Introduction into the ELK stack

Alexander Reelsen
alexander.reelsen@elasticsearch.com
@spinscale

elasticsearch.

Agenda

- Introduction
- The ELK stack
- Samples, samples, samples
- Summary

About Elasticsearch

- Founded 2012 in Amsterdam
- Funded by Benchmark, Index Ventures and NEA Ventures
- Distributed company
  Offices in Los Altos, Amsterdam, London, Berlin, Phoenix
- Offering support subscriptions & trainings
- We're hiring

About me

- Joined early 2013
- Interested in all things scale, search & concurrency
- Elasticsearch developer, doing trainings, support, blog posts, conferences, presentations

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Introduction

How do **you** decide?

- What is the core asset of your company?
  Ideas, patents, employees, customers, warehouse, software, ...
- Where to invest/develop next?
- Data driven decisions

How do **you** decide?

- What is the core asset of your company?
  Ideas, patents, employees, customers, warehouse, software, ...
- Where to invest/develop next?
- Data driven decisions
  logfiles for scaling up/down
  warehouse withdrawal triggers orders
  history for fraud detection
  assembly line, throughput improvement

  ... data explosion

More data is *Big Data*

- More and more data
  Recommendations, page views, IoT, social media

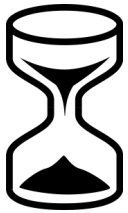
- Better decisions == more data?

but ...

The *Big Data* promise

The *Big Data* ~~promise~~ problem

The *Big Data* ~~promise~~ problem



reaction time

Time between storing and analysing an event

The *Big Data* ~~promise~~ problem

reaction time

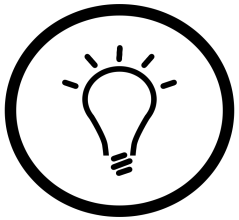
enrichment

Increase event value by enriching

The *Big Data* ~~promise~~ problem

reaction time

enrichment



insights

optimize for query, not for storage

No problem, lets make up a new job title

- We failed so hard in this industry, that we created a new job to clean up this mess

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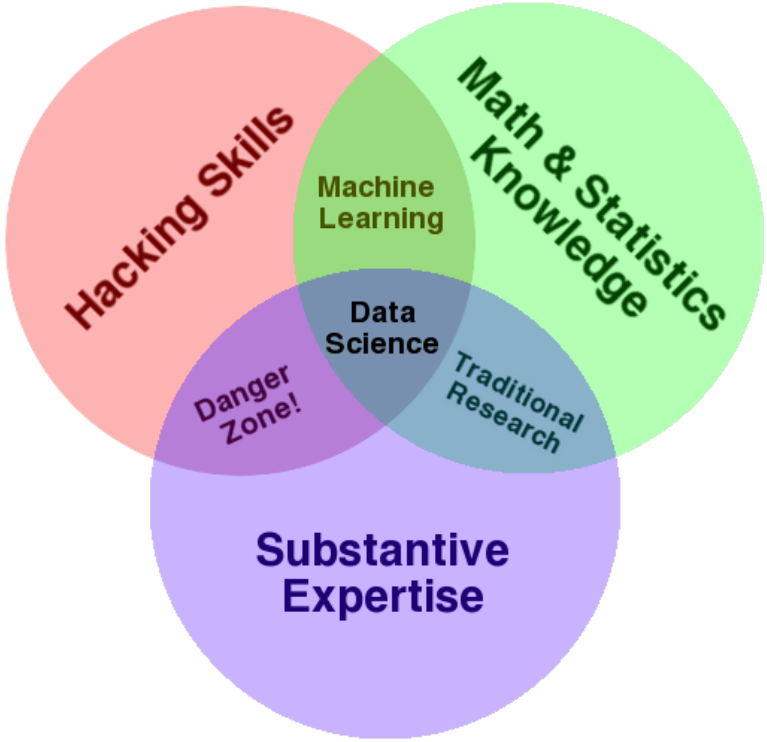


Source: http://drewconway.com/zia/2013/3/26/the-data-science-venn-diagram

Data scientist problem

- Result of a flawed infrastructure
- Result of a flawed process/company politics
- Often doing someone else job

  Enriching data, getting data, creating reports

- Data scientists are important, lets help them to do their real job, which is not ETL but providing information!

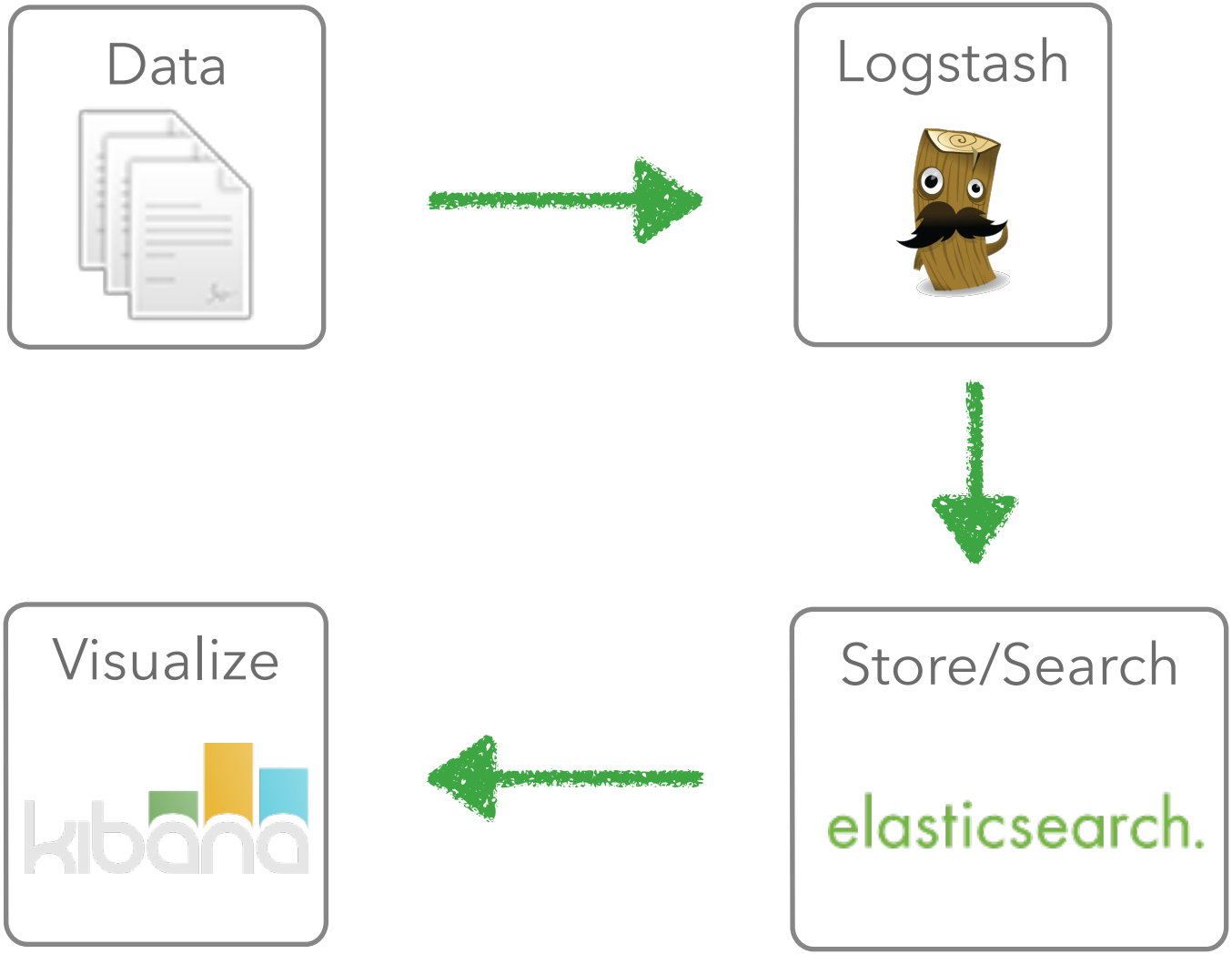
Requirements

- Clean data to work on
- Fast analysis chain
  near real-time
- Easy to use user interface
  Everyone is able to create own reports

