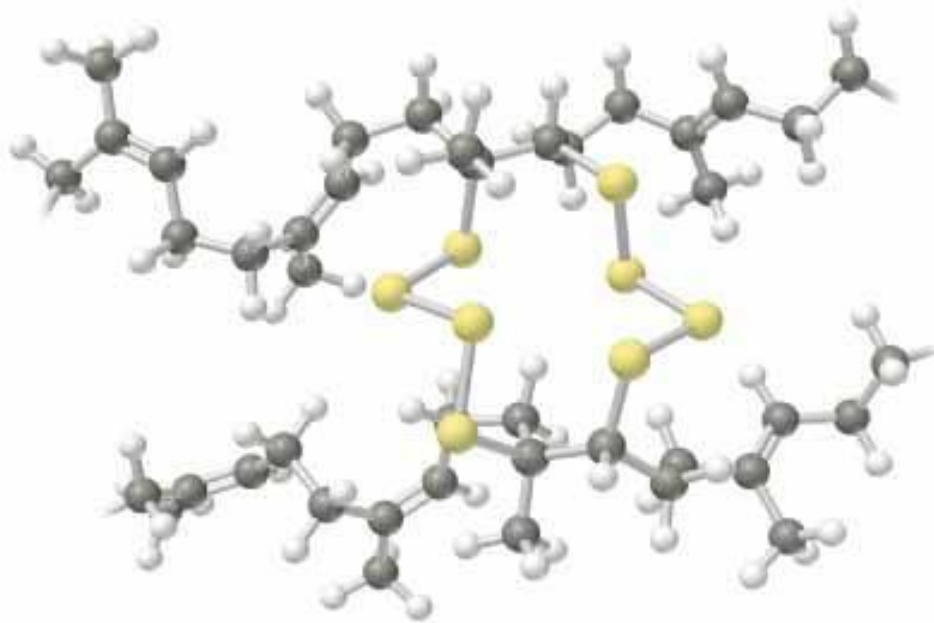


Introduction to



elasticsearch.

Elastic



(b)

- ✓ easy to install
- ✓ horizontally scalable
- ✓ highly available

Search



- ✓ **lucene inside**
 - ✓ ranked searching
 - ✓ proximity matches
 - ✓ wildcard queries
 - ✓ range queries
 - ✓ sorting
 - ✓ typo-tolerant
 - ✓ flexible faceting
 - ✓ simultaneous update and searching
 - ✓ high performance
 - ✓ highlighting
- ✓ **aggregations**
- ✓ **geolocations**

Elasticsearch



- ✓ distributed
- ✓ hi available
- ✓ RESTful
- ✓ crossplatform
- ✓ open source
- ✓ apache 2 licenced
- ✓ powerful

Dealing with human language

**Remove diacritics like ´, ^ and ¨
(normalizing)**

Get root form of a word (stemming)

- ✓ number
- ✓ Tense
- ✓ Gender
- ✓ Aspect (ate, eaten)
- ✓ etc

remove stopwords from search

Take synonyms into account

Check for misspelling (fuzzy matching)

Check for homophones

Mapping to RDB keywords

- RDB
- database
- table
- row
- Column/cell
- Index
- SQL
- Elasticsearch
- index
- type
- Document (JSON)
- Field
- Index (some ambiguous but who cares)
- DSL via HTTP

Storing Data

- **PUT** `http://es-host/your-index/your-type/id`
- **POST** `http://es-host/your-index/your-type`

```
POST http://localhost:9200/test/persons
{
  "name" : { "first name" : "Bill", "second name" : "Gates" },
  "gender" : "male",
  "age" : 58,
  "photo" : "http://photobank.som/p5pdynix5evsqw6sdlx11i5p1qtnhuxb/200x320",
  "company" : "Microsoft",
  "location" : { "address" : { "country" : "US", "city" : "Medina", "address"
    : "unknown" },
    "latitude" : 47.59375,
    "longitude" : -122.39926147460938
  },
  "emails": [ "bill@gmail.som", "boss@microsotf.com" ],
  "phones" : [ "1234567890"],
  "interested in" : [ "science", "computers", "windows", "charity" ],
  "balance" : 760000000000.00,
  "registered" : "Sep 7, 2004 9:28:09 AM"
}
```

Get

Server

localhost:9200

Marvel Dashboards ▾



```
1  
2  
3  
4  
5  
6  
7  
8  
9 GET /test/persons/ptod2rD1SR-PErYzVA8ThQ  
10
```

```
1 {  
2   "_index": "test",  
3   "_type": "persons",  
4   "_id": "ptod2rD1SR-PErYzVA8ThQ",  
5   "_version": 1,  
6   "found": true,  
7   "_source": {  
8     "name": {  
9       "first name": "Jesse",  
10      "second name": "White"  
11    },  
12    "gender": "unknown",  
13    "age": 3,  
14    "photo": "http://photobank.som/7jt9mpjsf8y8d8qk4gsmea8q8zs314mj/200x320",  
15    "company": "Goolge",  
16    "location": {  
17      "address": {  
18        "country": "Hungary",  
19        "city": "Brussels",  
20        "address": "Prospect Slavi, dom 330/0, kv. 668"  
21      },  
22      "latitude": 86.13565063476562,  
23      "longitude": 116.14791870117188  
24    },  
25    "phones": [],  
26    "interested in": [  
27      "vodka"  
28    ],  
29    "balance": 43935.383,  
30    "registered": "Nov 25, 1996 12:21:30 PM"  
31  }  
32 }
```

GET http://es-host/your-index/your-type/id

Multi Get

Server localhost:9200

Marvel Dashboards

```
1 POST /_mget
2 {
3   "docs" : [
4     {
5       "_index" : "test",
6       "_type" : "persons",
7       "_id" : "ptod2rD1SR-PErYzVA8ThQ"
8     },
9     {
10      "_index" : "test",
11      "_type" : "persons",
12      "_id" : "wrong_id"
13    }
14  ]
15 }
```

```
1 {
2   "docs": [
3     {
4       "_index": "test",
5       "_type": "persons",
6       "_id": "ptod2rD1SR-PErYzVA8ThQ",
7       "_version": 1,
8       "found": true,
9       "_source": {
10         "name": {
11           "first name": "Jesse",
12           "second name": "White"
13         },
14         "gender": "unknown",
15         "age": 3,
16         "photo": "http://photobank.com/7jt9mpjsf8y8d8qk4gsmea8q8zs314mj/200x320",
17         "company": "Goolge",
18         "location": {
19           "address": {
20             "country": "Hungary",
21             "city": "Brussels",
22             "address": "Prospect Slavi, dom 330/0, kv. 668"
23           },
24           "latitude": 86.13565063476562,
25           "longitude": 116.14791870117188
26         },
27         "phones": [],
28         "interested in": [
29           "vodka"
30         ],
31         "balance": 43935.383,
32         "registered": "Nov 25, 1996 12:21:30 PM"
33       }
34     },
35     {
36       "_index": "test",
37       "_type": "persons",
38       "_id": "wrong_id",
39       "found": false
40     }
41   ]
42 }
```

