Grafana is not enough:

DIY user interfaces for Prometheus

weaveworks

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Prometheus

DOCS DOWNLOAD COMMUNITY BLOG

From metrics to insight

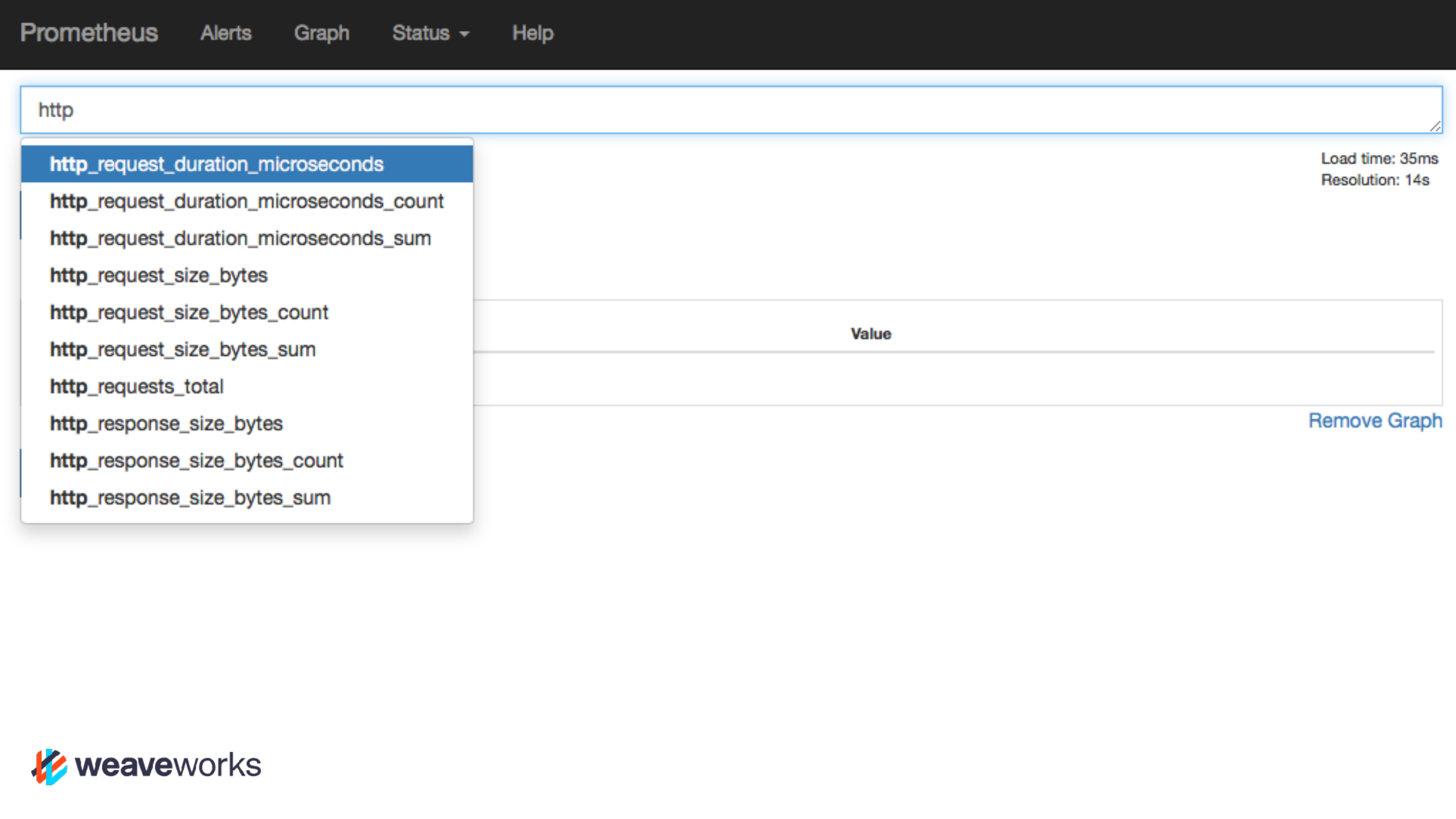
Power your metrics and alerting with a leading open-source monitoring solution.

- Dimensional data
- Powerful queries
- Great visualization
- Efficient storage
- Simple operation
- Precise alerting
- Many client libraries
- Many integrations

Get started

```
$ docker run -p 9090:9090 prom/prometheus
```

```
time="2016-11-16T00:51:06Z" level=info msg="Starting prometheus (version=1.2.1,
branch=master, revision=dd66f2e94b2b662804b9aa1b6a50587b990ba8b7)" source="main.go:75"

time="2016-11-16T00:51:06Z" level=info msg="Build context (go=go1.7.1,
user=root@fd9b0daff6bd, date=20161010-15:58:23)" source="main.go:76"

time="2016-11-16T00:51:06Z" level=info msg="Loading configuration file /etc/prometheus/
prometheus.yml" source="main.go:247"

time="2016-11-16T00:51:07Z" level=info msg="Loading series map and head chunks..."
source="storage.go:354"

time="2016-11-16T00:51:07Z" level=info msg="0 series loaded." source="storage.go:359"

time="2016-11-16T00:51:07Z" level=warning msg="No AlertManagers configured, not dispatching
any alerts" source="notifier.go:176"
```


