Elasticsearch

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Sistema de Gestió de BD, GEINF 2018/19

Minimum Viable Product (MVP)

- Aplicació Android de consulta, compra i venta d'articles d'usuaris.

- Obtenir beneficis a través d'un percentatge de les transaccions o anuncis que es poden afegir a l'aplicació.

Les 6 W

- What?
  Producte relativament econòmic amb grans capacitats per a obtenir beneficis en el futur.
- Why?
  Globalització. Capitalisme. Senzillesa.
- Where?
  Per regions; continents, països.
- When?
  ARA.
- How?
  Aplicació i registre gratuït.
- Who?
  Qualsevol usuari.

Què comporta?

- Aplicació ràpida i fàcil de fer servir.
- Disponibilitat i consistència de les dades.
- Una o vàries bases de dades grans.
- Consultes àgils.
- Transaccions eficients.
- Monitorització.

Entorn de treball

Dades

- Elasticsearch
- Kibana
- Logstash
- MySQL
- Ngrok

Aplicació

- IntelliJ IDEA
- Android
- Retrofit 2

Data
Aggregation
& Processing

Indexing &
storage

Analysis &
visualization

ElasticSearch
Que és?

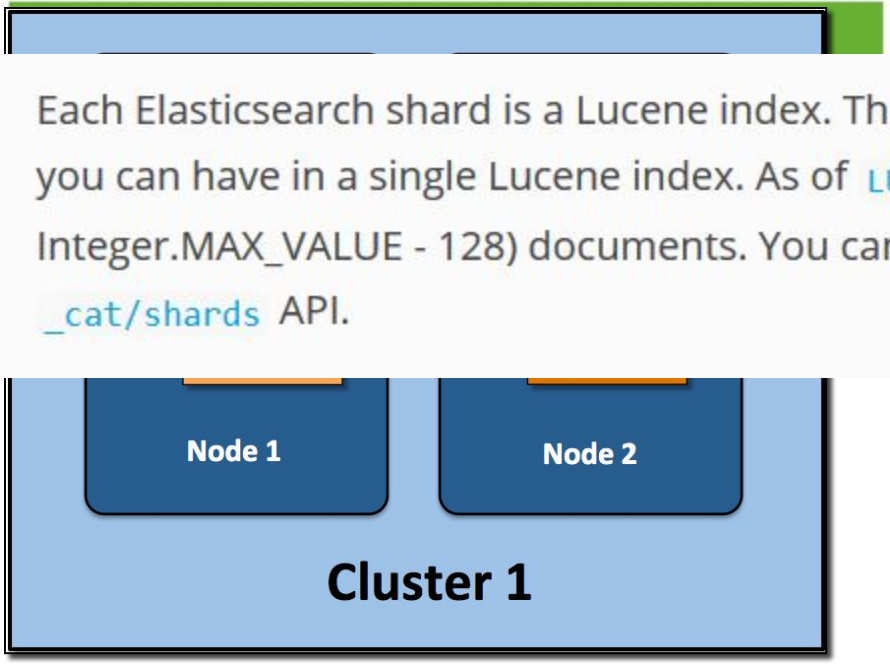
Motor de cerca i anàlisis (Java - codi obert)

Cerques molt ràpides

Servei API REST (Index, Get, Delete, Update)

Ara és el més potent

ElasticSearch per dins
Com funciona l'estructura?



NOTE

Each Elasticsearch shard is a Lucene index. There is a maximum number of documents you can have in a single Lucene index. As of `LUCENE-5843`, the limit is `2,147,483,519` (= Integer.MAX_VALUE - 128) documents. You can monitor shard sizes using the `_cat/shards` API.

ElasticSearch
Característiques

- **Cerques ràpides** en Big Data
- **Visualització de dades** immediata
- **Desnormalització**: proximitat entre els documents guardats = rapidesa
- **Distribuïda i altament escalable**

elasticsearch

AVANTATGES
ElasticSearch

- **Construit sobre lucene**
- **Fuzzy searching**: recerca difusa
- **Autocompletat i recerca instantània**
- Descobriment de **nous productes i serveis**