Simple Search via query

Server localhost:9200

Marvel Dashboards ▾ ○ ⚙ ?

```
1  
2  
3  
4  
5  
6  
7 GET /test/persons/_search?q=name.first%20name:Evgeny  
8  
9
```

```
1 {  
2   "took": 10,  
3   "timed_out": false,  
4   "_shards": {  
5     "total": 5,  
6     "successful": 5,  
7     "failed": 0  
8   },  
9   "hits": {  
10    "total": 158541,  
11    "max_score": 3.8076324,  
12    "hits": [  
13      {  
14        "_index": "test",  
15        "_type": "persons",  
16        "_id": "60pjk43ZQaWqE6FsvL7Twg",  
17        "_score": 3.8076324,  
18        "_source": {  
19          "name": {  
20            "first name": "Evgeny",  
21            "second name": "Walker"  
22          },  
23          "gender": "unknown",  
24          "age": 51,  
25          "photo": "http://photobank.som/nzujt1wu4czu7wlugd4abe5sfj6vjgi/200x320",  
26          "company": "Yandeks",  
27          "location": {  
28            "address": {  
29              "country": "Spain",  
30              "city": "Brussels",  
31              "address": "Baker str., dom 332/4, kv. 619"  
32            },  
33            "latitude": 77.02238464355469,  
34            "longitude": -117.07430267333984  
35          },  
36          "emails": [  
37            "pi9avjqsatxbtpw6@yandeks.com",  
38            "jxf1pcd9zfbjm810@yandeks.com"  
39          ],  
40          "phones": [  
41            "0755517766",  
42            "41322"  
43          ],  
44          "ed in": [  
45            "eball",  
46            "st"  
47          ],  
48          "st"  
49        }  
50      ]  
51    }  
52  }  
53 }
```

GET http://host/index/type/_search?q={query string}

Some more conditions

Serverlocalhost:9200

Marvel Dashboards

```
1
2
3
4
5
6
7 GET /test/persons/_search?q=%2Bname.first%20name%3AEvgeny
8
9 GET /test/persons/_search?q=%2Binterested%20in%3Acurling
10
11 GET /test/persons/_search?q=%2Bname.first%20name%3AEvgeny+%2Binterested%20in%3Acurling
```

```
75      "curling"
76    ],
77    "balance": 67204.04,
78    "registered": "May 4, 1983 2:13:17 PM"
79  }
80 },
81 {
82   "_index": "test",
83   "_type": "persons",
84   "_id": "zz0BvSt5S4KzPLwYRNx5Cg",
85   "_score": 5.2656927,
86   "_source": {
87     "name": {
88       "first name": "Evgeny",
89       "second name": "Razin"
90     },
91     "gender": "female",
92     "age": 127,
93     "photo": "http://photobank.som/zctngspg3tcfizz60ylwzu7kqghc8571/200x320",
94     "company": "C1",
95     "location": {
96       "address": {
97         "country": "Serbia",
98         "city": "Brussels",
99         "address": "Cricklewood Ln, dom 400/1, kv. 187"
100       },
101       "latitude": 59.56282043457031,
102       "longitude": -92.42988586425781
103     },
104     "emails": [
105       "nffazsqxaqnf@c1.com",
106       "qjmavycyigpjh3@c1.com"
107     ],
108     "phones": [
109       "3055810565",
110       "5555675685"
111     ],
112     "interested in": [
113       "curling"
114     ],
115     "balance": 34766.9,
116     "registered": "Sep 20, 2002 8:24:38 PM"
117   }
118 },
119 {
120   "_index": "test"
```

Too much %s

Wildcards

Server localhost:9200

Marvel Dashboards ▾



```
1  
2  
3  
4  
5  
6  
7 GET /test/persons/_search?q=%2Bname.first%20name%3AEvgeny+%2Binterested%20in%3Acu%3F%3F%3Fng+%2Bcountry%3ARu*a
```

```
1 {  
2   "took": 195,  
3   "timed_out": false,  
4   "_shards": {  
5     "total": 5,  
6     "successful": 5,  
7     "failed": 0  
8   },  
9   "hits": {  
10    "total": 75,  
11    "max_score": 4.061781,  
12    "hits": [  
13      {  
14        "_index": "test",  
15        "_type": "persons",  
16        "_id": "mg6AwTAfQlG8cVdQG0eqbA",  
17        "_score": 4.061781,  
18        "_source": {  
19          "name": {  
20            "first name": "Evgeny",  
21            "second name": "Tolstoy"  
22          },  
23          "gender": "female",  
24          "age": 145,  
25          "photo": "http://photobank.som/9nkeavvhfb6151x57e  
nlp0b1fseb1i1/200x320",  
26          "company": "Hot Brains",  
27          "location": {  
28            "address": {  
29              "country": "Russia",  
30              "city": "Varna",  
31              "address": "Malaya Sovetskaya, dom 345/3, kv  
. 797"  
32            },  
33            "latitude": -65.2096939086914,  
34            "longitude": 83.94891357421875  
35          },  
36          "phones": [  
37            "5035250513"  
38          ],  
39          "interested in": [  
40            "swimming",  
41            "curling"  
42          ],  
43          "balance": 14857.049,
```

Search via DSL

Server localhost:9200

Marvel Dashboards ▾ ⚙ ?

```
1 GET /test/persons/_search
2 {
3   "query" : {
4     "bool" : {
5       "must": [
6         { "match" : {"first name" : "Evgeny"}},
7         { "match" : {"interested in" : "curling"}}
8       ],
9       "must_not" : { "match" : {"interested in" : "vodka"}},
10      "should" : { "match" : {"country" : "Russia"}}
11    }
12  }
13 }
14
```

```
1 {
2   "took": 60,
3   "timed_out": false,
4   "_shards": {
5     "total": 5,
6     "successful": 5,
7     "failed": 0
8   },
9   "hits": {
10    "total": 8942,
11    "max_score": 7.7844553,
12    "hits": [
13      {
14        "_index": "test",
15        "_type": "persons",
16        "_id": "VANTKzhzTFidHSR9CzZRQw",
17        "_score": 7.7844553,
18        "_source": {
19          "name": {
20            "first name": "Evgeny",
21            "second name": "Oblonsky"
22          },
23          "gender": "female",
24          "age": 83,
25          "photo": "http://photobank.com/kijft5dytjn5xq5x8bt5n4id5j0dx4m5/200x320",
26          "company": "Besezda",
27          "location": {
28            "address": {
29              "country": "Russia",
30              "city": "Paris",
31              "address": "Malaya Sovetskaya, dom 83/0, kv. 125"
32            },
33            "latitude": -45.757347106933594,
34            "longitude": -1.5399322509765625
35          },
36          "phones": [],
37          "interested in": [
38            "curling"
39          ],
40          "balance": 9334.984,
41          "registered": "Mar 4, 1971 10:48:46 PM"
42        }
43      },
44      {
45        "_index": "test",
```

Fraze search

Server localhost:9200

Marvel Dashboards



```
1 GET /test/persons/_search
2 {
3   "query" : {
4     "bool" : {
5       "must" : [
6         { "match" : { "first name" : "Sergey"}},
7         { "match_phrase" : { "interested in" : "science fiction"}}
8       ],
9       "must_not" : { "match" : { "interested in" : "vodka"}},
10      "should" : { "match" : { "country" : "Russia"}}
11    }
12  }
13 }
14
```

```
5   "total": 5,
6   "successful": 5,
7   "failed": 0
8 },
9   "hits": {
10    "total": 8886,
11    "max_score": 7.8368416,
12    "hits": [
13      {
14        "_index": "test",
15        "_type": "persons",
16        "_id": "vx6PDNLMR6CYy310gjDWA",
17        "_score": 7.8368416,
18        "_source": {
19          "name": {
20            "first name": "Sergey",
21            "second name": "Onegin"
22          },
23          "gender": "unknown",
24          "age": 39,
25          "photo": "http://photobank.som/jji4zygvjx4bjq7z3pedtzjifrh13sg/200x320",
26          "company": "Goolge",
27          "location": {
28            "address": {
29              "country": "Russia",
30              "city": "New-York",
31              "address": "Baker str., dom 256/3, kv. 337"
32            },
33            "latitude": 32.39672088623047,
34            "longitude": 144.95648193359375
35          },
36          "emails": [
37            "kpwgjnhtstjgkypb1@goolge.com",
38            "lysychjsrry@goolge.com"
39          ],
40          "phones": [
41            "5513155222",
42            "3351238421",
43            "7022302658"
44          ],
45          "interested in": [
46            "science fiction"
47          ],
48          "balance": 47795.28,
49          "registered": "Oct 14, 2005 11:18:51 PM"
```

```
"match_fraze" : { "field" : "fraze" }
```

