Listing Program

Visualisasi Trafik Pelanggan Platform Bike Sharing Speeda menggunakan Teknologi Big Data ELK-Stack

A. Konfigurasi Docker & ELK-Stack
  1. Berkas Dockerfile
    a. Dockerfile Elasticsearch (elasticsearch/Dockerfile)
```
1.  ARG ELK_VERSION
2.
3.  # https://www.docker.elastic.co/
4.  FROM
    docker.elastic.co/elasticsearch/elasticsearch:${ELK_VE
    RSION}
5.
6.  # Add your elasticsearch plugins setup here
7.  # Example: RUN elasticsearch-plugin install analysis-
    icu
```
Dockerfile menerima argument ELK_VERSION dari environtment variable yang kemudian digunakan untuk menentukan versi base image resmi dari docker.elastic.co yang akan digunakan.

    b. Dockerfile Logstash (logstash/Dockerfile)
```
1.  ARG ELK_VERSION
2.
3.  # https://www.docker.elastic.co/
4.  FROM
    docker.elastic.co/logstash/logstash:${ELK_VERSION}
5.
6.  # Add your logstash plugins setup here
7.  # Example: RUN logstash-plugin install logstash-filter-
    json
```
Dockerfile menerima argument ELK_VERSION dari environtment variable yang kemudian digunakan untuk menentukan versi base image resmi dari docker.elastic.co yang akan digunakan.

    c. Dockerfile Kibana (kibana/Dockerfile)
```
1.  ARG ELK_VERSION
2.
3.  # https://www.docker.elastic.co/
4.  FROM docker.elastic.co/kibana/kibana:${ELK_VERSION}
5.
6.  # Add your kibana plugins setup here
7.  # Example: RUN kibana-plugin install <name|url>
```
Dockerfile menerima argument ELK_VERSION dari environtment variable yang kemudian digunakan untuk menentukan versi base image resmi dari docker.elastic.co yang akan digunakan.

2. Berkas Docker Compose
   a. Docker-compose.yml

```
1.  version: '3.2'
2.
3.  services:
4.    elasticsearch:
5.      build:
6.        context: elasticsearch/
7.        args:
8.          ELK_VERSION: $ELK_VERSION
9.      volumes:
10.       - type: bind
11.         source:
    ./elasticsearch/config/elasticsearch.yml
12.         target:
    /usr/share/elasticsearch/config/elasticsearch.yml
13.         read_only: true
14.       - type: bind
15.         source: $ELASTIC_DATA
16.         target: /usr/share/elasticsearch/data
17.      ports:
18.        - "9200:9200"
19.        - "9300:9300"
20.      environment:
21.        ES_JAVA_OPTS: "-Xmx256m -Xms256m"
22.        ELASTIC_PASSWORD:
23.        # Use single node discovery in order to disable
    production mode and avoid bootstrap checks
24.        #                                          see
    https://www.elastic.co/guide/en/elasticsearch/referenc
    e/current/bootstrap-checks.html
25.        discovery.type: single-node
26.      networks:
27.        - elk
28.
29.    logstash:
30.      build:
31.        context: logstash/
32.        args:
33.          ELK_VERSION: $ELK_VERSION
34.      volumes:
35.        - type: bind
36.          source: ./logstash/config/logstash.yml
37.          target:
    /usr/share/logstash/config/logstash.yml
38.          read_only: true
39.        - type: bind
40.          source: ./logstash/config/pipelines.yml
41.          target:
    /usr/share/logstash/config/pipelines.yml
42.          read_only: true
43.        - type: bind
44.          source: ./logstash/pipeline
45.          target: /usr/share/logstash/pipeline
46.          read_only: true
47.        - type: bind
48.          source: ./logstash/other
```

```
49.          target: /usr/share/logstash/other
50.          read_only: true
51.        - type: bind
52.          source: $LOGSTASH_LASTRUN
53.          target: /usr/share/logstash/lastrun
54.      ports:
55.        - "5000:5000/tcp"
56.        - "5000:5000/udp"
57.        - "9600:9600"
58.      environment:
59.        LS_JAVA_OPTS: "-Xmx256m -Xms256m"
60.        ELASTIC_PASSWORD:
61.        MYSQL_HOST:
62.        MYSQL_PORT:
63.        MYSQL_DATABASE:
64.        MYSQL_TIMEZONE:
65.        MYSQL_USER:
66.        MYSQL_PASSWORD:
67.      networks:
68.        - elk
69.      depends_on:
70.        - elasticsearch
71.
72.    kibana:
73.      build:
74.        context: kibana/
75.        args:
76.          ELK_VERSION: $ELK_VERSION
77.      volumes:
78.        - type: bind
79.          source: ./kibana/config/kibana.yml
80.          target: /usr/share/kibana/config/kibana.yml
81.          read_only: true
82.      ports:
83.        - "5601:5601"
84.      environment:
85.        ELASTIC_PASSWORD:
86.      networks:
87.        - elk
88.      depends_on:
89.        - elasticsearch
90.
91.  networks:
92.    elk:
93.      driver: bridge
```

Untuk menjalankan ketiga container dari ELK-stack sekaligus dengan baik perlu didefinisikan berkas docker-compose.yml.

3. Berkas ELK-Stack
    a. Elasticsearch.yml (elasticsearch/config/elasticsearch.yml)

```
1.  ---
2.  ##   Default   Elasticsearch   configuration   from
    Elasticsearch base image.
3.  ##
    https://github.com/elastic/elasticsearch/blob/master/d
    istribution/docker/src/docker/config/elasticsearch.yml
```

```
4.  #
5.  cluster.name: "docker-cluster"
6.  network.host: 0.0.0.0
7.
8.  ## X-Pack settings
9.  ##                                    see
    https://www.elastic.co/guide/en/elasticsearch/referenc
    e/current/setup-xpack.html
10. #
11. xpack.license.self_generated.type: basic
12. xpack.security.enabled: true
13. xpack.monitoring.collection.enabled: true
```

Konfigurasi khusus Elasticsearch terdapat pada sub-direktori "elasticsearch" direktori kerja, khususnya di dalam direktori "config" yaitu berkas elasticsearch.yml. Pada berkas ini diatur nama kluster, konfigurasi keamanan, serta monitoring elasticsearch sendiri.

b. Logstash.yml (logstash/config/logstash.yml)

```
1.  ---
2.  ## Default Logstash configuration from Logstash base
    image.
3.  ##
    https://github.com/elastic/logstash/blob/master/docker
    /data/logstash/config/logstash-full.yml
4.  #
5.  http.host: "0.0.0.0"
6.  xpack.monitoring.elasticsearch.hosts:           [
    "http://elasticsearch:9200" ]
7.
8.  ## X-Pack security credentials
9.  #
10. xpack.monitoring.enabled: true
11. xpack.monitoring.elasticsearch.username: elastic
12. xpack.monitoring.elasticsearch.password:
    "${ELASTIC_PASSWORD}"
```

Konfigurasi khusus Logstash terdapat pada sub-direktori "logstash" direktori kerja, khususnya di dalam direktori "config" yaitu berkas logstash.yml. Pada berkas ini diatur host logstash, host elasticsearch yang dihubungkan, monitoring logstash sendiri, serta username dan password dari host elasticsearch yang dihubungkan.

