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SIAM CHAMNAN KIT

ELK Stack

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สยามชำนาญกิจ
SIAM CHAMNAN KIT

SHU HA RI
SOFTWARE DEVELOPMENT SCHOOL

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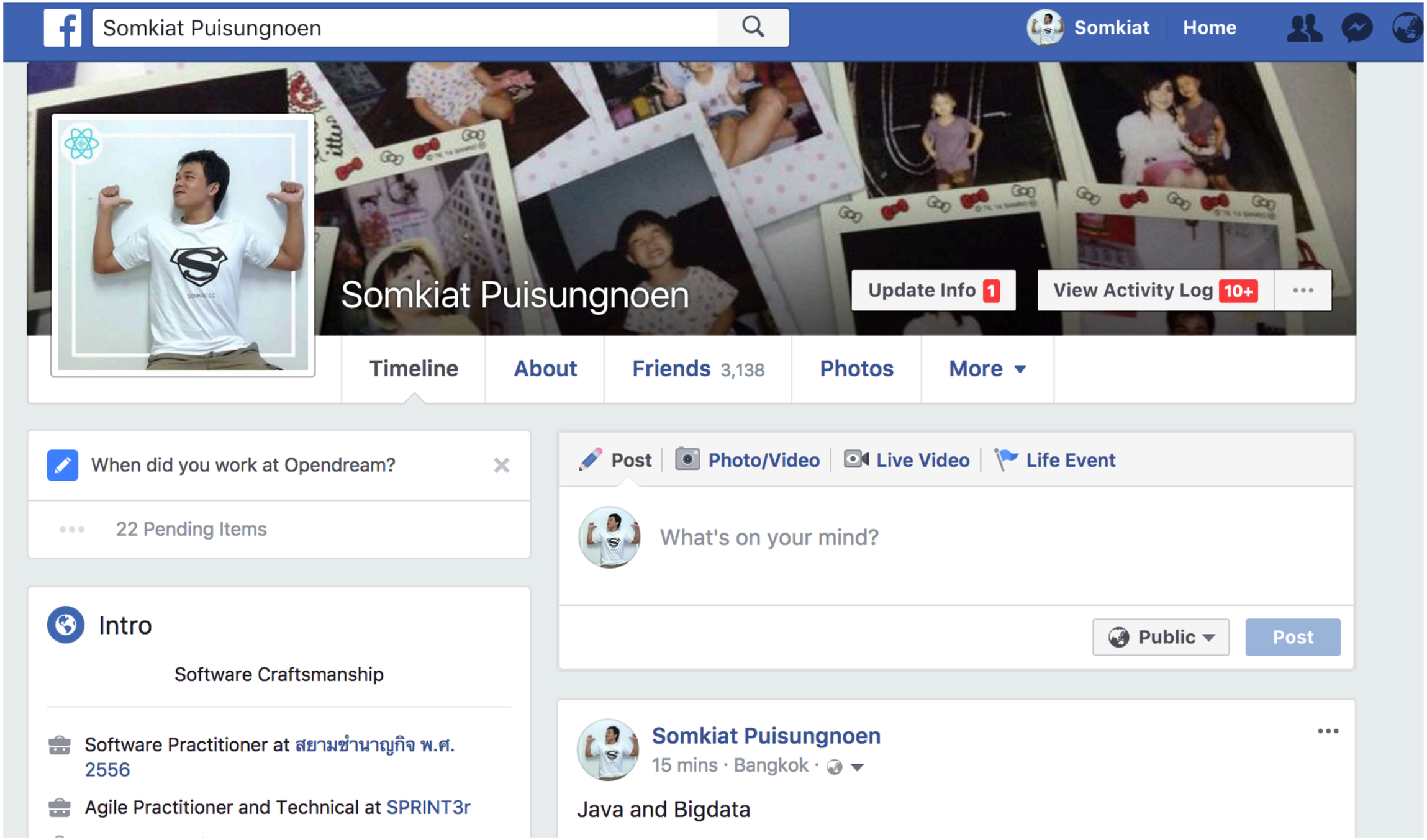

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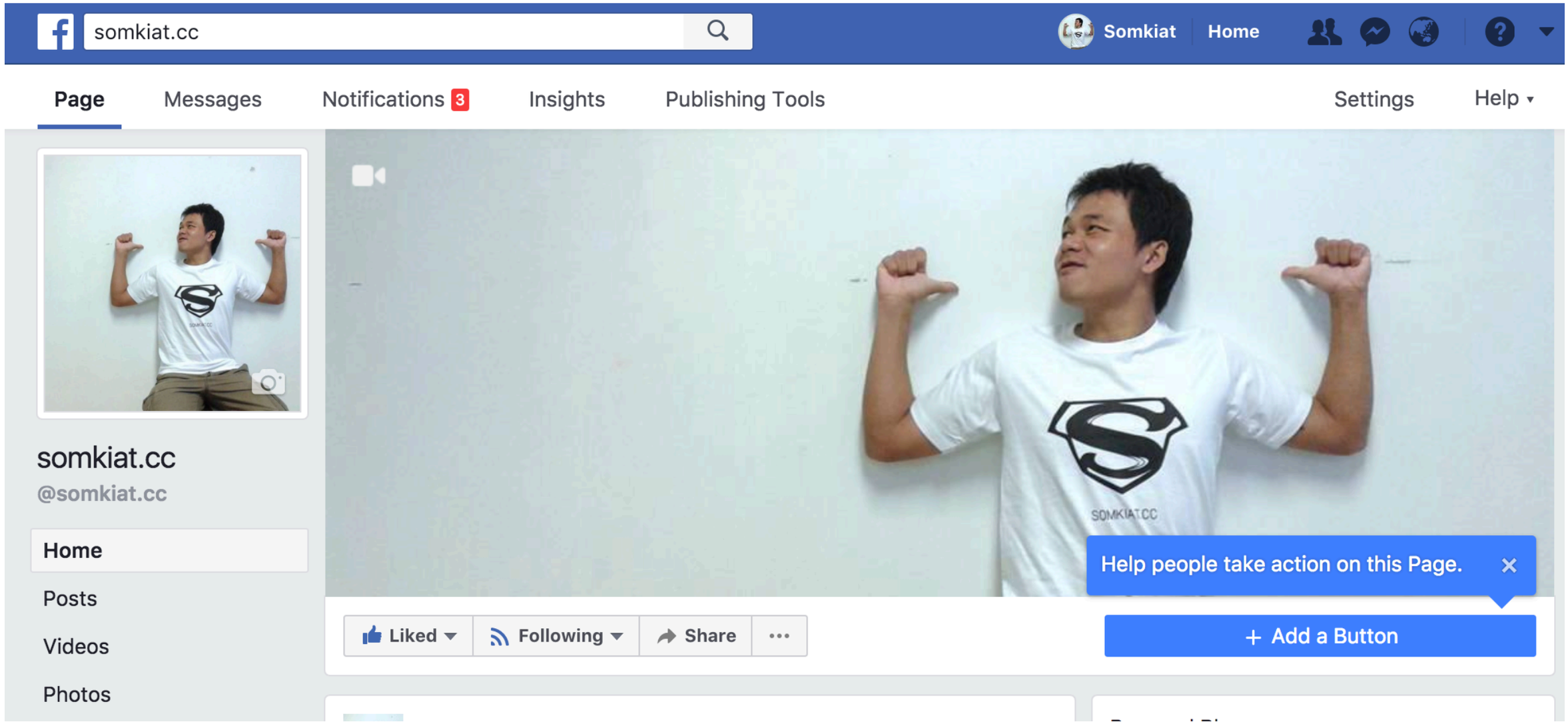

