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# Explore your Prometheus data in Grafana

David Kaltschmidt  
@davkals

PromCon 2018



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# I'm not Carl

Carl is having a  
great time on  
parental leave





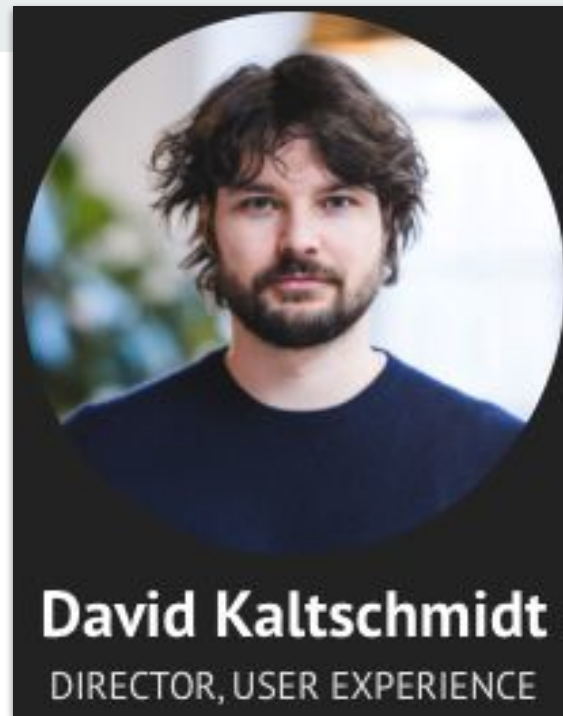
# I'm David

All things UX at Grafana Labs

If you click and are stuck,  
reach out to me.

[david@grafana.com](mailto:david@grafana.com)

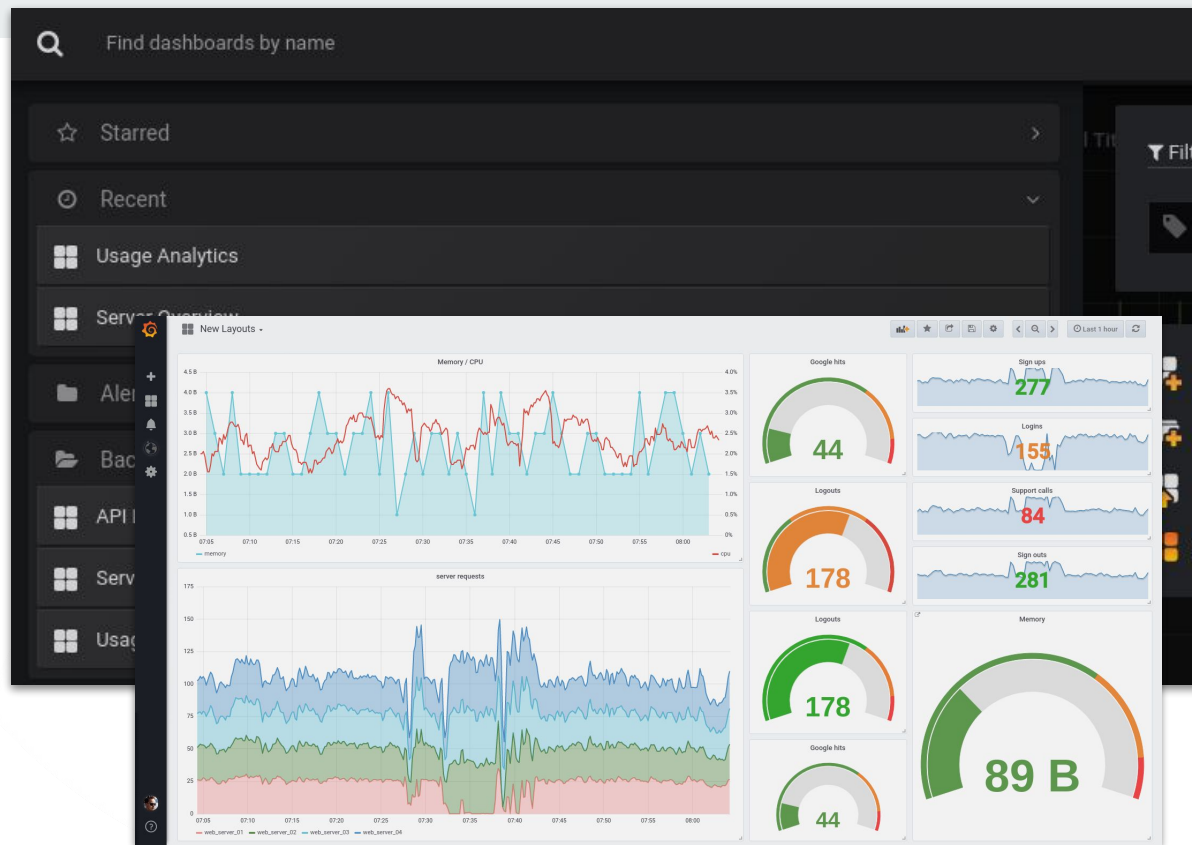
Twitter: @davkals



# Grafana

From  
Dashboarding solution

To  
Observability platform




# Instant query

queries only the last datapoint



best displayed in table panel

**Table**   General   Metrics   Options   Column Styles   Time range

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 Data Source   `$datasource` ▼

