PromQL for Mere Mortals

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Agenda

- Intro
  PromQL is important
- Time Series
  Series-ly cool
- Vector Selectors
  Range vs Instant
- Gauges & Counters
  How en-gauge-ing
- Operators & Functions
  Functionally operational
- Demo!
  Pray to the demo gods

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PromQL is Important

- Queries
- Alerts
- Dashboards

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...but also intimidating

```
label_replace((sum by(job, env, cluster,
instance) (exthttp_requests_total{ code=~"^5..$",
err_category!="Transient", handler!="/health",
job="prometheus"} ) or on(job, env, cluster,
instance) sum by(job, env, cluster, instance)
((up{ job="prometheus"} == 1) * 0)), "code",
"5xx", "job", ".*")
```

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Time Series

```
identifier -> (t0, v0), (t1, v1), (t2, v2), (t3, v3), ....
```

```
http_requests_total{path="/status", method="GET"}
```

```
{__name__="http_requests_total", path="/status",
                                 method="GET"}
```

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PromQL

Four data types:

- Strings ✔️
- Scalars ✔️
- Instant Vectors 🤷‍♀️
- Range Vectors 🤷‍♀️

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Some context...

- SQL ✔️
- JQL ✔️ 😳
- PromQL ... ?

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Instant Vectors

Instant vector selectors allow the selection of a set of time series and a single sample value for each at a given timestamp (instant): in the simplest form, only a metric name is specified. This results in an instant vector containing elements for all time series that have this metric name.

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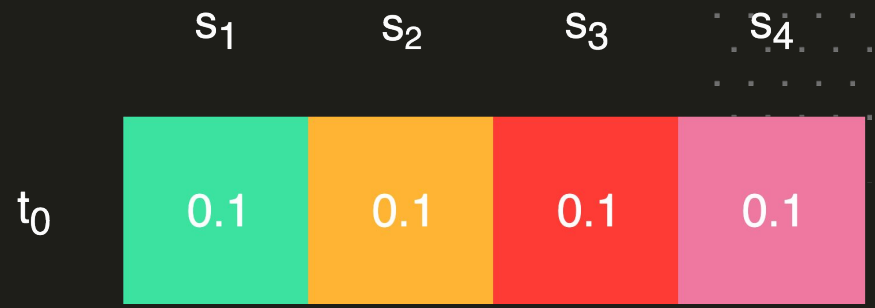
Instant Vectors



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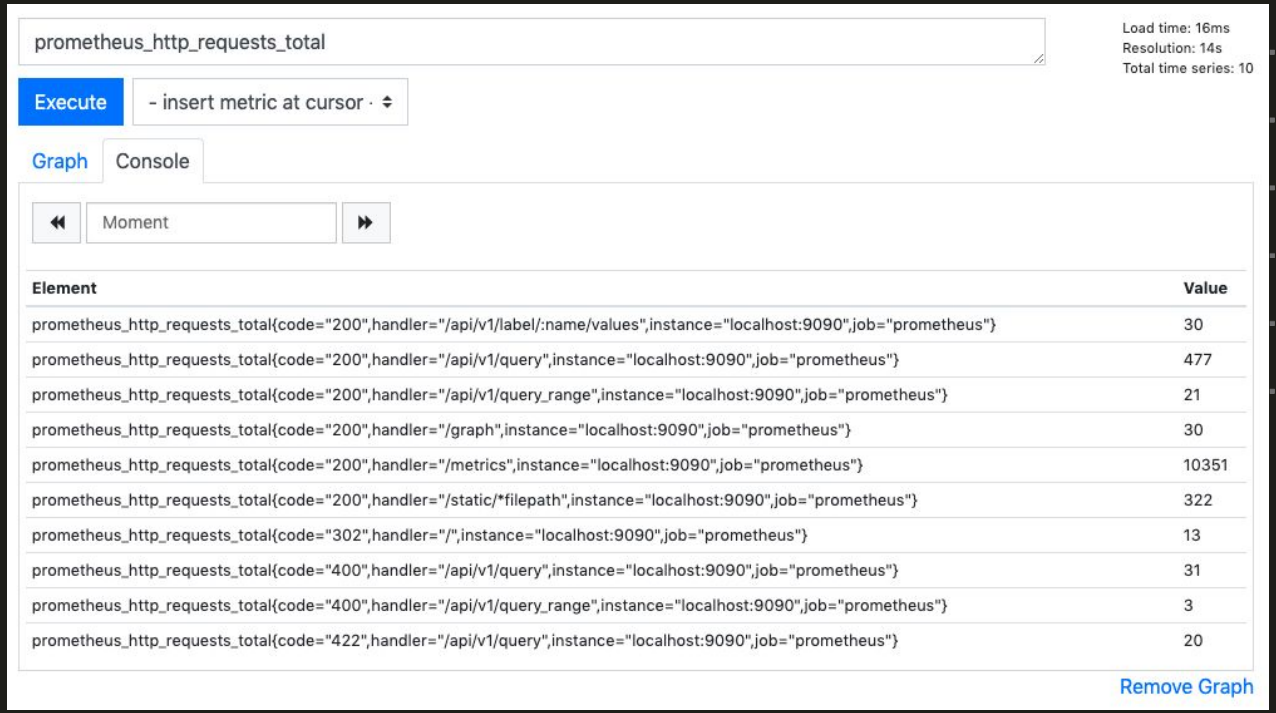
Instant Vectors



