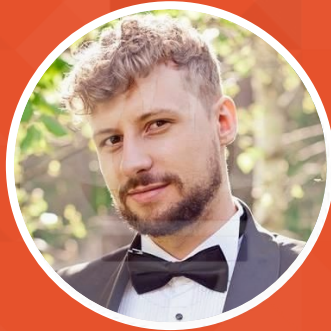




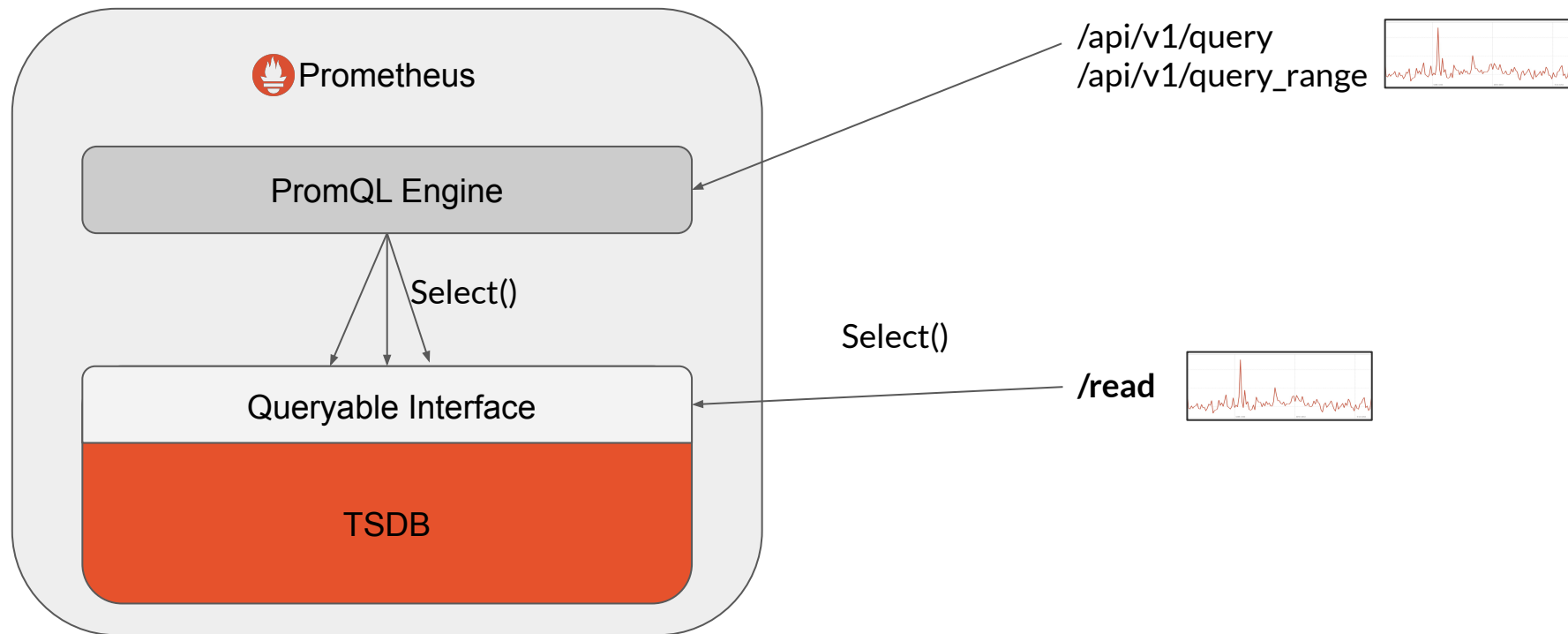
# Reducing Remote Read Footprint



Bartek Plotka

@bwplotka

# Getting samples from TSDB



# Remote Read: Response

/read

