

Grafana und InfluxDB

Ein Blick durch die Datenbrille. Messwerte sammeln und vollständig interaktiv visualisieren.

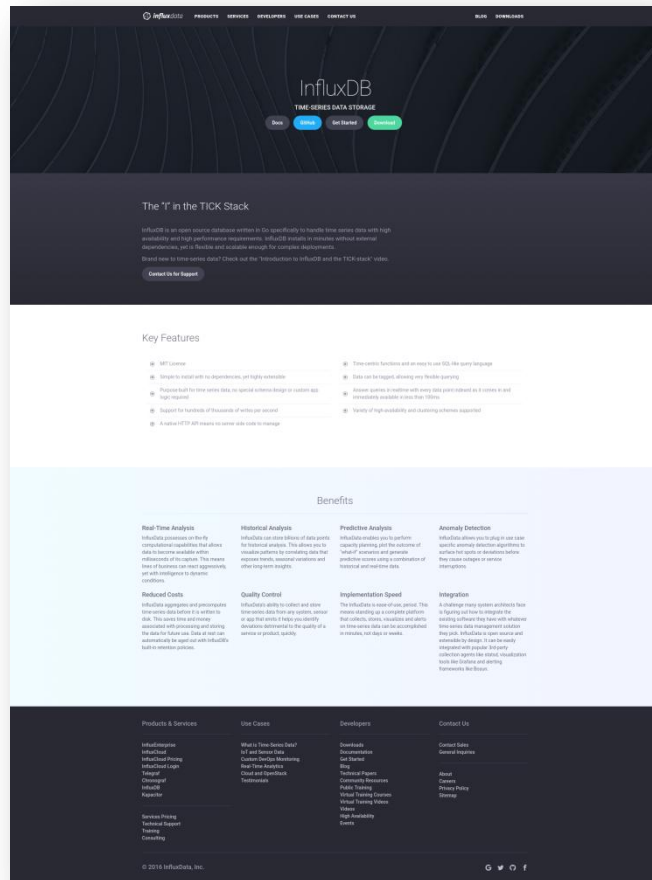
Sebastian Muszynski

17.10.2016



■ Datenbank für Zeitreihen

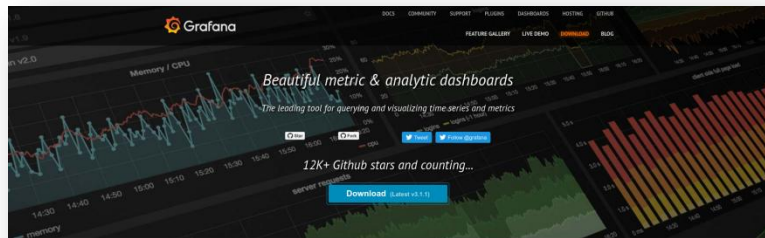
- zweckgebunden = optimiert
- einfaches Schema
- SQL-ähnliche Anfragen
- Antworten in Echtzeit
- günstige Schreiboperationen
- native Schnittstellen
- Tags, Anmerkungen
- freie Lizenz, leicht zu installieren, skaliert



Grafana

■ Visualisierung von Zeitreihen

- vollständig interaktiv
- rendert schnell auch große Zeiträume
- Zoom per Klick & Ziehen
- mehrere Y-Achsen
- Balken, Linien und Punkte
- Reihen ausblenden & Farbwahl
- Legende inkl. Mittelwert/Extrema
- Schwellenwerte



Grafana provides a powerful and elegant way to create, explore, and share dashboards and data with your team and the world.

Grafana is most commonly used for visualizing time series data for Internet infrastructure and application analytics but many use it in other domains including industrial sensors, home automation, weather, and process control.

[Graphite](#) [Elasticsearch](#) [Cloudwatch](#) [Prometheus](#) [InfluxDB](#) [& More](#)

Grafana features pluggable panels and data sources allowing easy extensibility and a variety of panels, including fully featured graph panels with rich visualization options. There is built-in support for many of the most popular time series data sources.

Feature Highlights

Rich Graphing
Fully interactive, editable graphs. Multiple Y-axis, Logarithmic scales & options.

Mixed Styling
Draw your graphs how you want. Mix lines, points and bars. Mix stacked or isolated series.

Themes
Drips with two themes. If you don't like the default dark theme, switch to a light theme.



Template Variables
Create variables that are automatically filled with values from your DB.

Generic & Reusable
You can use variables in your metric queries and panel titles.

Repeating Panels
Automatically repeat rows or panels for each selected variable value.

Data Sources
Supports Graphite, Elasticsearch, Prometheus, InfluxDB, OpenTSDB and many others out of the box. Or use the plug-in functionality to add your own.

Authentication
Manage users, roles and organizations through LDAP, Basic Auth and Auth Proxy.

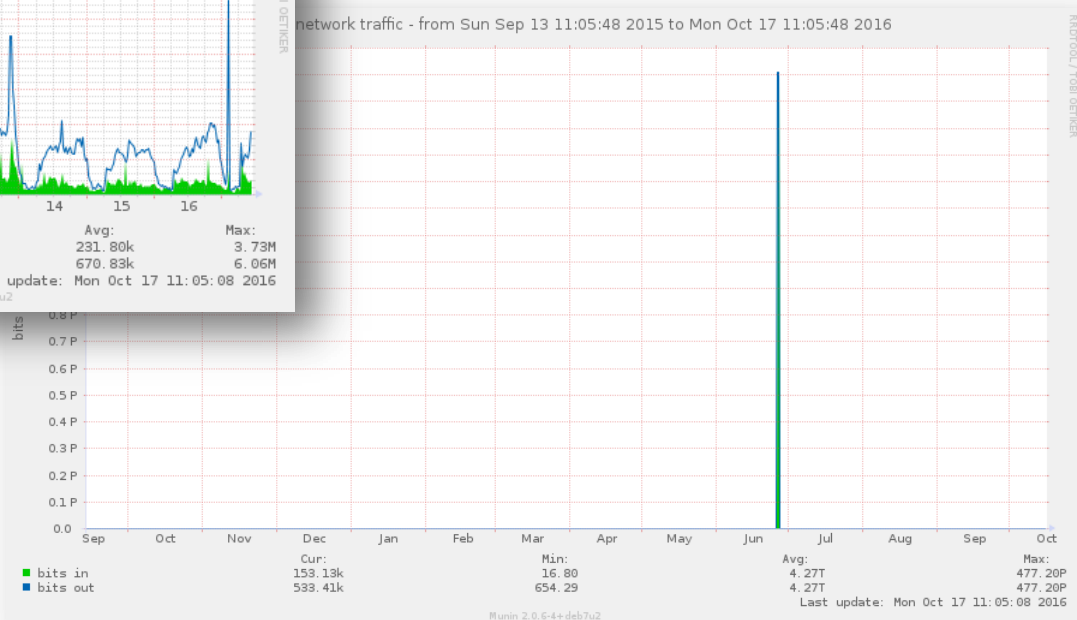
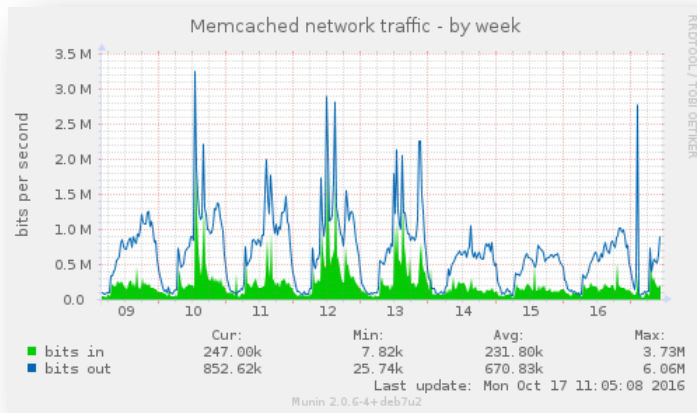
Annotations
Annotate graphs with rich events from data sources including Elasticsearch, Graphite and InfluxDB.

