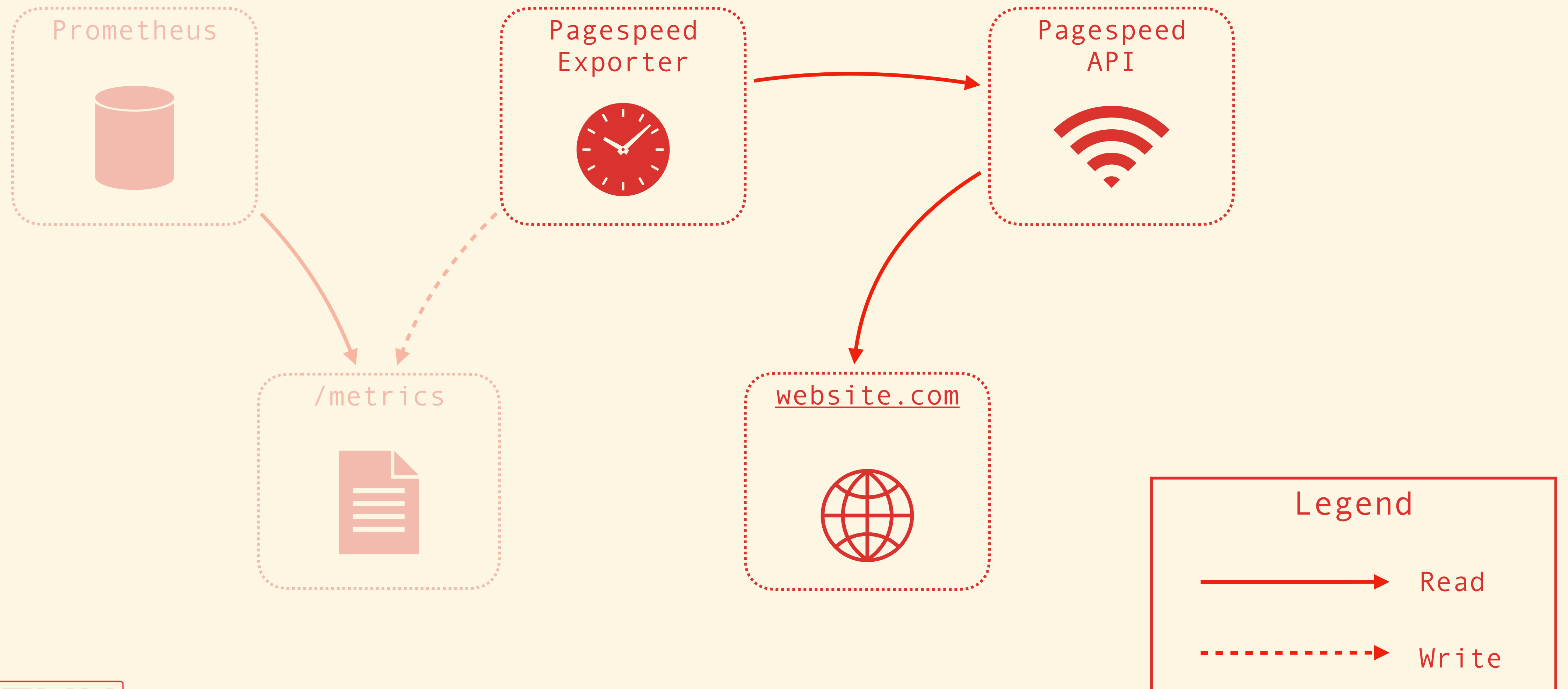
- Prometheus Exporter
- Open source
- Calls PageSpeed Insights API
- Measures both mobile and desktop performance

[GITHUB.COM/FOOMO/PAGESPEED_EXPORTER](https://github.com/foomo/pagespeed_exporter)