Element	Value
prometheus_http_requests_total{code="200",handler="/api/v1/label/:name/values",instance="localhost:9090",job="prometheus"}	30
prometheus_http_requests_total{code="200",handler="/api/v1/query",instance="localhost:9090",job="prometheus"}	477
prometheus_http_requests_total{code="200",handler="/api/v1/query_range",instance="localhost:9090",job="prometheus"}	21
prometheus_http_requests_total{code="200",handler="/graph",instance="localhost:9090",job="prometheus"}	30
prometheus_http_requests_total{code="200",handler="/metrics",instance="localhost:9090",job="prometheus"}	10351
prometheus_http_requests_total{code="200",handler="/static/*filepath",instance="localhost:9090",job="prometheus"}	322
prometheus_http_requests_total{code="302",handler="/",instance="localhost:9090",job="prometheus"}	13
prometheus_http_requests_total{code="400",handler="/api/v1/query",instance="localhost:9090",job="prometheus"}	31
prometheus_http_requests_total{code="400",handler="/api/v1/query_range",instance="localhost:9090",job="prometheus"}	3
prometheus_http_requests_total{code="422",handler="/api/v1/query",instance="localhost:9090",job="prometheus"}	20

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Range Vectors

Range vector literals work like instant vector literals, except that they select a range of samples back from the current instant. Syntactically, a range duration is appended in square brackets (`[]`) at the end of a vector selector to specify how far back in time values should be fetched for each resulting range vector element.