▼ **A**   `sum(kube_pod_container_resource_requests_cpu_cores) by (namespace)`

Legend format	legend format	Min step	15s		Resolution	1/2 ▼	Format as	Table ▼	Instant <input checked="" type="checkbox"/>	
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▼ CPU Requests

Requests by Namespace

Namespace	CPUs (Requests)	CPUs (Limits)	CPU Usage
prod	40.35	38.00	16.89
dev	4.65	0.50	0.68
kube-system	1.24	-	0.07
default	0.74	0.69	0.13

Table

General

Metrics

Options

Column Styles

Time range



Data Source

\$datasource ▼

► Query Inspector

▼ A `sum(kube_pod_container_resource_requests_cpu_cores) by (namespace)`



Legend format

legend format

Min step

15s



Resolution

1/2 ▼

Format as

Table ▼

Instant



▼ B `sum(kube_pod_container_resource_limits_cpu_cores) by (namespace)`



Legend format

legend format

Min step

15s



Resolution

1/2 ▼

Format as

Table ▼

Instant



▼ C `sum(rate(container_cpu_usage_seconds_total[5m])) by (namespace)`



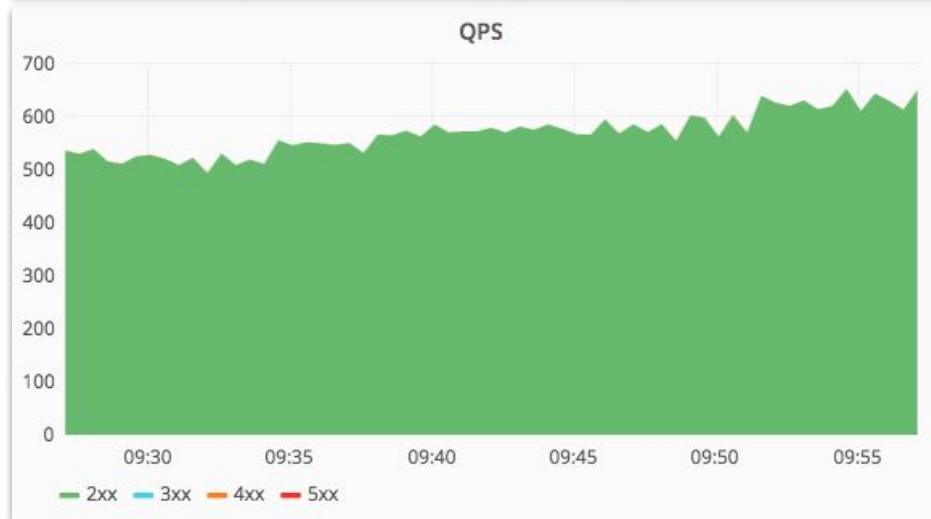
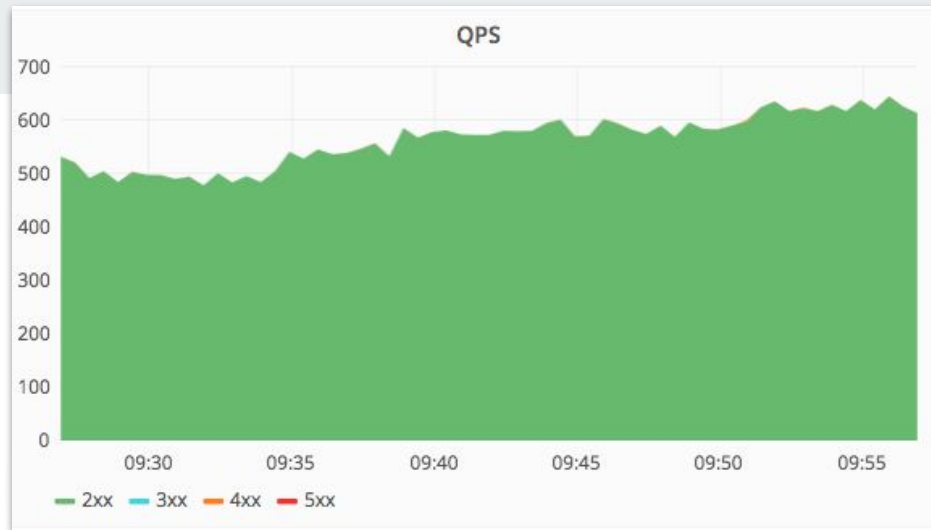
Table row merge on labels