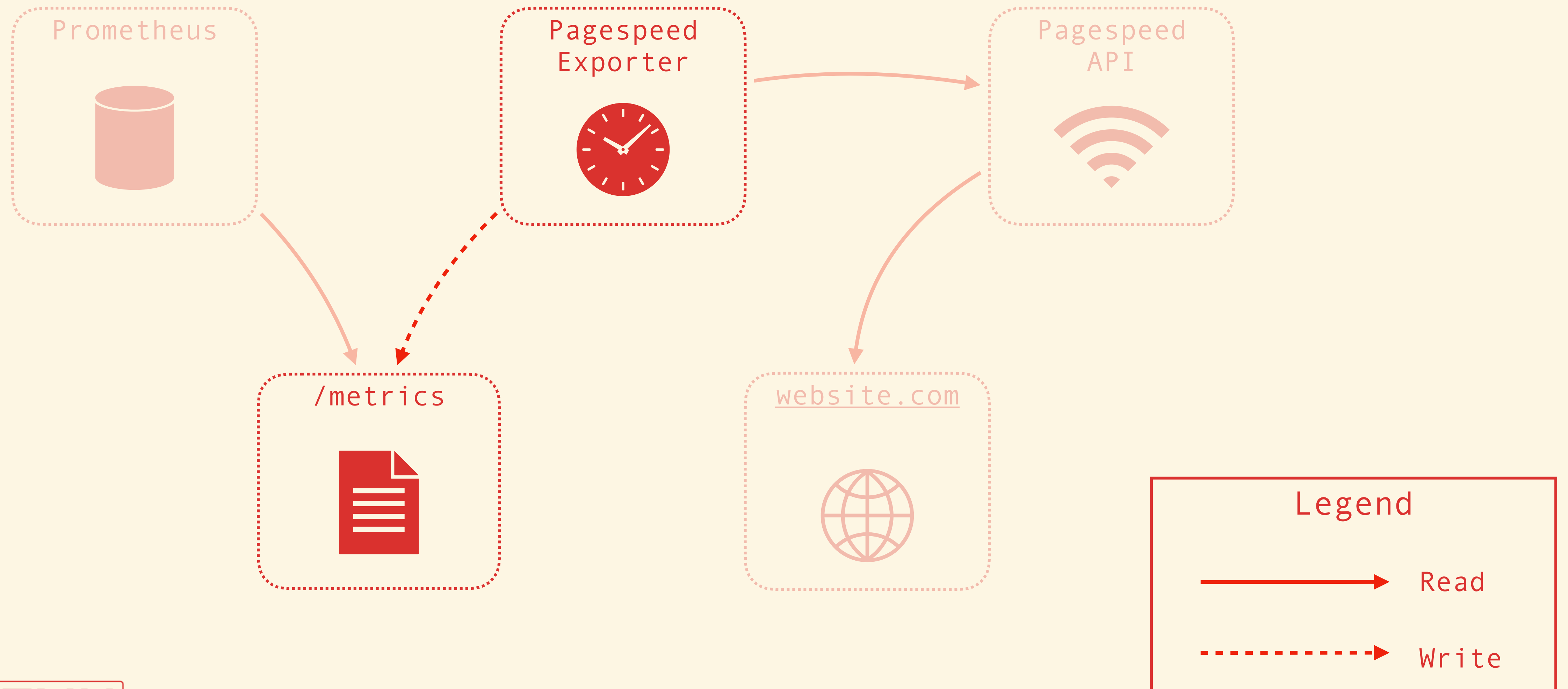
HIGH LEVEL ARCHITECTURE



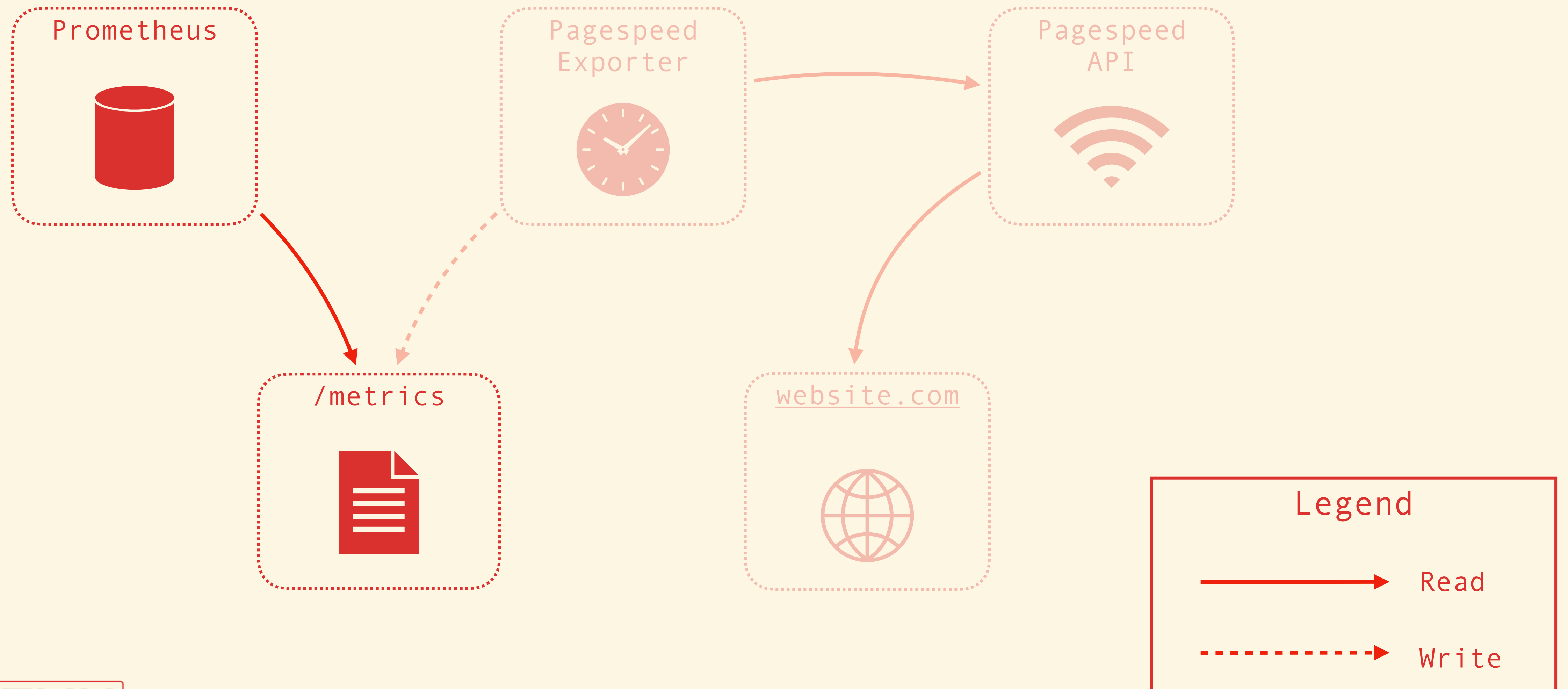
HIGH LEVEL ARCHITECTURE



HIGH LEVEL ARCHITECTURE



HIGH LEVEL ARCHITECTURE

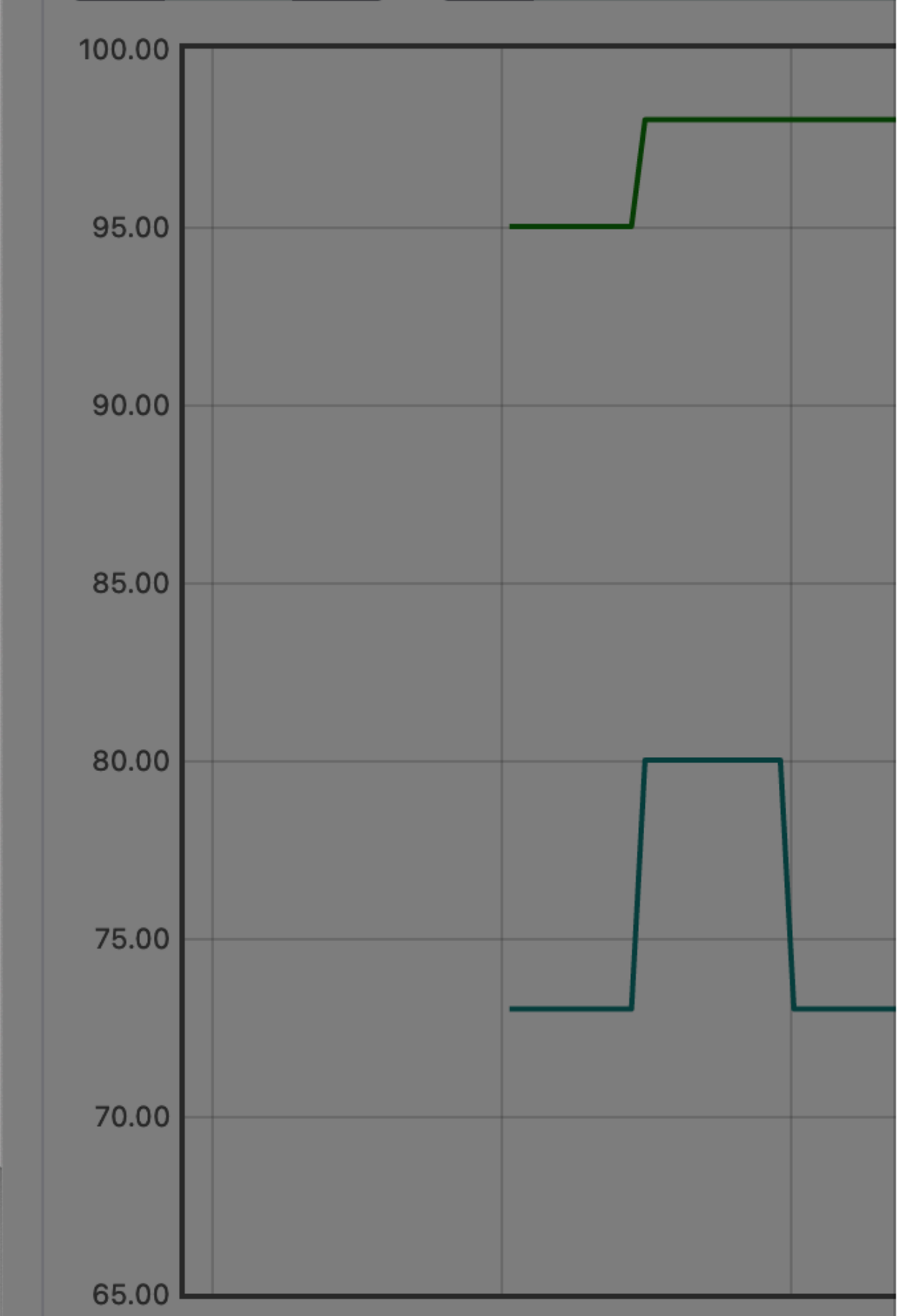


Use local time Enable query history

pagespeed_lighthouse_category_

Table Graph

2h End time



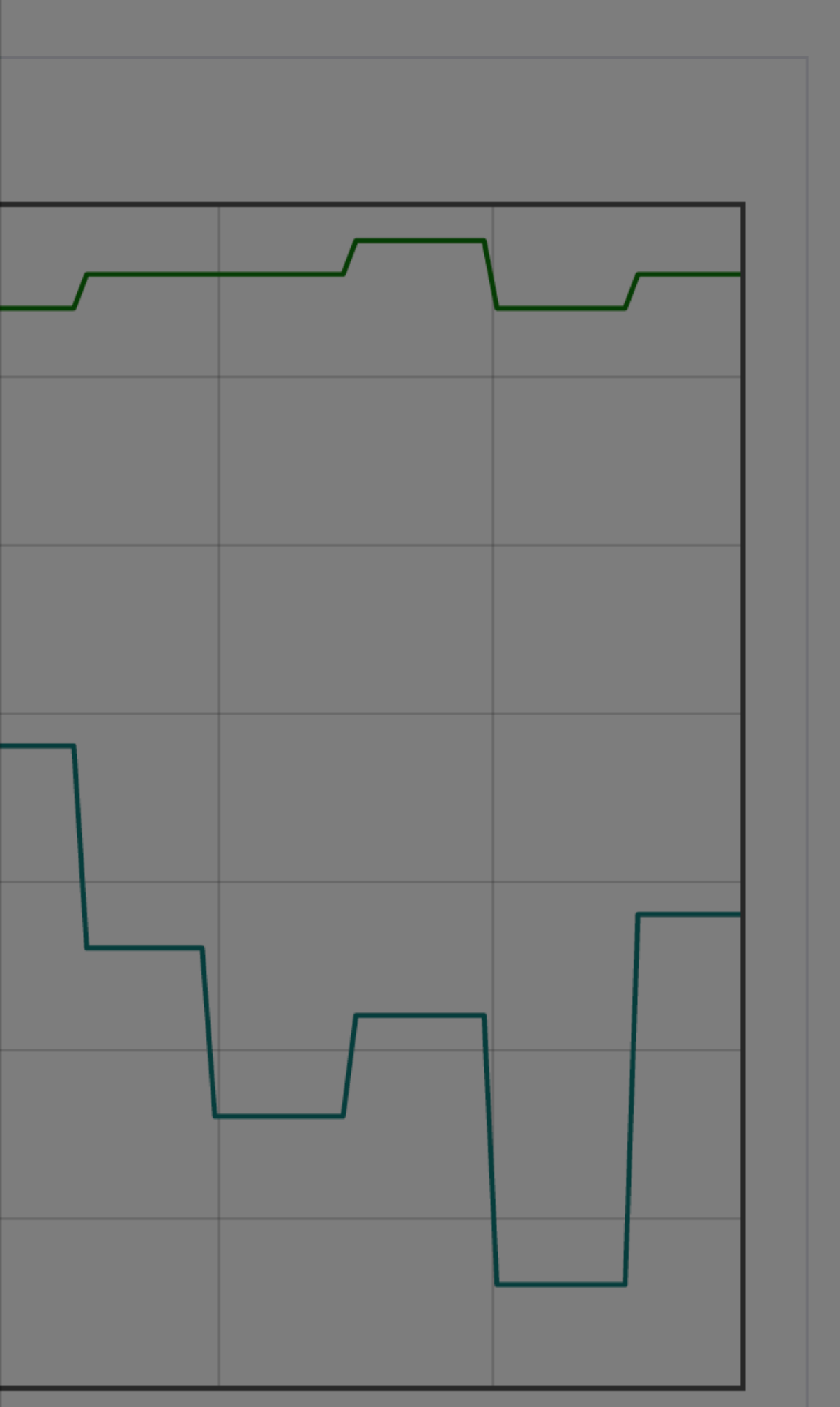
Metrics Explorer

pagespeed

- pagespeed_lighthouse_audit_score
- pagespeed_lighthouse_bootup_time_duration_seconds
- pagespeed_lighthouse_category_score
- pagespeed_lighthouse_cumulative_layout_shift_duration_seconds
- pagespeed_lighthouse_first_contentful_paint_duration_seconds
- pagespeed_lighthouse_first_meaningful_paint_duration_seconds
- pagespeed_lighthouse_interactive_duration_seconds
- pagespeed_lighthouse_largest_contentful_paint_duration_seconds
- pagespeed_lighthouse_mainthread_work_breakdown_duration_seconds
- pagespeed_lighthouse_max_potential_fid_duration_seconds
- pagespeed_lighthouse_server_response_time_duration_seconds
- pagespeed_lighthouse_speed_index_duration_seconds
- pagespeed_lighthouse_total_blocking_time_duration_seconds
- pagespeed_lighthouse_total_duration_seconds
- pagespeed_loading_experience_metrics_cumulative_layout_shift_score_duration_seconds