Screenshot Sharing
Create and share a fully interactive graphs in 1 click and share with only your team or the world.

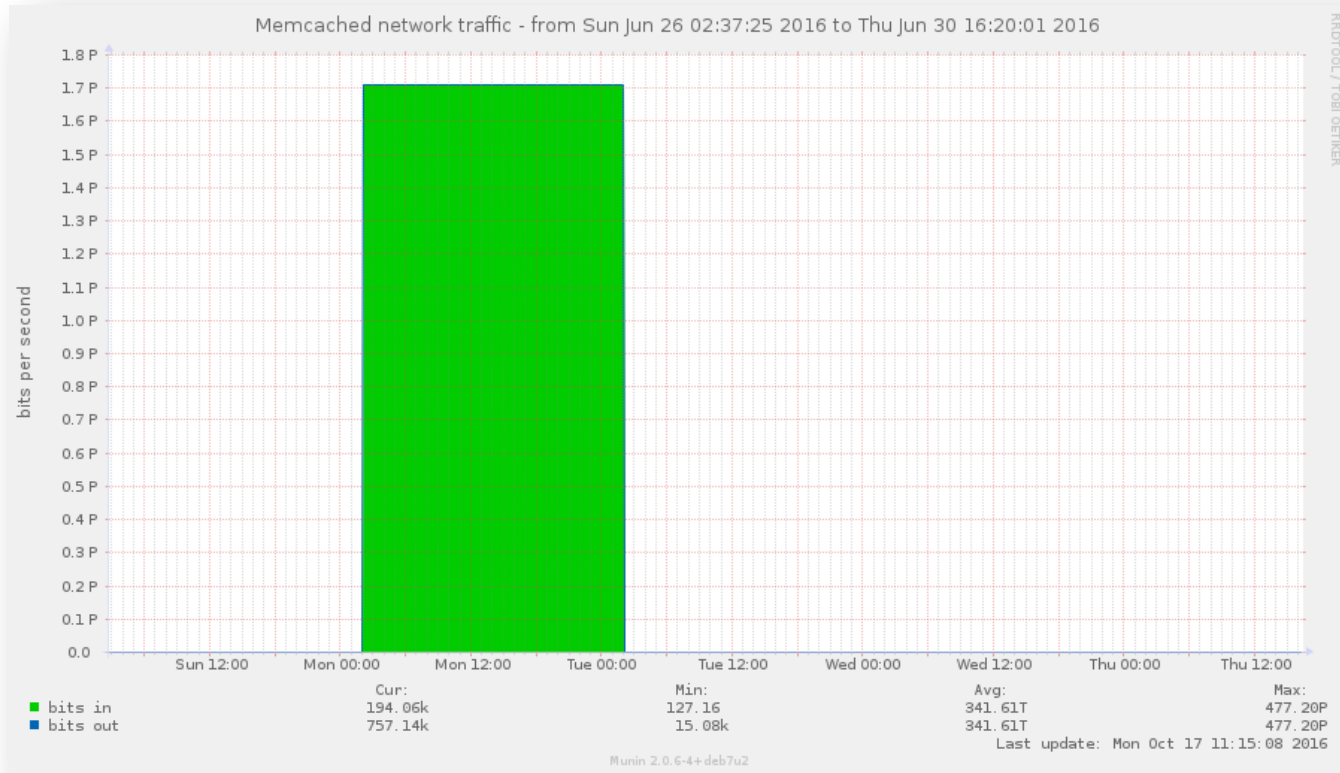
[See More Grafana Features](#)