c. Kibana.yml (kibana/config/kibana.yml)

```
1.  ---
2.  ## Default Kibana configuration from Kibana base
    image.
3.  ##
    https://github.com/elastic/kibana/blob/master/src/de
    v/build/tasks/os_packages/docker_generator/templates
    /kibana_yml.template.js
4.  #
5.  server.name: kibana
6.  server.host: 0.0.0.0
7.  elasticsearch.hosts: [ "http://elasticsearch:9200" ]
8.  monitoring.ui.container.elasticsearch.enabled: true
```

```
 9.
10.  ## X-Pack security credentials
11.  #
12.  elasticsearch.username: elastic
13.  elasticsearch.password: "${ELASTIC_PASSWORD}"
```

Konfigurasi khusus Kibana terdapat pada sub-direktori "kibana"
direktori kerja, khususnya di dalam direktori "config" yaitu berkas
kibana.yml. Pada berkas ini diatur host kibana, host elasticsearch
yang dihubungkan, monitoring kibana sendiri, serta username dan
password dari host elasticsearch yang dihubungkan.

B. Konfigurasi & Program Logstash
1. Pipelines.yml (logstash/config/pipelines.yml)
```
1.  - pipeline.id: speeda-operator
2.    path.config: "${HOME}/pipeline/speeda-operator"
3.  - pipeline.id: speeda-stasiun
4.    path.config: "${HOME}/pipeline/speeda-stasiun"
5.  - pipeline.id: speeda-lokasi
6.    path.config: "${HOME}/pipeline/speeda-lokasi"
7.
```

Pipeline yang dibutuhkan adalah berjumlah 3 buah, yaitu operator, stasiun,
dan lokasi.

2. Pipeline Operator
a. Speeda.operator.conf
(logstash/pipeline/speeda-operator/speeda.operator.conf)
```
 1.  input {
 2.    jdbc {
 3.      jdbc_driver_library  =>  "${HOME}/other/lib/mysql-
      connector-java-8.0.21.jar"
 4.      jdbc_driver_class => "com.mysql.jdbc.Driver"
 5.      jdbc_connection_string                    =>
      "jdbc:mysql://${MYSQL_HOST}:${MYSQL_PORT}/${MYSQL_DATA
      BASE}?serverTimezone=${MYSQL_TIMEZONE}"
 6.      jdbc_user => "${MYSQL_USER}"
 7.      jdbc_password => "${MYSQL_PASSWORD}"
 8.      tracking_column => "loc_id"
 9.      use_column_value => true
10.      last_run_metadata_path                    =>
      "${HOME}/lastrun/operator.txt"
11.      statement => "SELECT * from location WHERE loc_id
      > :sql_last_value"
12.      schedule => "* * * * *"
13.    }
14.  }
15.
16.  filter {
17.    ruby {
18.      path => "${HOME}/other/filter/speeda.operator.rb"
19.    }
20.  }
21.
22.  output {
23.    # stdout {
```

```
24.    #    codec => rubydebug
25.    # }
26.     elasticsearch {
27.            hosts => "elasticsearch:9200"
28.            user => "elastic"
29.            password => "${ELASTIC_PASSWORD}"
30.      index => "operator"
31.      template                                    =>
    "${HOME}/other/mapping/speeda.operator.json"
32.       template_name => "operator"
33.       document_id => "%{[operator][id]}"
34.     }
35. }
```

Berkas pipeline speeda-operator.conf secara umum berkas pipeline terbagi menjadi 3 bagian, yaitu bagian input, filter, dan output.

b. Speeda.operator.rb
    (logstash/other/filter/speeda.operator.rb)

```
1.  # the filter method receives an event and must return
    a list of events.
2.  # Dropping an event means not including it in the return
    array,
3.  # while creating new ones only requires you to add a
    new instance of
4.  # LogStash::Event to the returned array
5.  def filter(event)
6.  id = event.get("loc_id")
7.  code = event.get("loc_code")
8.  name = event.get("loc_name")
9.  operator = {
10.   "id" => id,
11.   "code" => code,
12.   "name" => name
13. }
14. event.set("operator", operator)
15.
16. event.remove("loc_desc")
17. event.remove("loc_icon")
18. event.remove("loc_cms_domain")
19. event.remove("loc_created")
20. event.remove("loc_logo")
21. event.remove("loc_name")
22. event.remove("loc_max_bike")
23. event.remove("loc_id")
24. event.remove("loc_code")
25. event.remove("loc_max_station")
26. event.remove("loc_colors")
27. return [event]
28. end
```

Merupakan kode program yang digunakan untuk *cleansing* dan transformasi data operator.

c. Speeda.operator.json
    (logstash/other/mapping/speeda.operator.json)

```
1.  {
```

```
2.     "template": "operator",
3.     "mappings": {
4.       "properties": {
5.         "operator": {
6.           "properties": {
7.             "code": {
8.               "type": "text",
9.               "fields": {
10.                 "keyword":    {    "type":    "keyword",
    "ignore_above": 256 }
11.               }
12.             },
13.             "id": { "type": "long" },
14.             "name": {
15.               "type": "text",
16.               "fields": {
17.                 "keyword":    {    "type":    "keyword",
    "ignore_above": 256 }
18.               }
19.             }
20.           }
21.         }
22.       }
23.     }
24. }
```

Struktur mapping dari indeks operator.

3. Pipeline Stasiun
    a. Speeda.stasiun.conf
       (logstash/pipeline/speeda-stasiun/speeda.stasiun.conf)

```
1.  input {
2.    jdbc {
3.      jdbc_driver_library  =>  "${HOME}/other/lib/mysql-
    connector-java-8.0.21.jar"
4.      jdbc_driver_class => "com.mysql.jdbc.Driver"
5.      jdbc_connection_string                        =>
    "jdbc:mysql://${MYSQL_HOST}:${MYSQL_PORT}/${MYSQL_DATA
    BASE}?serverTimezone=${MYSQL_TIMEZONE}"
6.      jdbc_user => "${MYSQL_USER}"
7.      jdbc_password => "${MYSQL_PASSWORD}"
8.      tracking_column => "sta_add_date"
9.      tracking_column_type => "timestamp"
10.     use_column_value => true
11.     last_run_metadata_path                        =>
    "${HOME}/lastrun/stasiun.txt"
12.     statement => "SELECT * FROM stations JOIN location
    ON   loc_id  =  sta_loc   WHERE   sta_add_date   >
    :sql_last_value OR sta_update_date > :sql_last_value
    ORDER BY sta_add_date ASC"
13.     schedule => "* * * * *"
14.   }
15. }
16.
17. filter {
18.   mutate {
19.     convert => [ "sta_lat", "float" ]
20.     convert => [ "sta_long", "float" ]
```

```
21.    }
22.    ruby {
23.      path => "${HOME}/other/filter/speeda.stasiun.rb"
24.    }
25. }
26.
27. output {
28.    # stdout {
29.    #    codec => rubydebug
30.    # }
31.    elasticsearch {
32.            hosts => "elasticsearch:9200"
33.            user => "elastic"
34.            password => "${ELASTIC_PASSWORD}"
35.      index => "stasiun"
36.      template                                      =>
   "${HOME}/other/mapping/speeda.stasiun.json"
37.      template_name => "stasiun"
38.      document_id => "%{id}"
39.    }
40. }
```