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https://github.com/up1/course_elk

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Agenda

- ELK stack
- Introduction to Elasticsearch
- CRUD (Create, Read, Update, Delete)
- Search DSL (Domain Specific Language)
- Analyzer
- Mapping
- Aggregation

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Agenda

- Working with Kibana
- Useful features
  - Auto-suggestion
  - ngram algorithm
- Clustering management
- Design for scaling
- Working with Logstash

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Agenda

- Working with Prometheus
- Working with Grafana
- Workshop

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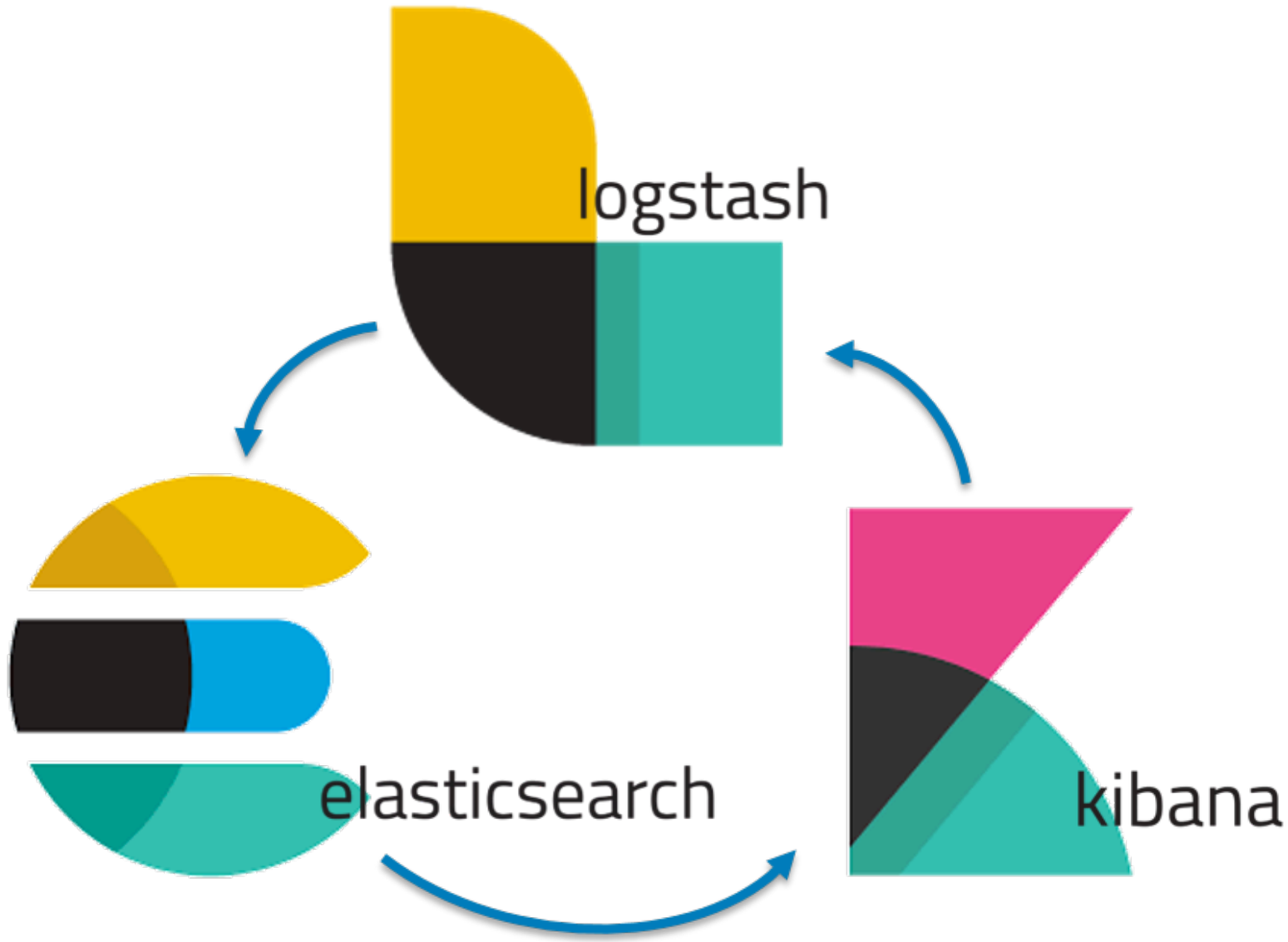

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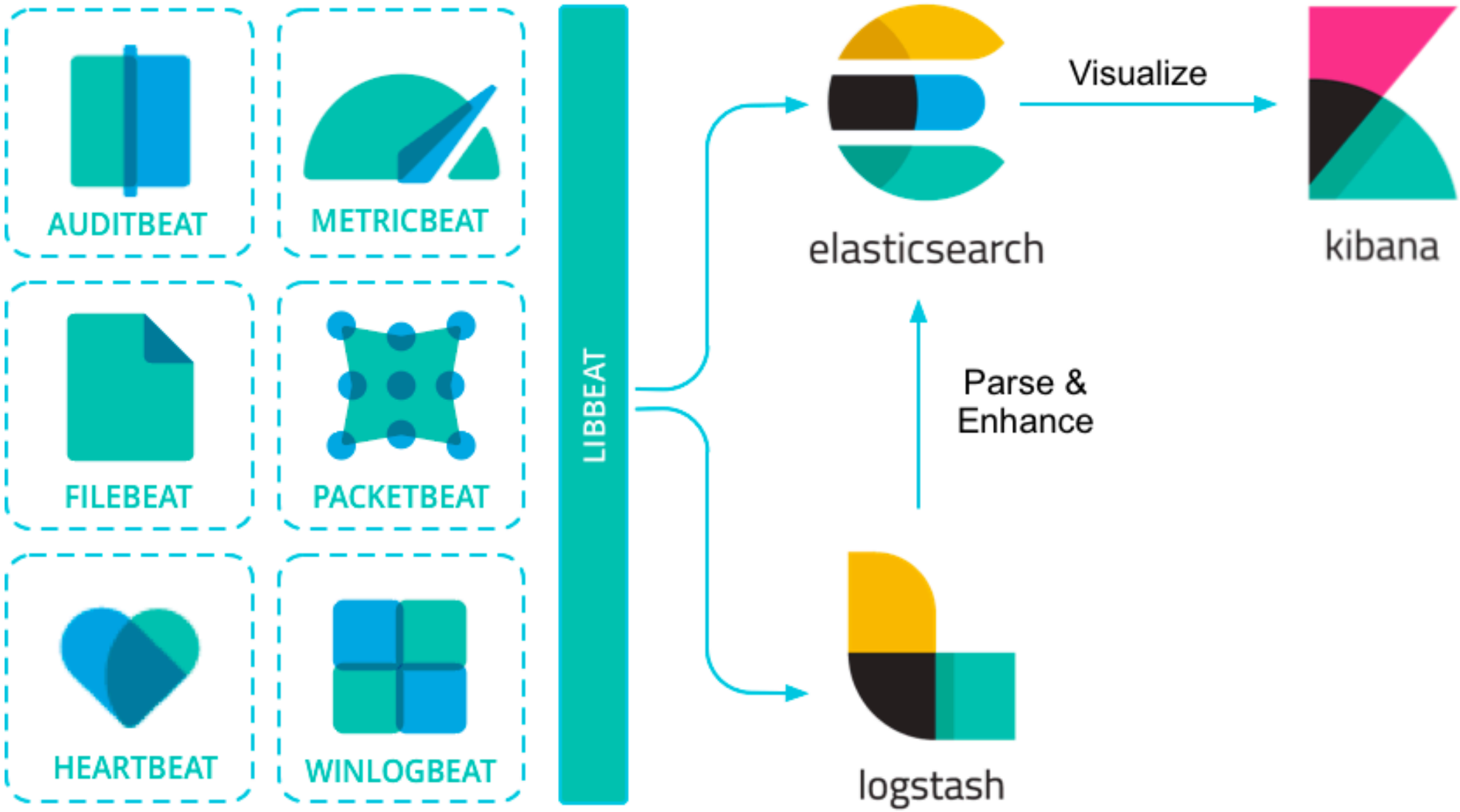
Beat