Motivation

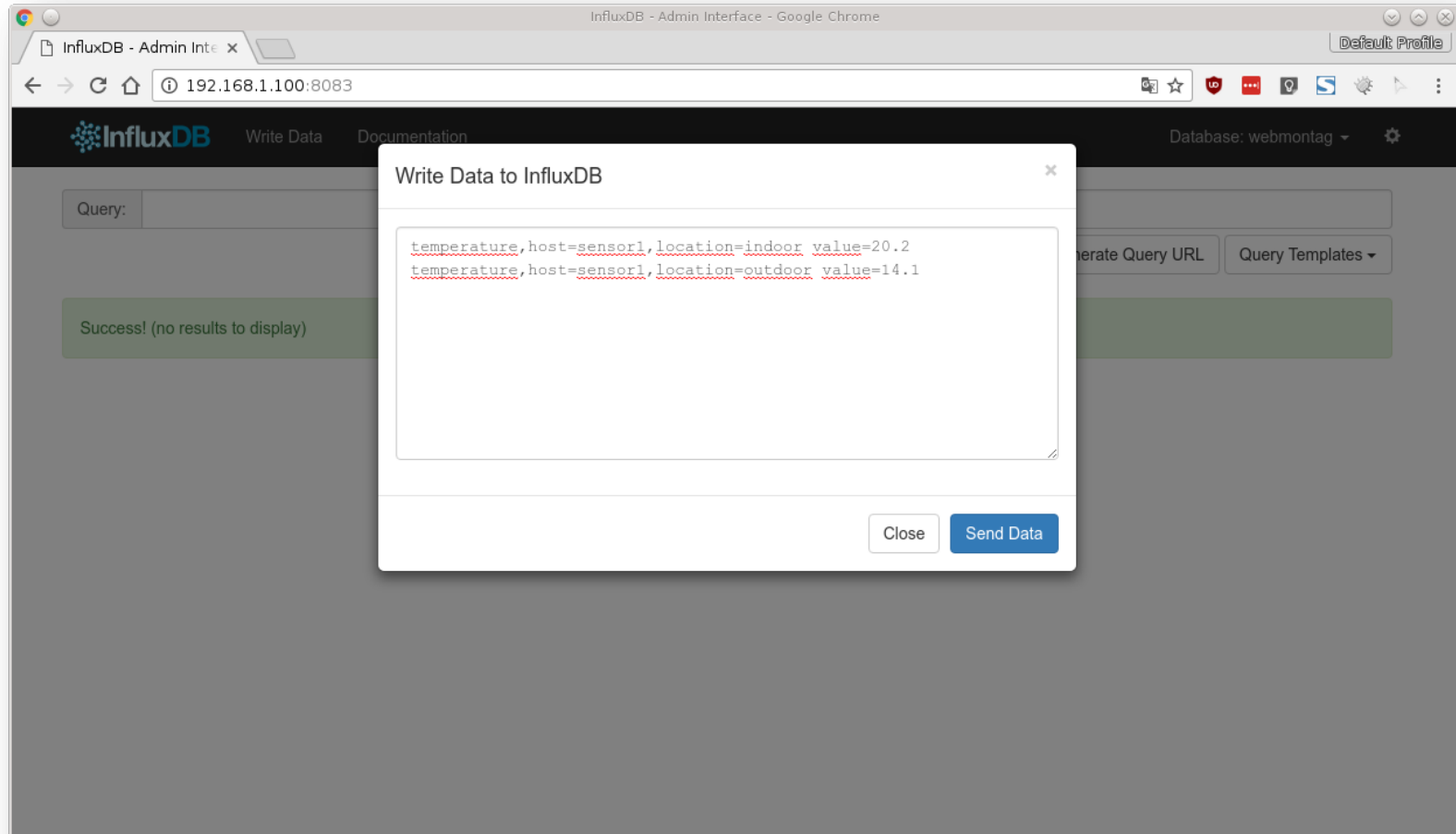
- Die Ablösung für RRDtool mit statischen Bildern aus Cairo/Pango.



Motivation



Daten schreiben



The screenshot shows the InfluxDB Admin Interface in a Google Chrome browser. The address bar displays the URL `192.168.1.100:8083`. The interface includes a top navigation bar with the InfluxDB logo, 'Write Data', and 'Documentation' links. A 'Database: webmontag' dropdown is visible on the right. A modal dialog titled 'Write Data to InfluxDB' is open in the center, containing a text area with two lines of InfluxDB data: `temperature,host=sensor1,location=indoor value=20.2` and `temperature,host=sensor1,location=outdoor value=14.1`. Below the text area are 'Close' and 'Send Data' buttons. In the background, a 'Query' input field and a green success message 'Success! (no results to display)' are visible.

InfluxDB - Admin Interface - Google Chrome

192.168.1.100:8083

Write Data to InfluxDB

```
temperature,host=sensor1,location=indoor value=20.2
temperature,host=sensor1,location=outdoor value=14.1
```

Close Send Data

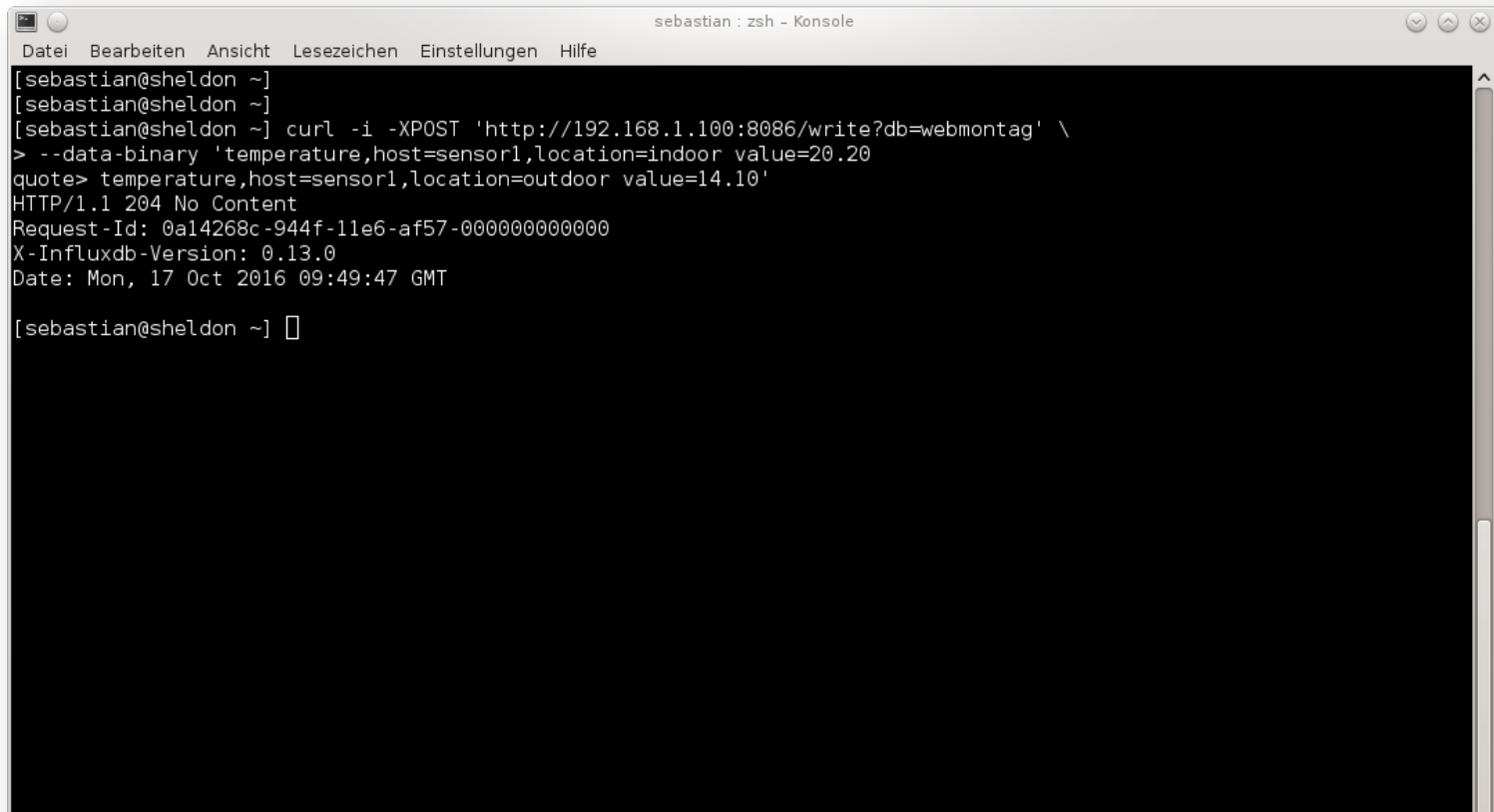
Query:

Success! (no results to display)

Database: webmontag

Generate Query URL Query Templates

Daten programmatisch schreiben



```
sebastian : zsh - Konsole
Datei  Bearbeiten  Ansicht  Lesezeichen  Einstellungen  Hilfe
[sebastian@sheldon ~]
[sebastian@sheldon ~]
[sebastian@sheldon ~] curl -i -XPOST 'http://192.168.1.100:8086/write?db=webmontag' \
> --data-binary 'temperature,host=sensor1,location=indoor value=20.20
quote> temperature,host=sensor1,location=outdoor value=14.10'
HTTP/1.1 204 No Content
Request-Id: 0a14268c-944f-11e6-af57-000000000000
X-Influxdb-Version: 0.13.0
Date: Mon, 17 Oct 2016 09:49:47 GMT

[sebastian@sheldon ~] █
```

Daten schreiben per UDP

```
void loop() {
  ArduinoOTA.handle();

  unsigned long currentMillis = millis();
  if (currentMillis - previousMillis >= interval) {
    previousMillis = currentMillis;

    dsTemp.requestTemperatures();
    float temperature = dsTemp.getTempC(dsTempAddress);
    float ppm = gasSensor.getPPM();
    float rzero = gasSensor.getRZero();

    String line = String("uptime,host=esp8266n5,room=bedroom,device=internal,type=uptime value=") + (int)(currentMillis / 1000);
    line += String("\nco2,host=esp8266n5,room=bedroom,device=mql35,type=co2 value=") + ppm;
    line += String("\nrzero,host=esp8266n5,room=bedroom,device=mql35,type=rzero value=") + rzero;

    if (temperature > -127.0 && temperature < 127.0) {
      line += String("\ntemperature,host=esp8266n5,room=bedroom,device=ds18b20,type=temperature value=") + temperature;
    }

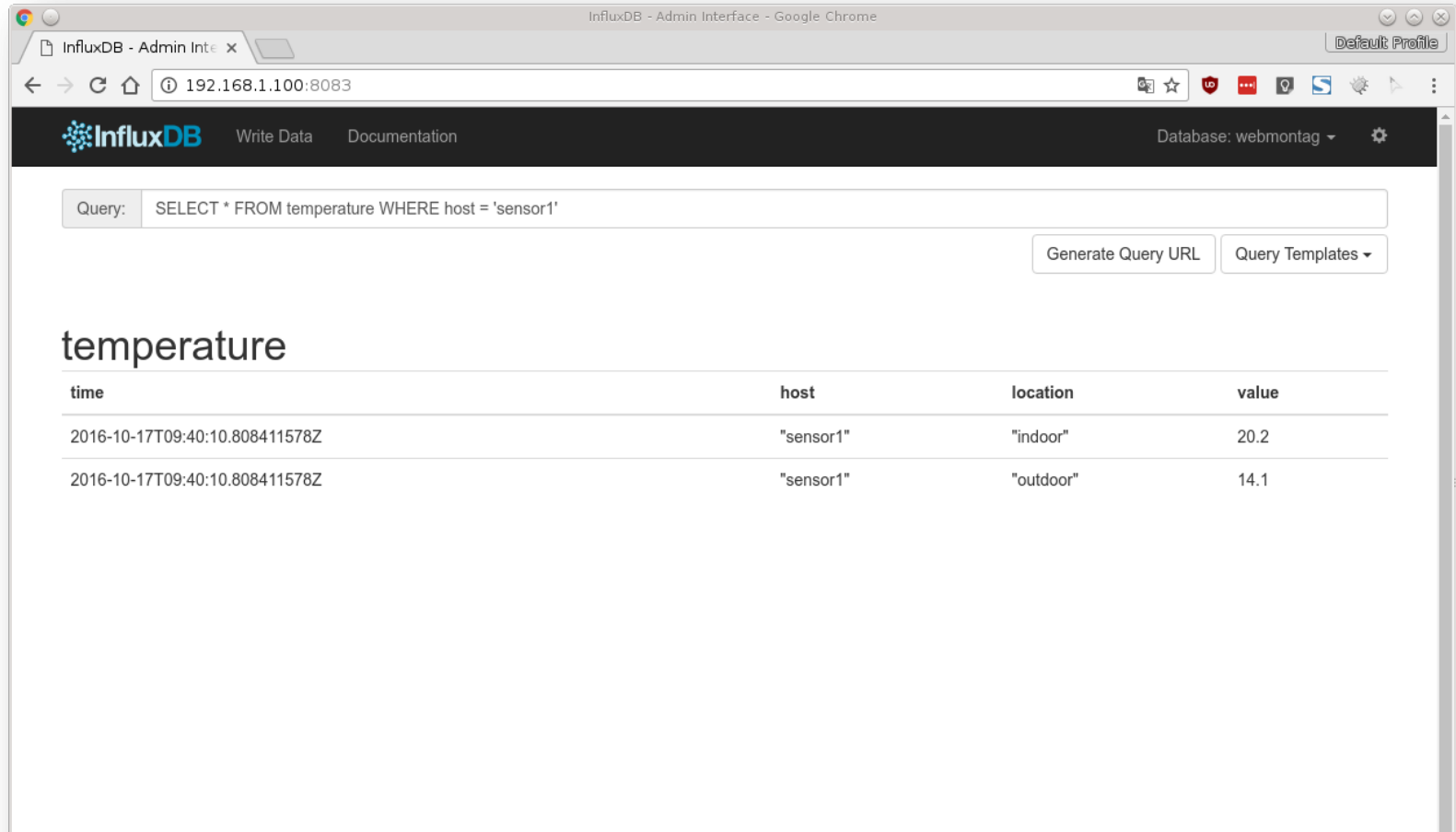
    udp.beginPacket(influxDatabaseHost, influxDatabasePort);
    udp.print(line);
    udp.endPacket();
  }
}
```

Writing Points

To write, just send newline separated **line protocol** over UDP. For better batches of points rather than multiple single points.

```
$ echo "cpu value=1"> /dev/udp/localhost/8089
```


Daten lesen



The screenshot shows the InfluxDB Admin Interface in a Google Chrome browser. The address bar shows the URL `192.168.1.100:8083`. The interface has a dark header with the InfluxDB logo, navigation links for "Write Data" and "Documentation", and a dropdown menu for the database "webmontag".

