Create two linux servers:
server1 => install and configure kibana and elasticsearch with basic username and password authentication
server2 => install and configure metricbeat.

Installing and Configuring ElasticSearch and Kibana on server 1 (Centos7)

a) **# rpm --import https://artifacts.elastic.co/GPG-KEY-elasticsearch**

b) Create a file called **elasticsearch.repo** in the **/etc/yum.repos.d/** directory as,

 # cd /etc/yum.repos.d
 # nano elasticsearch.repo

c) Copy the contents below in the file,

[elasticsearch]
name=Elasticsearch repository for 7.x packages
baseurl=https://artifacts.elastic.co/packages/7.x/yum
gpgcheck=1
gpgkey=https://artifacts.elastic.co/GPG-KEY-elasticsearch
enabled=0
autorefresh=1
type=rpm-md

```
  GNU nano 2.3.1            File: elasticsearch.repo

[elasticsearch]
name=Elasticsearch repository for 7.x packages
baseurl=https://artifacts.elastic.co/packages/7.x/yum
gpgcheck=1
gpgkey=https://artifacts.elastic.co/GPG-KEY-elasticsearch
enabled=0
autorefresh=1
type=rpm-md
```

d) # sudo yum install --enablerepo=elasticsearch elasticsearch

```
root@server1:/etc/yum.repos.d
Is this ok [y/d/N]: y
Downloading packages:
elasticsearch-7.15.2-x86_64.rpm                                | 325 MB   01:17
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Creating elasticsearch group... OK
Creating elasticsearch user... OK
  Installing : elasticsearch-7.15.2-1.x86_64                                  1/1
### NOT starting on installation, please execute the following statements to con
figure elasticsearch service to start automatically using systemd
 sudo systemctl daemon-reload
 sudo systemctl enable elasticsearch.service
### You can start elasticsearch service by executing
 sudo systemctl start elasticsearch.service
Created elasticsearch keystore in /etc/elasticsearch/elasticsearch.keystore
  Verifying  : elasticsearch-7.15.2-1.x86_64                                  1/1

Installed:
  elasticsearch.x86_64 0:7.15.2-1

Complete!
[root@server1 yum.repos.d]#
```

Now the **elasticsearch** is successfully installed.

Now we have to configure the config file of elasticsearch to open it in our browser.

We can find the elasticsearch files in **/etc/elasticsearch** directory as,

```
root@server1:/etc/elasticsearch
[root@server1 ~]# cd /etc/elasticsearch/
[root@server1 elasticsearch]# ls
elasticsearch.keystore  jvm.options.d      roles.yml
elasticsearch.yml       log4j2.properties  users
jvm.options             role_mapping.yml   users_roles
[root@server1 elasticsearch]#
```

We edit the highlighted file i.e. **elasticsearch.yml** as,

 # nano elasticsearch.yml

```
# By default Elasticsearch is only accessible on localhost. Set a different
# address here to expose this node on the network:
#
network.host: 192.168.1.165
#
```

Also add the below,

discovery.type: single-node

```
discovery.type: single-node
```

Now we can access the elasticsearch in our browser.

 # systemctl enable elasticsearch
 # systemctl start elasticsearch

We have the ip of our Server1 system i.e. ***192.168.1.165*** where es is configured so,

Not secure | 192.168.1.165:9200


```
{
  "name" : "server1",
  "cluster_name" : "elasticsearch",
  "cluster_uuid" : "oyqq0YSNR4C8zHDD-cFuXA",
  "version" : {
    "number" : "7.15.2",
    "build_flavor" : "default",
    "build_type" : "rpm",
    "build_hash" : "93d5a7f6192e8a1a12e154a2b81bf6fa7309da0c",
    "build_date" : "2021-11-04T14:04:42.515624022Z",
    "build_snapshot" : false,
    "lucene_version" : "8.9.0",
    "minimum_wire_compatibility_version" : "6.8.0",
    "minimum_index_compatibility_version" : "6.0.0-beta1"
  },
  "tagline" : "You Know, for Search"
}
```


*here, **9200** is the default port for elasticsearch.*

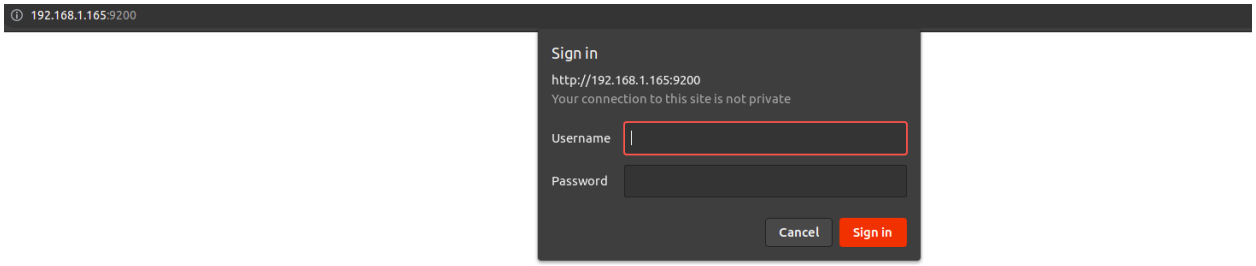
Now, we add the below for the authentication config in our **elasticsearch.yml** file,

xpack.security.enabled: true
xpack.security.authc.api_key.enabled: true

```
xpack.security.enabled: true
xpack.security.authc.api_key.enabled: true
discovery.type: single-node
```

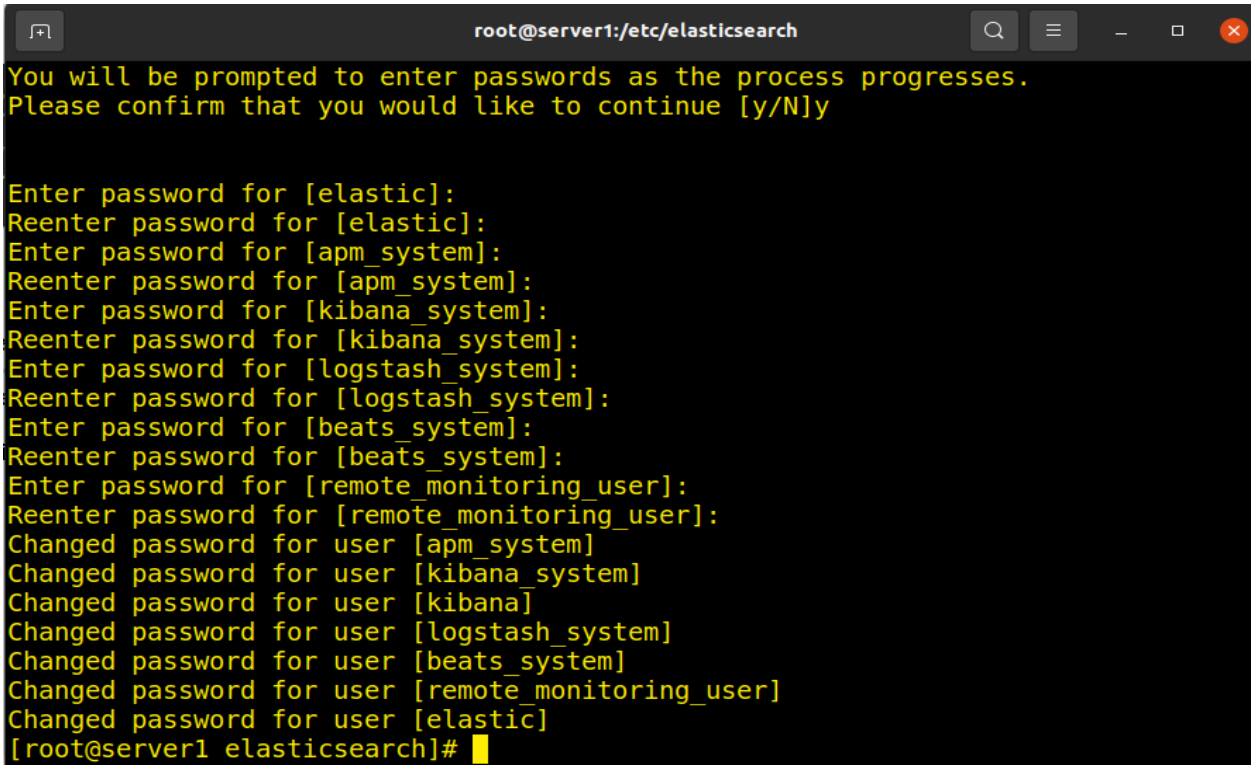
 # systemctl restart elasticsearch

Now lets check the browser if authentication security was success or not,



We can see, it's asking for username and password. Thus our auth protection was successful. Now let's add user and password so that we can sign in and access the elasticsearch;

 # bash usr/share/elasticsearch/bin/elasticsearch-setup-passwords interactive



Now we can sign in to our browser using username as **elastic** and our set-up password.

