Monitoring in a Serverless World

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Cloudflare Observability

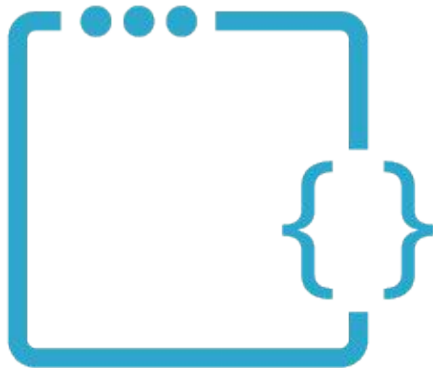**@sinkingpoint basically everywhere**

CLOUDFLARE®

In the beginning, life was good
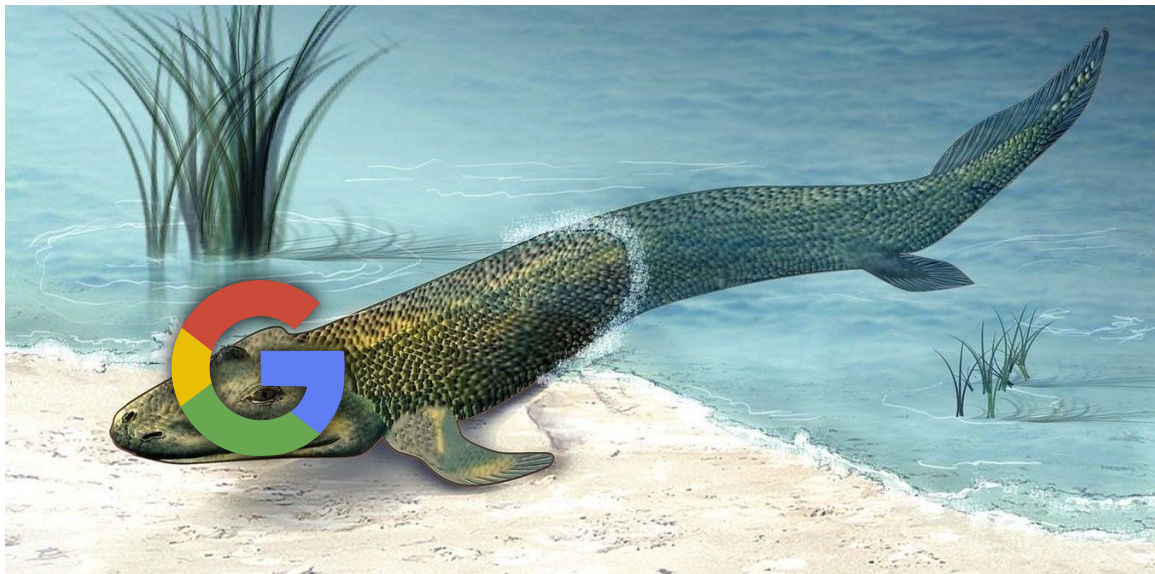
These SaaS providers decided to invent Serverless Computing one day, and now we have to support the Observability infrastructure

Serverless At Cloudflare

We made a thing

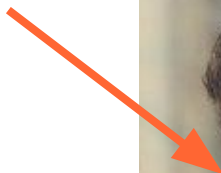# And then we started using it...

A Quick Introduction

Hi! I'm Colin

Observability Lead @ Cloudflare

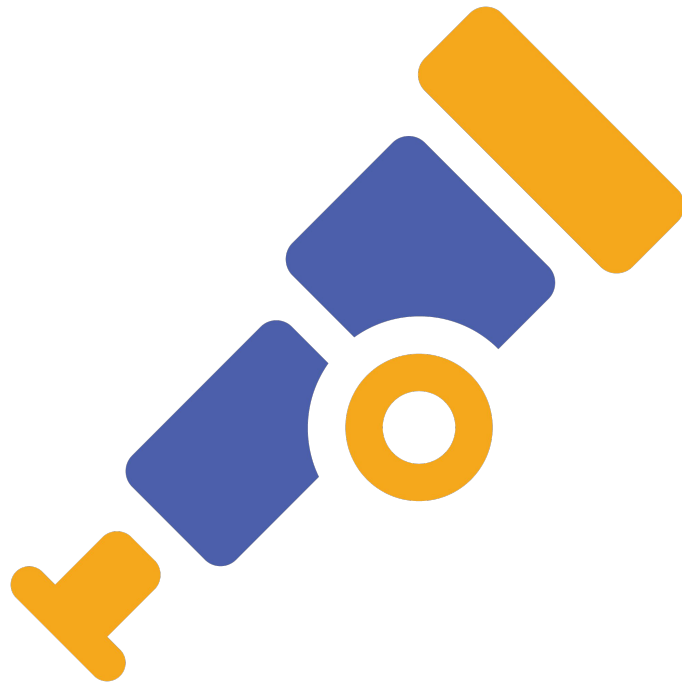Incorrectly thinks that COBOL is a decent language

Not British

Metrics

Logs

Traces

Prometheus: Innovative, Useful

Prometheus: Innovative, Useful, *Opinionated*

Your system can be discovered and scraped

You have to **wait for Prometheus** to talk to you

Your system can expose metrics over the network

Prometheus needs to be able
to **pull** your metrics

- Your metrics need to be
  exposed over HTTP
  (generally...)
- And it needs to be
  reachable over the network

Your system can do its own aggregation

Credit: Wikipedia

What if your service only ever processes one request?