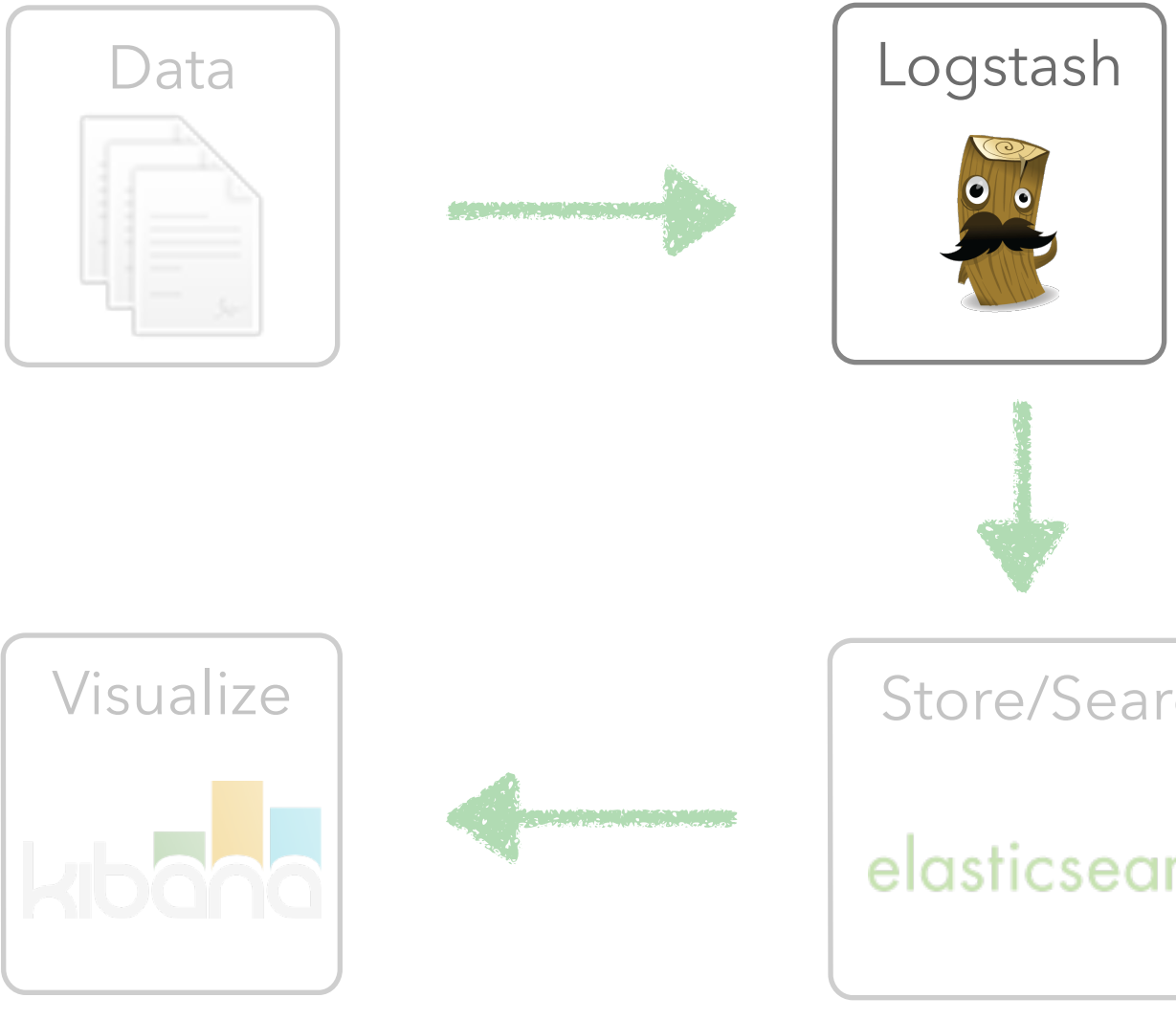
Meet the ELK stack

The ELK stack

The ELK stack



Logstash



Logstash

- Managing events and logs
- Collect data
- Parse data
- Enrich data
- Store data
- Open Source: Apache License 2.0

Logstash architecture

Input

datastore

stream

log files

files

monitoring

queues

network

Filter

parse, enrich, tag, drop

Output

datastore

files

email

pager

monitoring

chat

API

queues

Logstash architecture

Input

datastore

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network

ip: 141.1.1.1

Filter

Logstash

parse, enrich, tag, drop

ip: 141.1.1.1

city: Zurich

country: CH

Output

datastore

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monitoring

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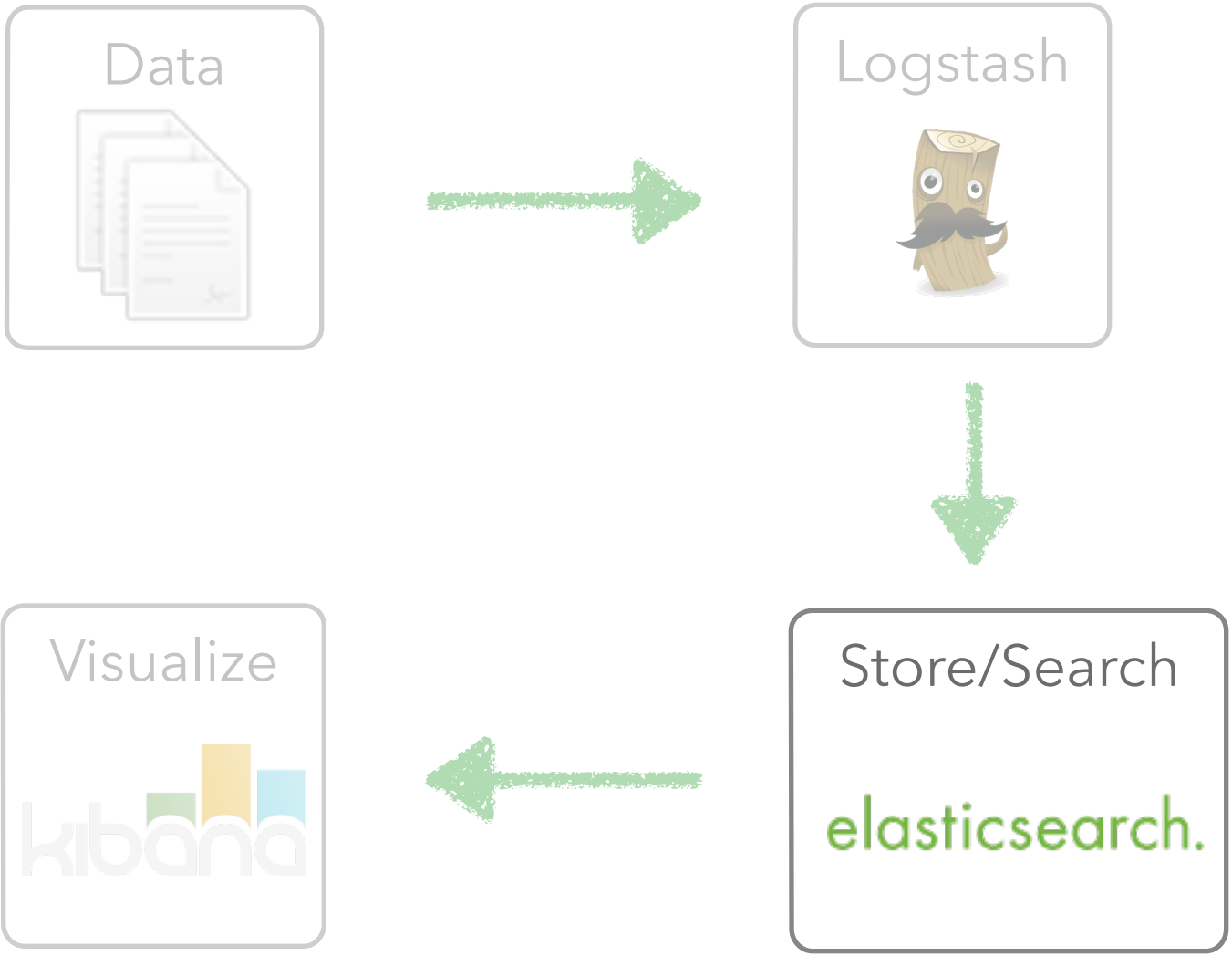
API

queues

Elasticsearch



Elasticsearch

- Schema-free, REST & JSON based distributed search engine
- Open Source: Apache License 2.0
- Easy to understand, yet very powerful query language

  Full text search (phrase, fuzzy)
  Numeric search (support ranges, dates, ipv4 addresses)
  Highlighting
  Aggregations
  Suggestions

Wenn Suchboxen nicht funktionieren

Wie am besten die Qualitaet der eigenen Suchapplikation sicherstellen?

Isabel Drost-Fromm

Freitag, 15:00 Uhr, Kinosaal 8

elasticsearch.

Kibana

- Execute queries on your data & visualize results
- Add/remove widgets
- Share/Save/Load dashboards
- Open Source: Apache License 2.0

Kibana

elasticsearch.