Organitzacions que l'utilitzen

Mercado Libre

4 milions de venedors actius

20 milions de productes en temps real

No cal reindexar totes les dades cada vegada que s'afegeix un atribut nou

elasticsearch

Organitzacions que l'utilitzen
Telefònica

elasticsearch

Solució per al **creixement** dels serveis de **vídeo sota demanda**

Identifica problemes que podrien quedar ocults d'un altre mode

Altres: **Facebook, Activision, IBM, ebay, justEat, tinder ...**

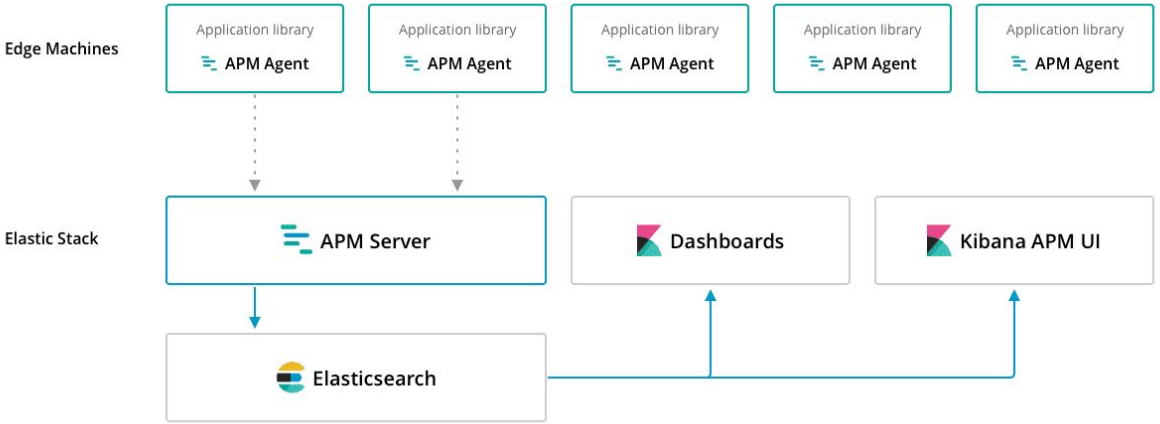
ELK
Què és Kibana?

- Eina open-source.
- Permet visualitzar dades indexades a ElasticSearch.
- Múltiples packs de software i eines que faciliten tasques als usuaris.
- Monitorització de dades: fluctuacions, rendiment, dashboards, etc.