TYPE slide SUMMARY

We did a survey!

- What sort of metrics do our teams actually use?

- Do teams actually *use* aggregation?

- What sort of semantics do they need?

What We Found: 😱

What we found: Counters

Numbers that sum together
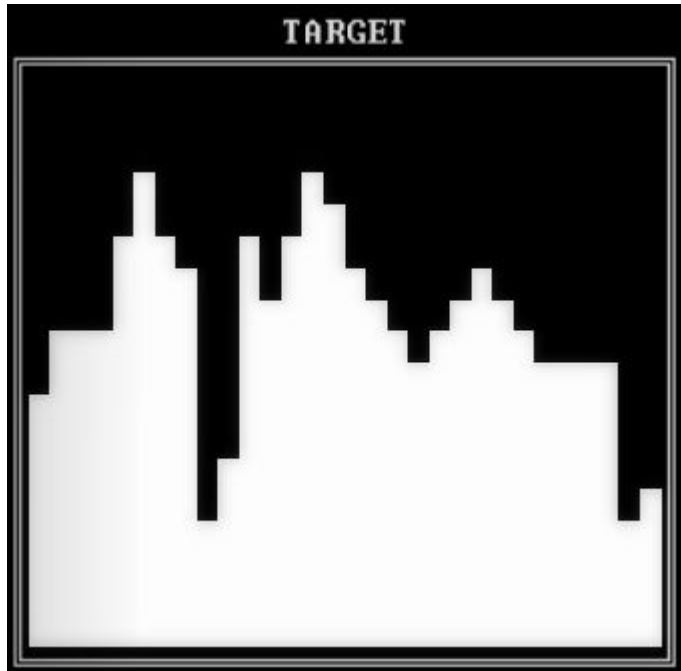
- Request counts
- Error counts

What we found: Gauges

Numbers that go up and down

- Memory usage
- Request Times
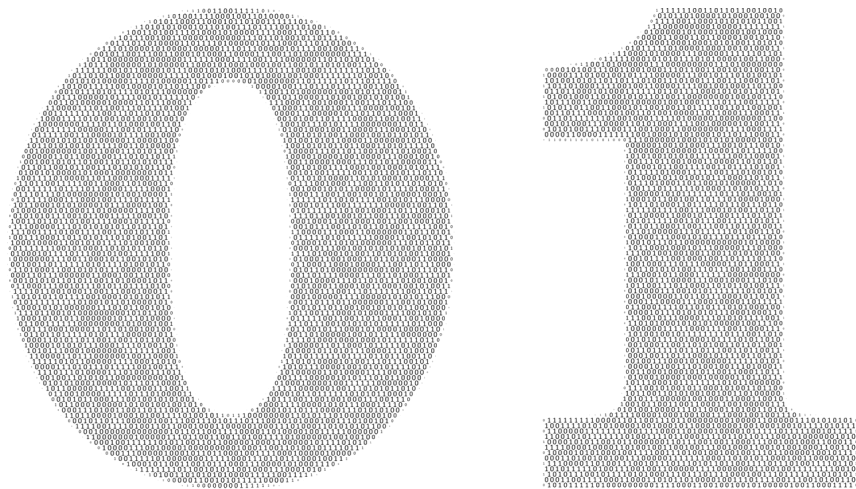
What we found: Histograms / Summaries

Deceptively hard.

- What happens when you need to merge buckets?
- What happens when you get a *summary*

What we found: Info metrics

Metrics that replace the entire *metric family* when a new label set comes in

- Version metrics
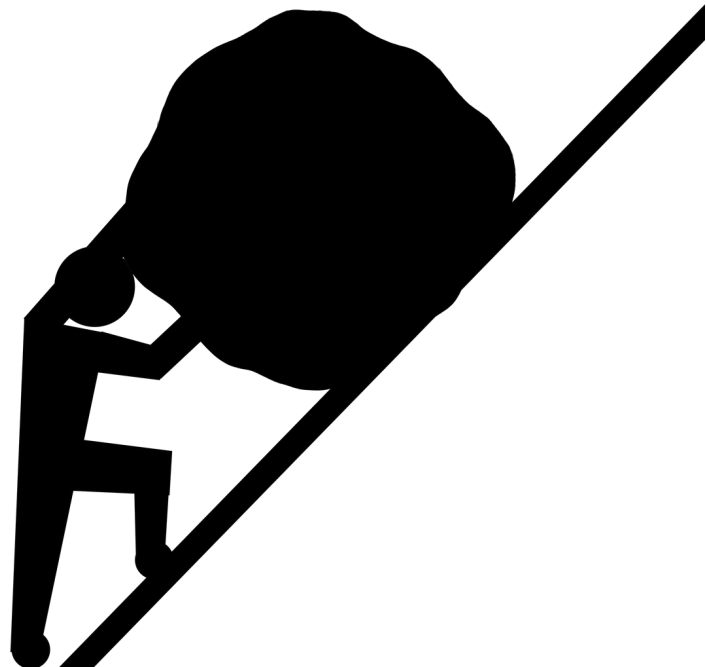- Enums

Some prior art

Push Gateway

https://github.com/prometheus/pushgateway

Usually, the only valid use case for the Pushgateway is for capturing the outcome of a service-level batch job.