A query is entered in the "Query:" field: `SELECT * FROM temperature WHERE host = 'sensor1'`. To the right of the query field are two buttons: "Generate Query URL" and "Query Templates".

The query result is displayed under the heading "temperature". It is a table with four columns: "time", "host", "location", and "value". There are two rows of data.

time	host	location	value
2016-10-17T09:40:10.808411578Z	"sensor1"	"indoor"	20.2
2016-10-17T09:40:10.808411578Z	"sensor1"	"outdoor"	14.1

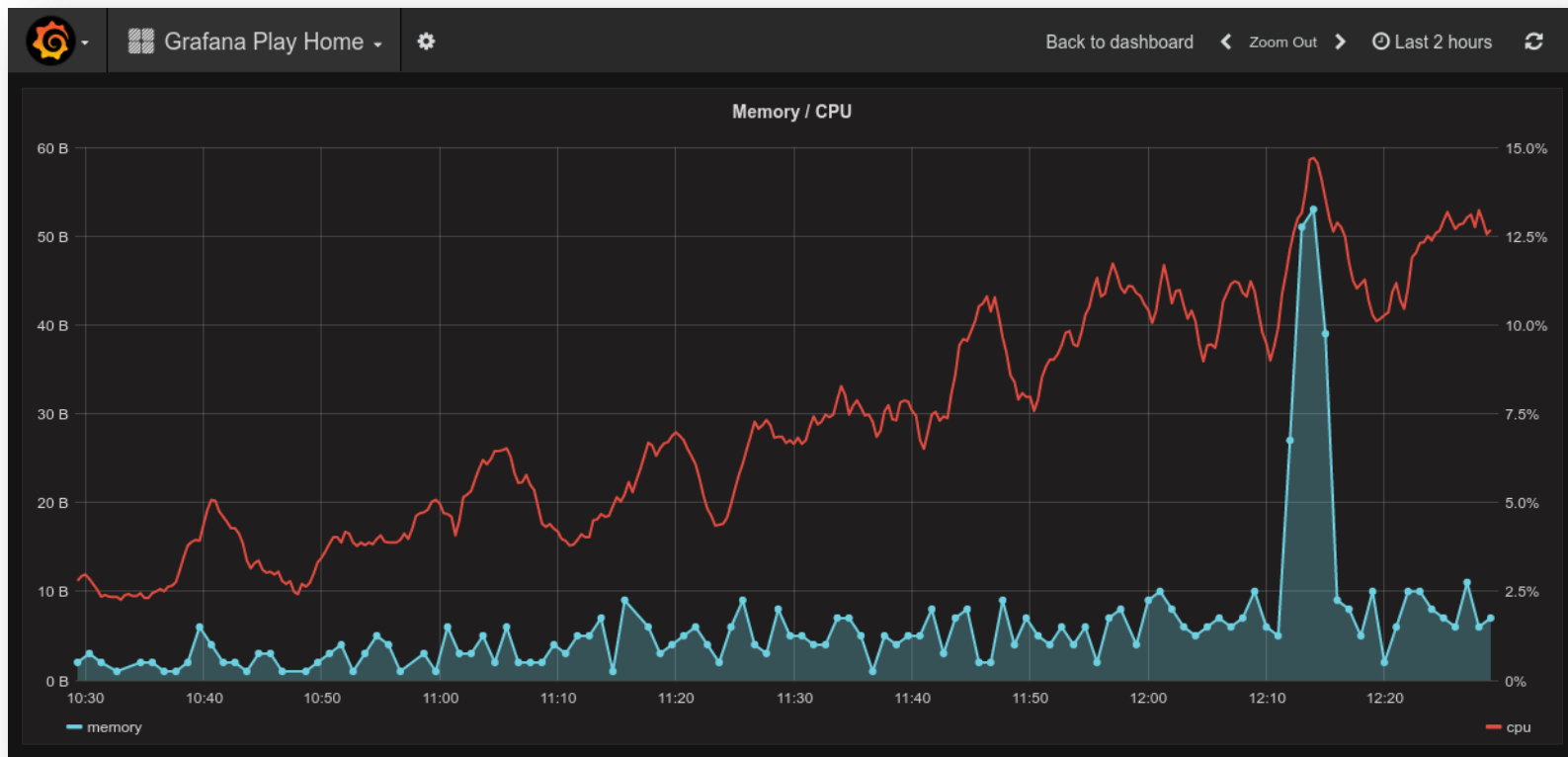
Daten programmatisch lesen

```
sebastian : zsh - Konsole
Datei Bearbeiten Ansicht Lesezeichen Einstellungen Hilfe
[sebastian@sheldon ~] curl -GET 'http://192.168.1.100:8086/query?pretty=true' \
> --data-urlencode "db=webmontag" \
> --data-urlencode "q=SELECT * FROM temperature WHERE host = 'sensor1'"
{
  "results": [
    {
      "series": [
        {
          "name": "temperature",
          "columns": [
            "time",
            "host",
            "location",
            "value"
          ],
          "values": [
            [
              "2016-10-17T09:40:10.808411578Z",
              "sensor1",
              "indoor",
              20.2
            ],
            [
              "2016-10-17T09:40:10.808411578Z",
              "sensor1",
              "outdoor",
              14.1
            ]
          ]
        }
      ]
    }
  ]
}
```