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Range Vectors

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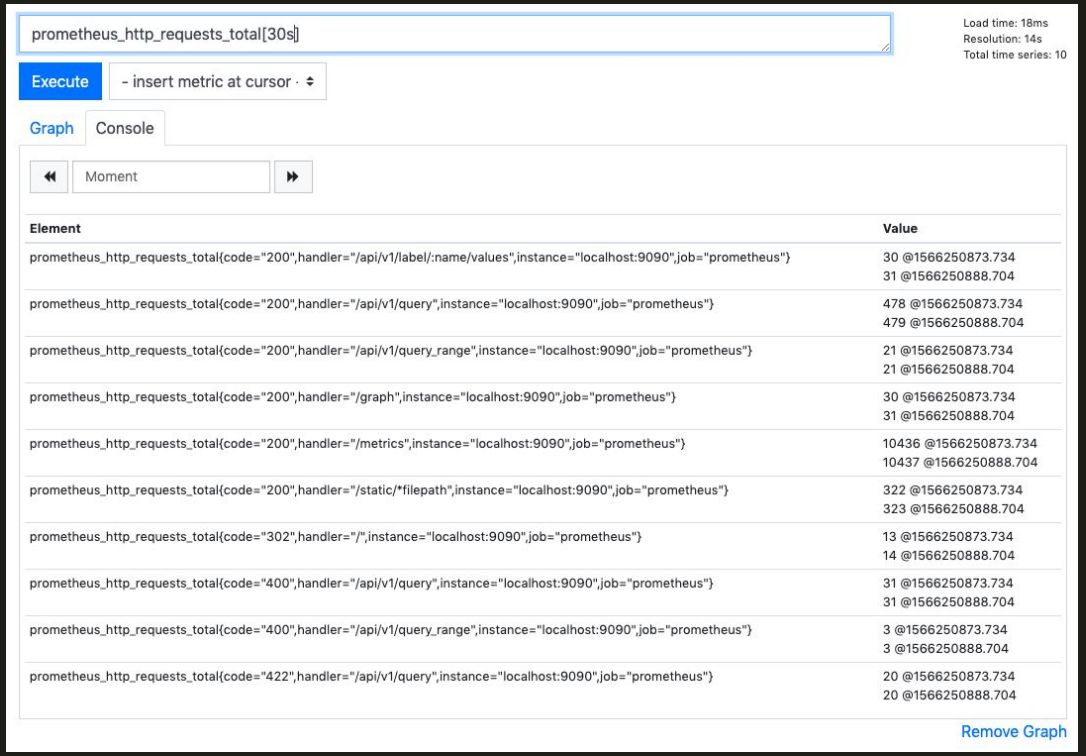
Range Vectors



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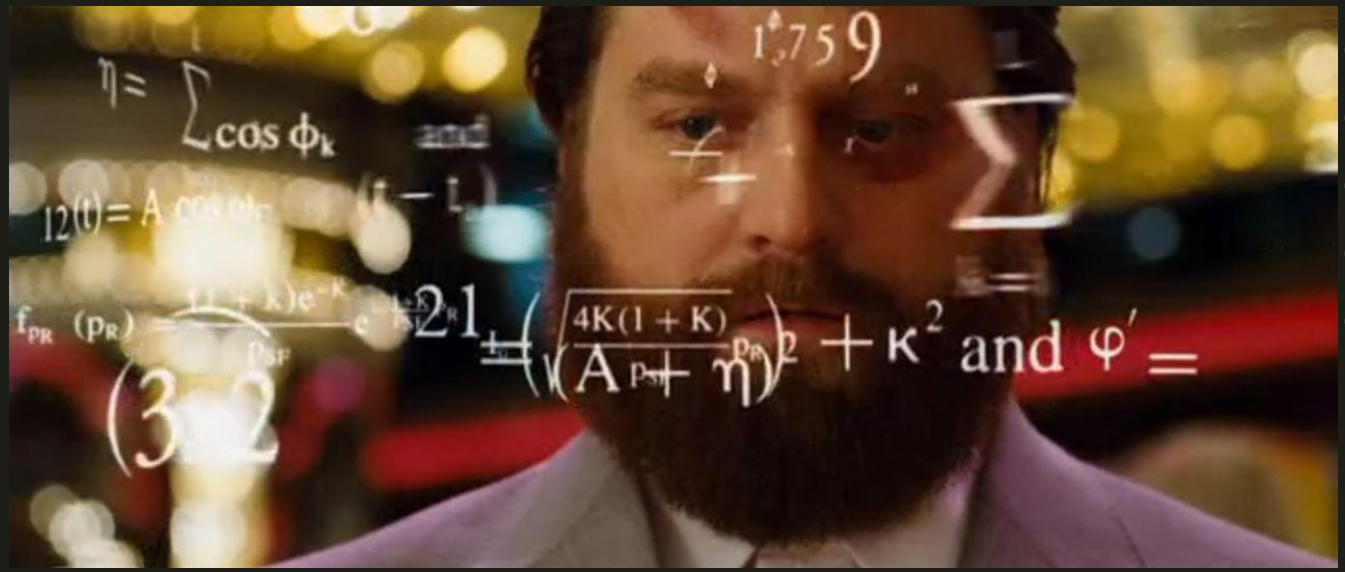
Are they really that different?



