



Integrating Grafana and Check_MK

TruePath Technologies



Who Is TruePath Technologies Inc.

Premiere Check_MK Partner in North and South America that specializes in sales, support and managed services. Since 2006, TruePath has provided industry-leading monitoring software, hardware, and services that put you, the customer, first.

We specialize in configuring and maintaining your monitoring software so you can avoid costly network downtime and maintenance and focus on what's most important: moving your business forward.



Douglas Mauro is the Founder and Senior Engineer at TruePath Technologies Inc. with over 20 years of experience in enterprise data centers. He's an O'Reilly author of Amazon's #1 selling network management book "Essential SNMP" (now in it's second edition).

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Cell: 716-474-1641





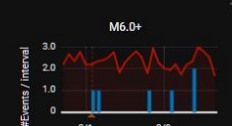
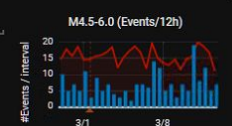
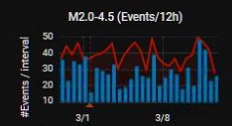
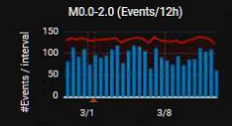
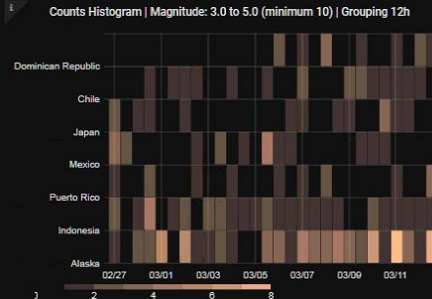
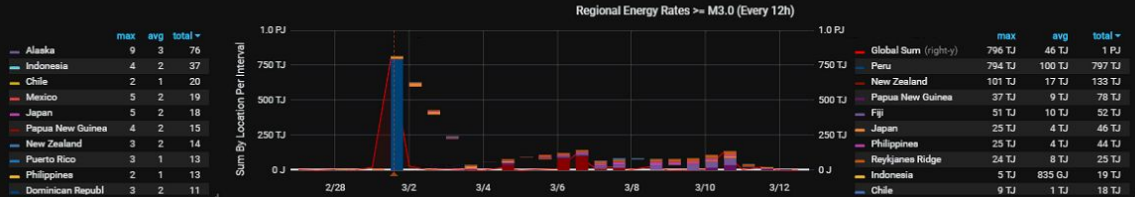
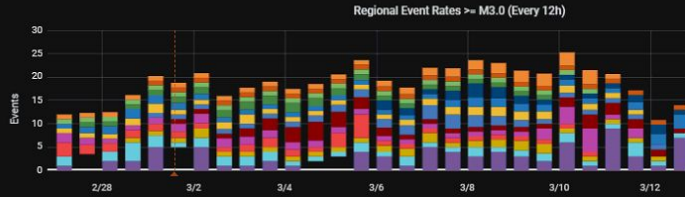
What Is Grafana?

- Web-based graphing engine
- Compose interactive dashboards
- Open source (GoLang)

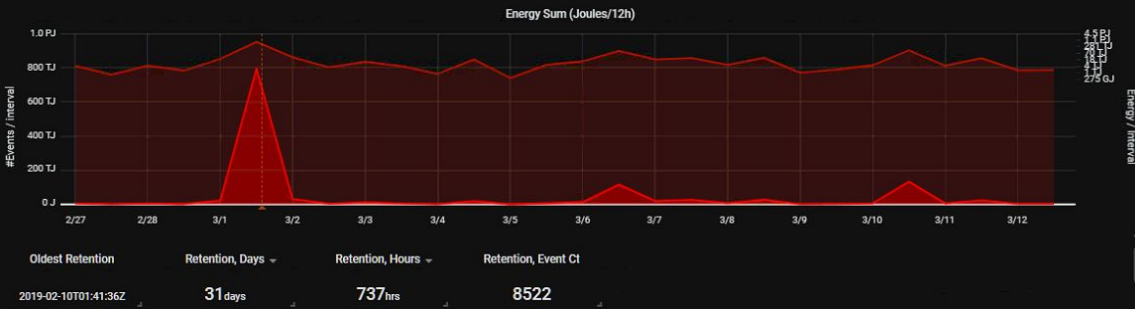
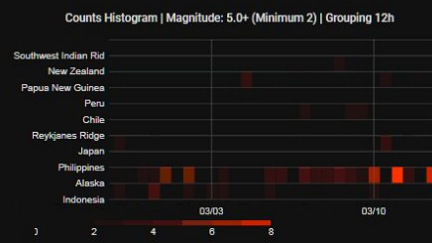




Counts Table Period 12h Grouping Interval 12h Region All Histogram Magnitude Split 5.0+ EVENT MARKERS: 6.5 - 6.9 7.0 - 7.9 8.0+



Days Ago	UTC Date	Energy (avg)	Energy (sum)	Count (M4.5+)	Peak Event
1	March 11, 2019	*	**	**	Kandrian, Papua New Guinea [5.80mww @ 31km] (reviewed)
2	March 10, 2019	*	***	**	Lambasa, Fiji [6.20mww @ 567km] (reviewed)
3	March 9, 2019	*	*	*	LEsperance Rock, New Zealand [4.90mb @ 10km] (reviewed)
4	March 8, 2019	*	**	*	Santa Monica, Philippines [6.00mww @ 54km] (reviewed)
5	March 7, 2019	*	**	**	Coquimbo, Chile [5.70mww @ 17km] (reviewed)
6	March 6, 2019	*	***	**	LEsperance Rock, New Zealand [6.40mww @ 29km] (reviewed)
7	March 5, 2019	*	*	*	Puerto Madero, Mexico [5.40mww @ 23km] (reviewed)







Why Do We Want Grafana?

- Rich visualizations
- Correlate data across sources
- Extensible

<https://grafana.com/plugins>

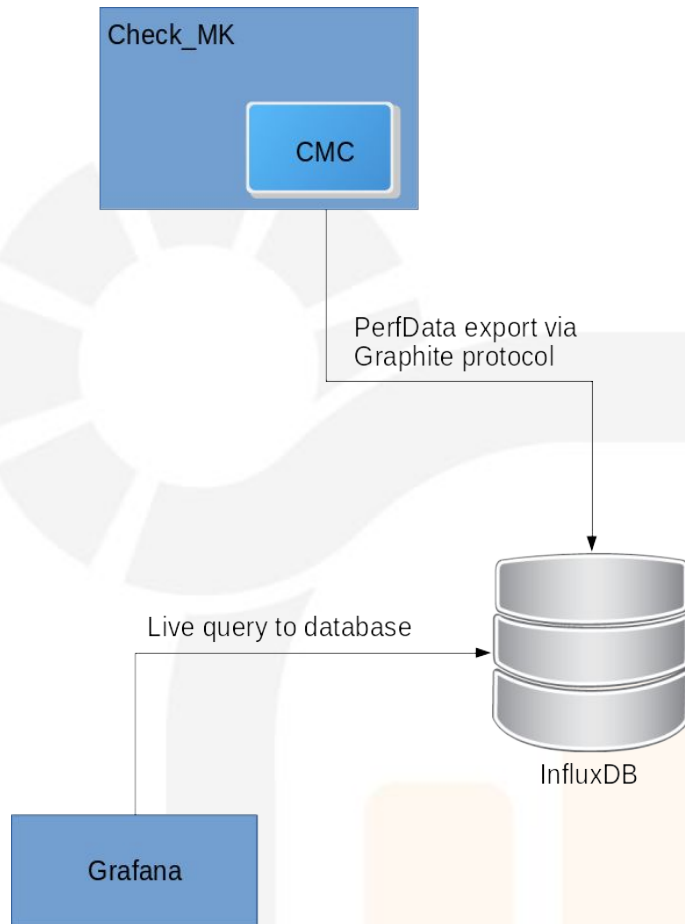
Officially Supported Data-Sources:

- Graphite
- Prometheus
- InfluxDB
- Elasticsearch
- Google Stackdriver
- AWS CloudWatch
- Azure Monitor
- Loki
- MySQL
- PostgreSQL
- Microsoft SQL Server (MSSQL)
- OpenTSDB
- Testdata



Architecture

How do we build this?