- pagespeed_loading_experience_metrics_first_contentful_paint_duration_seconds
- pagespeed_loading_experience_metrics_first_input_delay_duration_seconds

Execute

Load time: 52ms Resolution: 28s Result series: 2

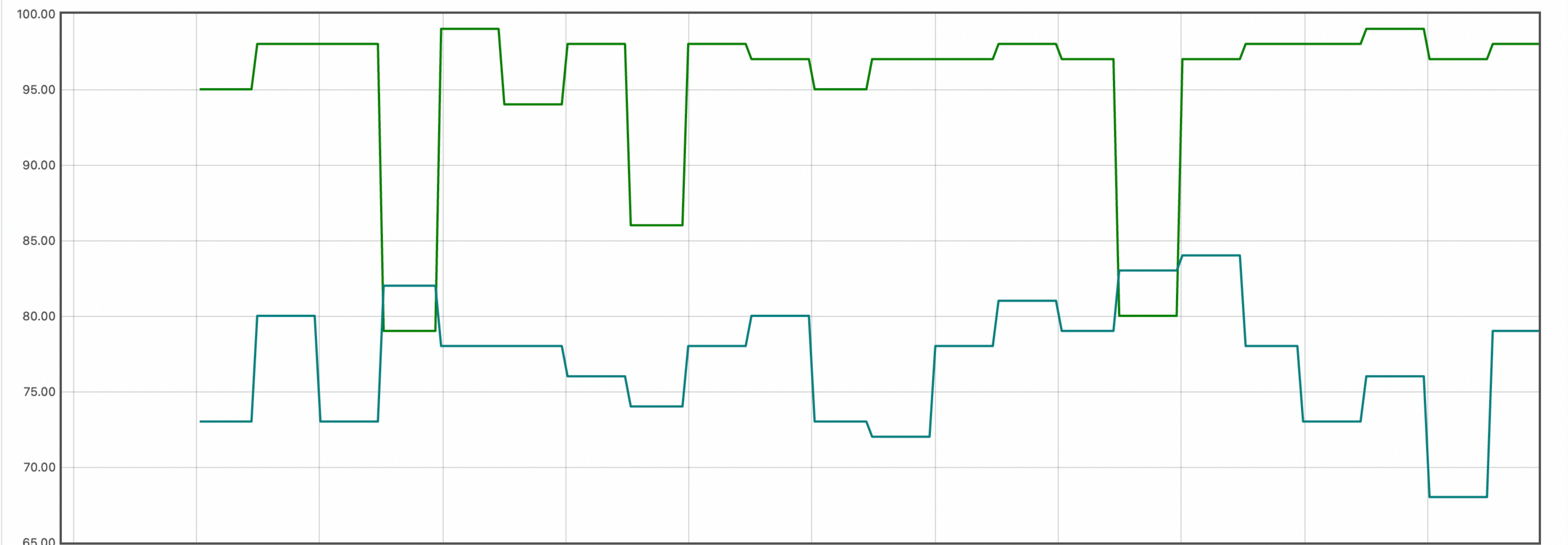


Use local time Enable query history Enable autocomplete Enable highlighting Enable linter

pagespeed_lighthouse_category_score{category="performance"}*100 Execute

Table Graph Load time: 52ms Resolution: 28s Result series: 2

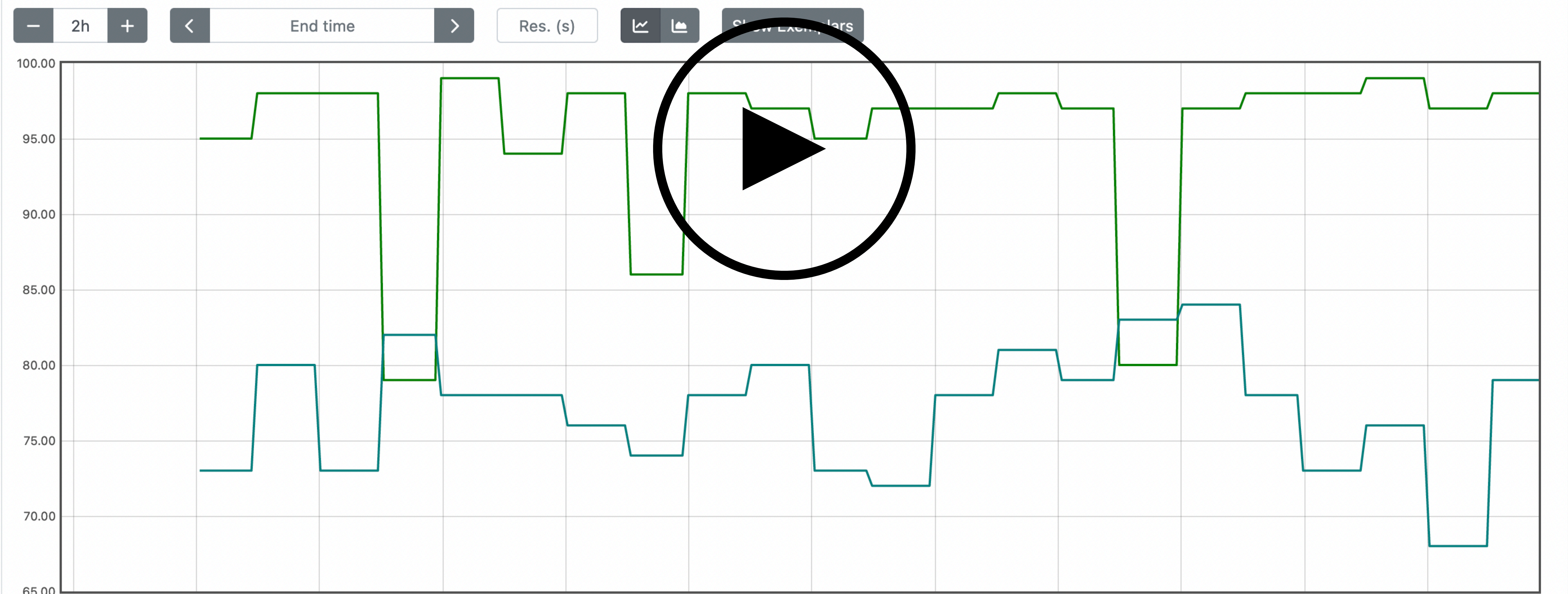
2h End time Res. (s) Show Exemplars



Use local time Enable query history Enable autocomplete Enable highlighting Enable linter

pagespeed_lighthouse_category_score{category="performance"}*100 Execute

Table Graph Load time: 52ms Resolution: 28s Result series: 2



“

Can we do better?

Grafana

Overview | Grafana project | Download

ANNOUNCEMENT GrafanaCONline June 13-17: Expert-led sessions & announcements on Grafana 9, Prometheus, Loki, and more. [Sign up →](#)

Dashboard anything. Observe everything.

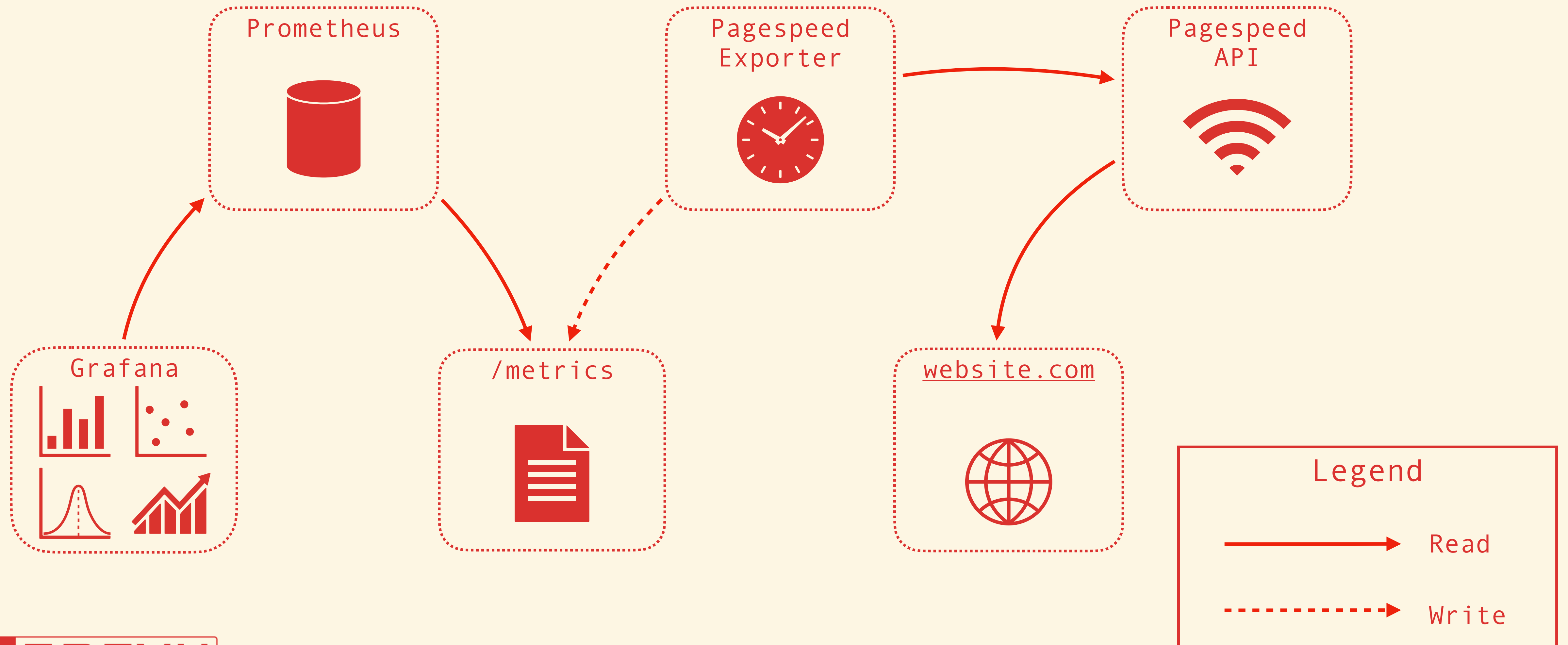
Query, visualize, alert on, and understand your data no matter where it's stored. With Grafana you can create, explore and share all of your data through beautiful, flexible dashboards.