# Step alignment

“Jumpy” rate graphs

Align start/end parameters to step



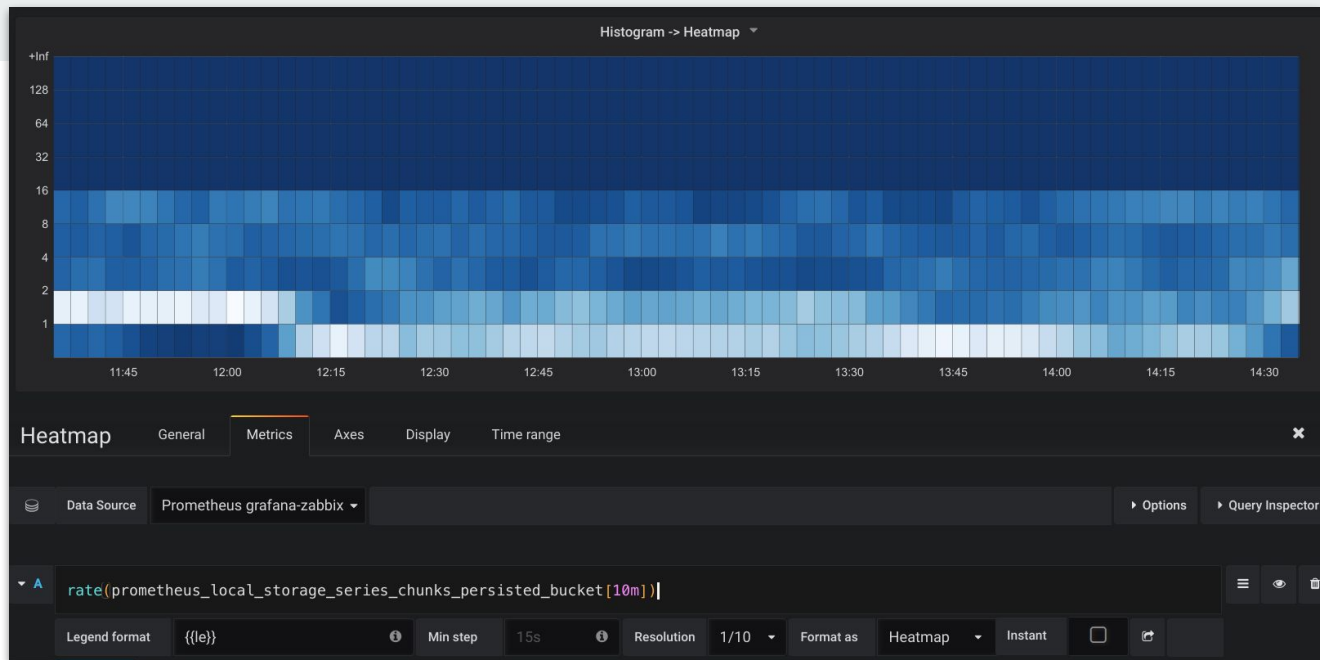
# Heatmap panel

released in 5.1

Query: `rate(foo_metric_bucket[10m])`

Legend format: `{{le}}`

Format as: Heatmap



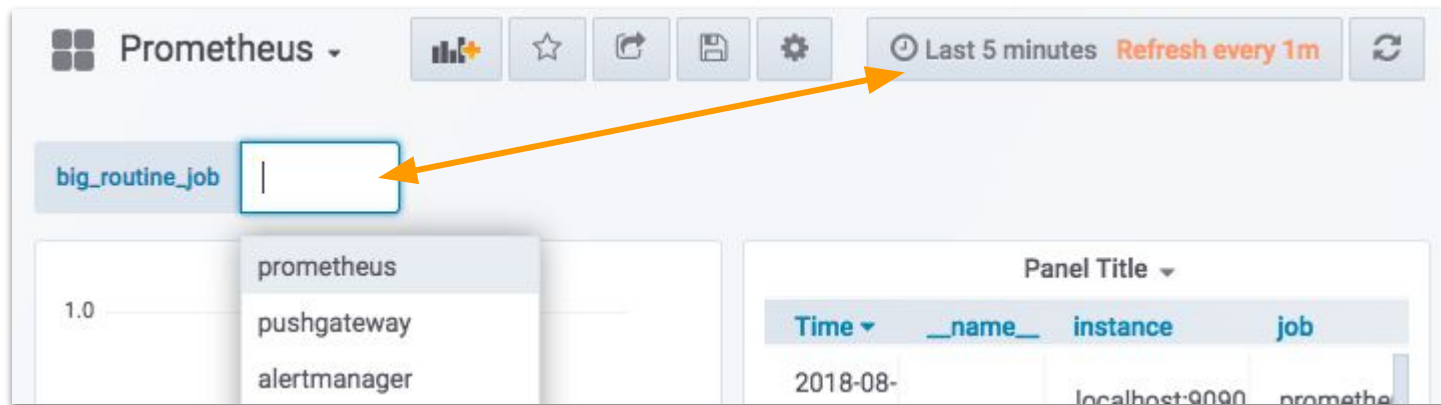


## Variable expansion in template variables

Summer intern project (Tobias, tak!!)

New built-in variable: `$_range`

Dashboard-range-based variables



## Settings

 General

 Annotations

 Variables

 Links

 Versions




 Permissions

 JSON Model







 Save

## Variables > Edit

### General

Name	big_routine_job	Type 	Query 
Label	optional display name	Hide	

### Query Options

Data source	Prom 	Refresh 	On Time Range Change 
Query	query_result(topk(3, avg_over_time(go_goroutines[\$__range])))		
Regex 	/job="([^\"]+)"/		
Sort 	Disabled 		

Template variable expansion



Use range-based template variables in queries



# Provisioning API

Define data sources and dashboards in files

Auto-reload on change

Allows version control of files

## Provisioning Grafana

In previous versions of Grafana, you could only use the API for provisioning data sources and dashboards. But that required the service to be running before you started creating dashboards and you also needed to set up credentials for the HTTP API. In v5.0 we