kibana

Kibana APM

APM

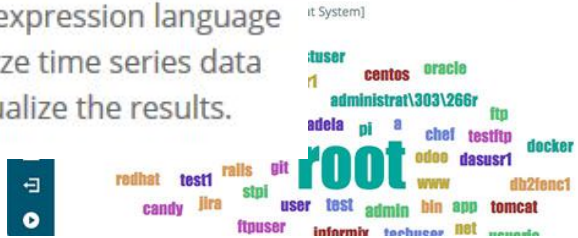


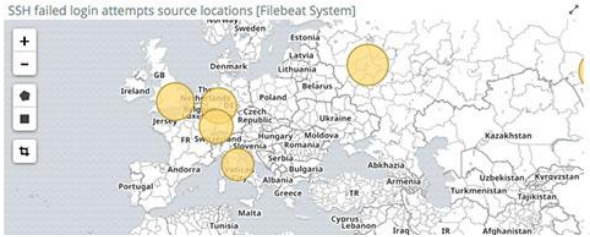
Kibana
Security Analytics

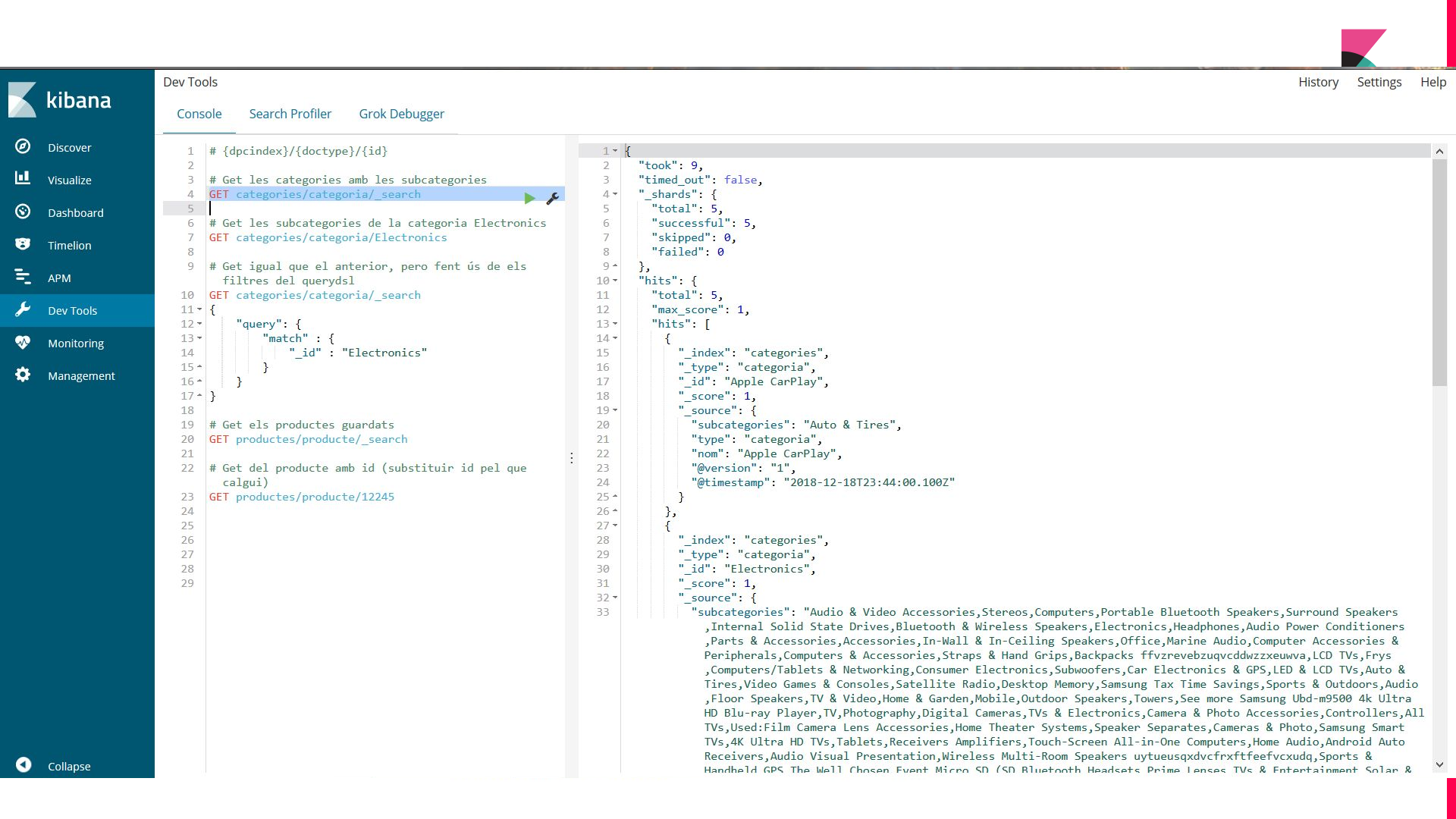
kibana

Timelion

Use an expression language to analyze time series data and visualize the results.






kibana
Discover
Visualize
Dashboard
Timelion
APM
Dev Tools
Monitoring
Management
Collapse
Dev Tools
History
Settings
Help
Console
Search Profiler
Grok Debugger
{dpcindex}/{doctype}/{id}
Get les categories amb les subcategories
GET categories/categoria/_search
Get les subcategories de la categoria Electronics
GET categories/categoria/Electronics
Get igual que el anterior, pero fent ús de els filtres del querydsl
GET categories/categoria/_search
{
"query": {
"match" : {
"_id" : "Electronics"
}
}
}
# Get els productes guardats
GET productes/producte/_search
Get del producte amb id (substituir id pel que calgui)
GET productes/producte/12245
{
"took": 9,
"timed_out": false,
"_shards": {
"total": 5,
"successful": 5,
"skipped": 0,
"failed": 0
},
"hits": {
"total": 5,
"max_score": 1,
"hits": [
{
"_index": "categories",
"_type": "categoria",
"_id": "Apple CarPlay",
"_score": 1,
"_source": {
"subcategories": "Auto & Tires",
"type": "categoria",
"nom": "Apple CarPlay",
"@version": "1",
"@timestamp": "2018-12-18T23:44:00.100Z"
}
},
{
"_index": "categories",
"_type": "categoria",
"_id": "Electronics",
"_score": 1,
"_source": {
"subcategories": "Audio & Video Accessories,Stereos,Computers,Portable Bluetooth Speakers,Surround Speakers ,Internal Solid State Drives,Bluetooth & Wireless Speakers,Electronics,Headphones,Audio Power Conditioners ,Parts & Accessories,Accessories,In-Wall & In-Ceiling Speakers,Office,Marine Audio,Computer Accessories & Peripherals,Computers & Accessories,Straps & Hand Grips,Backpacks ffvzrevebzuqvcddwzzxeuwva,LCD TVs,Frys ,Computers/Tablets & Networking,Consumer Electronics,Subwoofers,Car Electronics & GPS,LED & LCD TVs,Auto & Tires,Video Games & Consoles,Satellite Radio,Desktop Memory,Samsung Tax Time Savings,Sports & Outdoors,Audio ,Floor Speakers,TV & Video,Home & Garden,Mobile,Outdoor Speakers,Towers,See more Samsung Ubd-m9500 4k Ultra HD Blu-ray Player,TV,Photography,Digital Cameras,TVs & Electronics,Camera & Photo Accessories,Controllers,All TVs,Used:Film Camera Lens Accessories,Home Theater Systems,Speaker Separates,Cameras & Photo,Samsung Smart TVs,4K Ultra HD TVs,Tablets,Receivers Amplifiers,Touch-Screen All-in-One Computers,Home Audio,Android Auto Receivers,Audio Visual Presentation,Wireless Multi-Room Speakers uytueusqxdvcfrxftfeefvcxudq,Sports &

