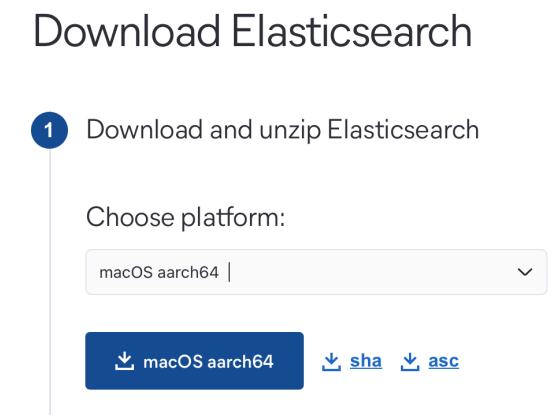
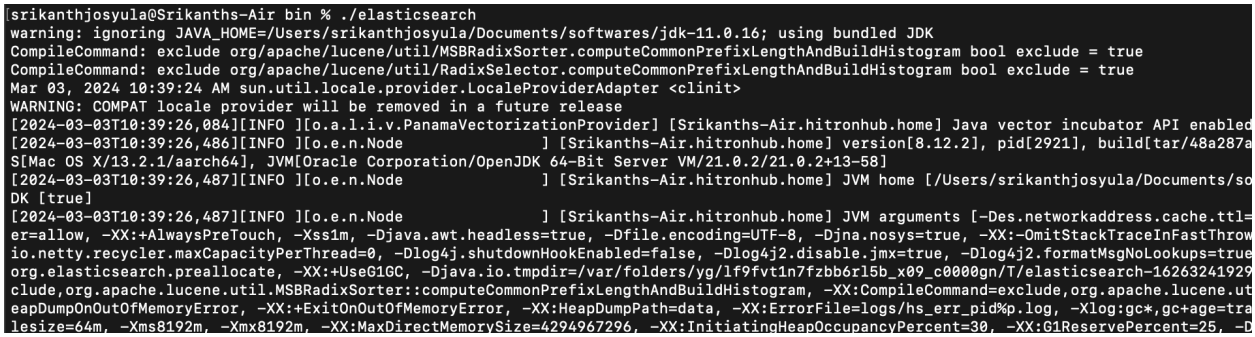
Setup ELK System

Install Elasticsearch

1. Download the file from https://www.elastic.co/downloads/elasticsearch



2. Extract the tar, navigate to ${location}/elasticsearch-8.12.2/bin
3. Run ./elasticsearch



4. Try loading localhost:9200, and if any issues are seen, try Disabling X-Pack security allowed Elasticsearch to start successfully. Re run elasticsearch by below command

   ./elasticsearch -E xpack.security.enabled=false

5. As of ES 8, SSL/TLS is ON by default for HTTP clients. The WARN message says

   http client did not trust this server's certificate

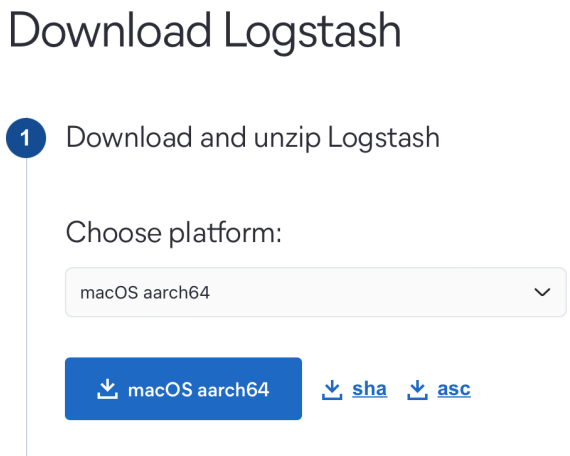
which means that you need to tell your browser to trust the server certificate. it is self-signed by default, so that's probably the reason. Or you can simply disable SSL in your elasticsearch.yml configuration, that would also work