Grafana



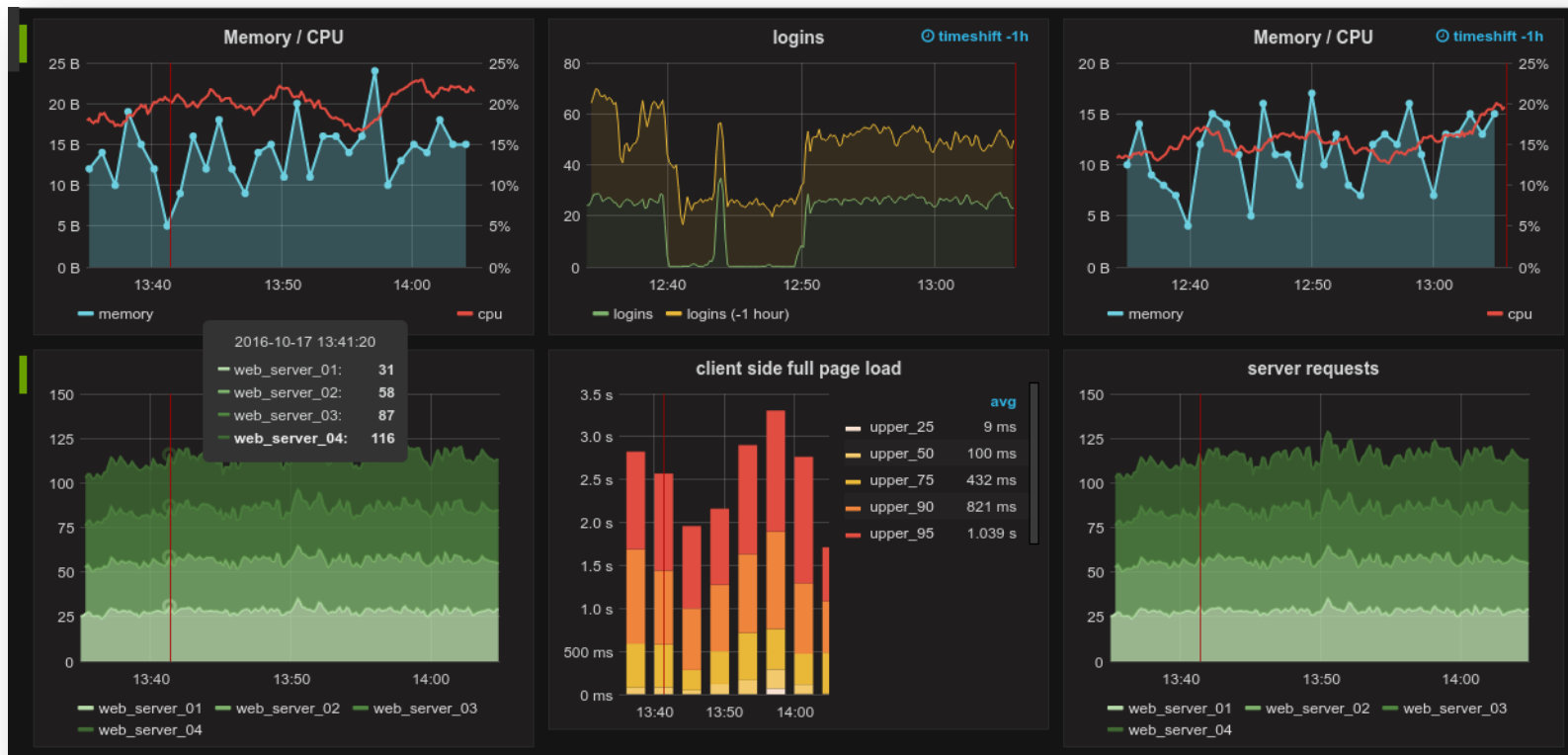
Graph mit zwei Messreihen über zwei Stunden