Berkas pipeline speeda-stasiun.conf secara umum berkas pipeline terbagi menjadi 3 bagian, yaitu bagian input, filter, dan output.

b. Speeda. stasiun.rb
    (logstash/other/filter/speeda.stasiun.rb)

```
1.   # the filter method receives an event and must return
     a list of events.
2.   # Dropping an event means not including it in the return
     array,
3.   # while creating new ones only requires you to add a
     new instance of
4.   # LogStash::Event to the returned array
5.   def filter(event)
6.     id = event.get("sta_id")
7.     name = event.get("sta_name")
8.     status = event.get("sta_status")
9.     lat = (event.get("sta_lat")).round(5)
10.    lon = (event.get("sta_long")).round(5)
11.    location = {
12.      "lat" => lat,
13.      "lon" => lon
14.    }
15.    operator_id = event.get("loc_id")
16.    operator_code = event.get("loc_code")
17.    operator_name = event.get("loc_name")
18.    operator ={
19.      "id" => operator_id,
20.      "code" => operator_code,
21.      "name" => operator_name
22.    }
23.    warehouse = event.get("is_warehouse")
24.
25.    event.set("id", id)
26.    event.set("name", name)
27.    event.set("status", status)
```

```
28.    event.set("location", location)
29.    event.set("operator", operator)
30.    event.set("warehouse", warehouse)
31.
32.    event.remove("sta_id")
33.     event.remove("sta_name")
34.     event.remove("sta_desc")
35.     event.remove("sta_add_user")
36.     event.remove("sta_add_date")
37.     event.remove("sta_update_user")
38.     event.remove("sta_update_date")
39.     event.remove("sta_status")
40.     event.remove("sta_lat")
41.     event.remove("sta_long")
42.     event.remove("sta_location_desc")
43.     event.remove("sta_loc")
44.     event.remove("sta_icon")
45.     event.remove("sta_deleted")
46.     event.remove("is_warehouse")
47.     event.remove("sta_hide")
48.    event.remove("loc_desc")
49.    event.remove("loc_icon")
50.    event.remove("loc_cms_domain")
51.    event.remove("loc_created")
52.    event.remove("loc_logo")
53.    event.remove("loc_name")
54.    event.remove("loc_max_bike")
55.    event.remove("loc_id")
56.    event.remove("loc_code")
57.    event.remove("loc_max_station")
58.    event.remove("loc_colors")
59.
60.    return [event]
61.    end
62.
```

Kode program yang digunakan untuk cleansing dan transformasi data stasiun. Dalam potongan kode tersebut terdapat proses penting cleansing untuk menyamakan data "sta_lat" dan "sta_long" dengan tingkat presisi 5 angka di belakang koma.

c. Speeda. stasiun.json
   (logstash/other/mapping/speeda.stasiun.json)

```
1.  {
2.    "template": "stasiun",
3.    "mappings": {
4.      "properties": {
5.        "id": { "type": "long" },
6.        "location": {
7.          "type": "geo_point"
8.        },
9.        "name": {
10.          "type": "text",
11.          "fields": { "keyword": { "type": "keyword",
      "ignore_above": 256 } }
12.        },
13.        "operator": {
```

```
14.          "properties": {
15.            "code": {
16.              "type": "text",
17.              "fields": {
18.                "keyword":    {    "type":    "keyword",
     "ignore_above": 256 }
19.              }
20.            },
21.            "id": { "type": "long" },
22.            "name": {
23.              "type": "text",
24.              "fields": {
25.                "keyword":    {    "type":    "keyword",
     "ignore_above": 256 }
26.              }
27.            }
28.          }
29.        },
30.        "status": {
31.          "type": "text",
32.          "fields": { "keyword": { "type": "keyword",
     "ignore_above": 256 } }
33.        },
34.        "warehouse": { "type": "boolean" }
35.      }
36.    }
37. }
```

Struktur mapping dari indeks stasiun.

4. Pipeline Lokasi
   a. Speeda.lokasi.conf
      (logstash/pipeline/speeda-lokasi/speeda.lokasi.conf)

```
1.  input {
2.    jdbc {
3.      jdbc_driver_library  =>  "${HOME}/other/lib/mysql-
    connector-java-8.0.21.jar"
4.      jdbc_driver_class => "com.mysql.jdbc.Driver"
5.      jdbc_connection_string                          =>
    "jdbc:mysql://${MYSQL_HOST}:${MYSQL_PORT}/${MYSQL_DATA
    BASE}?serverTimezone=${MYSQL_TIMEZONE}"
6.      jdbc_user => "${MYSQL_USER}"
7.      jdbc_password => "${MYSQL_PASSWORD}"
8.      tracking_column => "pos_id"
9.      use_column_value => true
10.     last_run_metadata_path                          =>
    "${HOME}/lastrun/lokasi.txt"
11.     statement => "SELECT * FROM bike_positions JOIN
    bikes ON bike_id = pos_bike JOIN location ON loc_id =
    bike_loc WHERE pos_id > :sql_last_value LIMIT 20000"
12.     schedule => "* * * * *"
13.   }
14. }
15.
16. filter {
17.   mutate {
18.     convert => [ "pos_lat", "float" ]
19.     convert => [ "pos_long", "float" ]
```

```
20.      convert => [ "pos_utc_time", "integer" ]
21.      convert => [ "pos_src", "integer" ]
22.    }
23.    ruby {
24.      path => "${HOME}/other/filter/speeda.lokasi.rb"
25.    }
26.    mutate {
27.      convert => [ "dayofweek", "integer" ]
28.      convert => [ "hourofday", "integer" ]
29.    }
30. }
31.
32. output {
33.    # stdout {
34.    #   codec => rubydebug
35.    # }
36.    elasticsearch {
37.          hosts => "elasticsearch:9200"
38.          user => "elastic"
39.          password => "${ELASTIC_PASSWORD}"
40.      index => "lokasi"
41.      template                                   =>
    "${HOME}/other/mapping/speeda.lokasi.json"
42.      template_name => "lokasi"
43.      document_id => "%{id}"
44.    }
45. }
```

Berkas pipeline speeda-lokasi.conf secara umum berkas pipeline
terbagi menjadi 3 bagian, yaitu bagian input, filter, dan output.

