Kibana Setup Document

Introduction:

Kibana is an open source data visualization plugin for Elastic-search. It provides visualization capabilities on top of the content indexed on an Elastic-search cluster. Users can create bar, line and scatter plots, or pie charts and maps on top of large volumes of data

Hardware Requirement

RAM	4 GB
Operating System	Ubuntu 18.04(64 bit),16.04, and Centos 7
CPU	2 core
DISK	SSD

Step1: Installation Dependency

(java 8 is required)
Java is required for the Elastic stack deployment. Elasticsearch requires Java 8. It is recommended to use the Oracle JDK 1.8

Install java using following command

```
sudo apt install openjdk-8-jre
```

Install apt repository

```
sudo apt-get install apt-transport-https
```

Install apache2 or Nginx server for ssl setup

```
sudo apt-get install apache2 or sudo apt-get install nginx
```

Install common packages

```
sudo apt-get install curl zip wget
```

Install mysql driver and server

```
sudo apt-get install mysql-client mysql-server
```

Step2: Install and configure Elastic-search

Elasticsearch is an open source search engine based on Lucene, developed in java. It provides a distributed and multi tenant full-text search engine with an HTTP Dashboard web-interface (Kibana) and JSON documents scheme. Elastic-search is a scalable search engine that can be used to search for all types of documents, including log file. Elastic-search is the heart of the 'Elastic Stack' or ELK Stack.

In this step, we will install and configure Elasticsearch. Install Elasticsearch from the elastic repository and configure it to run on the localhost IP.

1. Before installing Elasticsearch, add the elastic repository key to the serve

```
wget -qO - https://artifacts.elastic.co/GPG-KEY-elasticsearch | sudo apt-key add -
```

2. Save the repository definition to /etc/apt/sources.list.d/elastic-7.x.list:

```
echo "deb https://artifacts.elastic.co/packages/7.x/apt stable main" | sudo tee -a /etc/apt/sources.list.d/elastic-7.x.list
```

3. Install the Elasticsearch Debian package with:

```
sudo apt-get update && sudo apt-get install elasticsearch
```

4. Once Elasticsearch is finished installing, use your preferred text editor to edit Elasticsearch's main configuration file, elasticsearch.yml.
Here, we'll use nano:

```
sudo nano /etc/elasticsearch/elasticsearch.yml
```

Note: Elasticsearch's configuration file is in YAML format, which means that indentation is very important! Be sure that you do not add any extra spaces as you edit this file.

Elasticsearch listens for traffic from everywhere on port 9200.

Edit elasticsearch.yml file which is located at /etc/elasticsearch/elasticsearch.yml

```
network.host: localhost or IP
```

Save and close elasticsearch.yml by pressing CTRL+X, followed by Y and then ENTER if you're using nano. Then, start the Elasticsearch service with systemctl.

```
sudo systemctl start elasticsearch
```

Next, run the following command to enable Elasticsearch to start up every time your server boots:

```
sudo systemctl enable elasticsearch
```

You can test whether your Elasticsearch service is running by sending an HTTP request:

```
curl -X GET "localhost:9200" or curl -X GET "your_server_ip:9200"
```

Step3 : Installing and Configuring the Kibana Dashboard

Kibana is a data visualization interface for Elasticsearch. Kibana provides a pretty dashboard (web interfaces), it allows you to manage and visualize all data from Elasticsearch on your own. It's not just beautiful, but also powerful.

In this step, we will install and configure Kibana

Install Kibana with this apt command:

```
sudo apt-get install -y kibana
```

Now edit the kibana.yml configuration file.

```
nano /etc/kibana/kibana.yml
```

Uncomment the server.port, server.hos and elasticsearch.url lines.

```
server.port: 5601
server.host: "localhost"
elasticsearch.url: "http://localhost:9200" or ip:9200
```

Save the file and exit vim.

```
sudo systemctl enable kibana
sudo systemctl start kibana
```

Kibana will run on port 5601 as node application.

Step4: Installing and Configuring the Logstash

In this step, we will install and configure Logsatash to centralize server logs from client sources with filebeat, then filter and transform all data (Syslog) and transport it to the stash (Elasticsearch).

Install logstash using following command

```
sudo apt-get install -y logstash
```

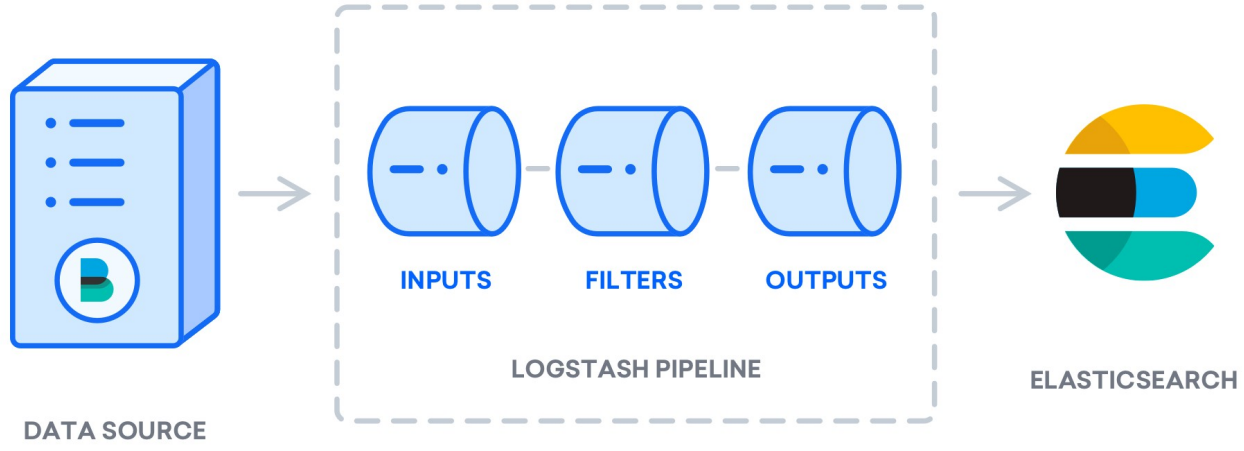
Configure /etc/logstash/logstash.yml file

Open this file and find http.host

update with your IP

http.host : 127.0.0.1 # server_ip

Pictorial representation of logstash



Logstash configuration files are in the JSON-format, and reside in **/etc/logstash/conf.d.** The configuration consists of three sections:

- input.conf
- filter.conf
- output.conf

configuration file looks like as followed

Input configuration:

```
input {
  beats {
    port => 5044
  }
}
```

Filter Configuration:

This filter is used to parse incoming system logs to make them structured and usable by the predefined Kibana dashboards

```
filter {

  if [fileset][module] == "system" {
    if [fileset][name] == "auth" {
      grok {
        match => { "message" => ["%{SYSLOGTIMESTAMP:[system][auth][timestamp]} %{SYSLOGHOST:[system][auth][hostname]} sshd(?:\[%{POSINT:[system][auth][pid]}\])?: %{DATA:[system][auth][ssh][event]} %{DATA:[system][auth][ssh][method]} for (invalid user )?%{DATA:[system][auth][user]} from %{IPORHOST:[system][auth][ssh][ip]} port %{NUMBER:[system][auth][ssh][port]} ssh2(: %{GREEDYDATA:[system][auth][ssh][signature]})?",
                "%{SYSLOGTIMESTAMP:[system][auth][timestamp]} %{SYSLOGHOST:[system][auth][hostname]} sshd(?:\[%{POSINT:[system][auth][pid]}\])?: %{DATA:[system][auth][ssh][event]} user %{DATA:[system][auth][user]} from %{IPORHOST:[system][auth][ssh][ip]}",
                "%{SYSLOGTIMESTAMP:[system][auth][timestamp]} %{SYSLOGHOST:[system][auth][hostname]} sshd(?:\[%{POSINT:[system][auth][pid]}\])?: Did not receive identification string from %{IPORHOST:[system][auth][ssh][dropped_ip]}",
                "%{SYSLOGTIMESTAMP:[system][auth][timestamp]} %{SYSLOGHOST:[system][auth][hostname]} sudo(?:\[%{POSINT:[system][auth][pid]}\])?: \s*%{DATA:[system][auth][user]} :( %{DATA:[system][auth][sudo][error]} ;)? TTY=%{DATA:[system][auth][sudo][tty]} ; PWD=%{DATA:[system][auth][sudo][pwd]} ; USER=%{DATA:[system][auth][sudo][user]} ; COMMAND=%{GREEDYDATA:[system][auth][sudo][command]}",
                "%{SYSLOGTIMESTAMP:[system][auth][timestamp]} %{SYSLOGHOST:[system][auth][hostname]} groupadd(?:\[%{POSINT:[system][auth][pid]}\])?: new group: name=%{DATA:system.auth.groupadd.name}, GID=%{NUMBER:system.auth.groupadd.gid}",
                "%{SYSLOGTIMESTAMP:[system][auth][timestamp]} %{SYSLOGHOST:[system][auth][hostname]} useradd(?:\[%{POSINT:[system][auth][pid]}\])?: new user: name=%{DATA:[system][auth][user][add][name]}, UID=%{NUMBER:[system][auth][user][add][uid]}, GID=%{NUMBER:[system][auth][user][add][gid]}, home=%{DATA:[system][auth][user][add][home]}, shell=%{DATA:[system][auth][user][add][shell]}$",
                "%{SYSLOGTIMESTAMP:[system][auth][timestamp]} %{SYSLOGHOST:[system][auth][hostname]} %{DATA:[system][auth][program]}(?:\[%{POSINT:[system][auth][pid]}\])?: %{GREEDYMULTILINE:[system][auth][message]}"] }
        pattern_definitions => {
          "GREEDYMULTILINE"=> "(.|\n)*"
        }
```

```
      remove_field => "message"
    }
    date {
      match => [ "[system][auth][timestamp]", "MMM  d HH:mm:ss", "MMM dd HH:mm:ss" ]
    }
    geoip {
      source => "[system][auth][ssh][ip]"
      target => "[system][auth][ssh][geoip]"
    }
  }
  else if [fileset][name] == "syslog" {
    grok {
      match => { "message" => ["%{SYSLOGTIMESTAMP:[system][syslog][timestamp]} %
{SYSLOGHOST:[system][syslog][hostname]} %{DATA:[system][syslog][program]}(?:\[%
{POSINT:[system][syslog][pid]}\])?: %{GREEDYMULTILINE:[system][syslog][message]}"] }
      pattern_definitions => { "GREEDYMULTILINE" => "(.|\n)*" }
      remove_field => "message"
    }
    date {
      match => [ "[system][syslog][timestamp]", "MMM  d HH:mm:ss", "MMM dd HH:mm:ss" ]
    }
  }
 }
}
```

Output Configuration:

Output configuration. Essentially, this output configures Logstash to store the Beats data in Elasticsearch, which is running at localhost:9200, in an index named after the Beat used

- output.conf

```
output {
        elasticsearch {
                hosts => ["localhost:9200"]
                manage_template => false
                index => "%{[@metadata][beat]}-%{[@metadata][version]}-%
{+YYYY.MM.dd}"
        }
}
```

Test Logstash configuration with this command:

```
sudo -u logstash /usr/share/logstash/bin/logstash --path.settings /etc/logstash -t
```

output will be Configuration OK

If your configuration test is successful, start and enable Logstash to put the configuration changes into effect:

```
sudo systemctl start logstash
sudo systemctl enable logstash
```

Step4: Installing and Configuring Filebeat

The Elastic Stack uses several lightweight data shippers called Beats to collect data from various sources and transport them to Logstash or Elasticsearch

Filebeat: collects and ships log files.

Install Filebeat using following command:

```
sudo apt install filebeat
```

Configure Filebeat to connect to Logstash. Open the Filebeat configuration file:

```
sudo nano /etc/filebeat/filebeat.yml
```

comment out the following lines by preceding them with a #;

```
...
 #output.elasticsearch:
  # Array of hosts to connect to.
        #hosts: ["localhost:9200"]
...
```

Uncomment the lines output.logstash: and hosts: ["localhost:5044"] by removing the #

```
output.logstash:
        hosts: ["localhost:5044"]
```

Let's enable it:

```
sudo filebeat modules enable system
```

You can see a list of enabled and disabled module:

```
sudo filebeat modules enable system
```

To load the template, use the following command:

```
sudo filebeat setup --template -E output.logstash.enabled=false -E
'output.elasticsearch.hosts=["localhost:9200"]'
```

Output
Loaded index template

Now you can start and enable Filebeat:

```
sudo systemctl start filebeat
sudo systemctl enable filebeat
```

To verify that Elasticsearch is indeed receiving this data, query the Filebeat index with this command:

```
curl -XGET 'http://localhost:9200/filebeat-*/_search?pretty'
```

Step5 : Sync and configure Mysql with logstash

Create mysql.conf file inside *etc*/logstash/mysql.conf

Insert following code:

Note : download location : https://dev.mysql.com/downloads/connector/j/

/usr/share/java/mysql-connector-java-8.0.16.jar → this represent path of jdbc file
jdbc:mysql://localhost:3306/kibana → here kibana is database name

```
input {
jdbc {
 jdbc_driver_library => "/usr/share/java/mysql-connector-java-8.0.16.jar"
    jdbc_driver_class => "com.mysql.jdbc.Driver"
    jdbc_connection_string => "jdbc:mysql://localhost:3306/kibana"
    jdbc_user => "root"
    jdbc_password => "password"
    statement => "SELECT * from kibana"
        jdbc_validate_connection => true
        tracking_column => "id"
        use_column_value => true
        tracking_column_type => "numeric"
        clean_run => true
        jdbc_pool_timeout => 10
        jdbc_paging_enabled => true
        jdbc_page_size => 10000
        }
}
output{
        elasticsearch {
        hosts => ["localhost:9200"]
        index => "kibana_dashboard" // name of index
        user => "elastic"
          password => "password"
}
 stdout { codec => rubydebug { metadata => true } }
   # stdout { codec => dots }
}
```

Finally, you can run logstash command which will pull all mysql data and create index for you to create custom kibana dashboard.