decided to improve this experience by adding a new active provisioning system that uses config files. This will make GitOps more natural as data sources and dashboards can be defined via files that can be version controlled. We hope to extend this system to later add support for users, orgs and alerts as well.

## Config File

Checkout the [configuration](#) page for more information on what you can configure in `grafana.ini`

## Config File Locations

- Default configuration from `$WORKING_DIR/conf/defaults.ini`
- Custom configuration from `$WORKING_DIR/conf/custom.ini`
- The custom configuration file path can be overridden using the `--config` parameter

<http://docs.grafana.org/administration/provisioning/>



# Grafana is now fully CI'ed

Test new features that are in master:

```
docker run -d --name=grafana -p 3000:3000 grafana/grafana:latest
```

<https://hub.docker.com/r/grafana/grafana/>

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# Prometheus adoption



2.8K



36K

PromCon

2016







2.8K

16K



36K

92K

PromCon

2016

2017





2.8K

16K

?K



36K

92K

186K

PromCon

2016

2017

2018





2.8K

16K

54K



36K

92K

186K

PromCon

2016

2017

2018



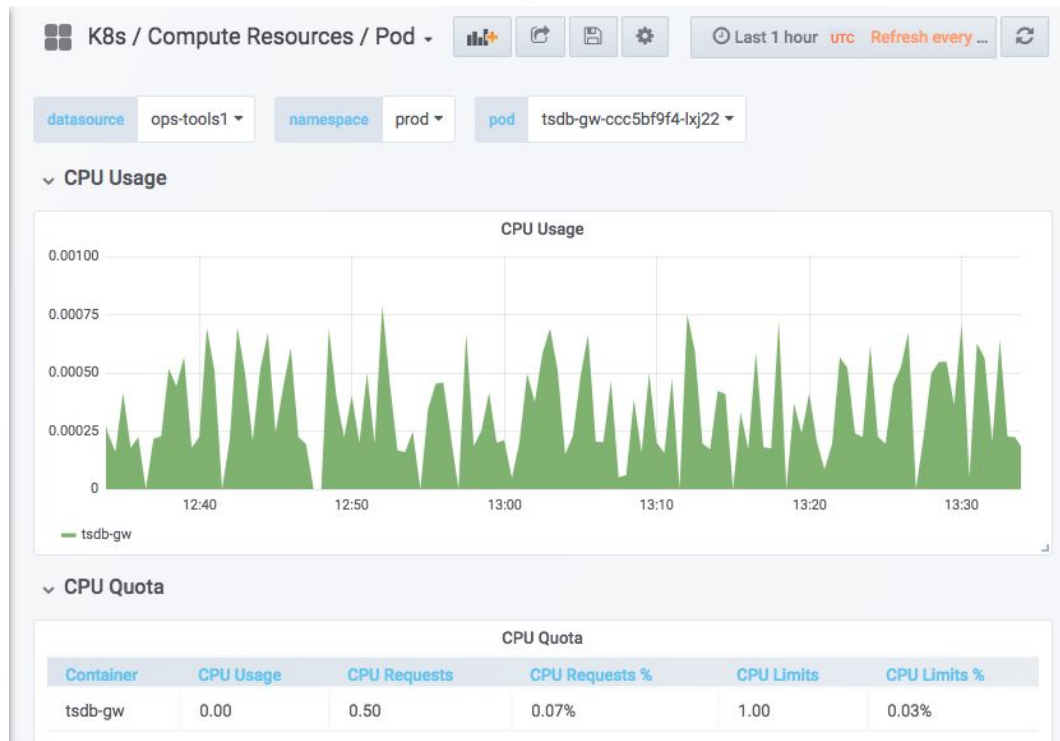
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**New: Explore UI (Alpha)**