Mapping

Server localhost:9200

Marvel Dashboards ▾



```
1 POST /test/messages
2 {
3   "user" : "dnuke",
4   "message" : "come get some",
5   "date" : "2014-08-11T20:37:12"
6 }
```

```
8 GET /test/messages/_mapping
```

```
1 {
2   "test": {
3     "mappings": {
4       "messages": {
5         "properties": {
6           "date": {
7             "type": "date",
8             "format": "dateOptionalTime"
9           },
10          "message": {
11            "type": "string"
12          },
13          "user": {
14            "type": "string"
15          }
16        }
17      }
18    }
19  }
20 }
```

Dynamic mapping

Server localhost:9200

Marvel Dashboards ▾ ○ ⚙ ⓘ

```
1 POST /test/messages
2 {
3   "user" : "dnukem",
4   "message" : "come get some",
5   "date" : "2014-08-11T20:37:12"
6 }
7
8 GET /test/messages/_mapping
9
10 POST /test/messages
11 {
12   "user" : "rcop",
13   "message" : "Thank you for your cooperation. Good night",
14   "date" : "2014-08-11T20:44:06",
15   "mood" : "calm"
16 }
17
18 GET /test/messages/_mapping
```

```
1 {
2   "test": {
3     "mappings": {
4       "messages": {
5         "properties": {
6           "date": {
7             "type": "date",
8             "format": "dateOptionalTime"
9           },
10          "message": {
11            "type": "string"
12          },
13          "mood": {
14            "type": "string"
15          },
16          "user": {
17            "type": "string"
18          }
19        }
20      }
21    }
22  }
23 }
```


You are wrong

Server localhost:9200

Marvel Dashboards ▾ ○ ⚙ ?

```
1 POST /test/messages
2 {
3   "user" : "dnuke",
4   "message" : "come get some",
5   "date" : "2014-08-11T20:37:12"
6 }
7
8 GET /test/messages/_mapping
9
10 POST /test/messages
11 {
12   "user" : "rcop",
13   "message" : "Thank you for your cooperation. Good night",
14   "date" : "2014-08-11T20:44:06",
15   "mood" : "calm"
16 }
17
18 GET /test/messages/_mapping
19
20 POST /test/messages
21 {
22   "user" : "dnuke",
23   "message" : "piece of cake",
24   "date" : "good day to die",
25   "mood" : "hilarious"
26 }
```

```
1 {
2   "error": "MapperParsingException[failed to parse [date]]; nested: MapperParsingException[failed to parse
   date field [good day to die], tried both date format [dateOptionalTime], and timestamp number with locale
   []]; nested: IllegalArgumentException[Invalid format: \"good day to die\"]"; ",
3   "status": 400
4 }
```

Mapping change is not simple

Server localhost:9200

Marvel Dashboards ▾ ○ ⚙ ?

```
1 DELETE /test/messages
2
3 POST /test/messages
4 {
5   "user": "dnukem",
6   "message": "come get some",
7   "date": "2014-08-11T20:37:12"
8 }
```

```
10 POST /test/messages
11 {
12   "user": "rcop",
13   "message": "Thank you for your cooperation. Good night",
14   "date": "2014-08-11T20:44:06",
15   "mood": "calm"
16 }
```

```
18 POST /test/messages
19 {
20   "user": "dnukem",
21   "message": "piece of cake",
22   "date": "good day to die",
23   "mood": "hilarious"
24 }
```

```
26 PUT /test/messages/_mapping
27 {
28   "messages": {
29     "properties": {
30       "message": {
31         "type": "string"
32       },
33       "mood": {
34         "type": "integer"
35       },
36       "user": {
37         "type": "string"
38       }
39     }
40   }
41 }
```

```
1 {
2   "error": "MergeMappingException[Merge failed with failures {[mapper [mood] of different type, current_type [string], merged_type [integer]}]",
3   "status": 400
4 }
```

Geo locations

Server localhost:9200

Marvel Dashboards ▾



```
1
2 PUT test/persons/_mapping
3 {
4   "persons": {
5     "properties": {
6       "location": {
7         "properties": {
8           "geo": {
9             "type": "geo_point"
10          }
11        }
12      }
13    }
14  }
15 }
```

```
16
17 GET test/persons/_search
18 {
19   "query": {
20     "filtered": {
21       "query": {
22         "match": { "interested in" : "vodka" }
23       },
24       "filter": {
25         "geo_distance": {
26           "distance": "76km",
27           "geo": {
28             "lat": 40,
29             "lon": -70
30           }
31         }
32       }
33     }
34   }
35 }
```

```
1 {
2   "took": 17,
3   "timed_out": false,
4   "_shards": {
5     "total": 5,
6     "successful": 5,
7     "failed": 0
8   },
9   "hits": {
10    "total": 1,
11    "max_score": 1.4665544,
12    "hits": [
13      {
14        "_index": "test",
15        "_type": "persons",
16        "_id": "kz_G03MMShuWFP-6xp0rSQ",
17        "_score": 1.4665544,
18        "_source": {
19          "name": {
20            "first name": "Stepan",
21            "second name": "Razin"
22          },
23          "gender": "male",
24          "age": 8,
25          "photo": "http://photobank.com/73yy1hxwhadngnnw8147d941uuw82npx/200x320",
26          "company": "Appel",
27          "location": {
28            "address": {
29              "country": "Switzerland",
30              "country_code": "CH",
31              "city": "Budva",
32              "address": "pr. Lenina, dom 79/2, kv. 560"
33            },
34            "geo": {
35              "lat": 40.069610595703125,
36              "lon": -70.8779067993164
37            }
38          },
39          "emails": [
40            "zpyreiwjfiz02@appel.com"
41          ],
42          "phones": [
43            "5027512827",
44            "0553652654"
45          ],
46          "interested in": [
47            "vodka",
48            "sniper rifles",
49            "science fiction"
50          ]
51        }
52      }
53    ]
54  }
55 }
```

highlighting

Server localhost:9200

Marvel Dashboards ▾



```
1
2
3
4
5
6 GET /test/messages/_search
7 {
8   "query" : {
9     "match_phrase" : {"message" : "get"}
10  },
11  "highlight": {
12    "fields" : {
13      "message" : {}
14    }
15  }
16 }
```

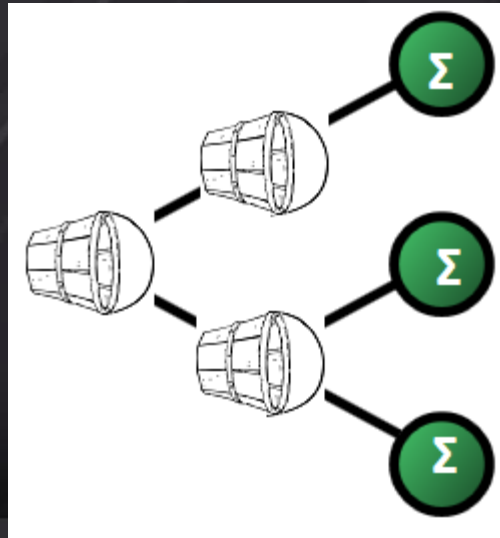
```
1 {
2   "took": 408,
3   "timed_out": false,
4   "_shards": {
5     "total": 5,
6     "successful": 5,
7     "failed": 0
8   },
9   "hits": {
10    "total": 1,
11    "max_score": 6.734254,
12    "hits": [
13      {
14        "_index": "test",
15        "_type": "messages",
16        "_id": "ZuJS26E_QZmIv9yqAHceVg",
17        "_score": 6.734254,
18        "_source": {
19          "user": "dnukem",
20          "message": "come get some",
21          "date": "2014-08-11T20:37:12"
22        },
23        "highlight": {
24          "message": [
25            "come <em>get</em> some"
26          ]
27        }
28      }
29    ]
30  }
31 }
```