b. Speeda.lokasi.rb
    (logstash/other/filter/speeda.lokasi.rb)

```
1.   # the filter method receives an event and must return
     a list of events.
2.   # Dropping an event means not including it in the return
     array,
3.   # while creating new ones only requires you to add a
     new instance of
4.   # LogStash::Event to the returned array
5.   def filter(event)
6.     id = event.get("pos_id")
7.     lat = (event.get("pos_lat")).round(5)
8.     lon = (event.get("pos_long")).round(5)
9.     location = {
10.      "lat" => lat,
11.      "lon" => lon
12.    }
13.    stamp = event.get("pos_utc_time")
14.    unless stamp
15.      stamp = event.get("pos_insert")
16.    end
17.    t = Time.at(stamp.to_i)
18.    d = DateTime.parse(t.to_s)
19.    l = d.new_offset("+07:00")
20.    datetime = l.strftime("%FT%T.%L%:z")
21.    dayofweek = l.strftime("%u")
```

```
22.    hourofday = l.strftime("%H")
23.    src = event.get("pos_src")
24.    trx = event.get("pos_trx")
25.    bike_id = event.get("bike_id")
26.    bike_longid = event.get("bike_longid")
27.    bike_name = event.get("bike_name")
28.    bike_mode = event.get("bike_mode")
29.    bike ={
30.      "id" => bike_id,
31.      "longid" => bike_longid,
32.      "name" => bike_name,
33.      "mode" => bike_mode
34.    }
35.    operator_id = event.get("loc_id")
36.    operator_code = event.get("loc_code")
37.    operator_name = event.get("loc_name")
38.    operator = {
39.      "id" => operator_id,
40.      "code" => operator_code,
41.      "name" => operator_name
42.    }
43.
44.    event.set("id", id)
45.    event.set("location", location)
46.    event.set("datetime", datetime)
47.    event.set("dayofweek", dayofweek)
48.    event.set("hourofday", hourofday)
49.    event.set("src", src)
50.    event.set("trx", trx)
51.    event.set("bike", bike)
52.    event.set("operator", operator)
53.
54.    event.remove("pos_id")
55.     event.remove("pos_bike")
56.     event.remove("pos_user")
57.     event.remove("pos_lat")
58.     event.remove("pos_long")
59.     event.remove("pos_alt")
60.     event.remove("pos_course")
61.     event.remove("pos_speed")
62.     event.remove("pos_ip")
63.     event.remove("pos_bat")
64.     event.remove("pos_tz")
65.     event.remove("pos_utc_time")
66.     event.remove("pos_bt")
67.     event.remove("pos_src")
68.     event.remove("pos_satellite")
69.     event.remove("pos_realtime")
70.     event.remove("pos_inposition")
71.     event.remove("pos_lbs")
72.     event.remove("pos_wifi")
73.     event.remove("pos_insert")
74.     event.remove("pos_addr")
75.     event.remove("pos_desc")
76.     event.remove("pos_trx")
77.    event.remove("bike_id")
78.     event.remove("bike_longid")
```

```
79.     event.remove("bike_frame")
80.     event.remove("bike_mode")
81.     event.remove("bike_lock")
82.     event.remove("bike_bt_name")
83.     event.remove("bike_bt_pass")
84.     event.remove("bike_name")
85.     event.remove("bike_desc")
86.     event.remove("bike_assets_status")
87.     event.remove("bike_maintenance")
88.     event.remove("bike_asset_date")
89.     event.remove("bike_add_date")
90.     event.remove("bike_update_date")
91.     event.remove("bike_delete")
92.     event.remove("bike_delete_user")
93.     event.remove("bike_delete_date")
94.     event.remove("bike_loc")
95.   event.remove("loc_desc")
96.   event.remove("loc_icon")
97.   event.remove("loc_cms_domain")
98.   event.remove("loc_created")
99.   event.remove("loc_logo")
100.  event.remove("loc_name")
101.  event.remove("loc_max_bike")
102.  event.remove("loc_id")
103.  event.remove("loc_code")
104.  event.remove("loc_max_station")
105.  event.remove("loc_colors")
106.
107.  return [event]
108.  end
109.
```

Kode program yang digunakan untuk cleansing dan transformasi data lokasi. Dalam potongan kode tersebut terdapat proses penting cleansing untuk menyamakan data "pos_lat" dan "pos_long" dengan tingkat presisi 5 angka di belakang koma. Terdapat juga kondisi untuk memilih nilai dari "timestamp" data, serta mengkonversinya sesuai dengan zona waktu GMT+7 kemudian di transformasi dengan format tanggal standar, format hari, dan format jam.

c. Speeda.lokasi.json
(logstash/other/mapping/speeda.lokasi.json)

```
1.  {
2.    "template": "lokasi",
3.    "mappings": {
4.      "properties": {
5.        "id": { "type": "long" },
6.        "bike": {
7.          "properties": {
8.            "id": { "type": "long" },
9.            "mode": { "type": "long" },
10.           "name": {
11.             "type": "text",
12.             "fields": {
13.               "keyword":    {    "type":    "keyword",
      "ignore_above": 256 }
```

```
14.                   }
15.               },
16.           "longid": {
17.             "type": "text",
18.             "fields": {
19.               "keyword":    {    "type":    "keyword",
    "ignore_above": 256 }
20.               }
21.             }
22.           }
23.         },
24.         "operator": {
25.           "properties": {
26.             "code": {
27.               "type": "text",
28.               "fields": {
29.                 "keyword":    {    "type":    "keyword",
    "ignore_above": 256 }
30.                 }
31.               },
32.             "id": { "type": "long" },
33.             "name": {
34.               "type": "text",
35.               "fields": {
36.                 "keyword":    {    "type":    "keyword",
    "ignore_above": 256 }
37.                 }
38.               }
39.             }
40.           },
41.           "location": {
42.             "type": "geo_point"
43.           },
44.           "datetime": {
45.             "type": "date"
46.           },
47.           "dayofweek": {
48.             "type": "long"
49.           },
50.           "hourofday": {
51.             "type": "long"
52.           },
53.           "src": { "type": "long" },
54.           "trx": { "type": "long" }
55.         }
56.       }
57. }
```
Struktur mapping dari indeks lokasi

C. Menjalankan ELK-Stack
1. Mengatur Environtment Variabel (.env)
```
1. ELK_VERSION=7.7.1
2. ELASTIC_DATA=/home/hidaru/docker/elasticsearch/data
3. ELASTIC_PASSWORD=r@h4asia
4. LOGSTASH_LASTRUN=/home/hidaru/docker/elasticsearch/lastrun
5. MYSQL_HOST=172.17.0.1
6. MYSQL_PORT=3306
```

```
 7.  MYSQL_DATABASE=akakom_speeda
 8.  MYSQL_TIMEZONE=Asia/Jakarta
 9.  MYSQL_USER=wahid
10.  MYSQL_PASSWORD=akakom
```

Variabel-variabel yang digunakan pada ELK-stack secara menyeluruh, Penjelasan field konfigurasi yang tersedia:

- ELK_VERSION
  Versi dari ELK-Stack yang akan digunakan. Biarkan nilai untuk menggunakan versi yang sama dengan penelitian.
- ELASTIC_DATA
  Direktori tempat berkas sistem dan basis data ELK-Stack disimpan. Sesuaikan dengan direktori tempat "data.zip" diekstrak.
- ELASTIC_PASSWORD
  Built-in Password ELK-Stack, digunakan untuk mengakses elasticsearch serta login ke kibana.
- LOGSTASH_LASTRUN
  Direktori tempat berkas sistem logstash disimpan. Sesuaikan dengan direktori tempat "lastrun.zip" diekstrak.
- MYSQL_HOST
  Host dari mysql server yang akan digunakan sebagai sumber data.
- MYSQL_PORT
  Port dari mysql server yang akan digunakan sebagai sumber data.
- MYSQL_DATABASE
  Nama basis data dari mysql server yang akan digunakan sebagai sumber data.
- MYSQL_TIMEZONE
  Zona waktu dari mysql server yang akan digunakan sebagai sumber data.
- MYSQL_USER
  Username dari user mysql server yang akan digunakan sebagai sumber data.
- MYSQL_PASSWORD
  Password dari user mysql server yang akan digunakan sebagai sumber data.