https://www.elastic.co/guide/en/beats/libbeat/current/index.html

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Beat

Purpose	Library
Audit data	Auditbeat
Log files	Filebeat
Cloud data	Functionbeat
Availability	Heartbeat
Metrics	Metricbeat
Network traffic	Packetbeat
Windows event logs	Winlogbeat

https://www.elastic.co/guide/en/beats/libbeat/current/beats-reference.html

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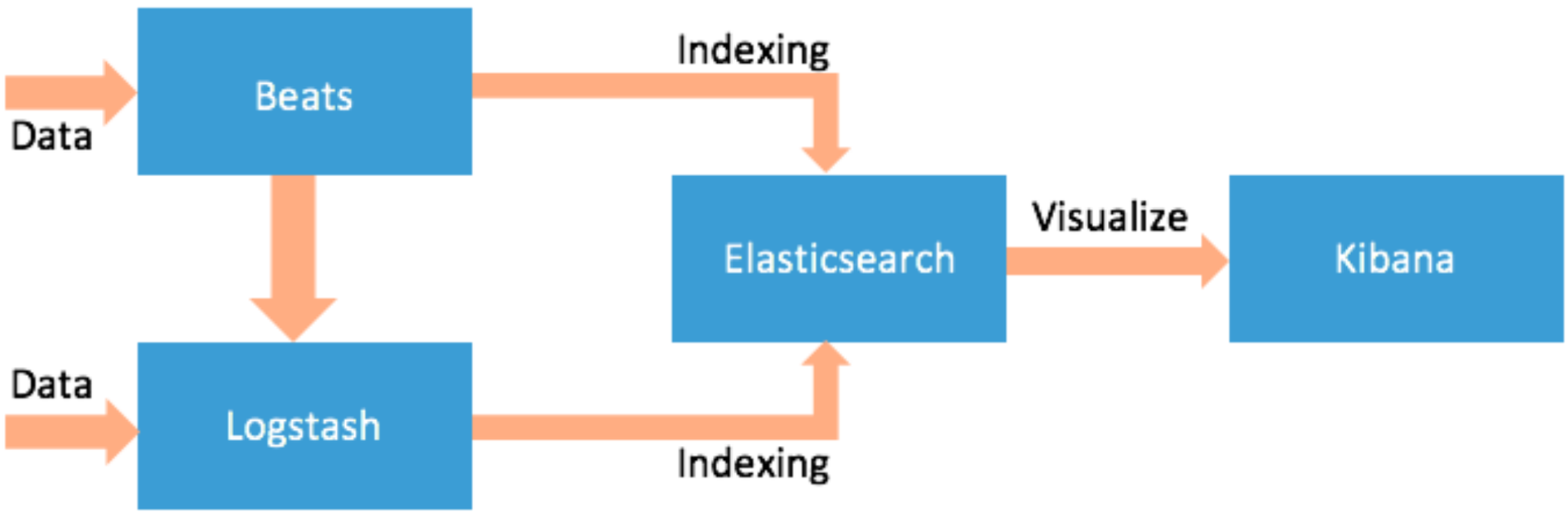
ELK stack



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Elasticsearch ?

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Elasticsearch

Search
Analytic
Real-time
Distributed
Scalability

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Distributed Search Engine

Open Source Java

Document-based JSON

Based on **Apache Lucene**

JSON over HTTP

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Distributed Search Engine

1999 → 2004 → 2010

Lucene

Compass

elasticsearch

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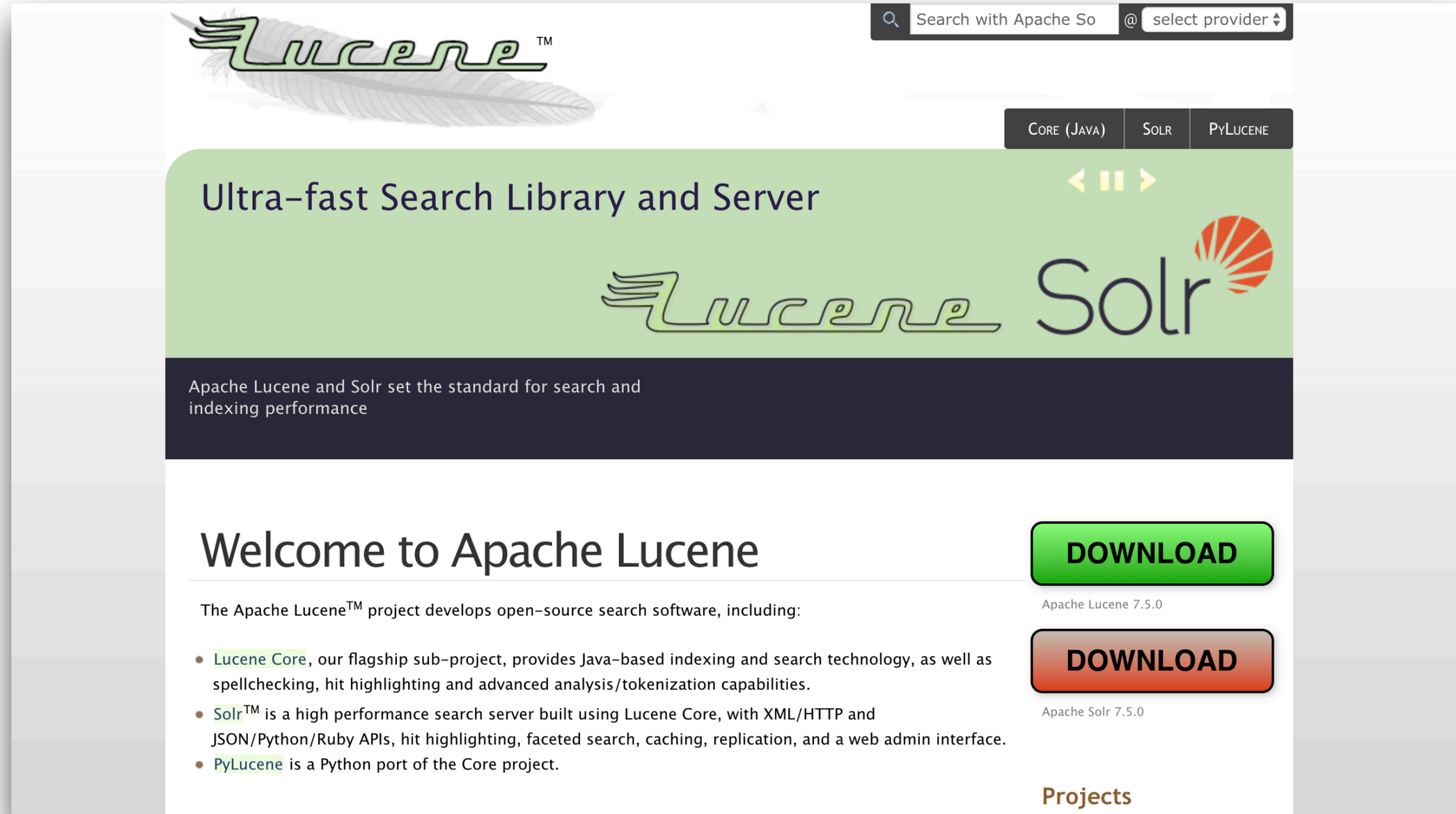
Apache Lucene