# Motivation

Dashboard UI is made for building dashboards, not query iteration.

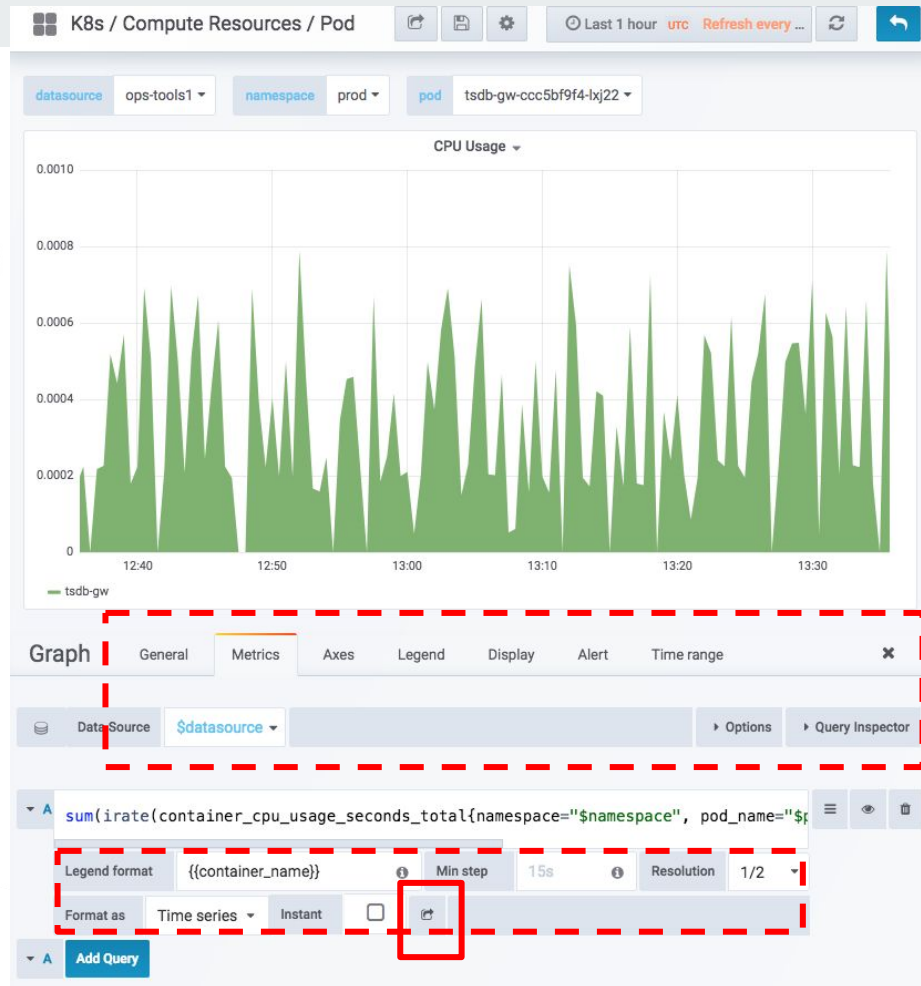
“I just want to quickly...”