Yes

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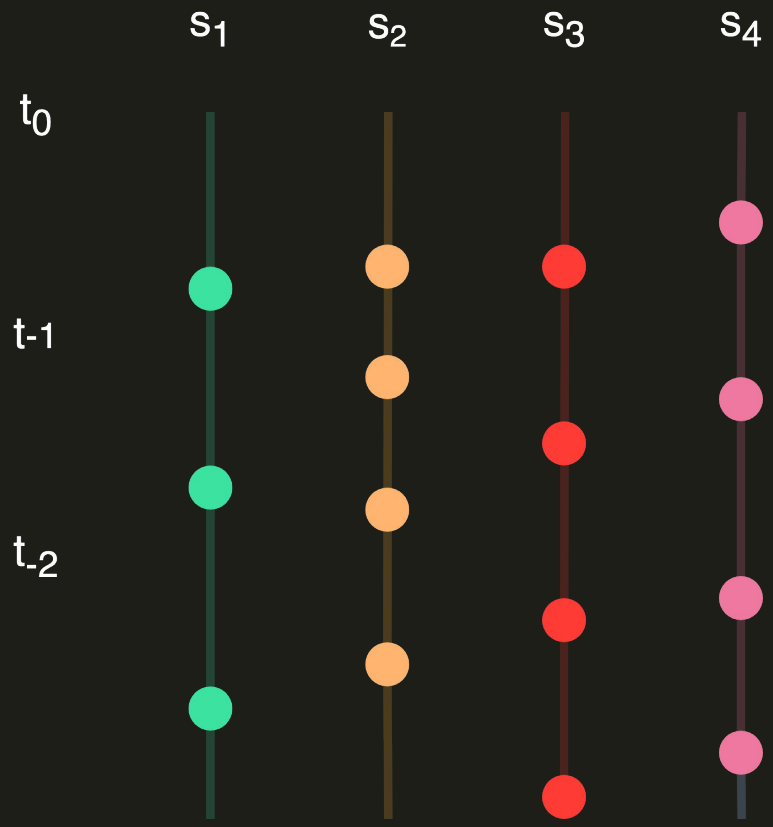
Data Model



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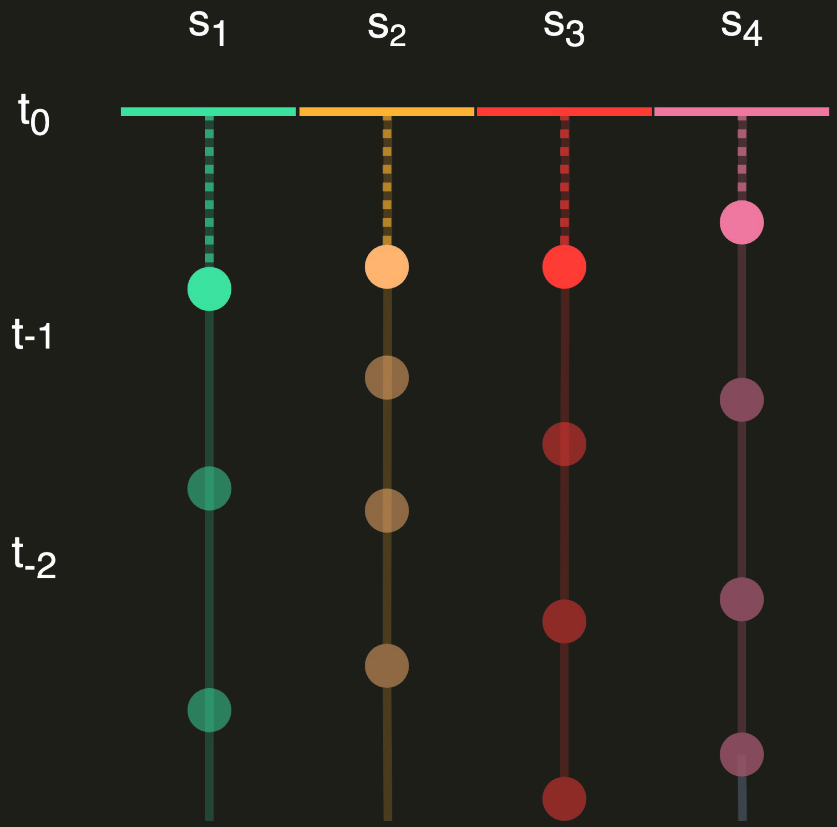
Instant Vector