[Get Grafana](#)

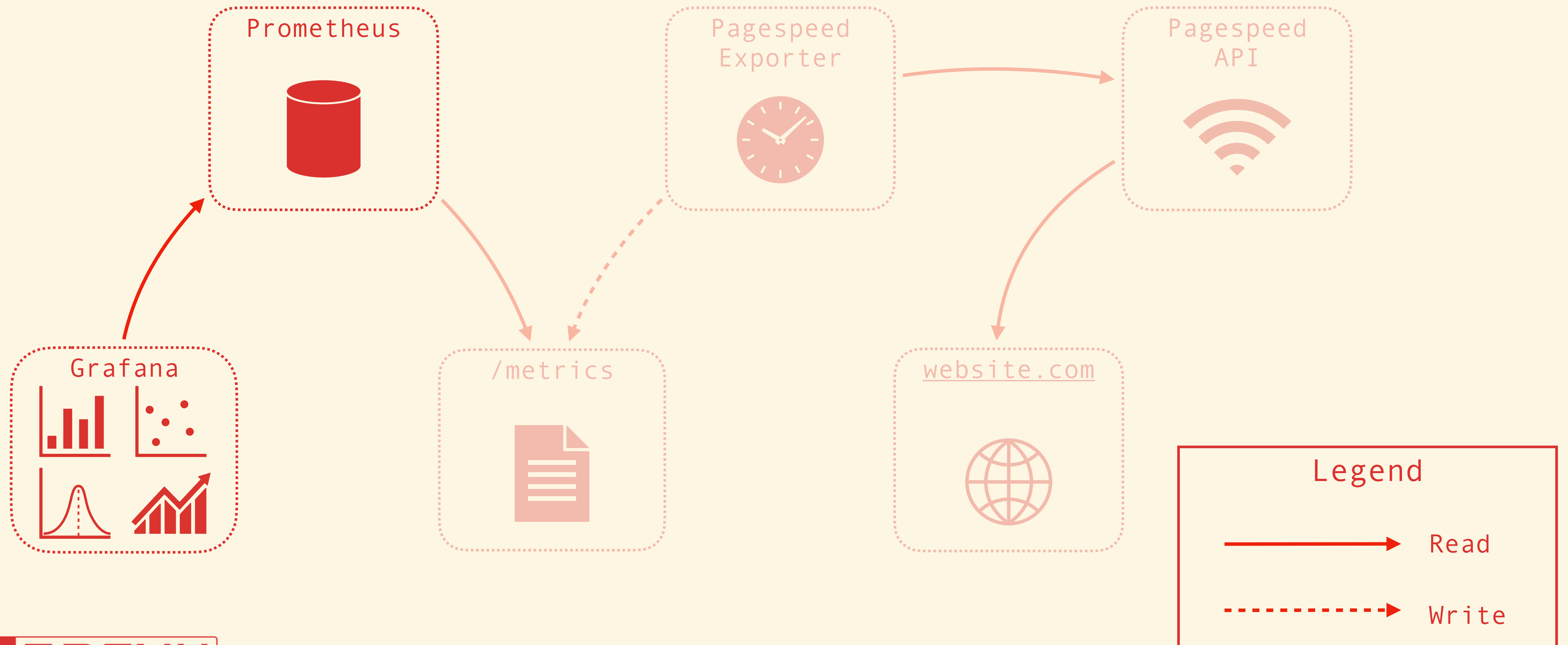
[Grafana sandbox](#)



HIGH LEVEL ARCHITECTURE



HIGH LEVEL ARCHITECTURE



General / Pagespeed

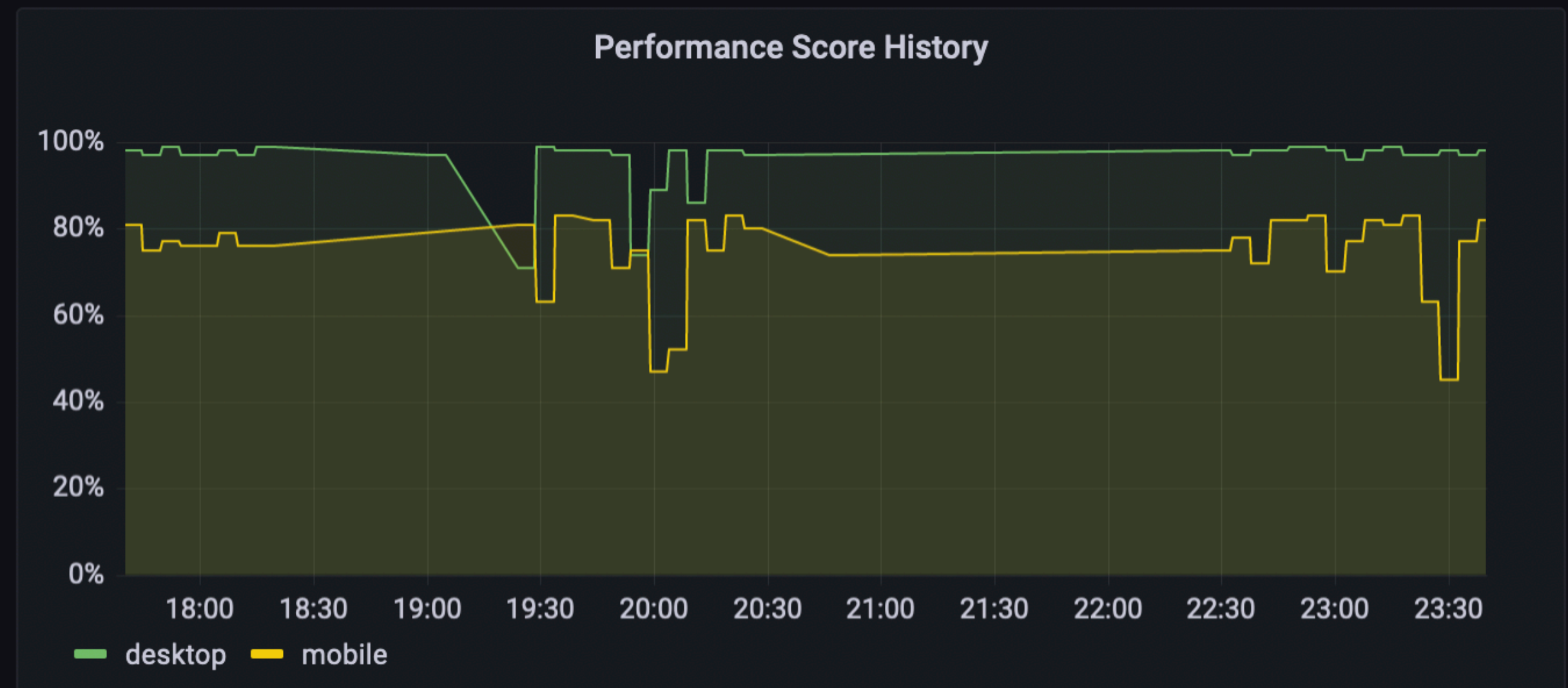
host

Last 6 hours 5m

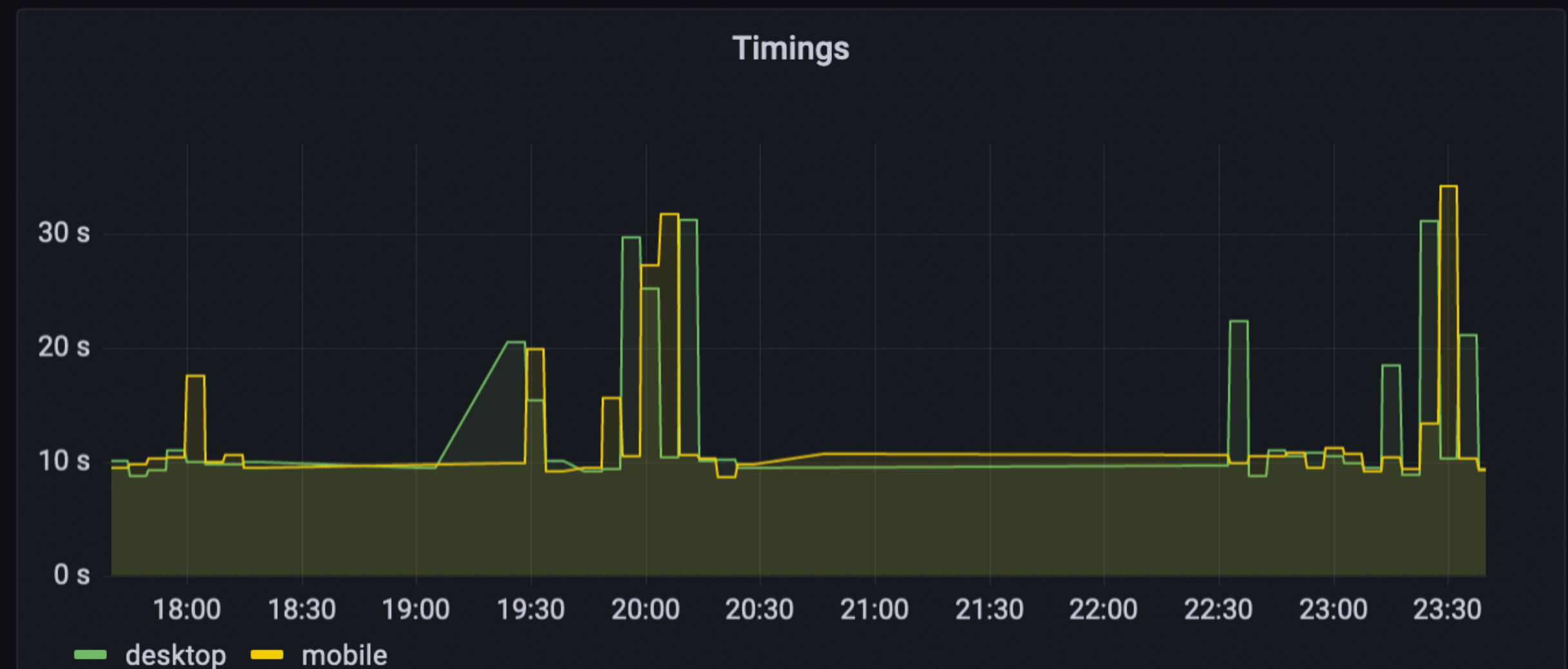
[Pagespeed v3 Reference](#)