Installing and Configuring Kibana on server 1 (Centos7)

a) **# rpm --import https://artifacts.elastic.co/GPG-KEY-elasticsearch**

b) Create a file called **kibana.repo** in **/etc/yum.repos.d/** directory as,
 # cd /etc/yum.repos.d
 # nano kibana.repo

```
[root@server1 elasticsearch]# rpm --import https://artifacts.elastic.co/GPG-KEY-
elasticsearch
[root@server1 elasticsearch]# cd /etc/yum.repos.d/
[root@server1 yum.repos.d]# nano kibana.repo
```

c) Copy the contents below in the file,

[kibana-7.x]
name=Kibana repository for 7.x packages
baseurl=https://artifacts.elastic.co/packages/7.x/yum
gpgcheck=1
gpgkey=https://artifacts.elastic.co/GPG-KEY-elasticsearch
enabled=1
autorefresh=1
type=rpm-md

```
  GNU nano 2.3.1             File: kibana.repo

[kibana-7.x]
name=Kibana repository for 7.x packages
baseurl=https://artifacts.elastic.co/packages/7.x/yum
gpgcheck=1
gpgkey=https://artifacts.elastic.co/GPG-KEY-elasticsearch
enabled=1
autorefresh=1
type=rpm-md
```

d) # sudo yum install kibana

```
root@server1:/etc/yum.repos.d
Transaction Summary
================================================================================
Install  1 Package

Total download size: 277 M
Installed size: 749 M
Is this ok [y/d/N]: y
Downloading packages:
kibana-7.15.2-x86_64.rpm                                   | 277 MB   01:49
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : kibana-7.15.2-1.x86_64                                      1/1
Creating kibana group... OK
Creating kibana user... OK
Created Kibana keystore in /etc/kibana/kibana.keystore
  Verifying  : kibana-7.15.2-1.x86_64                                      1/1

Installed:
  kibana.x86_64 0:7.15.2-1

Complete!
[root@server1 yum.repos.d]#
```

Now kibana is configured as,

 # cd /etc/kibana
 # nano kibana.yml

Add the below in the yml file,

server.host: 0.0.0.0
elasticsearch.username: "kibana_system"
elasticsearch.password: "centos"

```
server.host: 0.0.0.0
elasticsearch.username: "kibana_system"
elasticsearch.password: "centos"

# Kibana is served by a back end server.
#server.port: 5601
```

We can also add 32 character encryption key with,

xpack.encryptedSavedObjects.encryptionKey: " at least 32 character value"

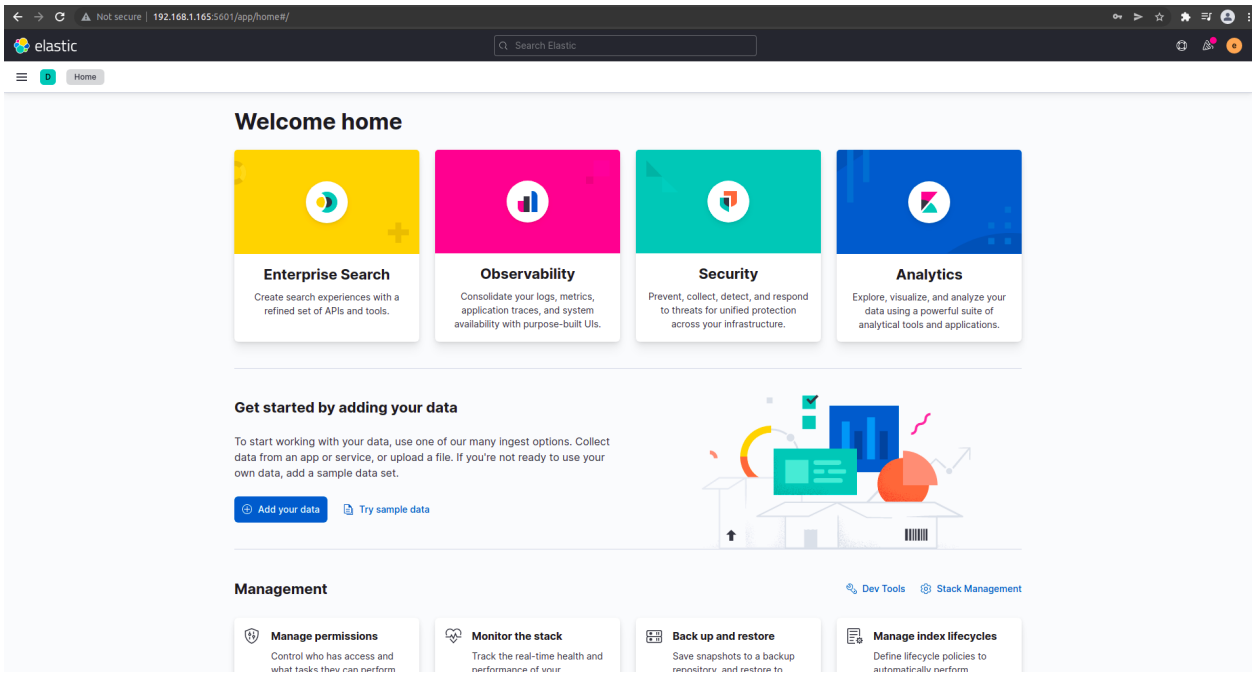
Also change the **elasticsearch.hosts** as below,

```
# The URLs of the Elasticsearch instances to use for all your queries.
elasticsearch.hosts: ["http://192.168.1.165:9200"]
```

Now we restart the kibana server to see in browser,

$ systemctl restart kibana

Now we go to **192.168.1.165:5601** and give our required credentials (username and password) to get the dashboard as,



Installing and Configuring Metricbeat on Server 2 (Centos 7)

Metricbeat helps you monitor your servers and the services they host by collecting metrics from the operating system and services.

 # curl -L -O
https://artifacts.elastic.co/downloads/beats/metricbeat/metricbeat-7.15.2-x86_64.rpm

 # sudo rpm -vi metricbeat-7.15.2-x86_64.rpm

```
[root@server2 ~]# curl -L -O https://artifacts.elastic.co/downloads/beats/metric
beat/metricbeat-7.15.2-x86_64.rpm
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 40.8M  100 40.8M    0     0  4051k      0  0:00:10  0:00:10 --:--:-- 4652k
[root@server2 ~]# sudo rpm -vi metricbeat-7.15.2-x86_64.rpm
warning: metricbeat-7.15.2-x86_64.rpm: Header V4 RSA/SHA512 Signature, key ID d8
8e42b4: NOKEY
Preparing packages...
metricbeat-7.15.2-1.x86_64
[root@server2 ~]#
```

