

Application Note REV:201908

Installation of Grafana for IPLOG

Description

This document describes the installation and basic configuration of the grafana application. The program ("Sample_grafana" for IPLOG-G2-05-BI8.1 with TH2 sensor connected) is runs in iplog, which stores the temperature sensor value into a local mysql database every minute. Furthermore, every change of digital input 1 is stored in the database. If the temperature exceeds the set limit, the OC2 output is activated. If IN1 is deactivated, the OC1 output is activated.

Installation

For installation of the package you need to have IPLOG connected to the Internet. In this example, the displayed data is stored directly in IPLOG and therefore it is necessary to install the metel-datalogger package in addition to the grafana package.

1) Run the putty and log in to the IPLOG unit as root user. Type the command „**opkg update**“.

```
root@iplog:~# opkg update
Downloading http://www.iplog.eu/opkg/base/Packages.gz.
Updated source 'base'.
Downloading http://www.iplog.eu/opkg/firmware/Packages.gz.
Updated source 'firmware'.
root@iplog:~#
```

📖 You can use the „**opkg list**“ command to display a list of all available packages.

2) Write command „**opkg install grafana**“ to install and run the grafana application.

```
root@iplog:~# opkg install grafana
Installing grafana (6.0.2-9324.091125600) on root.
Downloading http://www.iplog.eu/opkg/base/grafana_6.0.2-9324.091125600_all.ipk.
Installing glibc-lib (2.23.0-9324.091084411) on root.
Downloading http://www.iplog.eu/opkg/base/glibc-lib_2.23.0-9324.091084411_all.ipk.
Configuring glibc-lib.
Configuring grafana.
Starting grafana: OK
root@iplog:~#
```

3) Write „**opkg install metel-datalogger**“. This will install the datalogger and mysql package.

```
root@iplog:~# opkg install metel-datalogger
Installing metel-datalogger (0.0.1-9362.100141408) on root.
Downloading http://www.iplog.eu/opkg/base/metel-datalogger_0.0.1-9362.100141408_all.ipk.
Installing mysql (5.1.73-9667) on root.
Downloading http://www.iplog.eu/opkg/base/mysql_5.1.73-9667_all.ipk.
Installing libstdc++ (0.0.6-9667) on root.
Downloading http://www.iplog.eu/opkg/base/libstdc++_0.0.6-9667_all.ipk.
Configuring libstdc++.
Configuring mysql.
creating user mysql
Starting mysql...done.
Configuring metel-datalogger.
Creating or updating database
: Waiting for MySQL to start
190723 07:23:05 mysqld_safe Logging to '/mnt/data/mysql/iplog.err'.
190723 07:23:05 mysqld_safe Starting mysqld daemon with databases from /mnt/data/mysql
Starting metel-datalogger-asyncd:
Checking data...
datalogger.data_ins
note      : The storage engine for the table doesn't support check
datalogger.data_int_day           OK
datalogger.data_int_hour         OK
datalogger.data_int_min          OK
datalogger.data_int_raw          OK
datalogger.data_int_sec          OK
datalogger.data_str_raw          OK
datalogger.keys                  OK
datalogger.options               OK
OK
root@iplog:~#
```

