INTRODUCTION TO ELASTIC CLOUD

Opensource software by definition earns no money for its creators, since it's free. The primary sponsor then hopes larger companies will sign up for the enterprise product, for which they charge money. That way the user gets offer support, consulting, and it unlocks different features.

For example, ElasticSearch is free, but with the enterprise edition you get machine learning and other features, for a free. Here we show you the Elastic Cloud, hosted version of ElasticSearch.

Opensource companies recently have begun to host clusters themselves. This make this cheaper for its users that buying the product outright. It lets users pay monthly instead of up front.

The CFO loves that, as the company can write off operating costs immediately instead of having to amortize them over time. That's a fancy way of saying they can reduce their taxes sooner than later.

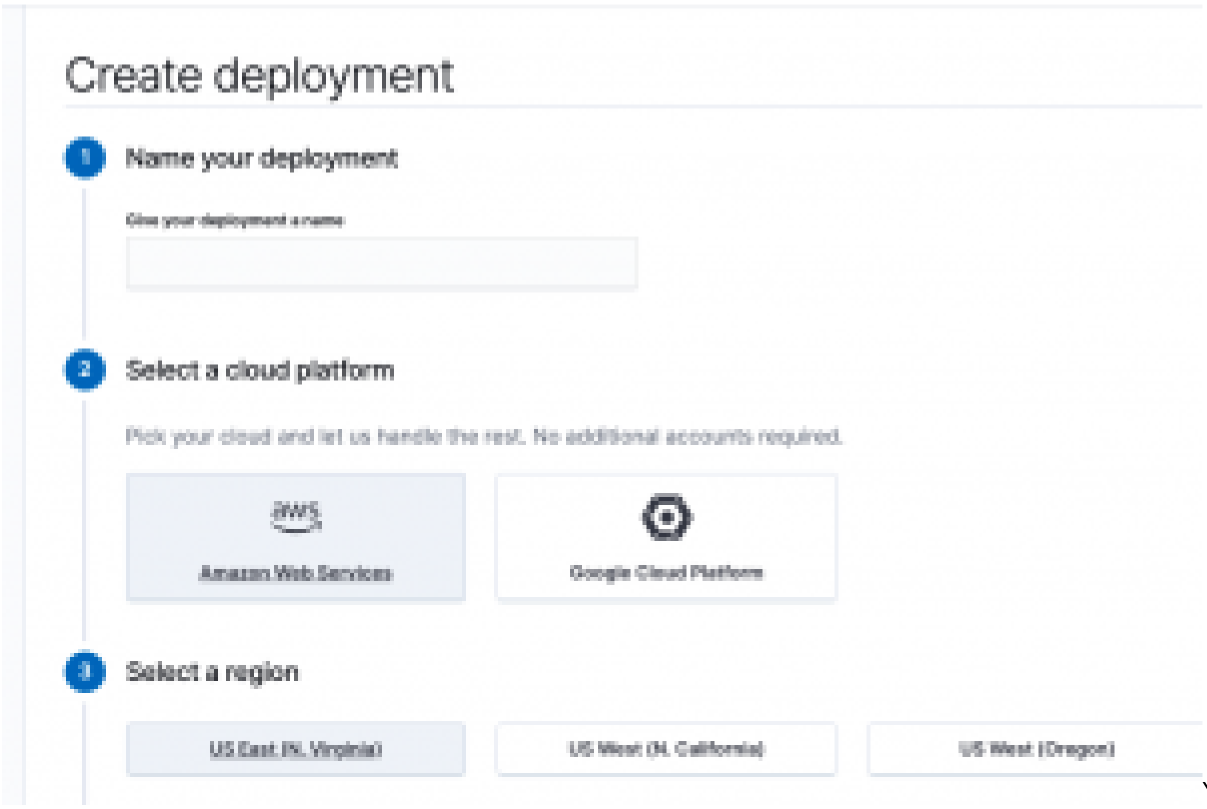
But for technical people like us, it makes the deployment and maintenance easier.

Here we discuss how ElasticSearch has done this with the Elastic Cloud. In short, the takeaway message is that you work with it the same as if you had installed it yourself. The only difference is you don't have ssh access to the instances. But you don't need that since you can use ssh from any other computer to get to those.

Getting Started

You can get a free 14 day Elastic Cloud trial at https://cloud.elastic.co/. It's easy to get started, you just create a Deployment and ElasticSearch installs a cluster for you at either Amazon AWS or the Google Cloud as the screen below shows.

The screen look familiar to those of you who have used AWS. It asks you for what region you want your servers and what size hardware, meaning EC2 template.



