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# ELK Stack: Elasticsearch, Logstash and Kibana

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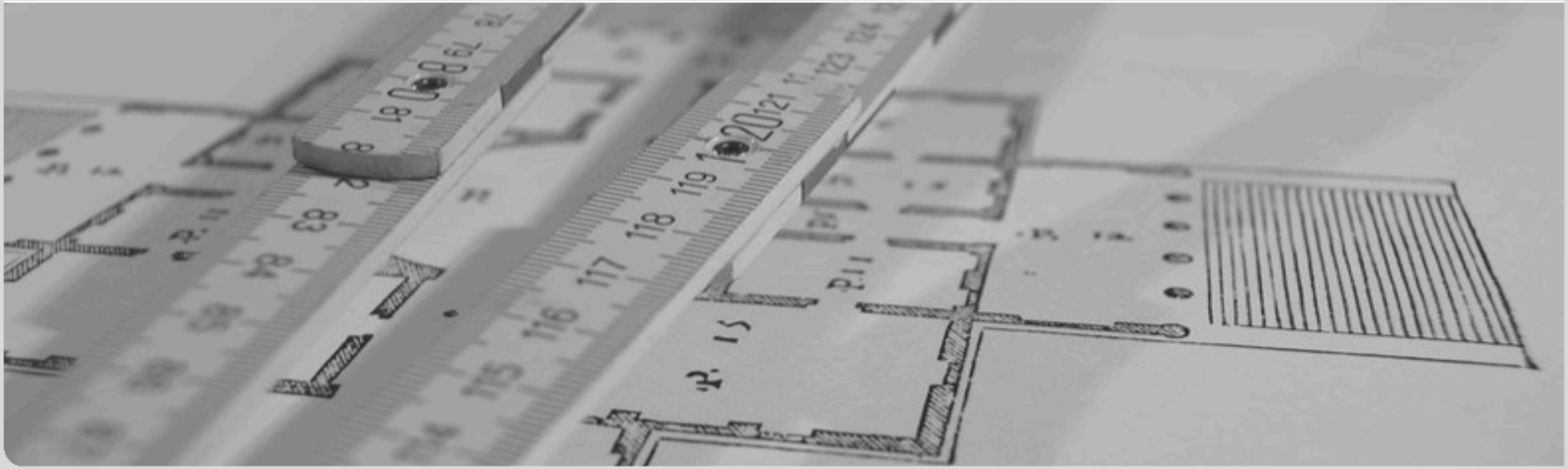
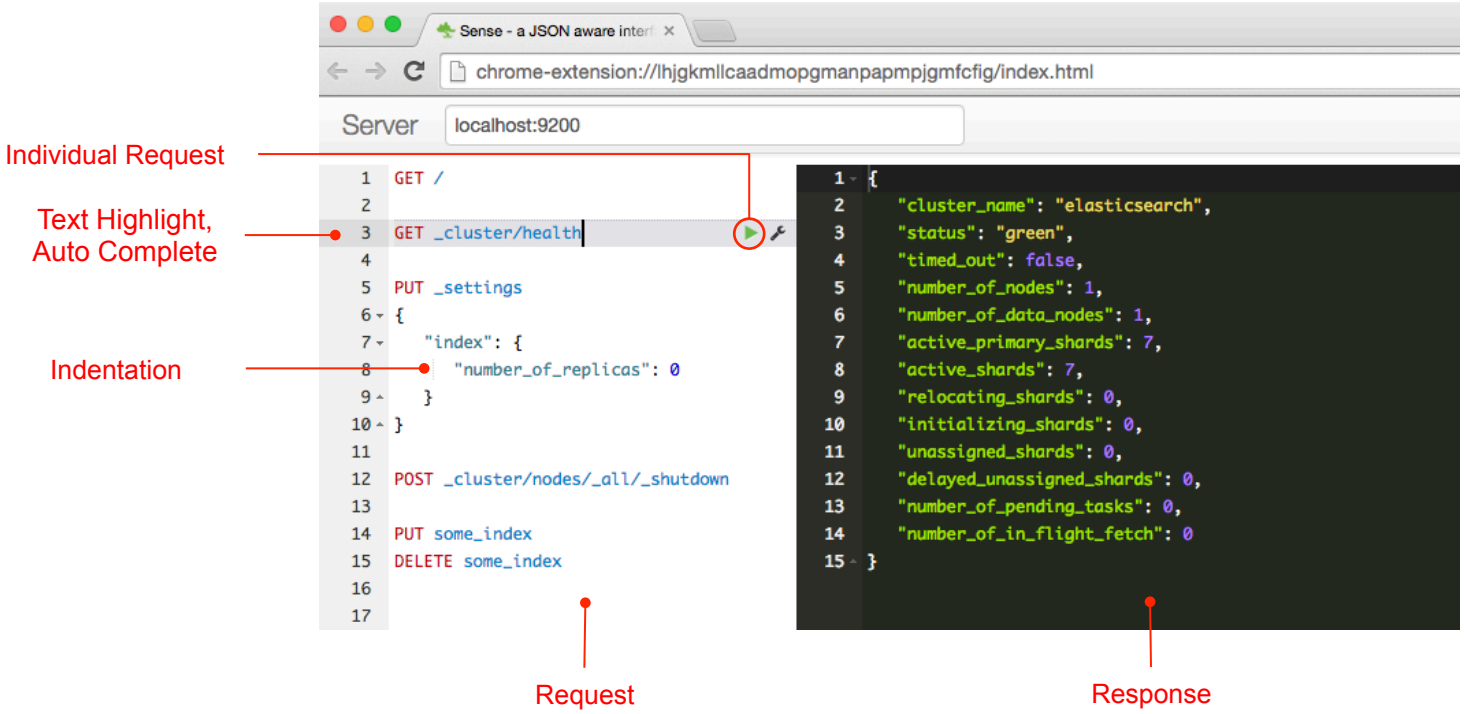


