5G EVE – WP4 – Visualization tool for transport vertical

Summary

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Prerequisites

- OS: Linux
- Distro: Ubuntu 18.04
- RAM: 4 GB
- CPU: 2

Variables

Name	Description
<hostname>	Hostname or public ip address of the linux machine

Installation

Initial Server Setup with Ubuntu 18.04

Login as root

```
$ ssh root@<hostname>
```

Creating new user

```
$ adduser user5g
```

Granting Administrative Privileges

```
$ usermod -aG sudo user5g
```

Setting Up a Basic Firewall

```
$ ufw allow OpenSSH
$ ufw enable
```

Install Oracle JDK (as user5g)

```
$ sudo add-apt-repository ppa:webupd8team/java
$ sudo apt update
$ sudo apt install oracle-java8-installer
```

Install NGINX (as user5g)

```
$ sudo apt update
$ sudo apt install nginx
$ sudo ufw allow 'Nginx HTTP'
```

Install Elasticsearch

Import the Elasticsearch public GPG key into APT

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

Add the Elastic source list to the sources.list.d directory,

```
$ echo "deb https://artifacts.elastic.co/packages/6.x/apt
stable main" | sudo tee -a /etc/apt/sources.list.d/elastic-
6.x.list
```

Update your package lists

```
$ sudo apt update
```

Install Elasticsearch

```
$ sudo apt install elasticsearch
```

Change Elasticsearch Configuration

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

/etc/elasticsearch/elasticsearch.yml

```
. . .
network.host: localhost
. . .
```

Start the Elasticsearch service

```
$ sudo systemctl start elasticsearch
```

Enable Elasticsearch

```
$ sudo systemctl enable elasticsearch
```

Install Kibana

Install Kibana

```
$ sudo apt install kibana
```

Enable and Start Kibana

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

Create the administrative Kibana user and password

```
$ echo "kibanaadmin:`openssl passwd -apr1`" | sudo tee -a
/etc/nginx/htpasswd.users
```

Direct your server's HTTP traffic to the Kibana application and configures Nginx to read the htpasswd.users

```
$ sudo nano /etc/nginx/sites-available/5geve
```

```
server {
    listen 80;
    server_name <hostname>;
    auth_basic "Restricted Access";
    auth_basic_user_file /etc/nginx/htpasswd.users;

    location / {
        proxy_pass http://localhost:5601;
        proxy_http_version 1.1;
        proxy_set_header Upgrade $http_upgrade;
        proxy_set_header Connection 'upgrade';
        proxy_set_header Host $host;
        proxy_cache_bypass $http_upgrade;
    }
}
```

Enable the new configuration by creating a symbolic link to the sites-enabled directory

```
$ sudo ln -s /etc/nginx/sites-available/5geve
/etc/nginx/sites-enabled/5geve
```

Restart the Nginx service

```
$ sudo systemctl restart nginx
```

Allow connections to Nginx

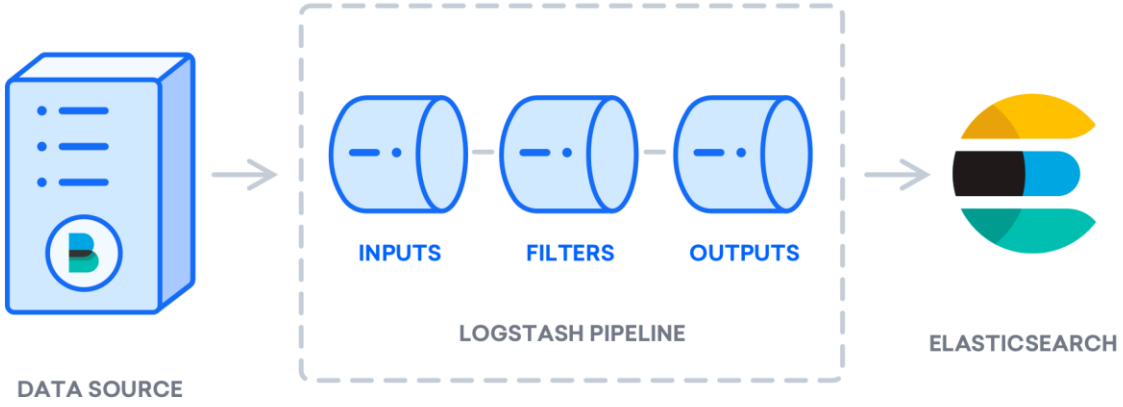
```
$ sudo ufw allow 'Nginx Full'
```

Install Logstash

Install Logstash

```
$ sudo apt install logstash
```

Configure Logstash



- ***Input***

```
$ sudo nano /etc/logstash/conf.d/02-beats-input.conf
```

```
input {
  file {
    type => "eve_tracker"
    path =>
"/var/www/html/5g_eve_tracker_backend/storage/csv/devices/*/*.
csv"
    start_position => "beginning"
    sincedb_path => "dev/null"
  }
}
```