# Motivation

once panel is found, difficult to interact with

overwhelming style and display options

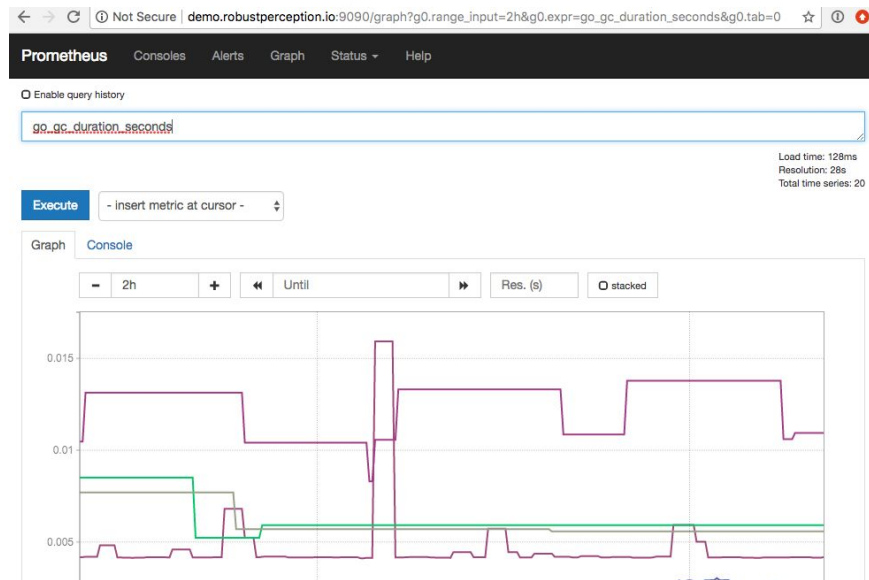


# Motivation

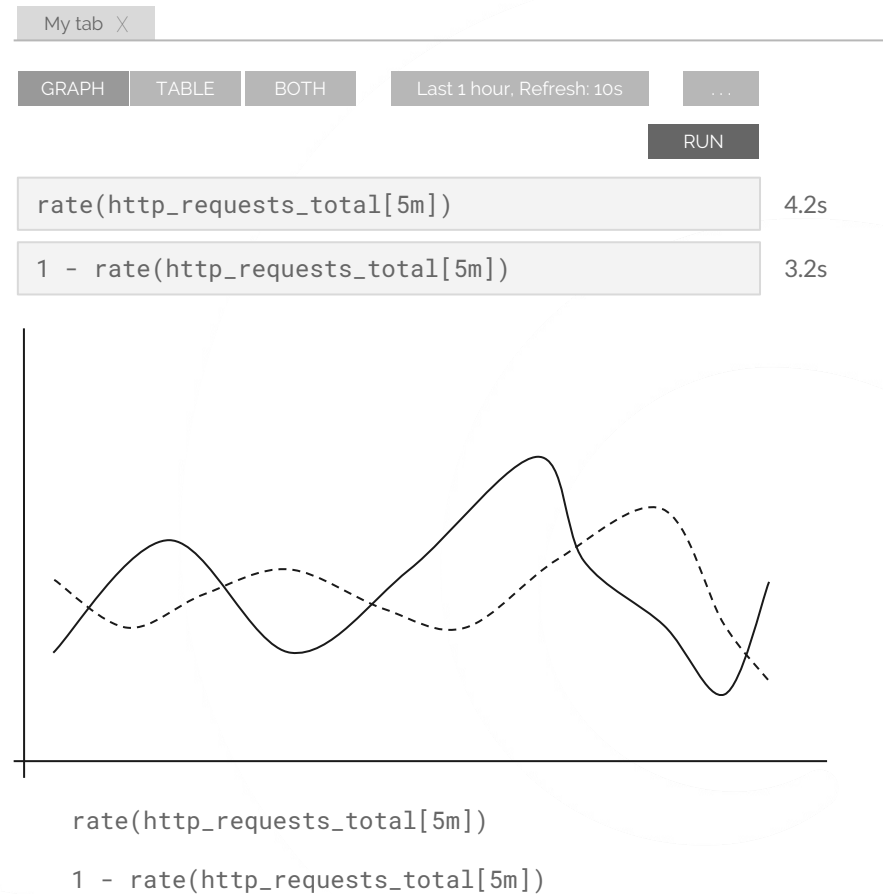
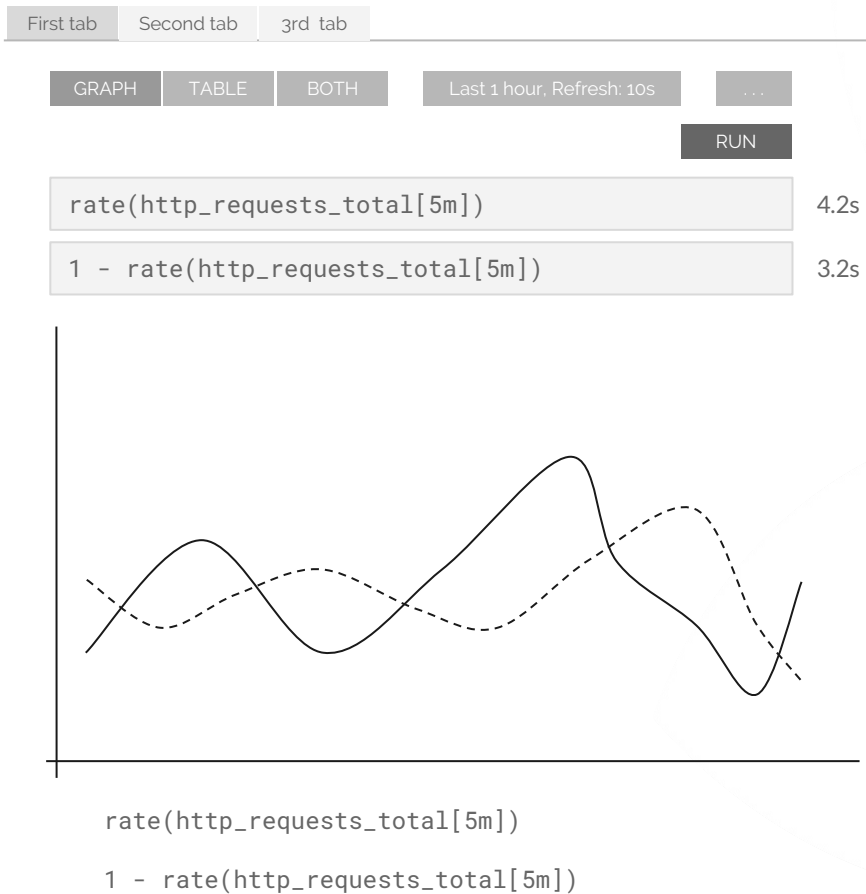
Incident response currently happens elsewhere!