6. Once loaded you should see as below when localhost:9200 is called

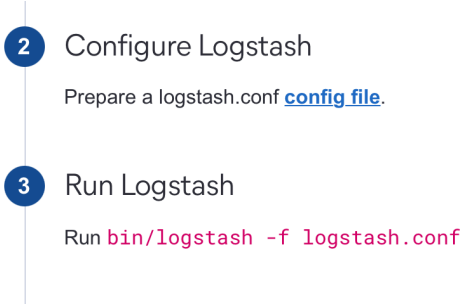

```
{
  "name" : "Srikanths-Air.hitronhub.home",
  "cluster_name" : "elasticsearch",
  "cluster_uuid" : "rdJ4Xs3xQV-T8QgbkPS-0A",
  "version" : {
    "number" : "8.12.2",
    "build_flavor" : "default",
    "build_type" : "tar",
    "build_hash" : "48a287ab9497e852de30327444b0809e55d46466",
    "build_date" : "2024-02-19T10:04:32.774273190Z",
    "build_snapshot" : false,
    "lucene_version" : "9.9.2",
    "minimum_wire_compatibility_version" : "7.17.0",
    "minimum_index_compatibility_version" : "7.0.0"
  },
  "tagline" : "You Know, for Search"
}
```


Install Logstash

1. Download the file from https://www.elastic.co/downloads/logstash



2. In the same page we can see that its mentioned to logstash.conf



3. We need to create logstash.conf, where we can mention about the location where our file is present for the Elasticsearch to know where to pick from

```
srikanthjosyula@Srikanths-Air bin % cat logstash.conf
input {
  file {
    path => "/Users/srikanthjosyula/Documents/GitHub-Projects/springboot-elk-stack-example/logs/springboot-elk.log"
    start_position => "beginning"
  }
}

output{
   stdout {
     codec => json
   }
   elasticsearch {
     hosts => ["localhost:9200"]
     index => "springboot-elk"
   }
}
```

4. In input we give from where the file needs to be picked from and output is where our elasticsearch is hosted

```
srikanthjosyula@Srikanths-Air bin % ls
benchmark.bat          dependencies-report    logstash              logstash-plugin       logstash.conf         pqcheck.bat           ruby
benchmark.sh           ingest-convert.bat     logstash-keystore     logstash-plugin.bat   logstash.lib.sh       pqrepair              setup.bat
cpdump                 ingest-convert.sh      logstash-keystore.bat logstash.bat          pqcheck               pqrepair.bat          system-install
srikanthjosyula@Srikanths-Air bin %
```

5. We need to run the logstash now. To start it we need to run the command

./logstash -f /Users/srikanthjosyula/Documents/softwares/logstash-8.12.2/bin/logstash.conf

```
[2024-03-03T14:38:55,557][INFO ][logstash.runner          ] Jackson default value override `logstash.jackson.stream-read-constraints.max-num
[2024-03-03T14:38:55,581][WARN ][logstash.config.source.multilocal] Ignoring the 'pipelines.yml' file because modules or command line option
[2024-03-03T14:38:55,899][INFO ][logstash.agent           ] Successfully started Logstash API endpoint {:port=>9600, :ssl_enabled=>false}
[2024-03-03T14:38:56,027][INFO ][org.reflections.Reflections] Reflections took 66 ms to scan 1 urls, producing 132 keys and 468 values
/Users/srikanthjosyula/Documents/softwares/logstash-8.12.2/vendor/bundle/jruby/3.1.0/gems/amazing_print-1.5.0/lib/amazing_print/formatter.rb
[2024-03-03T14:38:56,236][INFO ][logstash.javapipeline    ] Pipeline `main` is configured with `pipeline.ecs_compatibility: v8` setting. All
v8` unless explicitly configured otherwise.
```