2. Menjalankan Melalui Docker-compose
   ELK-stack pada docker dijalankan dengan perintah di terminal "docker-compose up -d".

```
hidaru at elucidator in /mnt/hid/dev/akakom/skripsi/docker-elk on skripsi!
± docker-compose up -d
Creating network "docker-elk_elk" with driver "bridge"
Creating docker-elk_elasticsearch_1 ... done
Creating docker-elk_kibana_1         ... done
Creating docker-elk_logstash_1       ... done
```

3. Mengecek ELK-Stack di Docker
   Status container-container ELK-stack dapat dicek menggunakan perintah di terimnal "docker ps".

```
hidaru at elucidator in /mnt/hid/dev/akakom/skripsi/docker-elk on skripsi!
± docker ps
CONTAINER ID      IMAGE                      COMMAND              CREATED
 STATUS            PORTS
          NAMES
5166774fbf21      docker-elk_logstash        "/usr/local/bin/dock…"  2 minutes ago
 Up 2 minutes       0.0.0.0:5000->5000/tcp, 0.0.0.0:9600->9600/tcp, 0.0.0.0:5000->5000/udp
, 5044/tcp   docker-elk_logstash_1
5ad08a31f740      docker-elk_kibana          "/usr/local/bin/dumb…"  2 minutes ago
 Up 2 minutes       0.0.0.0:5601->5601/tcp
          docker-elk_kibana_1
49efbf1df764      docker-elk_elasticsearch   "/tini -- /usr/local…"  2 minutes ago
 Up 2 minutes       0.0.0.0:9200->9200/tcp, 0.0.0.0:9300->9300/tcp
          docker-elk_elasticsearch_1
```

D. Ekspor *Object* Kibana (export.ndjson)

1. {"attributes":{"buildNum":30896,"defaultIndex":"629fe9e0-3499-11eb-b93d-bf8caa95ff45"},"id":"7.7.1","references":[],"type":"config","updated_at":"2020-12-02T12:24:56.611Z","version":"WzYsMV0="}

2. {"attributes":{"fields":"[{\"name\":\"@timestamp\",\"type\":\"date\",\"esTypes\":[\"date\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":true},{\"name\":\"@version\",\"type\":\"string\",\"esTypes\":[\"text\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":false,\"readFromDocValues\":false},{\"name\":\"@version.keyword\",\"type\":\"string\",\"esTypes\":[\"keyword\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":true,\"subType\":{\"multi\":{\"parent\":\"@version\"}}},{\"name\":\"_id\",\"type\":\"string\",\"esTypes\":[\"_id\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":false},{\"name\":\"_index\",\"type\":\"string\",\"esTypes\":[\"_index\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":false},{\"name\":\"_score\",\"type\":\"number\",\"count\":0,\"scripted\":false,\"searchable\":false,\"aggregatable\":false,\"readFromDocValues\":false},{\"name\":\"_source\",\"type\":\"_source\",\"esTypes\":[\"_source\"],\"count\":0,\"scripted\":false,\"searchable\":false,\"aggregatable\":false,\"readFromDocValues\":false},{\"name\":\"_type\",\"type\":\"string\",\"esTypes\":[\"_type\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":false},{\"name\":\"bike.id\",\"type\":\"number\",\"esTypes\":[\"long\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":true},{\"name\":\"bike.longid\",\"type\":\"string\",\"esTypes\":[\"text\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":false,\"readFromDocValues\":false},{\"name\":\"bike.longid.keyword\",\"type\":\"string\",\"esTypes\":[\"keyword\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":true,\"subType\":{\"multi\":{\"parent\":\"bike.longid\"}}},{\"name\":\"bike.mode\",\"type\":\"number\",\"esTypes\":[\"long\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":true},{\"name\":\"bike.name\",\"type\":\"string\",\"esTypes\":[\"text\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":false,\"readFromDocValues\":false},{\"name\":\"bike.name.keyword\",\"type\":\"string\",\"esTypes\":[\"keyword\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":true,\"subType\":{\"multi\":{\"parent\":\"bike.name\"}}},{\"name\":\"datetime\",\"type\":\"date\",\"esTypes\":[\"date\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":true,\"readFromDocValues\":true},{\"name\":\"dayofweek\",\"type\":\"number\",\"esTypes\":[\"long