Samples, samples, samples

Samples

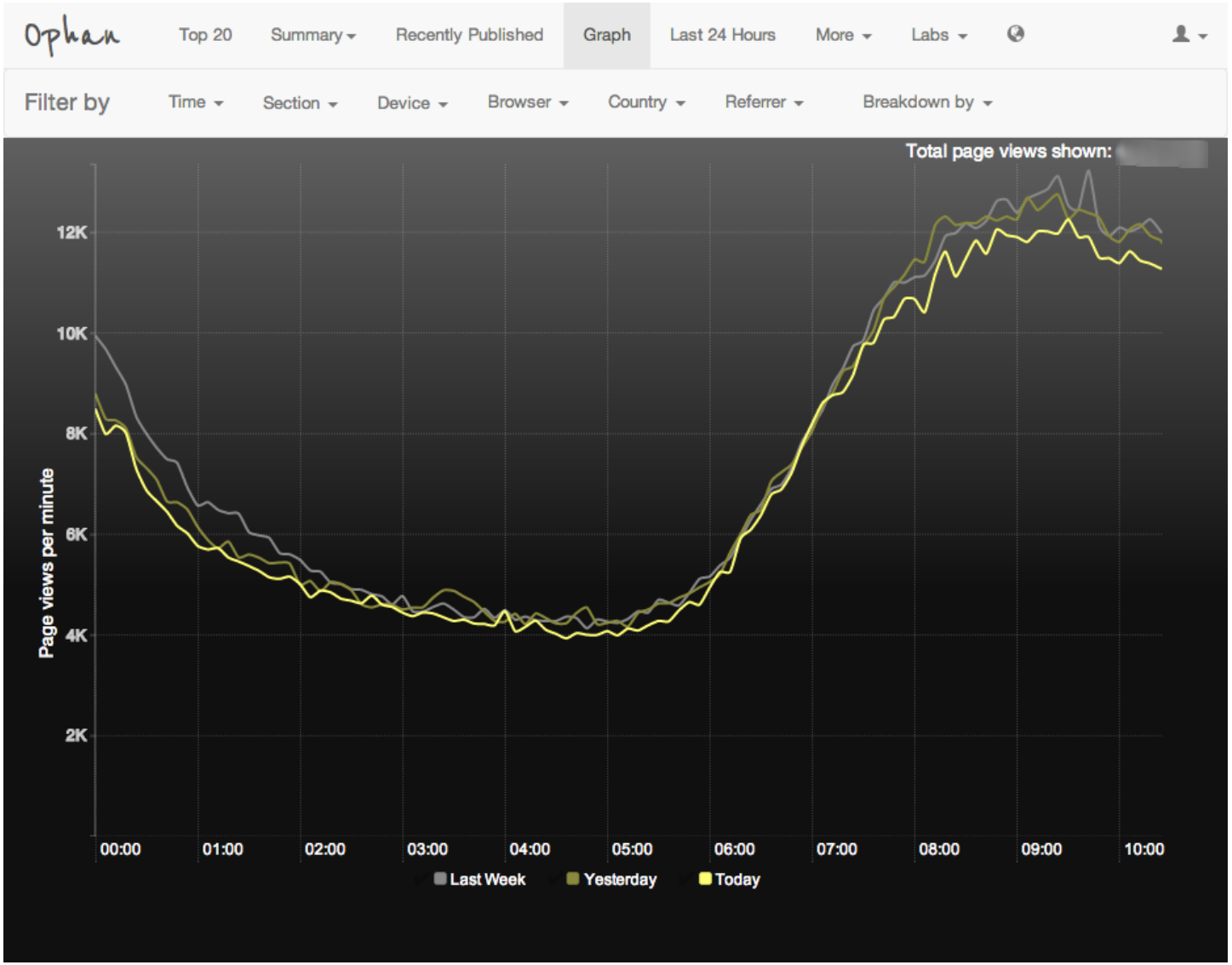
- Guardian case study
- Web server logs
- meetup.com RSVP stream
- Wikipedia update stream
- sysdig output

Case Study: The Guardian

theguardian

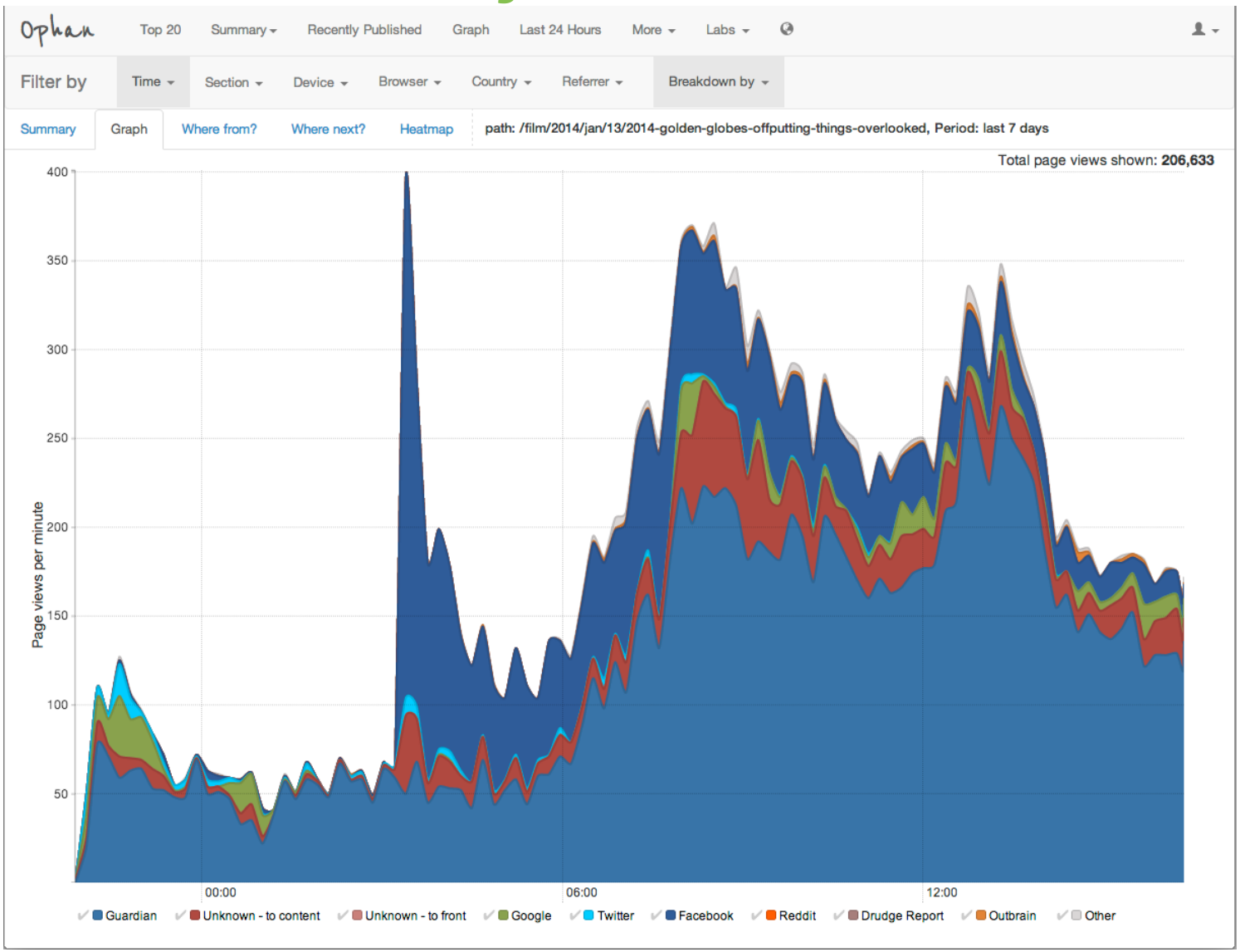
- Ophan: In-house analytics software
- Empower the organization
  Give the entire organization real-time insight into audience engagement
  Democratize analytics access for more than 500 users
  Encourage a culture of exploration and innovation for all employees
- Leverage real-time analytics
  Easily query 360 million documents
  See traffic for all content as it happens