Overview

Desktop Performance Desktop Accessibility Desktop SEO



Mobile Performance Mobile Accessibility Mobile SEO





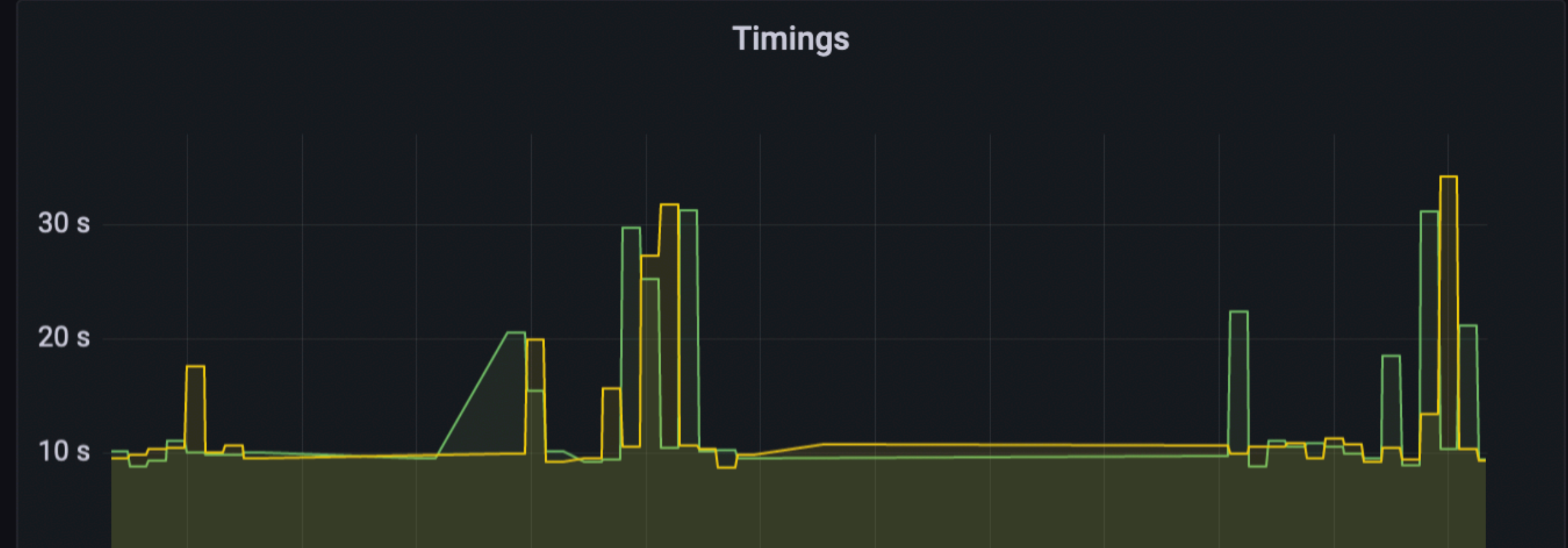
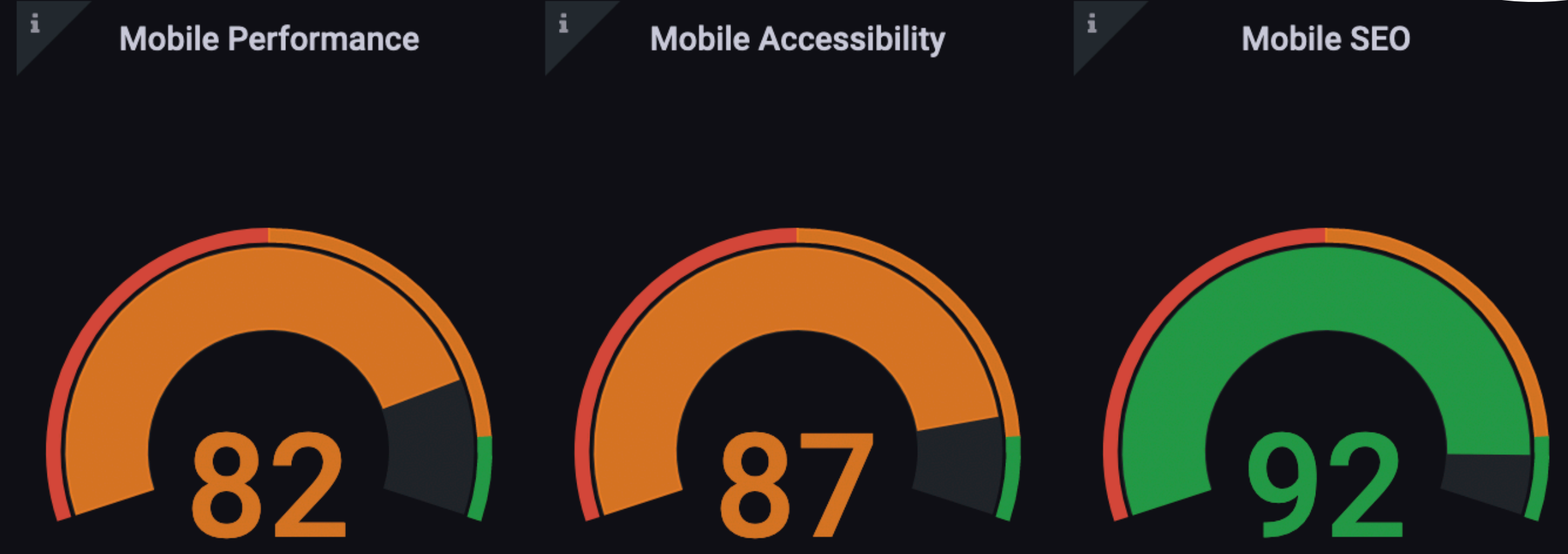
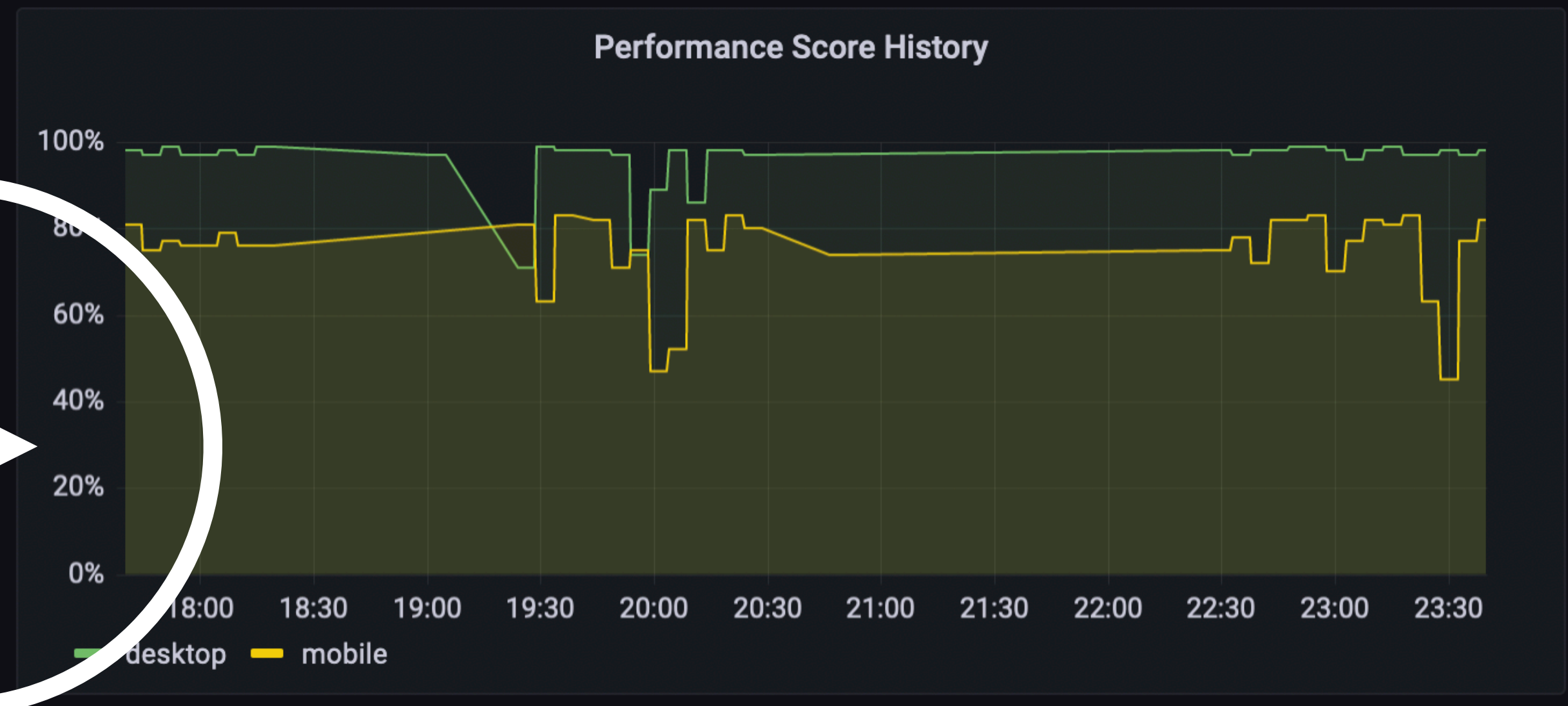
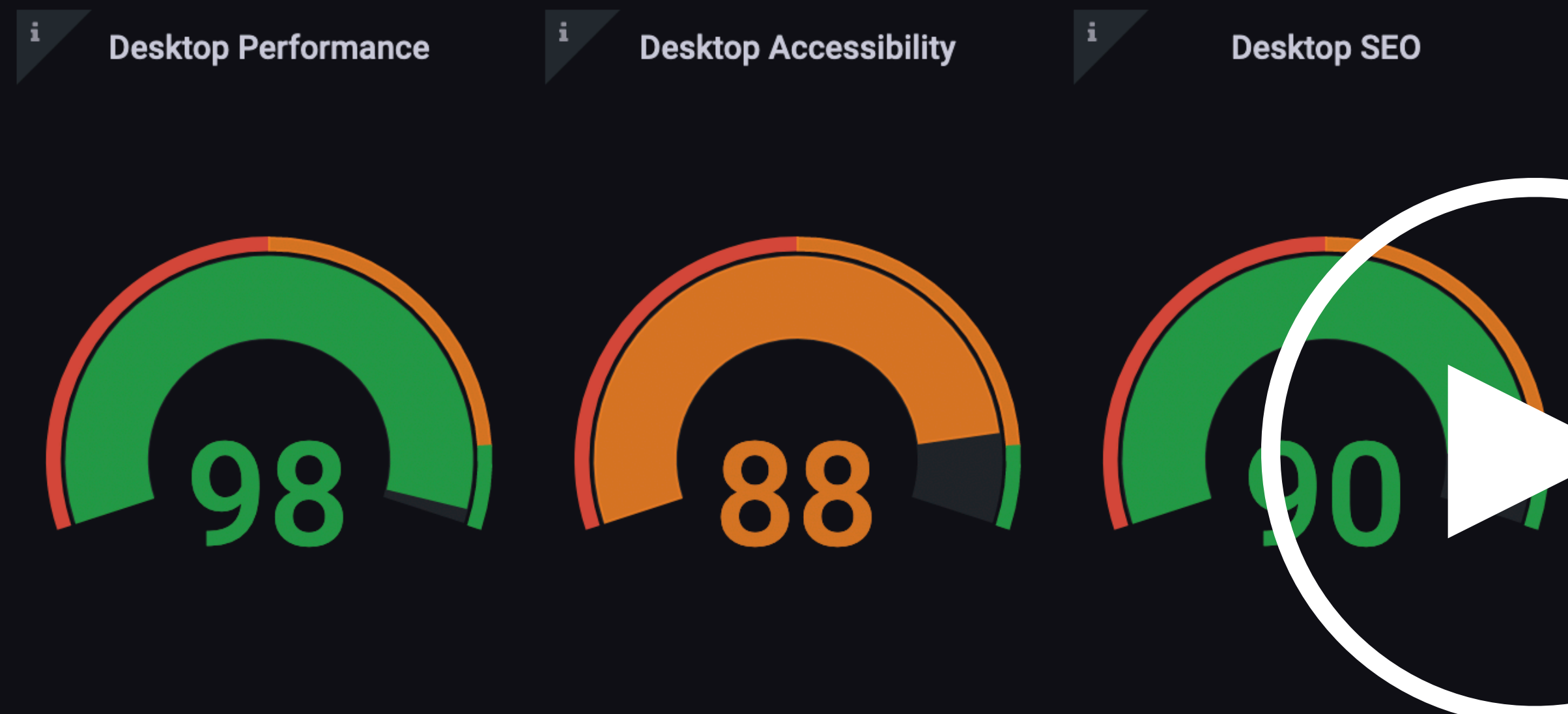
General / Pagespeed

Last 6 hours 5m

host


[Pagespeed v3 Reference](#)




Overview




“

Can we go further?

 **Observable** · observablehq.com
Use data to think, together.

Fork 3 unsaved changes   

2 collections By  Mike Bostock Published May 4, 2021 39 forks 351 Likes

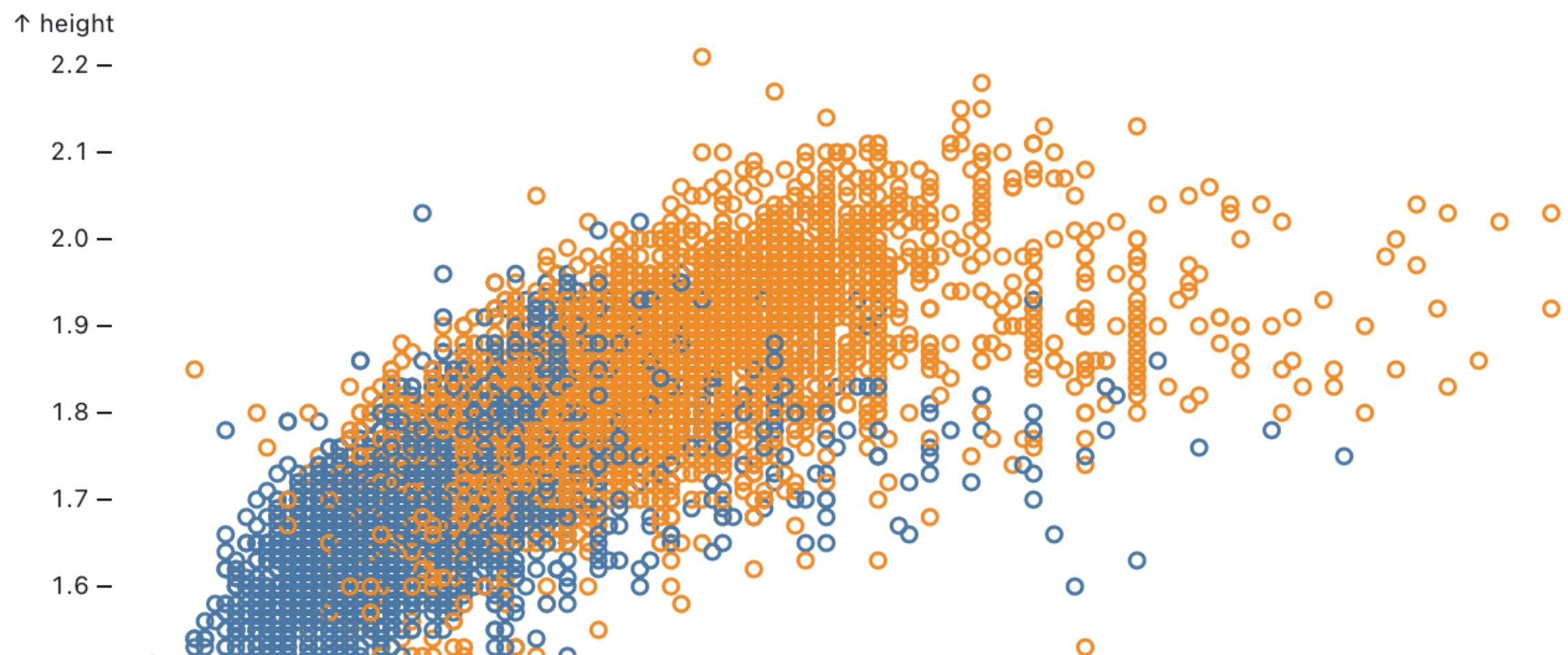
Observable Plot

Observable Plot is a free, open-source JavaScript library to help you quickly visualize tabular data.

```
athletes = ▶ Array(11538) [Object, Object, Object, Object, Object, Object, Object, Object, Object, Object, Object, Obj...
```