6. Logstash is started on port 9600 http://localhost:9600/

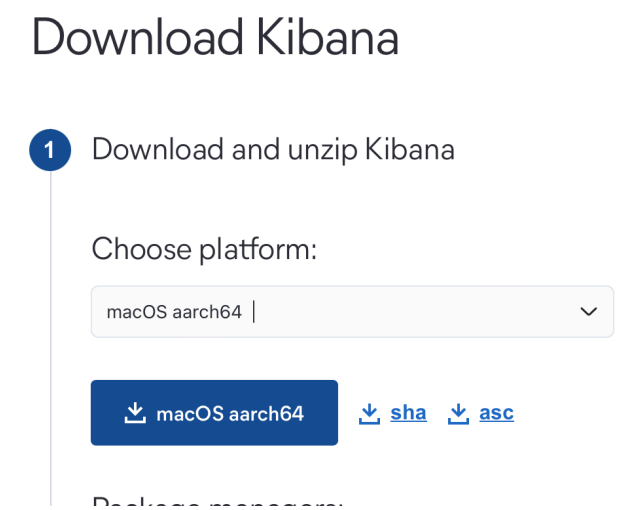

```
{"host":"Srikanths-Air.hitronhub.home","version":"8.12.2","http_address":"127.0.0.1:9600","id":"bf5a883f-ae92-466b-a47d-16157849f495","name":"Srikanths-
Air.hitronhub.home","ephemeral_id":"161852fc-fb35-4e08-8a12-33c7cdedb1e5","status":"green","snapshot":false,"pipeline":
{"workers":8,"batch_size":125,"batch_delay":50},"build_date":"2024-02-16T15:59:20+00:00","build_sha":"ee9dfd33260ed956568b47be75497c7bb7165e34","build_snapshot":false}
```


```
path":"/Users/srikanthjosyula/Documents/GitHub-Projects/springboot-elk-stack-example/logs/springboot-elk.log"}},"@version":"1","event":{"original":"2024-03-03 14:37:38.430  INFO 5662 --- [main] com.sample
.elk.ElkStackApplication       : Starting ElkStackApplication using Java 19.0.1 on Srikanths-Air.hitronhub.home with PID 5662 (/Users/srikanthjosyula/Documents/GitHub-Projects/springboot-elk-stack-example
/target/classes started by srikanthjosyula in /Users/srikanthjosyula/Documents/GitHub-Projects/springboot-elk-stack-example)"},"host":{"name":"Srikanths-Air.hitronhub.home"},"message":"2024-03-03 14:37:38
.430  INFO 5662 --- [main] com.sample.elk.ElkStackApplication       : Starting ElkStackApplication using Java 19.0.1 on Srikanths-Air.hitronhub.home with PID 5662 (/Users/srikanthjosyula/Documents/GitHub-
Projects/springboot-elk-stack-example/target/classes started by srikanthjosyula in /Users/srikanthjosyula/Documents/GitHub-Projects/springboot-elk-stack-example)"}{"@timestamp":"2024-03-04T13:08:07.464824
Z","log":{"file":{"path":"/Users/srikanthjosyula/Documents/GitHub-Projects/springboot-elk-stack-example/logs/springboot-elk.log"}},"@version":"1","event":{"original":"2024-03-03 14:37:39.252  INFO 5662 --
- [main] com.sample.elk.ElkStackApplication       : Started ElkStackApplication in 1.097 seconds (JVM running for 1.302)"},"host":{"name":"Srikanths-Air.hitronhub.home"},"message":"2024-03-03 14:37:39.252
  INFO 5662 --- [main] com.sample.elk.ElkStackApplication       : Started ElkStackApplication in 1.097 seconds (JVM running for 1.302)"}{"@timestamp":"2024-03-04T13:08:07.4662492","log":{"file":{"path":"/
Users/srikanthjosyula/Documents/GitHub-Projects/springboot-elk-stack-example/logs/springboot-elk.log"}},"@version":"1","event":{"original":"2024-03-03 14:42:42.633  INFO 5734 --- [main] o.s.b.w.embedded.t
omcat.TomcatWebServer  : Tomcat started on port(s): 8090 (http) with context path ''"},"host":{"name":"Srikanths-Air.hitronhub.home"},"message":"2024-03-03 14:42:42.633  INFO 5734 --- [main] o.s.b.w.embed
ded.tomcat.TomcatWebServer  : Tomcat started on port(s): 8090 (http) with context path ''"}{"@timestamp":"2024-03-04T13:08:07.467576Z","log":{"file":{"path":"/Users/srikanthjosyula/Documents/GitHub-Projec
ts/springboot-elk-stack-example/logs/springboot-elk.log"}},"@version":"1","event":{"original":"2024-03-03 14:43:46.939  INFO 5734 --- [http-nio-8090-exec-3] c.s.elk.services.impl.UserServiceImpl    : Fetc
hing user by id: 1"},"host":{"name":"Srikanths-Air.hitronhub.home"},"message":"2024-03-03 14:43:46.939  INFO 5734 --- [http-nio-8090-exec-3] c.s.elk.services.impl.UserServiceImpl    : Fetching user by id:
 1"}{"@timestamp":"2024-03-04T13:08:07.470880Z","log":{"file":{"path":"/Users/srikanthjosyula/Documents/GitHub-Projects/springboot-elk-stack-example/logs/springboot-elk.log"}},"@version":"1","event":{"ori
ginal":"2024-03-03 16:23:43.162  INFO 5734 --- [http-nio-8090-exec-9] c.s.elk.services.impl.UserServiceImpl    : Fetching user by id: 2"},"host":{"name":"Srikanths-Air.hitronhub.home"},"message":"2024-03-
03 16:23:43.162  INFO 5734 --- [http-nio-8090-exec-9] c.s.elk.services.impl.UserServiceImpl    : Fetching user by id: 2"}/Users/srikanthjosyula/Documents/softwares/logstash-8.12.2/vendor/bundle/jruby/3.1.
0/gems/manticore-0.9.1-java/lib/manticore/client.rb:284: warning: already initialized constant Manticore::Client::HttpPost
/Users/srikanthjosyula/Documents/softwares/logstash-8.12.2/vendor/bundle/jruby/3.1.0/gems/manticore-0.9.1-java/lib/manticore/client.rb:284: warning: already initialized constant Manticore::Client::HttpPos
t
```