Case Study: The Guardian



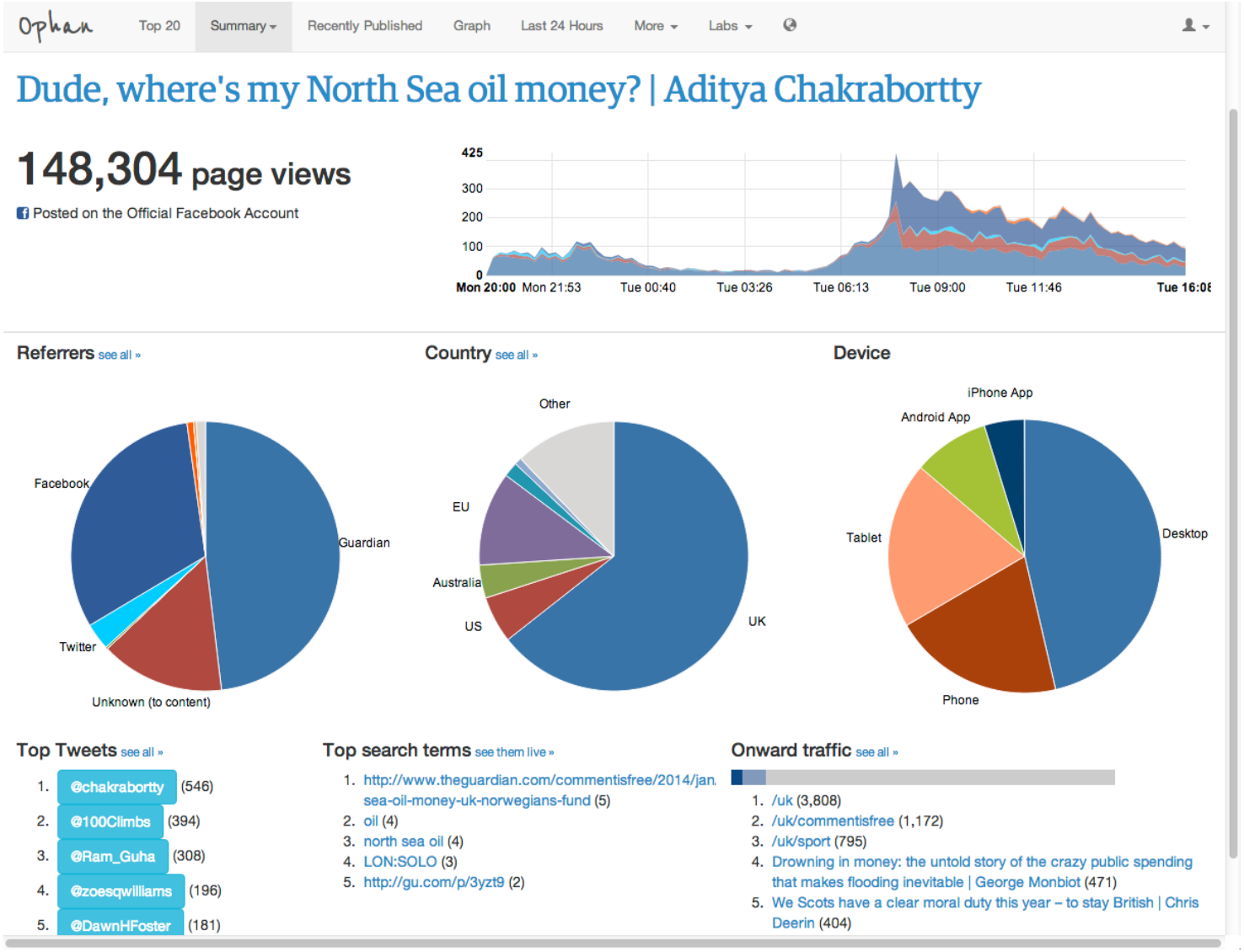
elasticsearch.

Case Study: The Guardian



elasticsearch.

Case Study: The Guardian



elasticsearch.

Case Study: The Guardian

"Now, people across the organization understand that being able to see what's happening to their content helps them do their jobs."

Graham Tackley
Director of Architecture

elasticsearch.

Example: Web server log files

elasticsearch.

Example: Web server log files

```
input { stdin {} }

filter {
  grok { match => { "message" => "%{COMBINEDAPACHELOG}" } }

  date { match => [ "timestamp", "dd/MMM/YYYY:HH:mm:ss Z" ] }

  geoip { source => “clientip" }

  useragent {
    source => "agent"
    target => "useragent"
  }
}

output {
  elasticsearch {
    protocol => "http"
    host => "localhost"
  }
}
```

Example: Web server log files

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output {
  elasticsearch {
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    host => "localhost"
  }
}
```

`cat access.log | logstash agent -f logstash-logs.conf`

Example: Web server log files


```
{
       "message" => "83.149.9.216 - - [28/May/2014:16:13:42 -0500] \"GET /presentations/logstash-monitorama-2013/images/kibana-search.png HTTP/1.1\" 200 203023
\"http://semicomplete.com/presentations/logstash-monitorama-2013/\" \"Mozilla/5.0 (Macintosh; Intel Mac OS X 10_9_1) AppleWebKit/537.36 (KHTML, like Gecko)
Chrome/32.0.1700.77 Safari/537.36\"",
      "@version" => "1",
    "@timestamp" => "2014-05-28T21:13:42.000Z",
          "host" => "kryptic.local",
      "clientip" => "83.149.9.216",
         "ident" => "-",
          "auth" => "-",
     "timestamp" => "28/May/2014:16:13:42 -0500",
          "verb" => "GET",
       "request" => "/presentations/logstash-monitorama-2013/images/kibana-search.png",
   "httpversion" => "1.1",
      "response" => "200",
         "bytes" => "203023",
      "referrer" => "\"http://semicomplete.com/presentations/logstash-monitorama-2013/\"",
         "agent" => "\"Mozilla/5.0 (Macintosh; Intel Mac OS X 10_9_1) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/32.0.1700.77 Safari/537.36\"",
         "geoip" => {
                   "ip" => "83.149.9.216",
          "country_code2" => "RU",
          "country_code3" => "RUS",
           "country_name" => "Russian Federation",
        "continent_code" => "EU",
           "region_name" => "48",
             "city_name" => "Moscow",
              "latitude" => 55.75219999999999,
             "longitude" => 37.6156,
              "timezone" => "Europe/Moscow",
      "real_region_name" => "Moscow City",
              "location" => [
          [0] 37.6156,
          [1] 55.75219999999999
      ]
   },
     "useragent" => {
           "name" => "Chrome",
             "os" => "Mac OS X 10.9.1",
        "os_name" => "Mac OS X",
      "os_major" => "10",
      "os_minor" => "9",
        "device" => "Other",
         "major" => "32",
         "minor" => "0",
         "patch" => "1700"
   }
}
```

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       "message" => "83.149.9.216 - - [28/May/2014:16:13:42 -0500] \"GET /
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```

grok

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AppleWebKit/537.36 (KHTML, like Gecko) Chrome/32.0.1700.77 Safari/
537.36\""
```