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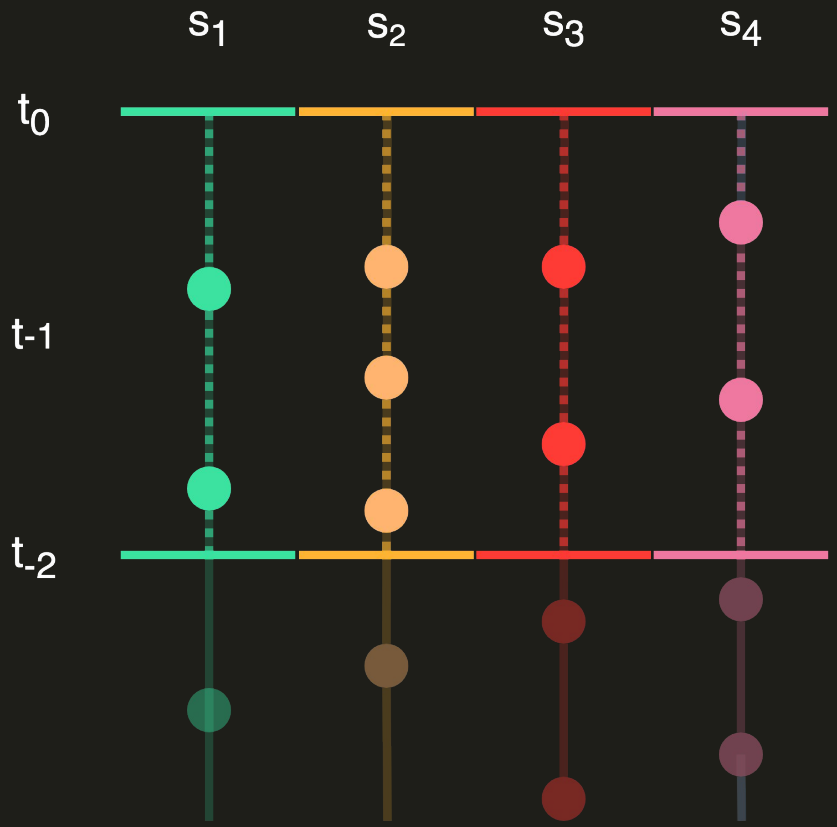
Range Vector



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Instant Vector

One value per time series guaranteed.

Range Vector

Any number of values between two timestamps.