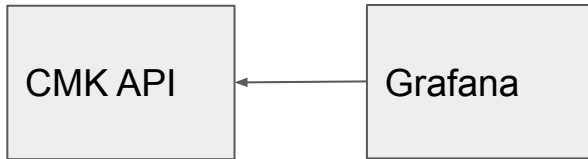




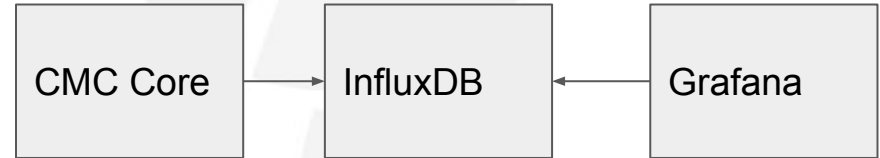
Two Methods



Directly via the **NEW** Grafana datasource



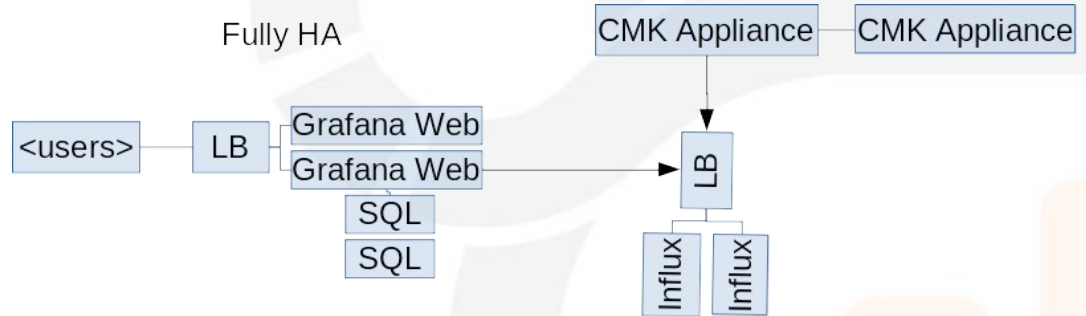
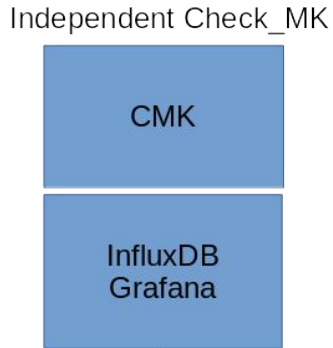
Graphite Export to InfluxDB





Common Topologies

Depending on scale and use-case, there are many ways to deploy.





InfluxDB

- High performance time-series database
- Natively supports the Graphite protocol
- Efficient storage
- Open source (GoLang)



influxdb



InfluxDB System Requirements

Load	Writes Per Second	Queries Per Second	Unique Series	CPU	RAM
Low	< 5 Thousand	< 5	< 100 thousand	2-4 Cores	2-4 GB
Med	< 250 Thousand	< 25	< 1 million	4-6 Cores	8-32 GB
High	> 250 Thousand	> 25	> 1 million	8 + Cores	32 + GB

https://docs.influxdata.com/influxdb/v1.7/guides/hardware_sizing/

Open source edition does NOT support clustering / high availability



InfluxDB Installation

1. Install the package

Stand-alone or as added repository.

<https://docs.influxdata.com/influxdb/v1.7/introduction/installation/>

2. Configure the Graphite endpoint (/etc/influxdb/influxdb.conf)

```
[[graphite]]  
# Determines whether the graphite endpoint is enabled.  
enabled = true  
database = "check_mk"
```

3. Start the InfluxDB service



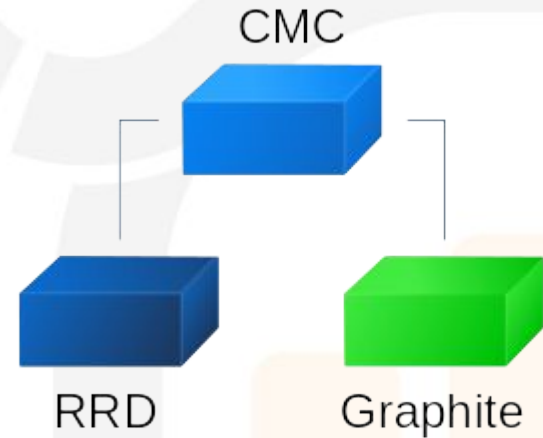
Check_MK Configuration

- Graphite export is supported by Check_MK Enterprise Edition

Performance data is split at the Micro Core when a check completes.

The data is pushed to the Graphite endpoint in real-time.

If the endpoint can not be contacted, the data is discarded.





Check_MK Configuration

Global Settings > Monitoring Core

▼ SEND METRICS TO GRAPHITE / INFLUXDB

Current setting

Hostname / IP address of Graphite server

127.0.0.1

TCP port of Carbon line receiver

2003

Optional variable prefix

C-style name mangling

Use invertible C-style mangling

Add new Graphite / InfluxDB connection

Factory setting

No connections defined

Current state

Hostname / IP address of Graphite server: 127.0.0.1

TCP port of Carbon line receiver: 2003

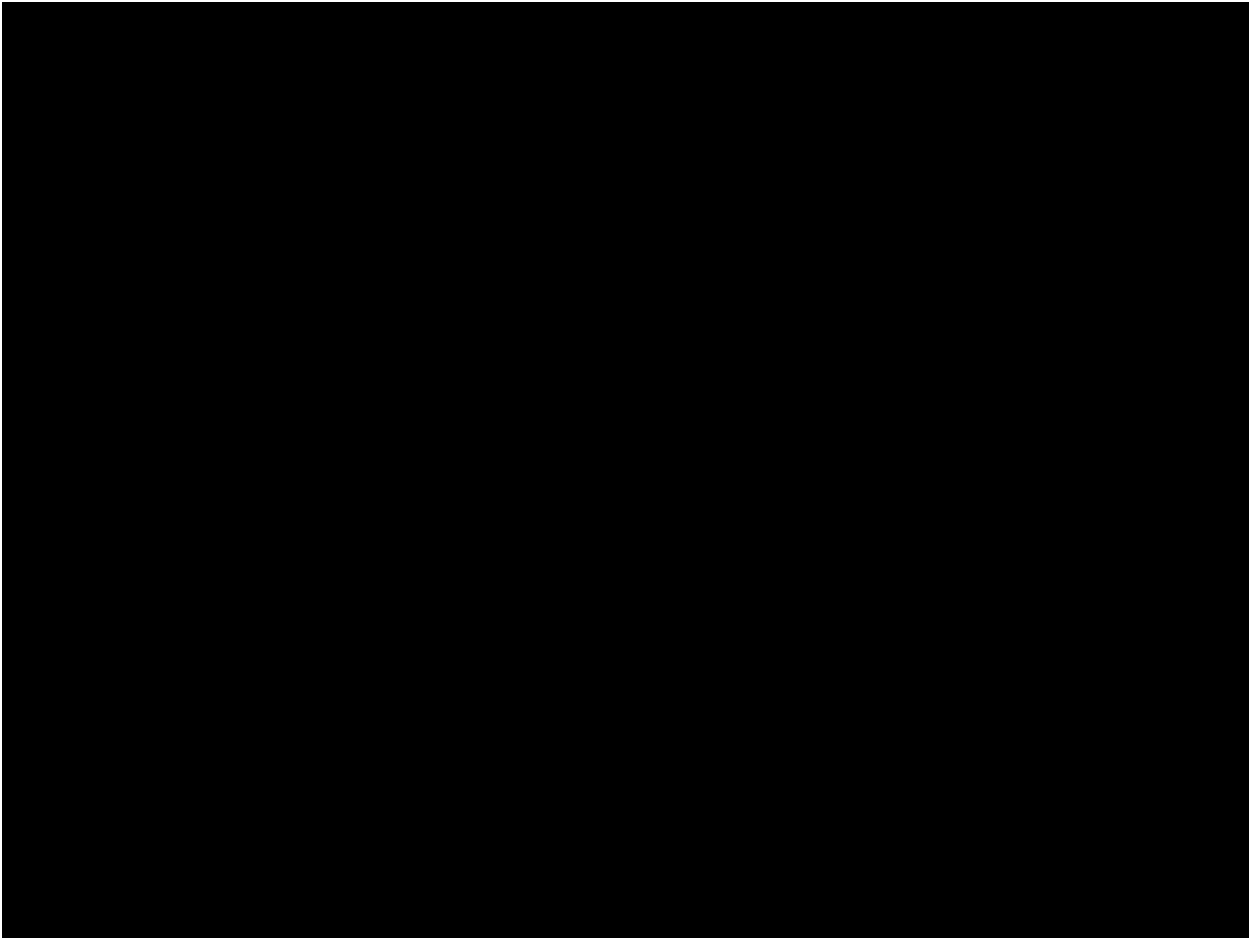
Optional variable prefix:

C-style name mangling: off

More configuration available in Host & Service Parameters

▼ SEND METRICS TO GRAPHITE/INFLUXDB

- Value
- Unity of measurement
- Warning threshold
- Critical threshold
- Minimum
- Maximum



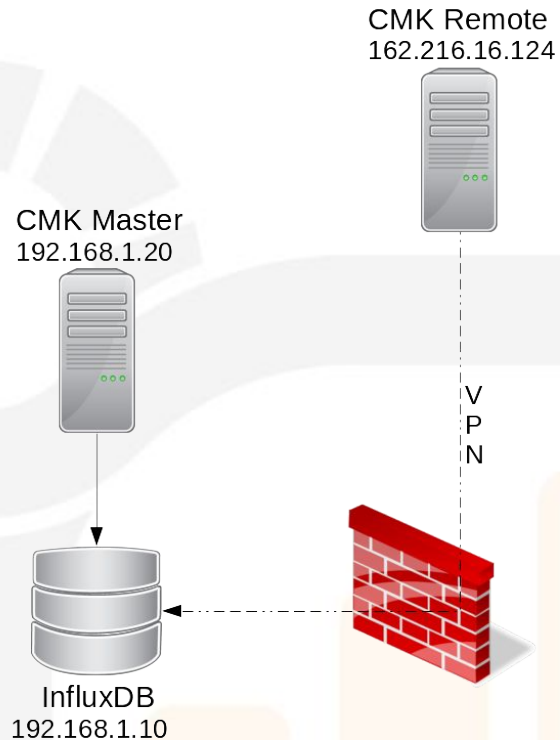
Check_MK Configuration

Check_MK does not proxy the metrics through the master.

Each site must be able to directly contact the Influx server.

If using a single Influx server behind a firewall or on a separate network, a VPN could be used to allow this contact.

A more advanced case would be running influx in a HA configuration with endpoints in each network.





Check_MK Configuration

After changes are activated, we should start seeing metrics in InfluxDB.

```
> show databases;
name: databases
name
----
_internal
check_mk
```

```
> use check_mk
Using database check_mk
```

```
> show series
key
---
Laptop.CPU_load.load1
Laptop.CPU_load.load15
Laptop.CPU_load.load5
Laptop.CPU_utilization.guest
Laptop.CPU_utilization.steal
Laptop.CPU_utilization.system
Laptop.CPU_utilization.user
Laptop.CPU_utilization.wait
Laptop.Check_MK.children_system_time
Laptop.Check_MK.children_user_time
Laptop.Check_MK.cmk_time_agent
Laptop.Check_MK.execution_time
Laptop.Check_MK.system_time
Laptop.Check_MK.user_time
...etc
```



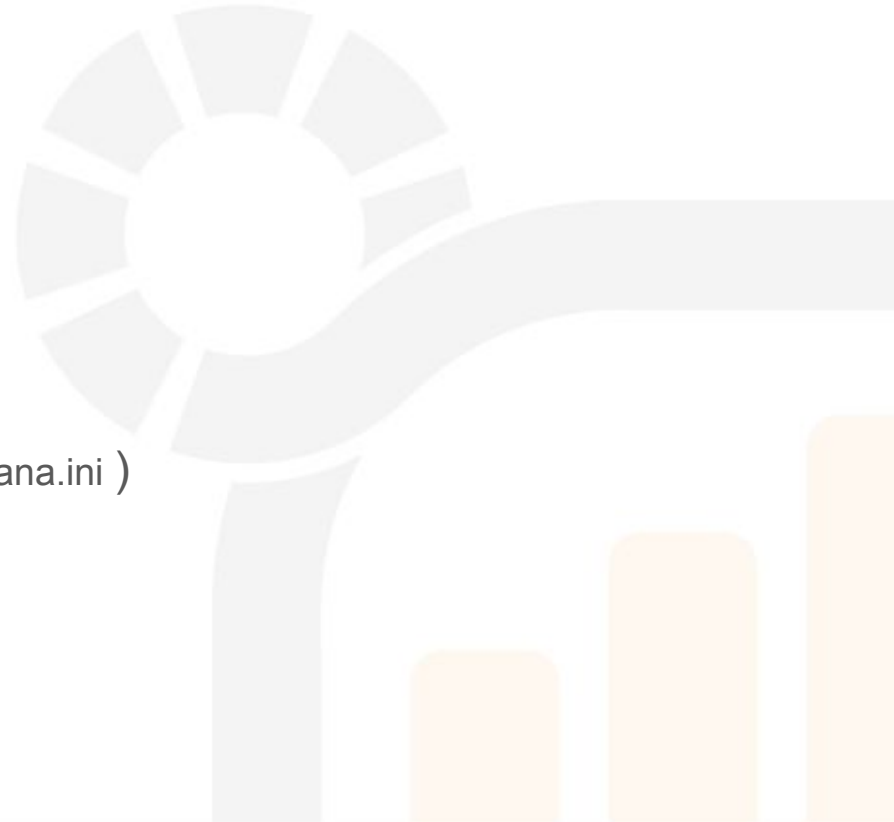
Grafana Installation

1. Install the package

Stand-alone or as added repository.
<http://docs.grafana.org/installation/>

2. Start the grafana-server service

(The Grafana configuration file is `/etc/grafana/grafana.ini`)





Grafana Configuration

- Binds to port 3000 by default
 - There are multiple ways to handle a port change depending on topology.
 - In the instance of a dedicated grafana server where port 80 is not already in use
 - Grafana needs “Linux capabilities” set in order to bind a well-known port.
 - A reverse proxy to the default port 3000 may be used in the instance that a web server is already present.

<http://docs.grafana.org/installation/configuration/#http-port>



Grafana Configuration

- Database Provider

By default Grafana uses an sqlite3 database to store its configuration.

Two other back-ends are supported: MySQL/MariaDB and PostgreSQL.

Either MySQL/MariaDB or PostgreSQL must be used to allow HA/Containerization.

Consider the cost of disk operations when using the sqlite3 database.



Overview

How do we see Check_MK Data
in Grafana?





How Check_MK Formats Data

Check_MK concatenates the host and service name and uses this name creates a series.

Each series contains a key named “value” with last measurement.