grok

date

Example: Web server log files

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      "geoip" => {
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       "major" => "32",
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       "patch" => "1700"
  }
```
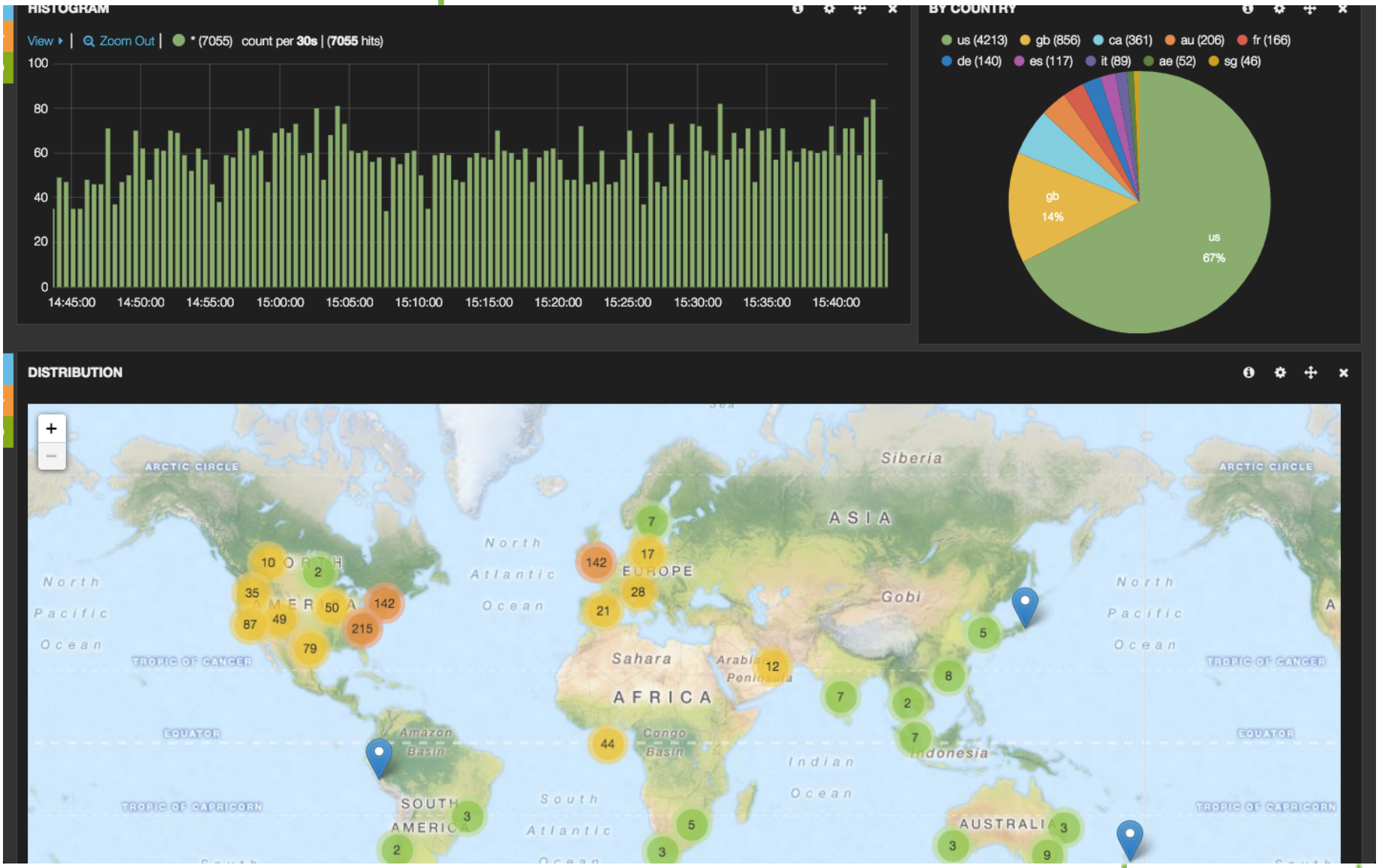

geoip

useragent

meetup.com RSVP stream

- All RSVPs are written out to a HTTP stream
- Each line is a JSON document
- Available at *http://stream.meetup.com/2/rsvps*

meetup.com RSVP stream



elasticsearch.

meetup.com RSVP stream

```
{
  response: "yes",
  member: { member_name: "Charlie “, member_id: 176530582 },
  visibility: "public",
  event: {
    time: 1413270000000,
    event_url: "http://www.meetup.com/2EuroBootCamp/events/212054422/",
    event_id: “qsvrtkysnbsb", event_name: "Tuesday Morning Boot Camp"
  },
  guests: 0,
  mtime: 1412774717000,
  rsvp_id: 1477279032,
  group: {
    group_name: "2 Euro Boot Camp!!",
    group_city: "Barcelona",
    group_lat: 41.4, group_lon: 2.17,
    group_urlname: "2EuroBootCamp",
    group_id: 17456462,
    group_country: "es",
    group_topics: [ { urlkey: "fitness", topic_name: "Fitness" } ]
  },
  venue: {
    lon: 1.58728,
    venue_name: "Paque de la Espana Industrial",
    venue_id: 22845382,
    lat: 41.462646
  }
}
```

meetup.com RSVP stream

```
# curl -s http://stream.meetup.com/2/rsvps |
logstash agent -f logstash-meetup.conf

input {
  stdin {
    codec => json_lines
    type => 'meetup'
  }
}
```

meetup.com RSVP stream

```
filter {
  if [venue][lat] and [venue][lon] {
    mutate {
      add_field => [ "[venue][lonlat]", "%{[venue][lon]}",
                     "tmplat", "%{[venue][lat]}" ]
    }
    mutate { merge => [ "[venue][lonlat]", "tmplat" ] }
    mutate {
      convert => [ "[venue][lonlat]", "float" ]
      remove => [ "tmplat" ]
    }
  }

 metrics {
    meter => "meetup.country.%{[group][group_country]}"
    meter => "meetup.country.total"
    add_tag => "metric"
    flush_interval => 60
  }
}
```

meetup.com RSVP stream

```
output {
  if "metric" in [tags] {
    stdout {
     codec => rubydebug
    }
    elasticsearch {
      host => 'localhost'
      index => 'metrics'
      protocol => 'http'
    }
  }
  if [type] == "meetup" {
    elasticsearch {
      host => 'localhost'
      index => 'meetups'
      protocol => 'http'
    }
  }
}
```

wikipedia edits

- wikipedia has a changes stream
- constantly posted in an IRC channel

wikipedia edits

```
input {
  irc {
    type => 'wikipedia'
    host => 'irc.wikimedia.org'
    nick => 'logstash-wikipedia'
    channels => ['#de.wikipedia']
  }
}
```

wikipedia edits

```
filter {
  # remove some weird encoding stuff from IRC
  mutate {
    gsub => [
      "message", "\u000302", "",
      "message", "\u000303", "",
      "message", "\u000307", "",
      "message", "\u000310", "",
      "message", "\u000314", "",
      "message", "\u00034", "",
      "message", "\u00035", "",
      "message", "\u0003", ""
    ]
  }
  # extract page and user
  grok {
    match => [ "message", "\[\[%{GREEDYDATA:page}\]\]%{GREEDYDATA} \*
%{GREEDYDATA:user} \* %{GREEDYDATA}" ]
  }
}
```

wikipedia edits

```
output {
  stdout {
    codec => line {
      format => 'Page: %{page}'
    }
  }
 elasticsearch {
   host => 'localhost'
   index => 'wikipedia-edits'
   protocol => 'http'
 }
}
```

wikipedia edits

```
» logstash agent -f logstash-wikipedia.conf

Page: Yamaha Aerox
Page: Neues Beginnen - Blätter internationaler Sozialisten
Page: Portal Diskussion:Fußball
Page: Saputo
Page: Portal:Phantastik/Mitarbeiten
Page: Gesetz über den Einsatz der Informations- und
Kommunikationstechnik in der öffentlichen Verwaltung
Page: Spvg Plettenberg
Page: Pflanzen gegen Zombies: Garden Warfare
Page: Wasserstandsanzeiger Bremerhaven
```

sysdig

- sysdig is a system call tracer (tcpdump for syscalls)
- powerful query language
- very useful for system tracing (intrusions, performance tracing, weird behaviour)

- See http://www.sysdig.org/

sysdig

- Easy to find things

```
# sysdig -r dumpfile.scap "evt.type = open and evt.arg.name
contains /usr/sbin"

2122 13:54:01.755117599 0 bash (1633) < open fd=3(<f>/usr/sbin/
hacked) name=/usr/sbin/hacked flags=262(O_TRUNC|O_CREAT|O_WRONLY)
mode=0
```

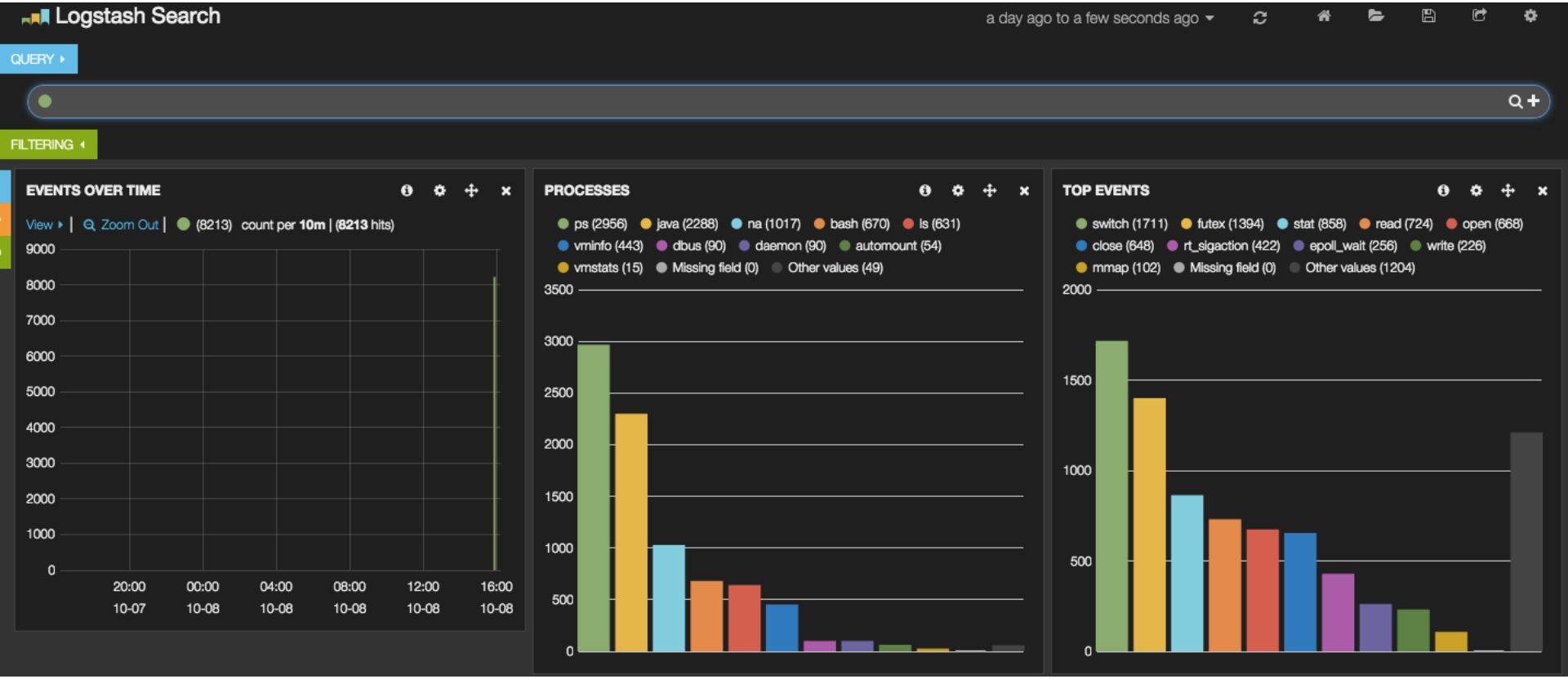
- Now do this for all machines...

sysdig