![Cloudflare logo]

Aggregation Gateway

https://github.com/weaveworks/prom-aggregation-gateway

An Internal Bespoke thing

Let's just stitch the two things together

Something Event Based?

We could **leave Text Exposition behind** *entirely*

Events2prom, Cleodora

What we came up with

The Gravel Gateway

Credit: Wikipedia

https://github.com/sinkingpoint/gravel-gateway

Some functional requirements

1. Accept **pushes**, like the Push Gateway

2. **Aggregate** like the Aggregation Gateway

3. Aggregate **with all our identified semantics**

"How do we express all the semantics we need, in the limited amount of space we have"?

```
# TYPE go_threads gauge
go_threads 13

# TYPE build_info
build_info{go_version="1.18",version="2022.2.1"} 1
```

That's easy: We Cheat

Let's smuggle semantic information in the labels!

🤫

Introducing the "Clear Mode Label"

```
wshim_build_info{go_version="1.18",clear_mode="info"}
```

Summing

```
wshim_request_count{clear_mode="sum"} 1
wshim_request_count{clear_mode="sum"} 1
```
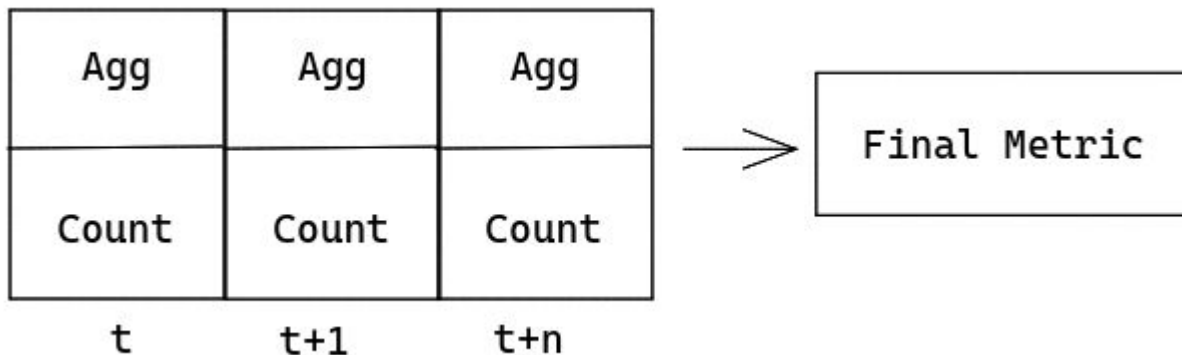
```
wshim_request_count 2
```

Info Metrics

```
wshim_info{version="1.0",go_version="1.17,clear_mode="family"} 1
wshim_info{version="1.1",go_version="1.18",clear_mode="family"} 1


             wshim_info{version="1.1",go_version="1.18"} 1
```
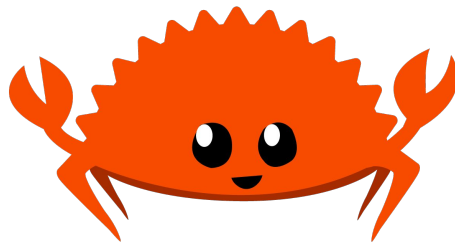
Means/Medians

```
wshim_memory_usage_bytes{clear_mode="mean5m"} 0
wshim_memory_usage_bytes{clear_mode="mean5m"} 5
wshim_memory_usage_bytes{clear_mode="mean5m"} 10
```

```
wshim_memory_usage_bytes 5
```

Compatibility with existing client libraries

How this looks in practice

```
const { Pushgateway, register } = require('prom-client')
const pushGw = new Pushgateway(
 'https://gravel.sinkingpoint.com',
 register
);

const counter = new client.Counter({name: 'requests'});
counter.inc();

const info = new client.Gauge({name: 'info'});
info.set(1, {'clear_mode': 'family', 'version': '1.0'});

pushGw.push({ jobName: 'test' }, (err, resp, body) => {});
```

Looking Forward to the Future

Where Gravel Gateway goes from here

- More work on scaling

- More interesting
  aggregations

- Rewriting pebbles

Credit: Wikipedia

Open Metrics

Cleodora and the shift towards Open Telemetry

Thanks!

https://blog.sinkingpoint.com/posts/prometheus-for-faas/

https://github.com/sinkingpoint/gravel-gateway

Want to chat, or tell me how bad of a person I am?

@sinkingpoint - basically everywhere

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In the hallway, after this