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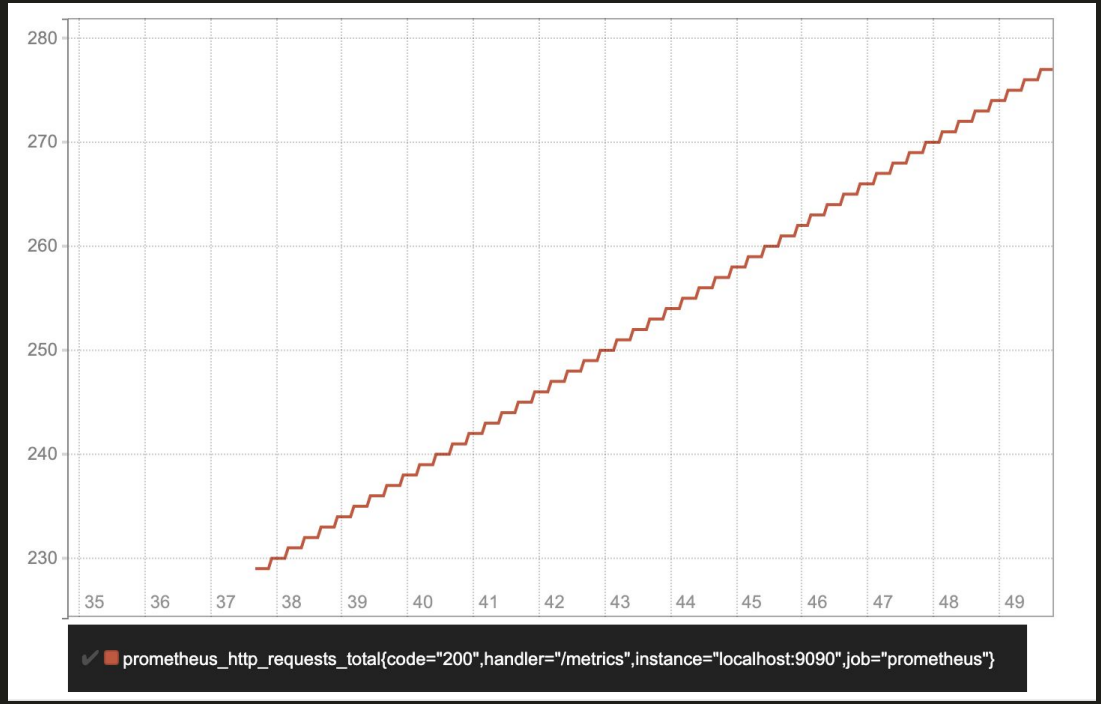
Counters & Gauges

Counters



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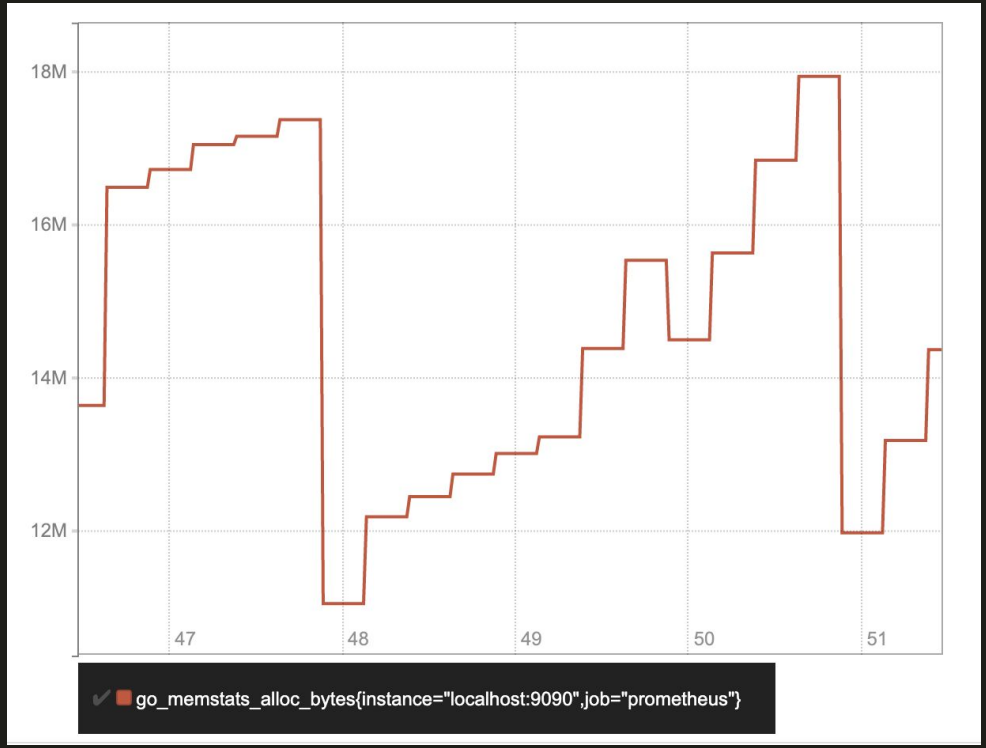
Gauges