# Extra: Sense (Beta)

- Extension for Google Chrome, available in Chrome Web Store
- User-friendly console
- Designed for Elasticsearch



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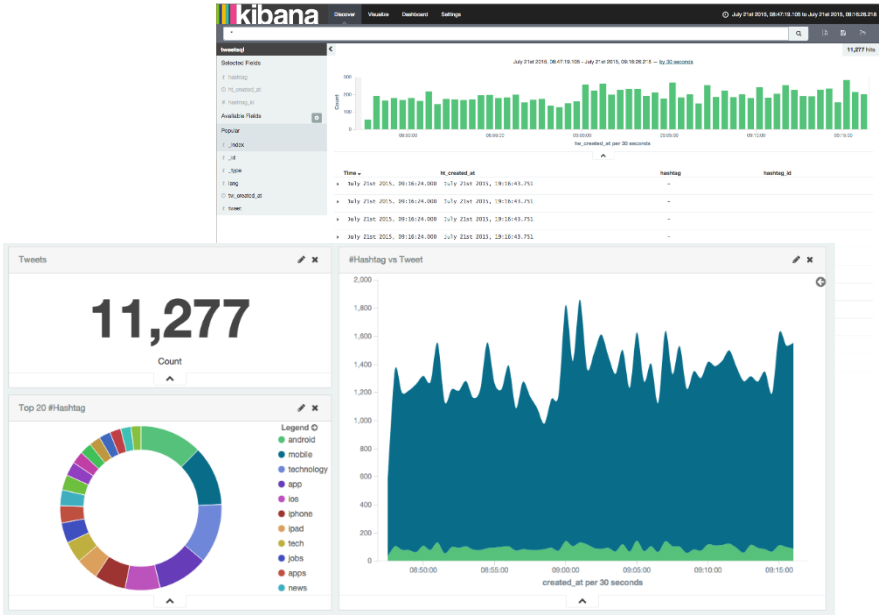
## Visualization Tool For Elasticsearch

# KIBANA

# Kibana - Overview

- **Full integration with Elasticsearch**
  - Easy Configuration
- **Import & Discovery**
  - Time-based Data
  - Real-time Discovery
- **Visualization**
  - Easy to customize
  - Fast analytic
- **Dashboard**
  - Connecting the visualizations
  - Easy to share as <iframe> or URL




- Open source. Community driven. Apache licensed.
- More Info

  `https://www.elastic.co/products/kibana`

# Kibana- Live Demo


KIBANA GOES LIVE

# Kibana - Summary

- Advantages
  - Easy visualizing
  - Various visualizations available
  - Fully integrated with Elasticsearch

- Limitations
  - No custom aggregation supported
  - No custom request
  - Event-based data only
  - Elasticsearch data only
  - Dashboard built on saved visualizations
  - Dashboard filter affects all visualizations

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## Use Case

# ELASTICSEARCH & SQL DATABASE

# Overview

- Relational Database:
  - Traditional SQL Databases
  - Complex SQL-Statements needed for some analytics
  - Still widely used
- Elasticsearch:
  - **Non-relational** Databases - **NoSQL**
  - As-a-service
  - Accessible via HTTP
- Relational DB→ Non-relational DB
  - Data Migration
  - Using plugin : ***JDBC River*** *plugin*

# JDBC River

- An Elasticsearch Plugin
- Enabling data migration
- SQL Database → Elasticsearch
  - **Import** – function
  - Using SQL statement to filter data
- Using a JDBC connector
  - Supports native connectors
    - MySQL, Postgresql, ...