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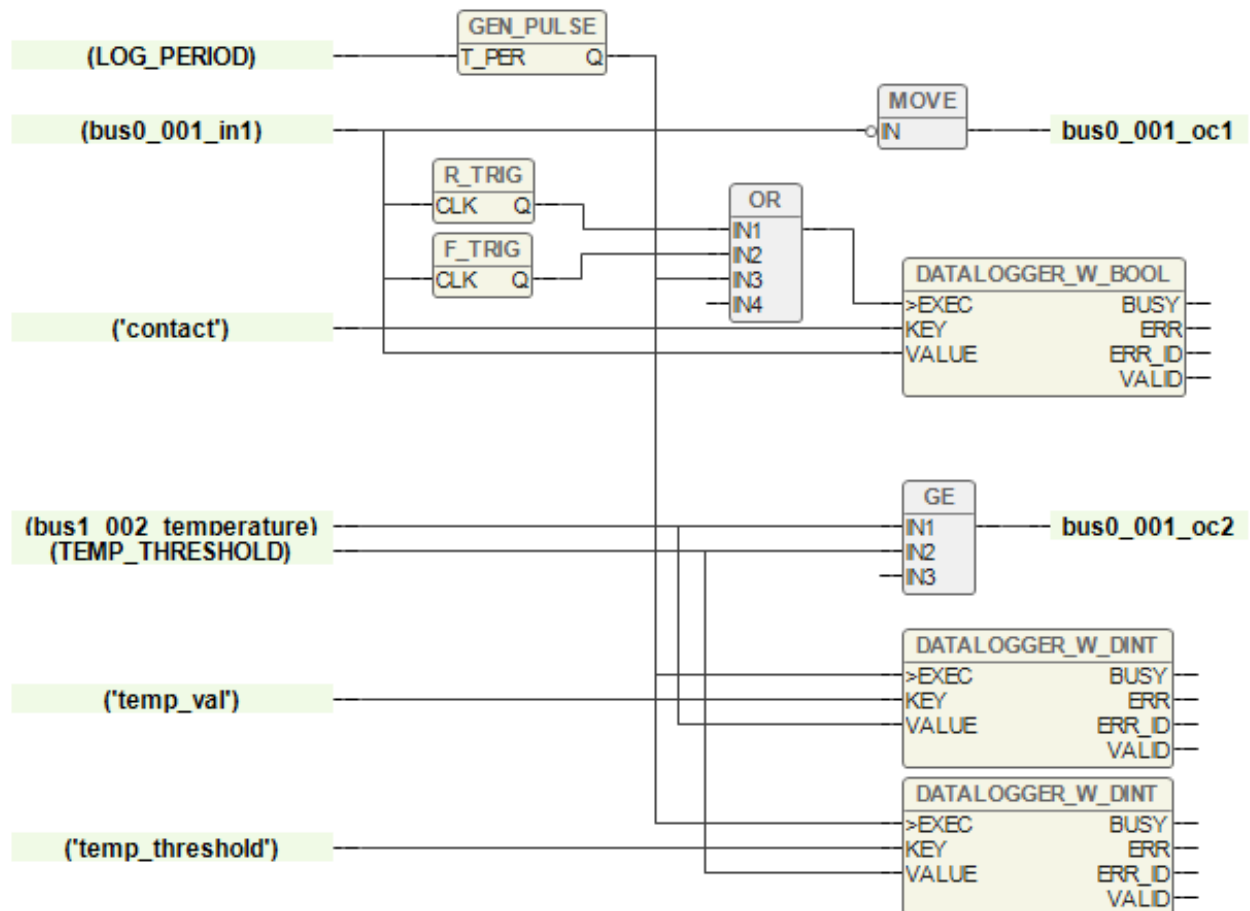
4) You can easily verify the installed packages via the IPLOG web interface.

Installed packages:

```
glibc-lib - 2.23.0-9324.091084411
grafana - 6.0.2-9324.091125600
libstdc++ - 0.0.6-9667
metel-datalogger - 0.0.1-9362.100141408
mysql - 5.1.73-9667
```

6) Set the correct time in the IPLOG unit, preferably using an NTP server.

7) Upload, modify (according to your available variables) and run the „Sample_Grafana“ program in the IPLOG unit.



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Configuration

Before running and configuring Grafana, it is necessary to create a user in the mysql with permission to the datalogger database.

- 1) Run putty.exe, log in as a root user to iplog and write the command „mysql“.
- 2) Write command „CREATE USER 'grafana' IDENTIFIED BY 'grafana';“
- 3) Write command „GRANT SELECT ON datalogger.* TO 'grafana'@'localhost' IDENTIFIED BY 'grafana';“ and next command „exit“.

```
login as: root
root@iplog:~# mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 74
Server version: 5.1.73 Source distribution

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE USER 'grafana' IDENTIFIED BY 'grafana';
Query OK, 0 rows affected (0.00 sec)

mysql> GRANT SELECT ON datalogger.* TO 'grafana'@'localhost' IDENTIFIED BY 'grafana';
Query OK, 0 rows affected (0.01 sec)

mysql> exit
Bye
root@iplog:~#
```