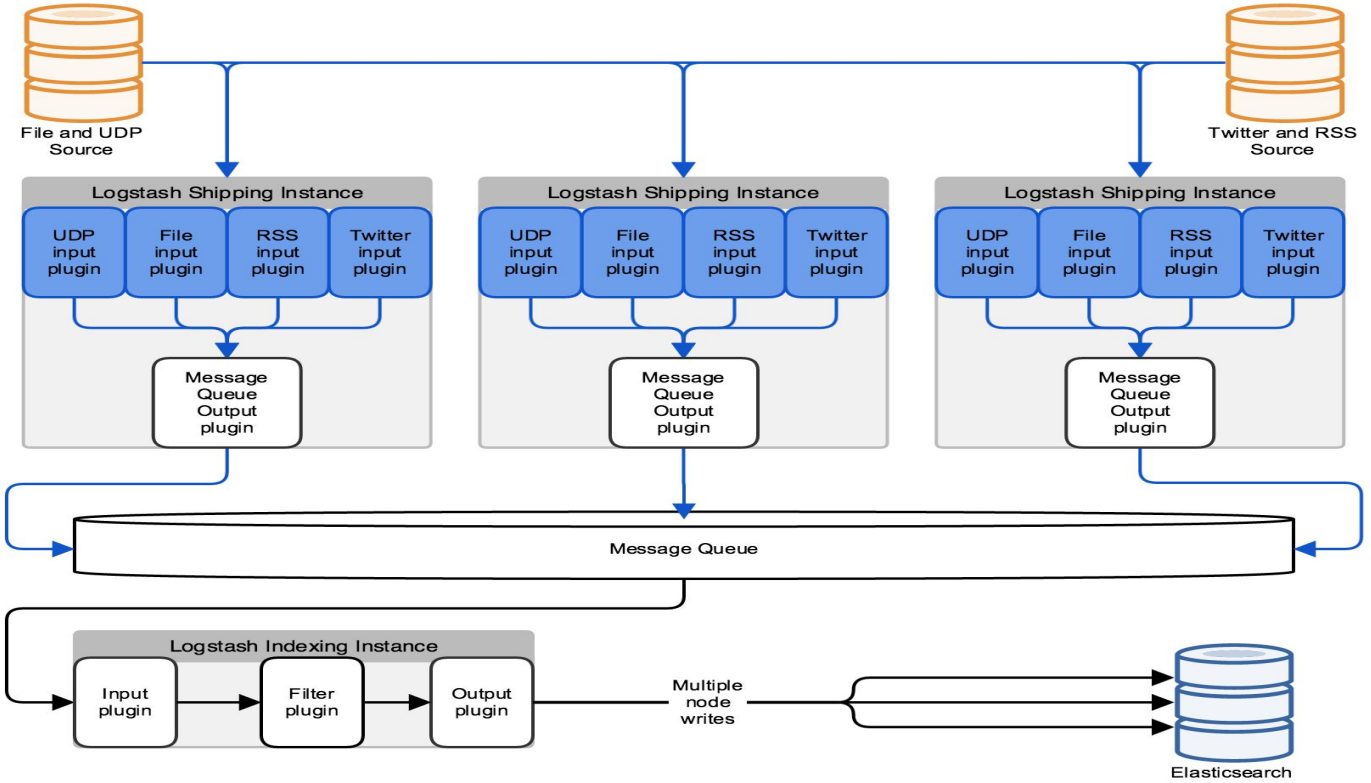
ELK

Que és LogStash?

- Eina intermitja entre Kibana i ElasticSearch.
- Disposa d'una gran quantitat de plugins
- Multi servidor. Vàries pipelines.

LogStash

Com funciona?