Aggregations

Two types

- ✓ bucketing
- ✓ metrics

Aggregations can be nested!
Buckets can have sub-buckets



Aggregations

Server localhost:9200

Development Trial

Dashboards ▾



```
1 GET /test/persons/_search
2 {
3   "query": {
4     "filtered": {
5       "query": {
6         "match": {
7           "company": "spearsoft"
8         }
9       },
10      "filter": {
11        "range": {
12          "registered": {
13            "gte": "now-12M"
14          }
15        }
16      }
17    },
18  },
19  "aggs": {
20    "young": {
21      "filter": {
22        "range": {
23          "age": {
24            "from": "20",
25            "to": "30"
26          }
27        }
28      },
29      "aggs": {
30        "city": {
31          "terms": {
32            "field": "location.address.city",
33            "size": 4
34          },
35          "aggs": {
36            "interests": {
37              "terms": {
38                "field": "interested in",
39                "size": 3
40              }
41            }
42          }
43        }
44      }
45    }
46  }
47 }
```

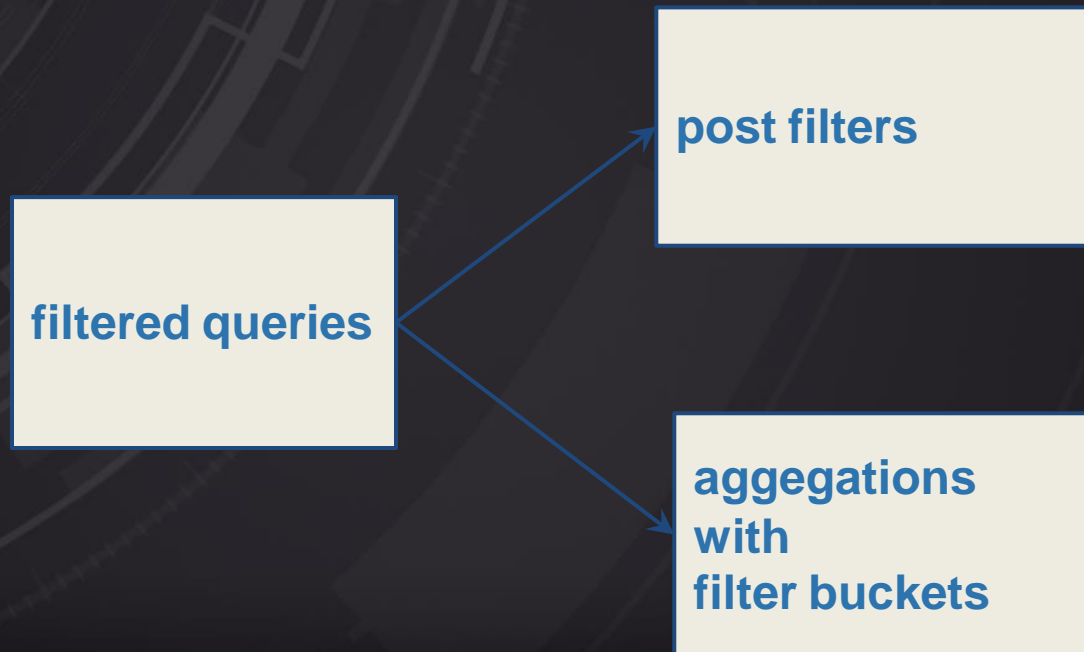
```
459 },
460 "aggregations": {
461   "young": {
462     "doc_count": 27,
463     "city": {
464       "buckets": [
465         {
466           "key": "moscow",
467           "doc_count": 5,
468           "interests": {
469             "buckets": [
470               {
471                 "key": "bicycles",
472                 "doc_count": 2
473               },
474               {
475                 "key": "body",
476                 "doc_count": 1
477               },
478               {
479                 "key": "boxing",
480                 "doc_count": 1
481               }
482             ]
483           }
484         },
485         {
486           "key": "amsterdam",
487           "doc_count": 4,
488           "interests": {
489             "buckets": [
490               {
491                 "key": "bicycles",
492                 "doc_count": 1
493               },
494               {
495                 "key": "paintball",
496                 "doc_count": 1
497               },
498               {
499                 "key": "seafood",
500                 "doc_count": 1
501               }
502             ]
503           }
504         }
505       ]
506     }
507   }
508 }
```

**Have a question?
Like this deck?**

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@Sperasoft**

Filtering

- **Filtered queries (affect search results and aggregations)**
- **Filter buckets (affect only aggregations)**
- **Post filters (affect only search results)**



Post Filter

Server localhost:9200

Development Trial

Dashboards ▾



```
1 GET /test/persons/_search
2 {
3   "query": {
4     "filtered": {
5       "query": {
6         "match": {
7           "company": "spearsoft"
8         }
9       },
10      "filter": {
11        "range": {
12          "registered": {
13            "gte": "now-12M"
14          }
15        }
16      }
17    },
18    "post_filter": {
19      "term": {
20        "interested in": "vodka"
21      }
22    }
23  },
24  "aggs": {
25    "young": {
26      "filter": {
27        "range": {
28          "age": {
29            "from": "20",
30            "to": "30"
31          }
32        }
33      },
34      "aggs": {
35        "city": {
36          "terms": {
37            "field": "location.address.city",
38            "size": 4
39          },
40          "aggs": {
41            "interests": {
42              "terms": {
43                "field": "interested in",
44                "size": 3
45              }
46            }
47          }
48        }
49      }
50    }
51  }
52 }
```

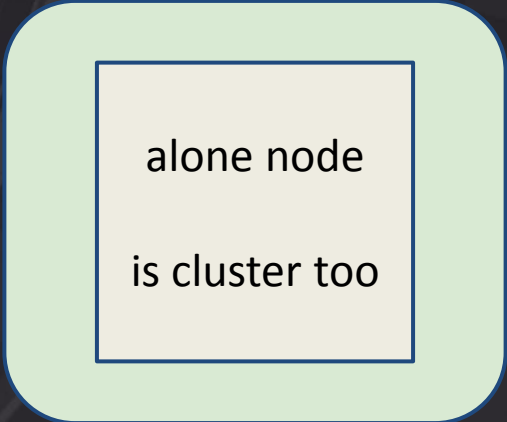
```
441 {
442   "country": "Ukraine",
443   "country_code": "UA",
444   "city": "Amsterdam",
445   "address": "Maly pr. V. O., dom 391/0, kv. 499"
446 },
447 {
448   "geo": {
449     "lat": 42.87870788574219,
450     "lon": 89.80148315429688
451   },
452   "coordinates": [
453     89.80148315429688,
454     42.87870788574219
455   ]
456 },
457 {
458   "emails": [
459     "ymjliypjjmir7@spearsoft.com",
460     "sqtbmsejjkw5@spearsoft.com",
461     "aruc9sjinxjvhy361@spearsoft.com"
462   ],
463   "phones": [],
464   "interested in": [
465     "vodka",
466     "paintball",
467     "boxing"
468   ],
469   "balance": 180280.06,
470   "registered": "2014-02-18T21:45:12Z"
471 }
472 ],
473 "aggregations": {
474   "young": {
475     "doc_count": 27,
476     "city": {
477       "buckets": [
478         {
479           "key": "moscow",
480           "doc_count": 5,
481           "interests": {
482             "buckets": [
483               {
484                 "key": "bicycles",
485                 "doc_count": 2
486               },
487               {
488                 "key": "bicycles",
489                 "doc_count": 2
490               }
491             ]
492           }
493         }
494       ]
495     }
496   }
497 }
```

Does not affect aggregations

Distributed document store

alone node

Distributed document store



alone node
is cluster too

The diagram consists of a light green rounded square containing a smaller white square with a thin blue border. The text 'alone node' and 'is cluster too' is centered within the white square. The background of the slide features a dark, abstract pattern of concentric circles and lines, resembling a stylized city map or a technical diagram.