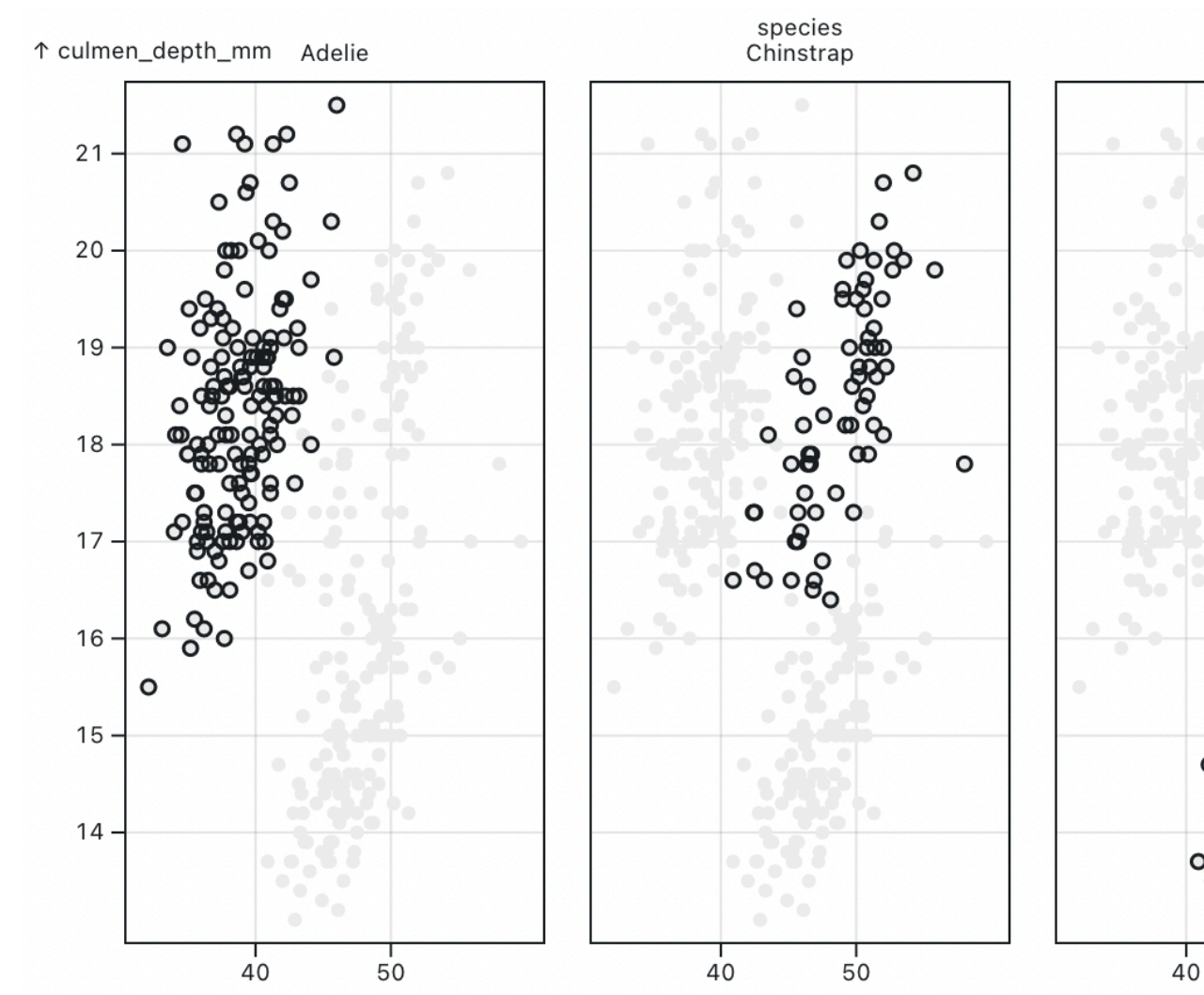
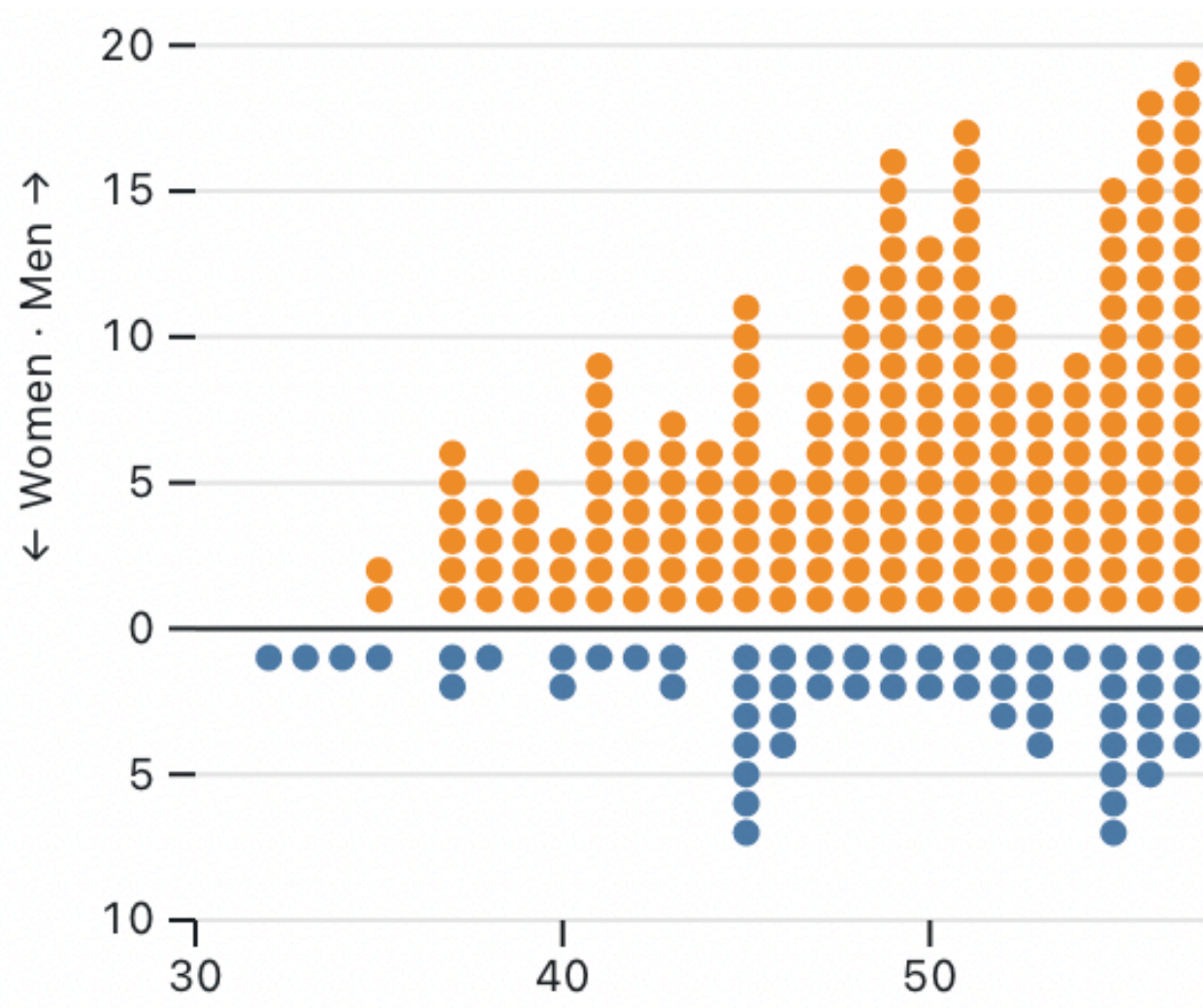
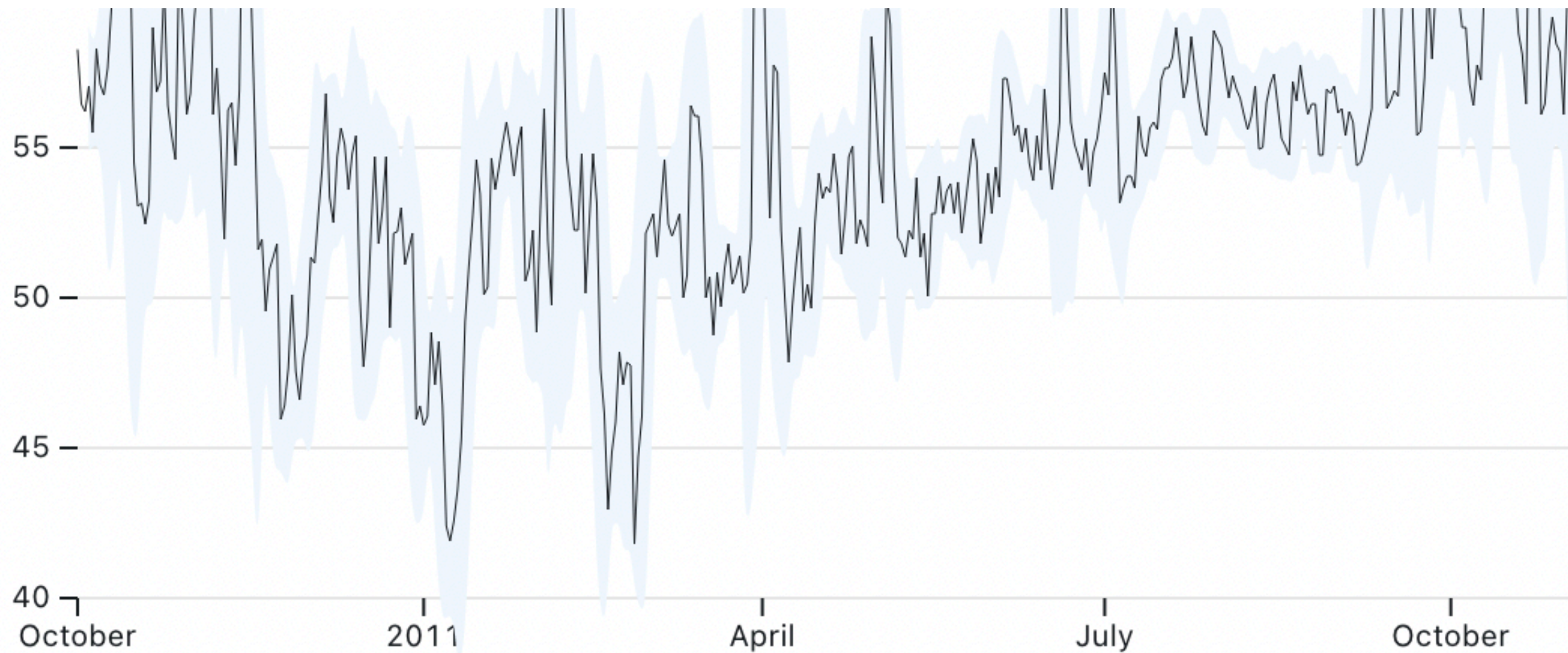
 female  male

```
dotplot.legend("color")
```



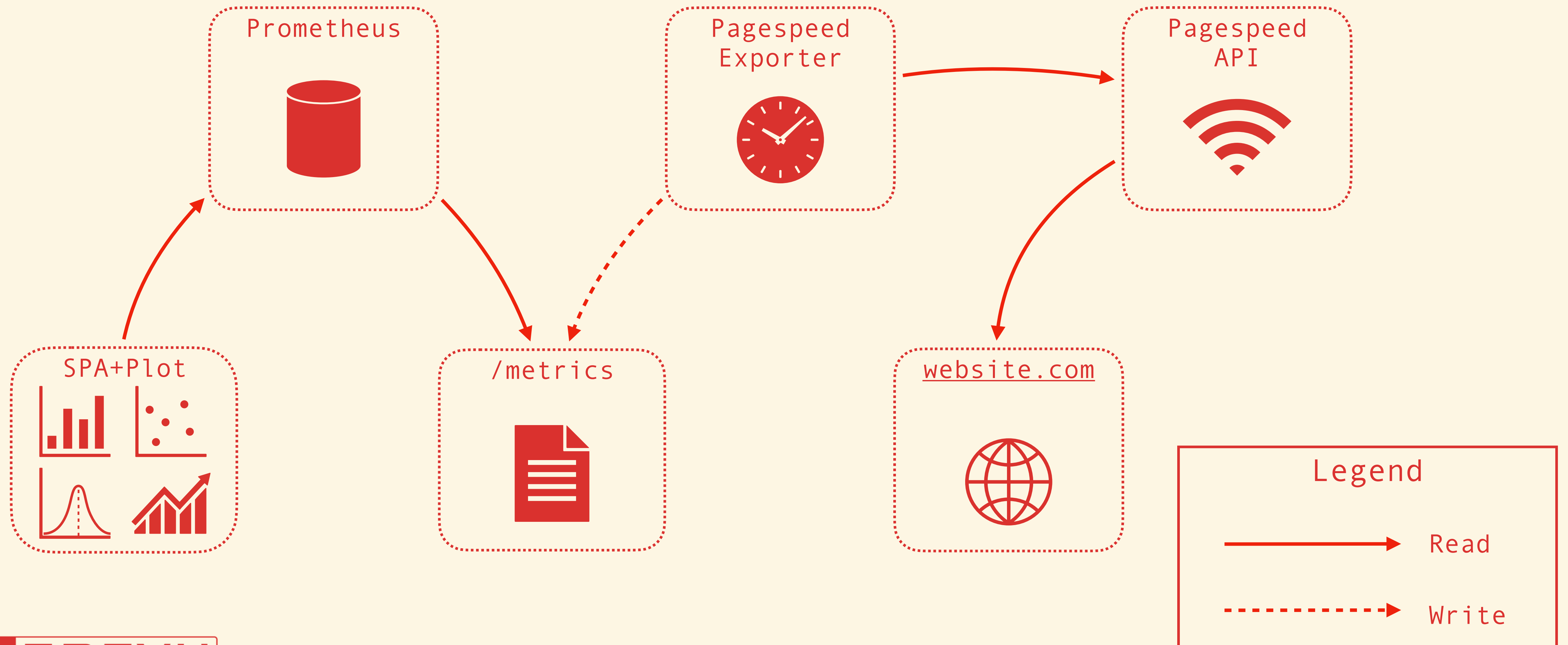
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↑ Stock price (\$)

