How to configure Pod restart notification using Grafana

Prerequisites :
Prometheus and Grafana must be configured in the kubernetes cluster.

Steps to configure :
 In the Alerting section, Configure a alert

1)Set a query :
- In the metrics select pod restart metric like:

```
kube_pod_container_status_restarts_total
```

And in the Labels, select namespace and pods

```
kube_pod_container_status_restarts_total {namespace="dev", pod=~".*"}
```

pod=~".*" :- to select all the pods from the dev namespace.

If you want to get notification from all the namespace of your cluster, configure
It's like this.

```
kube_pod_container_status_restarts_total {namespace=".*", pod=~".*"}
```

So with this query you will get all the pods with their metadata like the name of pod, containers, it's namespace and some useful data like pod's endpoints, job and the service which we don't want. So we can just filter it out from the query using the " by " expression which is used solely for removing all the labels except the container, pod and namespace label from the result.

```
kube_pod_container_status_restarts_total{pod=~".*"} by(pod,container,namespace)
```

With this query we will get the name of the pod/container and its namespace only.

Alert condition : give the alert condition using the expression sum and increase

```
sum(increase(kube_pod_container_status_restarts_total{pod=~".*"}[1m]))
by(pod,container,namespace)>0
```

The following PromQL query returns containers, which were restarted during the last 1 minutes. It also shows the number of restarts during the last 1 minute per each returned container.

Now you can run queries by clicking on the " Run Queries " button which should give the expected results. Because from this generated data will be exported to the " $value " , from this $value all the $labels will be able to fetch the data and print the output .

```
sum(increase(kube_pod_container_status_restarts_total{pod=~".*"}[1m])) by(pod,container,namespace)>0
```
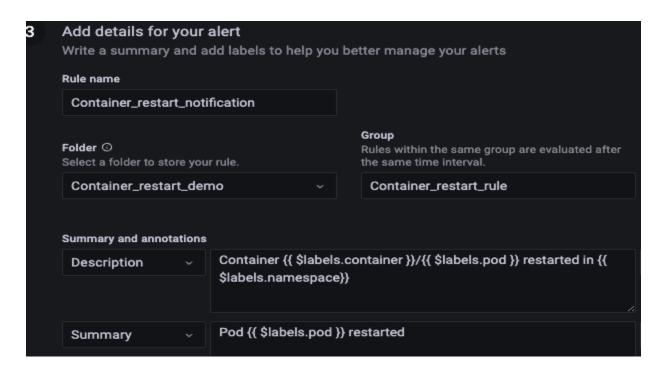
2) Alert evaluation behavior : you have to give the the time for evaluating the alert

3) Add details to your alert : in this section you will have to give the name of rule, folder(create if not already exist) and group.
In the Summary and annotations, define the labels which will take out the name of pod and its namespace from the $value.

4) Configure the contact points for the notifications :
First make sure that SMTP is enabled in the Prometheus.
In the contact point of type select - Email
And give the mail address to receive the notifications   .

Metrics browser ›   `sum(increase(kube_pod_container_status_restarts_total{pod=~".*"}[1m])) by(pod,container,namespace)>0`

1   `kube_pod_container_status_restarts_total {pod=~".*"}`
     Fetch all series matching metric name and label filters.

2   `increase(<expr>[1m])`
     Calculates the increase in the time series in the range vector. Breaks in monotonicity (such as counter resets due to target restarts) are automatically adjusted for. The increase is extrapolated to cover the full time range as specified in the range vector selector, so that it is possible to get a non-integer result even if a counter increases only by integer increments.

3   `sum by(pod, container, namespace) (<expr>)`
     Calculates sum over dimensions while preserving labels `pod` and `container` and `namespace` .

4   `<expr> > 0`
     no docs

> **Options**   Legend: Verbose   Format: Time series   Step: auto   Type: Range

⌄   **C**   *(Expression)*

Operation	Reduce ⌄				
Function	Min ⌄	Input	A ⌄	Mode	Strict ⌄

  + Add query   **+ Add expression**   🔄 **Run queries**

Set alert condition

Select one of your queries or expressions set above that contains your alert condition.

○ A - query

◉ C - expression