

# Prometheus histograms & Grafana heatmaps

Let's heat some maps and hist some grams

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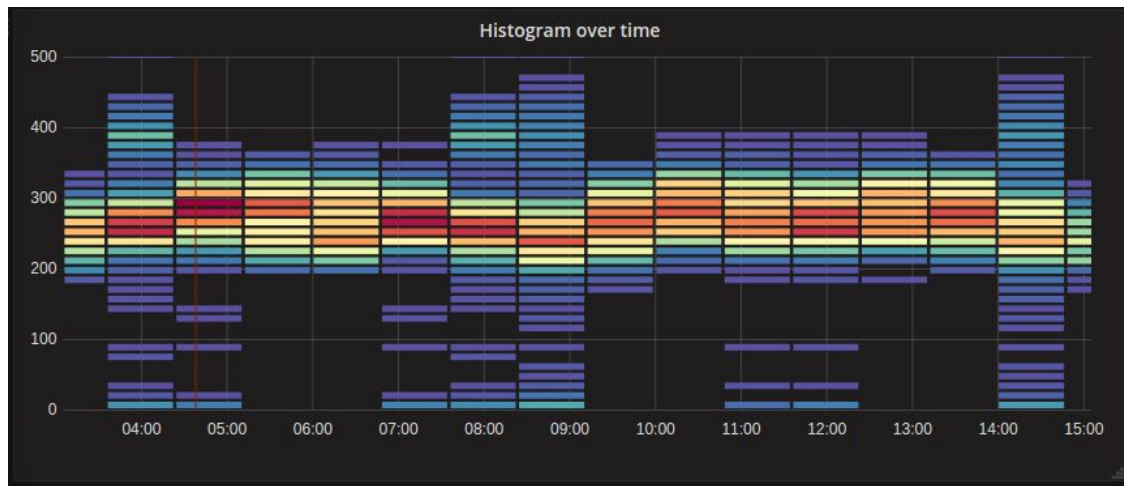
# Who am I?

- I'm Štefan Šafár
  - I work on the CDN @ Showmax
  - We deliver tens of gbit/s in ZA
  - I hunt speed bumps
  - Fell in love with Prom in 2015
  - I like travelling



# Contents

- Histograms in Prometheus
- Live coding of an exporter
- Grafana heatmaps customization

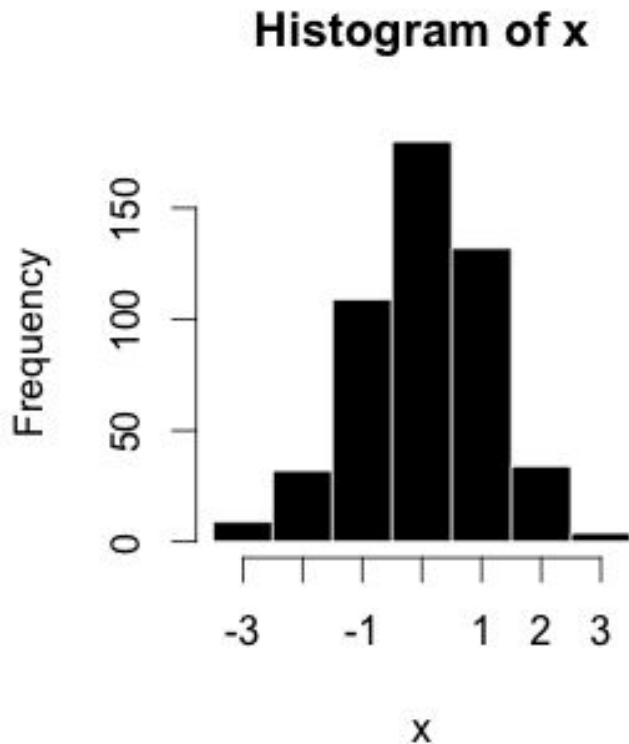


# My assumptions about you

- Used Prometheus
- Know Prometheus exposition format
- Understand code

# Histograms

- “Accurate representation of the distribution of numerical data”
- Frequency of values in a dataset
- Distributed into buckets



# Histograms in Prometheus

```
http_request_duration_seconds_bucket{le="0.05"} 24054
```

```
http_request_duration_seconds_bucket{le="0.1"} 33444
```

```
http_request_duration_seconds_bucket{le="0.2"} 100392
```

```
http_request_duration_seconds_bucket{le="0.5"} 129389
```

```
http_request_duration_seconds_bucket{le="1"} 133988
```

```
http_request_duration_seconds_bucket{le="+Inf"} 144320
```

```
http_request_duration_seconds_sum 53423
```

```
http_request_duration_seconds_count 144320
```

# Histograms vs summaries

- Histograms

- Buckets in advance
- Quantiles computed later server-side
- Light on the client CPU
- Stores a lot of data on the server

- Summaries

- Quantiles in advance
- More accurate quantiles
- No adjustment / computation later
- Might be heavy for the client CPU - sliding window

# Histogram example

Buckets “le” = 100, 200, 300, 400

SLA value of 250

Real 95 percentile: 210

histogram\_quantile(0.95, xxx) = 295



# Histogram buckets

- Default buckets - 0.005, 0.01, 0.025, 0.05, 0.1 ... 10.0, +Inf
- Great starting point, but not ideal in some cases
- Need to think about the distribution of your data
- Keep in mind corner cases and SLO
- Cumulative wire format

# Histogram pitfalls

- histogram\_quantile
- 99.9 percentile for rate(X) values

# CODING TIME

Let's pray to the demo gods

# Grafana - histograms

- Histograms
- Heatmaps - histograms over time
- Only in versions 4.3+
- Promql `histogram_quantile`

# Grafana time

# Grafana - Elasticsearch

- Fancy if you ~~need~~ want accurate data
- Basically the same feature set as Kibana
- Only need one website to ~~rule~~ graph them all
- [Documentation link](#)
- [V6 feature](#)

# Summary

- Prometheus is awesome
- Histograms are awesome
- Grafana is awesome
- You are awesome

# THANK YOU!

Get in touch!

Štefan Šafár