Joining nodes

/elastic/config/elasticsearch.yml

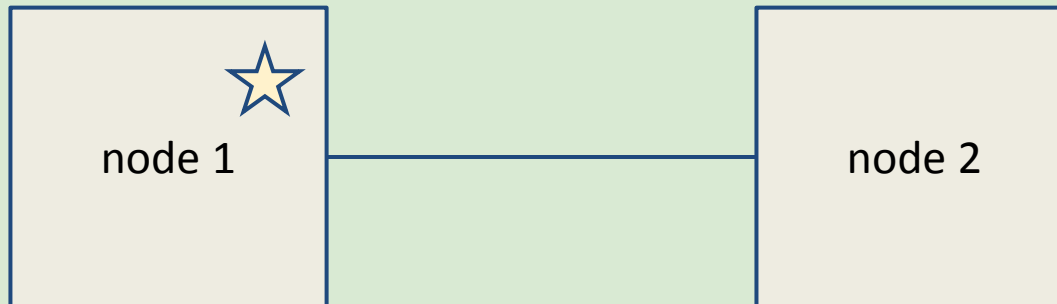
```
cluster.name: my_cluster
```

```
##### Cluster
#####
# Cluster name identifies your cluster for auto-
# discovery. If you're running
# multiple clusters on the same network, make sure you're
# using unique names.
#
cluster.name: elasticsearch

...

# Set a custom port for the node to node communication
# (9300 by default):
#
transport.tcp.port: 9300
```

Distributed document store



Master node is in charge of managing cluster wide stuff, such as creating/deleting an index or adding/removing a node

Shards

Server

localhost:9200

Marvel Dashboards ▾



```
1
2 PUT /orders
3 {
4   "settings" : {
5     "number_of_shards" : 3,
6     "number_of_replicas" : 1
7   }
8 }
9
10 GET /orders/_settings
11
```

```
1 {
2   "orders": {
3     "settings": {
4       "index": {
5         "uuid": "tUCRLPFuTEWaJrsG8dvV1A",
6         "number_of_replicas": "1",
7         "number_of_shards": "3",
8         "version": {
9           "created": "1020299"
10        }
11      }
12    }
13  }
14 }
```

