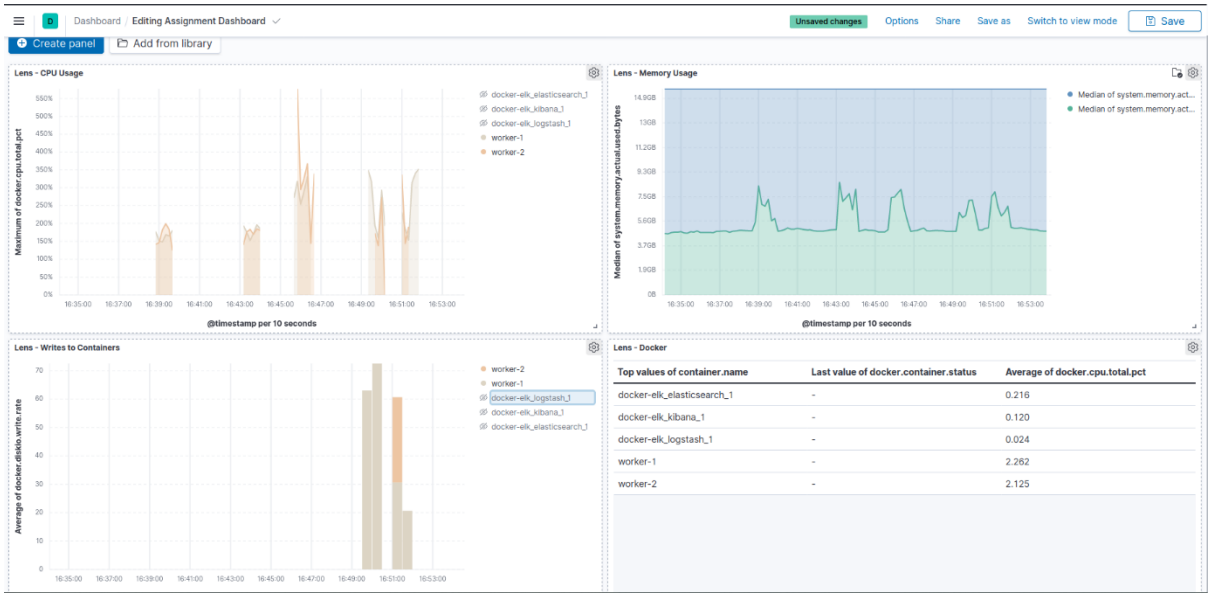
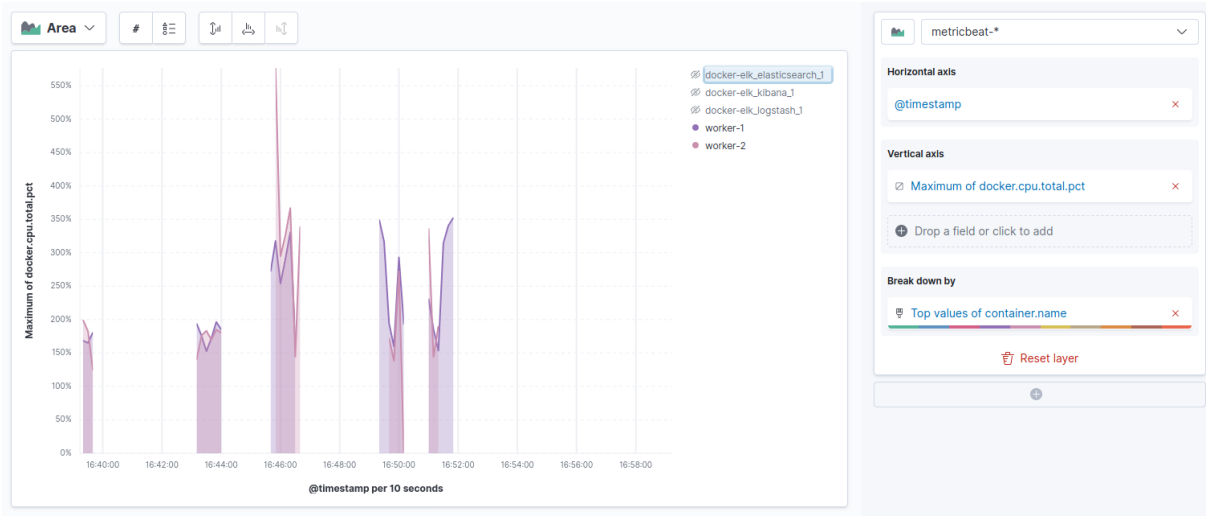
1. Monitoring with the elastic stack