Command to run logstash :

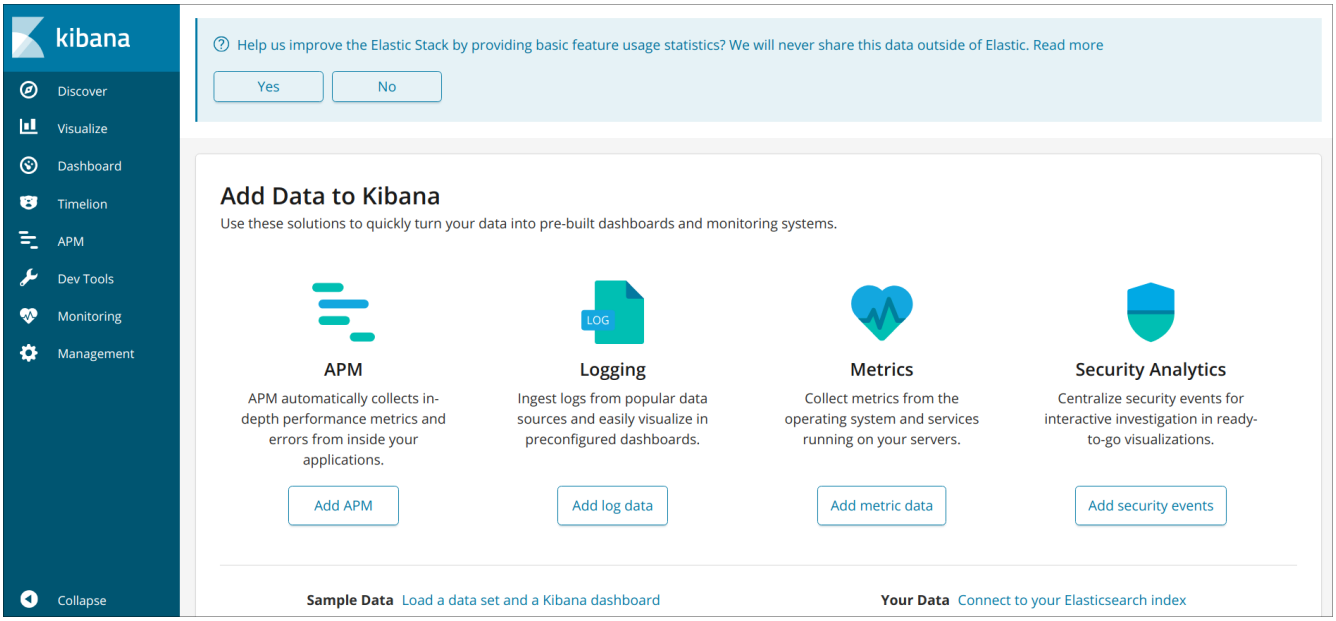
```
/usr/share/logstash/bin/logstash -f /etc/logstash/mysql.conf
```

Above command will create log file of mysql data.

Kibana is all set now. You can browse kibana dashboard using url :