7. Logs will be see on console with logstash

Install Kibana

1. Download the file from https://www.elastic.co/downloads/kibana



2. Extract the tar file,

```
srikanthjosyula@Srikanths-Air ~ % cd ~/Documents/softwares/kibana-8.12.2
srikanthjosyula@Srikanths-Air kibana-8.12.2 % ls
LICENSE.txt     README.txt      config          logs            node_modules    packages        src
NOTICE.txt      bin             data            node            package.json    plugins         x-pack
srikanthjosyula@Srikanths-Air kibana-8.12.2 %
```

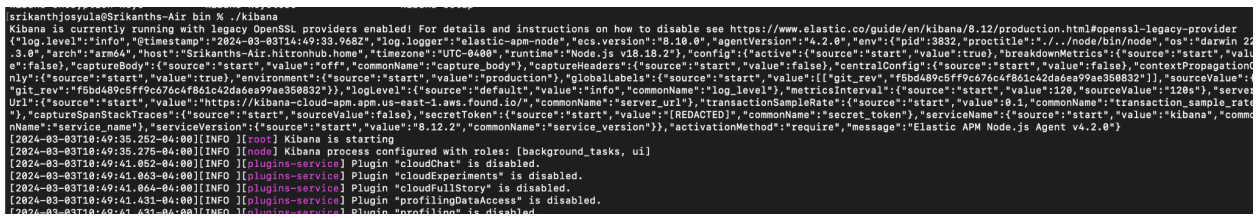
3. Before we start Kibana, we need to make sure its connecting to elasticsearch, so navigate to ${Home_Location}/kibana-8.12.2/config

```
srikanthjosyula@Srikanths-Air config % ls
kibana.yml      node.options
srikanthjosyula@Srikanths-Air config %
```