Check_MK does NOT currently make use of tagging available in InfluxDB

```
> show series
key
---
Laptop.CPU_load.load1
Laptop.CPU_load.load15
Laptop.CPU_load.load5
Laptop.CPU_utilization.guest
Laptop.CPU_utilization.steal
Laptop.CPU_utilization.system
Laptop.CPU_utilization.user
Laptop.CPU_utilization.wait
Laptop.Check_MK.children_system_time
Laptop.Check_MK.children_user_time
Laptop.Check_MK.cmk_time_agent
Laptop.Check_MK.execution_time
Laptop.Check_MK.system_time
Laptop.Check_MK.user_time
...etc
```



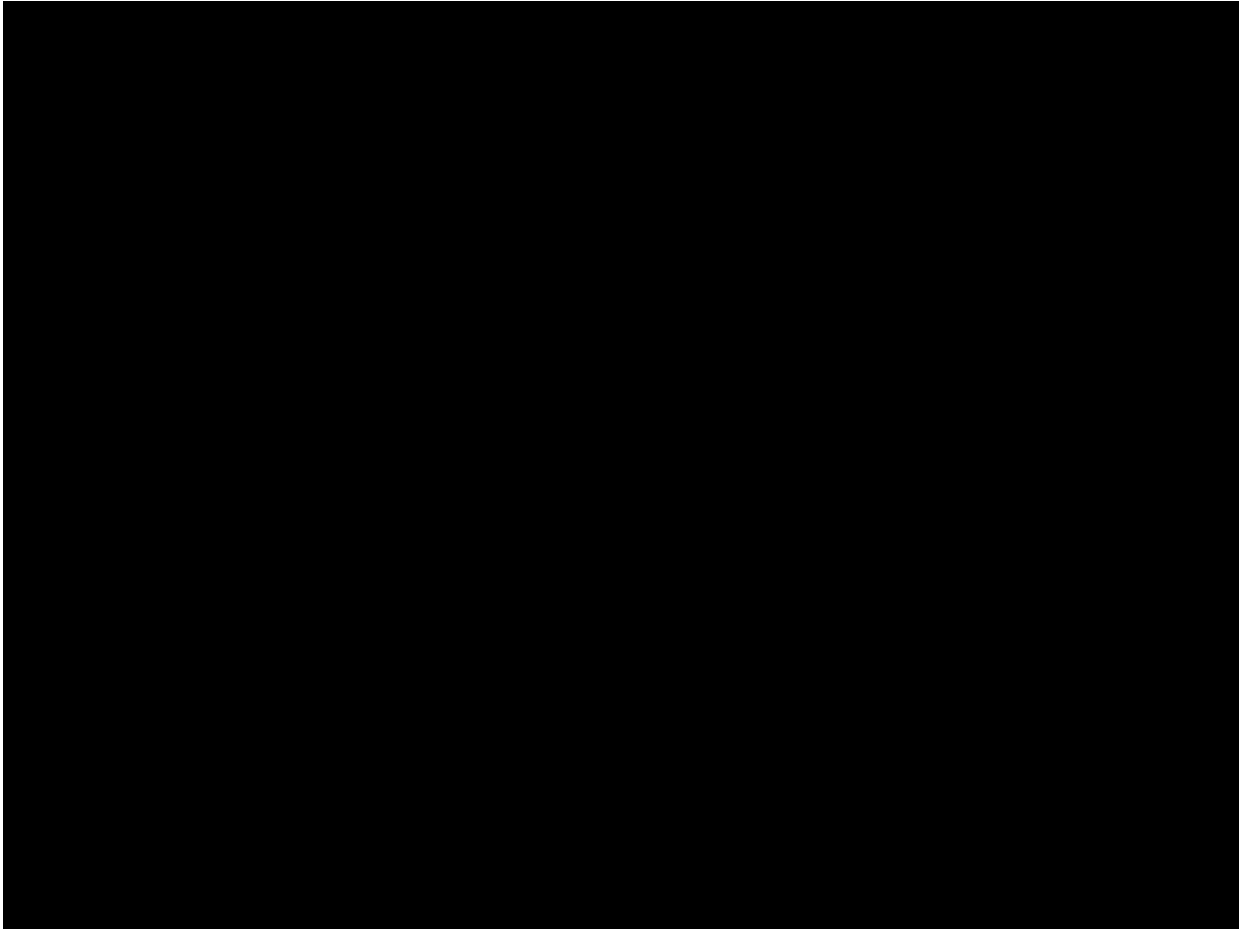
Adding A Datasource

A data source is a connector to a storage back-end, such as InfluxDB.

Each data source has a query editor that is customized for the specific back-end.

Data sources can return either a Time-Series or a Table.

The screenshot shows the configuration page for a new InfluxDB data source. The page title is "Data Sources / InfluxDB" with a sub-label "Type: InfluxDB". A "Settings" tab is active. The "Name" field is set to "InfluxDB" and has a "Default" toggle switch turned on. The "HTTP" section includes a "URL" field set to "http://localhost:8086", an "Access" dropdown menu set to "Server (Default)", and a "Whitelisted Cookies" field set to "Add Name". The "Auth" section has three rows: "Basic Auth" with a checkbox and a "With Credentials" toggle, "TLS Client Auth" with a checkbox and a "With CA Cert" toggle, and "Skip TLS Verify" with a checkbox. The "InfluxDB Details" section has a "Database" field set to "check_mk", and "User" and "Password" fields. A "Database Access" section contains explanatory text: "Setting the database for this datasource does not deny access to other databases. The InfluxDB query syntax allows switching the database in the query. For example: SHOW MEASUREMENTS ON _internal OF SELECT * FROM \"_internal\"..\"database\" LIMIT 10". Below this is a note: "To support data isolation and security, make sure appropriate permissions are configured in InfluxDB." The "Min time interval" field is set to "10s". At the bottom are three buttons: "Save & Test" (green), "Delete" (red), and "Back" (grey).