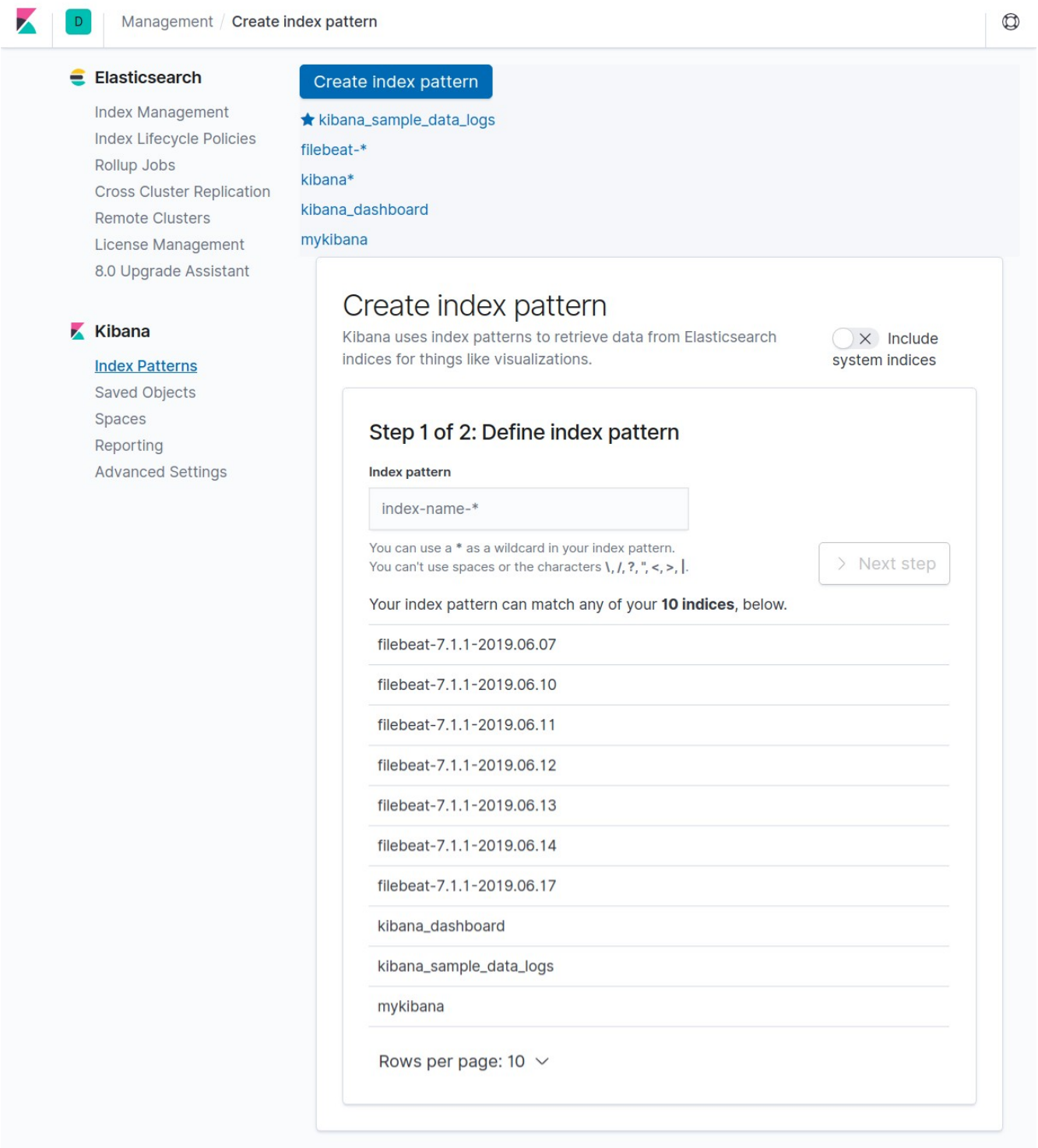
localhost:5601 or server_ip:5601

Exploring Kibana Dashboards



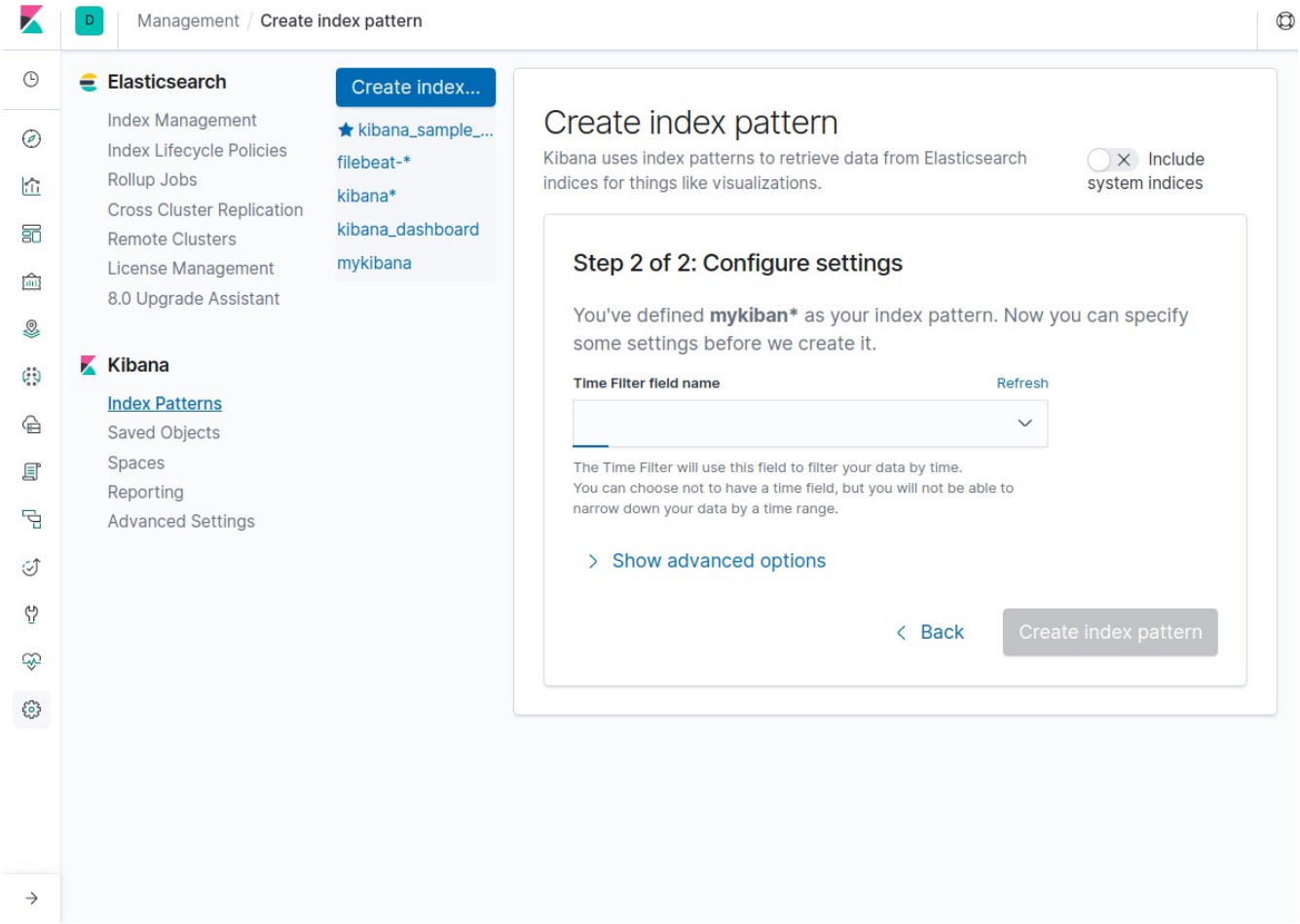
Go to management menu → index patter → create index pattern