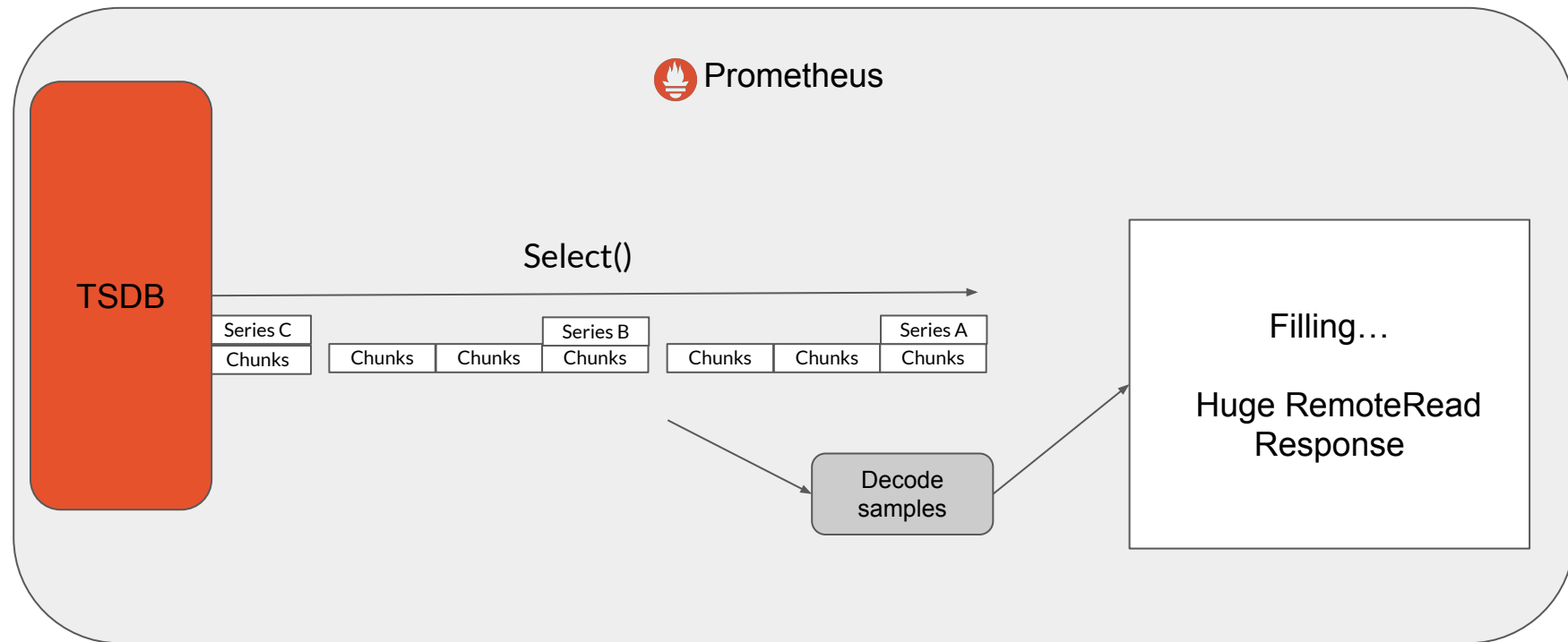
## SAMPLES

```
<proto>
message QueryResult {
  repeated prometheus.TimeSeries timeseries = 1;
}

message TimeSeries {
  repeated Label labels    = 1;
  repeated Sample samples = 2;
}
```