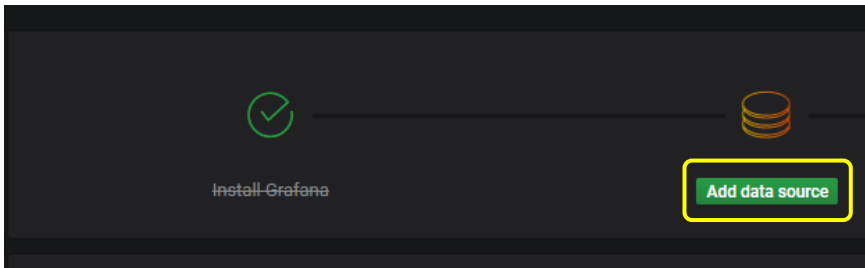
- 4) By default the grafana runs on port 3000, enter IP_address_iplog: 3000 in the browser.
- 5) Fill in the default credentials „admin“, „admin“ and change your password.



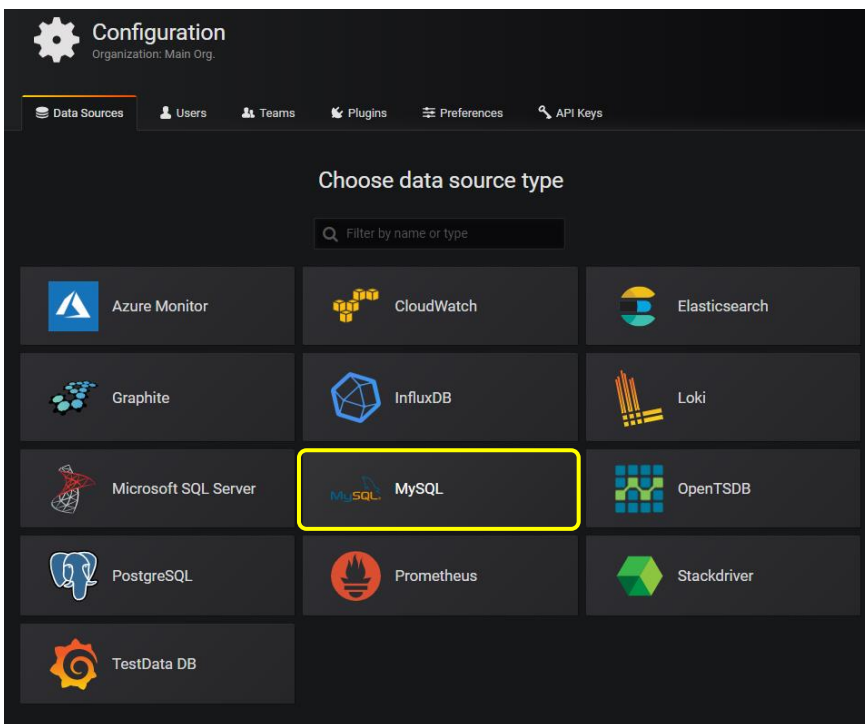
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6) Click on the icon **Add data source**.



7) Select **MySQL**.



8) Fill in the following login data to MySQL database in IPLOG.

Name - Name for setting MySQL connection.

MySQL Connection

Host: **127.0.0.1:3306**

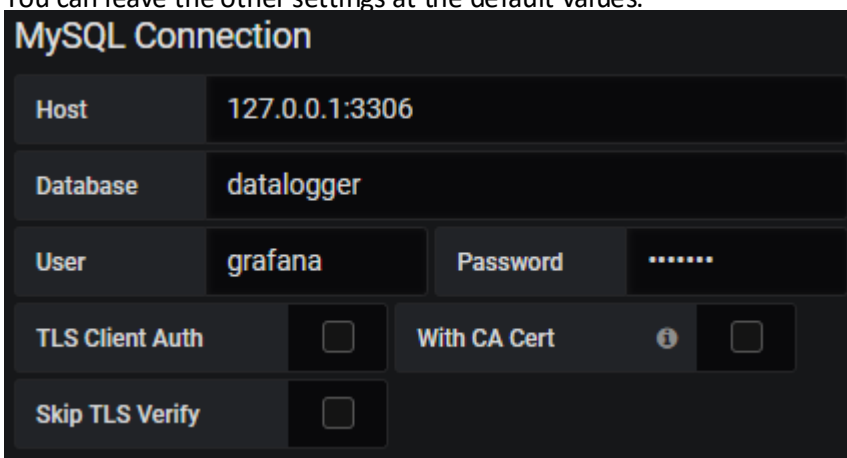
Database: **datalogger**

User: **grafana**

Password: **grafana**

 The user and password entered in section 2, section Configuration.