Prometheus
Alerts
Graph
Status
Help
http
http_request_duration_microseconds
http_request_duration_microseconds_count
http_request_duration_microseconds_sum
http_request_size_bytes
http_request_size_bytes_count
http_request_size_bytes_sum
http_requests_total
http_response_size_bytes
http_response_size_bytes_count
http_response_size_bytes_sum
Load time: 35ms
Resolution: 14s
Value
Remove Graph
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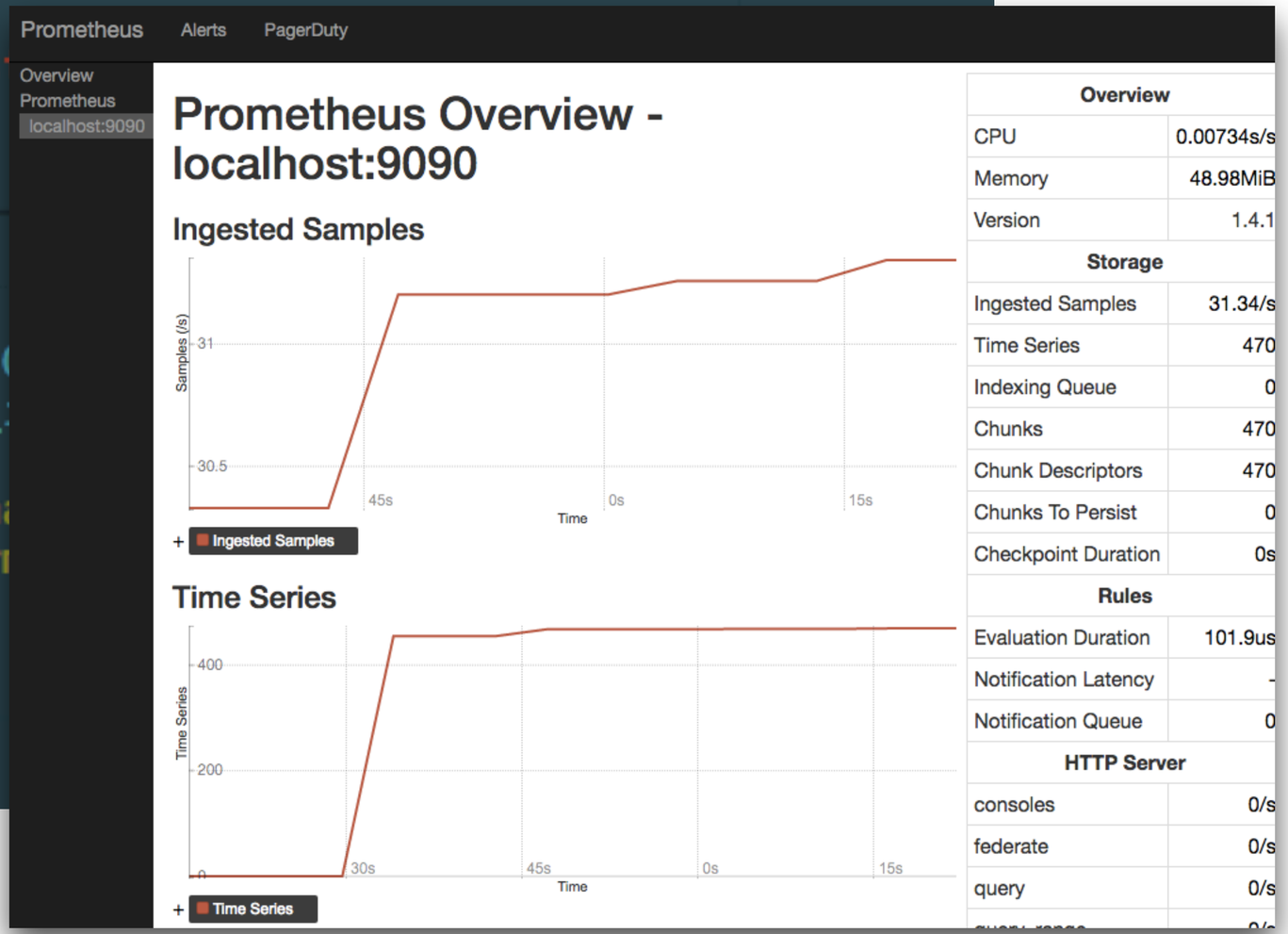
Console Templates: /consoles/prometheus-overview.html

```
{{ template "prom_right_table_tail" }}

{{ template "prom_content_head" . }}
  <h1>Prometheus Overview - {{ .Params.ins

  <h3>Ingested Samples</h3>
  <div id="samplesGraph"></div>
  <script>
  new PromConsole.Graph({
    node: document.querySelector("#samples
    expr: "irate(prometheus_local_storage_
    name: 'Ingested Samples',
    yAxisFormatter: PromConsole.NumberForma
    yHoverFormatter: PromConsole.NumberFor
    yTitle: "Samples",
    yUnits: "/s",
  })
  </script>
```