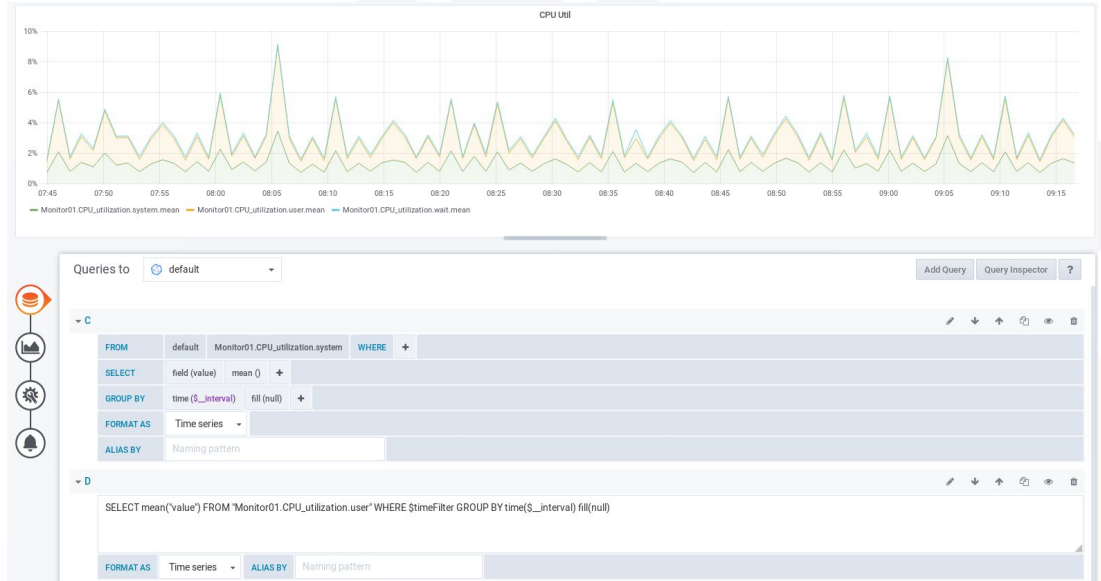


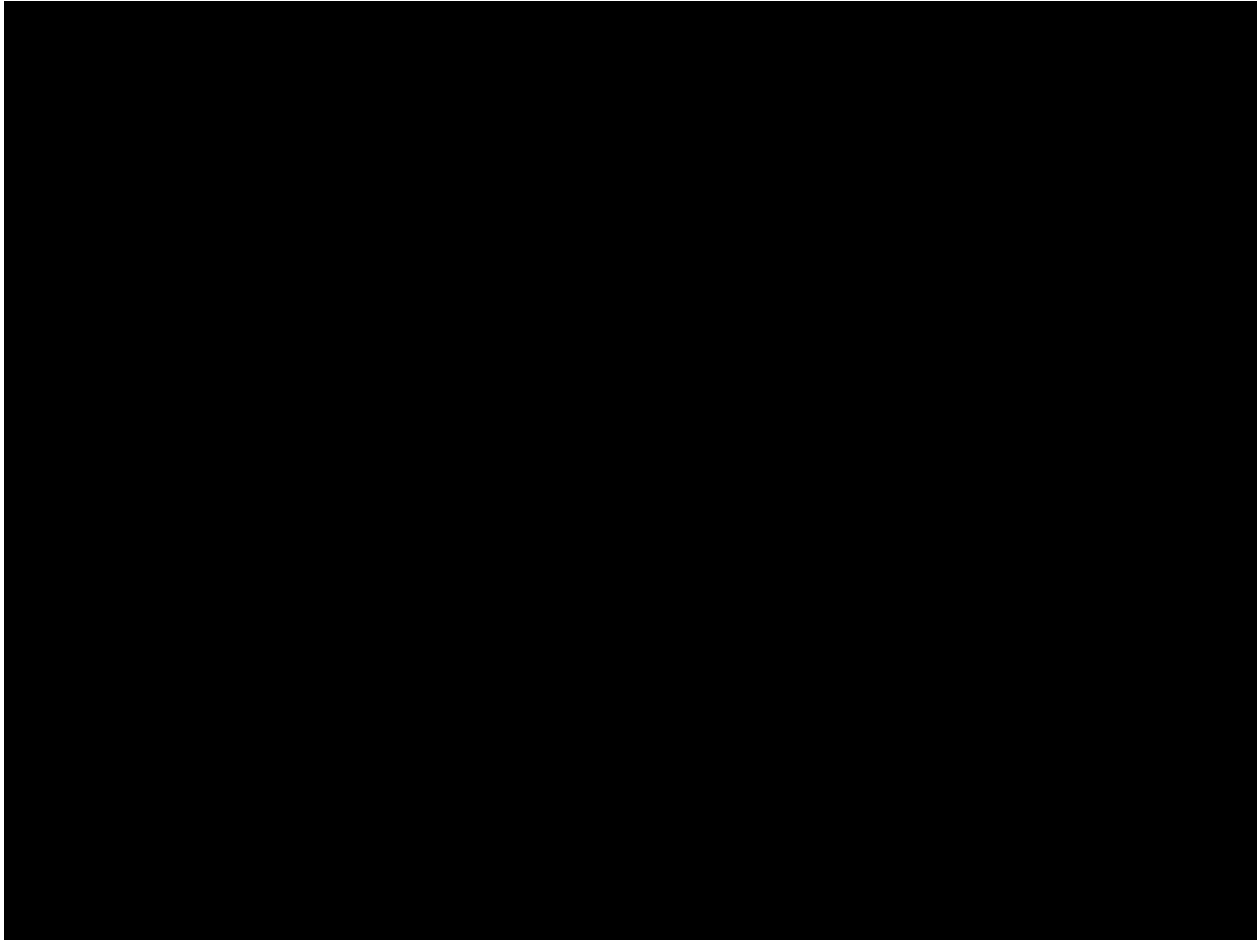


Creating a Basic Graph

Each dashboard widget consists of one or more queries to a datasource.

Each widget can only query one source at a time and may not be mixed.







Variables

Grafana supports creation of custom variables in dashboards.

Variables can be as simple or complex as needed.

They allow for creation of dashboard templates.

Settings

- General
- Annotations
- Variables**
- Links
- Versions
- Permissions
- JSON Model

Save

Save As...

Delete

Variables > Edit

General

Name	hostname	Type	Query
Label	optional display name	Hide	

Query Options

Data source	InfluxDB	Refresh	Never
Query	metric name or tags query		
Regex	/(.*)-*/		
Sort	Disabled		

Selection Options

Multi-value	<input type="checkbox"/>
Include All option	<input type="checkbox"/>

Value groups/tags (Experimental feature)

Enabled	<input type="checkbox"/>
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Preview of values

None

Update

<http://docs.grafana.org/reference/templating/#variable-types>



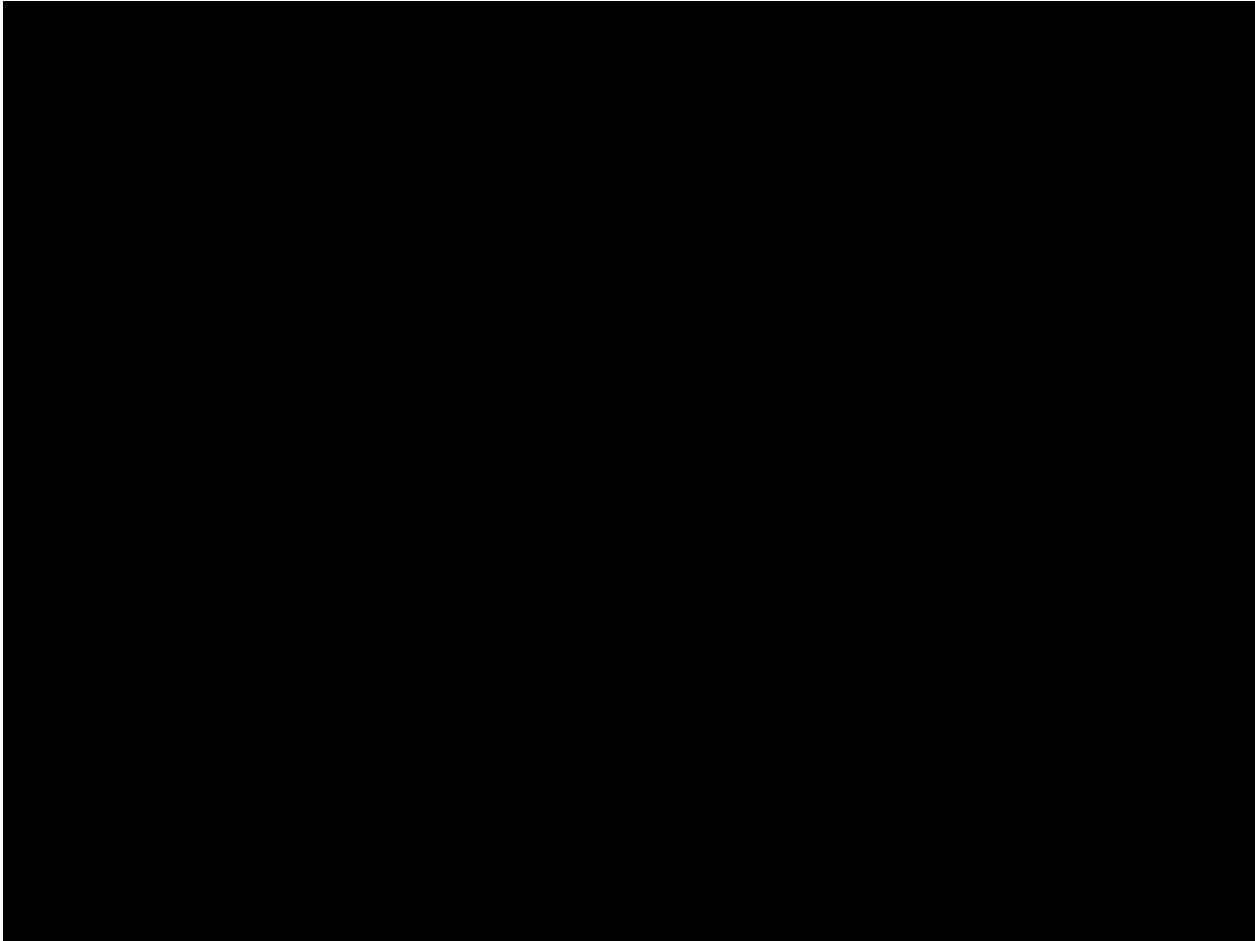
Variables



Variables are interpolated in the query and are passable via the URL.