- Note:
  - River plugin is deprecated since ES 1.5 (Currently ~1.7)
  - Still supported by community

# JDBC River - Parameters

```
$ curl -XPUT 'localhost:9200/_river/type_name/_meta' -d
'{
    "type" : "jdbc",
    "jdbc" : {
        "url" : "jdbc:mysql://localhost",
        "user" : "db_user",
        "password" : "db_user_password",
        "sql" : "SELECT * FROM table_name",
        "index": "es_index",
        "type" : "es_type",
        "type_mapping": {  …  }
    }
}'
```

- Easy import
- Filter Data by SQL-Statement
- More Info:
  https://github.com/jprante/elasticsearch-jdbc

# Experimental Scenario

- Input:
  - A dump file for MySQL
- Output:
  - Visualizations in Kibana
- Question: *How?*

- Answer: following instructions
  - 1. Prepare MySQL Server
  - 2. Prepare JDBC River plugin for MySQL
  - 3. Import data to Elasticsearch
  - 4. Visualizing with Kibana

# MySQL Server - Installation

- Required Components / File:
  - MySQL Server
  - MySQL Client
  - An SQL dump File

- Instructions:
  - 1. Set up MySQL Server & Client

```
$ aptitude install mysql-server mysql-client
```

  - 2. Create a database

```
$ mysql -u root -p
  > create database db_name;
  > exit
```

  - 3. Restore the database with dump file

```
$ mysql -u root -p db_name < dump_file.sql
```

# JDBC River - Installation

- Required Components:
  - JDBC River Plugin
  - JDBC Driver (Connector)

- Instructions:
  - 1. Download & install JDBC River plugin
  - 2. Download & install a JDBC driver
  - 3. Restart Elasticsearch

# JDBC River - Installation (2)

- Download & install JDBC River plugin

```
$ cd /usr/share/elasticsearch
$ ./bin/plugin --install river-jdbc -url '
http://xbib.org/repository/org/xbib/elasticsearch/plugin/elasticsearch-river-jdbc/1.5.0.5/elasticsearch-river-jdbc-1.5.0.5-plugin.zip'
```

- Download & install a JDBC connector (found in MySQL JDBC driver)

```
$ cd /usr/share/elasticsearch/plugins/
$ wget
  http://dev.mysql.com/get/Downloads/Connector-J/mysql-connector-java-5.1.36.tar.gz
$ tar -zxvf mysql-connector-java-5.1.36.tar.gz --wildcards '*.jar'
$ mv mysql-connector-java-5.1.36/mysql-connector-java-5.1.36-bin.jar
    ./river-jdbc/
$ rm -rf mysql-*
```