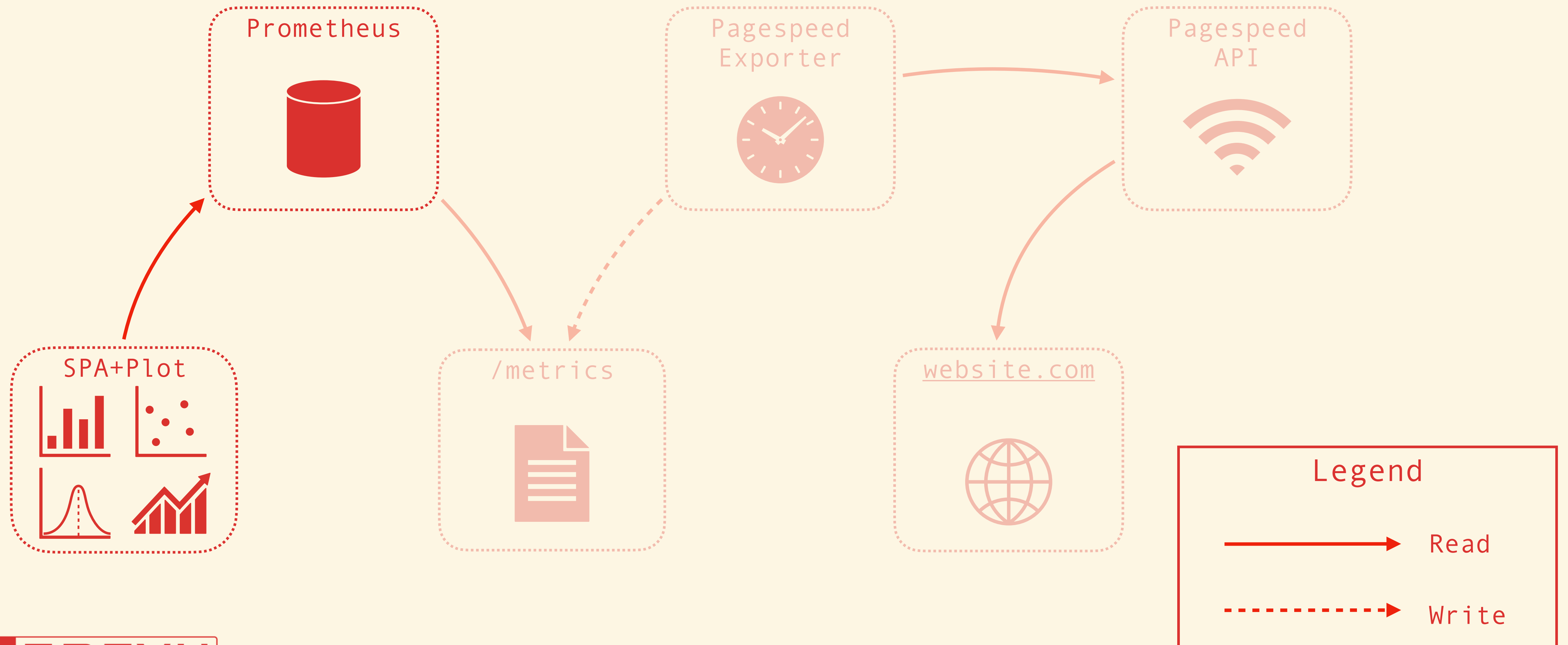


OBSERVABLE PLOT EXAMPLES

HIGH LEVEL ARCHITECTURE

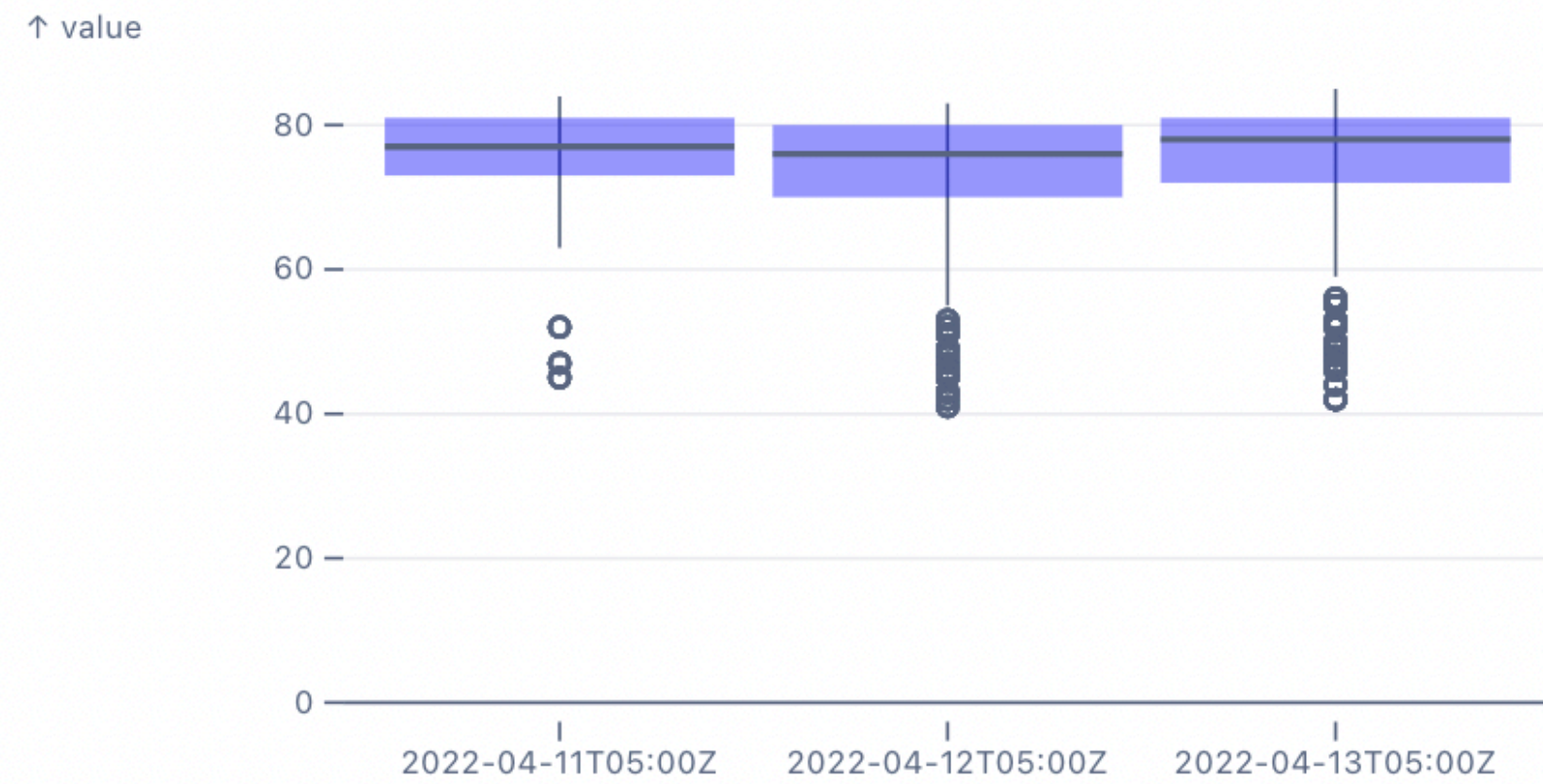


HIGH LEVEL ARCHITECTURE

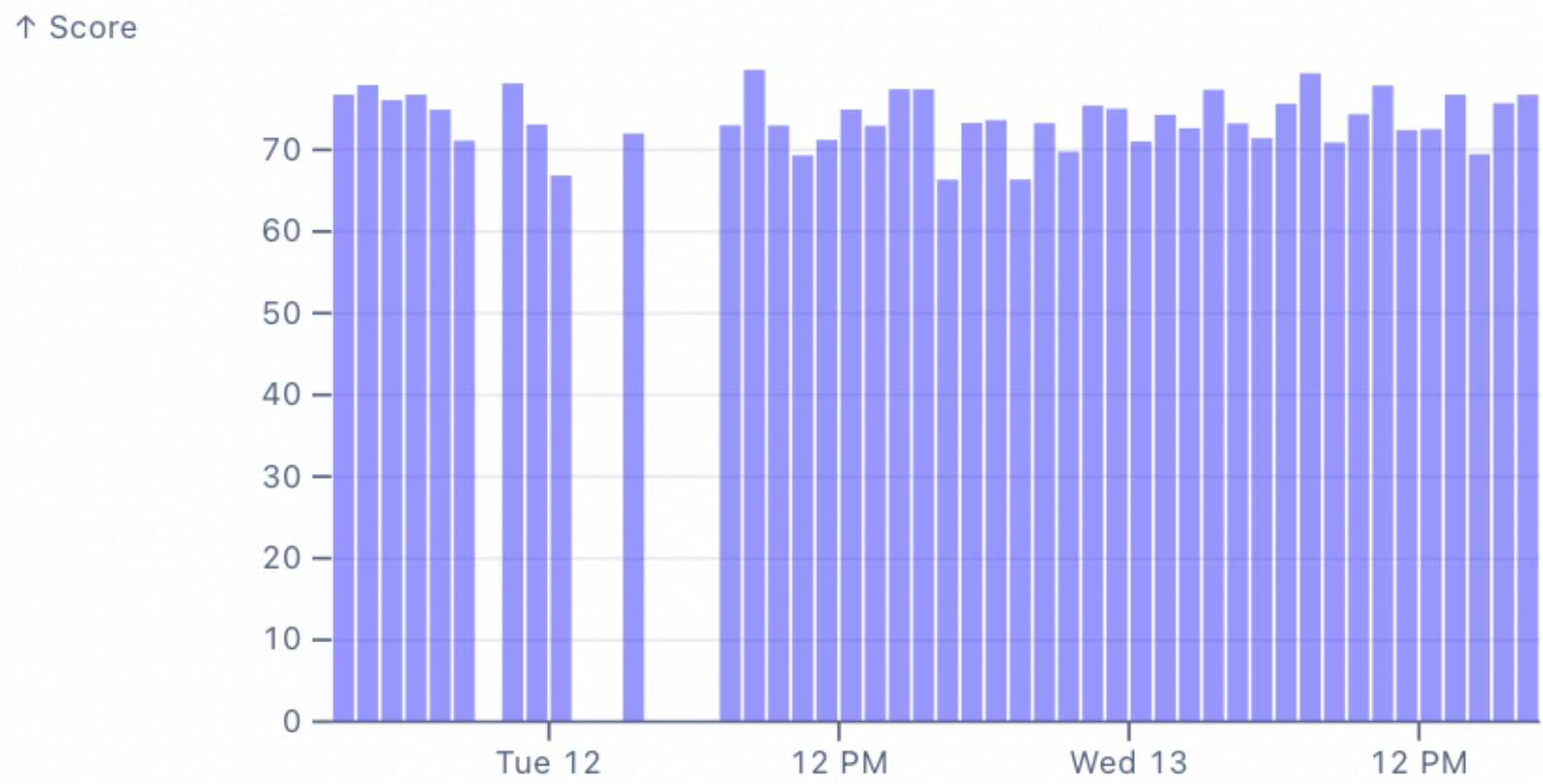


Prometheus Plot

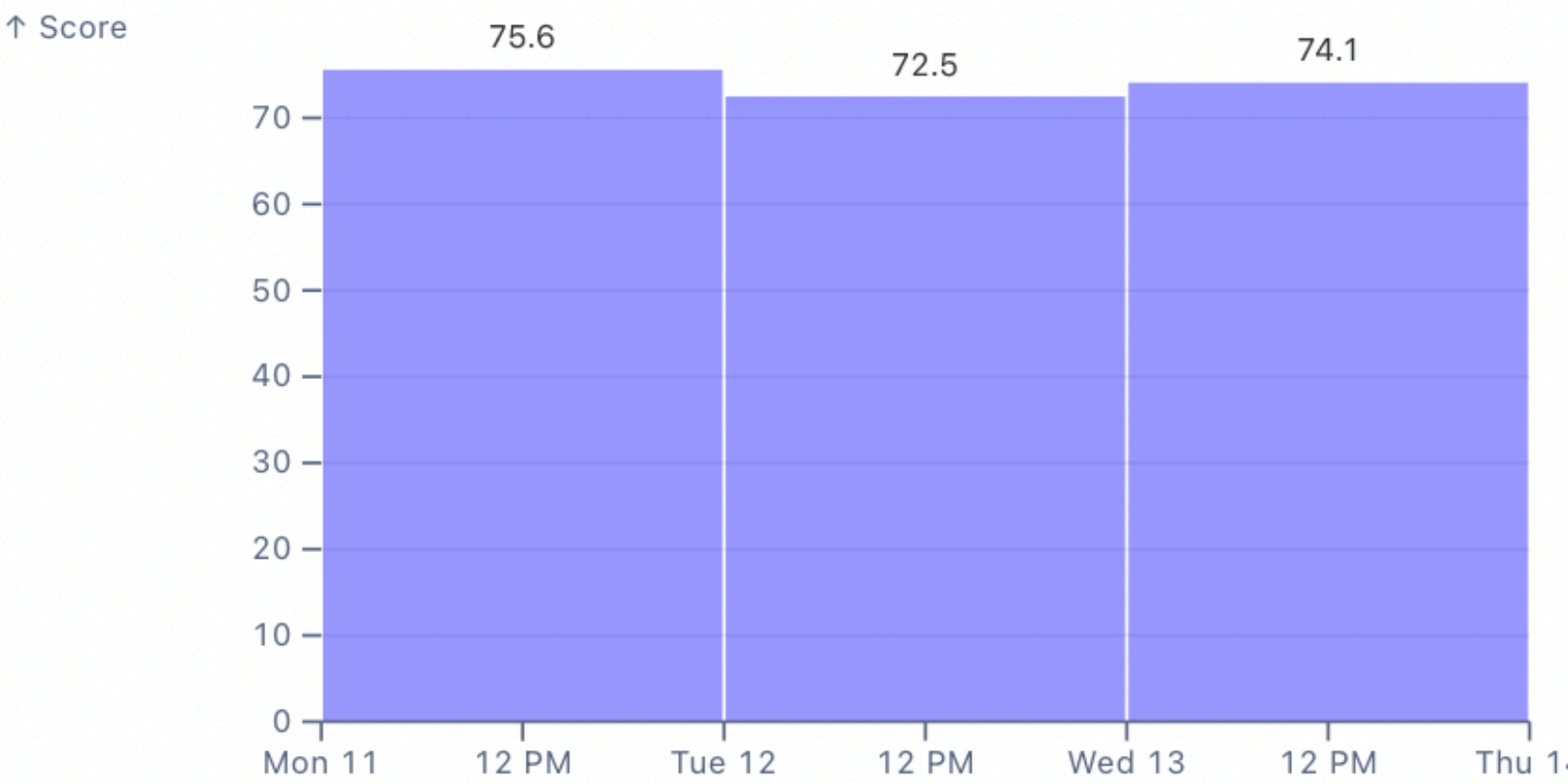
Average Daily Mobile Performance Score



Average Hourly Mobile Performance Score



Average Daily Mobile Performance Score



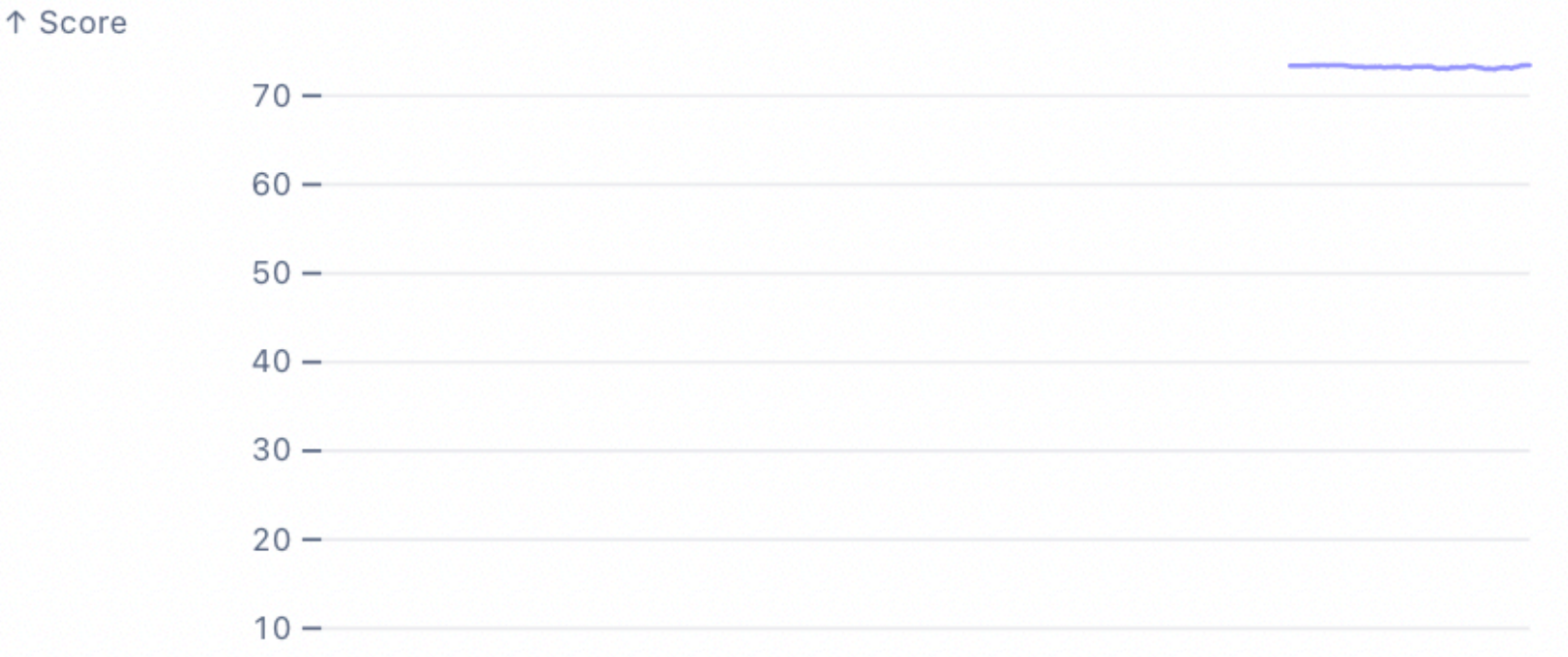
Mobile Performance Score



Mobile Performance Score (60 min moving average)

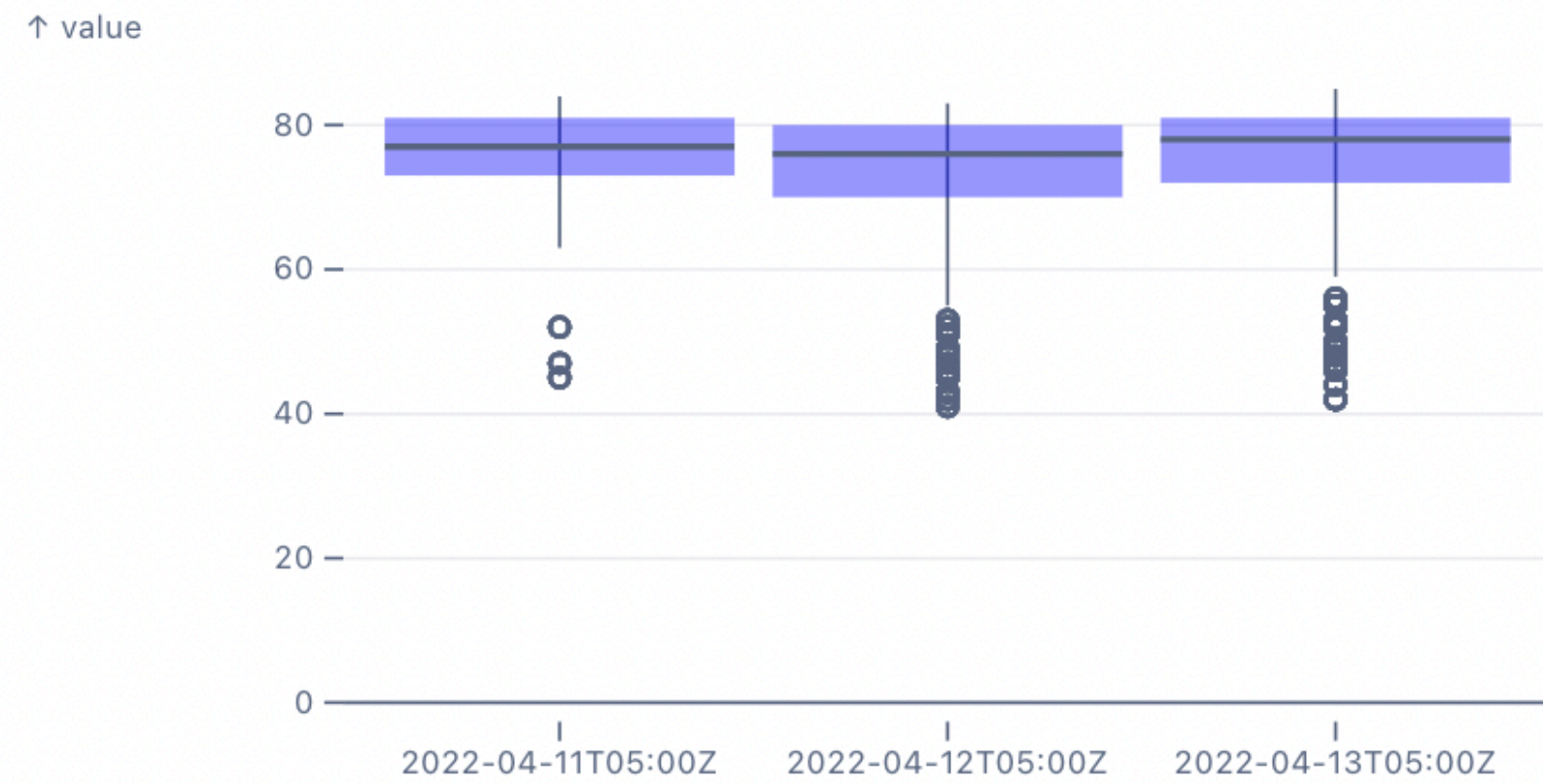


Mobile Performance Score (24 hour moving average)