http://lucene.apache.org/

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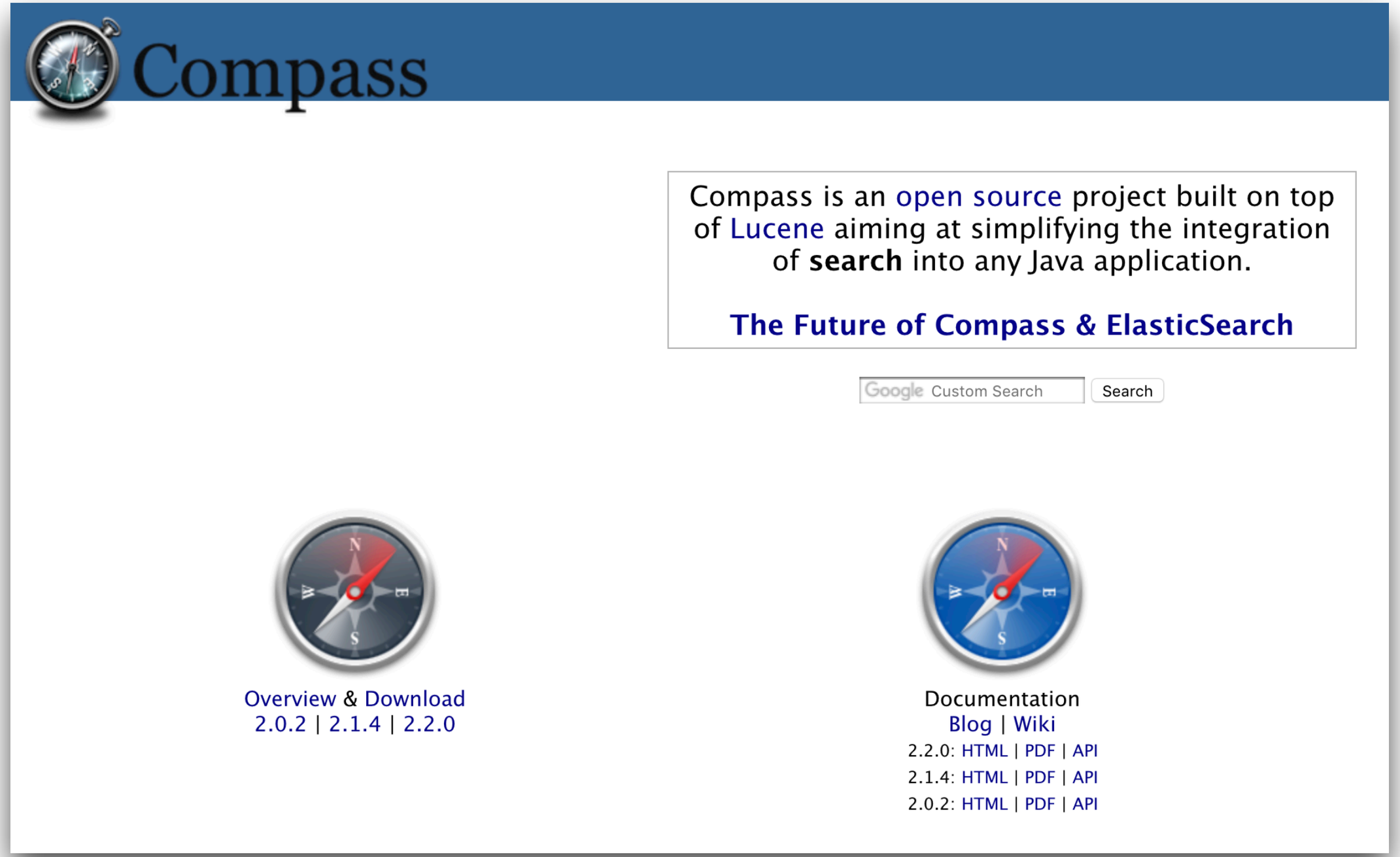
Compass



http://www.compass-project.org/

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Document based

JSON (JavaScript Object Notation)
Dynamic Schema (Schema-less)
Some relationship (nested, parent/child)

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StackOverflow Question


```
{
  "items": [
    {
      "owner": {
        "reputation": 13,
        "user_id": 9796344,
        "user_type": "registered",
        "profile_image": "",
        "display_name": "Cherry",
        "link": "https://stackoverflow.com/users/9796344/cherry"
      },
      "score": 0,
      "last_activity_date": 1528986761,
      "creation_date": 1528986761,
      "post_type": "question",
      "post_id": 50859951,
      "link": "https://stackoverflow.com/q/50859951"
    }
  ],
  "has_more": false,
  "quota_max": 10000,
  "quota_remaining": 9986
}
```


https://api.stackexchange.com/docs/posts-by-ids

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Ranking from DB Engine (2018)