```
input { stdin { } }

filter {

  grok {
    pattern => "^%{NUMBER:num:int} %{NUMBER:time:float} %{INT:cpu:int} %
{NOTSPACE:procname} %{NOTSPACE:tid} (?<direction>[<>]) %{WORD:event} %
{DATA:args}$"
  }

  date { match => [ "time", "UNIX" ] }

  if [args] {
    kv {
      source => "args"
      remove_field => "args"
    }
  }
}
```

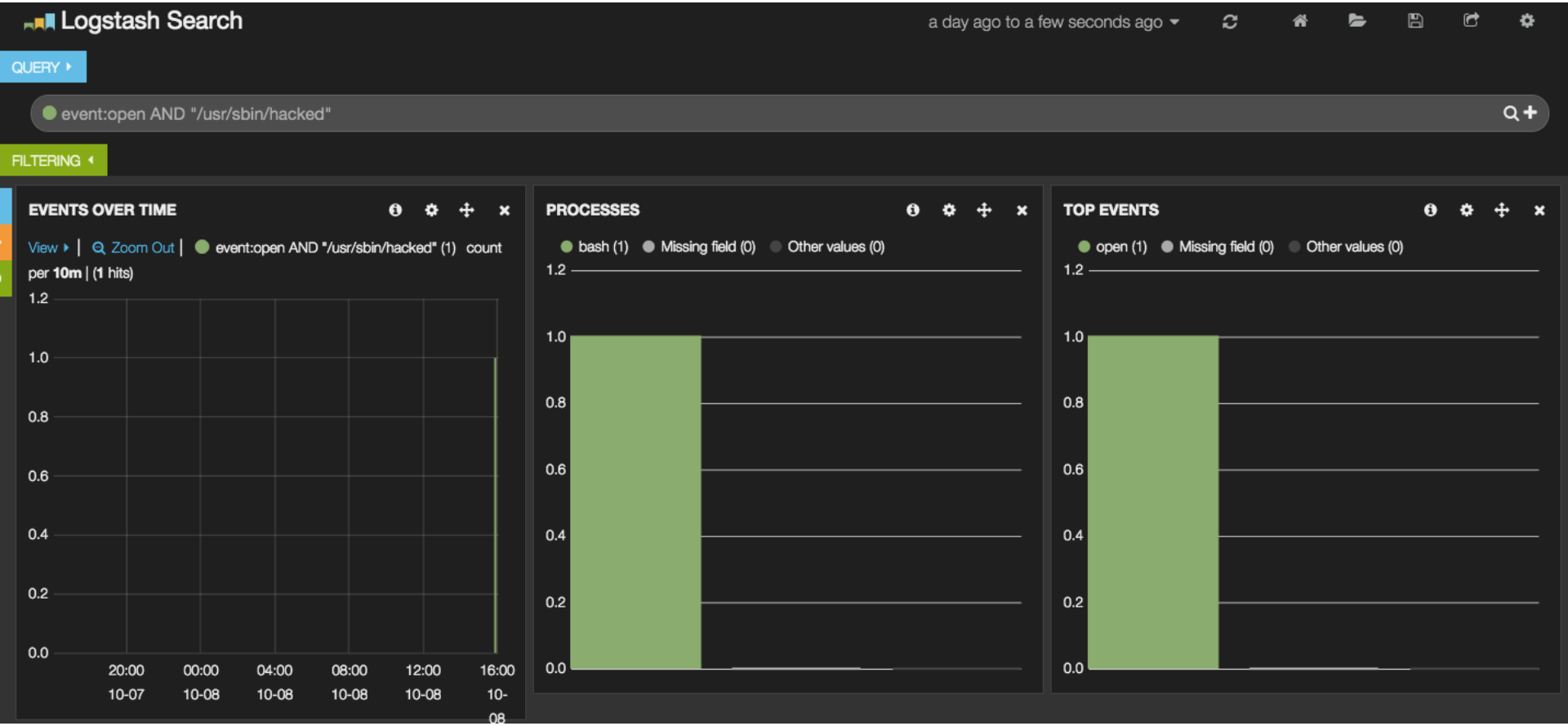
```
output {
 elasticsearch {
    protocol => http
    index => "sysdig-%{+YYYY.MM.dd}"
  }
}
```

sysdig



elasticsearch.

sysdig



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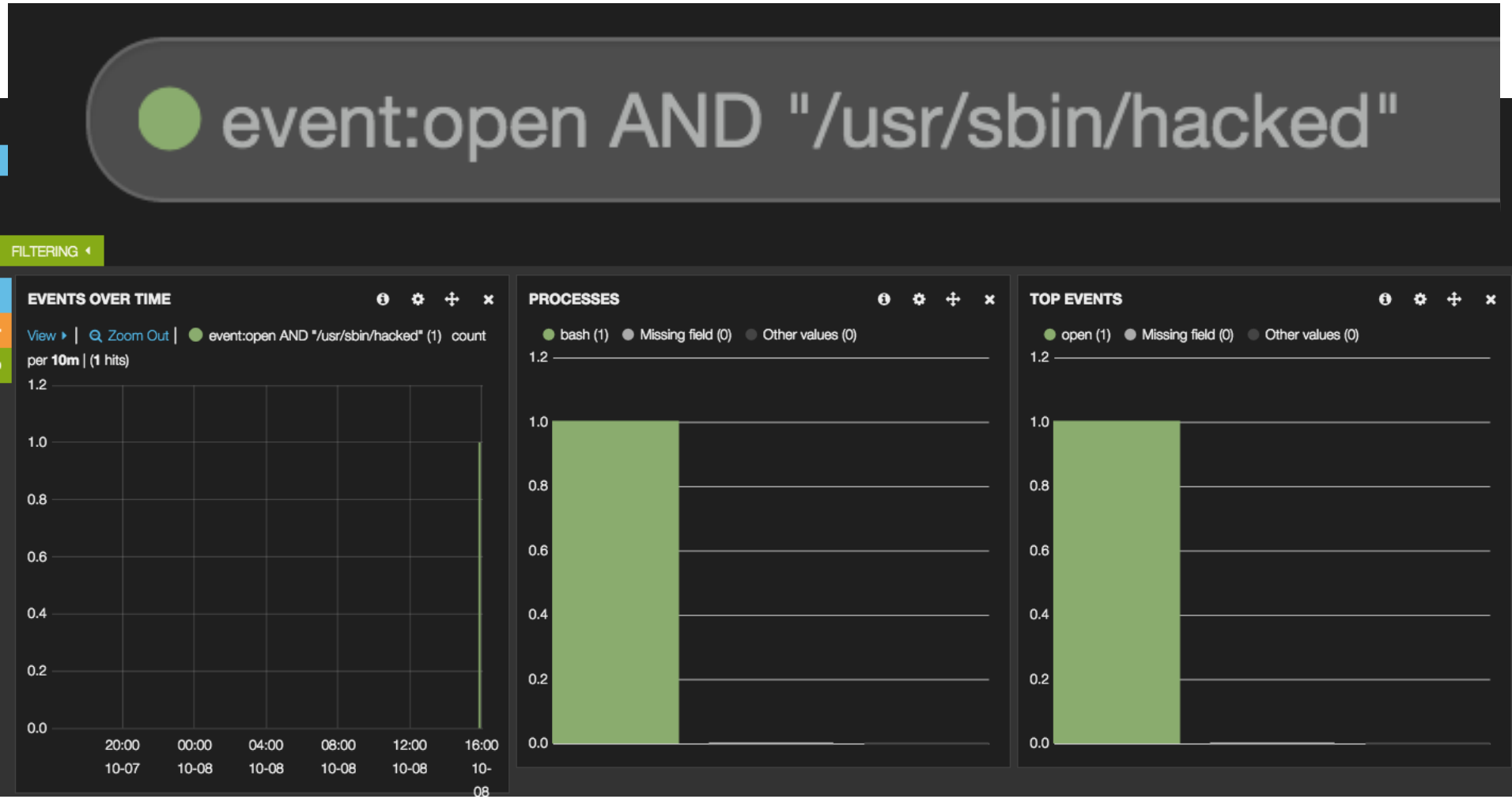