4. Open the .yml file, and enable the elasticsearch host. As we need to let Kibana to talk to elastic search to capture logs/data

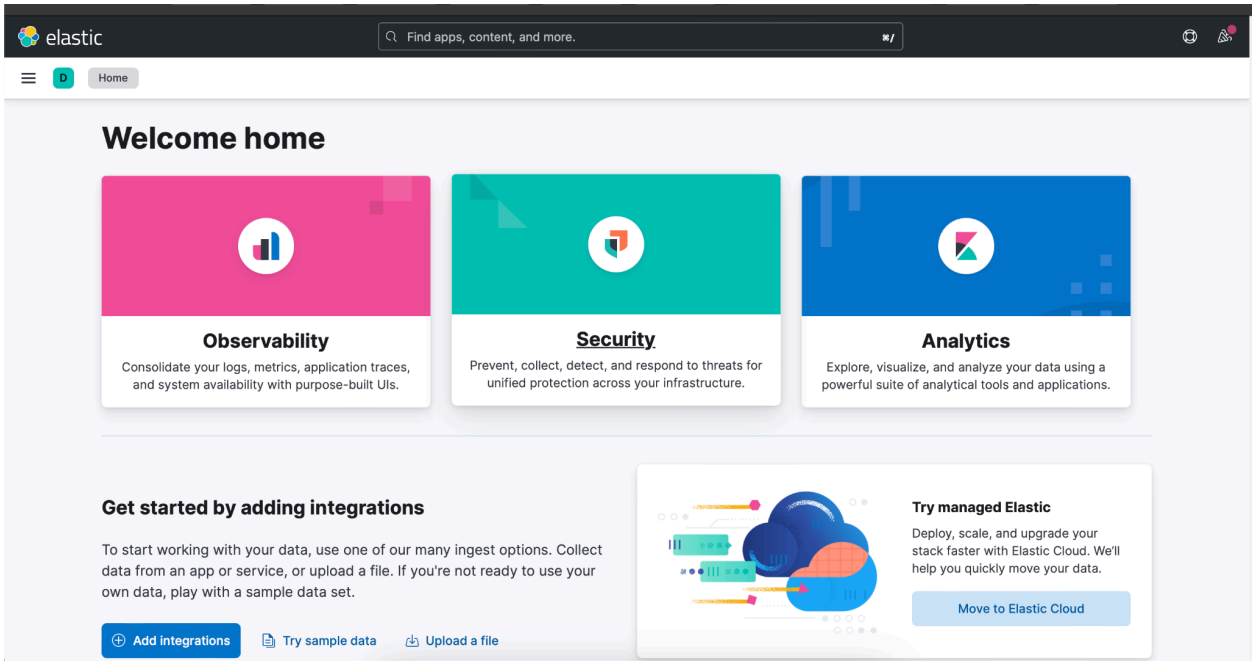
```
## ENABLED by SRIKANTH
elasticsearch.hosts: ["http://localhost:9200"]
```