350 systems in ranking, June 2019

Rank			DBMS	Database Model	Score		
Jun 2019	May 2019	Jun 2018			Jun 2019	May 2019	Jun 2018
1.	1.	1.	Oracle	Relational, Multi-model	1299.21	+13.67	-12.04
2.	2.	2.	MySQL	Relational, Multi-model	1223.63	+4.67	-10.06
3.	3.	3.	Microsoft SQL Server	Relational, Multi-model	1087.76	+15.57	+0.03
4.	4.	4.	PostgreSQL	Relational, Multi-model	476.62	-2.27	+65.95
5.	5.	5.	MongoDB	Document	403.90	-4.17	+60.12
6.	6.	6.	IBM Db2	Relational, Multi-model	172.20	-2.24	-13.44
7.	7.	↑ 8.	Elasticsearch	Search engine, Multi-model	148.82	+0.20	+17.78
8.	8.	↓ 7.	Redis	Key-value, Multi-model	146.13	-2.28	+9.83
9.	9.	9.	Microsoft Access	Relational	141.01	-2.77	+10.02
10.	10.	10.	Cassandra	Wide column	125.18	-0.54	+5.97

https://db-engines.com/en/ranking

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Use cases

Security/log analytics
Marketing
Operations
Searching data

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Let’s start

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Installation

Elasticsearch
Kibana

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Install Elasticsearch

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Elasticsearch

Required Java 8
JDK and Open JDK
Need $JAVA_HOME

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JAVA_HOME

$echo %JAVA_HOME% //For Windows

$echo $JAVA_HOME // for Linux/Mac

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Start Elasticsearch

$./bin/elasticsearch

```
[0g8-71W] loaded module [reindex]
[0g8-71W] loaded module [repository-url]
[0g8-71W] loaded module [transport-netty4]
[0g8-71W] loaded module [tribe]
[0g8-71W] no plugins loaded
[0g8-71W] using discovery type [zen]
initialized
[0g8-71W] starting ...
[0g8-71W] publish_address {127.0.0.1:9300},
[0g8-71W] recovered [0] indices into cluster_state
ansport] [0g8-71W] publish_address {127.0.0.1:9200},
```


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Configuration files

elasticsearch.yml
jvm.options
log4j2.properties

Default : $ES_HOME/config
Custom config path : $ES_PATH_CONF

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Default of Memory

1 GB !!! (Java need more memory)

```
    ] [DW5j42N] JVM arguments [-Xms1g, -Xmx1g, -
ction=75, -XX:+UseCMSInitiatingOccupancyOnly, -XX
Dfile.encoding=UTF-8, -Djna.nosys=true, -XX:-Omit
.netty.noKeySetOptimization=true, -Dio.netty.recy
led=false, -Dlog4j2.disable.jmx=true, -Djava.io.t
T/elasticsearch.G4kbTLZn, -XX:+HeapDumpOnOutOfMem
s_err_pid%p.log, -Xlog:gc*,gc+age=trace,safepoint
ize=64m, -Djava.locale.providers=COMPAT, -XX:UseA
```


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Config of JVM

$ES_HOME/config/jvm.options

```
# Xms represents the initial size of total heap space
# Xmx represents the maximum size of total heap space

-Xms1g
-Xmx1g
```


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Default plugins

```
[o.e.p.PluginsService     ] [DW5j42N] loaded module [aggs-matrix-stats]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [analysis-common]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [ingest-common]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [lang-expression]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [lang-mustache]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [lang-painless]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [mapper-extras]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [parent-join]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [percolator]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [rank-eval]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [reindex]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [repository-url]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [transport-netty4]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [tribe]
```


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Install X-Pack by default

```
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-core]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-deprecation]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-graph]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-logstash]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-ml]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-monitoring]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-rollup]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-security]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-sql]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-upgrade]
[o.e.p.PluginsService     ] [DW5j42N] loaded module [x-pack-watcher]
[o.e.p.PluginsService     ] [DW5j42N] no plugins loaded
```

https://www.elastic.co/guide/en/elasticsearch/reference/current/installing-xpack-es.html

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X-Pack ?

Elastic Stack Extension
Security
Monitoring
Alerting
Reporting
Machine Learning

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Licence

	FREE		GOLD	PLATINUM
	OPEN SOURCE	BASIC		
	Download		Request Info	Request Info
ELASTIC STACK				
Elasticsearch				
Scalability & Resiliency	✓	✓	✓	✓
Query & Analytics	✓	✓	✓	✓
Data Enrichment	✓	✓	✓	✓
Management & Tooling	✓	✓	✓	✓
Security			✓	✓
Alerting			✓	✓
Machine Learning				✓
Kibana				
Explore & Visualize	✓	✓	✓	✓
Stack Management & Tooling	✓	✓	✓	✓
Stack Monitoring		✓	✓	✓

https://www.elastic.co/subscriptions

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Hello Elasticsearch

http://localhost:**9200**/


```
{
    name: "Somkiats-MacBook-Pro",
    cluster_name: "elasticsearch",
    cluster_uuid: "gglAIg0NRHyn4AefFR61aw",
  - version: {
        number: "7.1.1",
        build_flavor: "default",
        build_type: "tar",
        build_hash: "7a013de",
        build_date: "2019-05-23T14:04:00.380842Z",
        build_snapshot: false,
        lucene_version: "8.0.0",
        minimum_wire_compatibility_version: "6.8.0",
        minimum_index_compatibility_version: "6.0.0-beta1"
    },
    tagline: "You Know, for Search"
}
```


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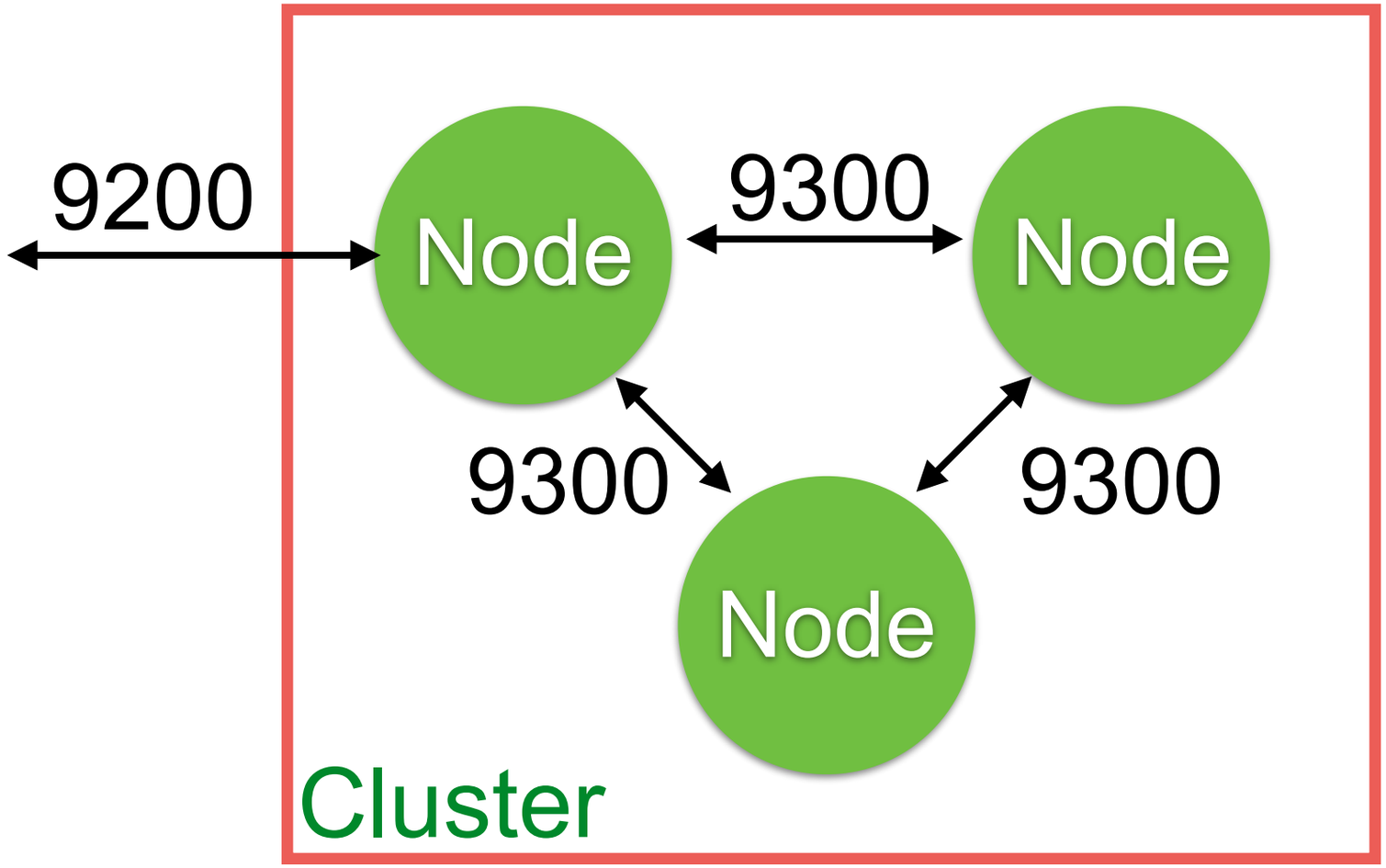
Ports of Elasticsearch