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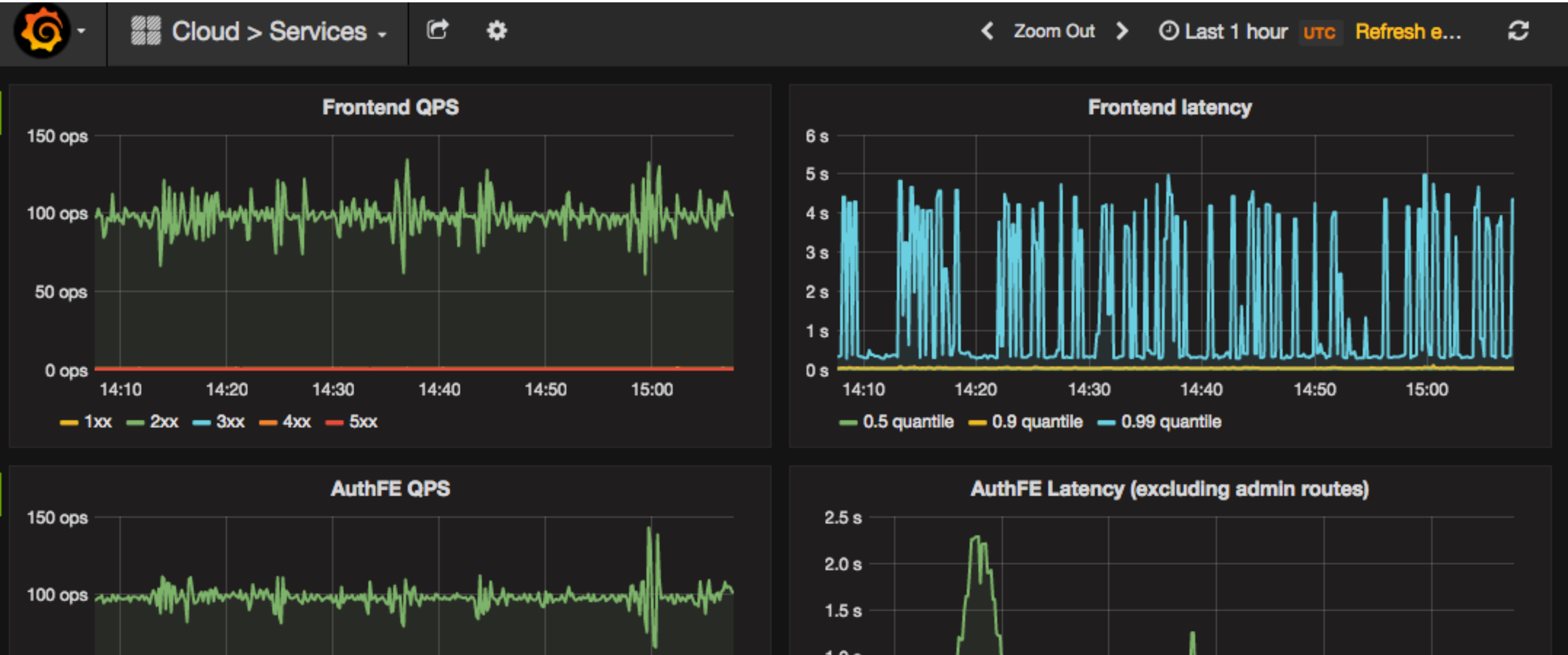
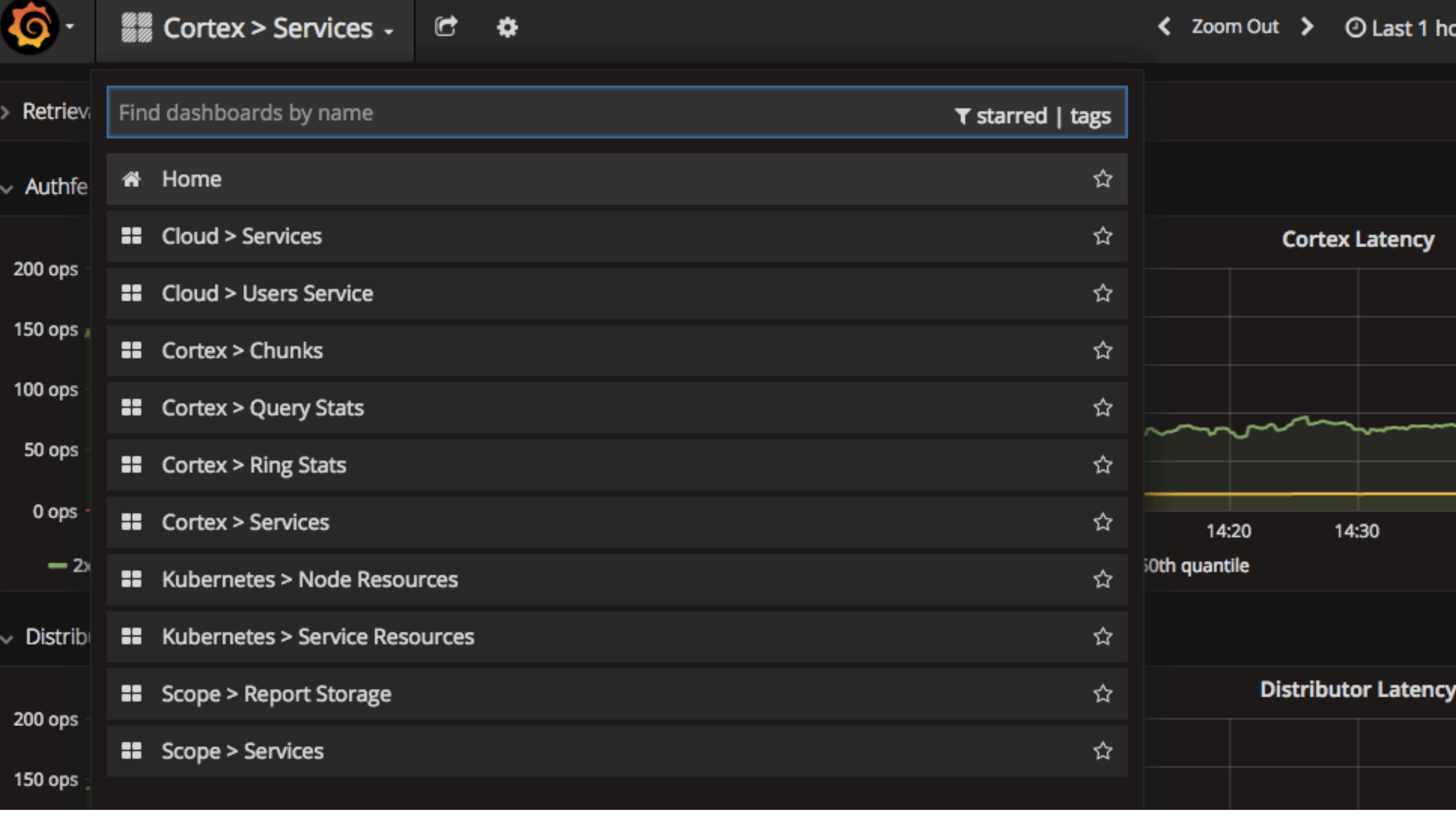
Grafana


Cloud > Services
Zoom Out
Last 1 hour
UTC
Refresh e...
Frontend QPS
150 ops
100 ops
50 ops
0 ops
14:10
14:20
14:30
14:40
14:50
15:00
1xx
2xx
3xx
4xx
5xx
Frontend latency
6 s
5 s
4 s
3 s
2 s
1 s
0 s
0.5 quantile
0.9 quantile
0.99 quantile
AuthFE QPS
AuthFE Latency (excluding admin routes)
2.5 s
2.0 s
1.5 s


Cortex > Services
Zoom Out
Last 1 ho
Find dashboards by name
starred | tags
Home
Cloud > Services
Cloud > Users Service
Cortex > Chunks
Cortex > Query Stats
Cortex > Ring Stats
Cortex > Services
Kubernetes > Node Resources
Kubernetes > Service Resources
Scope > Report Storage
Scope > Services
Retriev
Authfe
Distribu
200 ops
150 ops
100 ops
50 ops
0 ops
Cortex Latency
14:20
14:30
0th quantile
Distributor Latency

Aside: Grafanalib

https://github.com/weaveworks/grafanalib

https://www.weave.works/grafana-dashboards-as-code/

```
import itertools

from grafanalib.core import *


GRAPH_ID = itertools.count(1)


dashboard = Dashboard(
  title="Frontend Stats",
  rows=[
    Row(panels=[
      Graph(
        title="Frontend QPS",
        dataSource='My Prometheus',
        targets=[
          Target(
            expr='sum(irate(nginx_http_requests_total{job="default/frontend",status=~"1.."}[1m]))',
            legendFormat="1xx",
            refId='A',
```