<https://developers.google.com/protocol-buffers> over HTTP

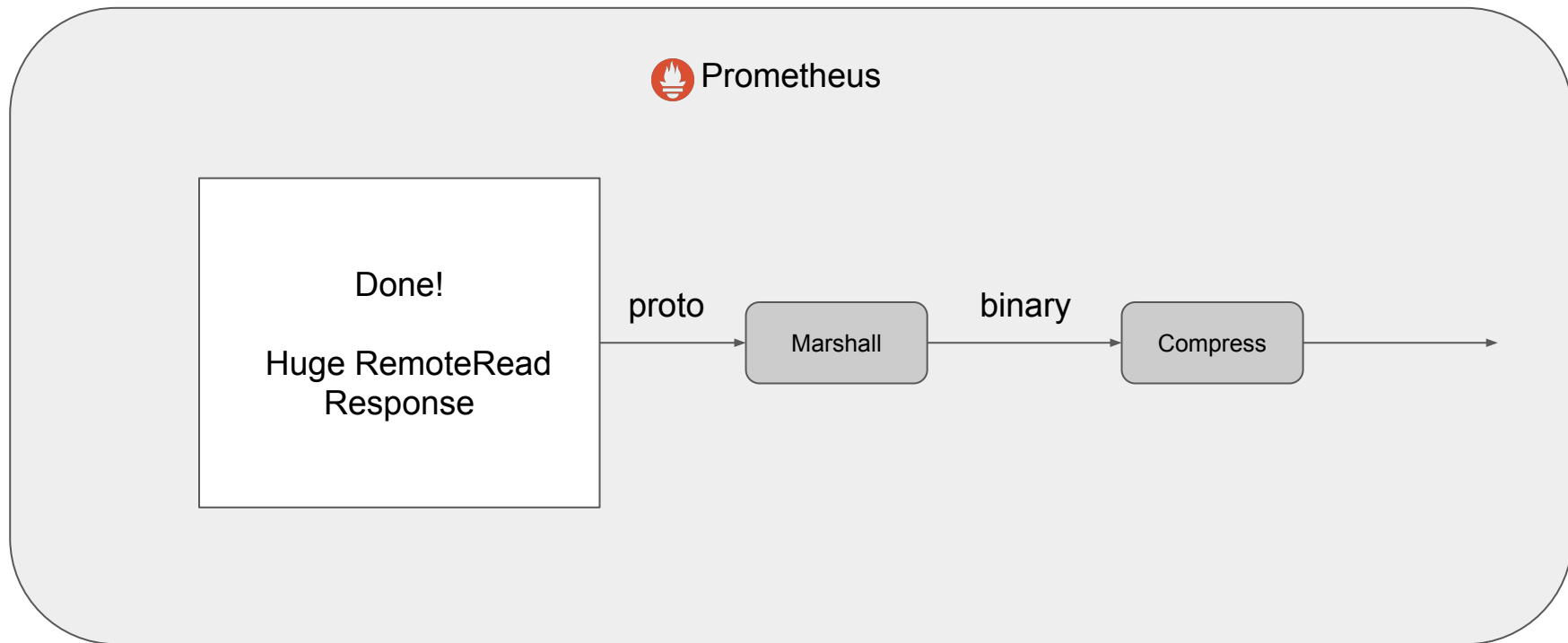
# Remote Read: Bottlenecks



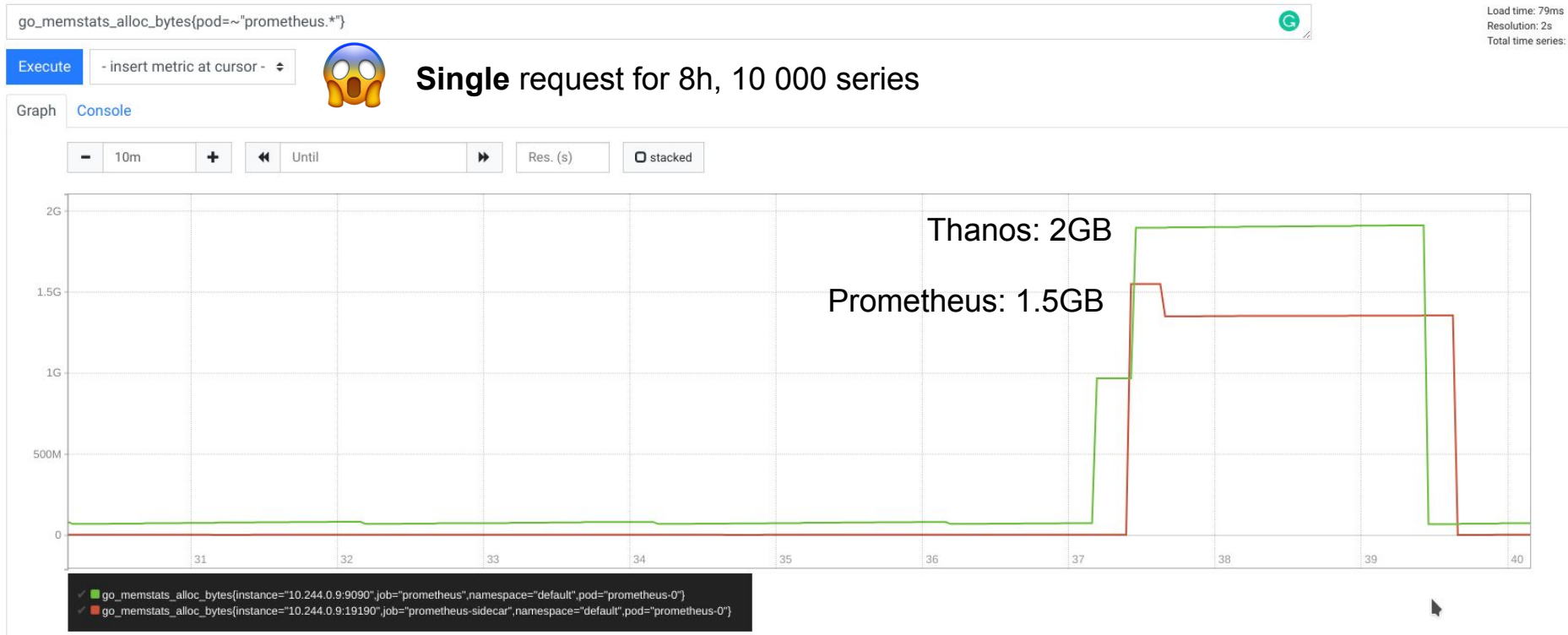
The background is a solid light blue color. It is decorated with several stylized yellow flowers, each with five petals and a dark blue center. Green leaves of various shapes are scattered around the flowers, connected by thin, dark green lines representing stems. The overall style is simple and illustrative.