Following page will be appear

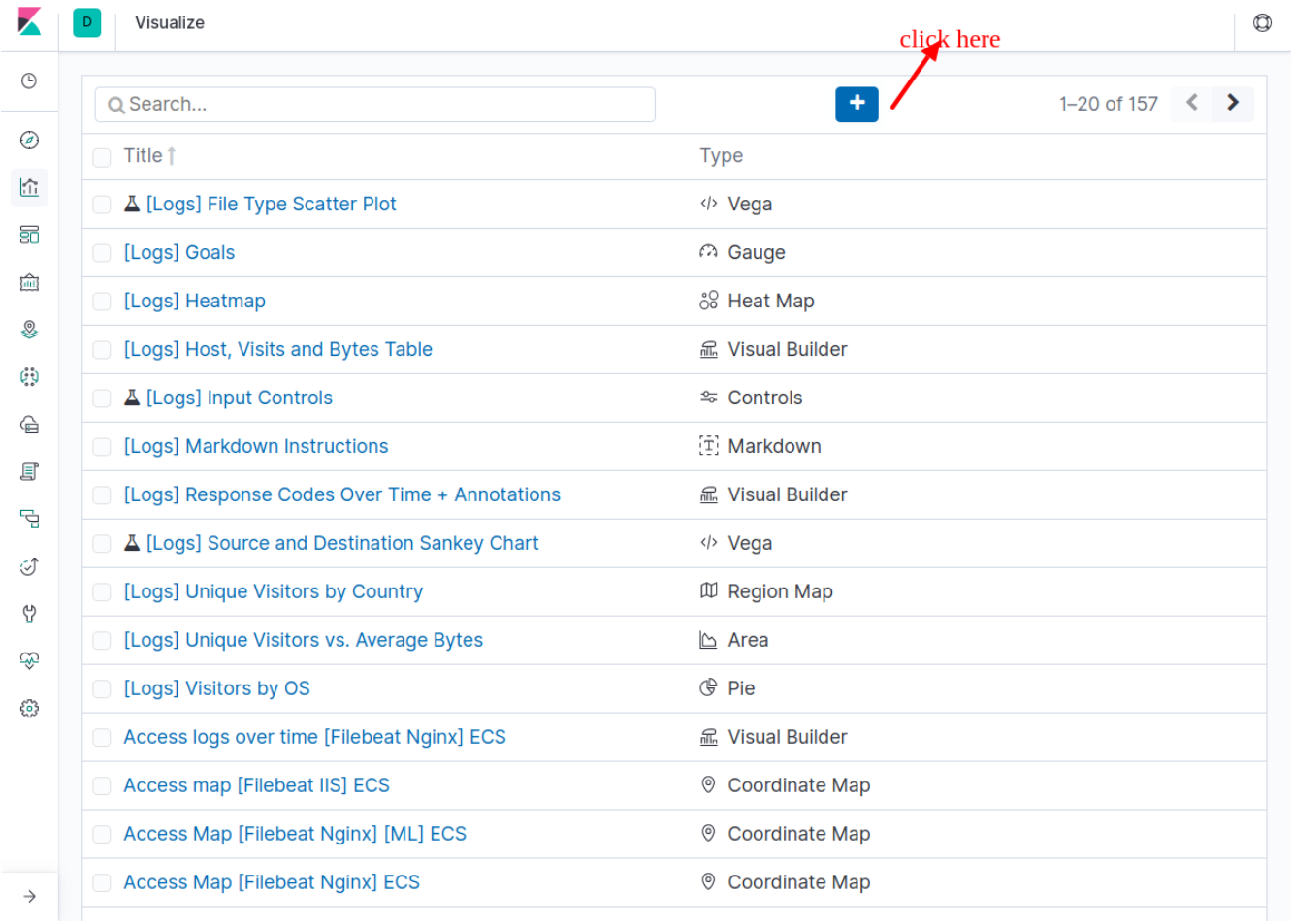


Search your index and click on next

Configure filter and click on create Index Pattern