Server

localhost:9200

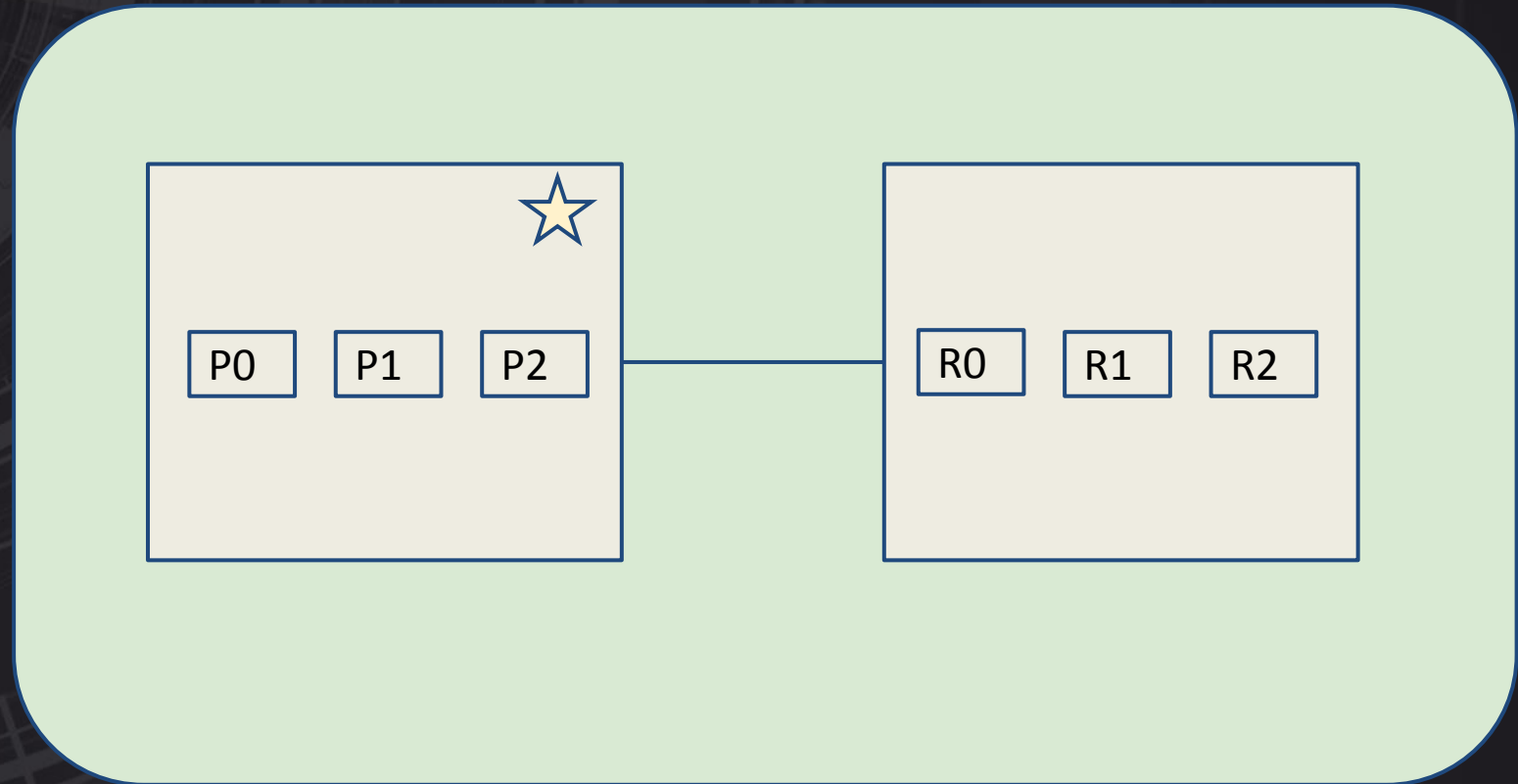
Marvel Dashboards ▾



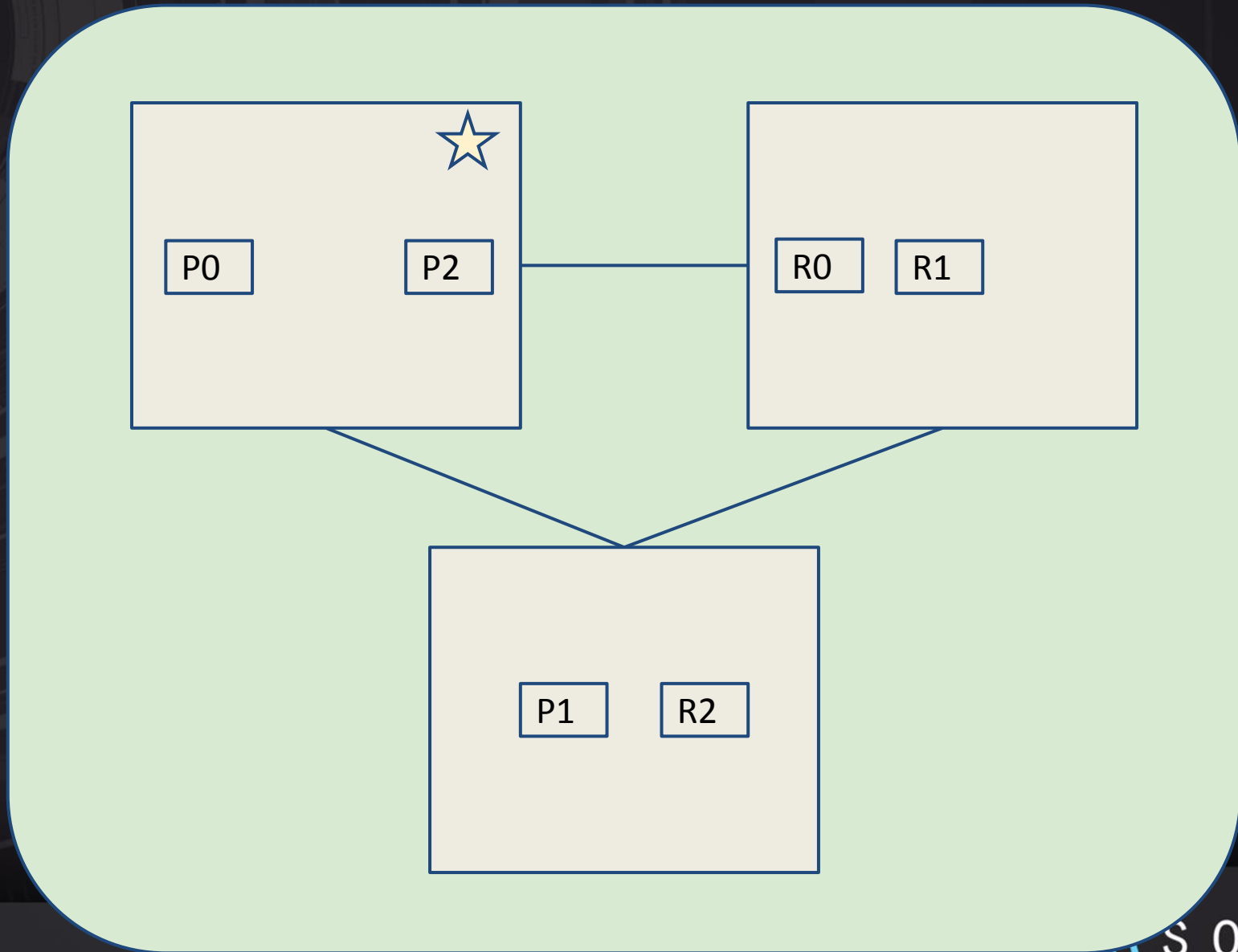
```
1
2 PUT /orders
3 {
4   "settings" : {
5     "number_of_shards" : 3,
6     "number_of_replicas" : 1
7   }
8 }
9
10 GET /orders/_settings
11
12 GET /_cluster/health
13
```

```
1 {
2   "cluster_name": "elasticsearch",
3   "status": "yellow",
4   "timed_out": false,
5   "number_of_nodes": 1,
6   "number_of_data_nodes": 1,
7   "active_primary_shards": 3,
8   "active_shards": 3,
9   "relocating_shards": 0,
10  "initializing_shards": 0,
11  "unassigned_shards": 3
12 }
```

Distributed document store

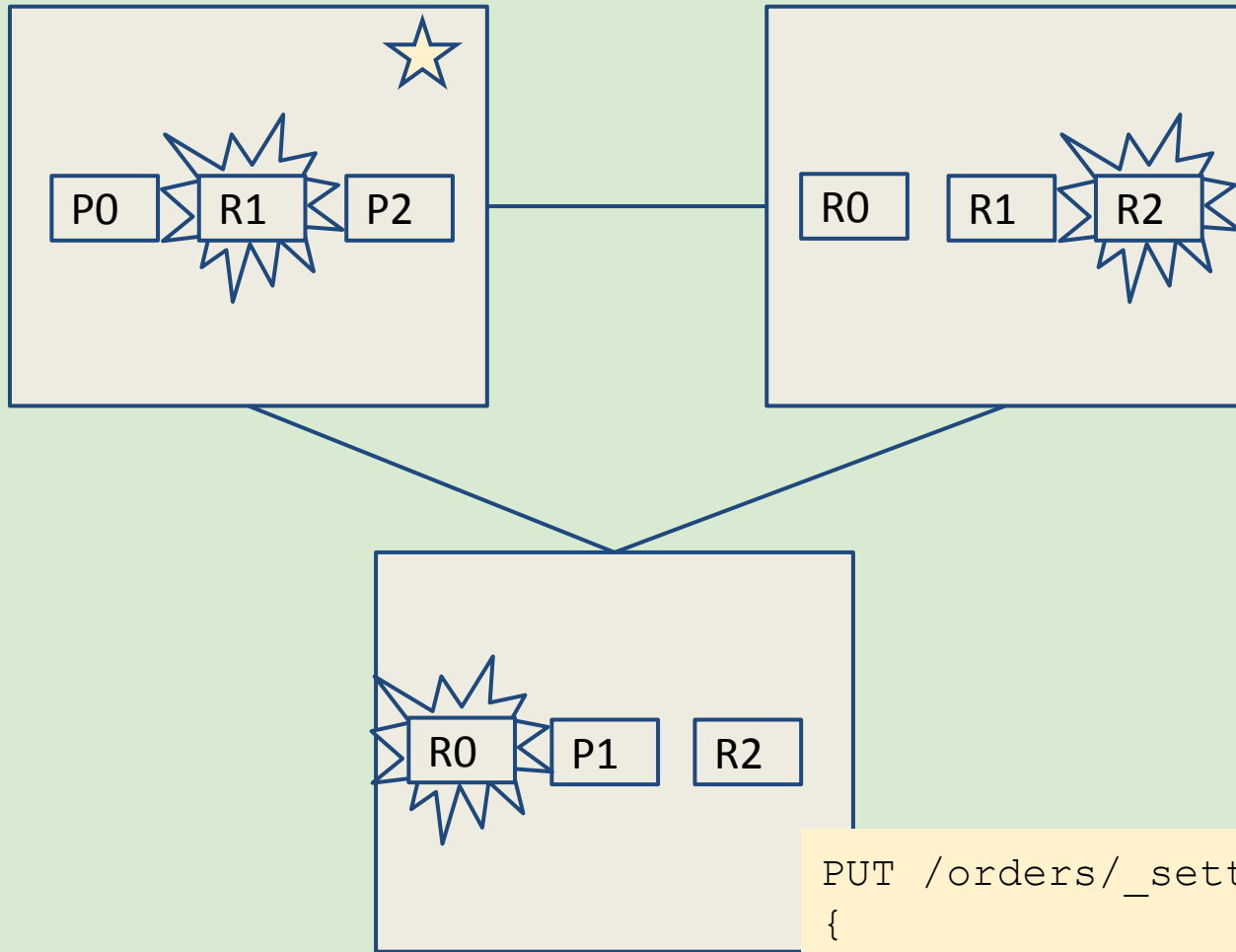


Adding third node



More shards

The number of primary shards is fixed at the moment an index is created.



```
PUT /orders/_settings
{
  "number_of_replicas" : 2
}
```