The following image shows the Dashboard with its 4 visualizations. We have hidden the 3 containers used by Elastic Stack so only the worker containers are visible.

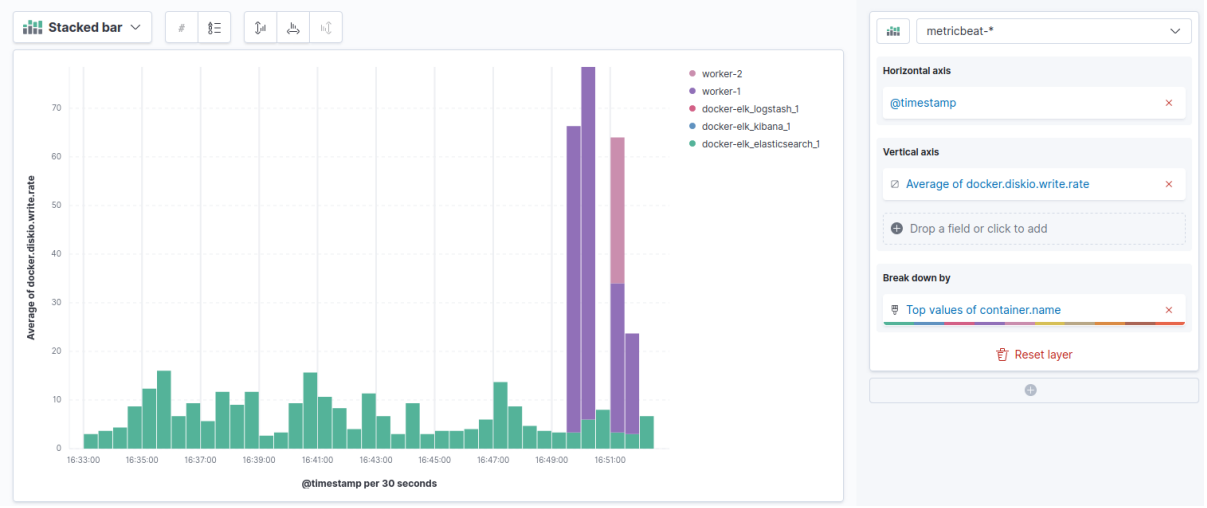


The first visualization shows the maximum of the *docker cpu total percentage*. We can see obvious spikes in CPU usage from the graph. Our workers were run for 60 seconds each. We have hidden the 3 Elastic Stack containers.



The second visualization shows the memory usage and clearly shows spikes when the worker nodes are being run.