## User story:

As an SRE, I want to investigate a certain aspect or incident of my infrastructure. I'm already looking at the right dashboard panel and have formed a hypothesis. From here I want to quickly run variations of the panel's query to verify my hypothesis. The panel I started from should stay unaffected.







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Demo: <http://localhost:3333/explore>

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# Enable Explore UI

Behind feature flag. To enable, edit Grafana config ini file

```
[explore]
```

```
enabled = true
```

Set up a datasource that supports Explore, e.g., Prometheus.

Will be released in 6.0

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# What we're working on

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# Explore UI needs to be refined

still behind feature flag, feedback welcome: @davkals or [david@grafana.com](mailto:david@grafana.com)

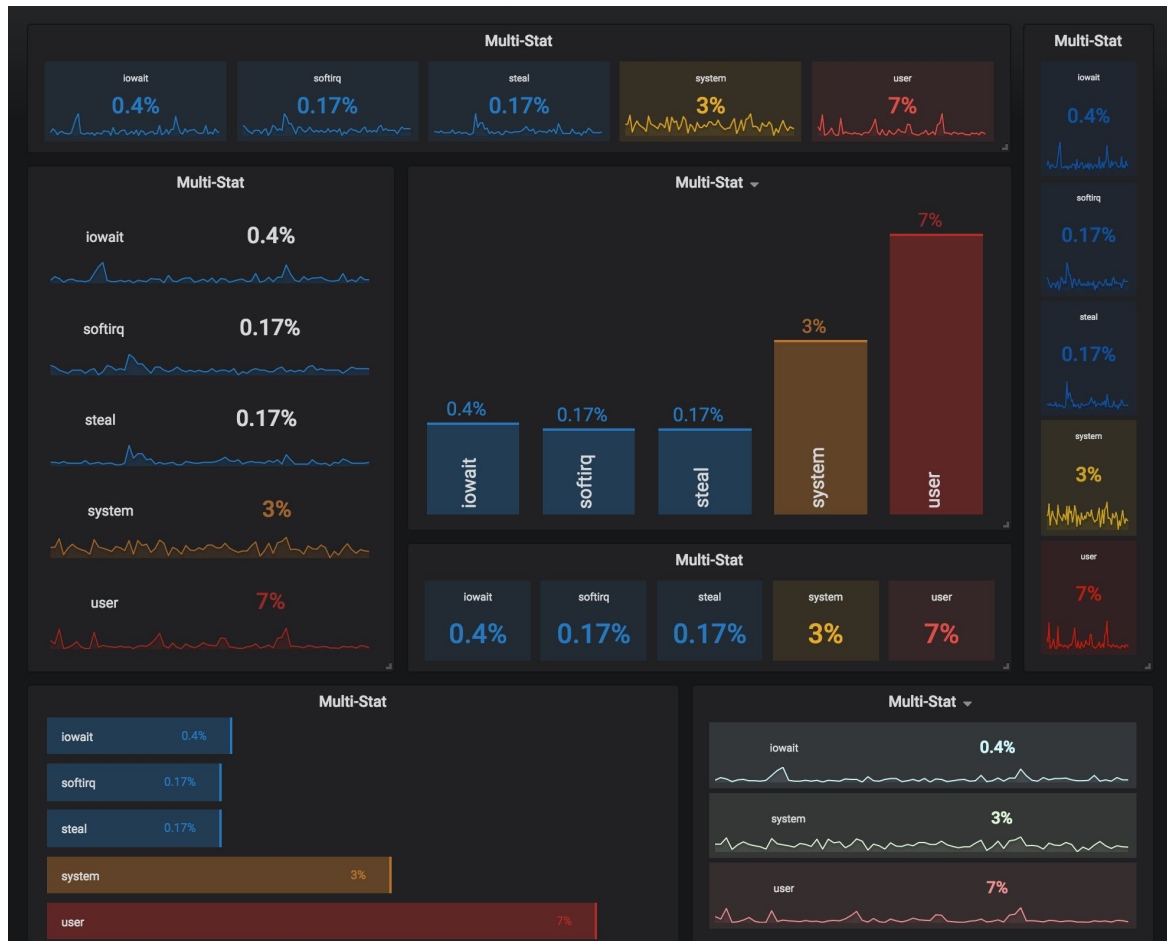
Prometheus metric metadata from HELP line in the exposition