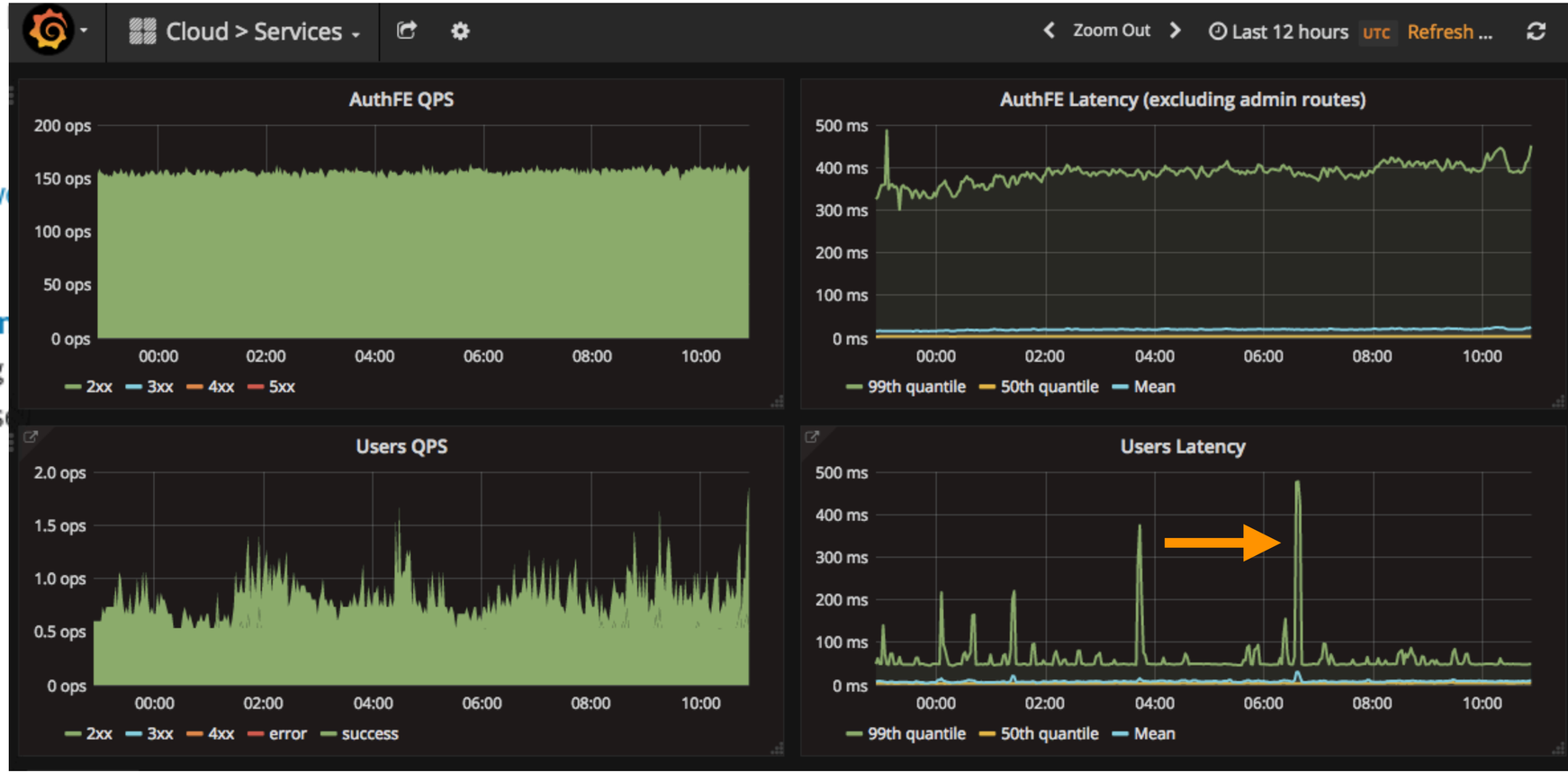
Grafana for troubleshooting?

fluxy-dev APP 05:17
Release (<automated>) quay.io/weaveworks/ui-server:master-937e44b to default/ui-server. done

prod-alert APP 06:17
[FIRING:1] RebootRequired (warning)
RebootRequired: Machine(s) require

dev-alert APP 07:01
[FIRING:1] Kubediff (warning)
Kubediff: See https://frontend.dev.w

prod-alert APP 07:28
[FIRING:1] CortexConstipated (warr
CortexConstipated: Cortex is having
1.5109511660764396 chunks per s



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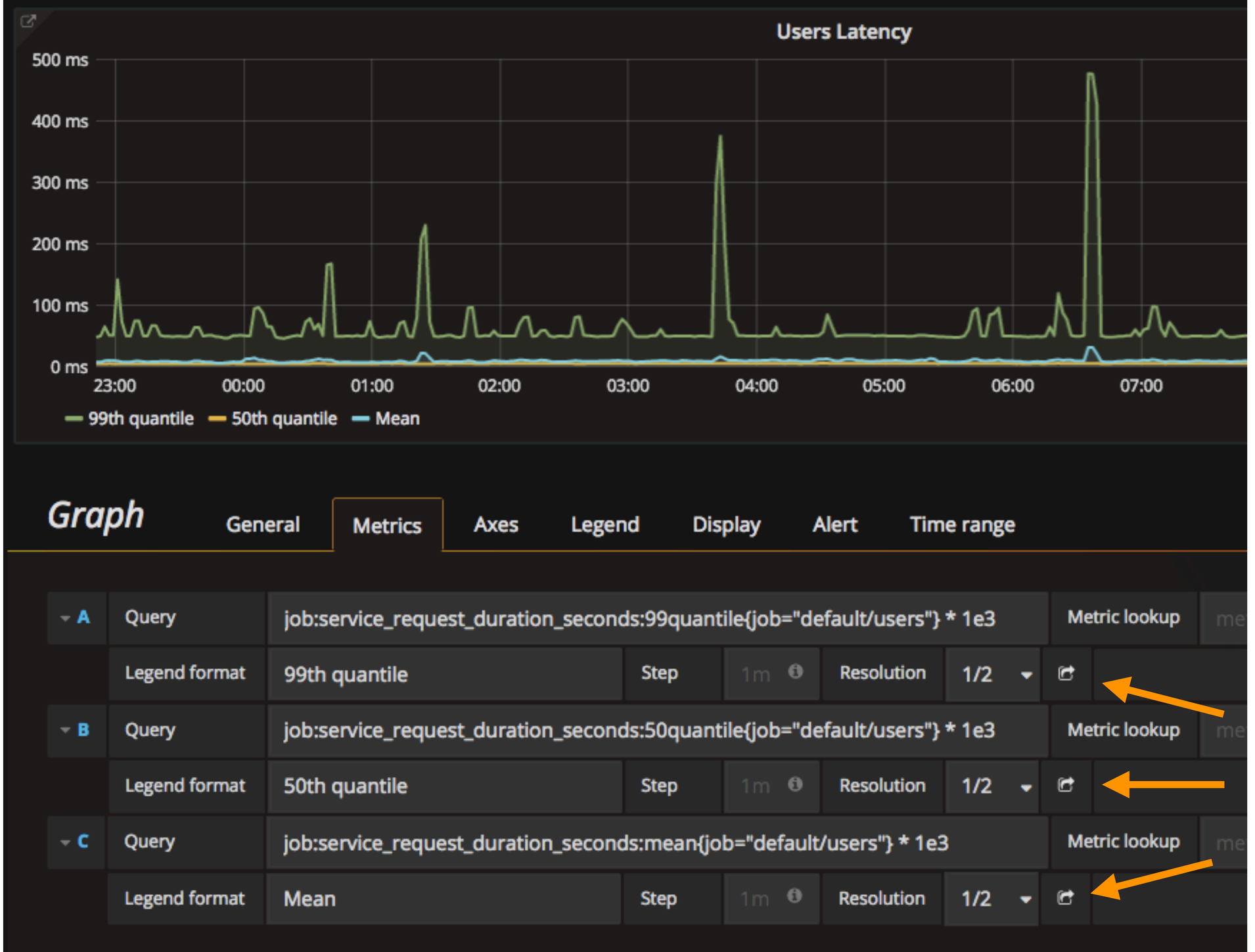
Whereto now?