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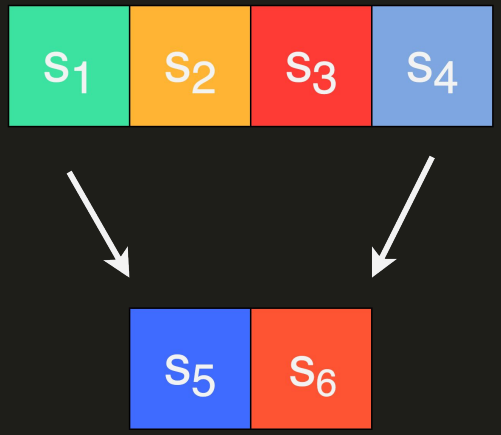
Aggregation Operators

Input: Instant Vector

Output: Instant Vector



- sum()
- min()
- max()
- stddev()
- stdvar()

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Binary Operators

- Arithmetic Binary Operators: +, -, /, *, ^, %,
- Comparison Binary Operators: !=, ==, <, <=, >, >=
- Set Binary Operators: and, or, unless

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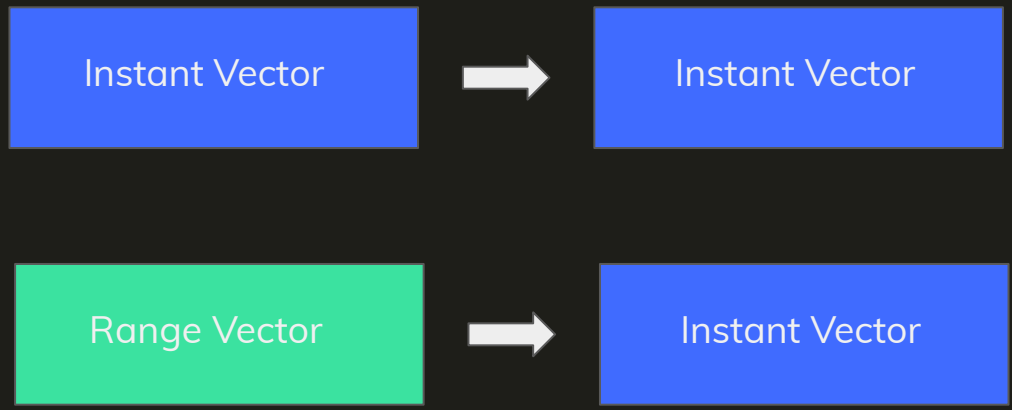
Functions



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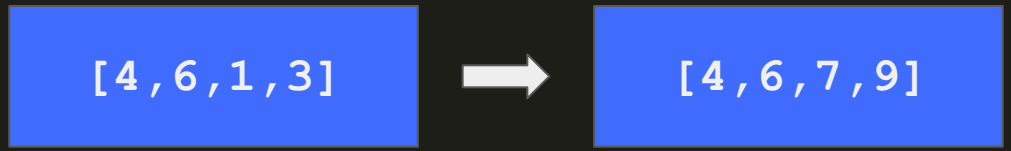
rate(v range-vector)

```
rate(http_requests_total[10m])
```



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Demo time!

Gotchas

- Tell your aggregation operators about the labels you care about!
- Never compare raw counters - use rate()
- Be careful with label sets when using binary operators.

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Resources

- https://www.robustperception.io Blog
- Prometheus Up & Running Book
- https://prometheus.io/docs/prometheus/ documentation

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↳ www.improbable.io