support for completion for

```
foo_metric / on(|) group_left(|) bar_metric
```

design doc for explore components for other datasources

bring query field over to panel editor



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# Dashboard management

Improve Grafana's integration with Mixins (see Tom Wilkie's talk)

Git integration to save changes back

Defaults for panel configs





**One more thing...**

Metrics

{job="metrictank/cassandra"} GC

x

+

-

Logs

```
2018-08-09 15:20:38 INFO [Service Thread] 2018-08-09 13:20:38,129 GCInspector.java:284 - ConcurrentMarkSweep GC in 279ms. CMS Old Gen: 5865053600 -> 1354677560; Par Eden Space: 368496 -> 18166128; Par Survivor Space: 56878272 -> 14320768
2018-08-09 15:20:22 INFO [Service Thread] 2018-08-09 13:20:22,593 GCInspector.java:284 - ParNew GC in 250ms. CMS Old Gen: 5813060072 -> 5865053600; Par Eden Space: 671088640 -> 0; Par Survivor Space: 83575568 -> 56878272
2018-08-09 14:56:31 INFO [Service Thread] 2018-08-09 12:56:31,667 GCInspector.java:284 - ConcurrentMarkSweep GC in 222ms. CMS Old Gen: 5830667152 -> 1307866312; Par Eden Space: 437192 -> 475829696; Par Survivor Space: 53047904 -> 25459776
2018-08-09 14:52:50 INFO [Service Thread] 2018-08-09 12:52:50,893 GCInspector.java:284 - ParNew GC in 202ms. CMS Old Gen: 4265719568 -> 4295147528; Par Eden Space: 671088640 -> 0; Par Survivor Space: 37792040 -> 53366752
2018-08-09 14:45:34 INFO [Service Thread] 2018-08-09 12:45:34,847 GCInspector.java:284 - ConcurrentMarkSweep GC in 216ms. CMS Old Gen: 5818886288 -> 965161840; Par Eden Space: 444544 -> 47293544; Par Survivor Space: 16345840 -> 35301552
2018-08-09 14:31:40 INFO [Service Thread] 2018-08-09 12:31:40,187 GCInspector.java:284 - ParNew GC in 207ms. CMS Old Gen: 5418071136 -> 5451205208; Par Eden Space: 671088640 -> 0; Par Survivor Space: 46496368 -> 46614568
2018-08-09 14:27:47 INFO [Service Thread] 2018-08-09 12:27:47,292 GCInspector.java:284 - ParNew GC in 300ms. CMS Old Gen: 3829749904 -> 3860331608; Par Eden Space: 671088640 -> 0; Par Survivor Space: 40456592 -> 43655616
2018-08-09 14:21:48 INFO [Service Thread] 2018-08-09 12:21:48,796 GCInspector.java:284 - ParNew GC in 238ms. CMS Old Gen: 1897084328 -> 1907917920; Par Eden Space: 671088640 -> 0; Par Survivor Space: 27510064 -> 16693152
2018-08-09 14:20:20 INFO [Service Thread] 2018-08-09 12:20:20,077 GCInspector.java:284 - ConcurrentMarkSweep GC in 250ms. CMS Old Gen: 5841443528 -> 1175515384; Par Eden Space: 841408 -> 75753888; Par Survivor Space: 62075360 -> 79889160
2018-08-09 14:13:02 INFO [Service Thread] 2018-08-09 12:13:02,193 GCInspector.java:284 - ParNew GC in 253ms. CMS Old Gen: 2653020816 -> 2680847928; Par Eden Space: 671088640 -> 0; Par Survivor Space: 42933504 -> 42669344
2018-08-09 14:10:56 INFO [Service Thread] 2018-08-09 12:10:56,796 GCInspector.java:284 - ParNew GC in 202ms. CMS Old Gen: 1697645304
```

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# Tak for listening

UX feedback to  
[david@grafana.com](mailto:david@grafana.com)  
@davkals



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