Create deployment

1 Name your deployment

Give your deployment a name

2 Select a cloud platform

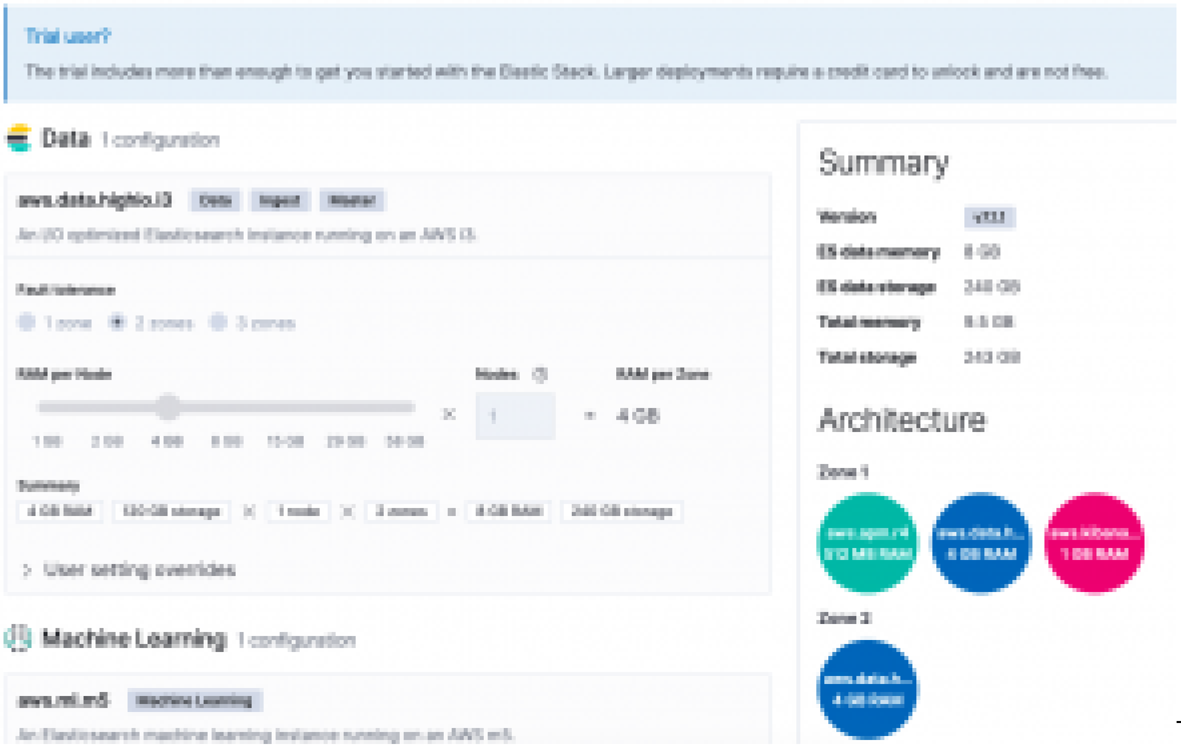
Pick your cloud and let us handle the rest. No additional accounts required.

Amazon Web Services | Google Cloud Platform

3 Select a region

US East (N. Virginia) | US West (N. California) | US West (Oregon)

You can select more memory, a necessity in any production use, storage and nodes on the customization screen. As you can see that is not possible with the trial version.



Trial user?

The trial includes more than enough to get you started with the Elastic Stack. Larger deployments require a credit card to unlock and are not free.

Data 1 configuration

aws.data.highio.i3 Data Ingest Master

An I/O optimized Elasticsearch instance running on an AWS i3.

Fault tolerance: 1 zone [✓ 2 zones] 3 zones

RAM per Node: 1 GB 2 GB 4 GB 8 GB 15 GB 29 GB 58 GB × Nodes 1 = RAM per Zone 4 GB

Summary: 4 GB RAM 120 GB storage × 1 node × 2 zones = 8 GB RAM 240 GB storage

User setting overrides

Machine Learning 1 configuration

aws.ml.m5 Machine Learning

An Elasticsearch machine learning instance running on an AWS m5.

Summary

Version	[illegible]
ES data memory	8 GB
ES data storage	240 GB
Total memory	9.5 GB
Total storage	243 GB

Architecture

Zone 1

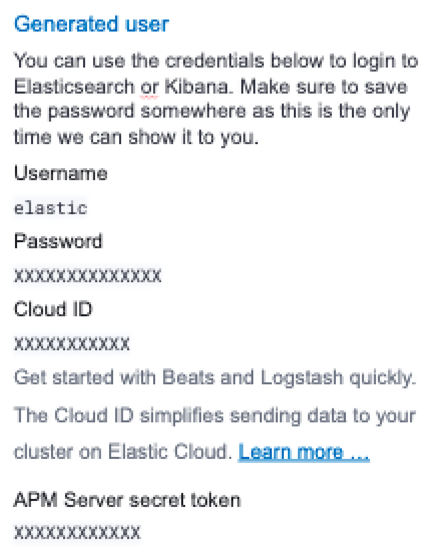
aws.apm.r4 512 MB RAM | aws.data.h... 8 GB RAM | aws.kibana... 1 GB RAM

Zone 2

aws.data.h... 4 GB RAM

Then it automatically rolls out a the ElasticSearch servers and the Kibana front end. It gives you an internet domain name so anyone in your organization can access it. It install the SSL certificates and adds a password.

Save your password:



Generated user

You can use the credentials below to login to Elasticsearch or Kibana. Make sure to save the password somewhere as this is the only time we can show it to you.

Username

elastic

Password

XXXXXXXXXXXXXX

Cloud ID

XXXXXXXXXXX

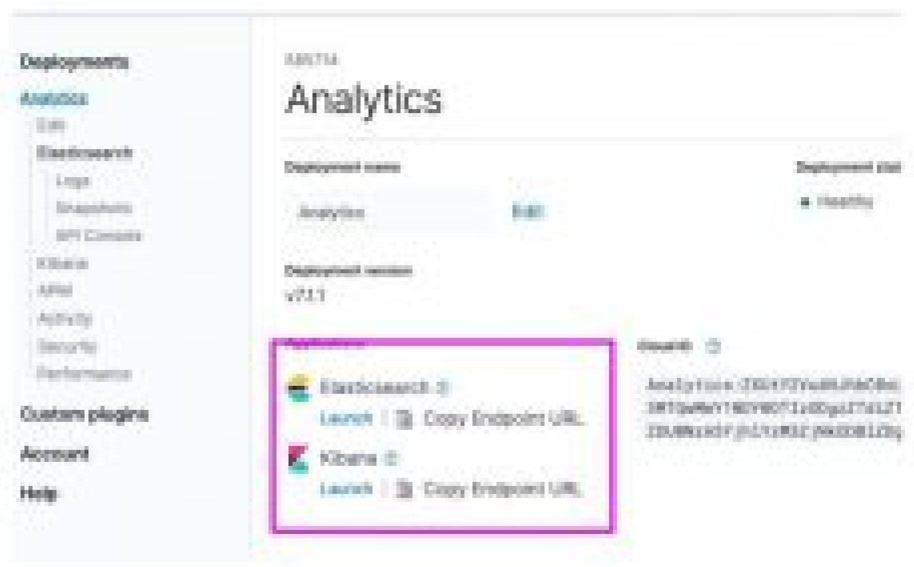
Get started with Beats and Logstash quickly.