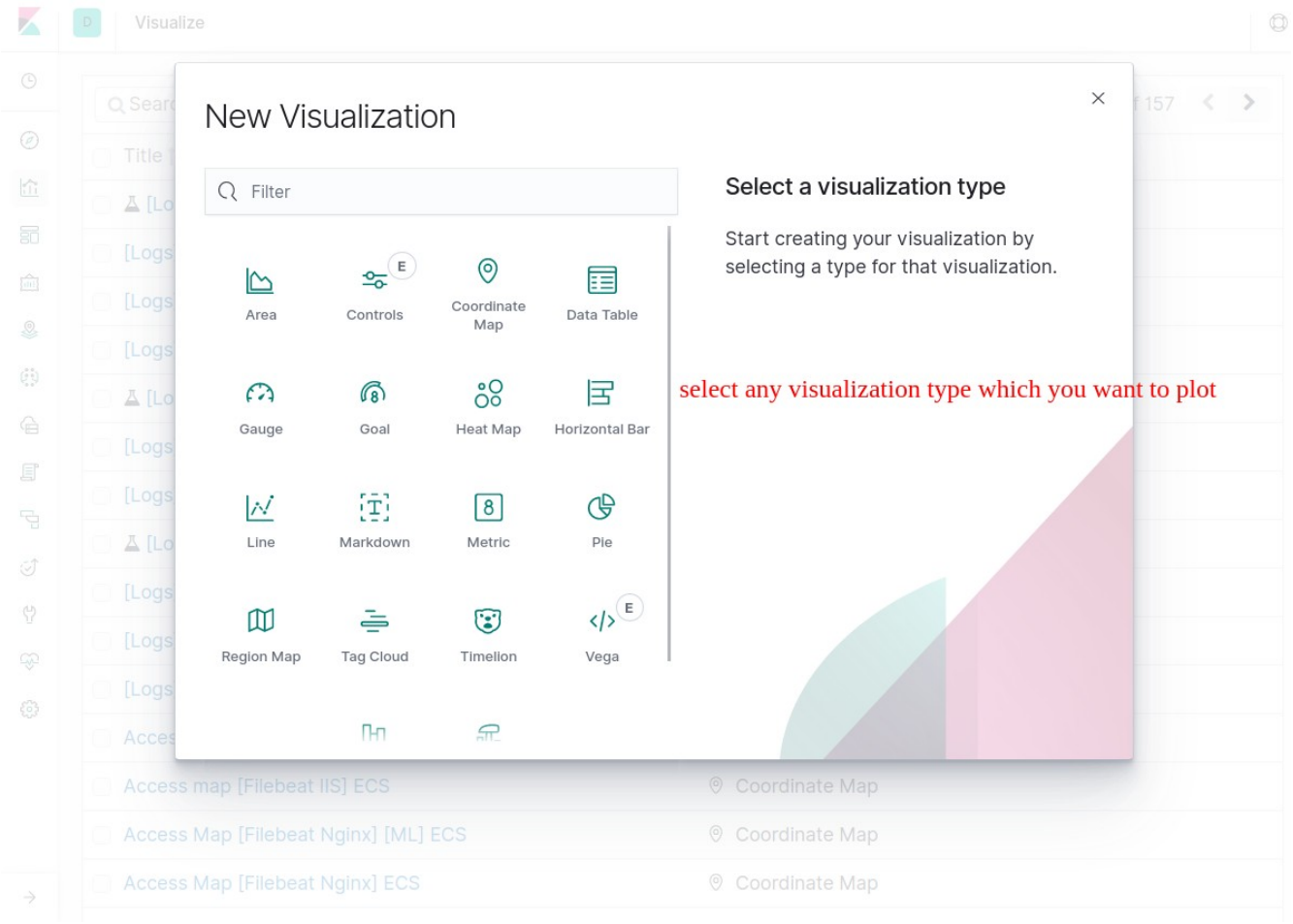


Now Click on Visualization menu

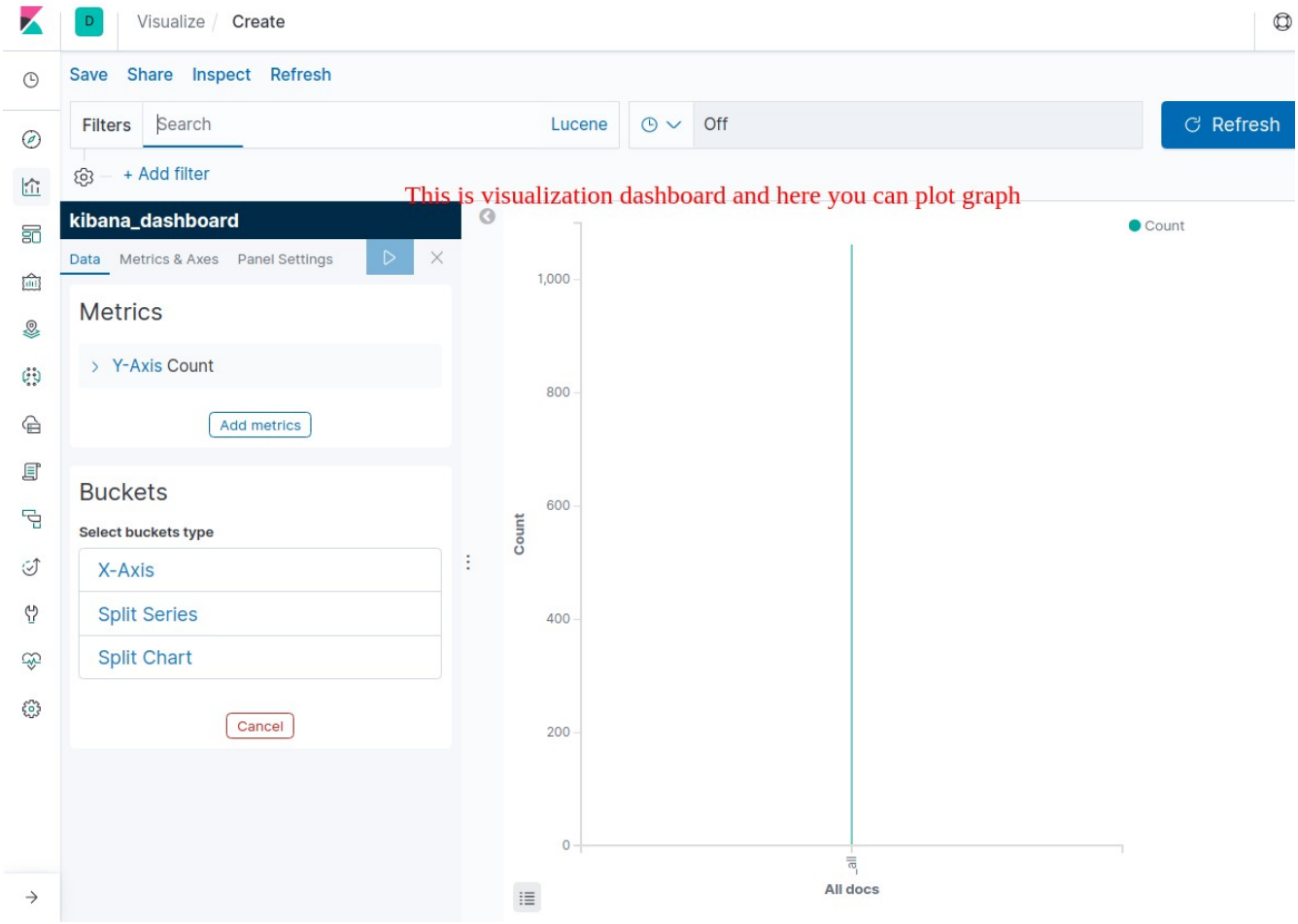


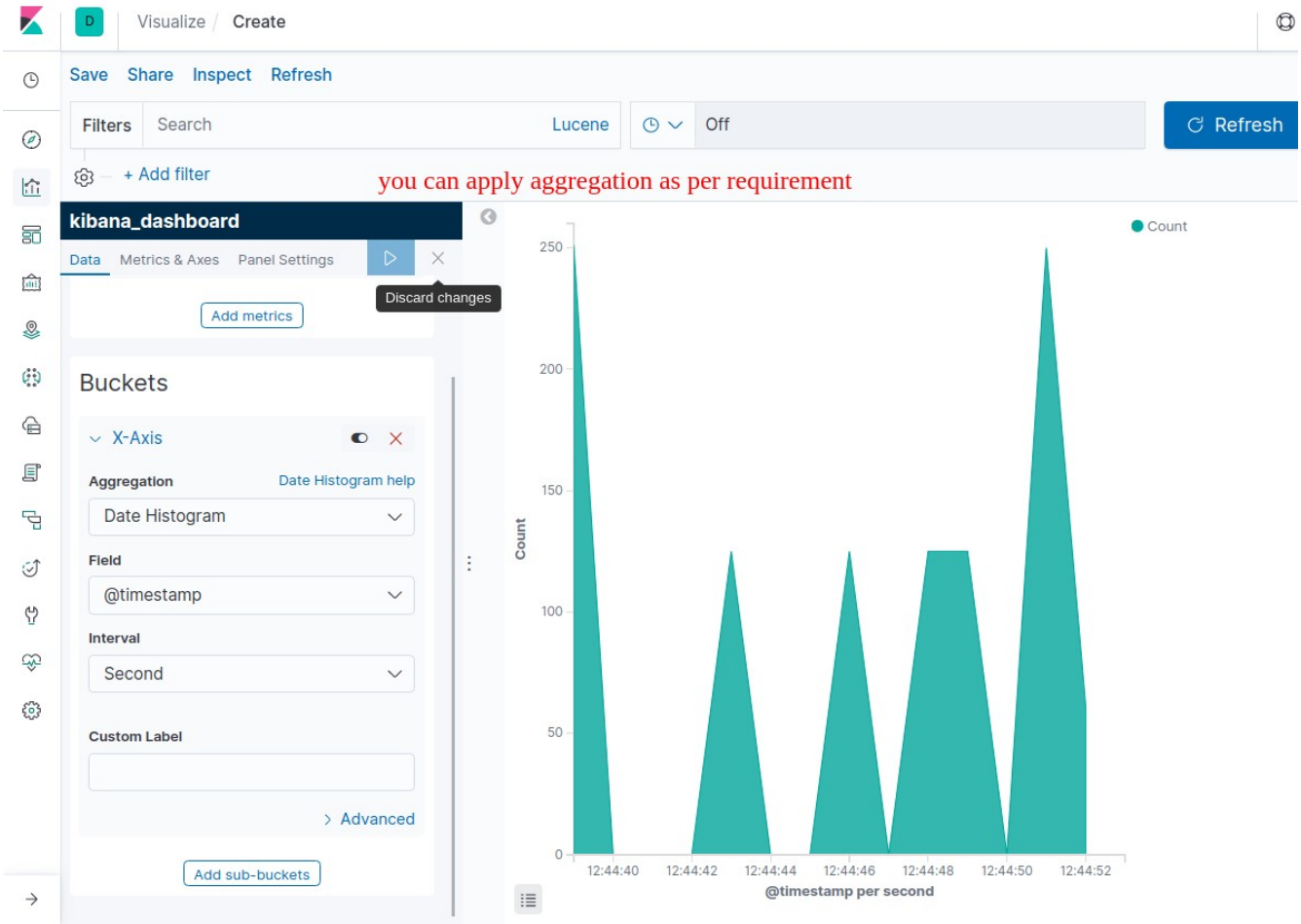
Click on + icon to create your visualization