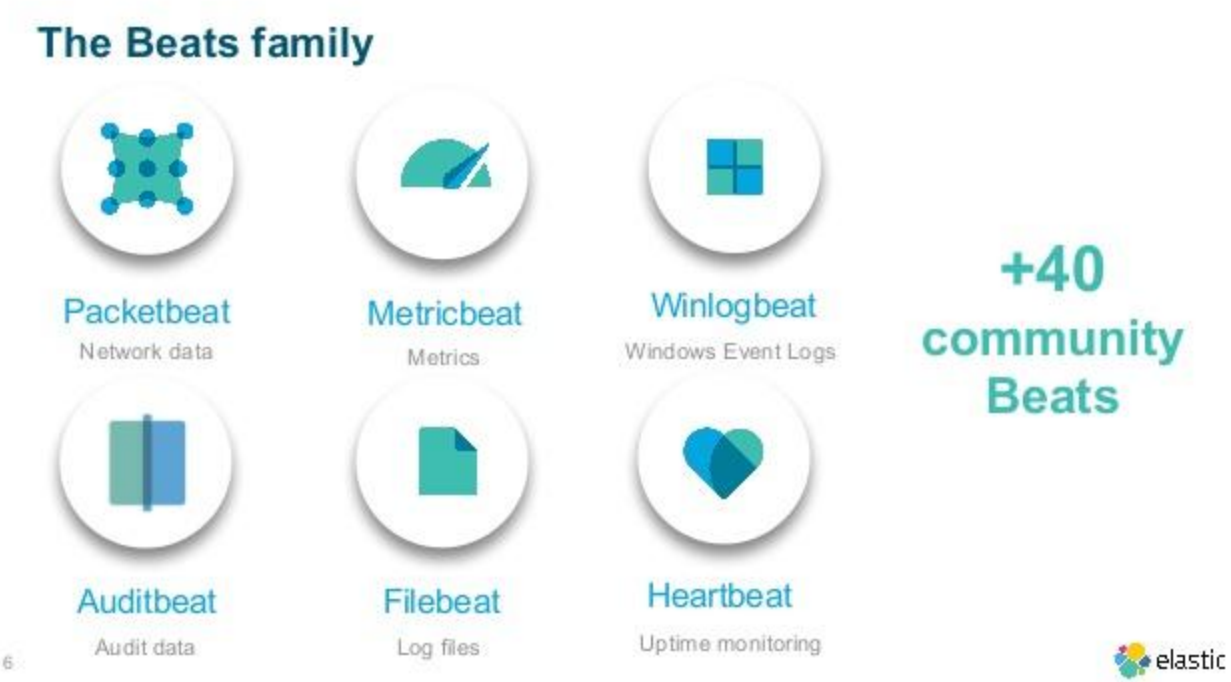


Beats
L'últim afegit a ELK

- ElasticStack, fa relativament poc, va ampliar-se amb un producte nou:
  - ElasticSearch
  - Kibana
  - LogStash
  - (+) Beats

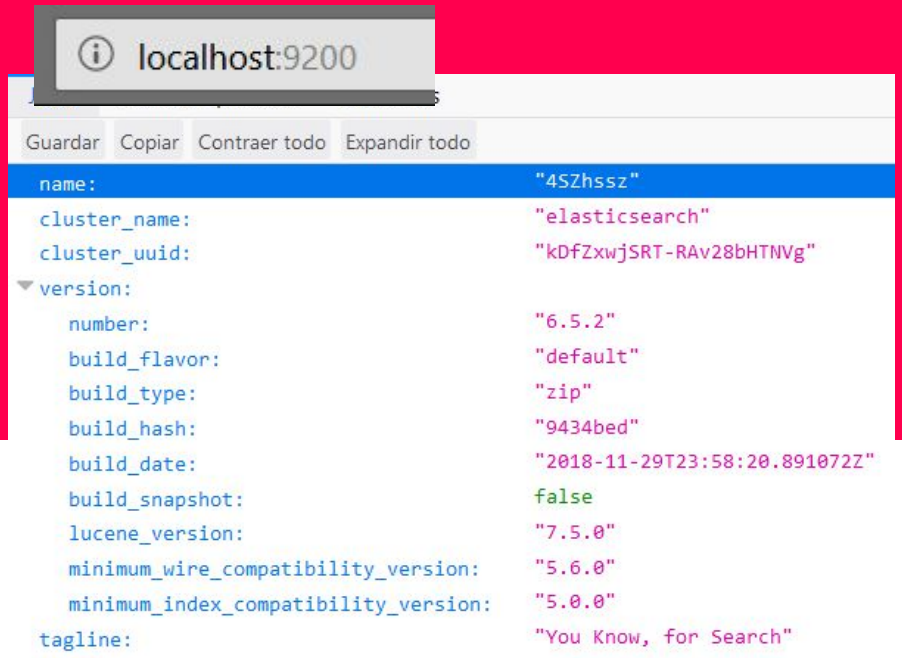
- Beats és una família d'agents encarregats de recollir dades.