You can leave the other settings at the default values.

A screenshot of the 'MySQL Connection' configuration form in Grafana. The form has the following fields:

- Host: 127.0.0.1:3306
- Database: datalogger
- User: grafana
- Password: [masked with dots]
- TLS Client Auth:
- With CA Cert: (with an information icon)
- Skip TLS Verify:

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9) Verify the database connection by clicking the button **Save and Test**.

Name MySQL_Iplog Default

MySQL Connection

Host

Database

User Password

TLS Client Auth With CA Cert

Skip TLS Verify

Connection limits

Max open

Max idle

Max lifetime

MySQL details

Min time interval

User Permission

The database user should only be granted SELECT permissions on the specified database & tables you want to query. Grafana does not validate that queries are safe so queries can contain any SQL statement. For example, statements like `USE otherdb;` and `DROP TABLE user;` would be executed. To protect against this we Highly recommend you create a specific MySQL user with restricted permissions. Checkout the [MySQL Data Source Docs](#) for more information.

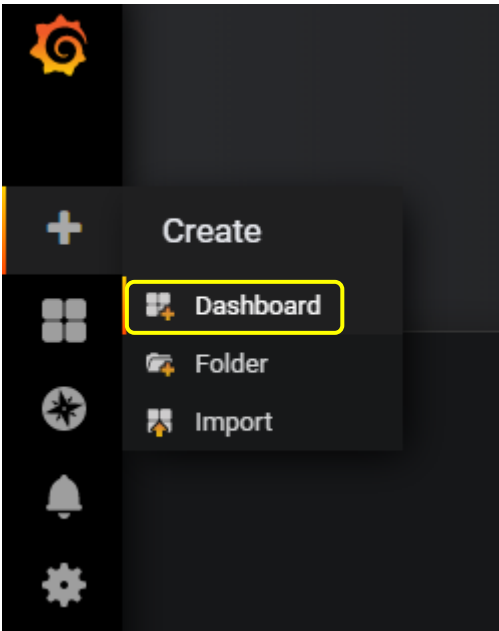
Database Connection OK

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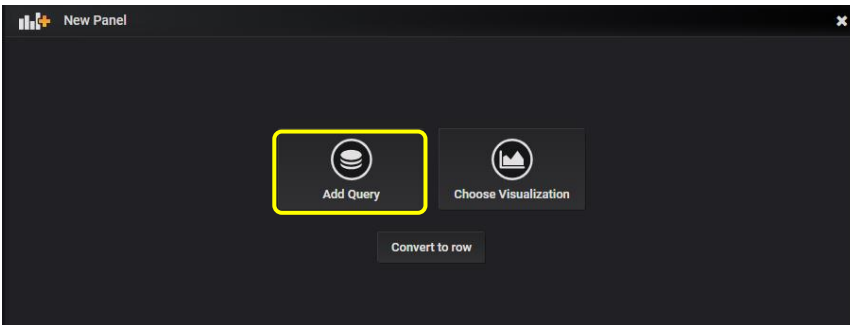
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Create a New Panel and Display Values

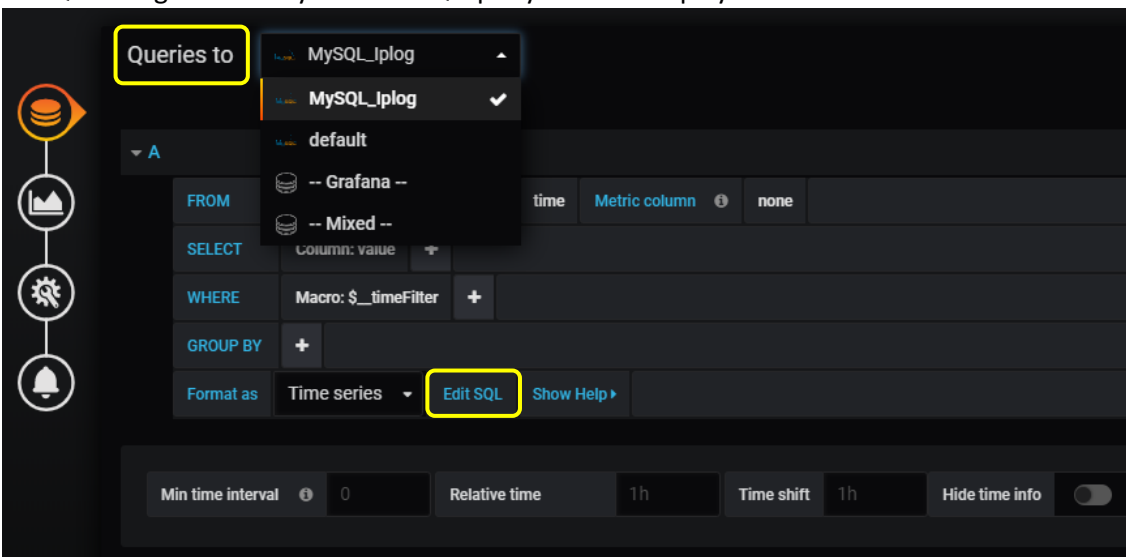
1) Click the + button on the left and select Create Dashboard.