Activate and enable the metricbeat,

 # systemctl enable metricbeat
 # systemctl start metricbeat
 # systemctl status metricbeat

```
[root@server2 ~]# systemctl status metricbeat
● metricbeat.service - Metricbeat is a lightweight shipper for metrics.
   Loaded: loaded (/usr/lib/systemd/system/metricbeat.service; disabled; vendor
preset: disabled)
   Active: inactive (dead)
     Docs: https://www.elastic.co/beats/metricbeat
[root@server2 ~]# systemctl enable metricbeat
Created symlink from /etc/systemd/system/multi-user.target.wants/metricbeat.serv
ice to /usr/lib/systemd/system/metricbeat.service.
[root@server2 ~]# systemctl start metricbeat
[root@server2 ~]# systemctl status metricbeat
● metricbeat.service - Metricbeat is a lightweight shipper for metrics.
   Loaded: loaded (/usr/lib/systemd/system/metricbeat.service; enabled; vendor p
reset: disabled)
   Active: active (running) since Fri 2021-12-03 04:33:18 EST; 4s ago
     Docs: https://www.elastic.co/beats/metricbeat
 Main PID: 18784 (metricbeat)
   CGroup: /system.slice/metricbeat.service
```

nano to the **/etc/metricbeat/metricbeat.yml** file and modify as below,

```
output.elasticsearch:
  # Array of hosts to connect to.
  hosts: ["192.168.1.165:9200"]

  # Protocol - either `http` (default) or `https`.
  #protocol: "https"

  # Authentication credentials - either API key or username/password.
  #api_key: "id:api_key"
  username: "elastic"
  password: "centos"
```

```
# Starting with Beats version 6.0.0, the dashboards are loaded via the Kibana A$
# This requires a Kibana endpoint configuration.
setup.kibana:

  # Kibana Host
  # Scheme and port can be left out and will be set to the default (http and 56$
  # In case you specify and additional path, the scheme is required: http://loc$
  # IPv6 addresses should always be defined as: https://[2001:db8::1]:5601
  host: "192.168.1.168:5601"
```

192.168.1.165 is the ip where our kibana is configured.

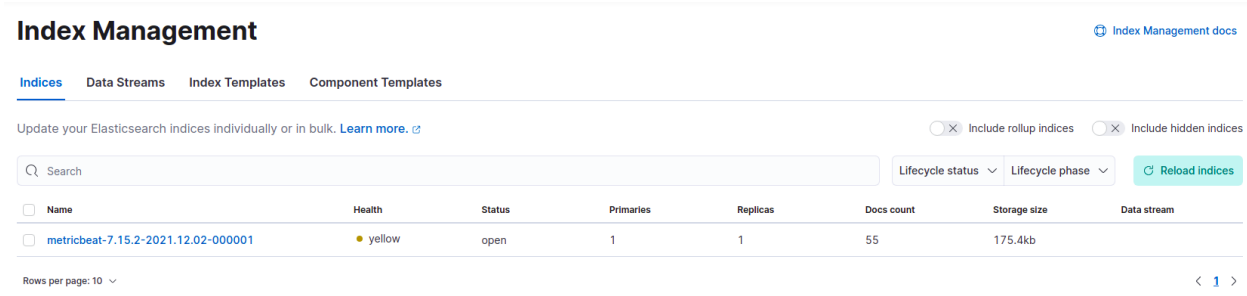
Now in our host machine, allow the incoming requests for **5601** and **9200** ports,

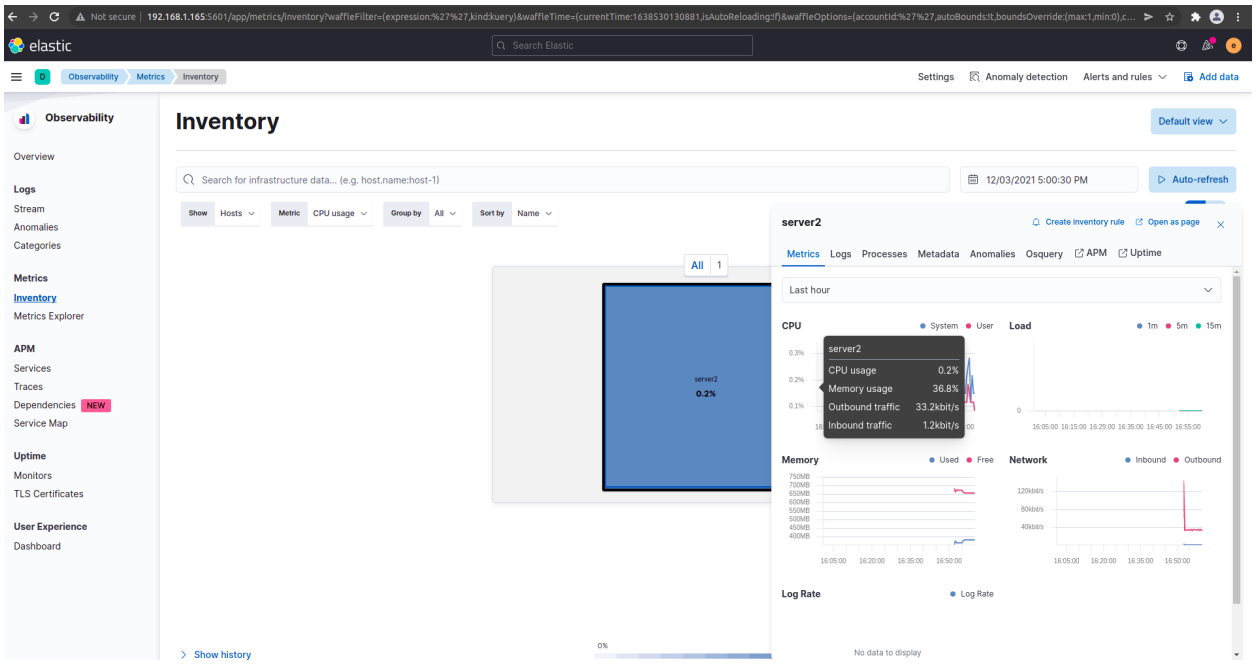
```
lostinserver@lostinserver: ~
root@server2:/etc/metricbeat    lostinserver@lostinserver: ~
lostinserver@lostinserver:~$ sudo ufw allow from 192.168.1.160 to 192.168.1.169
port 5601
Skipping adding existing rule
lostinserver@lostinserver:~$ sudo ufw allow from 192.168.1.160 to 192.168.1.169
port 9200
Rule added
lostinserver@lostinserver:~$ sudo ufw reload
Firewall reloaded
lostinserver@lostinserver:~$
```

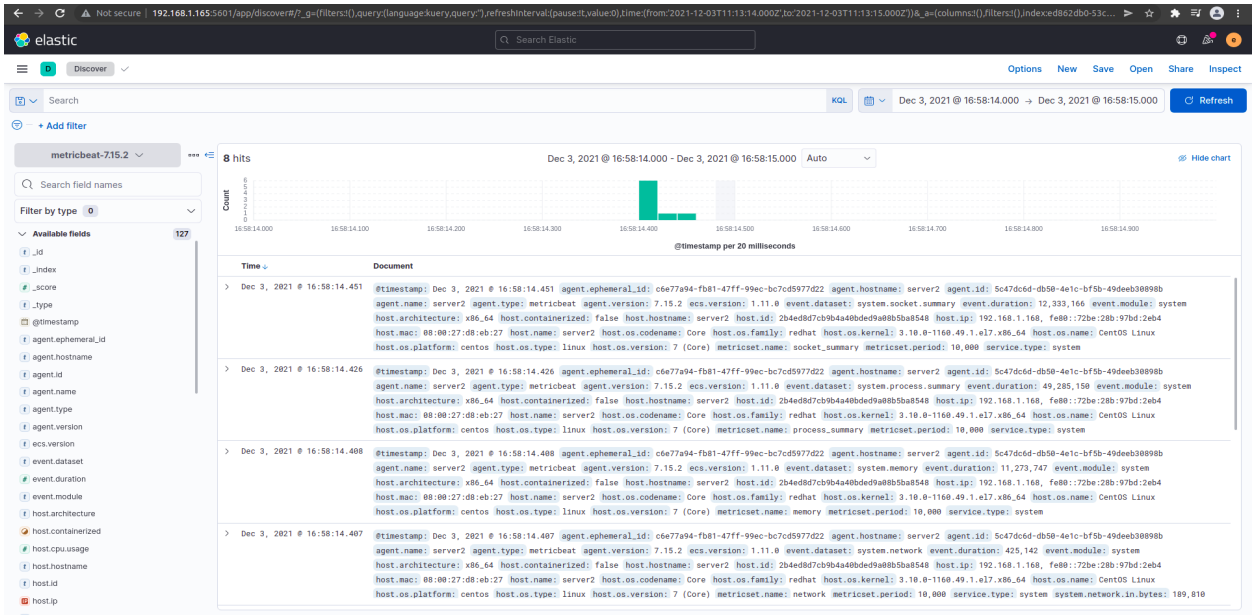
Run the metricbeat,

 # systemctl restart metricbeat
 # metricbeat -e

We can see the metricbeat configured successfully as,







Collect metric from following sources in server1 and send them to elasticsearch. Store them in an index named "server1-metrics". a. Memory usage b. Disk usage c. Load average