Zoom und Hover



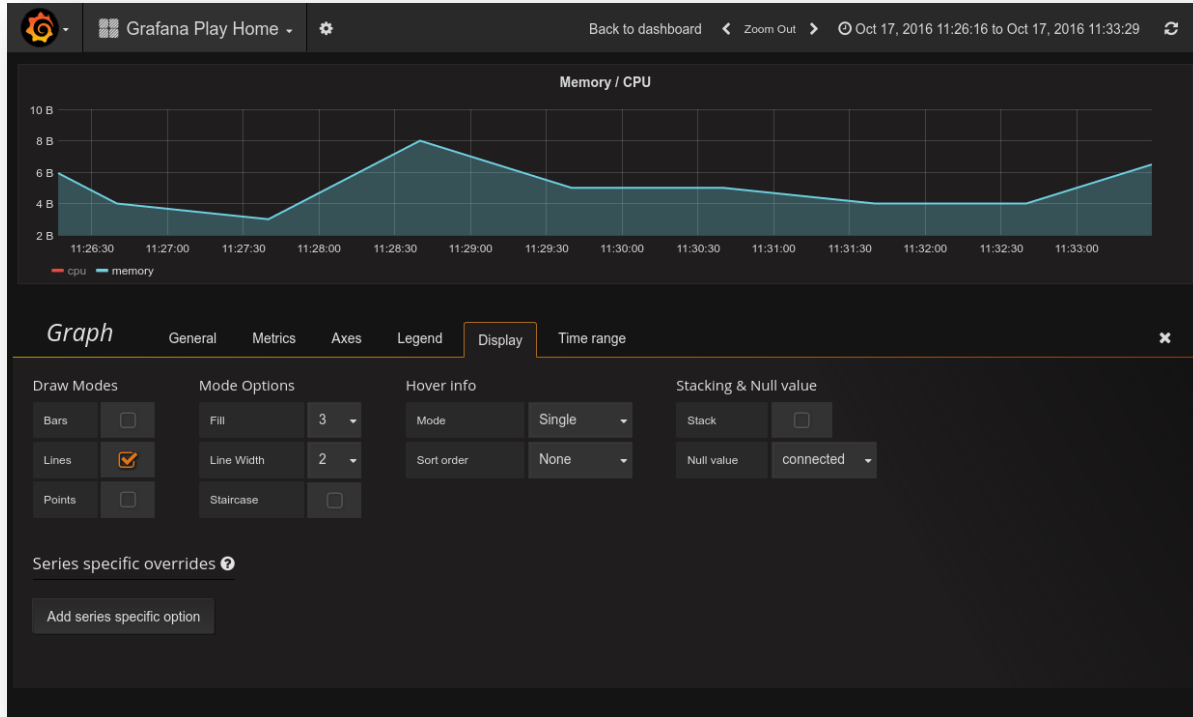
Graphenübergreifendes Fadenkreuz



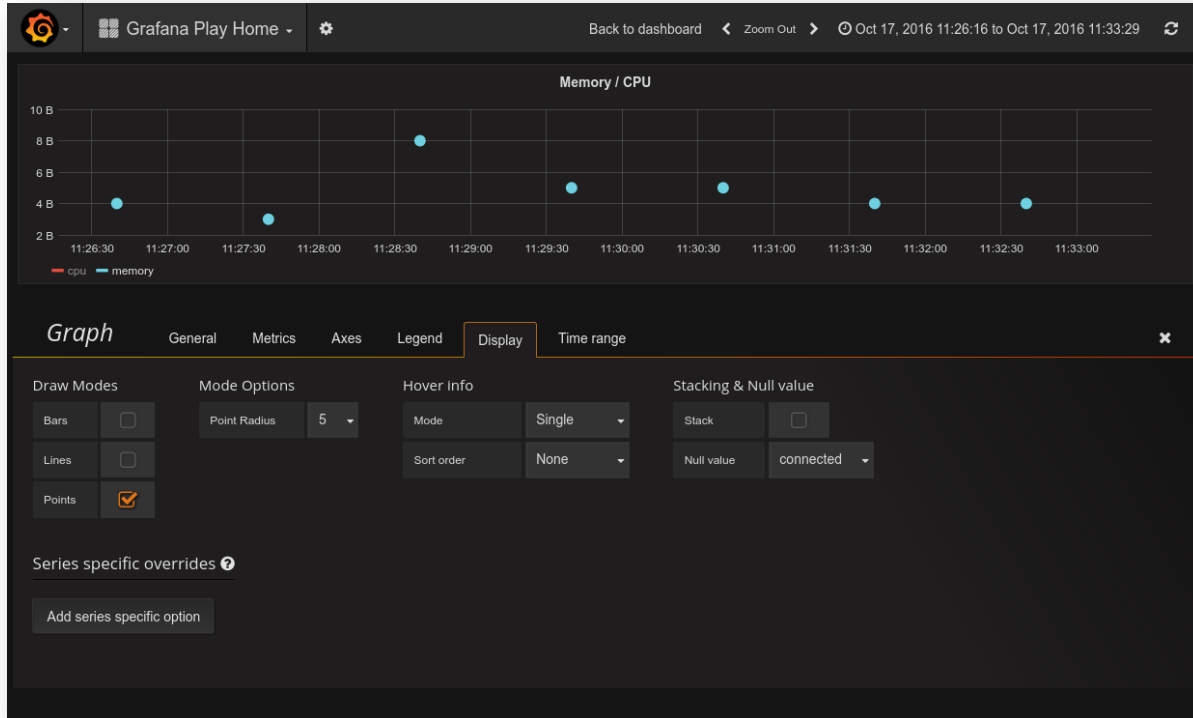
Legende mit Extermwerten



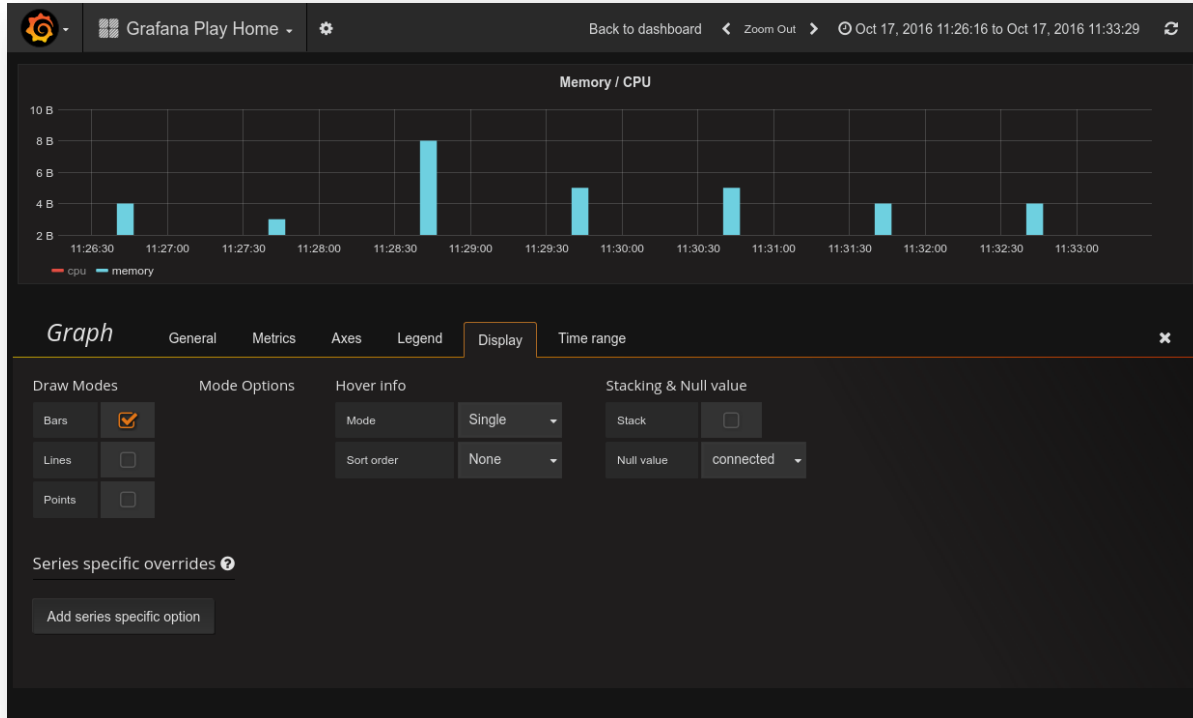
Darstellung mit Linien



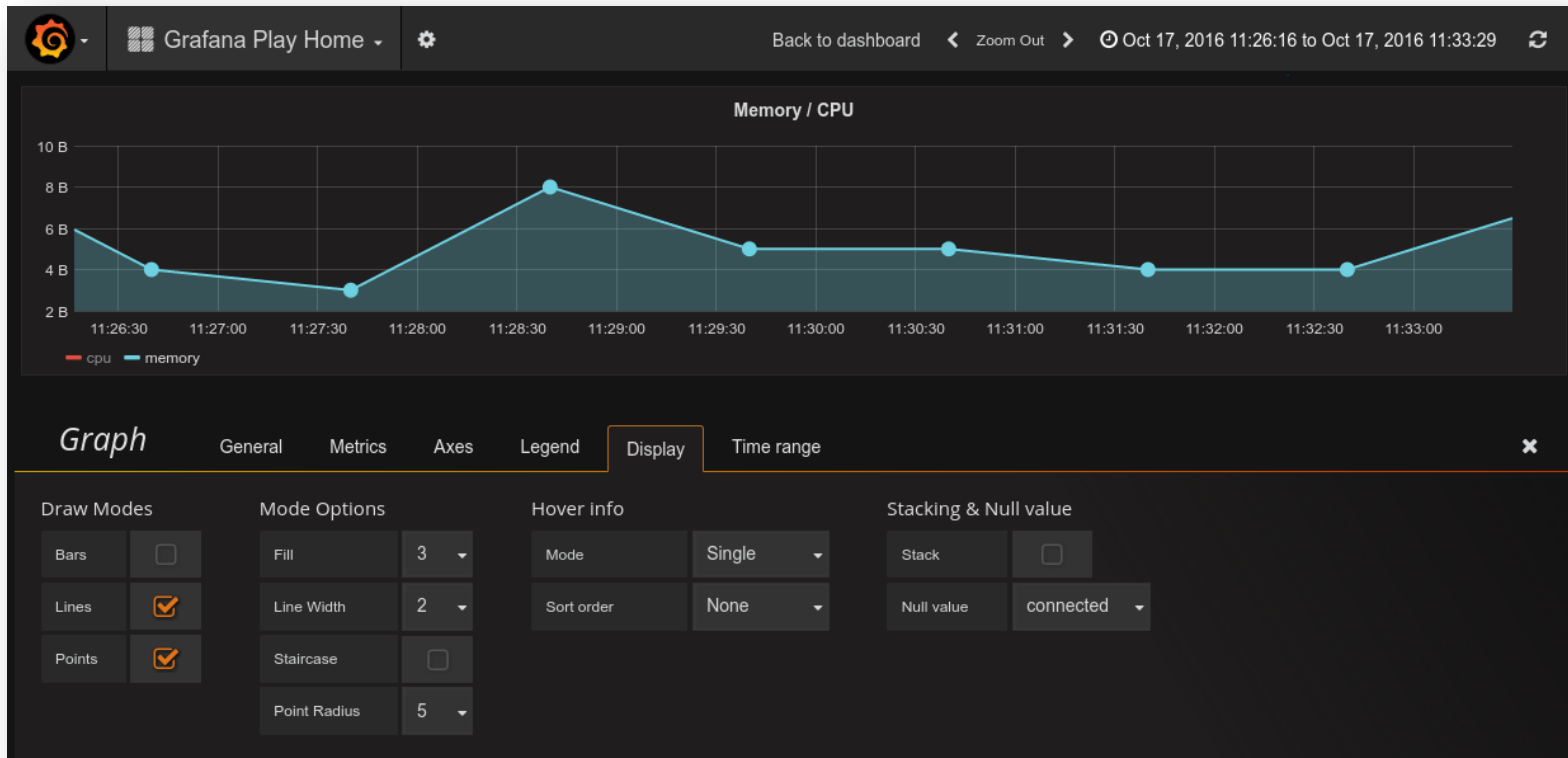
Darstellung mit Punkten



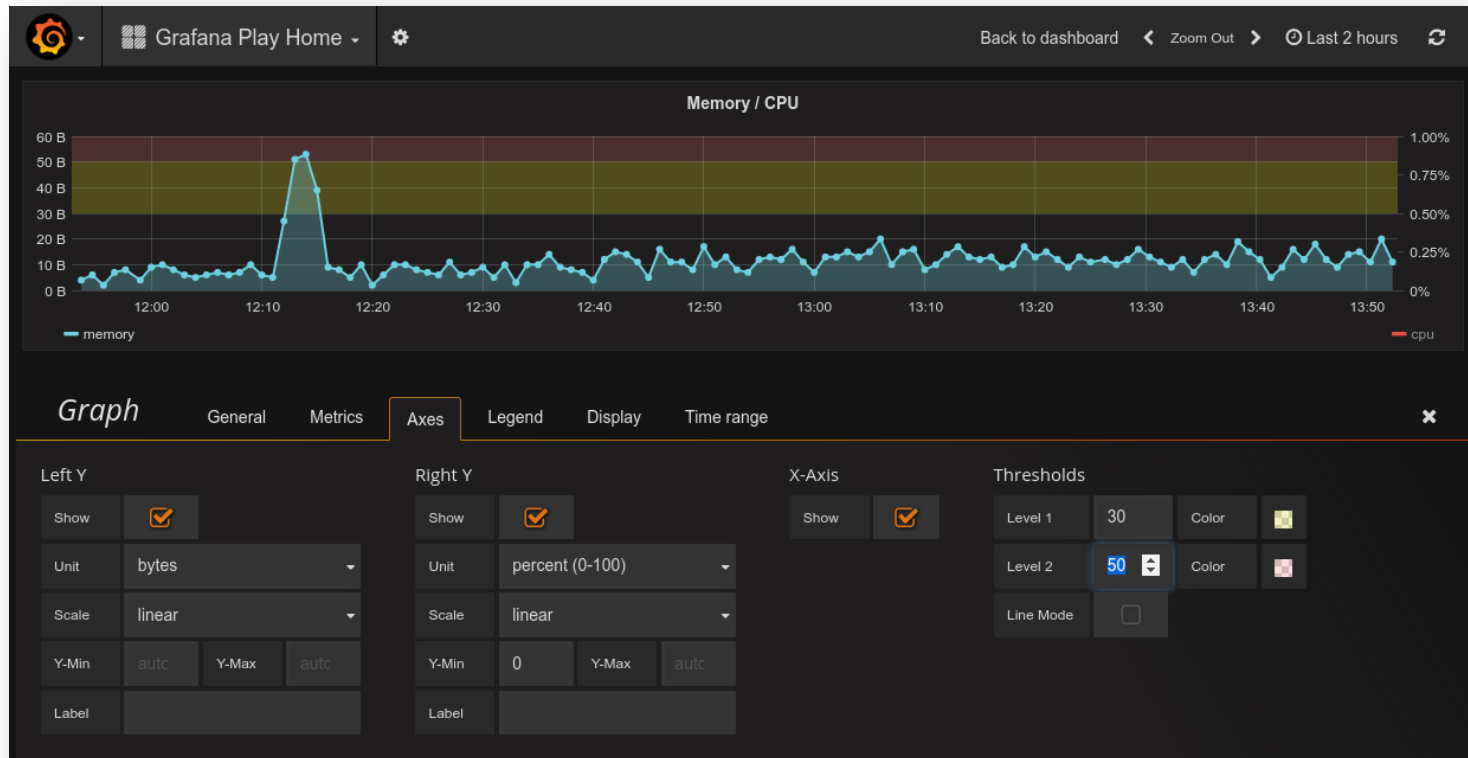
Darstellung mit Balken



Kombinationen



Achsen und Schwellenwerte



Livedemo

- Dashboard öffnen
- Zeile im Gitter anlegen
- Graph einfügen und benennen
 - Metrik A definieren über Messwerte vom Typ Lux von Raum Wohnzimmer
`SELECT mean(value) FROM lux WHERE room = 'livingroom' AND host = 'esp8266n3' AND $timeFilter GROUP BY time($interval) fill(null)`
 - Metrik B definieren über Messwerte vom Typ Lux von Raum Balkon
`SELECT mean(value) FROM lux WHERE room = 'balcony' AND host = 'esp8266n1' AND $timeFilter GROUP BY time($interval) fill(null)`
- Einheiten wählen, Achsen beschriften, Min. und Max.-Werte wählen
- Legende aktivieren
- Schwellenwerte setzen

Vielen Dank!

Fragen?

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