2) Select option Add Query.



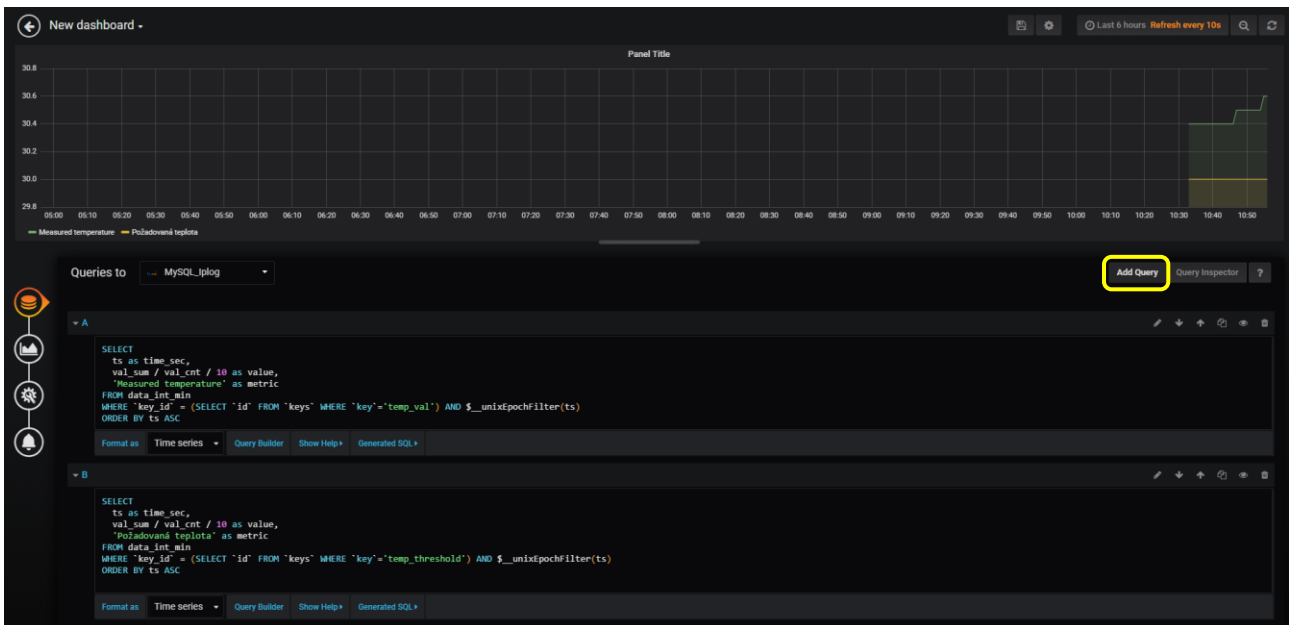
3) Select the default database connection. Now you can use the built-in builder for MySQL query or switch to SQL editing and write your own SQL query that will display the data.



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To add another query, use the Add Query button. In this example, there is one SQL query for the current temperature value and the other for displaying the required temperature.