**TWO HOURS LATER**

# Remote Read: Bottlenecks



# Remote Read Request: Allocations on heap



# Remote Read: Response (Prometheus 2.13.0)

/read

## SAMPLES

```
<proto>
message QueryResult {
  repeated prometheus.TimeSeries timeseries = 1;
}

message TimeSeries {
  repeated Label labels = 1;
  repeated Sample samples = 2;
}
```

## STREAMED\_XOR\_CHUNKS [NEW]

```
<proto>
message ChunkedReadResponse {
  repeated prometheus.ChunkedSeries chunked_series = 1;
}

message ChunkedSeries {
  repeated Label labels = 1;
  repeated Chunk chunks = 2;
}
```



# Remote read: Response (Prometheus 2.13.0)

/read

## SAMPLES

```
<proto>
message QueryResult {
  repeated prometheus.TimeSeries timeseries = 1;
}

message TimeSeries {
  repeated Label labels = 1;
  repeated Sample samples = 2;
}
```

sample{Value, Timestamp}

## STREAMED\_XOR\_CHUNKS [NEW]

```
<proto>
message ChunkedReadResponse {
  repeated prometheus.ChunkedSeries chunked_series = 1;
}

message ChunkedSeries {
  repeated Label labels = 1;
  repeated Chunk chunks = 2;
}
```

XOR chunk (~120 samples)

# Chunked protocol (Prometheus v2.13.0)

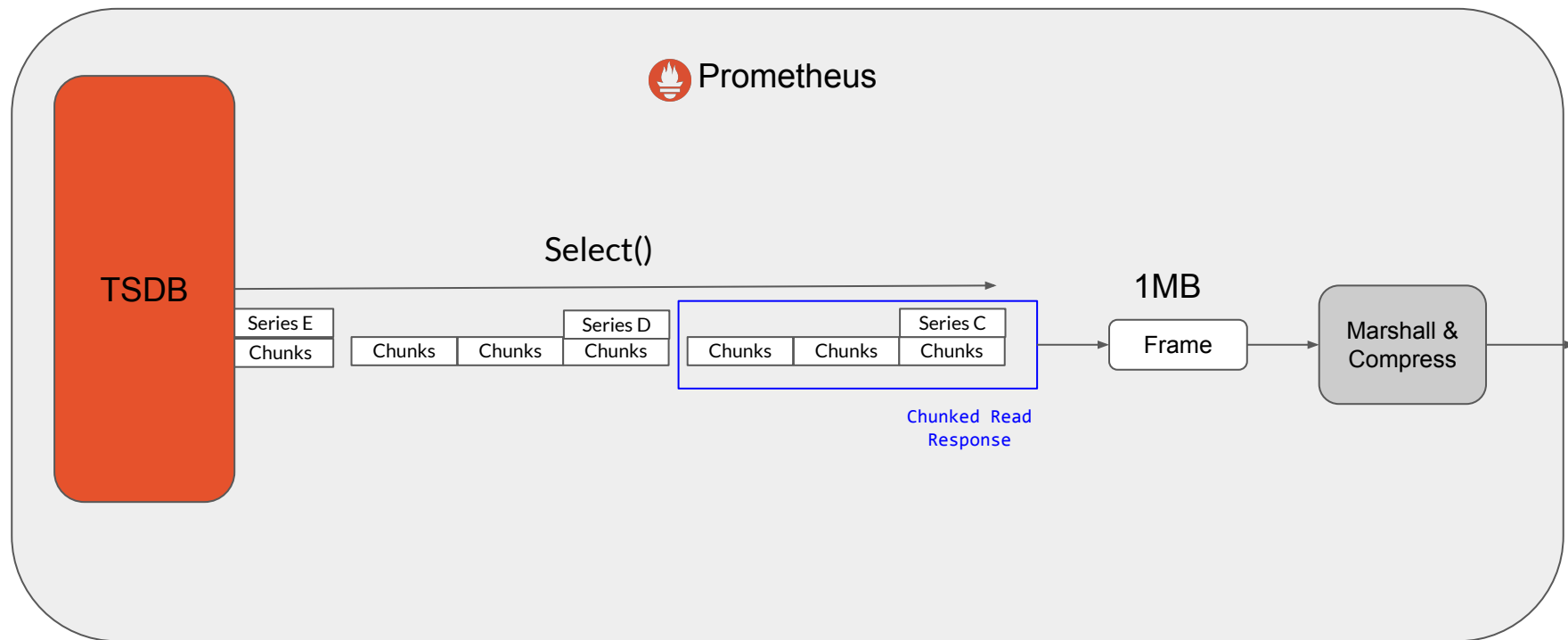
1MB Max

```
message ChunkedReadResponse {  
  repeated prometheus.ChunkedSeries chunked_series = 1;  
}
```