<http://grafanaserver/d/HdGBxKqmz/cpu-utilization?orgId=1&var-hostname=monitor01>

Using these custom URLs we can dynamically link hosts and services from the Check_MK UI.






Add Actions To Check_MK

▼ CUSTOM ICONS AND ACTIONS

Current setting

ID

Icon 

Title

Action

URL


Open in

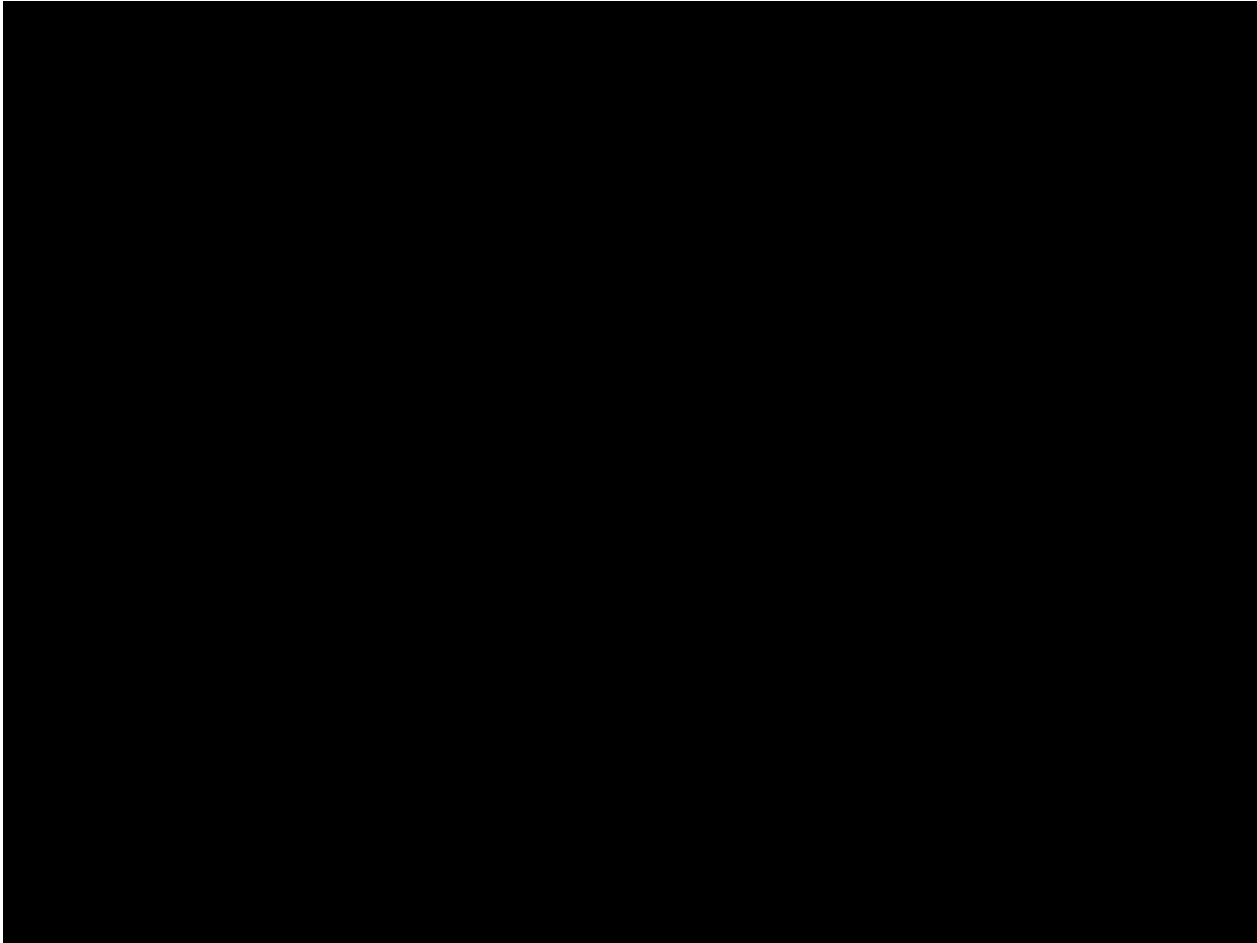
Show in column
Directly show the action icon in the column

Sort index

Factory setting 0 icons and actions

Current state 1 icons and actions

STATE	HOST	ICONS	OK	WA	UN	CR	PD
UP	Monitor01	 	25	0	0	0	0





Add Actions To Check_MK

Of course, these actions are rule based!

We can customize variables in the URL for different types of hosts.



Combining Data Sources





Combining Data Sources

- Aggregation from multiple sources allows a Look into the system from many angles at once or a deep dive into a specific metric.

By leveraging variables in Grafana, and Check_MK's rule based action icons, we can build one-click access to collections of device or environment specific data that can aid in the diagnosis of issues or provide business insights.