- Restart Elasticsearch Service

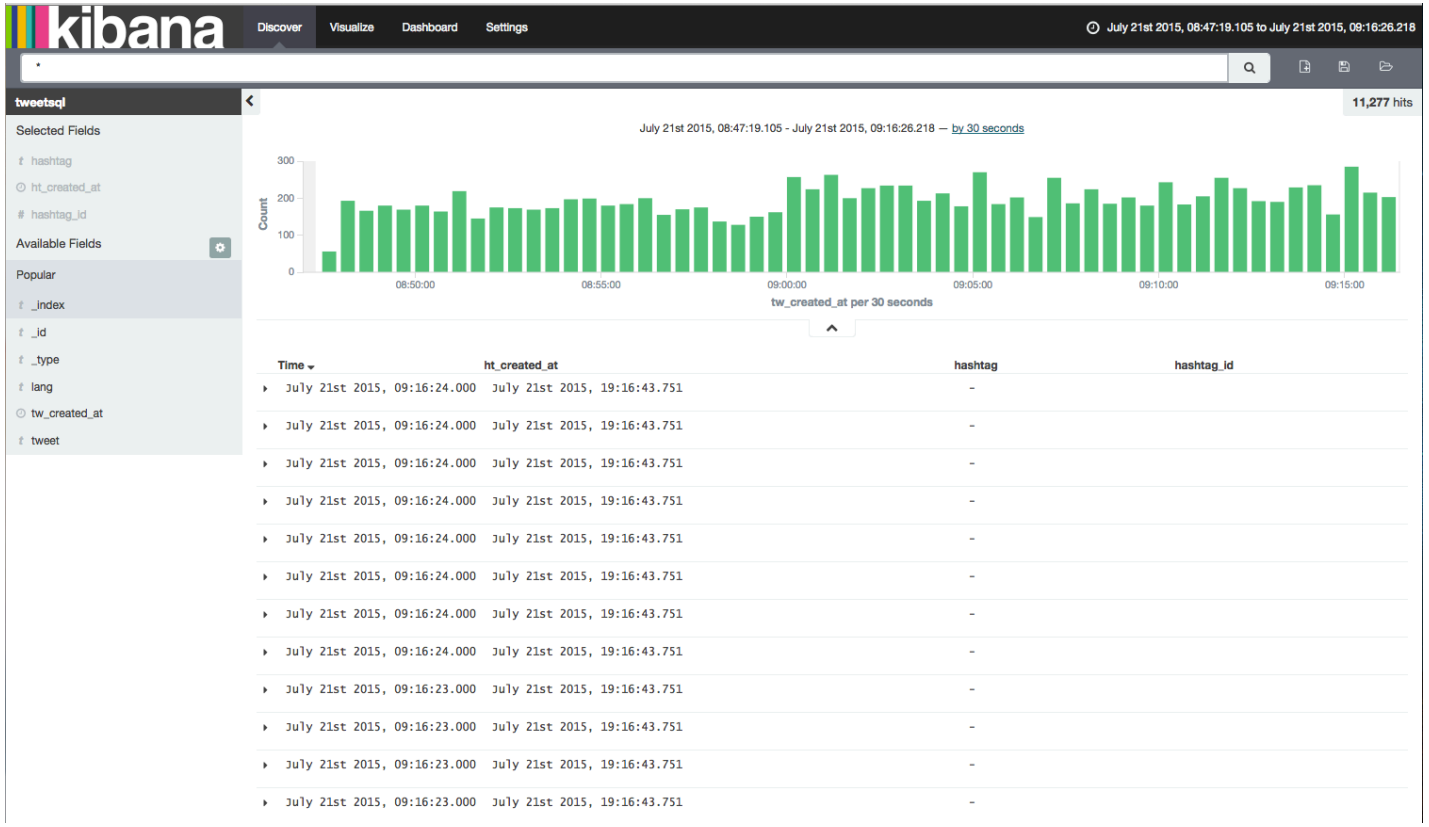
```
$ /etc/init.d/elasticsearch stop
$ /etc/init.d/elasticsearch start
```

# Import Data

- Define JDBC River parameters

```
$ curl -XPUT 'localhost:9200/_river/tweet/_meta' -d
'{
  "type" : "jdbc",
  "jdbc" : {
        "url" : "jdbc:mysql://localhost:3306/tweetsql",
        "user" : "root",
        "password" : "root",
        "sql" : "select tid as _id, tweet, hashtag.hashtag, lang, created_at
                 from tweet
                 left join hashtag_tweet on tweet.id = hashtag_tweet.tweet_id
                 left join hashtag on hashtag.id = hashtag_tweet.hashtag_id",
        "index": "tweetsql",
        "type" : "tweet",
        "type_mapping": {
            "tweet": {
                "dynamic": true,
                "properties": {
                    "created_at":{
                        "type": "date",
                        "format": "EEE MMM dd HH:mm:ss Z yyyy"
                    }
                }
            }
        }
    }
}'
```

# Visualization in Kibana



# Plugins

- Other River Plugins:
  - Google Drive River Plugin
  - Dropbox River Plugin
  - Wikipedia River Plugin
  - …
- Cloud Service Discovery Plugins
  - AWS Cloud Plugin, GCE Cloud Plugin, …
- Analysis Plugins
  - ICU Analysis Plugin, Stempel Analysis Plugin, …
- There are more plugins:
  https://www.elastic.co/guide/en/elasticsearch/reference/current/modules-plugins.html

# Exercise - MySQL Database

- Given:
  - A dump file contains tweet data
- Goal:
  - Visualizations in Kibana

- Example for visualizations
  - Number of tweets in total
  - Number of tweets by a language
  - Top hashtags / tweet-languages
  - etc.
- Create a dashboard with various visualizations

# Question ?