5. Now, navigate to bin folder of Kibana ${HOME_LOC}/kibana-8.12.2/bin
6. Start the kibana.sh



7. We can see the Kibana started on port 5601

```
[2024-03-03T11:02:49.205-04:00][INFO ][plugins.fleet] Task Fleet-Usage-Sender-1.1.4 scheduled with interval 1h
[2024-03-03T11:02:49.206-04:00][INFO ][plugins.fleet.fleet:check-deleted-files-task:1.0.1] Started with interval of [1d] and timeout
[2024-03-03T11:02:49.206-04:00][INFO ][plugins.fleet] Task Fleet-Metrics-Task:1.0.0 scheduled with interval 1h
[2024-03-03T11:02:49.212-04:00][INFO ][plugins.monitoring.monitoring] config sourced from: production cluster
[2024-03-03T11:02:49.242-04:00][INFO ][plugins.observability] Installing SLO shared resources
[2024-03-03T11:02:49.243-04:00][INFO ][plugins.observability] Installing SLO component template [.slo-observability.sli-mappings]
[2024-03-03T11:02:49.243-04:00][INFO ][plugins.observability] Installing SLO component template [.slo-observability.sli-settings]
[2024-03-03T11:02:49.244-04:00][INFO ][plugins.observability] Installing SLO component template [.slo-observability.summary-mappings]
[2024-03-03T11:02:49.244-04:00][INFO ][plugins.observability] Installing SLO component template [.slo-observability.summary-settings]
[2024-03-03T11:02:49.248-04:00][INFO ][plugins.alerting] Installing ILM policy .alerts-ilm-policy
[2024-03-03T11:02:49.249-04:00][INFO ][plugins.alerting] Installing component template .alerts-framework-mappings
[2024-03-03T11:02:49.250-04:00][INFO ][plugins.alerting] Installing component template .alerts-legacy-alert-mappings
[2024-03-03T11:02:49.264-04:00][INFO ][plugins.alerting] Installing component template .alerts-ecs-mappings
[2024-03-03T11:02:49.268-04:00][INFO ][plugins.ruleRegistry] Installing component template .alerts-technical-mappings
[2024-03-03T11:02:50.110-04:00][INFO ][http.server.Kibana] http server running at http://localhost:5601
[2024-03-03T11:02:50.160-04:00][INFO ][plugins.fleet] Task Fleet-Usage-Logger-Task scheduled with interval 15m
[2024-03-03T11:02:50.177-04:00][INFO ][plugins.telemetry] Telemetry collection is enabled. For more information on telemetry settings
gs-kbn.html.
[2024-03-03T11:02:50.196-04:00][INFO ][plugins.monitoring.monitoring.kibana-monitoring] Starting monitoring stats collection
[2024-03-03T11:02:50.203-04:00][ERROR][plugins.observabilityAIAssistant] Failed to resolve ELSER model definition: Error: Platinum, E
```



View Logs Kibana

Step1 : Check the Indexes for the logs in Elasticsearch

1. Open http://localhost:9200/_cat, we will get all the categories

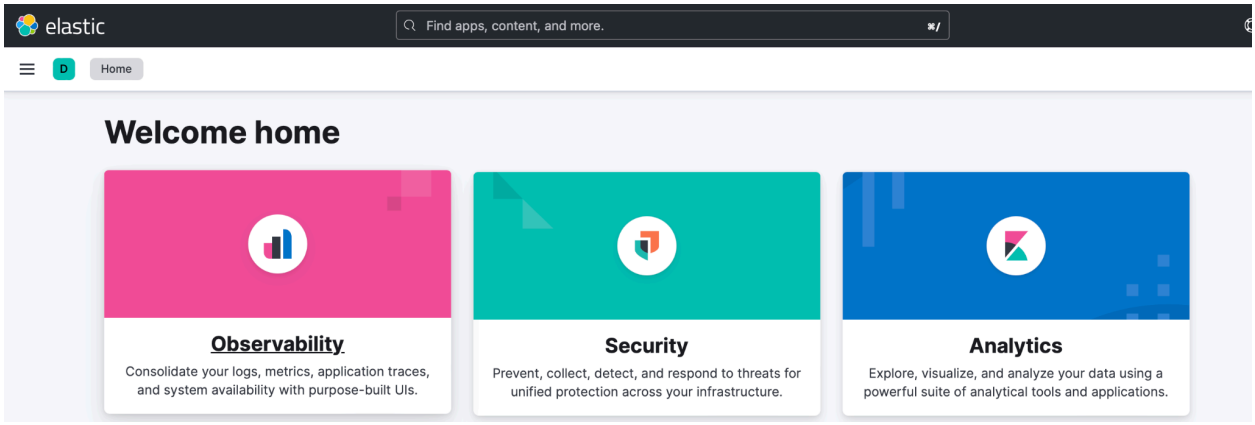
```
=^.^=
/_cat/allocation
/_cat/shards
/_cat/shards/{index}
/_cat/master
/_cat/nodes
/_cat/tasks
/_cat/indices
/_cat/indices/{index}
/_cat/segments
/_cat/segments/{index}
/_cat/count
/_cat/count/{index}
/_cat/recovery
/_cat/recovery/{index}
/_cat/health
/_cat/pending_tasks
/_cat/aliases
/_cat/aliases/{alias}
/_cat/thread_pool
/_cat/thread_pool/{thread_pools}
/_cat/plugins
/_cat/fielddata
/_cat/fielddata/{fields}
/_cat/nodeattrs
/_cat/repositories
/_cat/snapshots/{repository}
/_cat/templates
/_cat/component_templates/_cat/ml/anomaly_detectors
/_cat/ml/anomaly_detectors/{job_id}
/_cat/ml/datafeeds
/_cat/ml/datafeeds/{datafeed_id}
/_cat/ml/trained_models
/_cat/ml/trained_models/{model_id}
/_cat/ml/data_frame/analytics
/_cat/ml/data_frame/analytics/{id}
/_cat/transforms
/_cat/transforms/{transform_id}
```