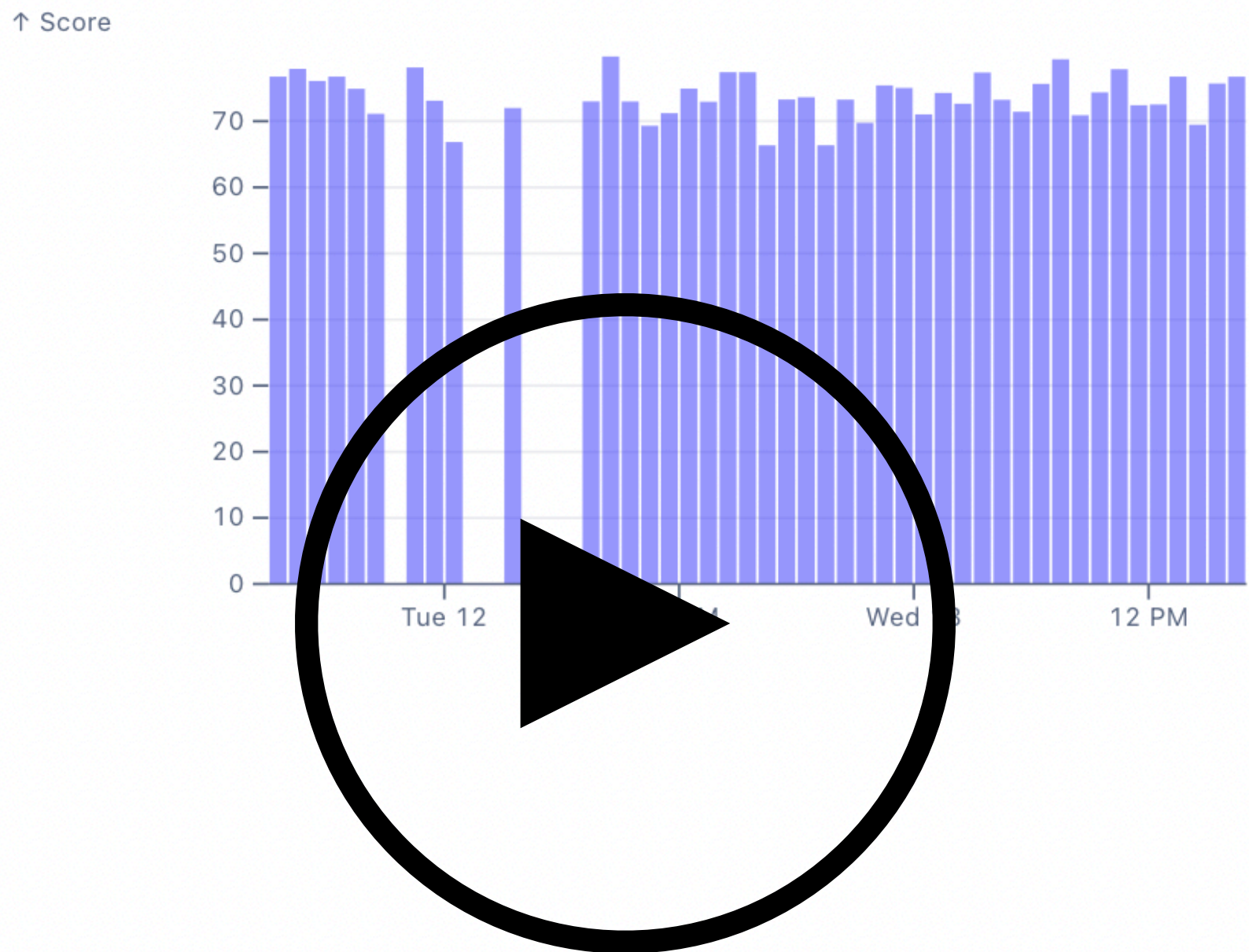


Prometheus Plot

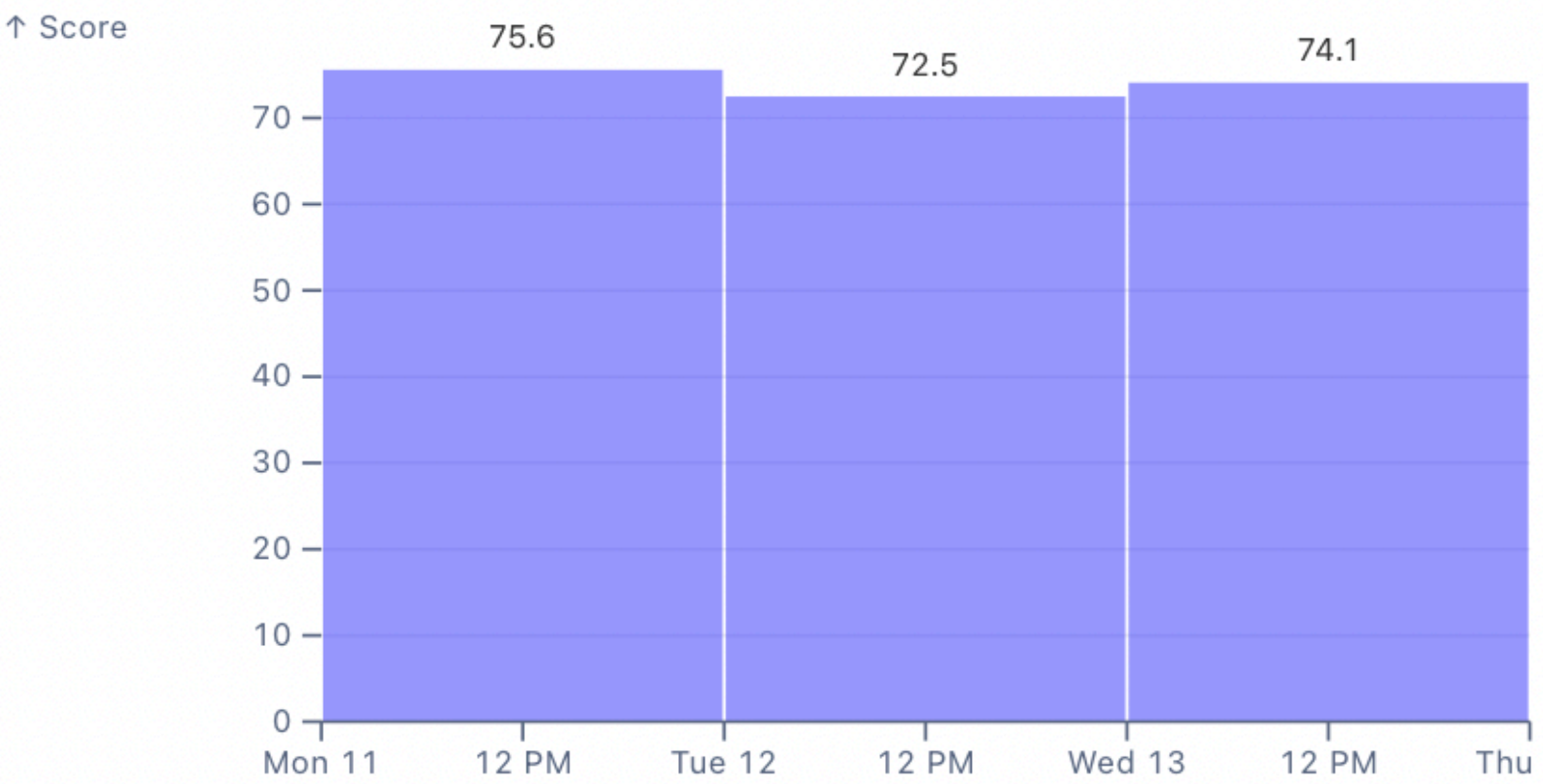
Average Daily Mobile Performance Score



Average Hourly Mobile Performance Score



Average Daily Mobile Performance Score



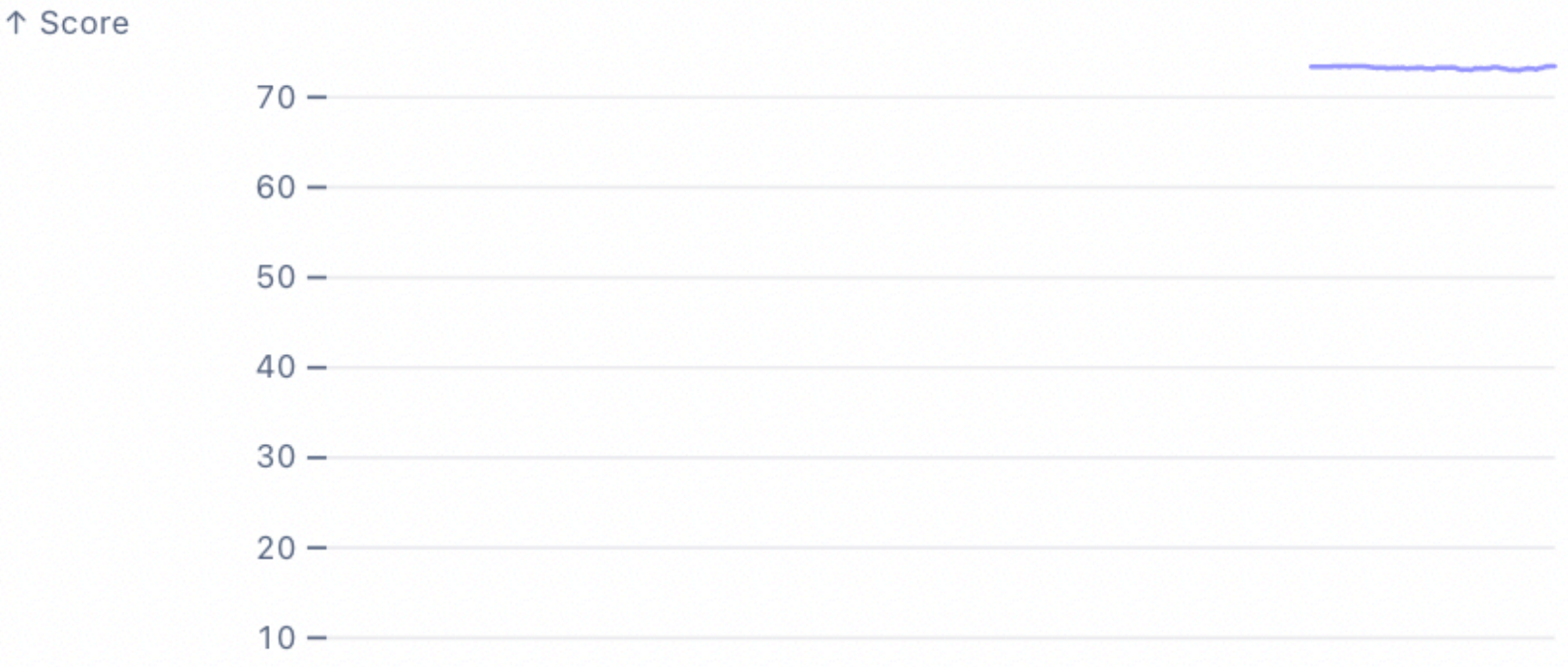
Mobile Performance Score



Mobile Performance Score (60 min moving average)



Mobile Performance Score (24 hour moving average)



WHEN TO USE WHICH

WHEN TO USE WHICH

Just Prometheus

**Prometheus +
Grafana**

Prometheus + Plot

WHEN TO USE WHICH

	Just Prometheus	Prometheus + Grafana	Prometheus + Plot
Single Metric	✓	✓	✓

WHEN TO USE WHICH

	Just Prometheus	Prometheus + Grafana	Prometheus + Plot
Single Metric	✓	✓	✓
Multiple Metrics	⚠	✓	⚠

WHEN TO USE WHICH

	Just Prometheus	Prometheus + Grafana	Prometheus + Plot
Single Metric	✓	✓	✓
Multiple Metrics	⚠	✓	⚠
Built-in Graphs	✗	✓	✓

WHEN TO USE WHICH

	Just Prometheus	Prometheus + Grafana	Prometheus + Plot
Single Metric	✓	✓	✓
Multiple Metrics	⚠	✓	⚠
Built-in Graphs	✗	✓	✓
Realtime	✗	✓	⚠

WHEN TO USE WHICH

	Just Prometheus	Prometheus + Grafana	Prometheus + Plot
Single Metric	✓	✓	✓
Multiple Metrics	⚠	✓	⚠
Built-in Graphs	✗	✓	✓
Realtime	✗	✓	⚠
Marketplace	✗	✓	⚠

WHEN TO USE WHICH

	Just Prometheus	Prometheus + Grafana	Prometheus + Plot
Single Metric	✓	✓	✓
Multiple Metrics	⚠	✓	⚠
Built-in Graphs	✗	✓	✓
Realtime	✗	✓	⚠
Marketplace	✗	✓	⚠
Query Explorer	✓	⚠	✗

WHEN TO USE WHICH

	Just Prometheus	Prometheus + Grafana	Prometheus + Plot
Single Metric	✓	✓	✓
Multiple Metrics	⚠	✓	⚠
Built-in Graphs	✗	✓	✓
Realtime	✗	✓	⚠
Marketplace	✗	✓	⚠
Query Explorer	✓	⚠	✗
Embeddable	✗	⚠	✓

WHEN TO USE WHICH

	Just Prometheus	Prometheus + Grafana	Prometheus + Plot
Single Metric	✓	✓	✓
Multiple Metrics	⚠	✓	⚠
Built-in Graphs	✗	✓	✓
Realtime	✗	✓	⚠
Marketplace	✗	✓	⚠
Query Explorer	✓	⚠	✗
Embeddable	✗	⚠	✓
Custom Graphs	✗	⚠	✓

WHEN TO USE WHICH

	Just Prometheus	Prometheus + Grafana	Prometheus + Plot
Single Metric	✓	✓	✓
Multiple Metrics	⚠	✓	⚠
Built-in Graphs	✗	✓	✓
Realtime	✗	✓	⚠
Marketplace	✗	✓	⚠
Query Explorer	✓	⚠	✗
Embeddable	✗	⚠	✓
Custom Graphs	✗	⚠	✓
Multiple Intervals	✗	⚠	✓



GRAFANA ONLINE: NISSAN LEAF → CLOUD

ALL THE THINGS





GRAFANA ONLINE: NISSAN LEAF → CLOUD

ALL THE THINGS





GRAFANA ONLINE: NISSAN LEAF → CLOUD

ALL THE THINGS





GRAFANA ONLINE: NISSAN LEAF → CLOUD

ALL THE THINGS



RESOURCES

- <https://www.cloudflare.com/learning/performance/more/website-performance-conversion-rates/>
- <https://web.dev/measure/>
- <https://prometheus.io/>
- https://github.com/foomo/pagespeed_exporter
- <https://grafana.com/grafana/>

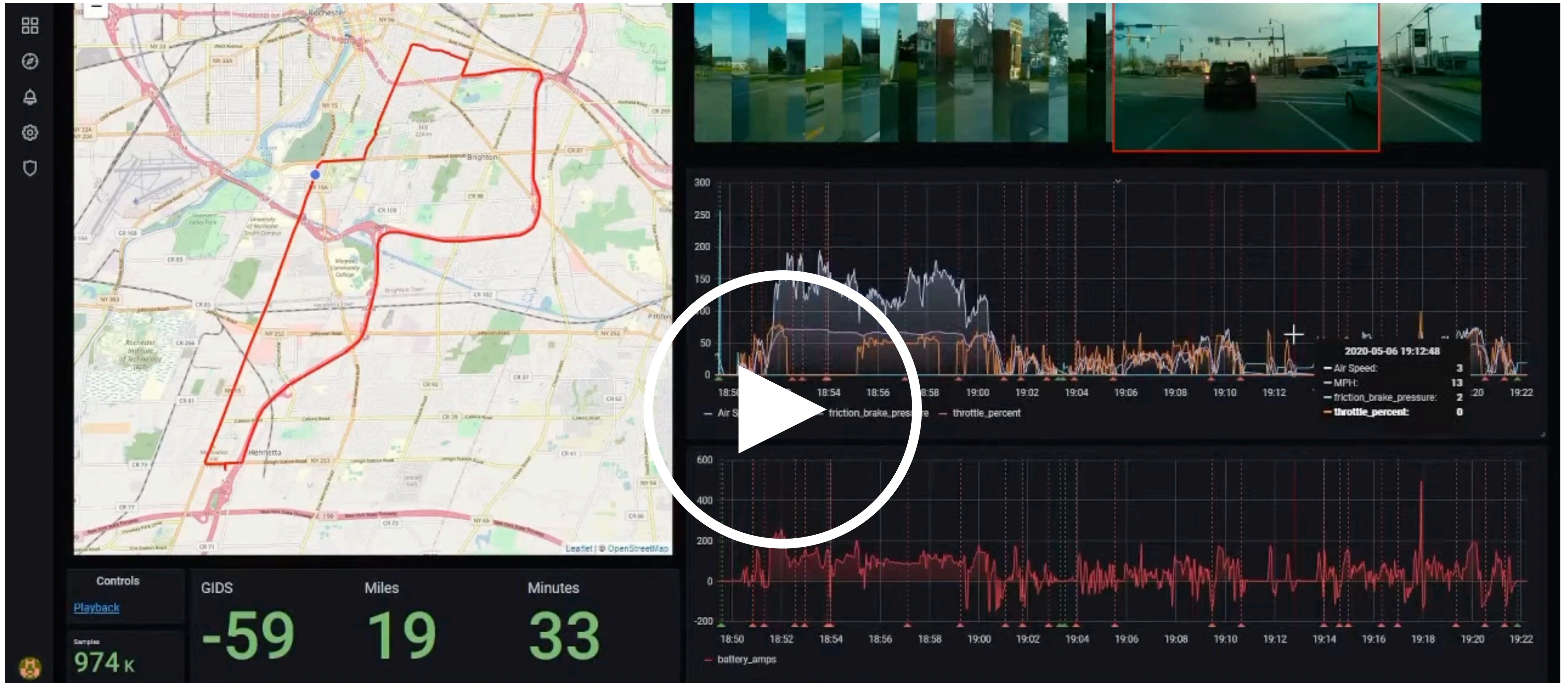
RESOURCES

- <https://github.com/observablehq/plot>
- <https://grafana.com/grafana/dashboards/>
- <https://grafana.com/go/grafanaonline/2020/nissan-leaf-cloud-all-the-things/>

QUESTIONS?

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GRAFANA ONLINE: NISSAN LEAF → CLOUD

ALL THE THINGS

