Sustainable observability: how to reduce data bloat and carbon impact

FOSDEM - 31st of January 2026

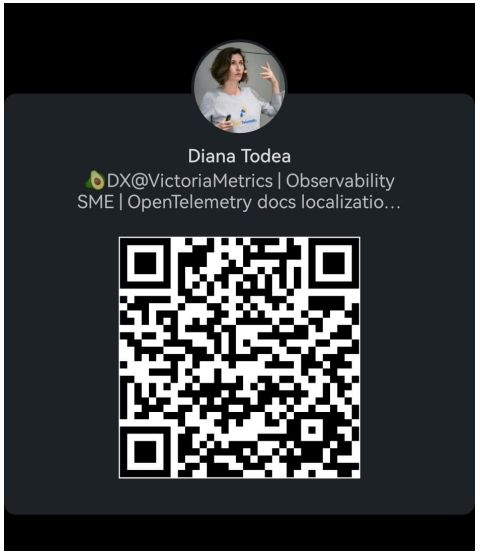
Diana Todea - DevEx Engineer

MERGE FORWARD

OpenTelemetry member and contributor

Cloud Native Days Romania organizer

Co-lead CNCF Merge-Forward Neurodiversity



Build Green Software from the Inside Out

https://greensoftware.foundation/manifesto

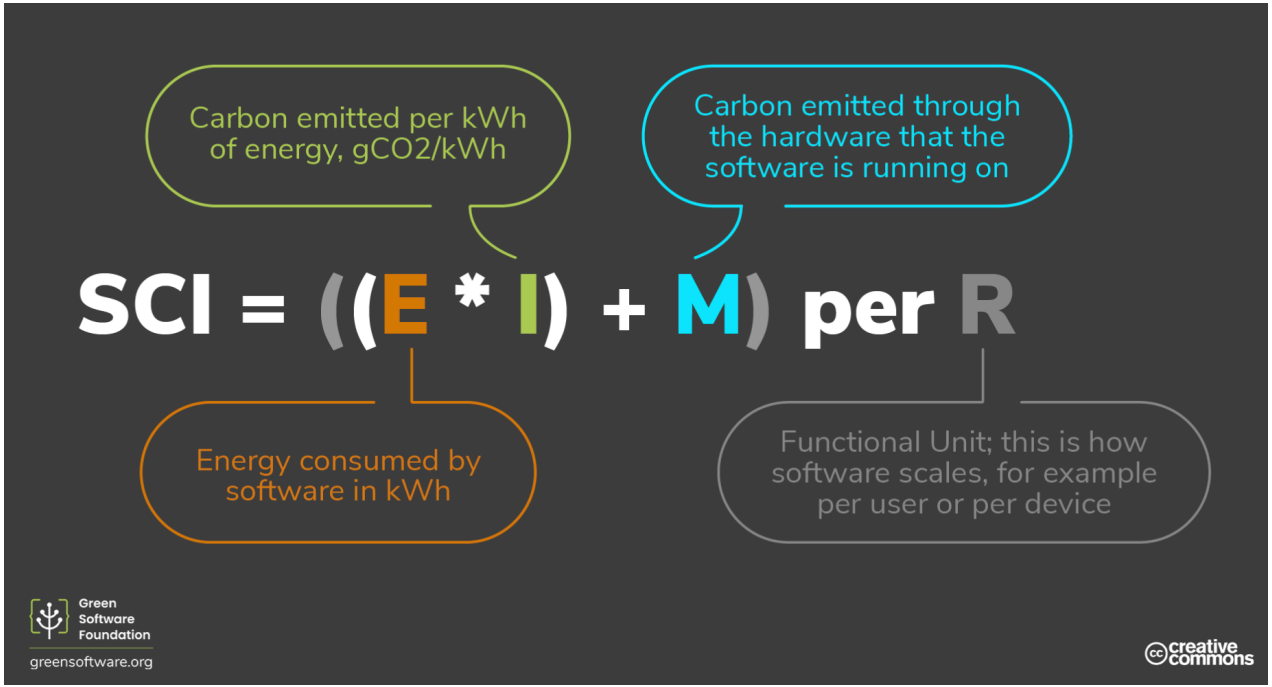
MINIMISE CARBON

The Foundation's mission is to reduce the total change in global carbon emissions associated with software. When evaluating choices we choose the option that advocates for abatement (reducing emissions) not neutralisation (offsetting emissions).

Operationalise:

- We will consider how to minimise carbon emissions in every decision we make around how we conduct ourselves operationally and the standards and technology we create and use.