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What does Bob need to do?

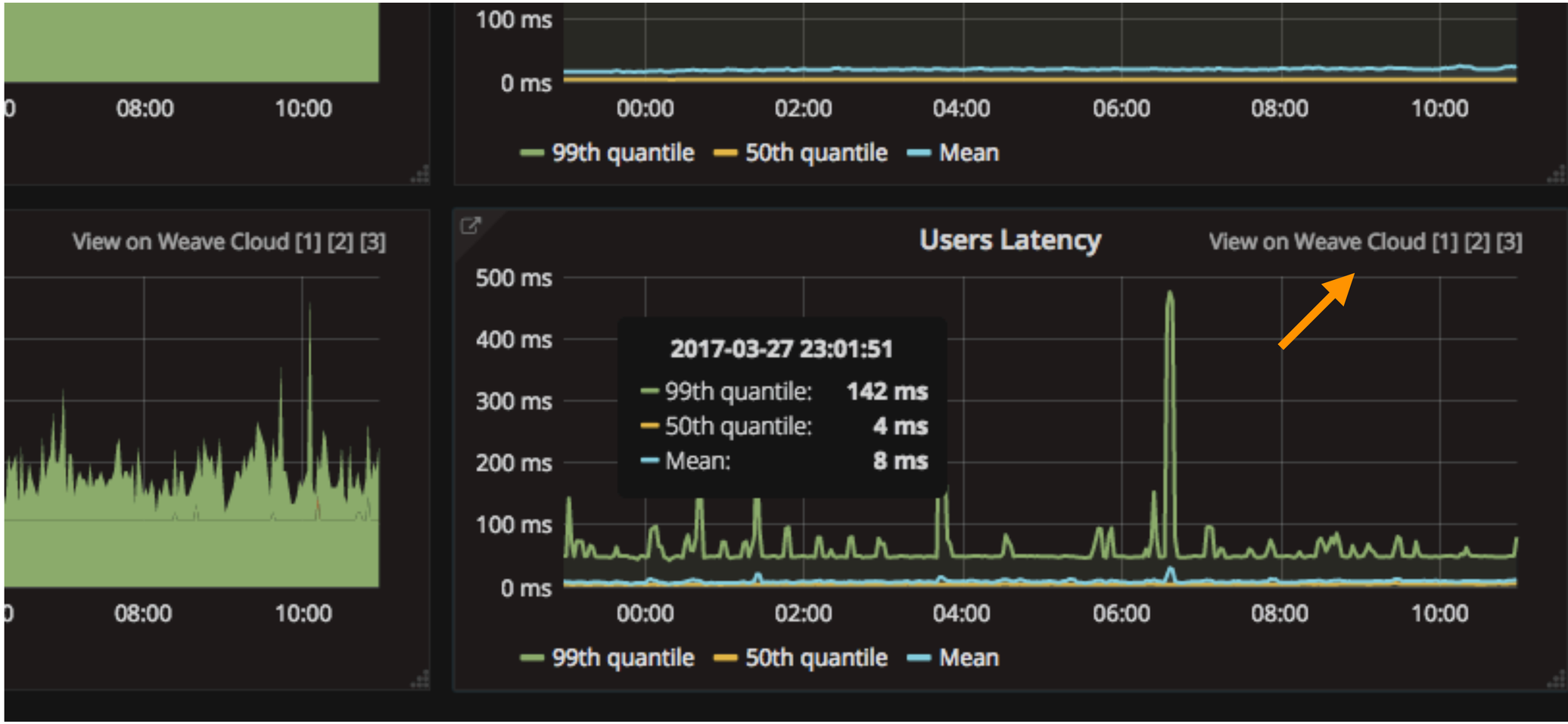
- Explore queries
- Compare time values
- Document his research
- Add notes
- Share with co-workers
- Handover incident

DIY all the things

- Jump out of Grafana
- Prometheus API
- Reuse time-series charts from expression browser
- React/Draft.js input fields