- ***Filter***

```
$ sudo nano /etc/logstash/conf.d/10-syslog-filter.conf
```

```
filter {
 if [type] == "eve_tracker" {
    csv {
      separator => ";"
      columns => [ "id", "name", "user", "timestamp",
"datetime", "networkgen", "networktype", "active", "mcc",
"mnc", "lac_tac", "cid_pci", "psc_ci", "rssi_rscp", "accel_x",
"a$
    }
    date {
      match => ["timestamp","UNIX_MS"]
      target => "timestamp"
```

```
    }
    date {
      match => ["gps_fixtime","UNIX_MS"]
      target => "gps_fixtime"
    }
    mutate {convert => ["id","integer"]}
    mutate {convert => ["active","boolean"]}
    mutate {convert => ["mcc","integer"]}
    mutate {convert => ["mnc","integer"]}
    mutate {convert => ["lac_tac","integer"]}
    mutate {convert => ["cid_pci","integer"]}
    mutate {convert => ["psc_ci","integer"]}
    mutate {convert => ["rssi_rscp","integer"]}
    mutate {convert => ["accel_x","float"]}
    mutate {convert => ["accel_y","float"]}
    mutate {convert => ["accel_z","float"]}
    mutate {convert => ["linear_x","float"]}
    mutate {convert => ["linear_y","float"]}
    mutate {convert => ["linear_z","float"]}
    mutate {convert => ["azimuth","float"]}
    mutate {convert => ["pitch","float"]}
    mutate {convert => ["roll","float"]}
    mutate {convert => ["gyro_x","float"]}
    mutate {convert => ["gyro_y","float"]}
    mutate {convert => ["gyro_z","float"]}
    mutate {convert => ["magnetic_x","float"]}
    mutate {convert => ["magnetic_y","float"]}
    mutate {convert => ["magnetic_z","float"]}
    mutate {convert => ["audio","integer"]}
    mutate {convert => ["gps_lat","float"]}
    mutate {convert => ["gps_lon","float"]}
    mutate {rename => ["gps_lat","latitude"]}
    mutate {rename => ["gps_lon","longitude"]}
    mutate { rename => {"latitude" => "[location][lat]"} }
    mutate { rename => {"longitude" => "[location][lon]"} }
    mutate {convert => ["gps_alt","float"]}
    mutate {convert => ["gps_accuracy","float"]}
    mutate {convert => ["gps_bearing","float"]}
    mutate {convert => ["gps_speed","float"]}
    mutate {convert => ["gps_satellites","integer"]}
  }
}
```

- ***Output***

```
$ sudo nano /etc/logstash/conf.d/30-elasticsearch-output.conf
```

```
output {
  if [type] == "eve_tracker" {
    elasticsearch {
      hosts => ["localhost:9200"]
      index => "5geve_tracker"
      template_name => "templtracker"
    }
  }
}
```

Start and enable Logstash

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

```
TEMPLATE
PUT _template/templtracker
{
  "index_patterns": ["5geve_tracker*"],
  "mappings": {
    "doc": {
      "properties": {
        "@timestamp": {
          "type": "date"
        },
        "@version": {
          "type": "text",
          "fields": {
            "keyword": {
              "type": "keyword",
              "ignore_above": 256
            }
          }
        },
        "accel_x": {
          "type": "float"
        },
        "accel_y": {
          "type": "float"
        },
        "accel_z": {
          "type": "float"
        },
```

```
"active": {
  "type": "boolean"
},
"audio": {
  "type": "long"
},
"azimuth": {
  "type": "float"
},
"cid_pci": {
  "type": "long"
},
"datetime": {
  "type": "text",
  "fields": {
    "keyword": {
      "type": "keyword",
      "ignore_above": 256
    }
  }
},
"gps_accuracy": {
  "type": "float"
},
"gps_alt": {
  "type": "float"
},
"gps_bearing": {
  "type": "float"
},
"gps_fixtime": {
  "type": "date"
},
"gps_satellites": {
  "type": "long"
},
"gps_speed": {
  "type": "float"
},
"gyro_x": {
  "type": "float"
},
"gyro_y": {
  "type": "float"
```

```
},
"gyro_z": {
  "type": "float"
},
"host": {
  "type": "text",
  "fields": {
    "keyword": {
      "type": "keyword",
      "ignore_above": 256
    }
  }
},
"id": {
  "type": "long"
},
"lac_tac": {
  "type": "long"
},
"linear_x": {
  "type": "float"
},
"linear_y": {
  "type": "float"
},
"linear_z": {
  "type": "float"
},
"location": {
  "type": "geo_point"
},
"magnetic_x": {
  "type": "float"
},
"magnetic_y": {
  "type": "float"
},
"magnetic_z": {
  "type": "float"
},
"mcc": {
  "type": "long"
},
"message": {
```

```
    "type": "text",
    "fields": {
      "keyword": {
        "type": "keyword",
        "ignore_above": 256
      }
    }
  },
  "mnc": {
    "type": "long"
  },
  "name": {
    "type": "text",
    "fields": {
      "keyword": {
        "type": "keyword",
        "ignore_above": 256
      }
    }
  },
  "networkgen": {
    "type": "text",
    "fields": {
      "keyword": {
        "type": "keyword",
        "ignore_above": 256
      }
    }
  },
  "networktype": {
    "type": "text",
    "fields": {
      "keyword": {
        "type": "keyword",
        "ignore_above": 256
      }
    }
  },
  "path": {
    "type": "text",
    "fields": {
      "keyword": {
        "type": "keyword",
        "ignore_above": 256
```

```
            }
          }
        },
        "pitch": {
          "type": "float"
        },
        "psc_ci": {
          "type": "long"
        },
        "roll": {
          "type": "float"
        },
        "rssi_rscp": {
          "type": "long"
        },
        "timestamp": {
          "type": "date"
        },
        "type": {
          "type": "text",
          "fields": {
            "keyword": {
              "type": "keyword",
              "ignore_above": 256
            }
          }
        },
        "user": {
          "type": "text",
          "fields": {
            "keyword": {
              "type": "keyword",
              "ignore_above": 256
            }
          }
        }
      }
    }
  }

}
```