GHG protocol
ISO 14064
ISO 14067


Carbon emitted per kWh of energy, gCO2/kWh
Carbon emitted through the hardware that the software is running on
SCI = ((E * I) + M) per R
Energy consumed by software in kWh
Functional Unit; this is how software scales, for example per user or per device
Green Software Foundation
greensoftware.org
creative commons

The sustainability paradox

The observability sustainability paradox

VictoriaMetrics Sustainable Mission

Green Coding Practices

Preventing Code Bloat

Careful Use of External Libraries

Observability and Profiling

Language Choice

VictoriaMetrics Sustainable Features

1.7x
less memory

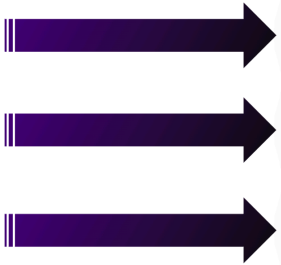
90%
energy cost reduction

2.5x
less disk space

10x
infrastructure cost Savings

16x
faster query latency

4x
network cost Savings

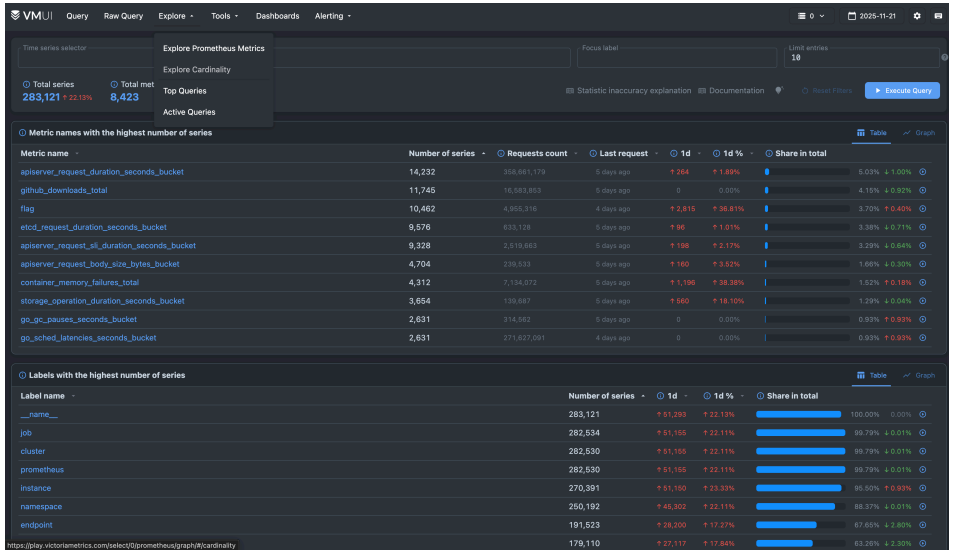