big-endian uint32 Checksum of ChunkedReadResponse

uvarint64 of ChunkedReadResponse

# Remote Read (Prometheus v2.13.0)



# Remote Read Request: Heap Allocs

go\_memstats\_alloc\_bytes{pod=~"prometheus-rr.\*"}



Load time: 65ms  
Resolution: 2s  
Total time series: 2

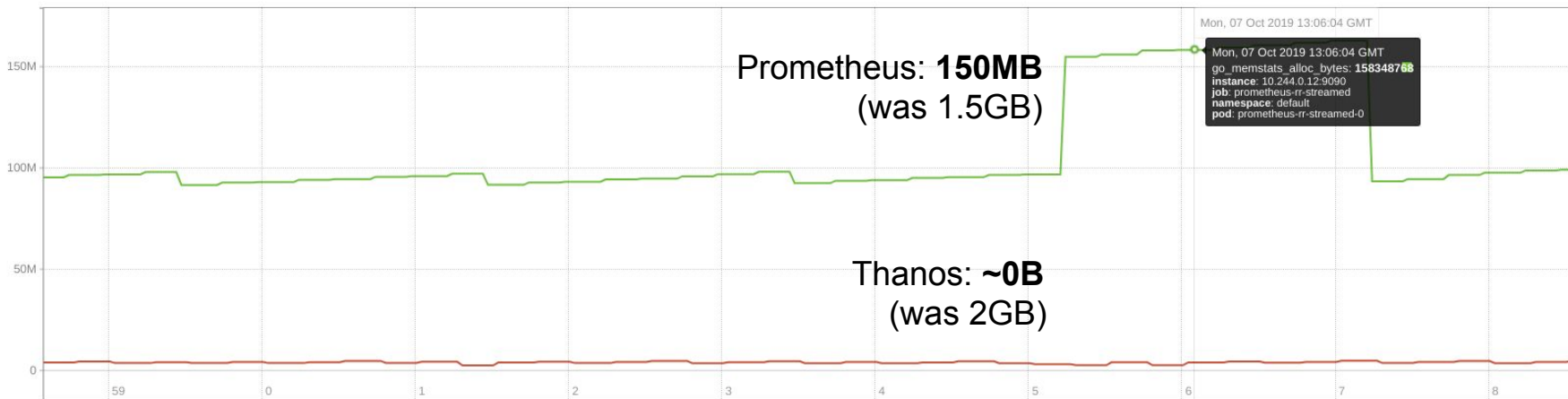
Execute

- insert metric at cursor -

**Single request for 8h, 10 000 series**

Graph Console

- 10m + << Until >> Res. (s) stacked



~2.5x reduced latency  
~2x less CPU time

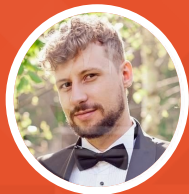


# Thanks!

Questions?

## Links:

- **APIs:** <https://prometheus.io/docs/prometheus/latest/querying/api/>
- **Remote read:** <https://github.com/prometheus/prometheus/blob/master/prompb/remote.proto#L27>
- **Go stream client:** <https://github.com/prometheus/prometheus/blob/master/storage/remote/chunked.go>
- **Blog:** <https://prometheus.io/blog/2019/10/10/remote-read-meets-streaming/>



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