\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggreg
atable\":true,\"readFromDocValues\":true},{\"name\":\"hourofday
\",\"type\":\"number\",\"esTypes\":[\"long\"],\"count\":0,\"scr
ipted\":false,\"searchable\":true,\"aggregatable\":true,\"readF
romDocValues\":true},{\"name\":\"id\",\"type\":\"number\",\"esT
ypes\":[\"long\"],\"count\":0,\"scripted\":false,\"searchable\"
:true,\"aggregatable\":true,\"readFromDocValues\":true},{\"name
\":\"location\",\"type\":\"geo_point\",\"esTypes\":[\"geo_point
\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggreg
atable\":true,\"readFromDocValues\":true},{\"name\":\"operator.
code\",\"type\":\"string\",\"esTypes\":[\"text\"],\"count\":0,\
"scripted\":false,\"searchable\":true,\"aggregatable\":false,\"
readFromDocValues\":false},{\"name\":\"operator.code.keyword\",
\"type\":\"string\",\"esTypes\":[\"keyword\"],\"count\":0,\"scr
ipted\":false,\"searchable\":true,\"aggregatable\":true,\"readF
romDocValues\":true,\"subType\":{\"multi\":{\"parent\":\"operat
or.code\"}}},{\"name\":\"operator.id\",\"type\":\"number\",\"es
Types\":[\"long\"],\"count\":0,\"scripted\":false,\"searchable\
":true,\"aggregatable\":true,\"readFromDocValues\":true},{\"nam
e\":\"operator.name\",\"type\":\"string\",\"esTypes\":[\"text\"
],\"count\":0,\"scripted\":false,\"searchable\":true,\"aggregat
able\":false,\"readFromDocValues\":false},{\"name\":\"operator.
name.keyword\",\"type\":\"string\",\"esTypes\":[\"keyword\"],\"
count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable
\":true,\"readFromDocValues\":true,\"subType\":{\"multi\":{\"pa
rent\":\"operator.name\"}}},{\"name\":\"src\",\"type\":\"number
\",\"esTypes\":[\"long\"],\"count\":0,\"scripted\":false,\"sear
chable\":true,\"aggregatable\":true,\"readFromDocValues\":true}
,{\"name\":\"trx\",\"type\":\"number\",\"esTypes\":[\"long\"],\
"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatabl
e\":true,\"readFromDocValues\":true}]","timeFieldName":"datetim
e","title":"lokasi"},"id":"629fe9e0-3499-11eb-b93d-
bf8caa95ff45","migrationVersion":{"index-
pattern":"7.6.0"},"references":[],"type":"index-
pattern","updated_at":"2020-12-
02T12:24:57.877Z","version":"WzcsMV0="}
3. {"attributes":{"fields":"[{\"name\":\"@timestamp\",\"type\":\"d
ate\",\"esTypes\":[\"date\"],\"count\":0,\"scripted\":false,\"s
earchable\":true,\"aggregatable\":true,\"readFromDocValues\":tr
ue},{\"name\":\"@version\",\"type\":\"string\",\"esTypes\":[\"t
ext\"],\"count\":0,\"scripted\":false,\"searchable\":true,\"agg
regatable\":false,\"readFromDocValues\":false},{\"name\":\"@ver
sion.keyword\",\"type\":\"string\",\"esTypes\":[\"keyword\"],\"
count\":0,\"scripted\":false,\"searchable\":true,\"aggregatable
\":true,\"readFromDocValues\":true,\"subType\":{\"multi\":{\"pa
rent\":\"@version\"}}},{\"name\":\"_id\",\"type\":\"string\",\"
esTypes\":[\"_id\"],\"count\":0,\"scripted\":false,\"searchable
\":true,\"aggregatable\":true,\"readFromDocValues\":false},{\"n
ame\":\"_index\",\"type\":\"string\",\"esTypes\":[\"_index\"],\
"count\":0,\"scripted\":false,\"searchable\":true,\"aggregatabl
e\":true,\"readFromDocValues\":false},{\"name\":\"_score\",\"ty
pe\":\"number\",\"count\":0,\"scripted\":false,\"searchable\":f
alse,\"aggregatable\":false,\"readFromDocValues\":false},{\"nam
e\":\"_source\",\"type\":\"_source\",\"esTypes\":[\"_source\"],
\"count\":0,\"scripted\":false,\"searchable\":false,\"aggregata
ble\":false,\"readFromDocValues\":false},{\"name\":\"_type\",\"
type\":\"string\",\"esTypes\":[\"_type\"],\"count\":0,\"scripte
d\":false,\"searchable\":true,\"aggregatable\":true,\"readFromD
ocValues\":false},{\"name\":\"operator.code\",\"type\":\"string
\",\"esTypes\":[\"text\"],\"count\":0,\"scripted\":false,\"sear
chable\":true,\"aggregatable\":false,\"readFromDocValues\":fals
e},{\"name\":\"operator.code.keyword\",\"type\":\"string\",\"es

Types\":[\"keyword\"],\"count\":0,\"scripted\":false,\"searchab
le\":true,\"aggregatable\":true,\"readFromDocValues\":true,\"su
bType\":{\"multi\":{\"parent\":\"operator.code\"}}},{\"name\":\
"operator.id\",\"type\":\"number\",\"esTypes\":[\"long\"],\"cou
nt\":0,\"scripted\":false,\"searchable\":true,\"aggregatable\":
true,\"readFromDocValues\":true},{\"name\":\"operator.name\",\"
type\":\"string\",\"esTypes\":[\"text\"],\"count\":0,\"scripted
\":false,\"searchable\":true,\"aggregatable\":false,\"readFromD
ocValues\":false},{\"name\":\"operator.name.keyword\",\"type\":
\"string\",\"esTypes\":[\"keyword\"],\"count\":0,\"scripted\":f
alse,\"searchable\":true,\"aggregatable\":true,\"readFromDocVal
ues\":true,\"subType\":{\"multi\":{\"parent\":\"operator.name\"
}}}]","title":"operator"},"id":"89ee0450-3499-11eb-b93d-
bf8caa95ff45","migrationVersion":{"index-
pattern":"7.6.0"},"references":[],"type":"index-
pattern","updated_at":"2020-12-
02T12:26:02.164Z","version":"WzEyLDFd"}

4. {"attributes":{"description":"","kibanaSavedObjectMeta":{"searc
hSourceJSON":"{\"query\":{\"query\":\"\",\"language\":\"kuery\"
},\"filter\":[]}"},"title":"Dropdown   Filter
Operator","uiStateJSON":"{}","version":1,"visState":"{\"type\":
\"input_control_vis\",\"aggs\":[],\"params\":{\"controls\":[{\"
id\":\"1606912254137\",\"fieldName\":\"operator.name.keyword\",
\"parent\":\"\",\"label\":\"Operator\",\"type\":\"list\",\"opti
ons\":{\"type\":\"terms\",\"multiselect\":true,\"dynamicOptions
\":true,\"size\":5,\"order\":\"desc\"},\"indexPatternRefName\":
\"control_0_index_pattern\"}],\"updateFiltersOnChange\":true,\"
useTimeFilter\":false,\"pinFilters\":false},\"title\":\"Dropdow
n   Filter   Operator\"}"},"id":"bc593430-349b-11eb-b93d-
bf8caa95ff45","migrationVersion":{"visualization":"7.7.0"},"ref
erences":[{"id":"89ee0450-3499-11eb-b93d-
bf8caa95ff45","name":"control_0_index_pattern","type":"index-
pattern"}],"type":"visualization","updated_at":"2020-12-
02T12:41:44.947Z","version":"WzMwLDFd"}

5. {"attributes":{"description":"","kibanaSavedObjectMeta":{"searc
hSourceJSON":"{\"query\":{\"language\":\"kuery\",\"query\":\"\"
},\"filter\":[],\"indexRefName\":\"kibanaSavedObjectMeta.search
SourceJSON.index\"}"},"title":"Unit   Terpakai   &   Jumlah
Perjalanan","uiStateJSON":"{}","version":1,"visState":"{\"type\
":\"area\",\"aggs\":[{\"id\":\"1\",\"enabled\":true,\"type\":\"
cardinality\",\"schema\":\"metric\",\"params\":{\"field\":\"bik
e.id\",\"customLabel\":\"Unit
Sepeda\"}},{\"id\":\"2\",\"enabled\":true,\"type\":\"cardinalit
y\",\"schema\":\"metric\",\"params\":{\"field\":\"trx\",\"custo
mLabel\":\"Perjalanan
Sepeda\"}},{\"id\":\"3\",\"enabled\":true,\"type\":\"date_histo
gram\",\"schema\":\"segment\",\"params\":{\"field\":\"datetime\
",\"timeRange\":{\"from\":\"2019-10-
25T16:27:53.642Z\",\"to\":\"2019-11-
01T16:52:38.306Z\"},\"useNormalizedEsInterval\":true,\"scaleMet
ricValues\":false,\"interval\":\"auto\",\"drop_partials\":false
,\"min_doc_count\":1,\"extended_bounds\":{},\"customLabel\":\"
\"}}],\"params\":{\"type\":\"area\",\"grid\":{\"categoryLines\"
:true},\"categoryAxes\":[{\"id\":\"CategoryAxis-
1\",\"type\":\"category\",\"position\":\"bottom\",\"show\":fals
e,\"style\":{},\"scale\":{\"type\":\"linear\"},\"labels\":{\"sh
ow\":true,\"filter\":true,\"truncate\":100,\"rotate\":0},\"titl
e\":{}}],\"valueAxes\":[{\"id\":\"ValueAxis-
1\",\"name\":\"LeftAxis-
1\",\"type\":\"value\",\"position\":\"left\",\"show\":false,\"s
tyle\":{},\"scale\":{\"type\":\"linear\",\"mode\":\"normal\",\"
defaultYExtents\":false,\"setYExtents\":false},\"labels\":{\"sh