RESTful API with JSON Over HTTP (9200)
Java API (9300)



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Name of node and cluster


```
{
    name: "Somkiats-MacBook-Pro",
    cluster_name: "elasticsearch",
    cluster_uuid: "gglAIg0NRHyn4AefFR61aw",
  - version: {
        number: "7.1.1",
        build_flavor: "default",
        build_type: "tar",
        build_hash: "7a013de",
        build_date: "2019-05-23T14:04:00.380842Z",
        build_snapshot: false,
        lucene_version: "8.0.0",
        minimum_wire_compatibility_version: "6.8.0",
        minimum_index_compatibility_version: "6.0.0-beta1"
    },
    tagline: "You Know, for Search"
}
```


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Name of node and cluster

$ES_HOME/config/elasticsearch.yml

```
# ---------------------------------- 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
#
```


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Change in Elasticsearch 7.x

Default name = Hostname

https://www.elastic.co/guide/en/elasticsearch/reference/master/breaking-changes-7.0.html

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Try to change and restart !!!

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```
{
    name: "Somkiats-MacBook-Pro",
    cluster_name: "elasticsearch",
    cluster_uuid: "gglAIg0NRHyn4AefFR61aw",
  - version: {
        number: "7.1.1",
        build_flavor: "default",
        build_type: "tar",
        build_hash: "7a013de",
        build_date: "2019-05-23T14:04:00.380842Z",
        build_snapshot: false,
        lucene_version: "8.0.0",
        minimum_wire_compatibility_version: "6.8.0",
        minimum_index_compatibility_version: "6.0.0-beta1"
    },
    tagline: "You Know, for Search"
}
```


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Compatibility of DSL and Index

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```
{
    name: "Somkiats-MacBook-Pro",
    cluster_name: "elasticsearch",
    cluster_uuid: "gglAIg0NRHyn4AefFR61aw",
  - version: {
        number: "7.1.1",
        build_flavor: "default",
        build_type: "tar",
        build_hash: "7a013de",
        build_date: "2019-05-23T14:04:00.380842Z",
        build_snapshot: false,
        lucene_version: "8.0.0",
        minimum_wire_compatibility_version: "6.8.0",
        minimum_index_compatibility_version: "6.0.0-beta1"
    },
    tagline: "You Know, for Search"
}
```

DSL version

Index version

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```
{
    name: "Somkiats-MacBook-Pro",
    cluster_name: "elasticsearch",
    cluster_uuid: "gglAIg0NRHyn4AefFR61aw",
  - version: {
        number: "7.1.1",
        build_flavor: "default",
        build_type: "tar",
        build_hash: "7a013de",
        build_date: "2019-05-23T14:04:00.380842Z",
        build_snapshot: false,
        lucene_version: "8.0.0",
        minimum_wire_compatibility_version: "6.8.0",
        minimum_index_compatibility_version: "6.0.0-beta1"
    },
    tagline: "You Know, for Search"
}
```

Index version

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Health of cluster

http://localhost:9200/_cluster/health


```
{
  "cluster_name": "elasticsearch",
  "status": "green",
  "timed_out": false,
  "number_of_nodes": 1,
  "number_of_data_nodes": 1,
  "active_primary_shards": 0,
  "active_shards": 0,
  "relocating_shards": 0,
  "initializing_shards": 0,
  "unassigned_shards": 0,
  "delayed_unassigned_shards": 0,
  "number_of_pending_tasks": 0,
  "number_of_in_flight_fetch": 0,
  "task_max_waiting_in_queue_millis": 0,
  "active_shards_percent_as_number": 100.0
}
```


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Health of cluster

Status	Meaning
Green	All shards are allocated
Yellow	Primary shard is allocated, but replicas are not
Red	Shard not allocated in the cluster

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cat APIs

http://localhost:9200/_cat

```
=^.^=
/_cat/allocation
/_cat/shards
/_cat/shards/{index}
/_cat/master
/_cat/nodes
/_cat/tasks
/_cat/indices
/_cat/indices/{index}
/_cat/segments
/_cat/segments/{index}
/_cat/count
/_cat/count/{index}
/_cat/recovery
/_cat/recovery/{index}
/_cat/health
/_cat/pending_tasks
/_cat/aliases
/_cat/aliases/{alias}
```

https://www.elastic.co/guide/en/elasticsearch/reference/current/cat.html

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cat APIs

http://localhost:9200/_cat/nodes?v

```
ip        heap.percent ram.percent cpu load_1m load_5m load_15m node.role master name
127.0.0.1           20         100   7    1.98                  mdi       *      DW5j42N
```


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Install Kibana

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Start Kibana

```
[status][plugin:xpack_main@6.4.2] Status changed from yellow to green - Ready
[status][plugin:searchprofiler@6.4.2] Status changed from yellow to green - Ready
[status][plugin:ml@6.4.2] Status changed from yellow to green - Ready
[status][plugin:tilemap@6.4.2] Status changed from yellow to green - Ready
[status][plugin:watcher@6.4.2] Status changed from yellow to green - Ready
[status][plugin:index_management@6.4.2] Status changed from yellow to green - Rea