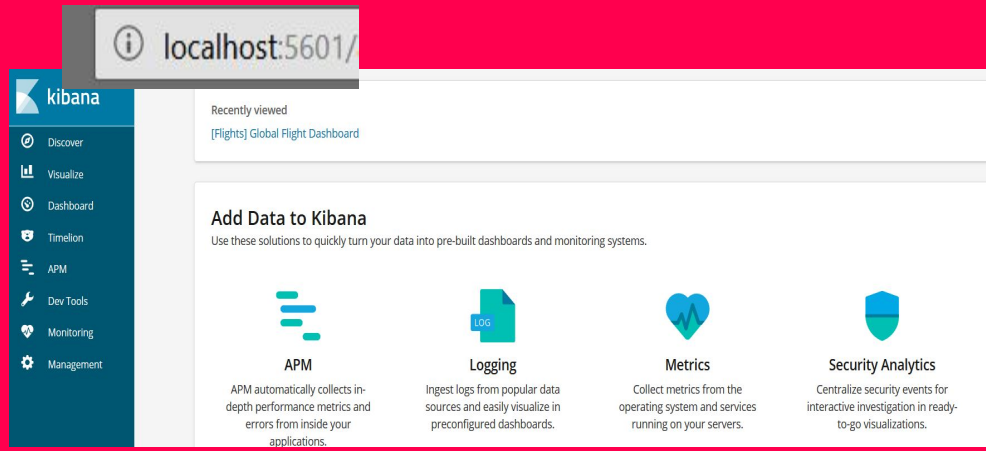
Beats
La familia beats



Preparació entorn

Muntatge del sistema ELK
ElasticSearch i Kibana





Elasticsearch
(elasticsearch.yml)

```
# ======================== Elasticsearch Configuration =========================
#
# NOTE: Elasticsearch comes with reasonable defaults for most settings.
#       Before you set out to tweak and tune the configuration, make sure you
#       understand what are you trying to accomplish and the consequences.
#
# The primary way of configuring a node is via this file. This template lists
# the most important settings you may want to configure for a production clust
#
# Please consult the documentation for further information on configuration op
# https://www.elastic.co/guide/en/elasticsearch/reference/index.html
#
# ---------------------------------- Cluster -----------------------------------
#
# Use a descriptive name for your cluster:
#
#cluster.name: my-application
#
# ------------------------------------ Node ------------------------------------
#
# Use a descriptive name for the node:
#
#node.name: node-1
#
# Add custom attributes to the node:
#
#node.attr.rack: r1
#
# ----------------------------------- Paths ------------------------------------
#
# Path to directory where to store the data (separate multiple locations by co
#
#path.data: /path/to/data
#
# Path to log files:
#
#path.logs: /path/to/logs
#
```

```
# ---------------------------------- Memory ------------------------------------
#
# Lock the memory on startup:
#
#bootstrap.memory_lock: true
#
# Make sure that the heap size is set to about half the memory available
# on the system and that the owner of the process is allowed to use this
# limit.
#
# Elasticsearch performs poorly when the system is swapping the memory.
#
# ---------------------------------- Network -----------------------------------
#
# Set the bind address to a specific IP (IPv4 or IPv6):
#
#network.host: 0.0.0.0
#
# Set a custom port for HTTP:
#
#http.port: 9200
#
# For more information, consult the network module documentation.
#
# --------------------------------- Discovery ----------------------------------
#
# Pass an initial list of hosts to perform discovery when new node is started:
# The default list of hosts is ["127.0.0.1", "[::1]"]
#
#discovery.zen.ping.unicast.hosts: ["host1", "host2"]
#
# Prevent the "split brain" by configuring the majority of nodes (total number of master-eligible nodes / 2 + 1):
#
#discovery.zen.minimum_master_nodes:
#
# For more information, consult the zen discovery module documentation.
#
# ---------------------------------- Gateway -----------------------------------
#
# Block initial recovery after a full cluster restart until N nodes are started:
#
#gateway.recover_after_nodes: 3
#
# For more information, consult the gateway module documentation.
#
# ---------------------------------- Various -----------------------------------
#
# Require explicit names when deleting indices:
#
#action.destructive_requires_name: true
```

Muntatge ELK

Dades emmagatzemades a MySQL DB

- Base de dades extretes de: https://data.world/ amb petites modificacions
- Apache POI per xlsx i Java
- Taules producte, categoria i condicions.