ow\":false,\"rotate\":0,\"filter\":false,\"truncate\":100},\"ti
tle\":{\"text\":\"Count\"}}],\"seriesParams\":[{\"show\":true,\
"type\":\"area\",\"mode\":\"stacked\",\"data\":{\"label\":\"Uni
t
Sepeda\",\"id\":\"1\"},\"drawLinesBetweenPoints\":true,\"lineWi
dth\":2,\"showCircles\":true,\"interpolate\":\"linear\",\"value
Axis\":\"ValueAxis-
1\"},{\"show\":true,\"type\":\"area\",\"mode\":\"stacked\",\"da
ta\":{\"id\":\"2\",\"label\":\"Perjalanan
Sepeda\"},\"drawLinesBetweenPoints\":true,\"lineWidth\":2,\"sho
wCircles\":true,\"interpolate\":\"linear\",\"valueAxis\":\"Valu
eAxis-
1\"}],\"addTooltip\":true,\"addLegend\":true,\"legendPosition\"
:\"right\",\"times\":[],\"addTimeMarker\":false,\"thresholdLine
\":{\"show\":false,\"value\":10,\"width\":1,\"style\":\"full\",
\"color\":\"#E7664C\"},\"labels\":{}},\"title\":\"Unit Terpakai
&   Jumlah   Perjalanan\"}"},"id":"84808d60-34be-11eb-b93d-
bf8caa95ff45","migrationVersion":{"visualization":"7.7.0"},"ref
erences":[{"id":"629fe9e0-3499-11eb-b93d-
bf8caa95ff45","name":"kibanaSavedObjectMeta.searchSourceJSON.in
dex","type":"index-
pattern"}],"type":"visualization","updated_at":"2020-12-
03T03:00:23.762Z","version":"WzM3MiwyXQ=="}

6. {"attributes":{"description":"","kibanaSavedObjectMeta":{"searc
hSourceJSON":"{\"query\":{\"language\":\"kuery\",\"query\":\"\"
},\"filter\":[],\"indexRefName\":\"kibanaSavedObjectMeta.search
SourceJSON.index\"}"},"title":"Unit   Sepeda
Terpakai","uiStateJSON":"{}","version":1,"visState":"{\"type\":
\"metric\",\"aggs\":[{\"id\":\"1\",\"enabled\":true,\"type\":\"
cardinality\",\"schema\":\"metric\",\"params\":{\"field\":\"bik
e.id\",\"customLabel\":\"Unit
Sepeda\"}}],\"params\":{\"addTooltip\":true,\"addLegend\":false
,\"type\":\"metric\",\"metric\":{\"percentageMode\":false,\"use
Ranges\":false,\"colorSchema\":\"Green   to
Red\",\"metricColorMode\":\"None\",\"colorsRange\":[{\"from\":0
,\"to\":10000}],\"labels\":{\"show\":true},\"invertColors\":fal
se,\"style\":{\"bgFill\":\"#000\",\"bgColor\":false,\"labelColo
r\":false,\"subText\":\"\",\"fontSize\":40}}},\"title\":\"Unit
Sepeda   Terpakai\"}"},"id":"b9a82580-34bd-11eb-b93d-
bf8caa95ff45","migrationVersion":{"visualization":"7.7.0"},"ref
erences":[{"id":"629fe9e0-3499-11eb-b93d-
bf8caa95ff45","name":"kibanaSavedObjectMeta.searchSourceJSON.in
dex","type":"index-
pattern"}],"type":"visualization","updated_at":"2020-12-
03T07:56:25.517Z","version":"WzQ1NCwyXQ=="}

7. {"attributes":{"description":"","kibanaSavedObjectMeta":{"searc
hSourceJSON":"{\"query\":{\"language\":\"kuery\",\"query\":\"\"
},\"filter\":[],\"indexRefName\":\"kibanaSavedObjectMeta.search
SourceJSON.index\"}"},"title":"Jumlah   Perjalanan
Sepeda","uiStateJSON":"{}","version":1,"visState":"{\"type\":\"
metric\",\"aggs\":[{\"id\":\"1\",\"enabled\":true,\"type\":\"ca
rdinality\",\"schema\":\"metric\",\"params\":{\"field\":\"trx\"
,\"customLabel\":\"Perjalanan
Sepeda\"}}],\"params\":{\"addLegend\":false,\"addTooltip\":true
,\"metric\":{\"colorSchema\":\"Green   to
Red\",\"colorsRange\":[{\"from\":0,\"to\":10000}],\"invertColor
s\":false,\"labels\":{\"show\":true},\"metricColorMode\":\"None
\",\"percentageMode\":false,\"style\":{\"bgColor\":false,\"bgFi
ll\":\"#000\",\"fontSize\":40,\"labelColor\":false,\"subText\":
\"\"},\"useRanges\":false},\"type\":\"metric\"},\"title\":\"Jum
lah   Perjalanan   Sepeda\"}"},"id":"09a6ff00-34bb-11eb-b93d-
bf8caa95ff45","migrationVersion":{"visualization":"7.7.0"},"ref

erences":[{"id":"629fe9e0-3499-11eb-b93d-
bf8caa95ff45","name":"kibanaSavedObjectMeta.searchSourceJSON.in
dex","type":"index-
pattern"}],"type":"visualization","updated_at":"2020-12-
03T07:55:57.975Z","version":"WzQ1MiwyXQ=="}

8. {"attributes":{"description":"Heatmap yang menampilkan frekuensi
pemakaian   tiap   hari/jam
tertentu","kibanaSavedObjectMeta":{"searchSourceJSON":"{\"query
\":{\"language\":\"kuery\",\"query\":\"\"},\"filter\":[],\"inde
xRefName\":\"kibanaSavedObjectMeta.searchSourceJSON.index\"}"},
"title":"Frekuensi   Perjalanan   (Hari-
Jam)","uiStateJSON":"{}","version":1,"visState":"{\"type\":\"he
atmap\",\"aggs\":[{\"id\":\"1\",\"enabled\":true,\"type\":\"car
dinality\",\"schema\":\"metric\",\"params\":{\"field\":\"trx\",
\"customLabel\":\"Sepeda   Aktif
\"}},{\"id\":\"2\",\"enabled\":true,\"type\":\"histogram\",\"sc
hema\":\"group\",\"params\":{\"field\":\"hourofday\",\"interval
\":1,\"min_doc_count\":true,\"has_extended_bounds\":true,\"exte
nded_bounds\":{\"max\":23,\"min\":0},\"customLabel\":\"Jam\"}},
{\"id\":\"3\",\"enabled\":true,\"type\":\"filters\",\"schema\":
\"segment\",\"params\":{\"filters\":[{\"input\":{\"language\":\
"kuery\",\"query\":\"dayofweek   :
1\"},\"label\":\"Senin\"},{\"input\":{\"language\":\"kuery\",\"
query\":\"dayofweek   :
2\"},\"label\":\"Selasa\"},{\"input\":{\"language\":\"kuery\",\
"query\":\"dayofweek   :
3\"},\"label\":\"Rabu\"},{\"input\":{\"language\":\"kuery\",\"q
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4\"},\"label\":\"Kamis\"},{\"input\":{\"language\":\"kuery\",\"
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12.
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13.
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File ini merupakan hasil ekspor dari objek sistem, objek konfigurasi, dan objek dasbor serta visualisasi dari kibana.