We edit the config file to collect the metric as,

 # cd /etc/metricbeat
 # nano metricbeat.yml

```
[root@server2 ~]# cd /etc/metricbeat/
[root@server2 metricbeat]# ls
fields.yml  metricbeat.reference.yml  metricbeat.yml  modules.d
[root@server2 metricbeat]# nano metricbeat.yml
```

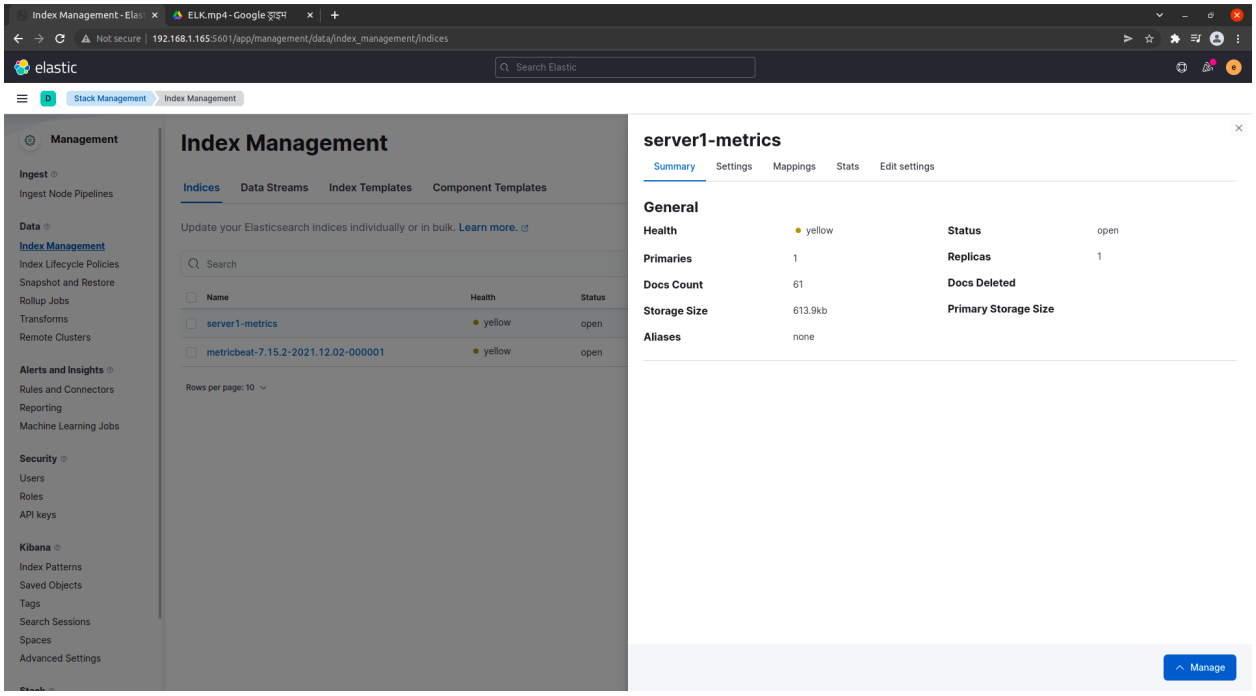
Add the below in it,

```
  GNU nano 2.3.1              File: metricbeat.yml


metricbeat.modules:
- module: system
  metricsets:
    - memory
    - diskio
    - load
  index: "server1-metrics"
  enabled: true
  period: 4s
```

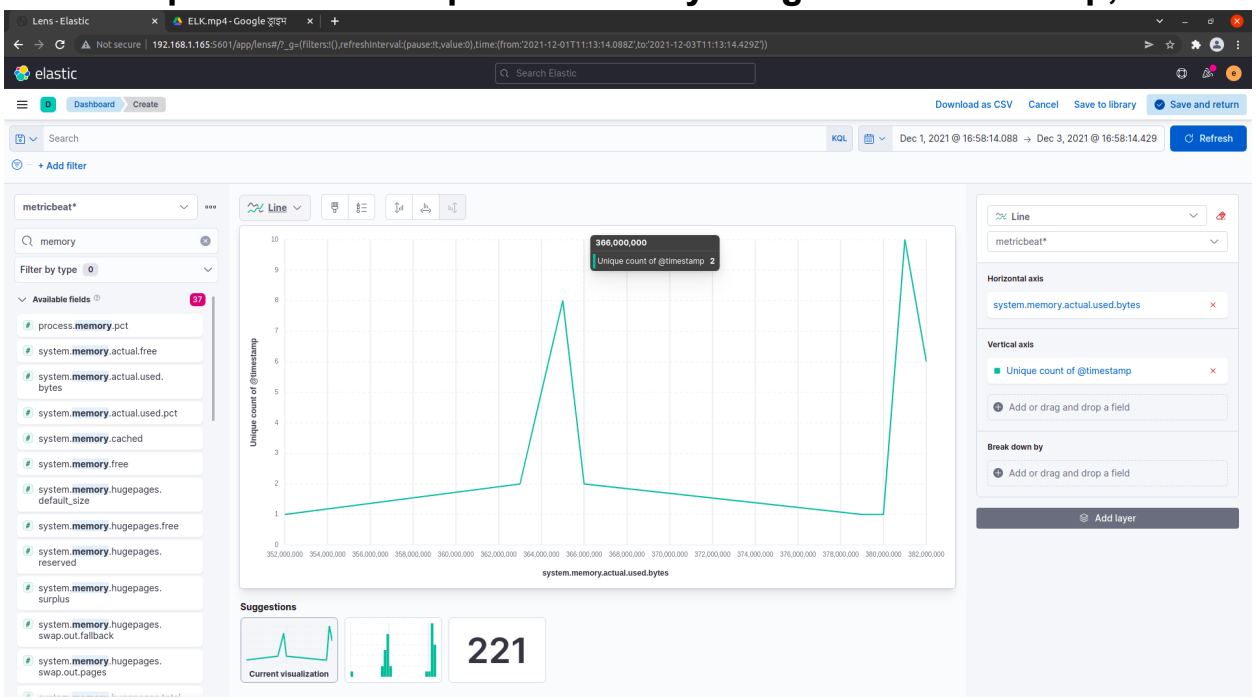
Restart the metricbeat to see the collected metrics as,

 # systemctl restart metricbeat



Create a dashboard in kibana and generate visual report(line graph) for Memory usage and load average of server1 with relation to time