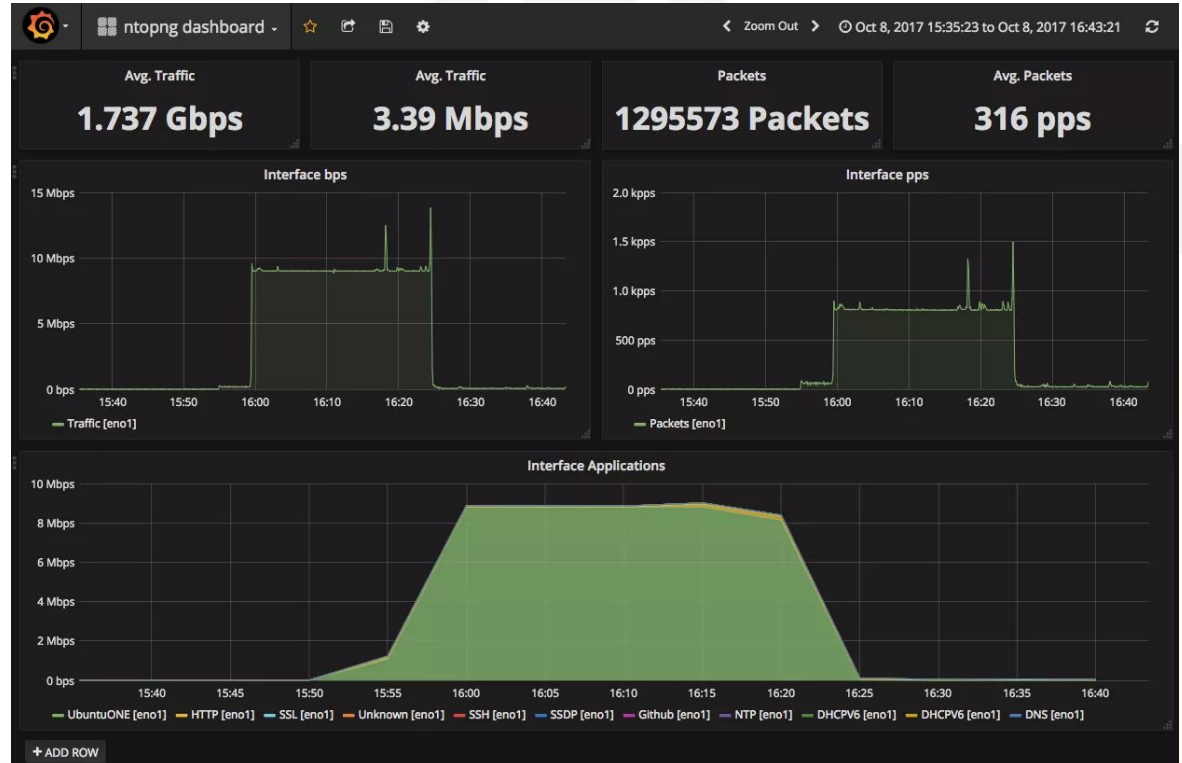
ntopng

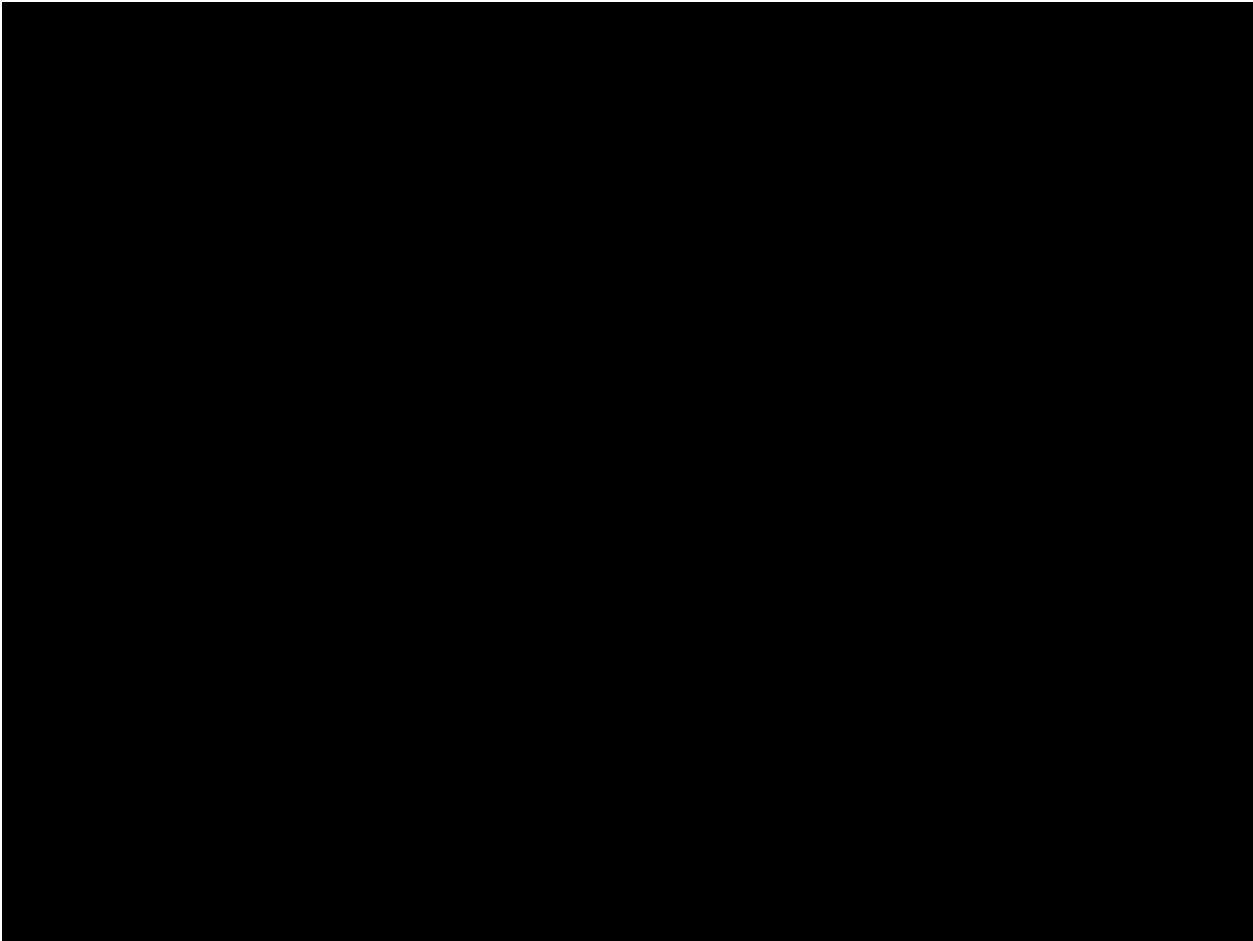
ntopng offers real time traffic monitoring with DPI.

Integration with Grafana allows us to graph network traffic in an interesting way.

For example, if high traffic volume occurs on a device or a network segment, we are able to see a protocol breakdown immediately.

STATE	HOST	ICONS	OK	WA	UN	CR	PD
UP	EdgeRouter	☰ ⚙️	23	2	0	2	0







Account Management / Multi-User

- Grafana is not just for administrators!
- In addition to the built-in SQL database, Grafana supports several authentication methods suitable for large deployments.

LDAP

Reverse Proxy

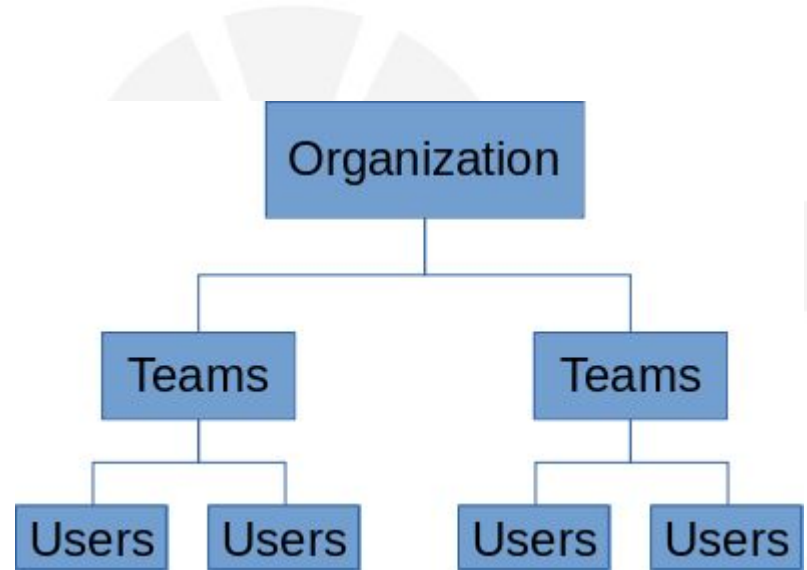
O-Auth Integrations

<http://docs.grafana.org/auth/overview/>

Account Management / Multi-User

Grafana allows for easy account management by dividing users into organizations and teams.

For instance, if you were an ISP such as a VPS company, it would be possible to provide customer portals with access to metrics, billing, or even support information.





Account Management / Multi-User

- End users don't usually need access to the monitor.

Users are typically read only and in charge of a small number of systems or operations. This also reduces load of the monitor with large user base.

- Easily Automate

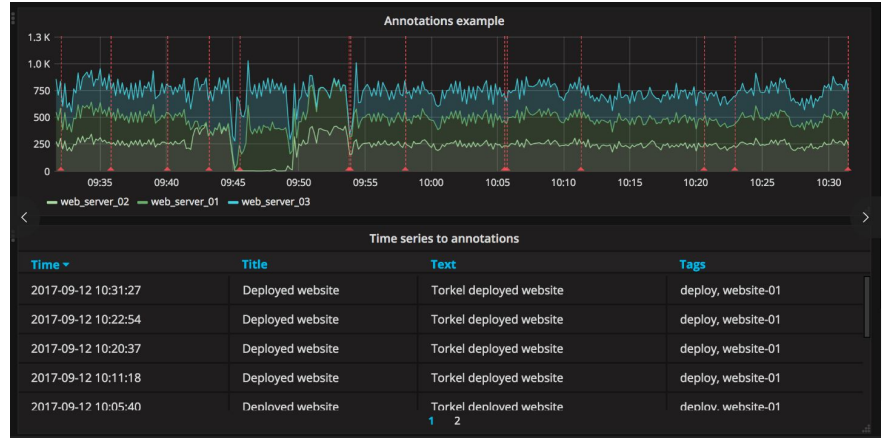
Grafana clearly exposes its HTTP API for use in automation. It is very easy to deploy and manage dashboards for users and organizations.