E. *Query* Struktur Tabel Sumber Data

```
1.  CREATE TABLE `bike_positions` (
2.    `pos_id` int(20) unsigned NOT NULL AUTO_INCREMENT,
3.    `pos_bike` int(5) DEFAULT NULL,
4.    `pos_user` varchar(50) DEFAULT NULL,
5.    `pos_lat` varchar(30) DEFAULT NULL,
6.    `pos_long` varchar(30) DEFAULT NULL,
```

```
7.      `pos_alt` int(5) DEFAULT NULL,
8.      `pos_course` int(3) DEFAULT NULL,
9.      `pos_speed` int(3) DEFAULT NULL,
10.     `pos_ip` varchar(30) DEFAULT NULL,
11.     `pos_bat` int(3) DEFAULT NULL,
12.     `pos_tz` varchar(50) DEFAULT NULL,
13.     `pos_utc_time` varchar(50) DEFAULT NULL,
14.     `pos_bt` char(1) DEFAULT NULL,
15.     `pos_src` tinyint(1) NOT NULL DEFAULT 0 COMMENT '0 = user, 1 =
   lock',
16.     `pos_satellite` int(4) DEFAULT NULL,
17.     `pos_realtime` tinyint(1) DEFAULT NULL,
18.     `pos_inposition` tinyint(1) DEFAULT NULL,
19.     `pos_lbs` text DEFAULT NULL,
20.     `pos_wifi` text DEFAULT NULL,
21.     `pos_insert` timestamp NULL DEFAULT current_timestamp(),
22.     `pos_addr` text DEFAULT NULL,
23.     `pos_desc` varchar(100) DEFAULT NULL,
24.     `pos_trx` int(10) NOT NULL,
25.     PRIMARY KEY (`pos_id`),
26.     KEY `pos_user` (`pos_user`,`pos_trx`),
27.     KEY `pos_trx` (`pos_trx`)
28. ) ENGINE=MyISAM AUTO_INCREMENT=16120653 DEFAULT CHARSET=latin1;
29.
30. CREATE TABLE `bikes` (
31.     `bike_id` int(5) unsigned NOT NULL AUTO_INCREMENT,
32.     `bike_longid` varchar(32) DEFAULT NULL,
33.     `bike_frame` varchar(100) DEFAULT NULL COMMENT 'No Rangka',
34.     `bike_mode` int(11) NOT NULL DEFAULT 0 COMMENT '0=qr only,
   1=own lock, 2=aino lock',
35.     `bike_lock` bigint(20) DEFAULT NULL,
36.     `bike_bt_name` varchar(32) DEFAULT NULL,
37.     `bike_bt_pass` varchar(32) DEFAULT NULL,
38.     `bike_name` varchar(25) DEFAULT NULL,
39.     `bike_desc` varchar(500) DEFAULT NULL,
40.     `bike_assets_status` enum('OK','RUSAK') DEFAULT NULL,
41.     `bike_maintenance` tinyint(1) DEFAULT 0,
42.     `bike_asset_date` datetime DEFAULT NULL,
43.     `bike_add_date` timestamp NULL DEFAULT NULL,
44.     `bike_update_date`    timestamp    NOT    NULL    DEFAULT
   current_timestamp(),
45.     `bike_delete` int(1) NOT NULL DEFAULT 0,
46.     `bike_delete_user` int(10) DEFAULT NULL,
47.     `bike_delete_date` datetime DEFAULT NULL,
48.     `bike_loc` int(4) unsigned NOT NULL,
49.     PRIMARY KEY (`bike_id`)
50. ) ENGINE=InnoDB AUTO_INCREMENT=556 DEFAULT CHARSET=latin1;
51.
52. CREATE TABLE `location` (
53.     `loc_id` int(4) unsigned NOT NULL AUTO_INCREMENT,
54.     `loc_code` varchar(3) DEFAULT NULL,
55.     `loc_name` varchar(50) DEFAULT NULL,
56.     `loc_desc` varchar(500) DEFAULT NULL,
57.     `loc_logo` varchar(255) DEFAULT NULL,
58.     `loc_icon` varchar(255) DEFAULT NULL,
59.     `loc_colors` varchar(255) DEFAULT NULL,
60.     `loc_cms_domain` varchar(255) DEFAULT NULL,
61.     `loc_max_bike` int(11) NOT NULL DEFAULT 0,
```

```
62.    `loc_max_station` int(11) NOT NULL DEFAULT 0,
63.    `loc_created` timestamp NOT NULL DEFAULT current_timestamp(),
64.    PRIMARY KEY (`loc_id`)
65. ) ENGINE=InnoDB AUTO_INCREMENT=5 DEFAULT CHARSET=latin1;
66.
67. CREATE TABLE `stations` (
68.    `sta_id` int(5) unsigned NOT NULL AUTO_INCREMENT,
69.    `sta_name` varchar(50) DEFAULT NULL,
70.    `sta_desc` varchar(200) DEFAULT NULL,
71.    `sta_add_user` int(10) unsigned NOT NULL,
72.    `sta_add_date` timestamp NOT NULL DEFAULT current_timestamp()
   ON UPDATE current_timestamp(),
73.    `sta_update_user` int(11) DEFAULT NULL,
74.    `sta_update_date` datetime DEFAULT NULL,
75.    `sta_status` enum('OPEN','CLOSE') DEFAULT NULL,
76.    `sta_lat` varchar(30) DEFAULT NULL,
77.    `sta_long` varchar(30) DEFAULT NULL,
78.    `sta_location_desc` varchar(100) DEFAULT NULL,
79.    `sta_loc` int(4) unsigned NOT NULL,
80.    `sta_icon` varchar(1000) DEFAULT NULL,
81.    `sta_deleted` tinyint(1) NOT NULL DEFAULT 0,
82.    `is_warehouse` tinyint(1) DEFAULT 0,
83.    `sta_hide` tinyint(1) DEFAULT 0,
84.    PRIMARY KEY (`sta_id`)
85. ) ENGINE=InnoDB AUTO_INCREMENT=45 DEFAULT CHARSET=latin1;
```

Merupakan sampel query sumber data yang berisi DML dari tabel bike_positions, bikes, location, stastions.