elasticsearch.

Summary

Summary

- Do not create data silos. Free your data!
- Make sure data is easy to query, not to store

elasticsearch.

- Visualize

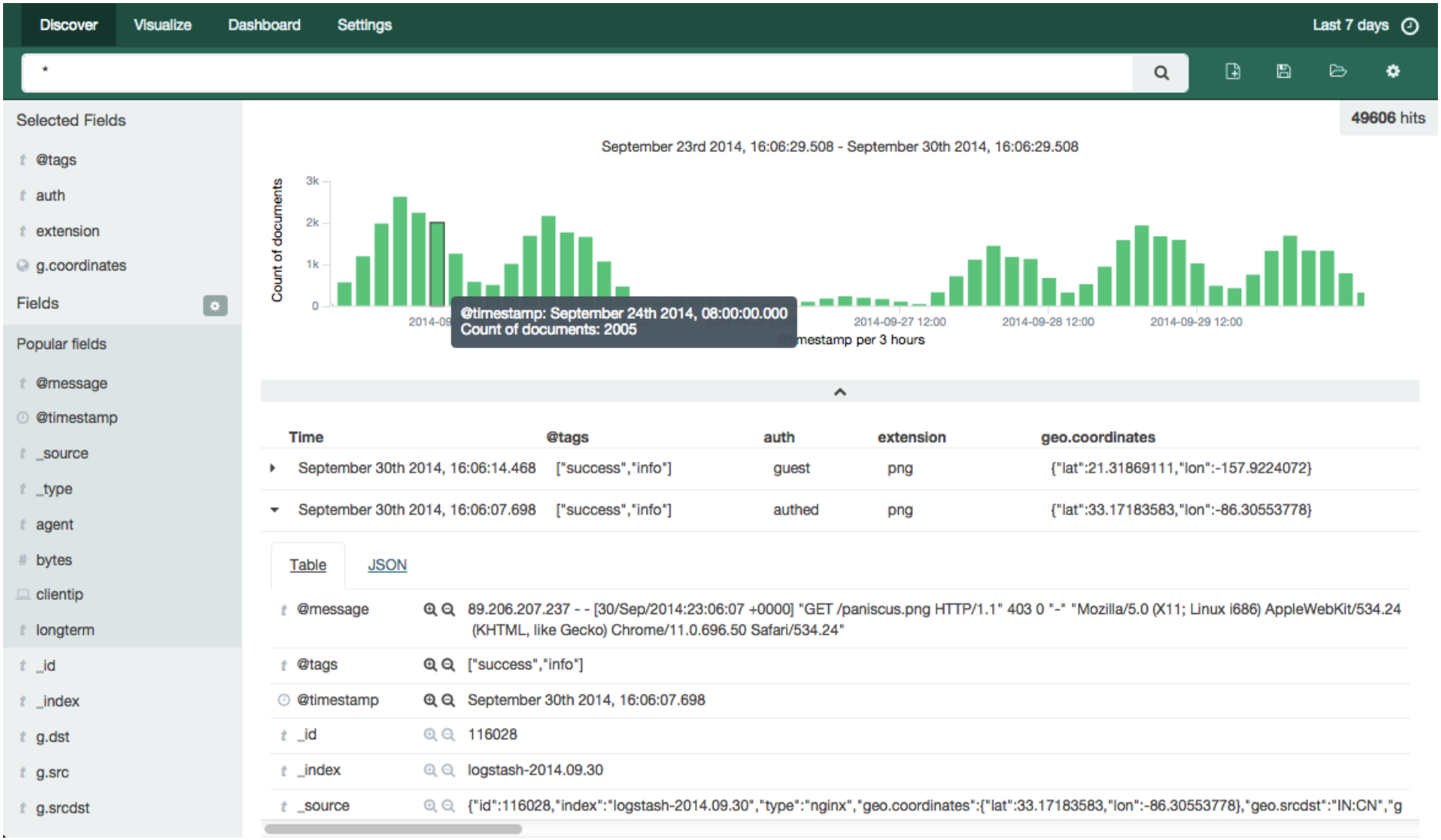
kibana

- Find your use-case: Business, system administration, your app... it's versatile!

Soon...

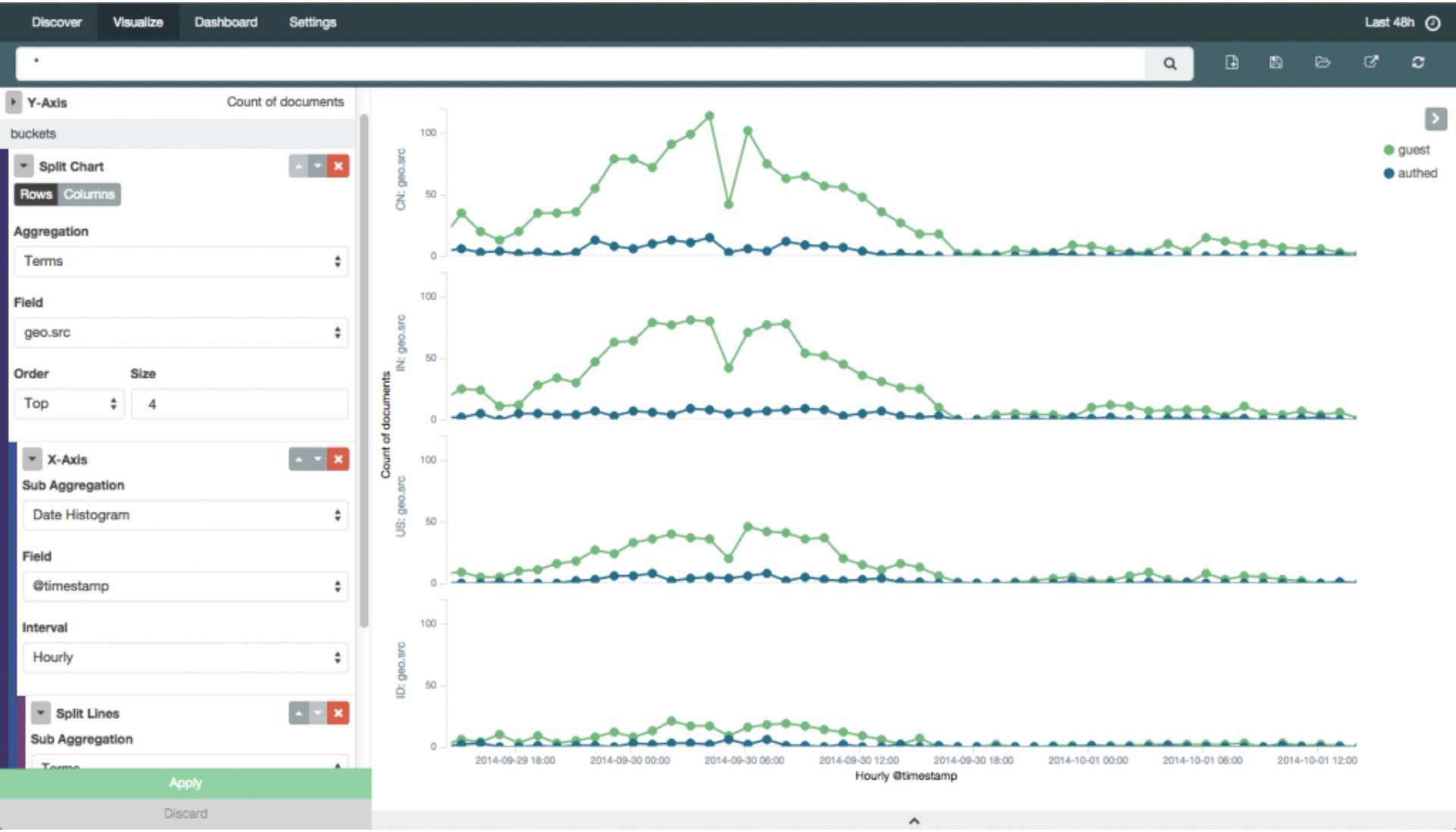
- Kibana 4... is going to be **huge**
- Elasticsearch 1.4.0.Beta1 has been released
- Logstash going towards 1.5.0

Kibana 4



elasticsearch.

Kibana 4

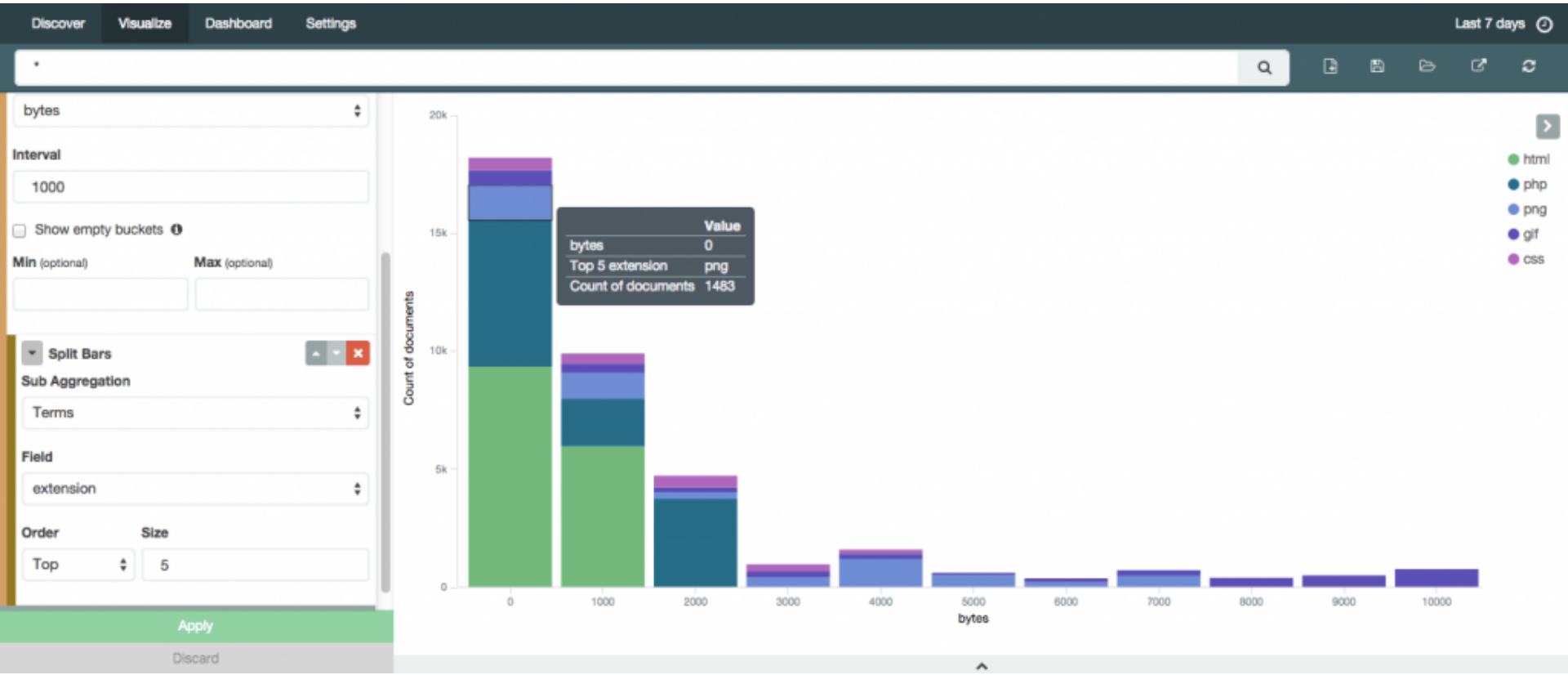


elasticsearch.

Kibana 4