Table: producte

Columns:

codi	int(11) AI PK
dataInsercio	datetime
disponibilitat	int(11)
condicions	varchar(20)
nom	varchar(200)
marca	varchar(40)
fabricant	varchar(100)
preu	float(8,2)
preuEnviament	float(8,2)
categoriaPrincipal	varchar(30)
altreCategoria	varchar(200)
imageURL	varchar(400)

Table: categoria

Columns:

nom	varchar(50) PK
subcategories	varchar(4000)

Table: condicions

Columns:

nom	varchar(50) PK

Logstash: INPUT i OUPTPUT

```
input {
    jdbc {
        jdbc_connection_string => "jdbc:mysql://localhost:3306/productes"
        jdbc_user => "root"
        jdbc_password => "root"
        schedule => "* * * * *"
        jdbc_validate_connection => true
        jdbc_driver_library => "C:\Program Files (x86)\MySQL\Connector J 8.0\mysql-connector-java-8.0.13.jar"
        jdbc_driver_class => "com.mysql.cj.jdbc.Driver"
        statement => "SELECT * from producte"
        type => "producte"
    }
    jdbc {
        jdbc_connection_string => "jdbc:mysql://localhost:3306/productes"
        jdbc_user => "root"
        jdbc_password => "root"
        schedule => "* * * * *"
        jdbc_validate_connection => true
        jdbc_driver_library => "C:\Program Files (x86)\MySQL\Connector J 8.0\mysql-connector-java-8.0.13.jar"
        jdbc_driver_class => "com.mysql.cj.jdbc.Driver"
        statement => "SELECT * from categoria"
        type => "categoria"
    }
    jdbc {
        jdbc_connection_string => "jdbc:mysql://localhost:3306/productes"
        jdbc_user => "root"
        jdbc_password => "root"
        schedule => "* * * * *"
        jdbc_validate_connection => true
        jdbc_driver_library => "C:\Program Files (x86)\MySQL\Connector J 8.0\mysql-connector-java-8.0.13.jar"
        jdbc_driver_class => "com.mysql.cj.jdbc.Driver"
        statement => "SELECT * from condicions"
        type => "condicio"
    }
}
```

```
output {
    if [type] == "producte" {
        elasticsearch {
            hosts => "localhost:9200"
            index => "productes"
            document_type => "%{type}"
            document_id => "%{codi}"
        }
    }
    if [type] == "categoria" {
        elasticsearch {
            hosts => "localhost:9200"
            index => "categories"
            document_type => "%{type}"
            document_id => "%{nom}"
        }
    }
    if [type] == "condicio" {
        elasticsearch {
            hosts => "localhost:9200"
            index => "condicions"
            document_type => "%{type}"
            document_id => "%{nom}"
        }
    }
}
```

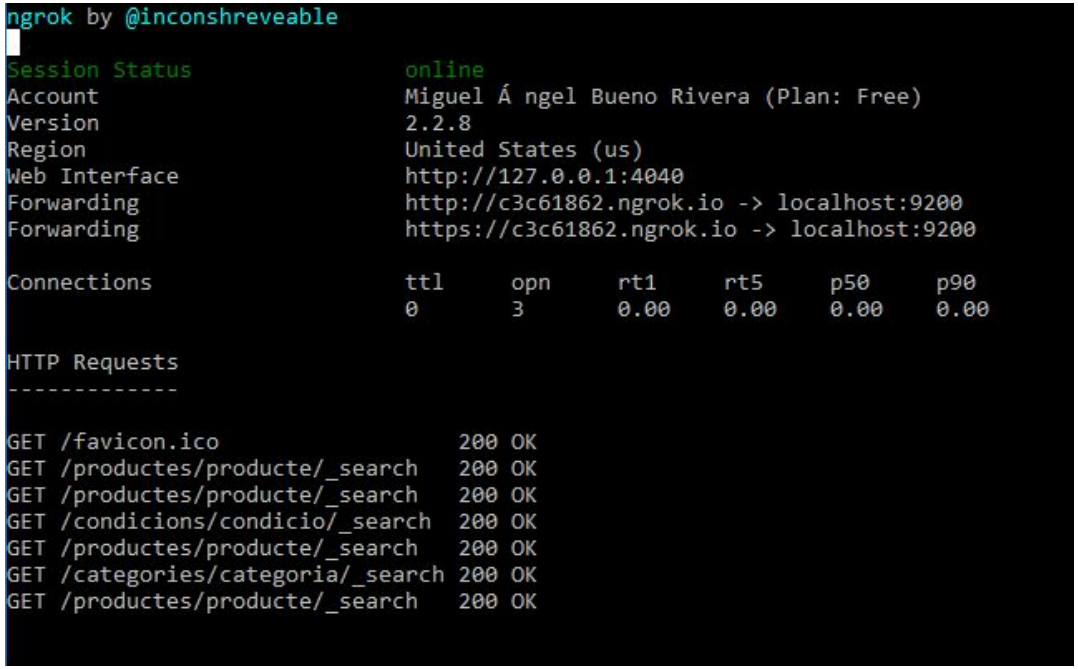
Execució:`logstash.bat -f logstash.conf`
Rufus Scheduler:
`minut hora dia mesos(int) UTC`
MySQL DB:
`SET @@global.time_zone='+00:00';`
`SET @@session.time_zone='+00:00';`