The Cloud ID simplifies sending data to your cluster on Elastic Cloud. Learn more ...

APM Server secret token

XXXXXXXXXXXX

From the main screen, click **Copy Endpoint** it will give you the URL for your instance. For example, my URL is https://58571402f5464923883e7be42a037917.eu-central-1.aws.cloud.es.io:9243



Once you get a deployment (aka cluster) you can check its status with curl, if you are used to using the command line, as shown below.

First save pwd=**"userid:password"**, used for basic authentication, in an environment variable. Then run the curl:

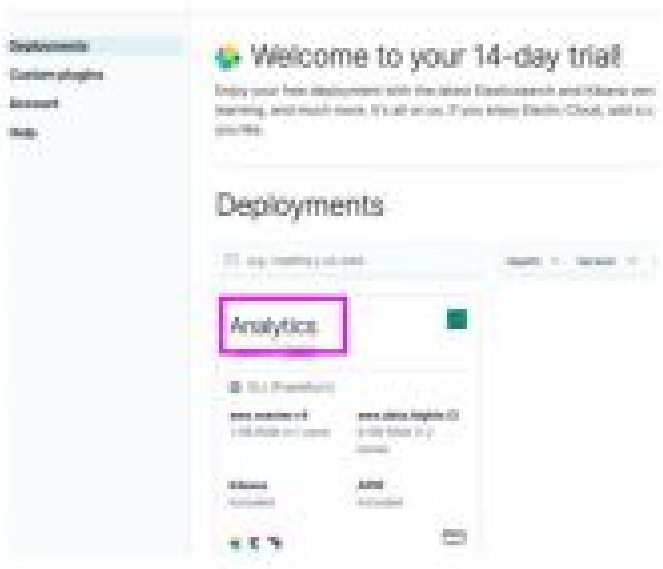
```
export pwd="elastic:"


curl --user $pwd  -H 'Content-Type: application/json' -XGET
https://58571402f5464923883e7be42a037917.eu-central-1.aws.cloud.es.io:9243/_c
luster/health?pretty
```

Here it shows all is good (green) and I that have 2 data nodes.

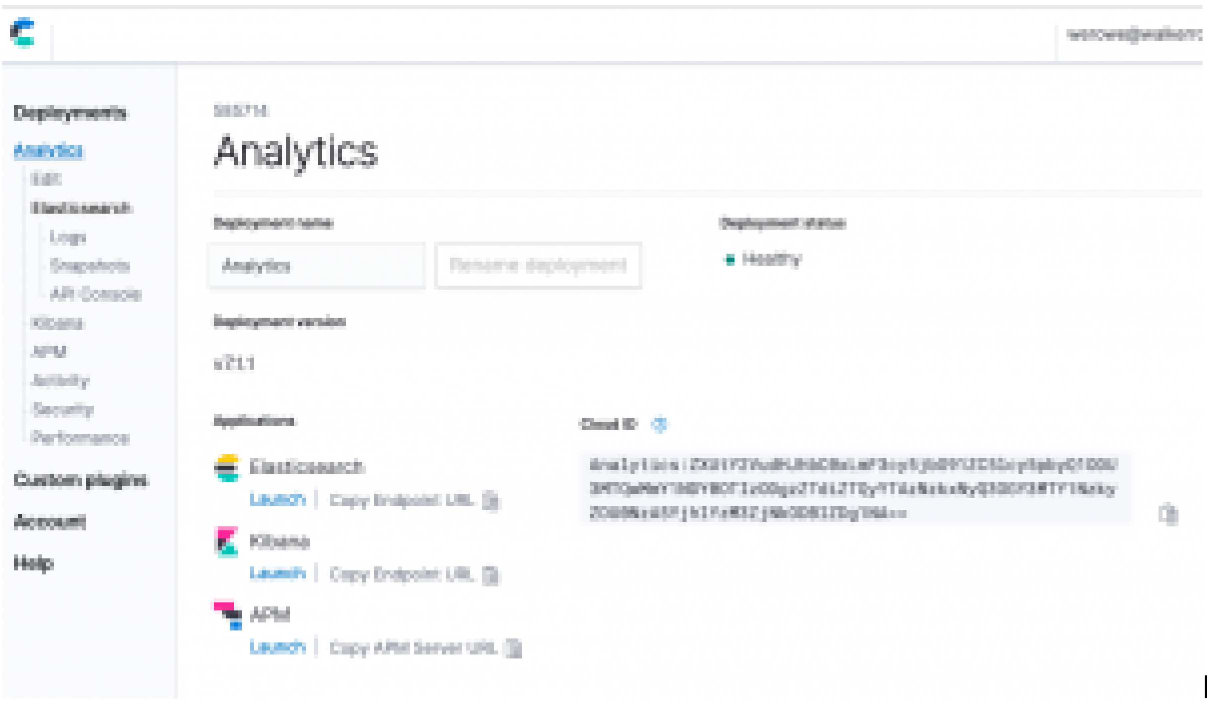
```
{
  "cluster_name" : "58571402f5464923883e7be42a037917",
  "status" : "green",
  "timed_out" : false,
  "number_of_nodes" : 3,
  "number_of_data_nodes" : 2,
  "active_primary_shards" : 6,
  "active_shards" : 12,
  "relocating_shards" : 0,
  "initializing_shards" : 0,
  "unassigned_shards" : 0,
  "delayed_unassigned_shards" : 0,
  "number_of_pending_tasks" : 0,
  "number_of_in_flight_fetch" : 0,
  "task_max_waiting_in_queue_millis" : 0,
  "active_shards_percent_as_number" : 100.0
}
```

And you can see the cluster status from the main screen https://cloud.elastic.co/deployments.