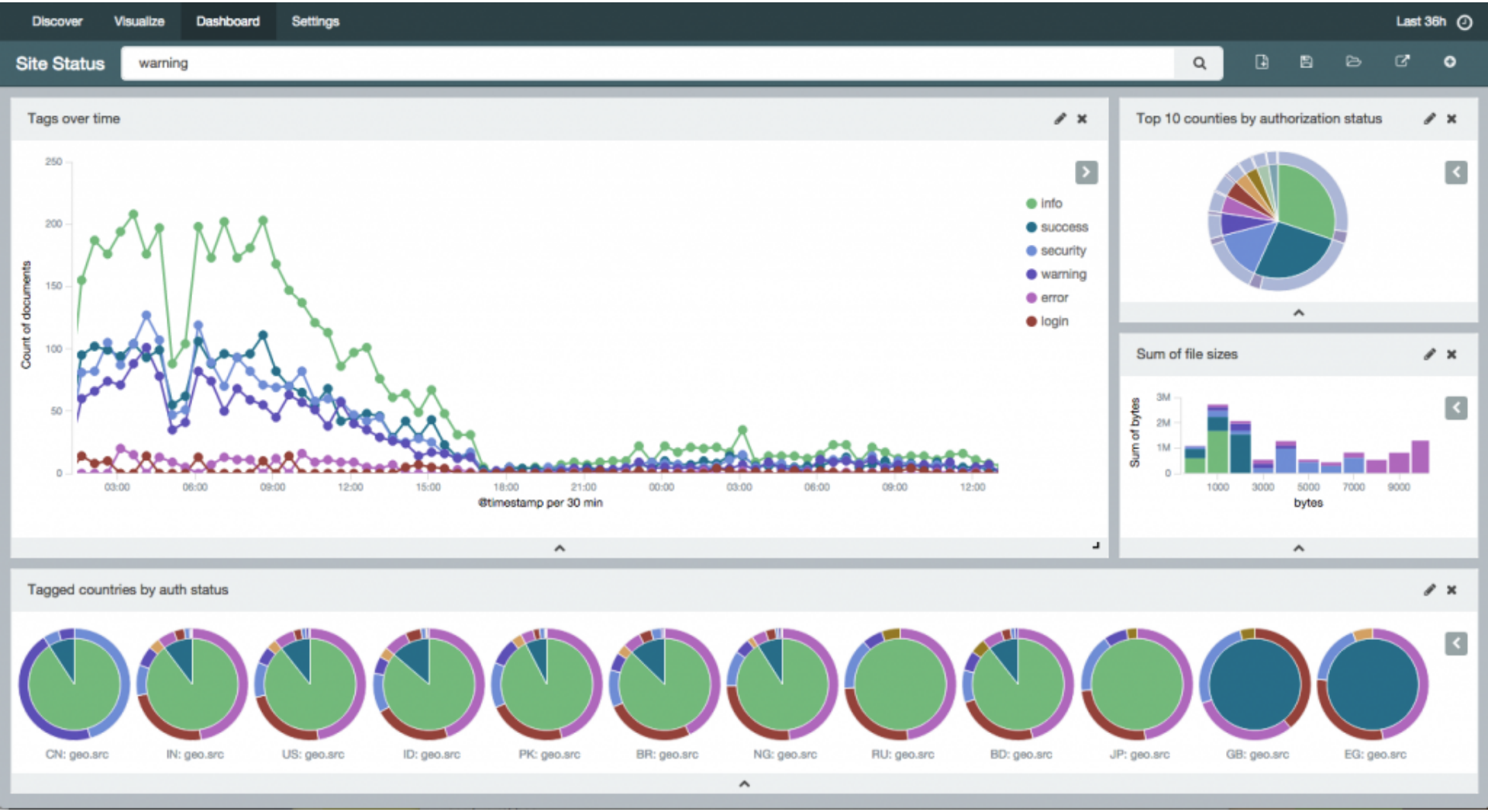
elasticsearch.

Kibana 4



elasticsearch.

Kibana 4



elasticsearch.

Getting up & running is easy

- Download Elasticsearch, logstash & Kibana archives

```
# elasticsearch-1.4.0.Beta1/bin/elasticsearch

# kibana-4.0.0-BETA1/bin/kibana

# logstash-1.4.2/bin/logstash agent -f logstash.conf

# open localhost:5601
```

Thanks for listening!
Q & A

P.S. We're hiring
http://elasticsearch.com/about/jobs

P.P.S. We're helping
http://elasticsearch.com/support
http://elasticsearch.com/training

Alexander Reelsen
@spinscale
alexander.reelsen@elasticsearch.com

elasticsearch.