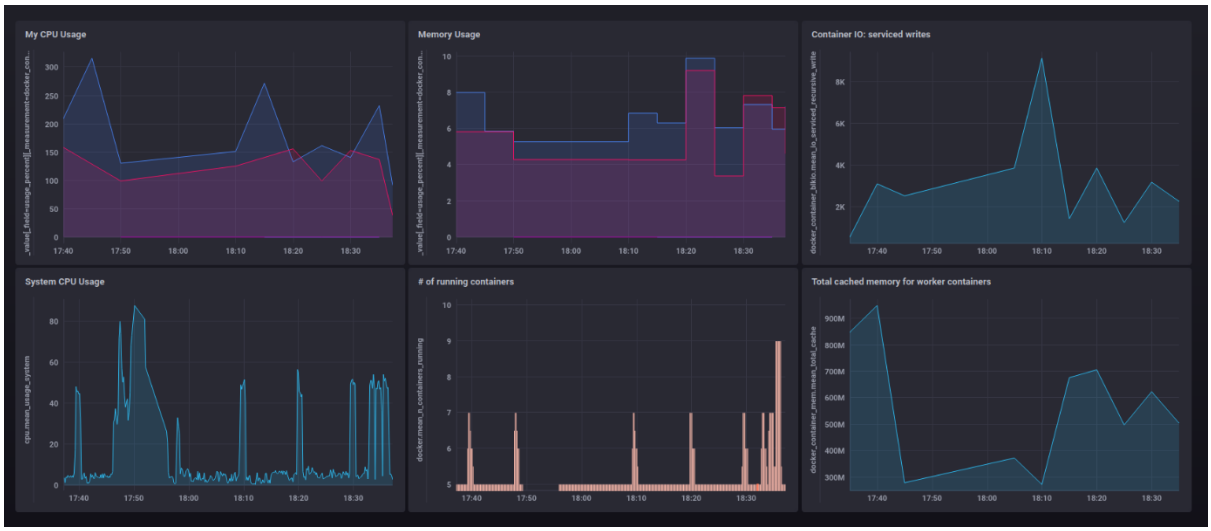
The third visualization shows the average amount of writes to each container every 30 seconds.



The fourth and final visualization shows a table with the various docker containers that were running, as well as their average total cpu usage in percentages.

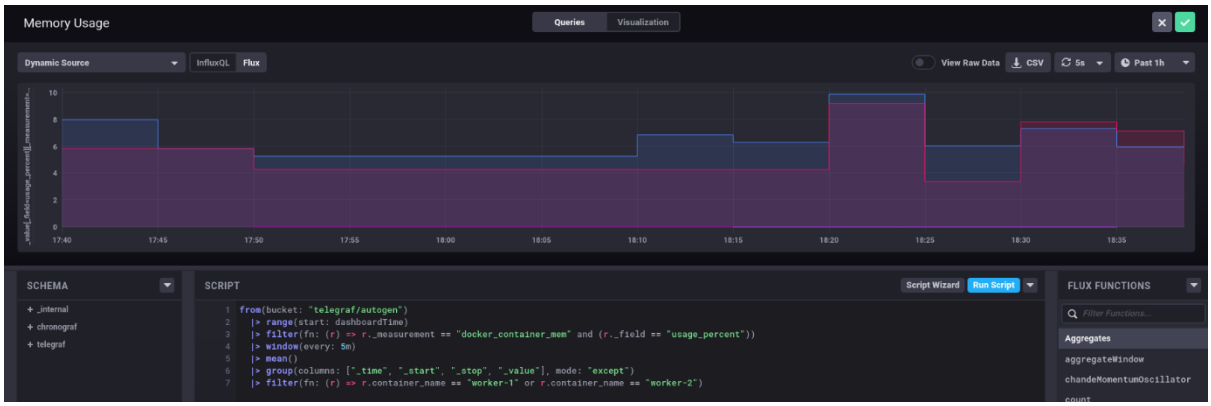
2. Monitoring with the Tick Stack

The following image shows the Tick Stack Dashboard containing 6 visualizations.



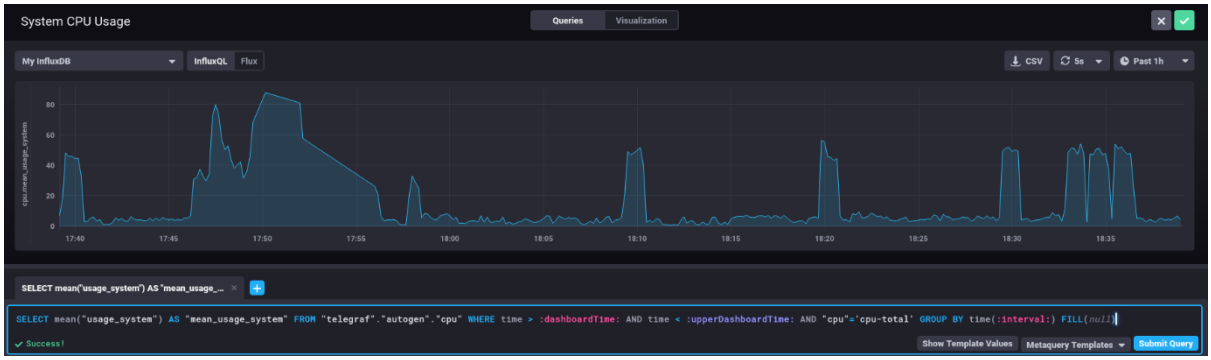
The first graph shows the average CPU usage of the two worker nodes.