Click on the name you gave the deployment. Here I called mine **Analytics.**

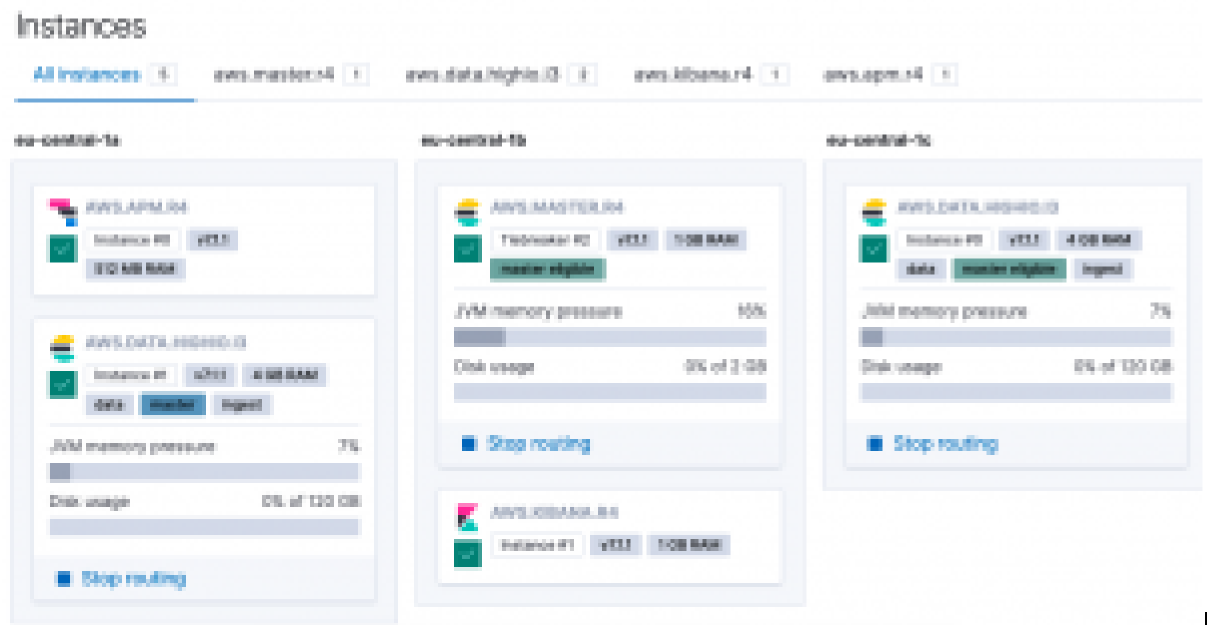


You can see that it has created ElasticSearch, Kibana, and APM, which is their monitoring tool.

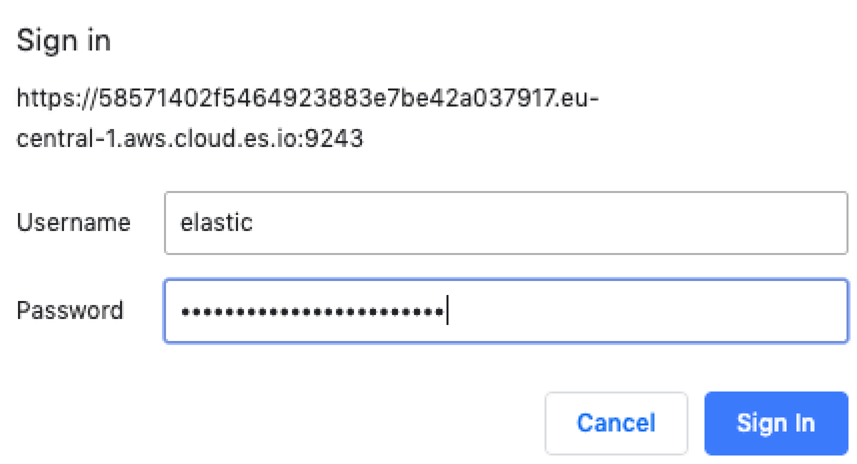


Here you can see that I have 5 VMs. Or they could be running in containers. I am not sure.

There's not a lot of memory on these nodes. Which, if you have worked with AWS before, makes sense as the larger the machine the higher the subscription fees.