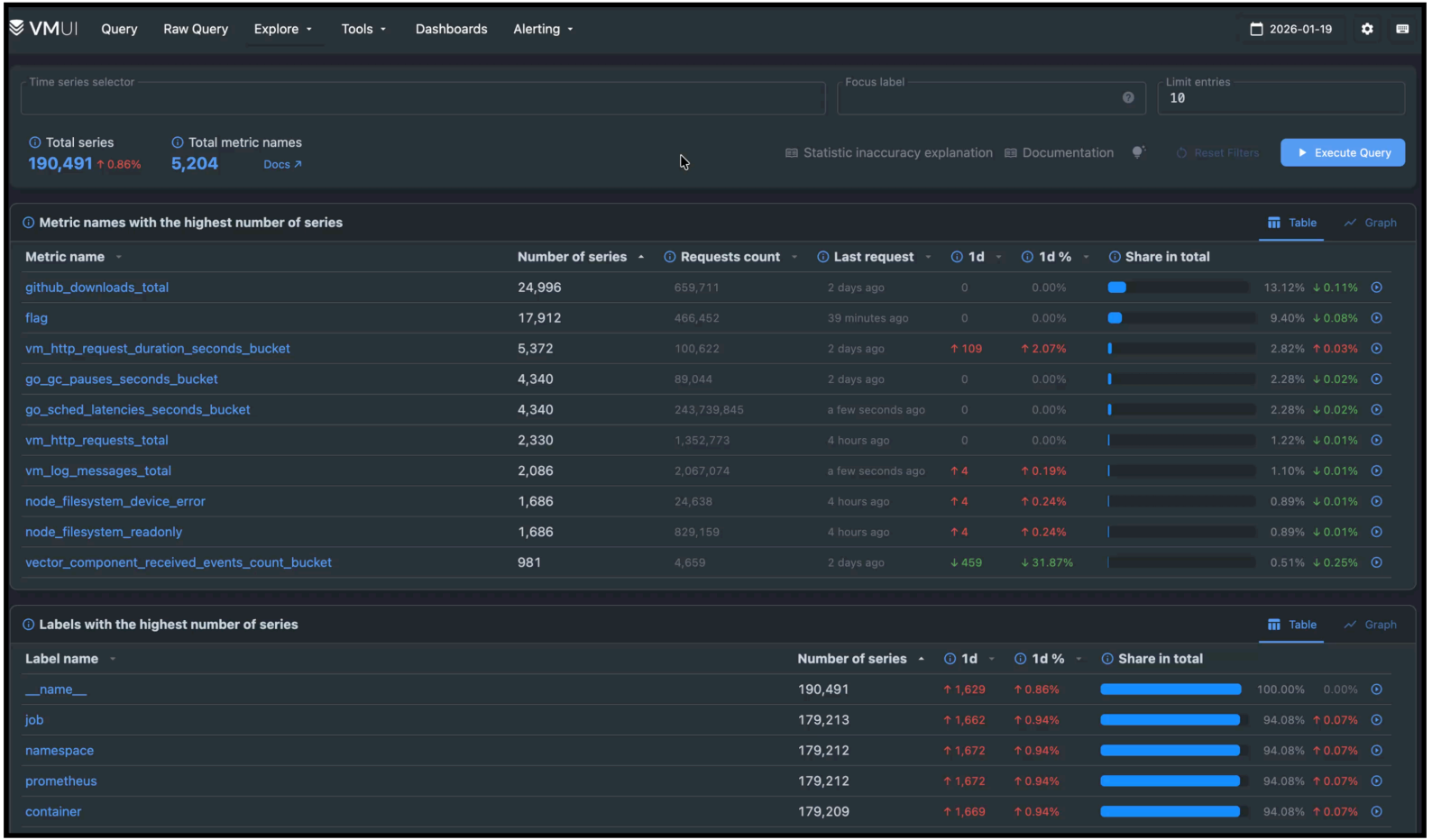
Benchmarks

Energy Savings

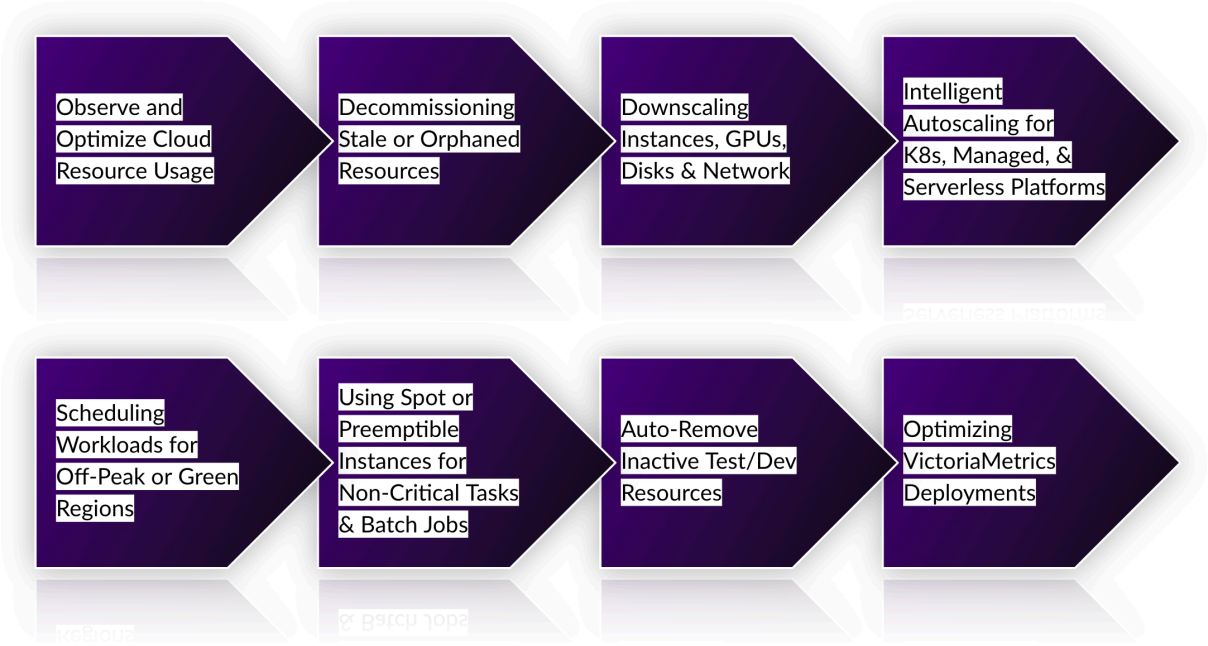
Hardware reduction

Find your “most bloated” metrics in Cardinality Explorer




VMUI
Query
Raw Query
Explore
Tools
Dashboards
Alerting
2026-01-19
Time series selector
Focus label
Limit entries
10
Total series
190,491 ↑ 0.86%
Total metric names
5,204
Docs ↗
Statistic inaccuracy explanation
Documentation
Reset Filters
Execute Query
Metric names with the highest number of series
Table
Graph
Metric name
Number of series
Requests count
Last request
1d
1d %
Share in total
github_downloads_total 24,996 659,711 2 days ago 0 0.00% 13.12% ↓ 0.11%
flag 17,912 466,452 39 minutes ago 0 0.00% 9.40% ↓ 0.08%
vm_http_request_duration_seconds_bucket 5,372 100,622 2 days ago ↑ 109 ↑ 2.07% 2.82% ↑ 0.03%
go_gc_pauses_seconds_bucket 4,340 89,044 2 days ago 0 0.00% 2.28% ↓ 0.02%