Marvel plugin

```
plugin -i elasticsearch/marvel/latest  
sence
```

Server

localhost:9200

Marvel Dashboards ▾



1

2

DELETE /com

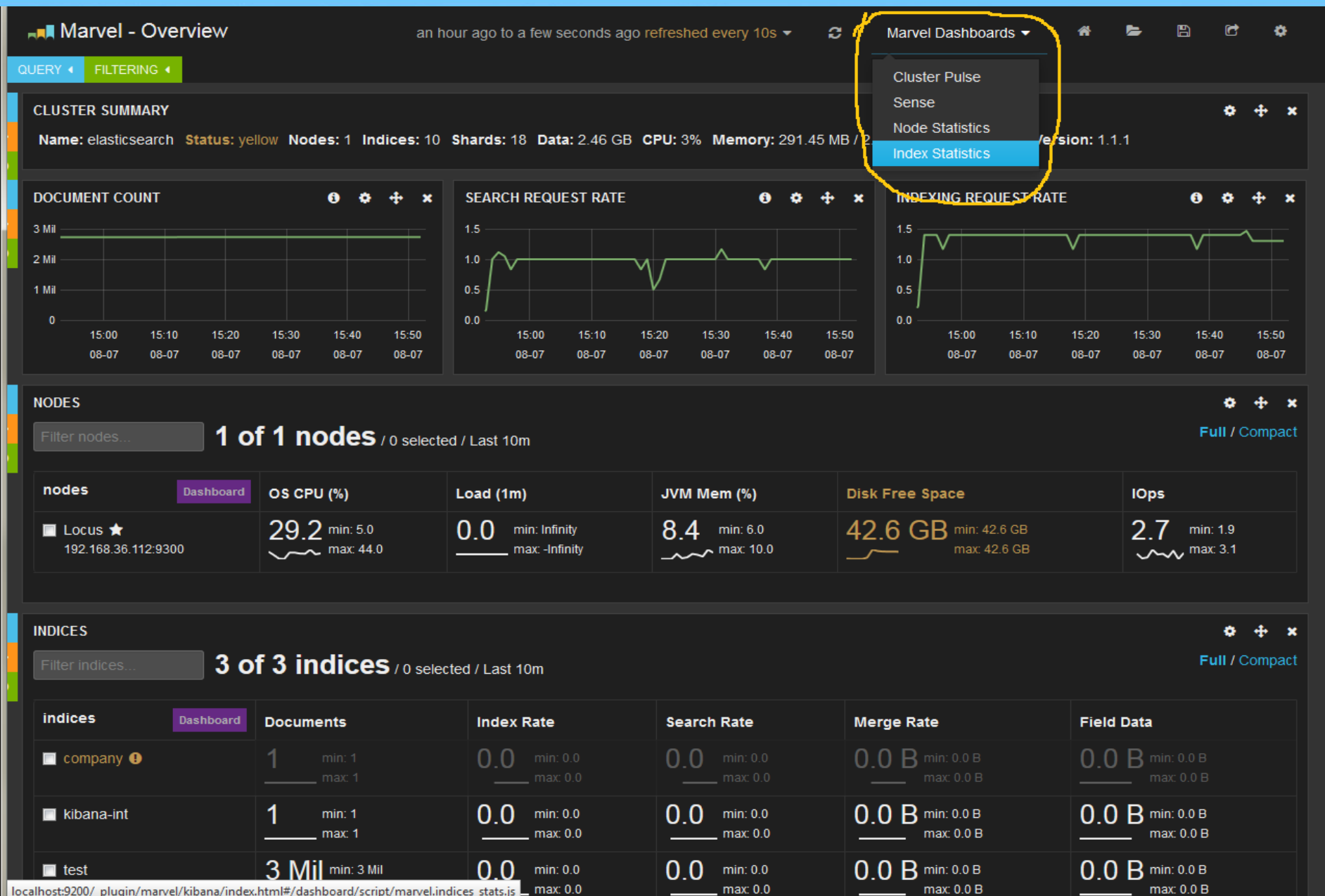
company

index

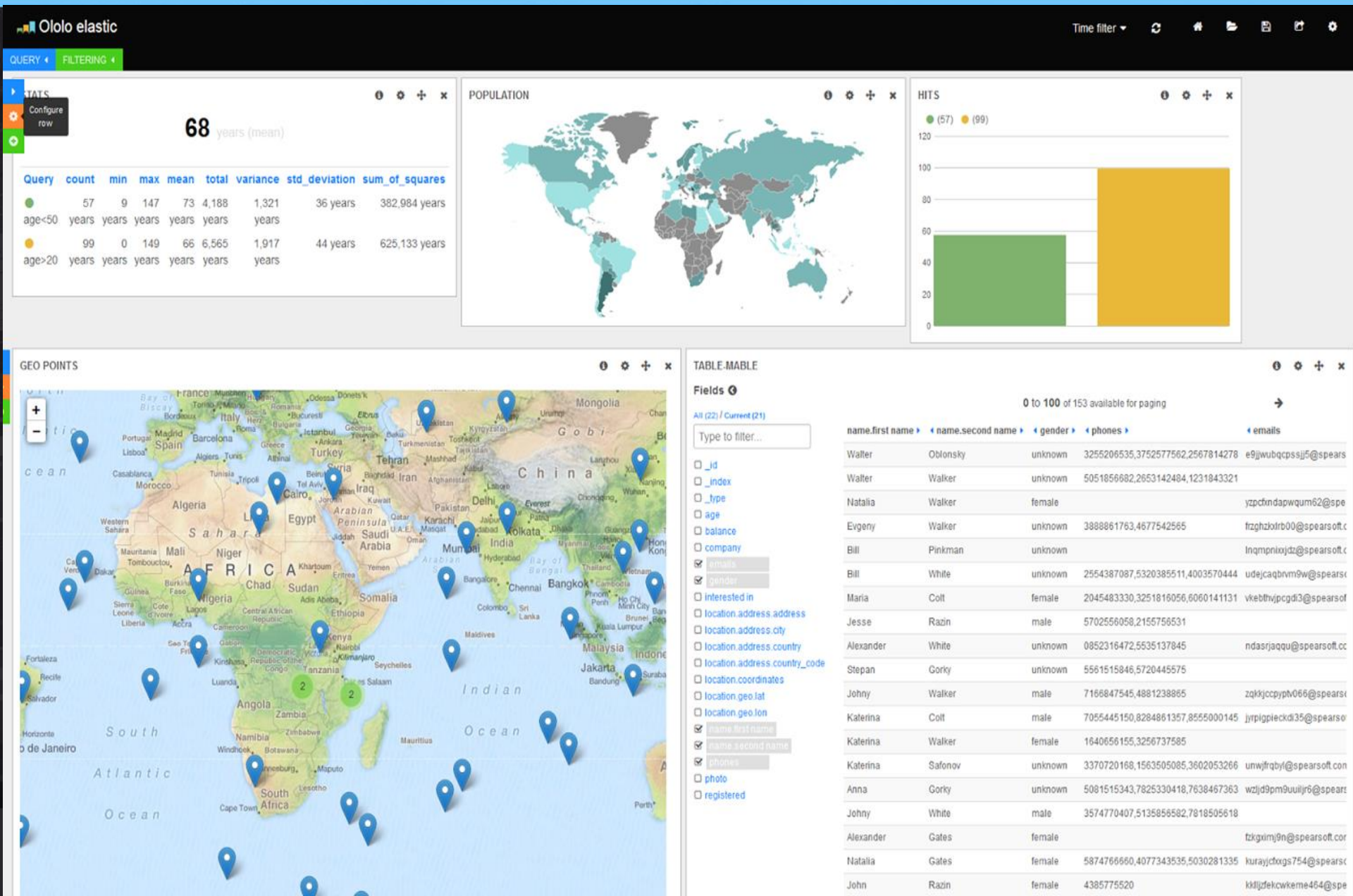


1

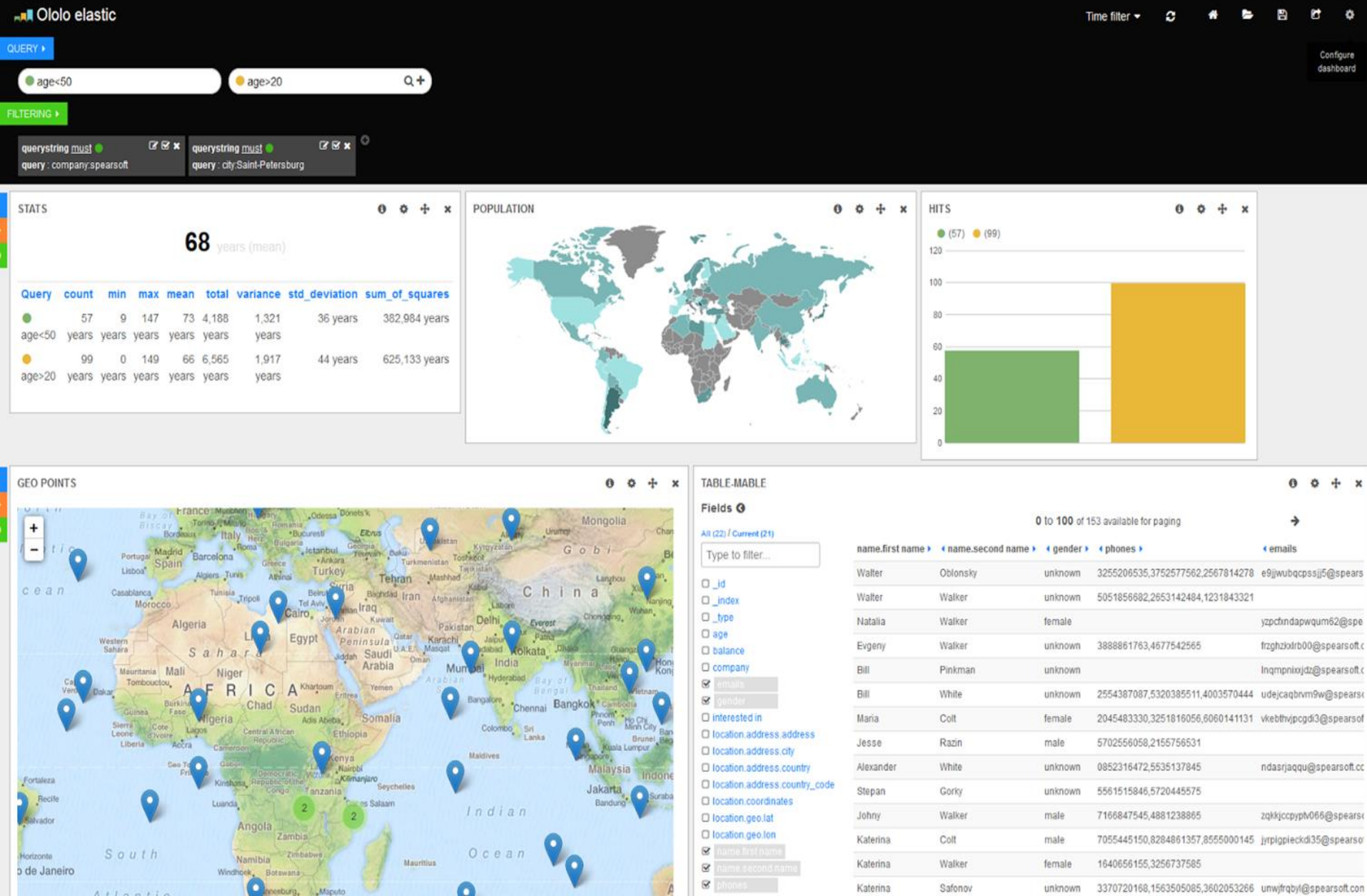
Overview



Kibana



Kibana queries and filters



Kibana settings

Row Settings

General Panels **Add Panel**

Select Panel Type

histogram

Note: This row is full, new panels will wrap to a new line. You should add another row.

Stable // A bucketed time series chart of the current query or queries. Uses the Elasticsearch date_histogram facet. If using time stamped indices this panel will query them sequentially to attempt to apply the highest possible load to your Elasticsearch cluster

Title Span Editable Inspect ?

4



Values

Chart value

count

Transform Series

Seconds ? Derivative ? Zero fill ?



Time Options

Time Field Time correction Auto-interval Resolution ?

@timestamp

browser



100

Style

Chart Options

Bars Lines Points Selectable xAxis yAxis Y Format ?



none

Multiple Series

Stack Percent ? Stacked Values ?



cumulative

Header

Legend

Grid

Zoom View Legend Query ? Counts



Min / Auto

Max / Auto ★

0

Queries

Charted

Queries

all

How to make your colleague wonder

```
DELETE kibana-int
```

Error Could not find Ololo elastic. If you are using a proxy, ensure it is configured correctly

1 alert(s) ✕



Extensible

- ✓ plugins (rivers, ui and others)
- ✓ scripts (scoring, script fields etc)
- ✓ custom analyzers and tokenizers
- ✓ open source

Plugins

```
public void onModule(RiversModule module) {  
    module.registerRiver("myRiver", MyRiverModule.class);  
}  
  
public void onModule(AnalysisModule module) {  
    module.addAnalyzer("my-analyzer", MyAnalyzerProvider.class);  
}  
  
public void onModule(ScriptModule module) {  
    module.addScriptEngine(NewScriptEngineService.class);  
}
```

don't forget to write
es-plugin.properties

to install: `plugin -i <org>/<user/component>/<version>`

UI: `elastic/plugins/_site ->`
`http://es_node:9200/_plugin/[plugin_name]/`

Provides ability to add functionality to the **elasticsearch**

- ✓ RestModule
- ✓ RiverModule
- ✓ AnalysisModule
- ✓ NetworkModule
- ✓ and other modules

Scripts

- ✓ Elasticsearch default script language is groovy (before version 1.3 default language was ?mvel?)
- ✓ If you want, you can add your own language support via plugins
- ✓ unsecure scripts (non sandbox languages) should be placed in config/scripts directory
- ✓ you can store scripts in special index (for sandboxed languages only)

you can use scripts streight from query:

```
"custom_score" : {
  "query" : {
    ....
  },
  "params" : {
    "param1" : 2,
    "param2" : 3.1
  },
  "script" : "_score * doc['my_numeric_field'].value /
              pow(param1, param2) "
}
```

Using of Stored Script

```
{
  "query": {
    "function_score": {
      "query": {
        "match": {
          "body": "foo"
        }
      },
      "functions": [
        {
          "script_score": {
            "script": "calculate-score",
            "params": {
              "my_modifier": 8
            }
          }
        }
      ]
    }
  }
}
```

Some Other Scripts

Field scripts:

```
{
  "query" : {
    ...
  },
  "script_fields" : {
    "test1" : {
      "script" : "doc['my_field_name'].value
* 2"
    },
    "test2" : {
      "script" : "doc['my_field_name'].value
* factor",
      "params" : {
        "factor" : 2.0
      }
    }
  }
}
```

sort scripts

```
{
  "query" : {
    ....
  },
  "sort" : {
    "_script" : {
      "script" : "doc['field_name'].value *
factor",
      "type" : "number",
      "params" : {
        "factor" : 1.1
      },
      "order" : "asc"
    }
  }
}
```

Custom analyzers and tokenizers

- ✓ Tokenizers split texts into tokens
- ✓ Analyzers are composed of a single tokenizer and zero or more token filters
- ✓ Also analyzers can contain one or more char filters

```
{
  "settings": {
    "analysis": {
      "filter": {
        "russian_stop": {
          "type": "stop",
          "stopwords": "_russian_"
        },
        "russian_keywords": {
          "type": "keyword_marker",
          "keywords": []
        },
        "russian_stemmer": {
          "type": "stemmer",
          "language": "russian"
        }
      },
      "analyzer": {
        "russian": {
          "tokenizer": "standard",
          "filter": [
            "lowercase",
            "russian_stop",
            "russian_keywords",
            "russian_stemmer"
          ]
        }
      }
    }
  }
}
```

Combination of
tokenizer and
filters

PUT it to your
index

Response:

```
{
  "tokens": [
    {
      "token": "пиш",
      "start_offset": 6,
      "end_offset": 10,
      "type": "<ALPHANUM>",
      "position": 3
    },
    {
      "token": "бол",
      "start_offset": 20,
      "end_offset": 24,
      "type": "<ALPHANUM>",
      "position": 6
    }
  ]
}
```

Other Features

- ✓ bulk operations
- ✓ result sorting
- ✓ parent-children relations support
- ✓ custom filters score query
- ✓ function score query
- ✓ percolation
- ✓ more like this document api
- ✓ numeric aggregation scripts
- ✓ and others

Thanks!

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