If you click Launch ElasticSearch, it simply runs the curl command that gives you information about the instance. But basic authentication is turned on. So the nginx web server that serves as the front end will ask you to login:


Sign in

https://58571402f5464923883e7be42a037917.eu-central-1.aws.cloud.es.io:9243

Username elastic

Password ••••••••••••••••••••••••

Then in the browser it gives you the same data we extracted using curl above.

```
{
  "name" : "instance-0000000001",
  "cluster_name" : "58571402f5464923883e7be42a037917",
  "cluster_uuid" : "x4gHtdPbTiiFlcxWkjDJsQ",
  "version" : {
    "number" : "7.1.1",
    "build_flavor" : "default",
    "build_type" : "tar",
    "build_hash" : "7a013de",
    "build_date" : "2019-05-23T14:04:00.380842Z",
    "build_snapshot" : false,
    "lucene_version" : "8.0.0",
    "minimum_wire_compatibility_version" : "6.8.0",
    "minimum_index_compatibility_version" : "6.0.0-beta1"
  },
  "tagline" : "You Know, for Search"
}
```

Here is that curl again Notice what we have put the **userid:password** into the environment variable **pwd** to avoid having to type that each time.

```
export pwd="elastic:"

curl --user $pwd
https://58571402f5464923883e7be42a037917.eu-central-1.aws.cloud.es.io:9243/
```

Look Some (a lot of Data) Into the Environment
Now, let's stress this environment and show you how to use it by loading it with the extremely large FDA (American Food and Drug Administration) data on drug reactions. Will we use this later to build a machine learning model to try to prective the side effects of a particular drug.

```
wget
https://download.open.fda.gov/drug/event/all_other/drug-event-0004-of-0004.js
```

```
on.zip

unzip drug-event-0004-of-0004.json.zip
```

There are 4 datasets you can download. As you can see it is quite large > 1 GB when unzipped. And this is just JSON text.

1. -rwxrwxrwx 1 ubuntu ubuntu 33M Jun 4 10:51 drug-event-0001-of-0004.json
2. -rwxrwxrwx 1 ubuntu ubuntu 79M Jun 5 10:51 drug-event-0002-of-0004.json
3. -rwxrwxrwx 1 ubuntu ubuntu 211M Jun 5 10:52 drug-event-0003-of-0004.json
4. -rwxrwxrwx 1 ubuntu ubuntu 637M Jun 4 10:52 drug-event-0004-of-0004.json

We can try to use the bulk loader against this data. But ES complains, saying the JSON file is malformed. Plus files 3 and 4 are larger than 100 MB, which is the maximum size the ES bulk loader will handle:

```
curl --user $pwd  -H 'Content-Type: application/x-ndjson' -XPOST
'https://58571402f5464923883e7be42a037917.eu-central-1.aws.cloud.es.io:9243/0
/_bulk?pretty' --data-binary @drug-event-0004-of-0004.json
```

It will give this error:

```
{
  "error" : {
    "root_cause" : )\n at "
      }
    ],
```

Load the Data Using Python

So we can load it the slow way by running this python code below. This program will run slow because it connects to the API one time for each JSON record. It will take days to load it into this instance. But we can load enough of it in a few hours to run some analytics against it, which we will illustrate in subsequent posts.

Change the open statement to pick up the name of the file you downloaded:

```
open('drug-event-0004-of-0004.json')
```

And the URL of your instance. Keep **/fda/_doc** on the end, as **fda** is the instance we will use and **/fda/_doc** is the index type.

```
url =
"https://58571402f5464923883e7be42a037917.eu-central-1.aws.cloud.es.io:9243/f
da/_doc/"
```

Here is the code:

```
import json
import requests
import uuid

def fdict(d):
    ky =

    headers = { 'content-type': 'application/json' }

    url =
"https://58571402f5464923883e7be42a037917.eu-central-1.aws.cloud.es.io:9243/f
da/_doc/"

    data={}
    for i in ky:
        data = d

    response = requests.put(url + str(uuid.uuid4()) , headers=headers,
json=data, auth=('elastic', '
```

You can list some of the data like this:

```
curl --user $pwd  -H 'Content-Type: application/json' -XGET
https://58571402f5464923883e7be42a037917.eu-central-1.aws.cloud.es.io:9243/fd
a/?pretty
```

And list all indices in this cluster to get the document count:

```
curl --user $pwd  -XGET
https://58571402f5464923883e7be42a037917.eu-central-1.aws.cloud.es.io:9243/_c
at/indices?v
```

As you can see, the data is large. 47,939 documents is 1.9 GB of storage.

```
health status index        uuid                   pri rep docs.count
docs.deleted store.size pri.store.size
green  open   fda     DRQnRqnmQsaRcsxHVIT1pg   1   1      47939            0
1.9gb       1003.6mb
```