Select Visualization type

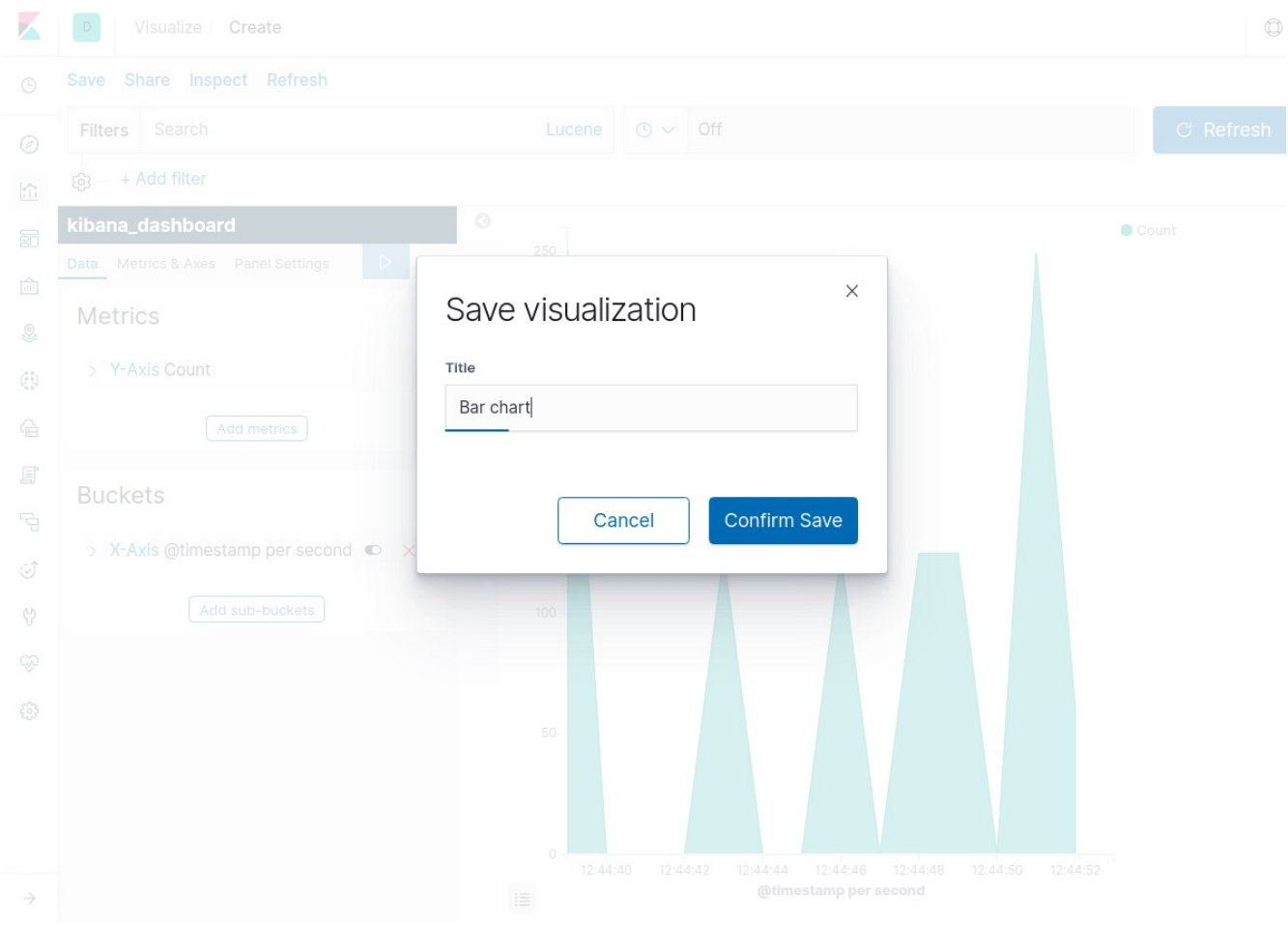


Click on visualization type and choose your index


Visualize / Create
Save Share Inspect Refresh
Filters
Search
Lucene
Off
Refresh
+ Add filter
This is visualization dashboard and here you can plot graph
kibana_dashboard
Data
Metrics & Axes
Panel Settings
Metrics
Y-Axis Count
Add metrics
Buckets
Select buckets type
X-Axis
Split Series
Split Chart
Cancel
Count
1,000
800
600
400
200
0
Count
All docs

