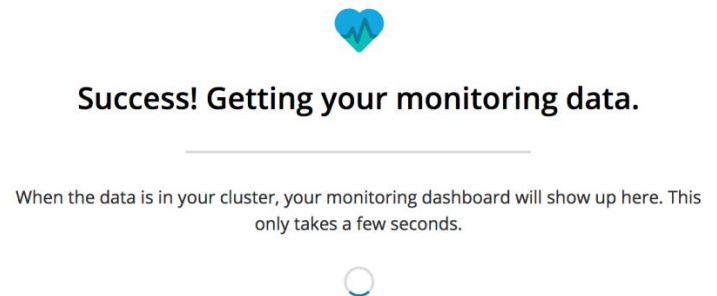
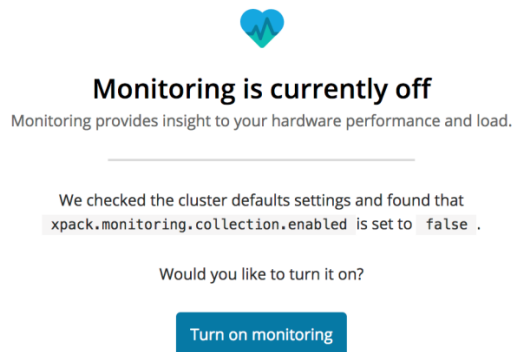


Lab 2 : Scale Elasticsearch with shards & nodes

In Lab 1, we installed a 1 node cluster and loaded some data in it, using the default sharding settings.

Go in Kibana, under Stack Monitoring, click on “Turn on Monitoring”, and then wait for a couple of seconds :



If the screen does not refresh, please click again on Monitoring in the menu.

You should see an overview of your current cluster, number of Elasticsearch nodes, of indices, of Kibana, ...

2.1 Do a screenshot of the monitoring and add it to your report

Go under “indices”, look at the indexes you created in lab1 (bank, logstash-2015.05.*, Shakespeare).

What is their status ? Do they have unassigned shards ?

2.2 Do a screenshot of indices monitoring and add it to your report

Meaning of status color in “Indices” monitoring :

- Green : all shards of the index assigned
- Yellow : some replicas shards of the index not assigned
- Red : some primary shards of the index not assigned (some data are not available)

Why is there unassigned shards for all our indices created in Lab 1 ?

Click on the “bank” index, you will see the details of memory usage, disk usage, search rate, index rate, document count, ... and at the bottom the shard legend, where you will see that the only primary shard is assigned to the node currently running, while there is 1 “copy” (replica) unassigned.

2.3 Do a screenshot of the monitoring of the “bank” index and add it to your report

Now, let’s try to add some nodes to the cluster, so these shards can be assigned and we can benefit from high availability.

Shutdown Kibana, and then Elasticsearch.

Edit `jvm.options` and change `xms` and `mxm` settings to 512m instead of 1g. This is to limit the memory usage of each Elasticsearch instance we will run.

```
17 #####
18
19 # Xms represents the initial size of total heap space
20 # Xmx represents the maximum size of total heap space
21
22 -Xms512m
23 -Xmx512m
```

Now, re-launch Elasticsearch with the following parameters :

```
./elasticsearch-7.*.*bin/elasticsearch -E node.name=node1
```

And launch Kibana : `./kibana-7.*.*bin/kibana`

And then go under Monitoring > Indices > Bank

Nothing should have change except the node name which is not random anymore, and which is node1.

Stay on the monitoring page, and in parallel launch a new terminal and launch another Elasticsearch node :

```
./elasticsearch-7.*.*bin/elasticsearch -E node.name=node2 -E path.data=data2 -E path.logs=log2
```

2.4 Do a screenshot of the monitoring of the “bank” index, after the addition of 1 node and add it to your report. Comment about what happen on the bank index monitoring page ?

Stay on the monitoring page, and in parallel launch a new terminal and launch a 3rd Elasticsearch node

```
./elasticsearch-7.*.*bin/elasticsearch -E node.name=node3 -E path.data=data3 -E path.logs=log3
```

2.5 Do a screenshot of the monitoring of the “bank” index, after the addition of 2 nodes and add it to your report. Comment about what happen on the bank index monitoring page ?

Go back to monitoring > Indices – are all your indices green now ? Are there still unassigned shards ?

2.6 Do a screenshot of indices monitoring, after the addition of 2 nodes and add it to your report

Do we really need replicas for bank – maybe we have another data source elsewhere ?

Let's move it down to 0 replicas.

Go to the console and execute this query :

```
PUT /bank/_settings
{
  "number_of_replicas": 0
}
```

Go back to Monitoring > Indices > Bank

2.7 Do a screenshot of the monitoring of the “bank” index, after reducing number of replica to 0 and add it to your report. What happened ?

We changed our mind, maybe we don't need high availability for the bank data, but we expect a lot of read operations, because all customers accessing their web bank portal will generate queries to the clusters to get current balance and so on. We want to leverage all the machines in the clusters, by making sure each node has a copy of the data. Let's increase replicas to 2 = Each primary will have 2 copies.

```
PUT /bank/_settings
{
  "number_of_replicas": 2
}
```

2.8 Do a screenshot of the monitoring of the “bank” index, after increasing number of replica to 2 and add it to your report. What happened ?

Move it back to the default :

```
PUT /bank/_settings
{
  "number_of_replicas": 1
}
```