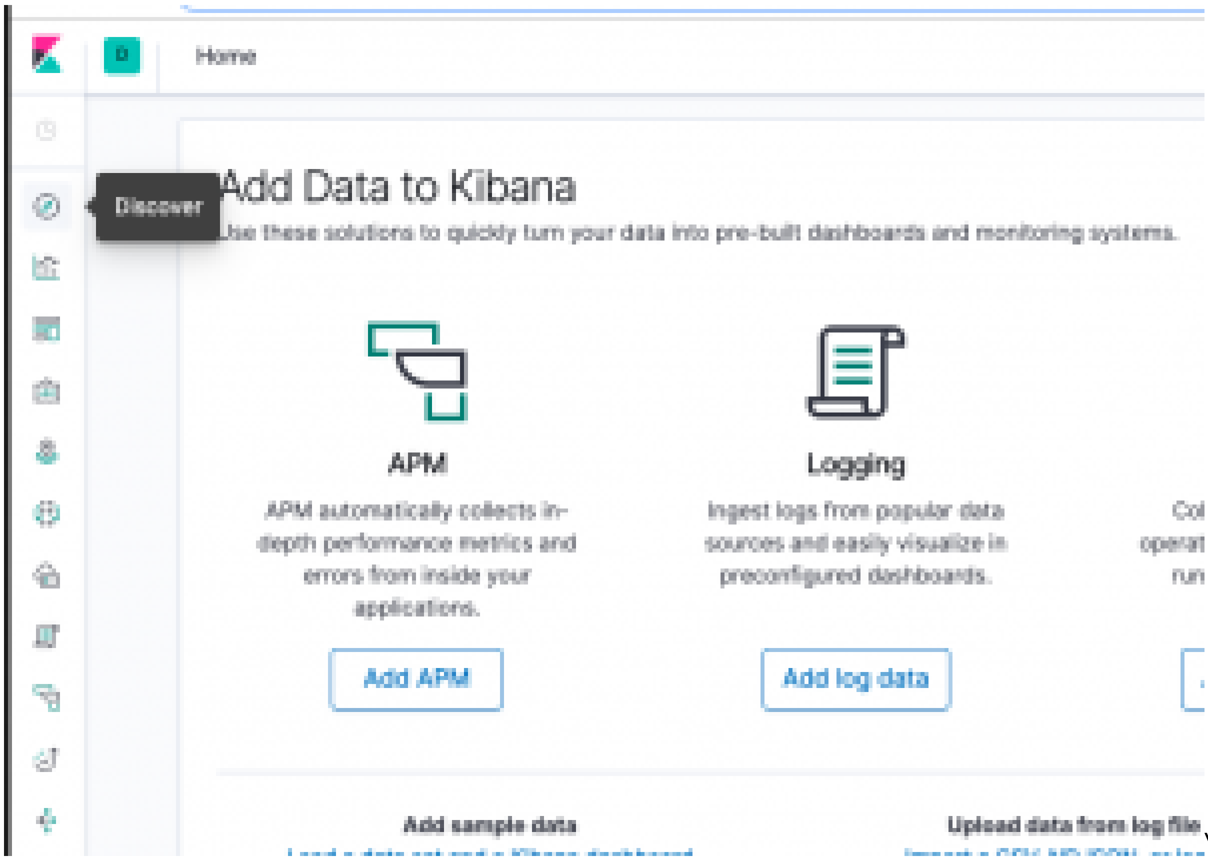
Kibana

Now let's look at the same data with Kibana. Click on the Kibana link from the main screen. In our case it is https://78f7165792d54709b8ec37f3d80ed854.eu-central-1.aws.cloud.es.io:9243/app/kibana

If you're new to Kibana you have to create an **Index Pattern** before you look at any of the data. which you will do using the Discover screen.

The Index Pattern is the name of the index, in this case **fda**, or a wildcard that matches the index name, like **fda***.

You click the **discover** button in Kibana to see this.

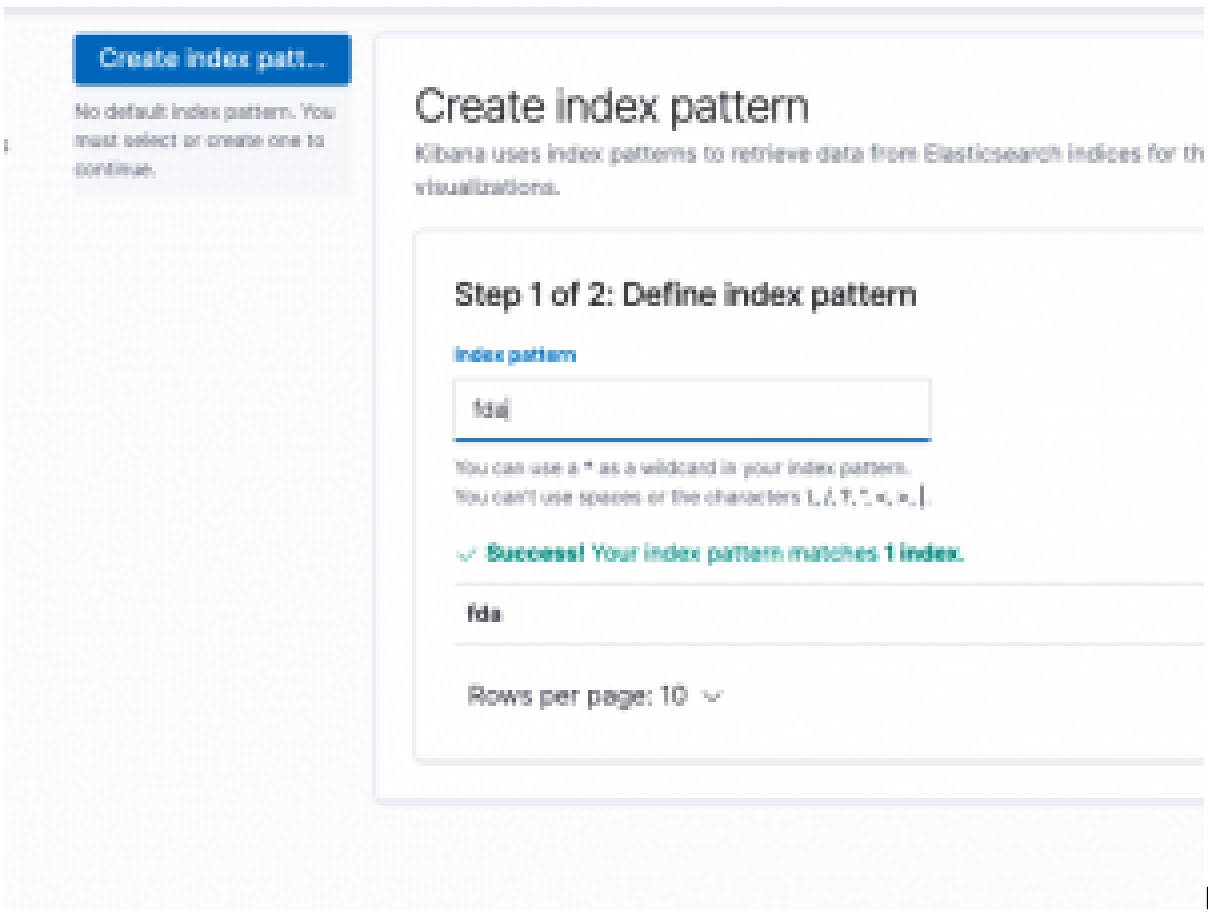


Use these solutions to quickly turn your data into pre-built dashboards and monitoring systems.