[status][plugin:graph@6.4.2] Status changed from yellow to green - Ready
[status][plugin:grokdebugger@6.4.2] Status changed from yellow to green - Ready
[status][plugin:logstash@6.4.2] Status changed from yellow to green - Ready
[status][plugin:reporting@6.4.2] Status changed from yellow to green - Ready
[kibana-monitoring][monitoring-ui] Starting monitoring stats collection
[status][plugin:security@6.4.2] Status changed from yellow to green - Ready
[license][xpack] Imported license information from Elasticsearch for the [monitor
tatus: active
[listening][server][http] Server running at http://localhost:5601
```


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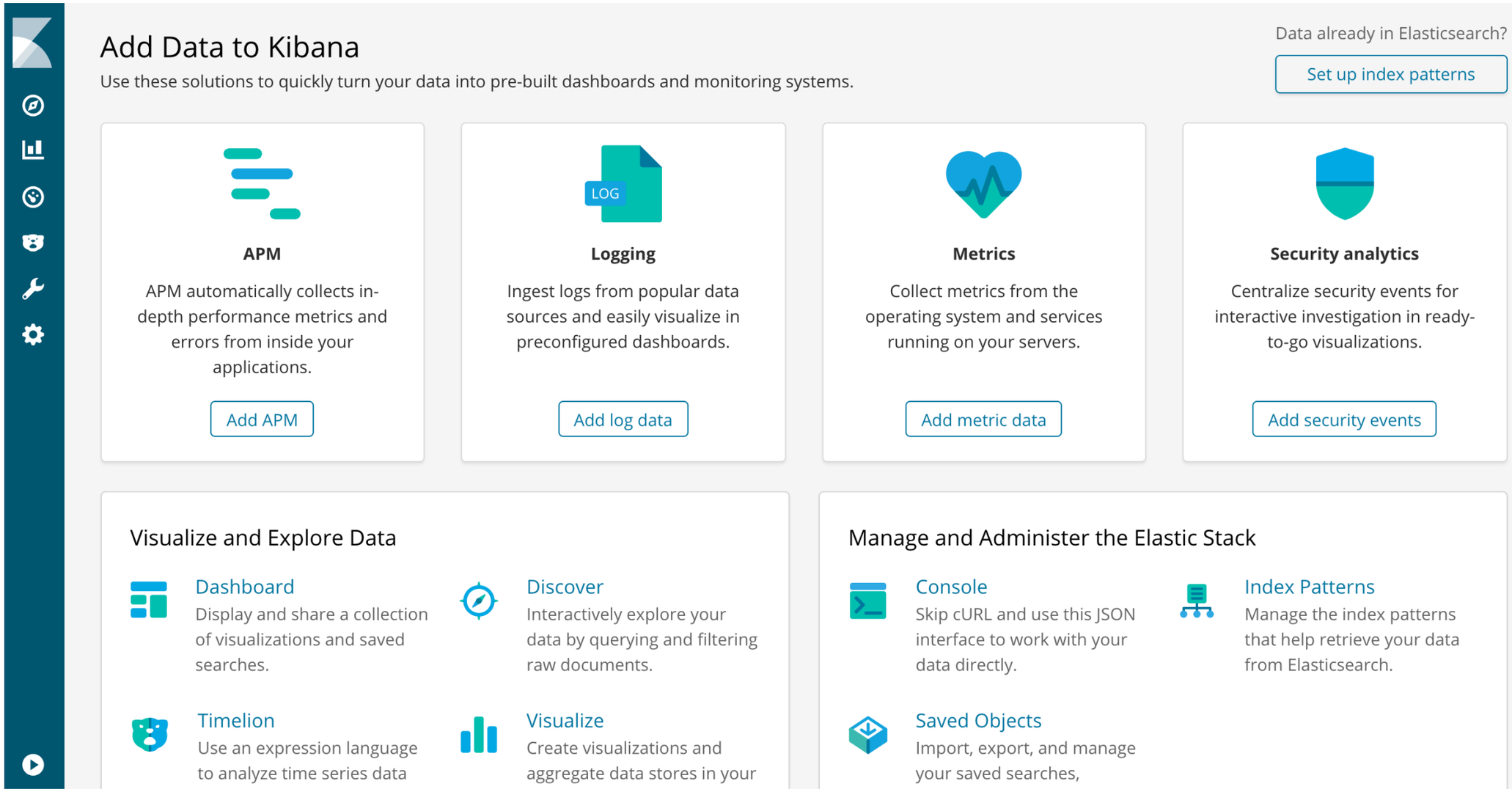
Hello Kibana

http://localhost:**5601**/



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Using Dev Tools

kibana

- Discover
- Visualize
- Dashboard
- Timelion
- APM
- Dev Tools
- Monitoring
- Management

Dev Tools

Welcome to Console

Quick intro to the UI

The Console UI is split into two panes: an editor pane (left) and a response pane (right). Use the editor to type requests and submit th
response pane on the right side.

Console understands requests in a compact format, similar to cURL:

```
# index a doc
PUT index/type/1
{
  "body": "here"
}

# and get it ...
GET index/type/1
```

While typing a request, Console will make suggestions which you can then accept by hitting Enter/Tab. These suggestions are made b
types.

A few quick tips, while I have your attention

- Submit requests to ES using the green triangle button.
- Use the wrench menu for other useful things.
- You can paste requests in cURL format and they will be translated to the Console syntax.
- You can resize the editor and output panes by dragging the separator between them.
- Study the keyboard shortcuts under the Help button. Good stuff in there!

Get to work

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Ready to start

kibana

Discover
Visualize
Dashboard
Timelion
APM
Dev Tools
Monitoring
Management

Dev Tools

Console | Search Profiler | Grok Debugger