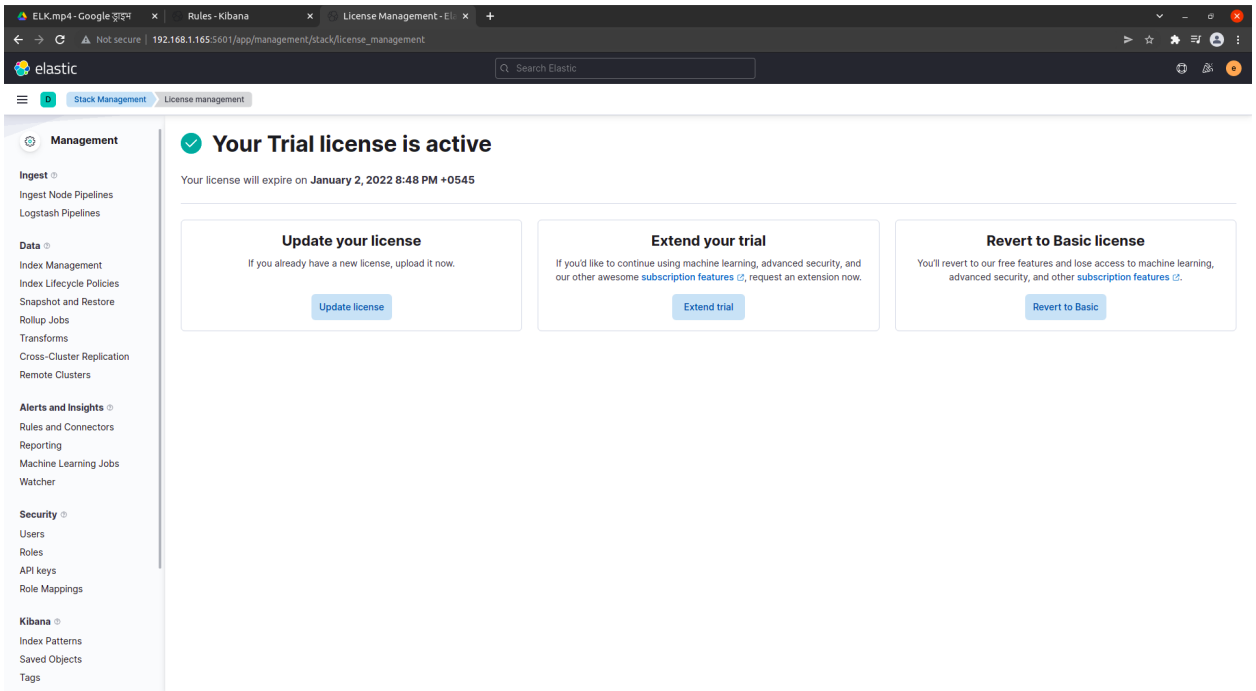
Visual Report of Line Graph for Memory usage wrt. Timestamp,



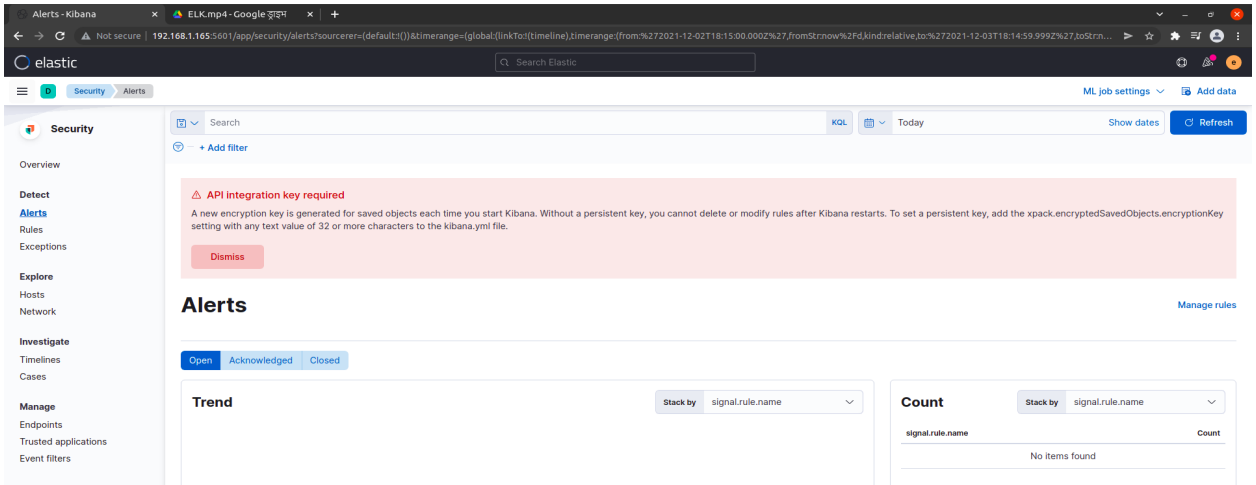
Visual Report of Line Graph for load avg of server 1 wrt. Timestamp,

Generate alerts through the kibana system for following thresholds a. when memory usage > 80% for the last 2 minutes send an alert to a slack channel b. When Disk usage > 70% send alerts to a slack channel c. When load average > 1 for last 2 minutes send alert to a slack channel

Activate the trial license first,



For generating alert we need to generate certain rules,



We see the alert home as above. We need to set a persistent key first as suggested above in **kibana.yml** file as,

 # sudo nano /etc/kibana/kibana.yml

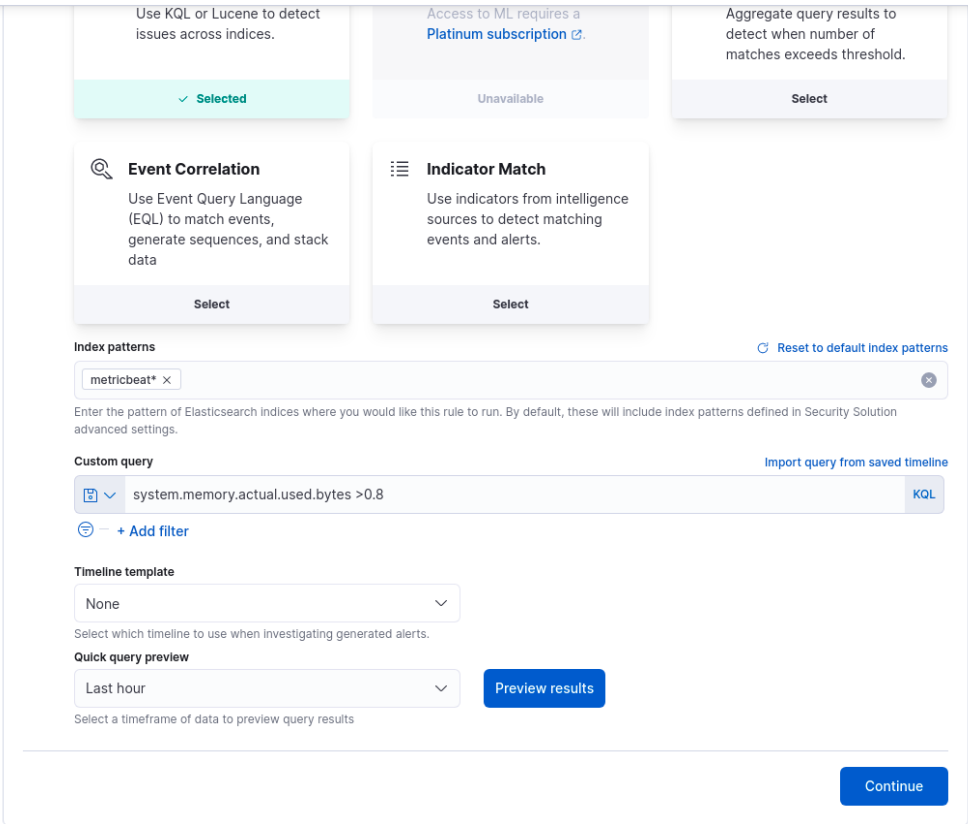
Add below to the file,

xpack.encryptedSavedObjects.encryptionKey:"gxraLwPeOGXtoZsVtJcZCLz31O0221J4"

```
xpack.encryptedSavedObjects.encryptionKey: abrakwpeOGXtomsWtJcZCLz31O0221J43c
```

Rules:

For Memory Usage



2 About rule

Name

Alert for memory usage

Description

Alert when memory usage is > 80%

Default severity

Select a severity level for all alerts generated by this rule.

Low

Severity override

Use source event values to override the default severity.

Default risk score

Select a risk score for all alerts generated by this rule.

0 25 50 75 100 21

Risk score override

Use a source event value to override the default risk score.

Tags Optional

memory ×

Type one or more custom identifying tags for this rule. Press enter after each tag to begin a new one.