The SQL query used in the example to display the current temperature.

```
SELECT
  ts as time_sec,
  val_sum / val_cnt / 10 as value,
  'Measured Temperature' as metric
FROM data_int_min
WHERE `key_id` = (SELECT `id` FROM `keys` WHERE `key`='temp_val') AND $__unixEpochFilter(ts)
ORDER BY ts ASC
```

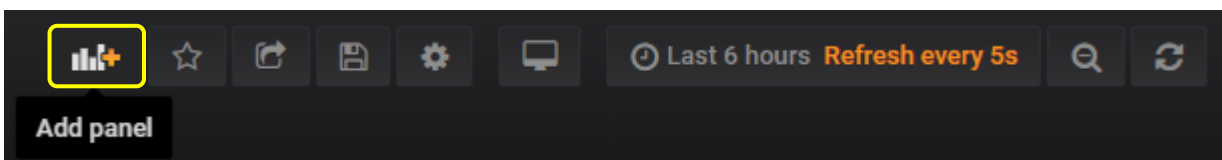
The SQL query used in the example to display the require temperature.

```
SELECT
  ts as time_sec,
  val_sum / val_cnt / 10 as value,
  'Required Temperature' as metric
FROM data_int_min
WHERE `key_id` = (SELECT `id` FROM `keys` WHERE `key`='temp_threshold') AND $__unixEpochFilter(ts)
ORDER BY ts ASC
```

`data_int_min` is a table in the datalogger database where a record with values is stored for each minute. The part of the query, where **WHERE `key` = 'temp_threshold'**, so the key string must match the correct name that is written at the datalogger block input in the program see. page 2.

Add Next Panel

In this example, we will add another panel that will display the status of the digital input. Click the Add panel icon at the top right.



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Select Add Query and enter a SQL query to read the current value from the mysql database.

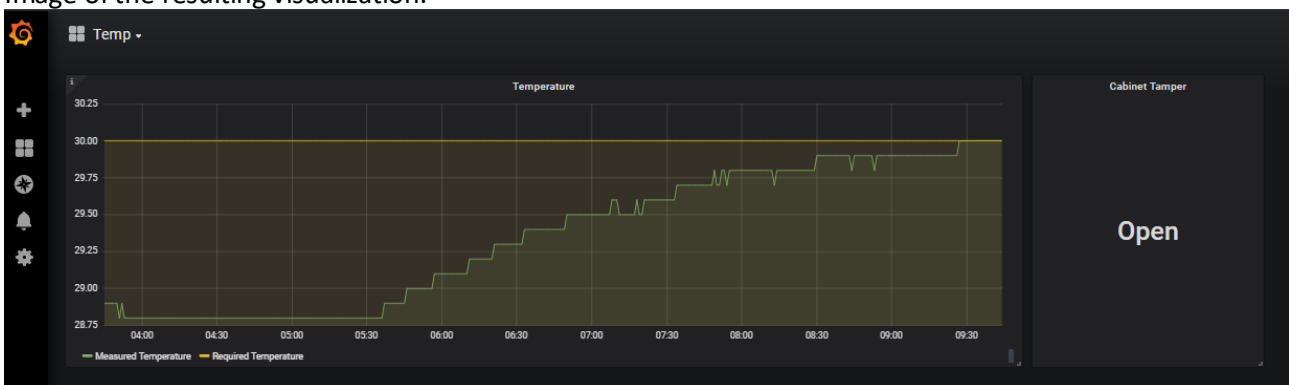
```
SELECT
  ts as time_sec,
  val_max as value,
  'Input' as metric
FROM data_int_sec
WHERE `key_id` = (SELECT `id` FROM `keys` WHERE `key`='contact') AND $__unixEpochFilter(ts)
ORDER BY ts ASC
```

Select visualizations on the left and choose Singlestat, select the current value and set the thresholds.

The screenshot shows the Grafana configuration interface for a Singlestat visualization. The 'Visualization' dropdown is set to 'Singlestat', which displays a large number '12.4'. The 'Value' section is configured with 'Stat' set to 'Current', 'Prefix' and 'Postfix' are empty, 'Unit' is 'none', and 'Decimals' is 'AUTO'. The 'Coloring' section has 'Background' and 'Value' toggles off, 'Prefix' and 'Postfix' toggles off, 'Thresholds' set to '50,80', and 'Colors' set to 'Invert'. The 'Value Mappings' section is set to 'range to text' and contains three mappings:

*	From	To	Text	N/A
*	From null	To null	Text	N/A
*	From -0.5	To 0.5	Text	Open
*	From 0.5	To 1.5	Text	Close

Image of the resulting visualization.



For more examples of Grafana settings and work, visit <https://grafana.com>.