2. Navigate to Indexes http://localhost:9200/_cat/indices
3. We can see our indexes . These are the indexes internally created by ELK, we can view this content in kibana

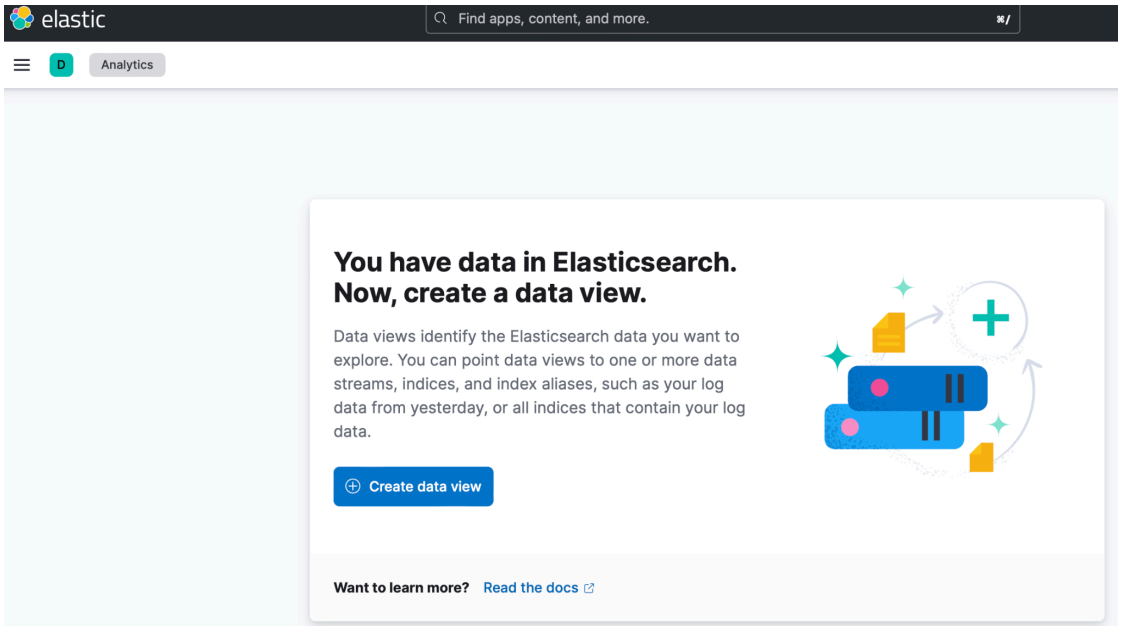
```
yellow open springboot-elk                              oIX7r4oqT3CBZ0HjZlXcaQ 1 1 35 0 109.6kb 109.6kb 109.6kb
yellow open .ds-logs-generic-default-2024.03.03-000001 cnJd5v7oQt-p_A7sC3DlcQ 1 1 35 0 132.4kb 132.4kb 132.4kb
```