Advanced settings

Continue

3 Schedule rule

Runs every

2 Minutes

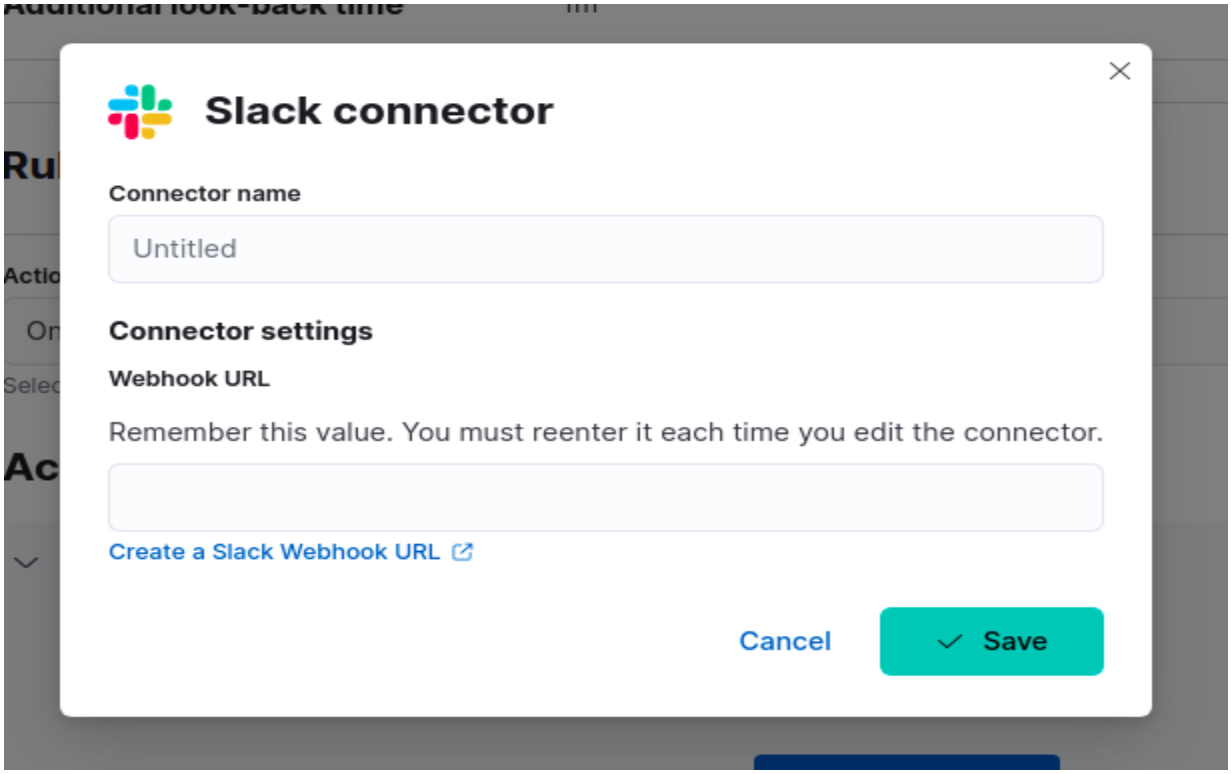
Rules run periodically and detect alerts within the specified time frame.