The second visualization shows the average memory usage in percentages of the docker worker containers. Spikes are visible when the worker nodes are run.



In the third graph the number of writes that were processed by all containers is shown.

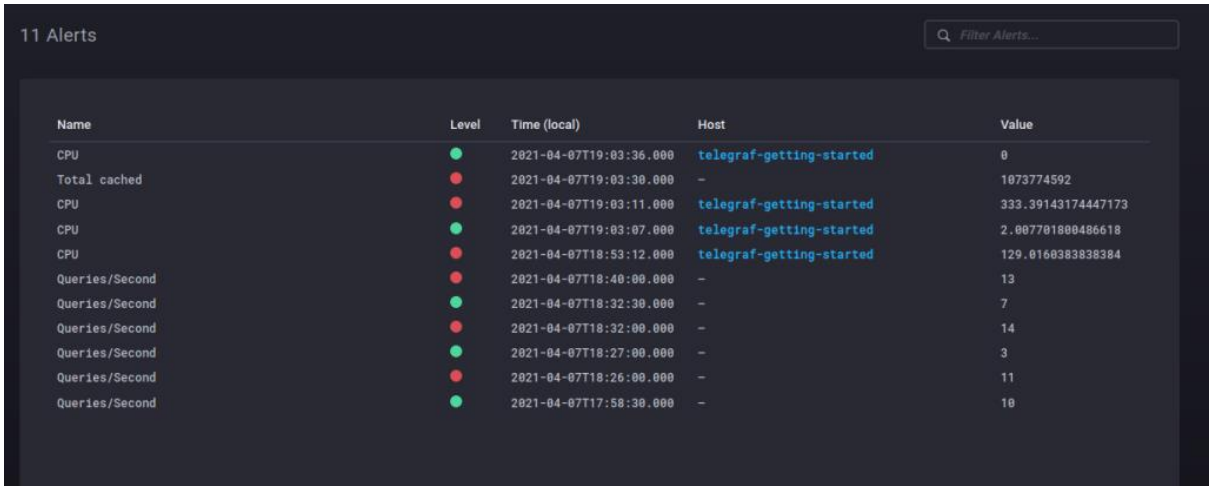
The fourth graph visualizes the System wide CPU, showing correlation with the spikes in the first image.



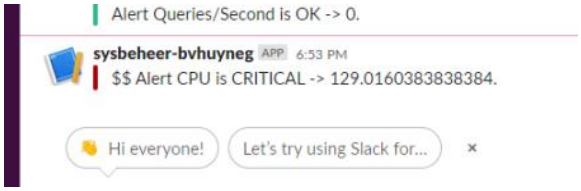
In the fifth graph a visualization of the amount of running containers Is given. The last spike is due to the fact that we added two additional workers whilst experimenting, so this can be ignored.

The final graph visualizes the total cached memory of all running workers, which increases when we run the workers.