http://docs.grafana.org/http_api/



Further Customization

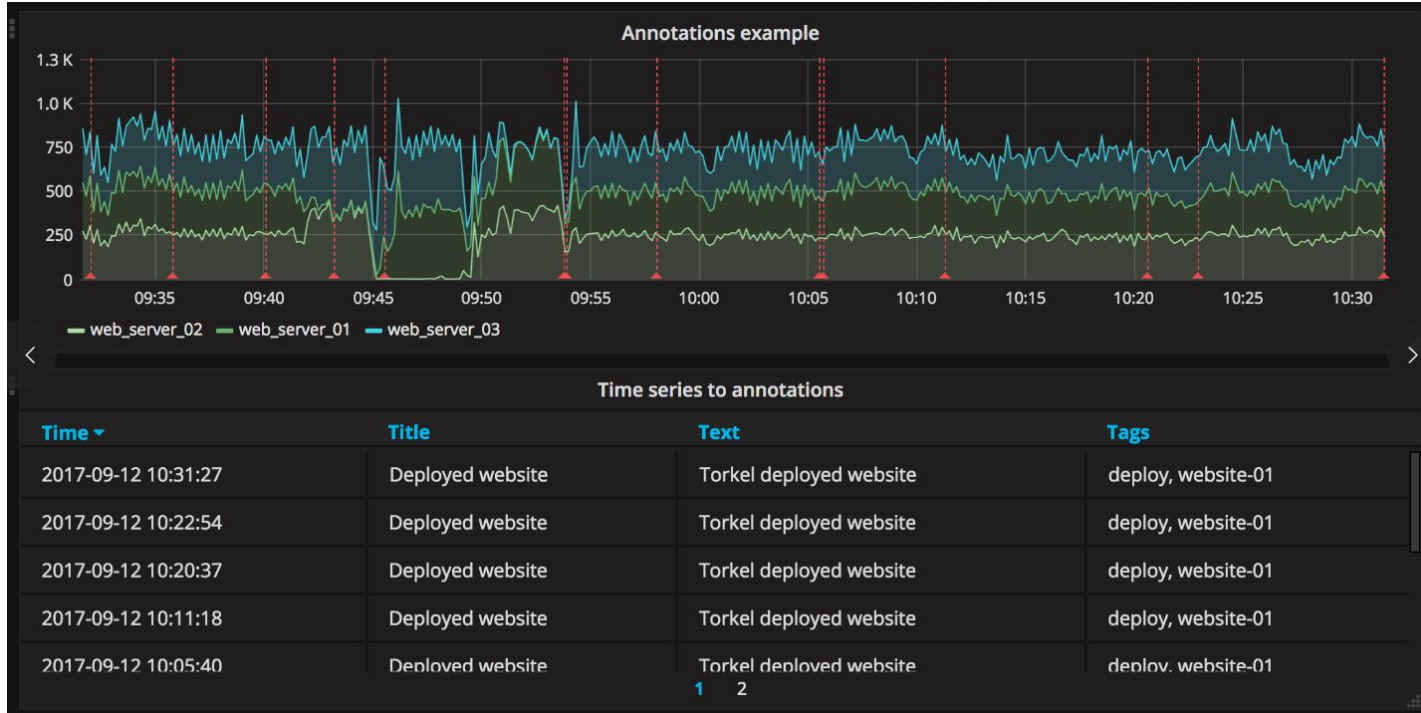
Widgets, Visualizations and Features



- Graph
- Singlestat (12.4)
- Gauge (79)
- Table
- Text (T)
- Heatmap
- Alert List
- Dashboard list
- Clock (8888)
- Pie Chart
- Polystat
- Worldmap Panel
- Plugin list
- Annotation List
- worldPing CTA
- worldPing Endpoint List
- worldPing Endpoint Nav

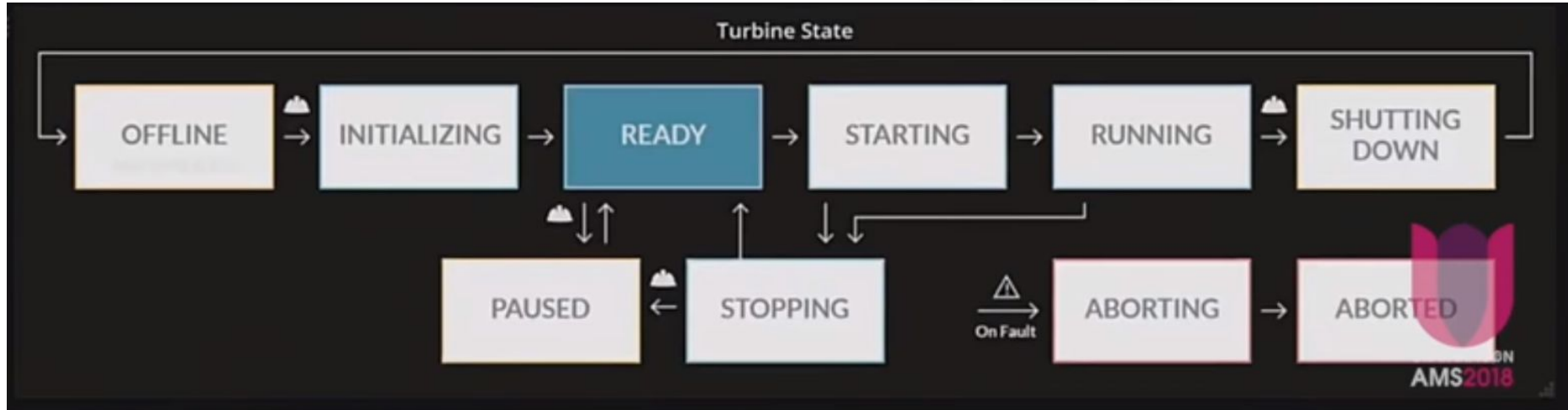


As Interactive as you like





As Interactive as you like



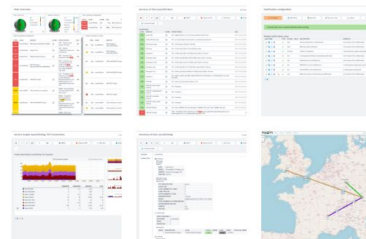


https://truepathtechnologies.com/check_mk/

Check_MK Enterprise Premiere Partner

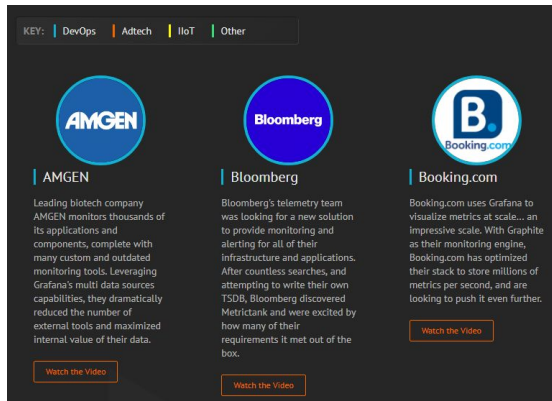
Thank You!

TruePath Technologies is the premier reseller of Check_MK monitoring software, subscriptions and support in the US. Purchase Check_MK subscriptions or Check_MK support. Check_MK is a comprehensive IT monitoring software solution in the tradition of Nagios. Check_MK is available as Raw Edition, which is 100% pure open source. The Check_MK paid Enterprise Edition includes lots of additional features and optional professional support.




 [Purchase Check_MK Enterprise Licenses](#)

<https://grafana.com/grafana/testimonials>



KEY: | DevOps | Adtech | IIoT | Other



AMGEN

Leading biotech company AMGEN monitors thousands of its applications and components, complete with many custom and outdated monitoring tools. Leveraging Grafana's multi data sources capabilities, they dramatically reduced the number of external tools and maximized internal value of their data.

[Watch the Video](#)




Questions & Answers