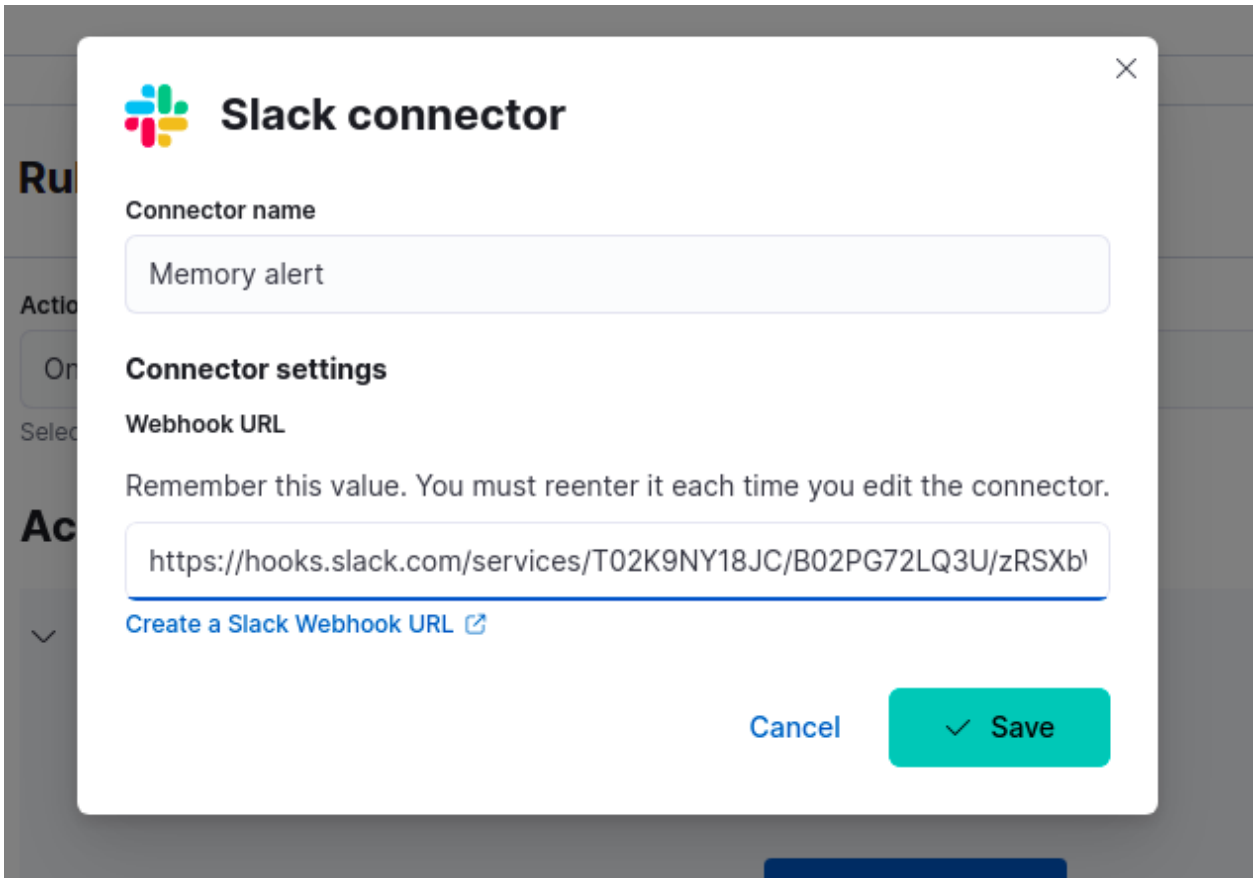
Additional look-back time Optional

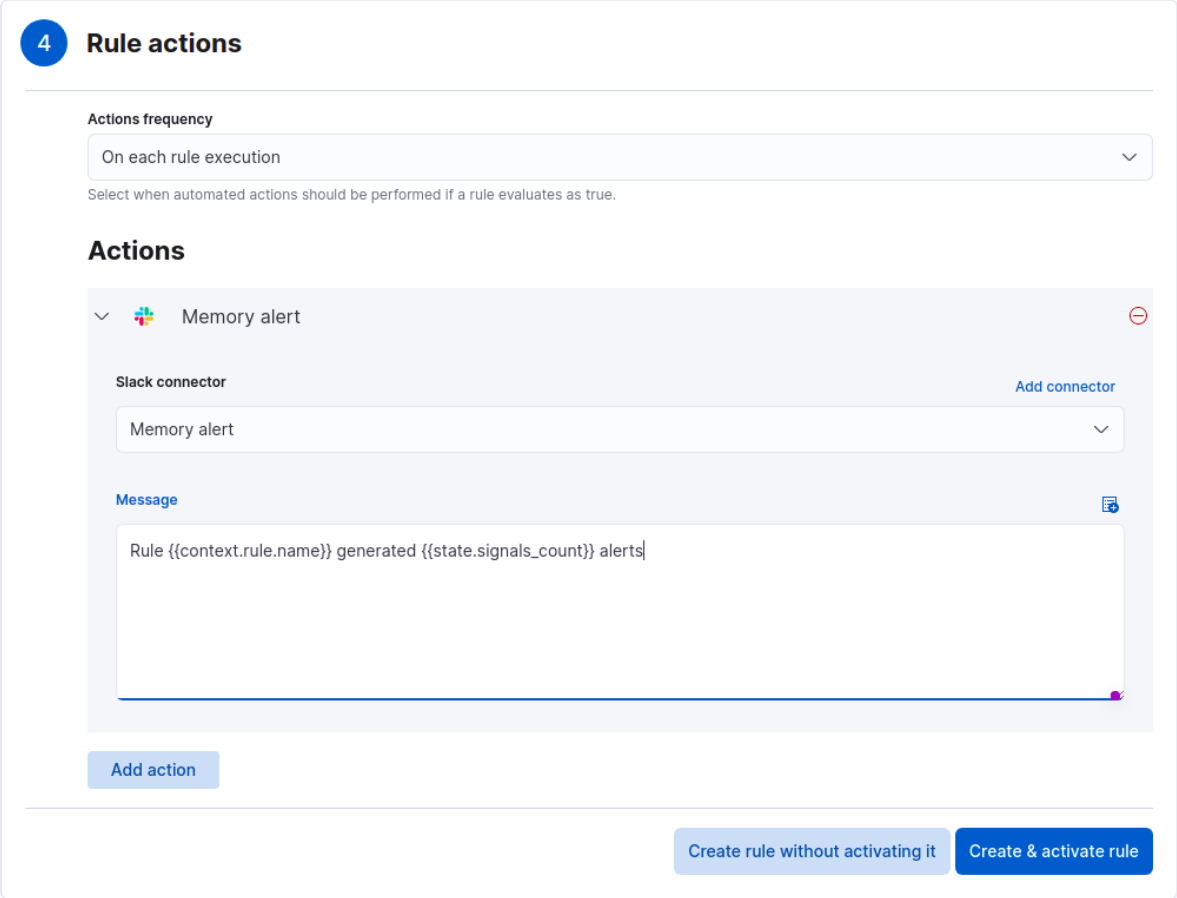
1 Minutes

Adds time to the look-back period to prevent missed alerts.

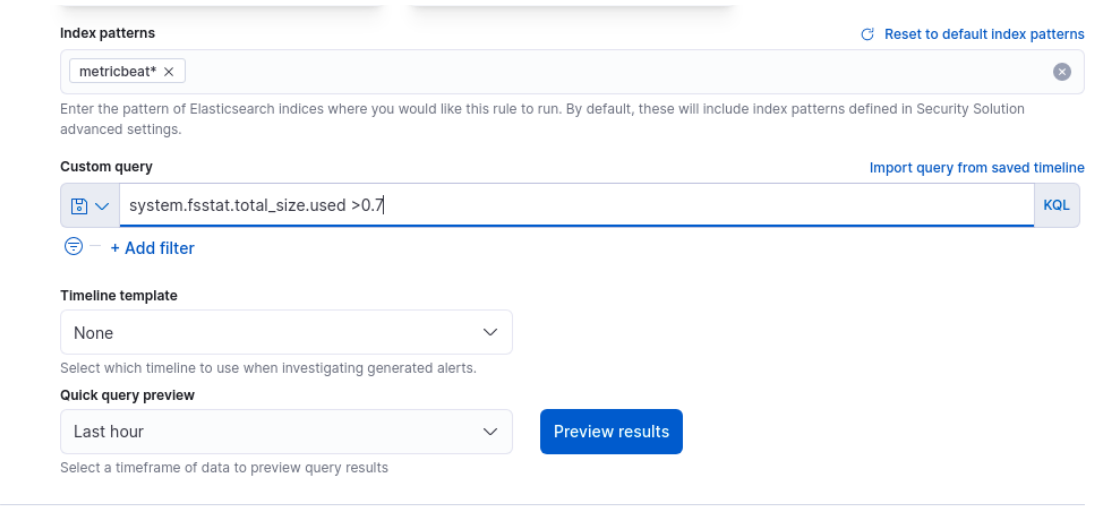
Continue


Slack connector
Connector name
Untitled
Connector settings
Webhook URL
Remember this value. You must reenter it each time you edit the connector.
Create a Slack Webhook URL
Cancel
Save


Slack connector
Connector name
Memory alert
Connector settings
Webhook URL
Remember this value. You must reenter it each time you edit the connector.
https://hooks.slack.com/services/T02K9NY18JC/B02PG72LQ3U/zRSXb
Create a Slack Webhook URL
Cancel
Save



For Disk Usage



2 About rule

Name

Alert for disk usage

Description

Alert when disk usage is > 0.7

Default severity

Select a severity level for all alerts generated by this rule.

Low

☐ **Severity override**

Use source event values to override the default severity.

Default risk score

Select a risk score for all alerts generated by this rule.

0 25 50 75 100 21

☐ **Risk score override**

Use a source event value to override the default risk score.

Tags Optional

Type one or more custom identifying tags for this rule. Press enter after each tag to begin a new one.

3 Schedule rule

Runs every

02 Minutes

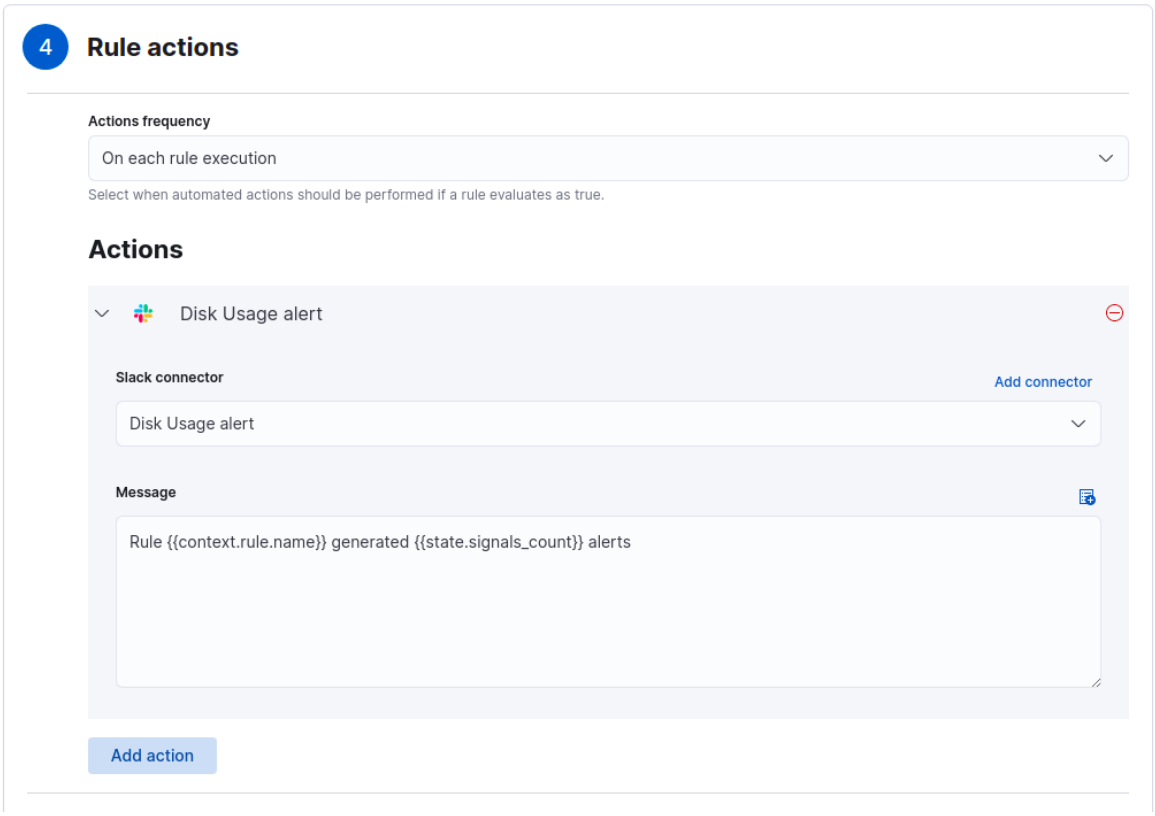
Rules run periodically and detect alerts within the specified time frame.