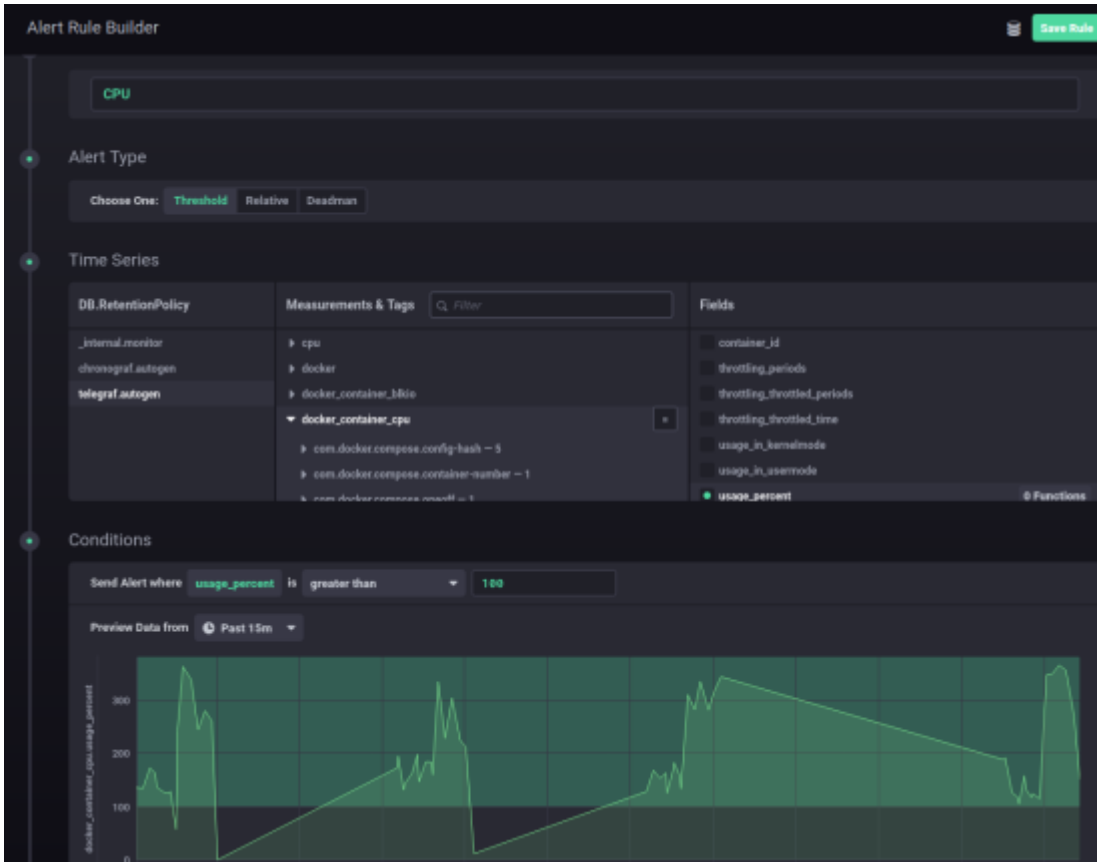
Additionally, we created two alerts: CPU and total cached.



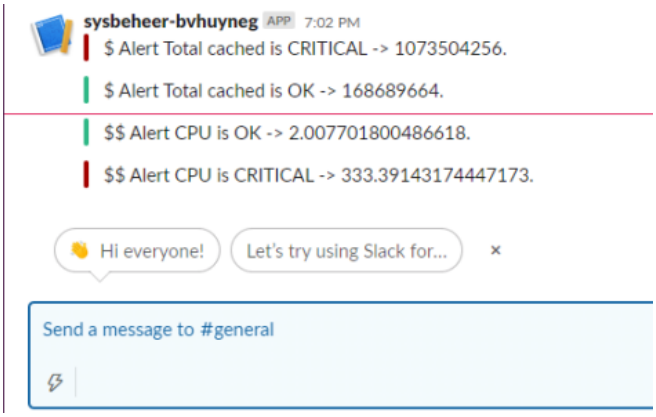
The first is an alert called CPU and sends a message to our Slack channel when the CPU usage reaches a value above 100 (percent).



Below are the rules for our CPU alert.



The second alert posts a message in our Slack channel when the spread of the total cached memory in the container is above 1 billion bytes. An alert pertaining the CPU usage can also be seen in this image.



Below are the rules for the Total cached alert.