Jumping out

Injecting links to where we want to explore queries



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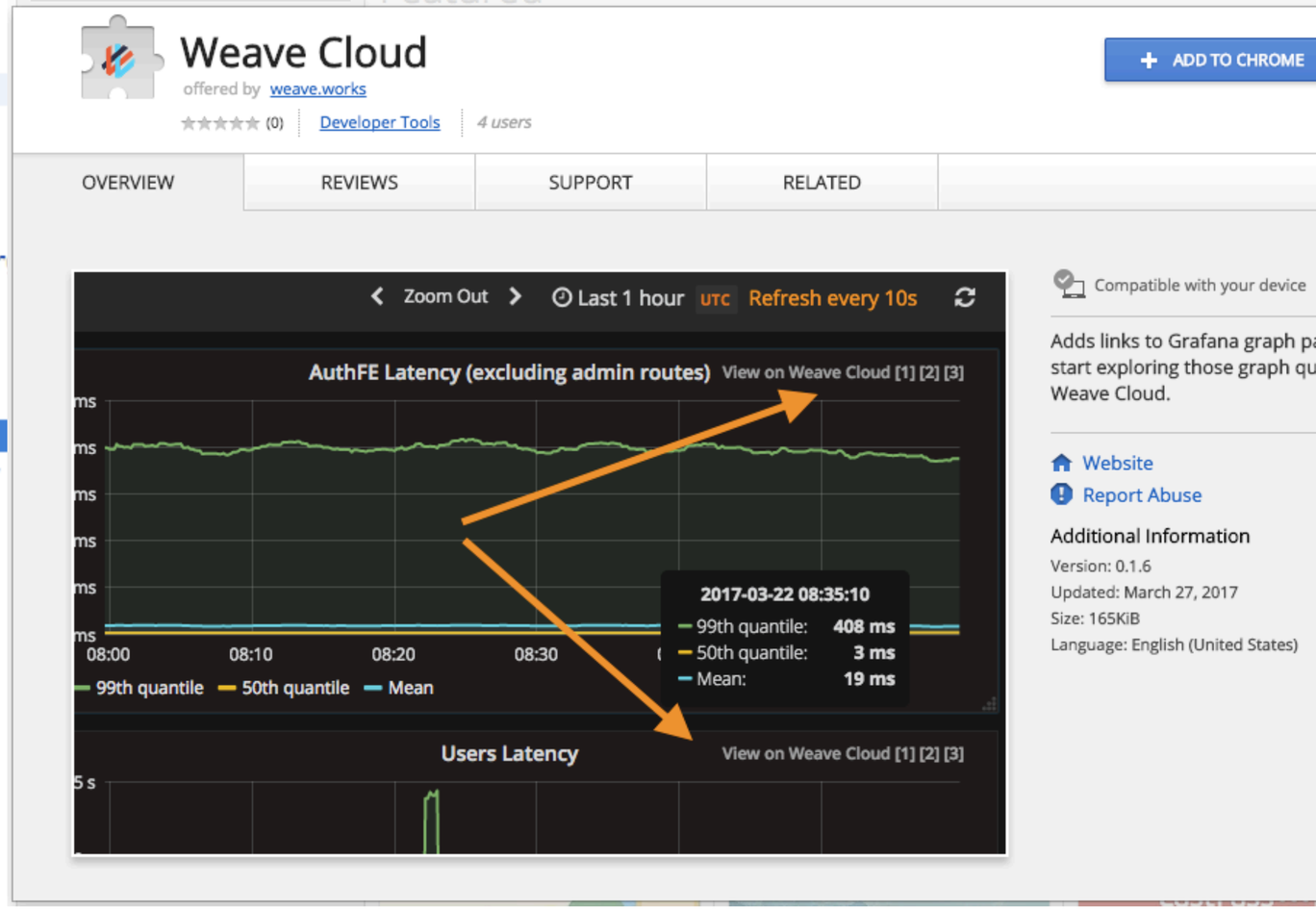
Yay, browser extensions

```
-component type="panel" class="panel-margin">
l-plugin-graph dashboard="ctrl.dashboard" panel="panel" row="ctrl.row">
afana-panel ctrl="ctrl">
div class="panel-container" style="min-height: 250px;">
<div class="panel-header">
▶<span class="panel-info-corner panel-info-corner--links drop-help drop-tar
▶<span class="panel-loading ng-hide" ng-show="ctrl.loading">…</span>
▼<div class="panel-title-container drag-handle" panel-menu>
▼<span class="panel-title drag-handle pointer">
<span class="icon-gf panel-alert-icon"></span>
<span class="panel-title-text drag-handle">Users Latency</span> == $0
▶<span class="panel-time-info ng-hide" ng-show="ctrl.timeInfo">…</span>
</span>
</div>
▶<span>…</span>
</div>
<div class="panel-content">…</div>
<panel-resizer>…</panel-resizer>
/div>
```



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https://github.com/weaveworks/weavecloud-browser-extension

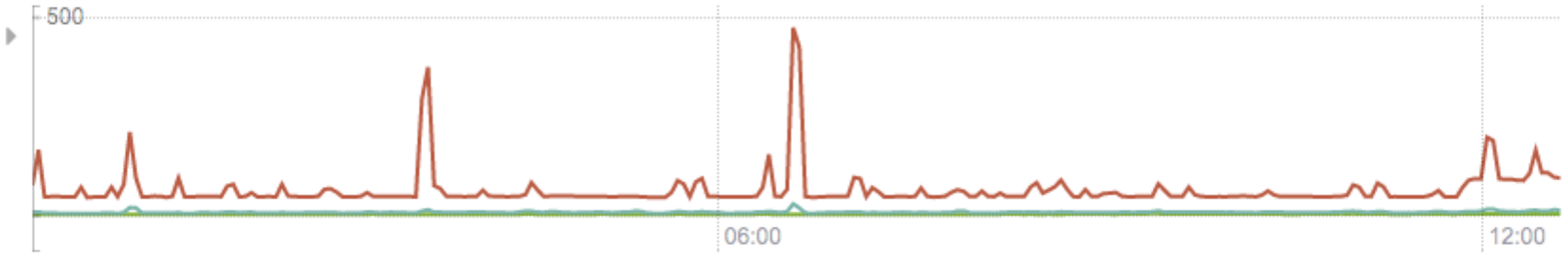
Jump, but where to?

Users Latency with major peaks on 2017-03-28

Time: Now Now Interval: 12h • Last edit: a few seconds ago by davidk@weave.works • Remove

1
```
job:service_request_duration_seconds:99quantile{job="default/users"} * 1e3;
job:service_request_duration_seconds:50quantile{job="default/users"} * 1e3;
job:service_request_duration_seconds:mean{job="default/users"} * 1e3
```

Run or press Shift+Return Show values or press Alt+Return



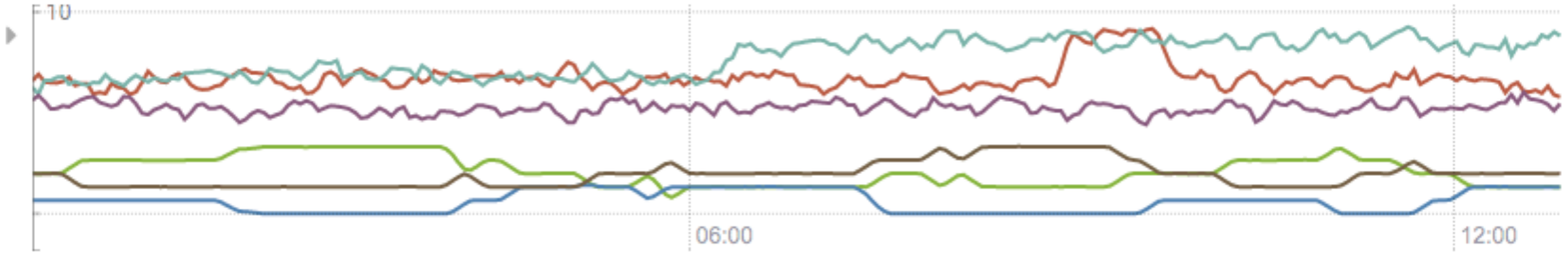
Query took: 519ms

Released: quay.io/weaveworks/ui-server:cortex-kubecon-2017-20395d2-WIP to default/ui-server