Additional look-back time Optional

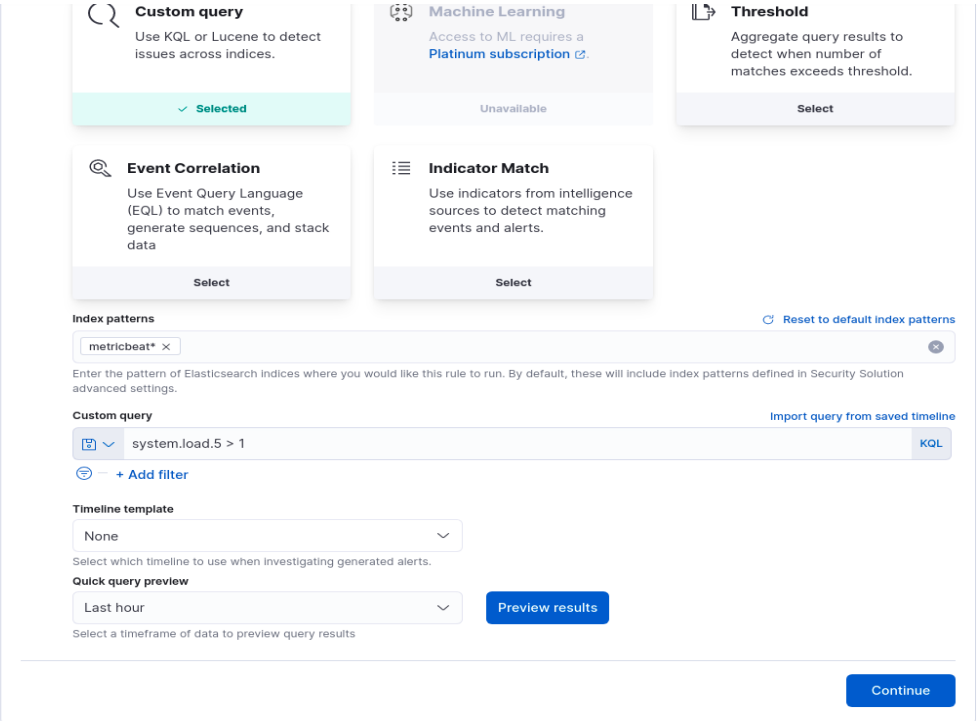
1 Minutes

Adds time to the look-back period to prevent missed alerts.

Continue



For Load Average



2 About rule

Name

System load Alert

Description

Load alert when avg load > 1

Default severity

Select a severity level for all alerts generated by this rule.

Low

Severity override

Use source event values to override the default severity.

Default risk score

Select a risk score for all alerts generated by this rule.

0 25 50 75 100

21

Risk score override

3 Schedule rule

Runs every

02 Minutes

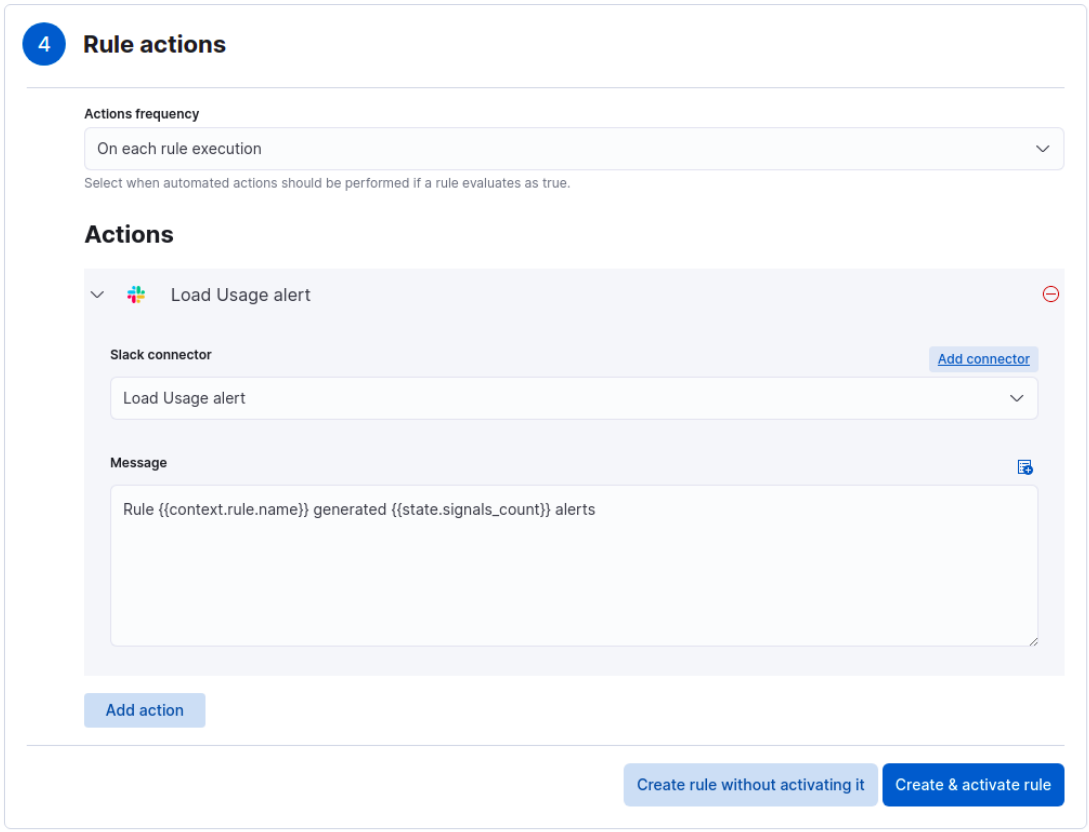
Rules run periodically and detect alerts within the specified time frame.

Additional look-back time Optional

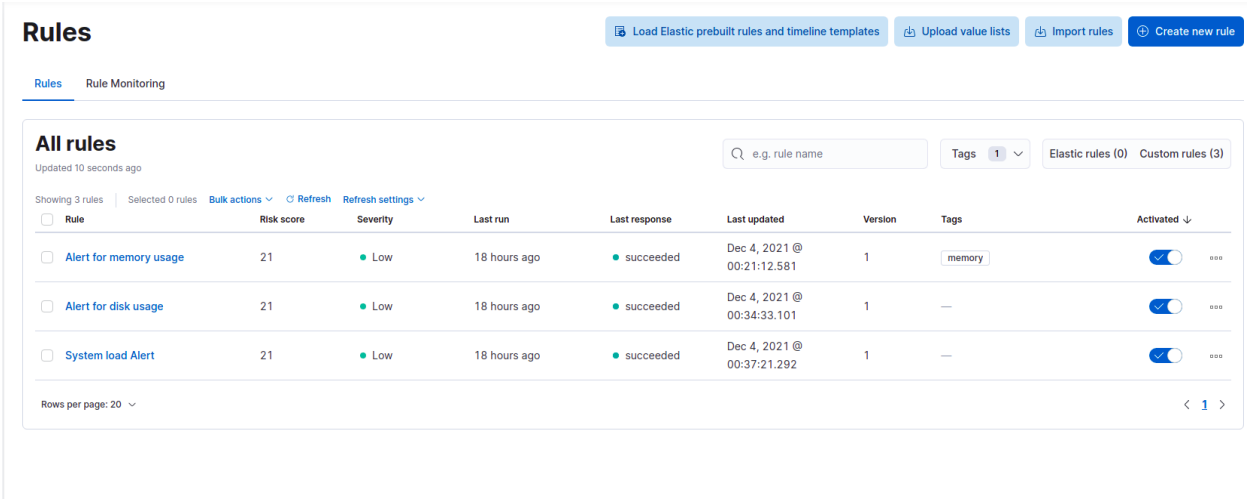
1 Minutes

Adds time to the look-back period to prevent missed alerts.

Continue



We can see all the rules created as,



We can see the alerts generated in slack also as,

incoming-webhook APP 12:38 AM
Rule system load alert generated 12 alerts

incoming-webhook APP 12:44 AM
Rule system load alert generated 13 alerts

incoming-webhook APP 8:14 AM
Rule disk usage alert(>70%) generated 12 alerts

Rule memory alert generated 11 alerts