Filtres logstash(extres)

```
filter {
  mutate { remove_field => [ "field1", "field2", "field3", ... "fieldN" ] }
}
```

La gran majoría de camps es poden filtrar excepte els que són de sistema, com els _index, _type, _id, _source. Altres que directament es generen a l'hora de fer la cerca com és el _score. O altres com per exemple el @timestamp, que són necessaris.

Ngrok



ngrok.exe http port

Muntatge ELK
Crides REST

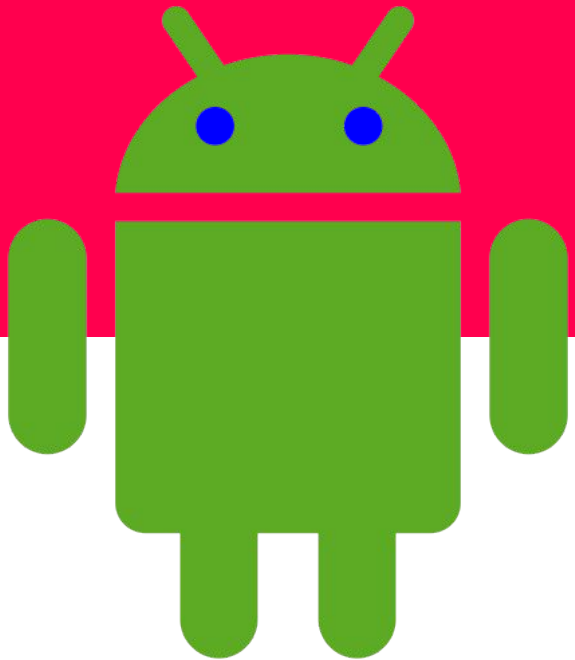
Algunes funcionalitats de la aplicació, requereixen agafar dades dels documents indexats a l'elasticsearch fent ús de crides REST, com per exemple:

- productes (per o id o tots)

```
@GET("/productes/producte/{id}")
@GET("/productes/producte/_search")
```

- categories (subcategories, categories)

```
@GET("/categories/categoria/_search")
@GET("/categories/categoria/{id}")
```

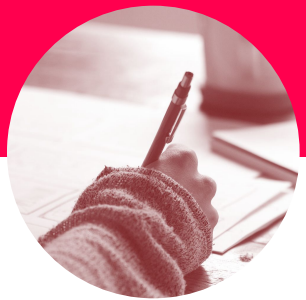


Futurs canvis en la aplicació - ELK

- Utilitzar l'eina APM per rebre informació d'execució de l'aplicació i possibles errors que es produeixin en elles
- Implementar un servei de login i utilitzar el FileBeat per captar informació que ens interessi sobre aquests. I/o utilitzar Logging per utilitzar ja les dashboards pre-dissenyades.
- Millorar la distribució dels shards, repliques i ampliar informació.
- Ampliar la bases de dades, establir un schedule, exportar les dades d'elasticsearch a MySQL.
- Logs, millorar app, transaccions, seguretat, custom url keys, etc.

Exemple query

```
GET _search
{
  "query": {
    "bool": {
      "must": {
        "match": {
          "nom": "tv"
        }
      },
      "filter": {
        "range": { "disponibilitat": { "gte": 30 }}
      }
    }
  }
}
```



Gràcies!!

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Webgrafia

https://github.com/jmettraux/rufus-scheduler
https://www.elastic.co/guide/en/logstash/5.0/plugins-inputs-jdbc.html
https://www.elastic.co/*
https://stackoverflow.com/*
https://lucene.apache.org/core/2_9_4/queryparsersyntax.html
https://developer.android.com/
https://square.github.io/retrofit/
https://www.elastic.co/guide/en/elasticsearch/reference/current/docs-get.html