2 Nothing new was released that morning. See chart above.
Let's rule out users authentication:

3
```
rate(authenticated_user_requests[10m])
```

Run or press Shift+Return Show values or press Alt+Return



Query took: 216ms

4

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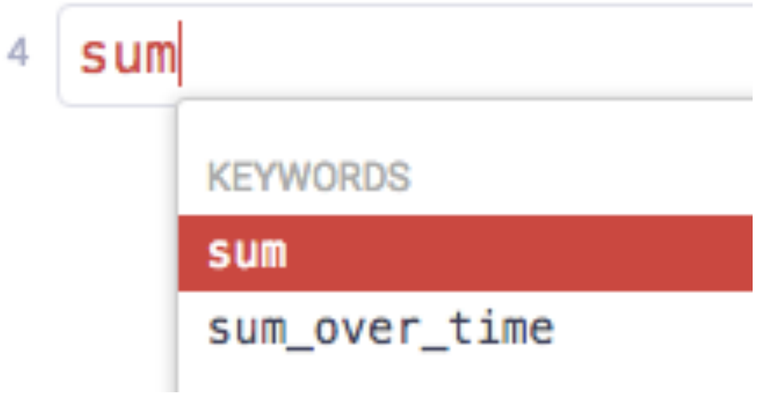
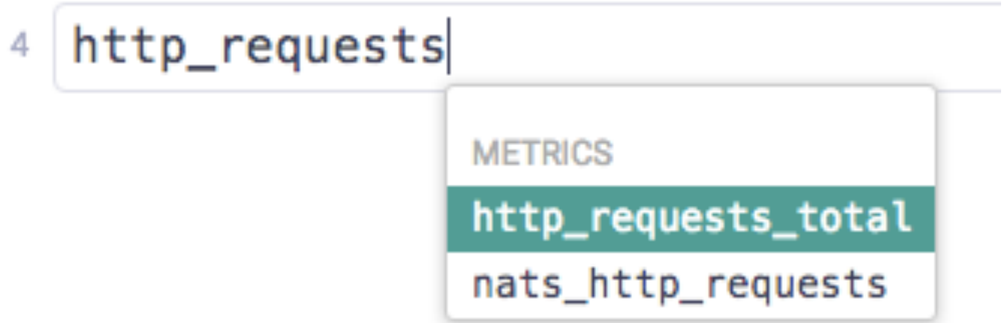
Enhancing the query field





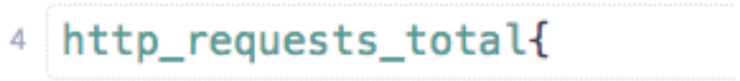
/api/v1/label/__name__/values

One step further

```
4 http_requests_total{
```

/api/v1/series?match[]=${metric}

One step further



/api/v1/series?match[]=${metric}

One step further

```
4 http_requests_total{
```

```
4 http_requests_total{}
```

LABEL KEYS

- code
- handler
- instance
- job
- method
- node

/api/v1/series?match[]=${metric}


```
▼ labels: {…}
  ▼ http_requests_total: {…}
    ▼ data: {…}
      ▼ code: Array[4]
          0: "200"
          1: "422"
          2: "400"
          3: "404"
      ▼ handler: Array[17]
          0: "lib_files"
          1: "prometheus"
          2: "targets"
          3: "graph"
          4: "app_files"
          5: "query"
          6: "status"
```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One step further

```
4 http_requests_total{
```

```
4 http_requests_total{}
```

LABEL KEYS
- code
- handler
- instance
- job
- method
- node

/api/v1/series?match[]=${metric}

```
4 http_requests_total{code="200",handler=}
```

LABEL VALUES
- add_alerts
- add_silence
- alert_groups
- app_files
- graph

```
▼ labels: {…}
  ▼ http_requests_total: {…}
    ▼ data: {…}
      ▼ code: Array[4]
          0: "200"
          1: "422"
          2: "400"
          3: "404"
      ▼ handler: Array[17]
          0: "lib_files"
          1: "prometheus"
          2: "targets"
          3: "graph"
          4: "app_files"
          5: "query"
          6: "status"
```

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Naive syntax decorators for Draft.js

Metric Label key Label value /=\s*"([^"]+)"\s*/g


```
t-ltr">
prom-expression prom-expression-metric-name"

fset-key="7u9rv-1-0">…</span>
prom-expression prom-expression-label-key" st

offset-key="7u9rv-2-0">
a-text="true">code</span> == $0
```

```
▶<span data-offset-key="7u9rv-3-0">…</span>
▶<span class="prom-expression prom-expression-label-value"
161);">…</span>
▶<span data-offset-key="7u9rv-5-0">…</span>
```

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Let’s add table mode

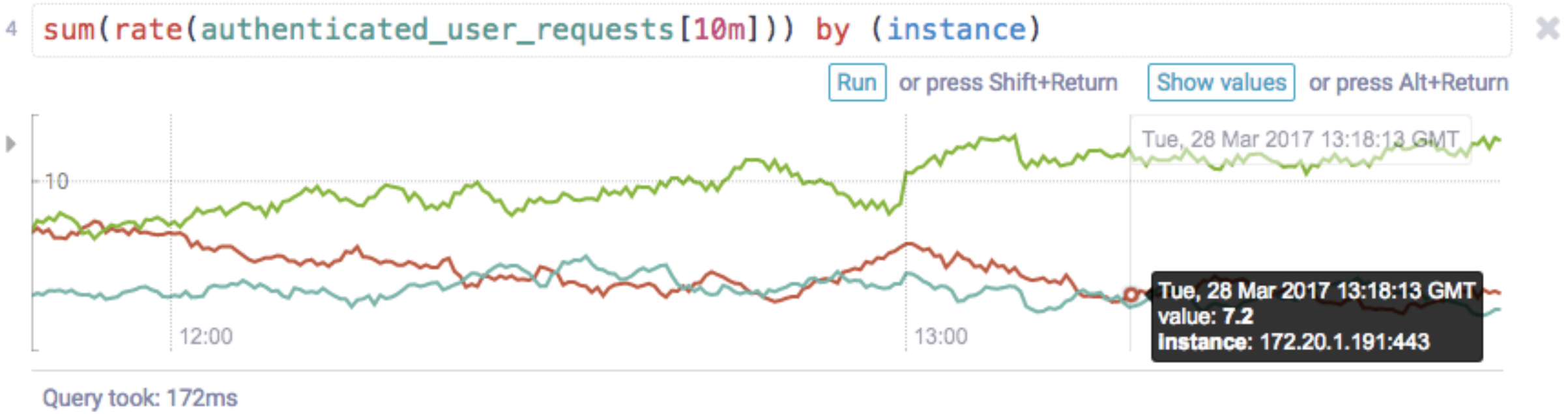
```
4 http_requests_total{handler="query_range"}
```