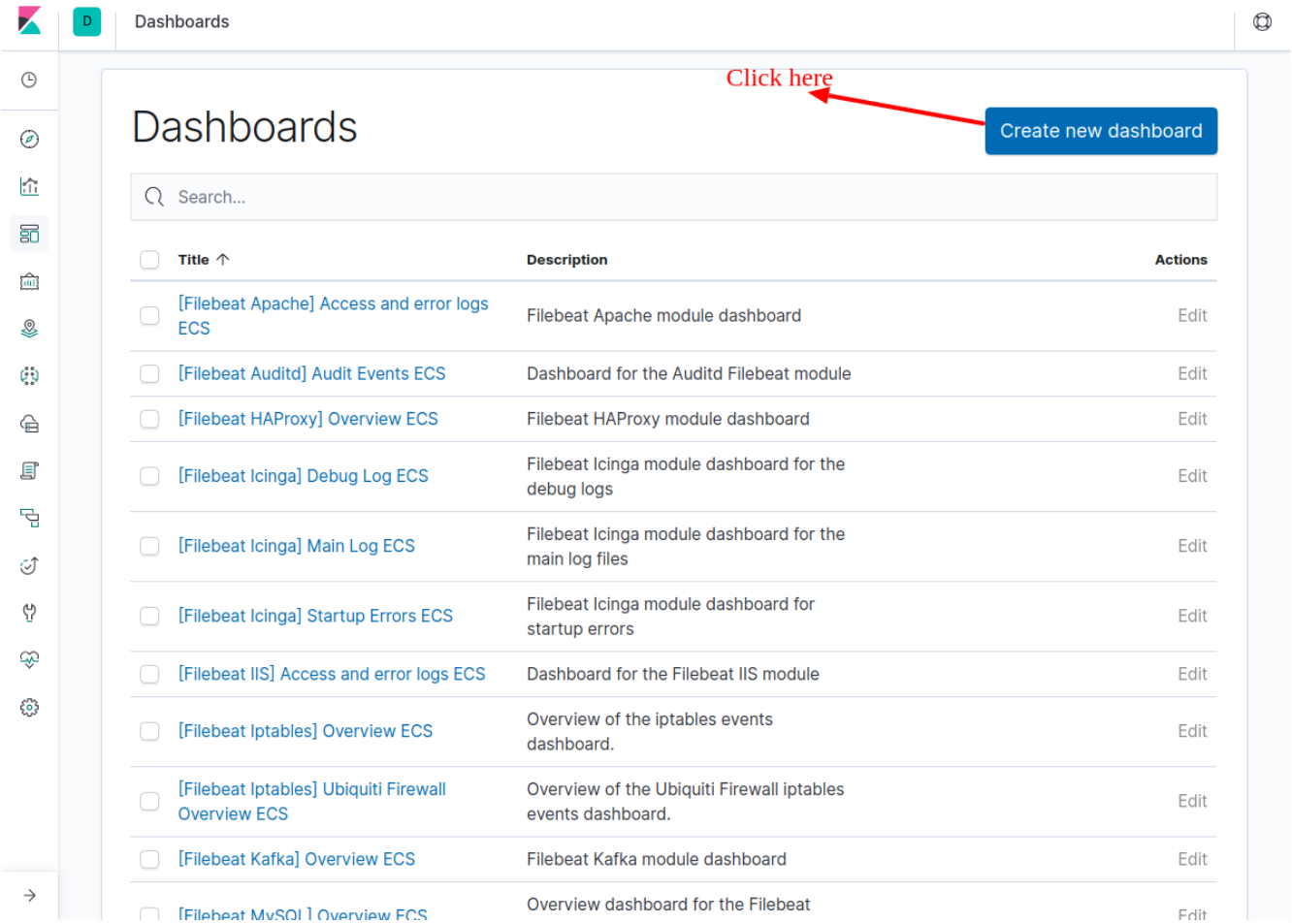


Now click now save button to save graph

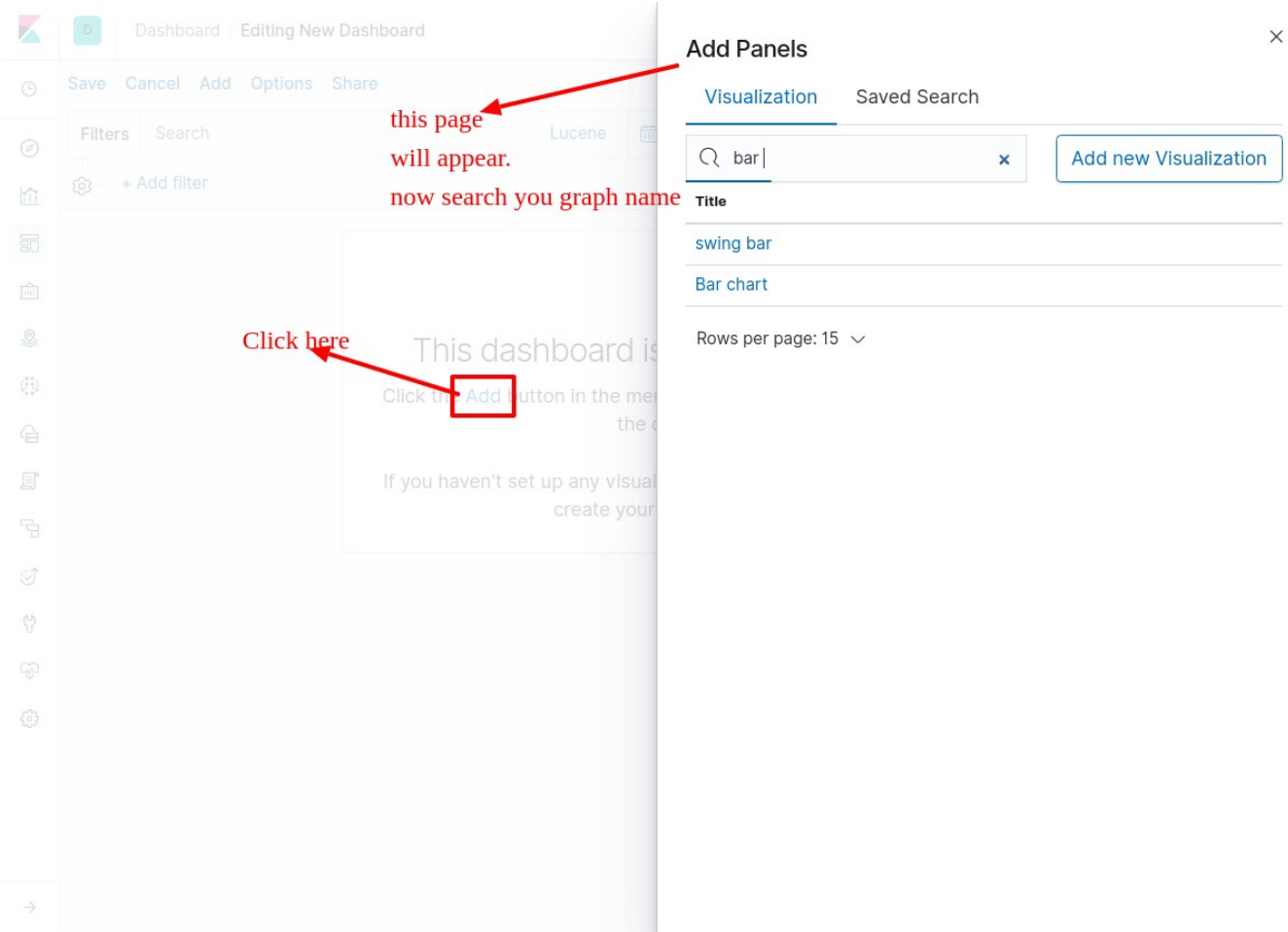


Once you done. Now you create your dashboard.

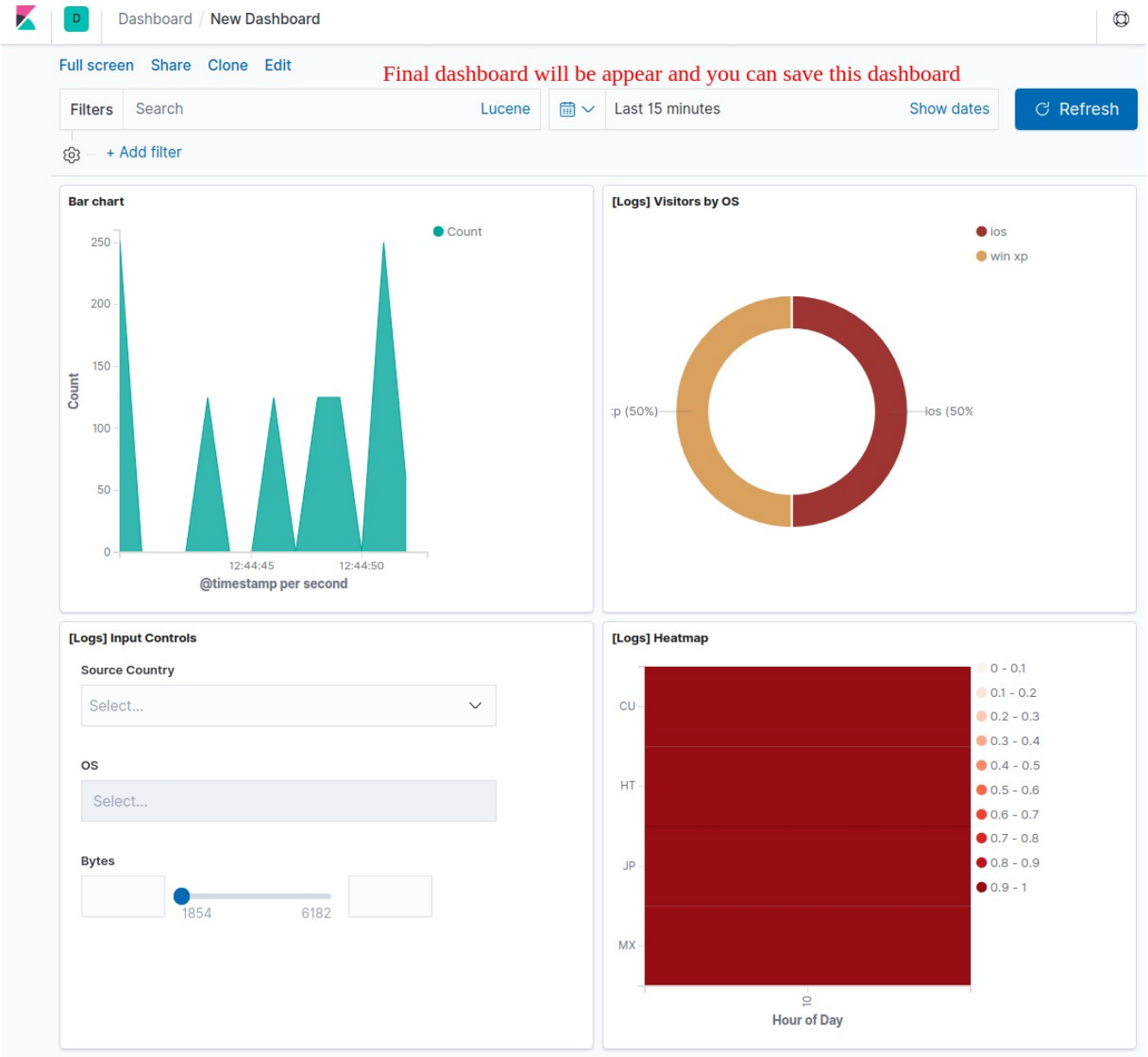
Goto dashboard menu then following page will appear



Click on create new dashboard



As soon as you ll start selecting visualization, Your dashboard will creates and this will looks like following image.



Thank you !

Kundan roy