go_sched_latencies_seconds_bucket 4,340 243,739,845 a few seconds ago 0 0.00% 2.28% ↓ 0.02%
vm_http_requests_total 2,330 1,352,773 4 hours ago 0 0.00% 1.22% ↓ 0.01%
vm_log_messages_total 2,086 2,067,074 a few seconds ago ↑ 4 ↑ 0.19% 1.10% ↓ 0.01%
node_filesystem_device_error 1,686 24,638 4 hours ago ↑ 4 ↑ 0.24% 0.89% ↓ 0.01%
node_filesystem_readonly 1,686 829,159 4 hours ago ↑ 4 ↑ 0.24% 0.89% ↓ 0.01%
vector_component_received_events_count_bucket 981 4,659 2 days ago ↓ 459 ↓ 31.87% 0.51% ↓ 0.25%
Labels with the highest number of series
Table
Graph
Label name
Number of series
1d
1d %
Share in total
__name__ 190,491 ↑ 1,629 ↑ 0.86% 100.00% 0.00%
job 179,213 ↑ 1,662 ↑ 0.94% 94.08% ↑ 0.07%
namespace 179,212 ↑ 1,672 ↑ 0.94% 94.08% ↑ 0.07%
prometheus 179,212 ↑ 1,672 ↑ 0.94% 94.08% ↑ 0.07%
container 179,209 ↑ 1,669 ↑ 0.94% 94.08% ↑ 0.07%