Run or press Shift+Return Show values or press Alt+Return

CODE	HANDLER	INSTANCE	JOB	METHOD	NODE	VALUE
200	query_range	prometheus-3384...	monitoring/prom...	get	ip-172-20-3-30.ec...	36,882.000
200	query_range	querier-12346855...	cortex/querier	get	ip-172-20-1-135.e...	4,415.000
200	query_range	querier-12346855...	cortex/querier	get	ip-172-20-3-30.ec...	4,402.000
200	query_range	querier-12346855...	cortex/querier	get	ip-172-20-1-176.e...	4,384.000
422	query_range	querier-12346855...	cortex/querier	get	ip-172-20-3-30.ec...	2.000
422	query_range	querier-12346855...	cortex/querier	get	ip-172-20-1-135.e...	2.000
400	query_range	prometheus-3384...	monitoring/prom...	get	ip-172-20-3-30.ec...	1.000
400	query_range	querier-12346855...	cortex/querier	get	ip-172-20-1-176.e...	1.000

Query took: 124ms

Charts!


4
sum(rate(authenticated_user_requests[10m])) by (instance)
Run
or press Shift+Return
Show values
or press Alt+Return
Tue, 28 Mar 2017 13:18:13 GMT
10
12:00
13:00
Tue, 28 Mar 2017 13:18:13 GMT
value: 7.2
Instance: 172.20.1.191:443
Query took: 172ms

/api/v1/query_range?query=..&start=..&end=..&step=..

- Range query to get graph data
- Rickshaw graph library (same as vanilla expression browser)
- https://github.com/prometheus/prometheus/blob/master/web/ui/static/js/graph.js

```
// Now create the new graph.
self.rickshawGraph = new Rickshaw.Graph({
  element: self.graph,
  height: Math.max(self.graph.clientHeight, 100),
  width: Math.max(self.graph.clientWidth - 49, 200),
  renderer: (self.isStacked() ? 'stack' : 'line'),
  series: data,
  min: 'auto',
});

self.xAxis = new Rickshaw.Graph.Axis.Time({
  graph: self.rickshawGraph
});

self.yAxis = new Rickshaw.Graph.Axis.Y({
  graph: self.rickshawGraph,
  orientation: 'right',
  tickFormat: Rickshaw.Fixtures.Number.formatKMBT,
  element: self.yAxisEl,
});

self.rickshawGraph.render();
```

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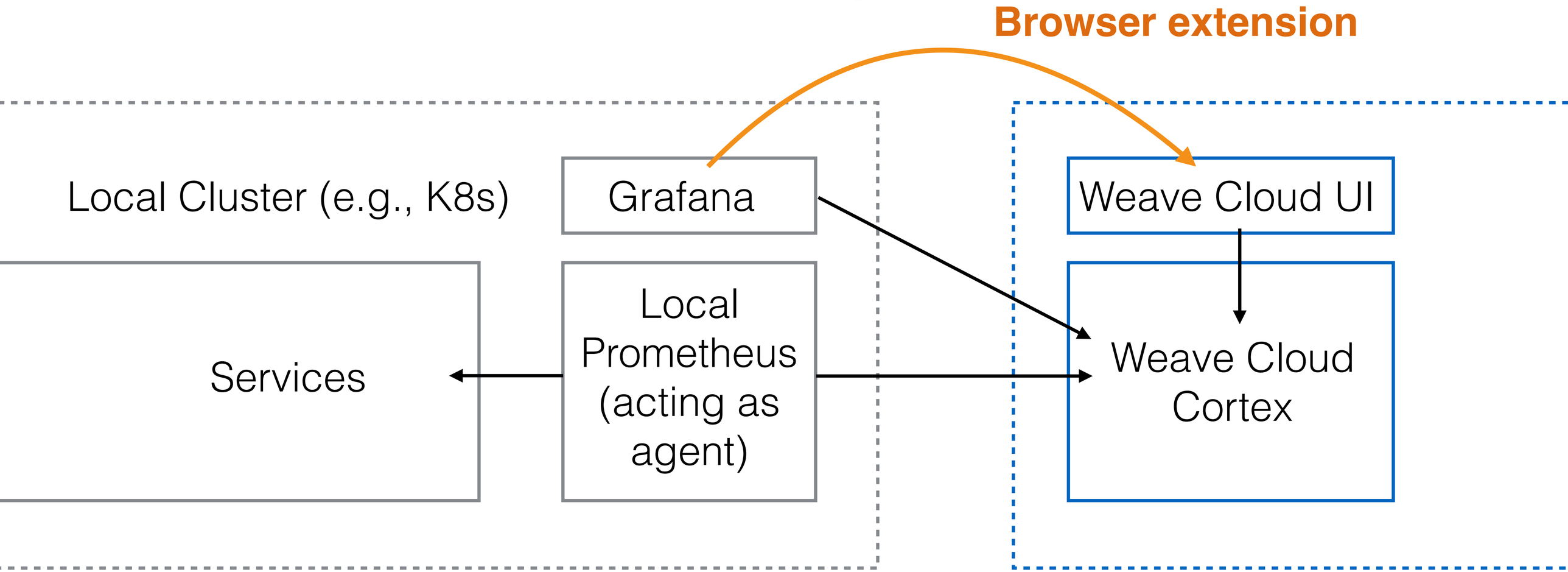
Setup


Browser extension
Local Cluster (e.g., K8s)
Grafana
Weave Cloud UI
Services
Local Prometheus (acting as agent)
Weave Cloud Cortex

DEMO

https://cloud.weave.works

Todo

- ~~Deep link from Grafana (via plugin?)~~
- ~~Multiple cells notebooks to tell incident story~~
- ~~Values table~~
- Shareable notebooks with other users
- Lots of syntax tweaks, e.g.
  sum by (mode) (irate(node_cpu{mode!="idle"}[5m]))

Take-aways

- Look at your behaviour:
  Where do you get stuck? What can you automate?
- Look for jump points
- Study the API, and how existing implementations are using it
- You'll find easy ways to take it one step further
- Don't be afraid of the frontend, just build it

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We’re hiring!

London

San Francisco

Berlin

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Questions?

Trying to figure out how to open source it

Backend is already OSS:
https://github.com/weaveworks/cortex

Try It Out!

Connect your Prometheus to https://cloud.weave.works/