APM automatically collects in-depth performance metrics and errors from inside your applications.

Ingest logs from popular data sources and easily visualize in preconfigured dashboards.

When you first open Kibana you create the first Index Pattern. ElasticSearch will parse the JSON documents it finds there and show you the schema it found. The schema is the Index Pattern.



No default index pattern. You must select or create one to continue.

Kibana uses index patterns to retrieve data from Elasticsearch indices for th visualizations.

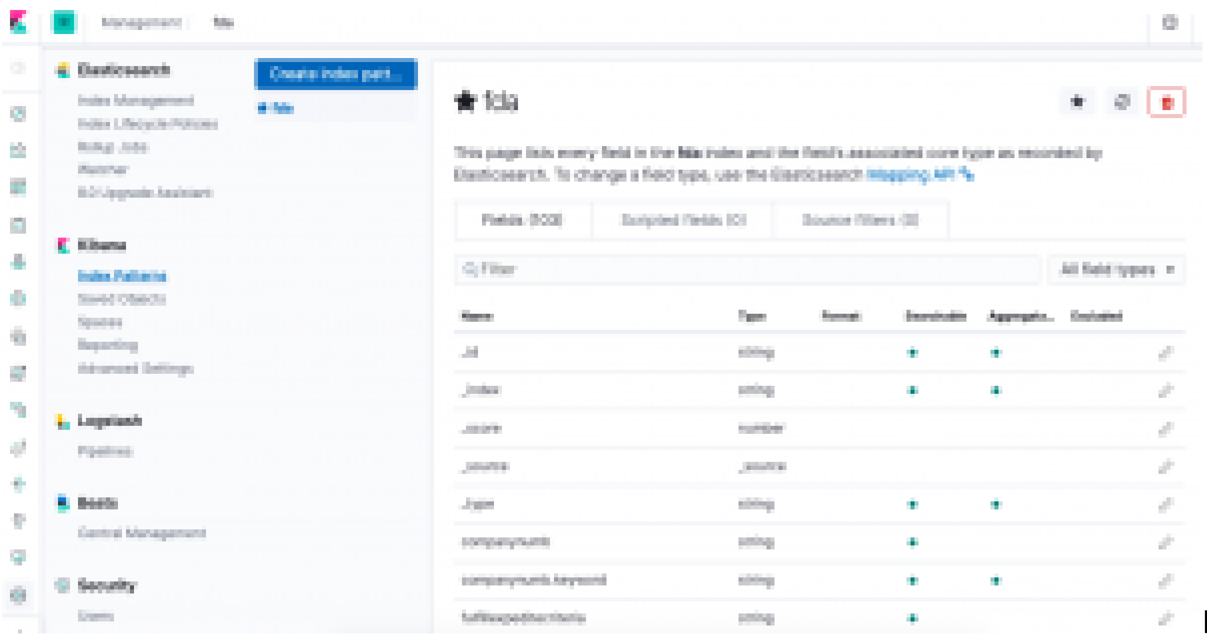
Index pattern: fda|

You can use a * as a wildcard in your index pattern.
You can't use spaces or the characters \, /, ?, ", <, >, |.

✓ Success! Your index pattern matches 1 index.

fda

Kibana will churn for a few seconds and then show you the fields it has auto discovered.