Recommendations to Reduce Footprint

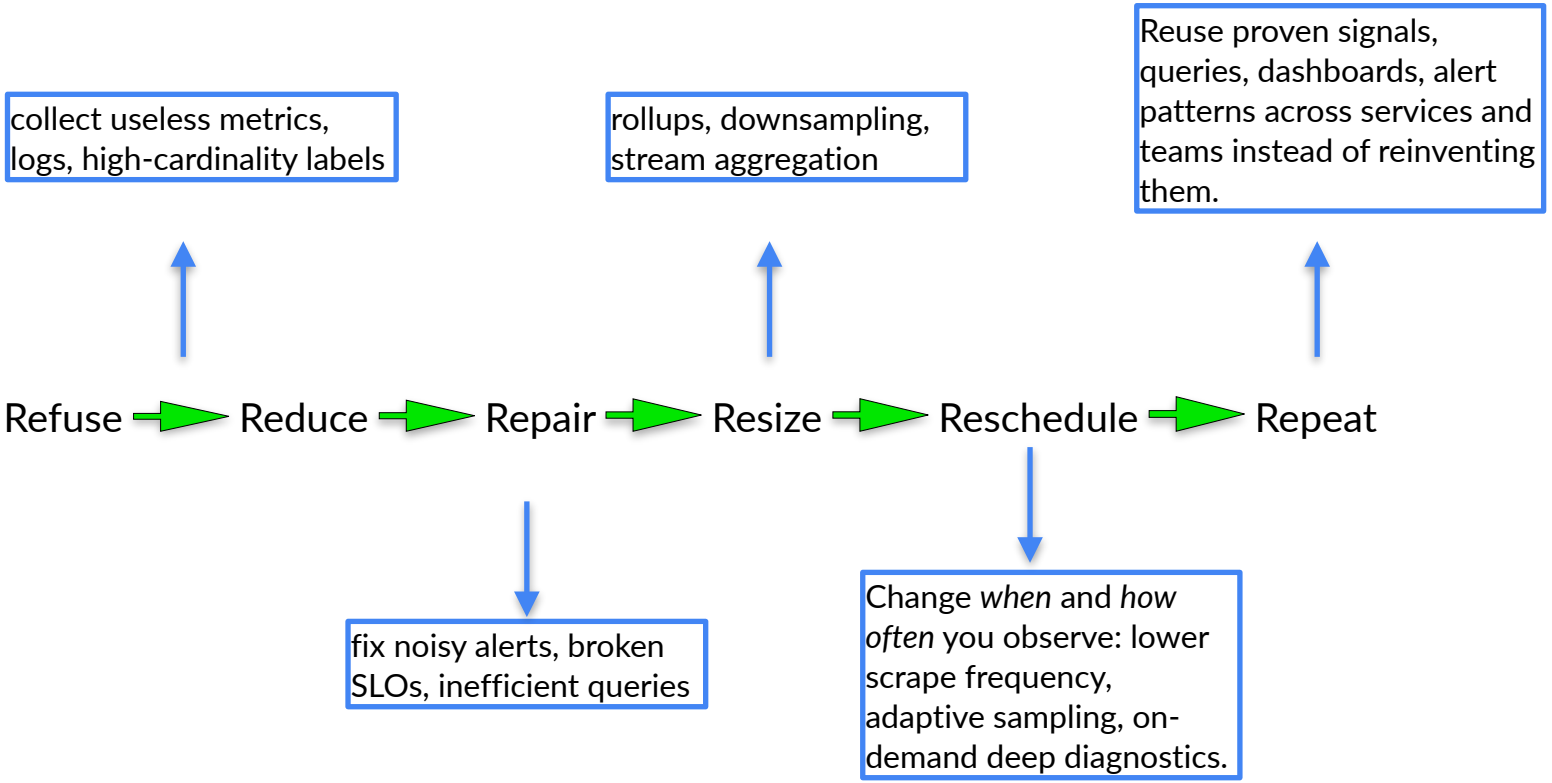


The 9Rs of circular economy

Refuse Rethink Reduce Reuse Repair Refurbish Remanufacture Repurpose Recycle

Sustainability

prevent waste first, keep products and materials in use longer, minimize energy, carbon, raw resource extraction.


collect useless metrics, logs, high-cardinality labels
rollups, downsampling, stream aggregation
Reuse proven signals, queries, dashboards, alert patterns across services and teams instead of reinventing them.
Refuse
Reduce
Repair
Resize
Reschedule
Repeat
fix noisy alerts, broken SLOs, inefficient queries
Change *when* and *how often* you observe: lower scrape frequency, adaptive sampling, on-demand deep diagnostics.

A CNCF project that uses eBPF and system counters to estimate energy use of containers, pods, VMs, and processes in Kubernetes environments.

Kepler

A standardized open-source observability framework for collecting telemetry across software systems.

OpenTelemetry

A climate-tech nonprofit using open-source AI and machine learning to improve renewable energy forecasting (especially solar PV and wind).

OpenClimateFix

An open-source tool to measure, monitor, and help reduce cloud infrastructure carbon emissions.

Cloud Carbon Footprint

Take-aways

- Observability companies should start applying Green Software Foundation's actions since day 1
- Sustainability is spread through company culture
- But ultimately, we are all responsible to maintain it
- Homework: talk about a green project with your co-workers and start implementing it!

Resources

https://greensoftware.foundation/articles/what-is-green-software
https://github.com/cncf/tag-env-sustainability
https://www.thegreenwebfoundation.org/news/creating-a-standard-for-measuring-software-carbon-intensity-for-the-web/
CNCF Slack #tag-operational-resilience

https://play.victoriametrics.com/
https://docs.victoriametrics.com/
Sustainability at VictoriaMetrics

Thank you!

Bsky: @didiviking.bsky.social
X: @dianavtodea
Github: @didiViking/Conferences_Talks
LinkedIn: @diana-todea-b2a79968