Step2 : Check Logs on Kibana

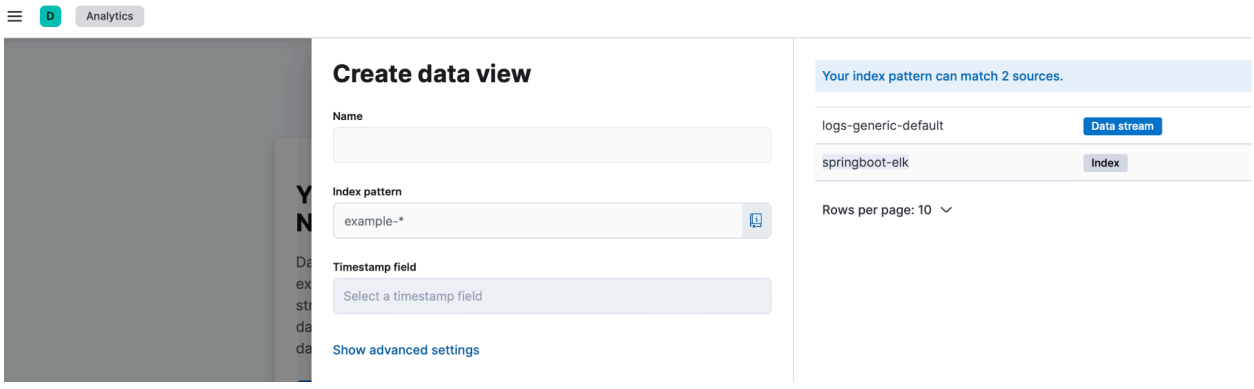
1. Open Kibana which is running on http://localhost:5601/app/home#/
2. Navigate to Analytics



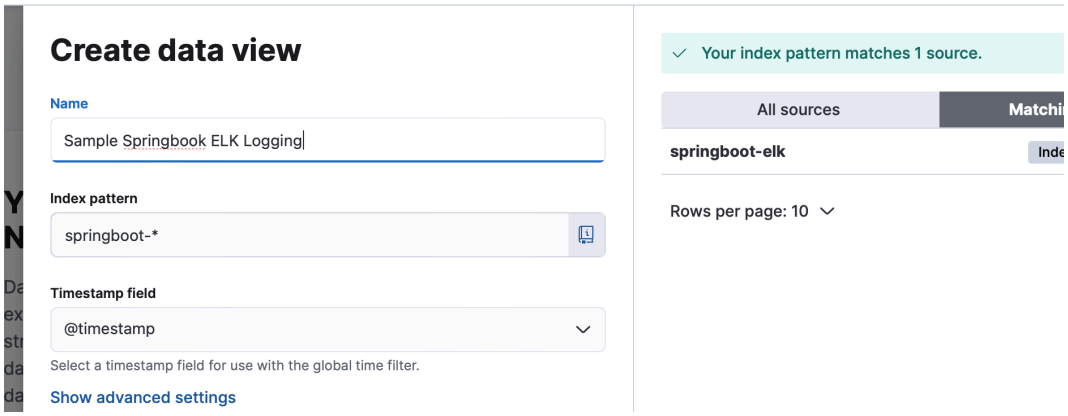
3. Click on create data view



4. We can see our index patterns there



5. Provide your index pattern and save the view



6. Once we click on discover, we can see the hits and logs, where we can see our logs and other details in json format