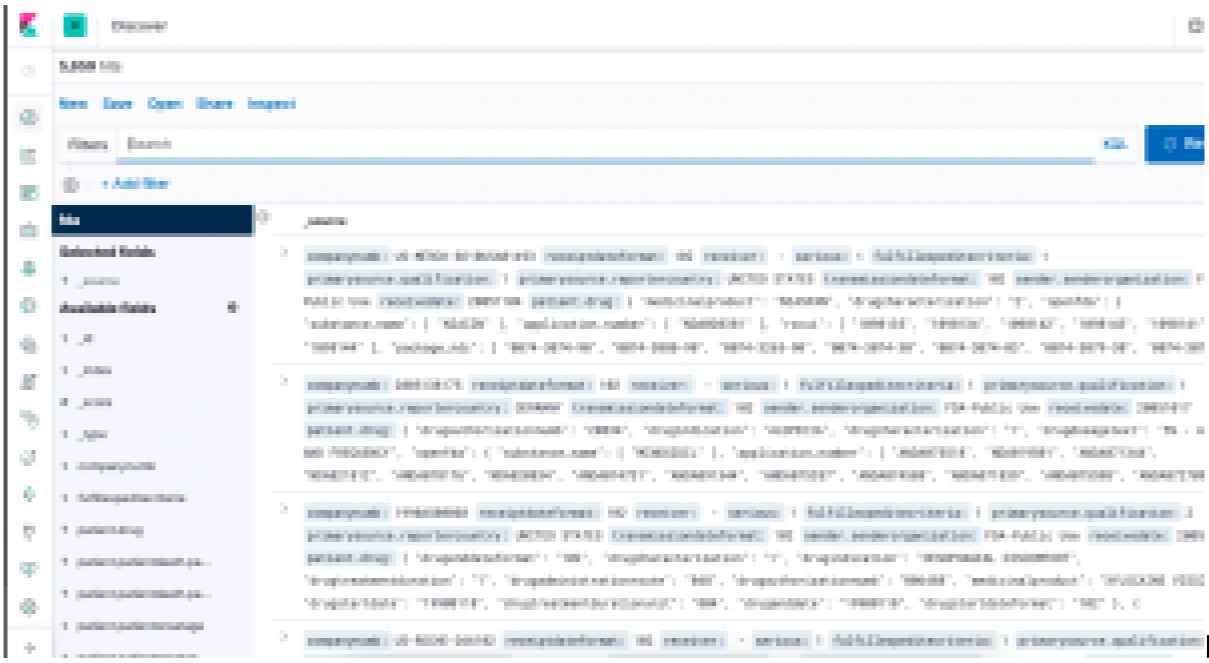


fda

This page lists every field in the fda index and the field's associated core type as recorded by Elasticsearch. To change a field type, use the Elasticsearch mapping API

Name	Type	Format	Searchable	Aggregata...	Excluded
_id	string		●	●	
_index	string		●	●	
_score	number				
_source	_source				
_type	string		●	●	
companynumb	string		●		
companynumb.keyword	string		●	●	
fulfillexpeditecriteria	string		●		

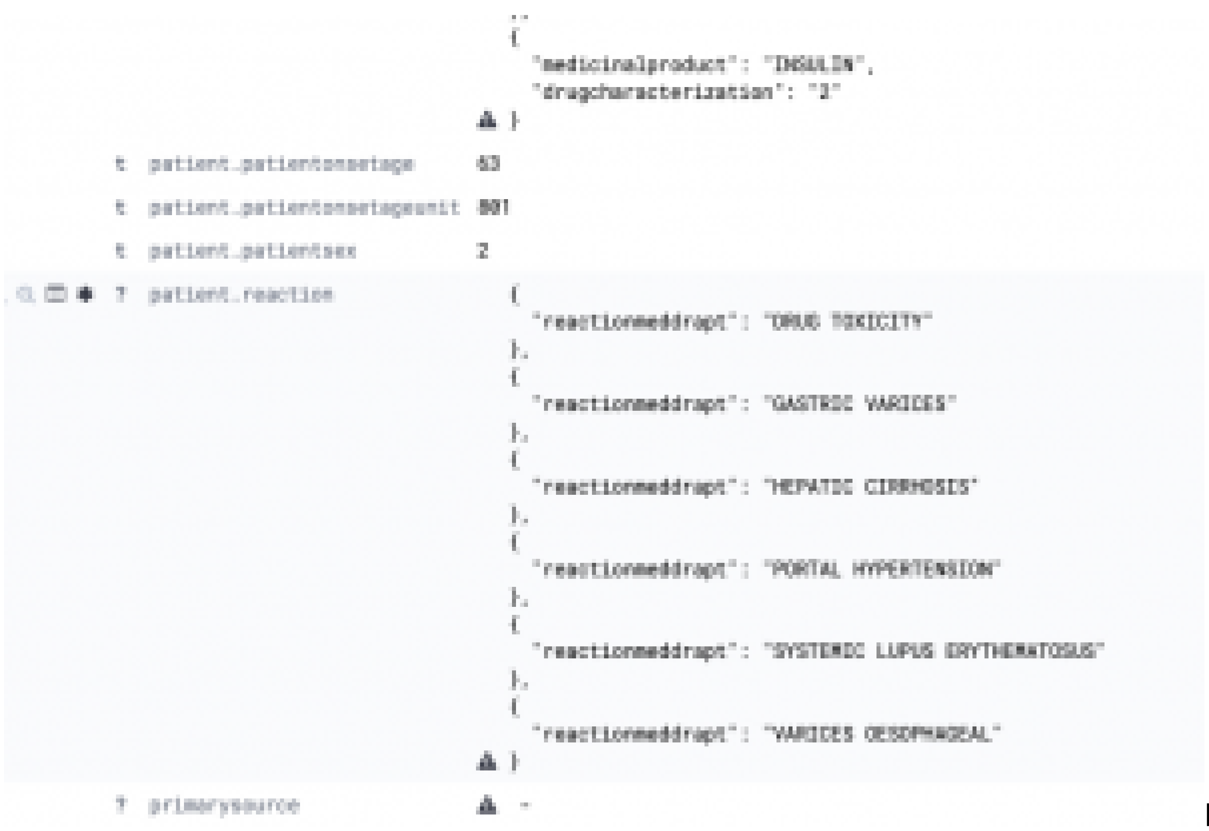
Below it shows the first few records. Below we click on one record to expand it.



Discover

[illegible]

Each JSON record from the FDA is enormous. A small part looks like this:



```
                                        ..
                                        {
                                          "medicinalproduct": "INSULIN",
                                          "drugcharacterization": "2"
                                        }
t  patient.patientonsetage        63
t  patient.patientonsetageunit    801
t  patient.patientsex             2
?  patient.reaction               {
                                          "reactionmeddrapt": "DRUG TOXICITY"
                                        },
                                        {
                                          "reactionmeddrapt": "GASTRIC VARICES"
                                        },
                                        {
                                          "reactionmeddrapt": "HEPATIC CIRRHOSIS"
                                        },
                                        {
                                          "reactionmeddrapt": "PORTAL HYPERTENSION"
                                        },
                                        {
                                          "reactionmeddrapt": "SYSTEMIC LUPUS ERYTHEMATOSUS"
                                        },
                                        {
                                          "reactionmeddrapt": "VARICES OESOPHAGEAL"
                                        }
?  primarysource                  -
```

From here you could connect logstash to it, to ingest some application or hardware logs. We will explain that and how to use analytics in subsequent posts.