```
GET _search
{
  "query": {
    "match_all": {}
  }
}
```

```
{
  "took": 0,
  "timed_out": false,
  "_shards": {
    "total": 1,
    "successful": 1,
    "skipped": 0,
    "failed": 0
  },
  "hits": {
    "total": 1,
    "max_score": 1,
    "hits": [
      {
        "_index": ".kibana",
        "_type": "doc",
        "_id": "config:6.4.2",
        "_score": 1,
        "_source": {
          "type": "config",
          "updated_at": "2018-10-26T15:42:26.589Z",
          "config": {
            "buildNum": 18010,
            "telemetry:optIn": false
          }
        }
      }
    ]
  }
}
```


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Elasticsearch architecture

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Basic concepts

Cluster

Node

Shard

Replica

Gateway

Index

Document

Type

Mapping

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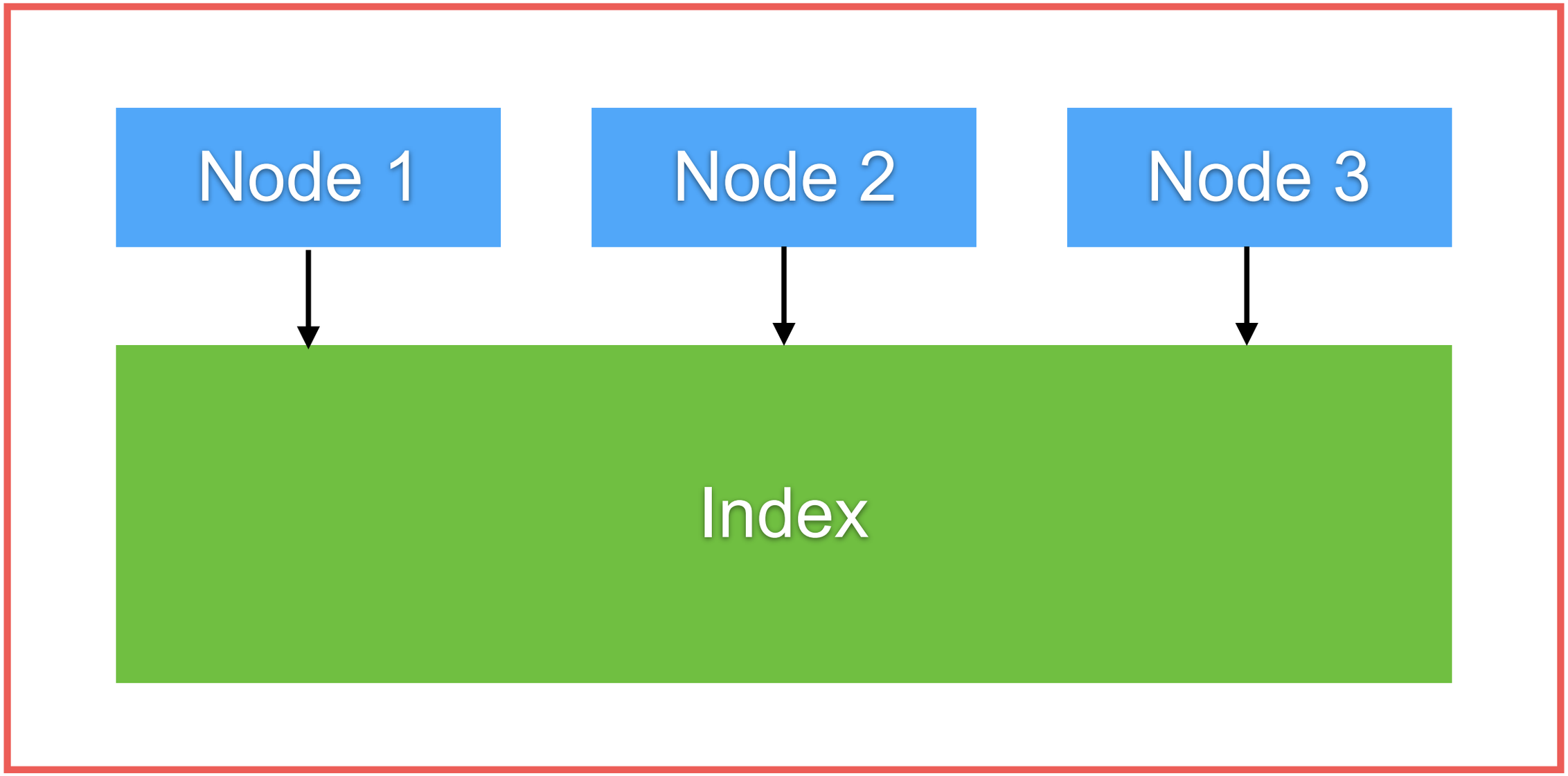
Cluster



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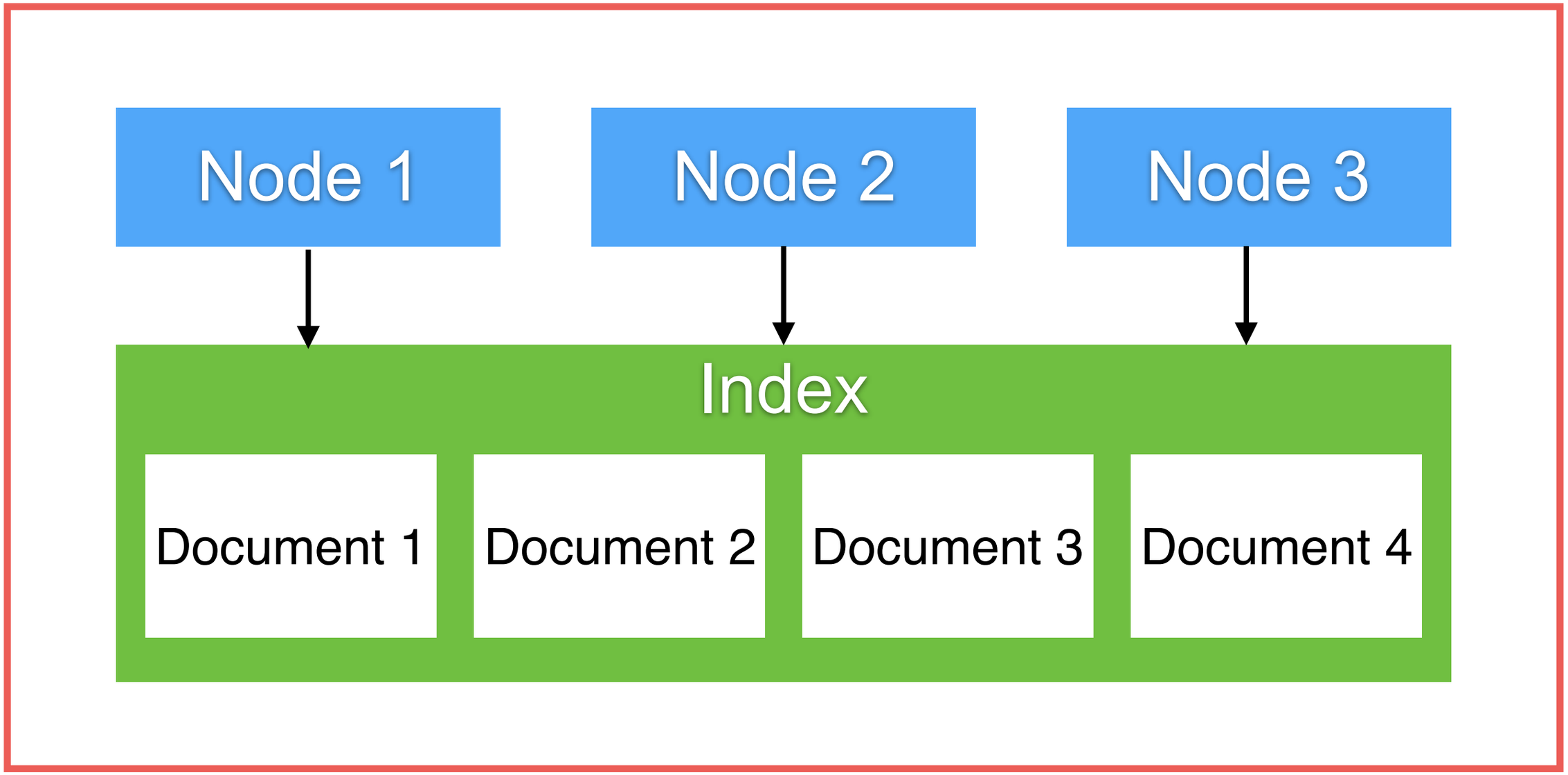
Documents !!



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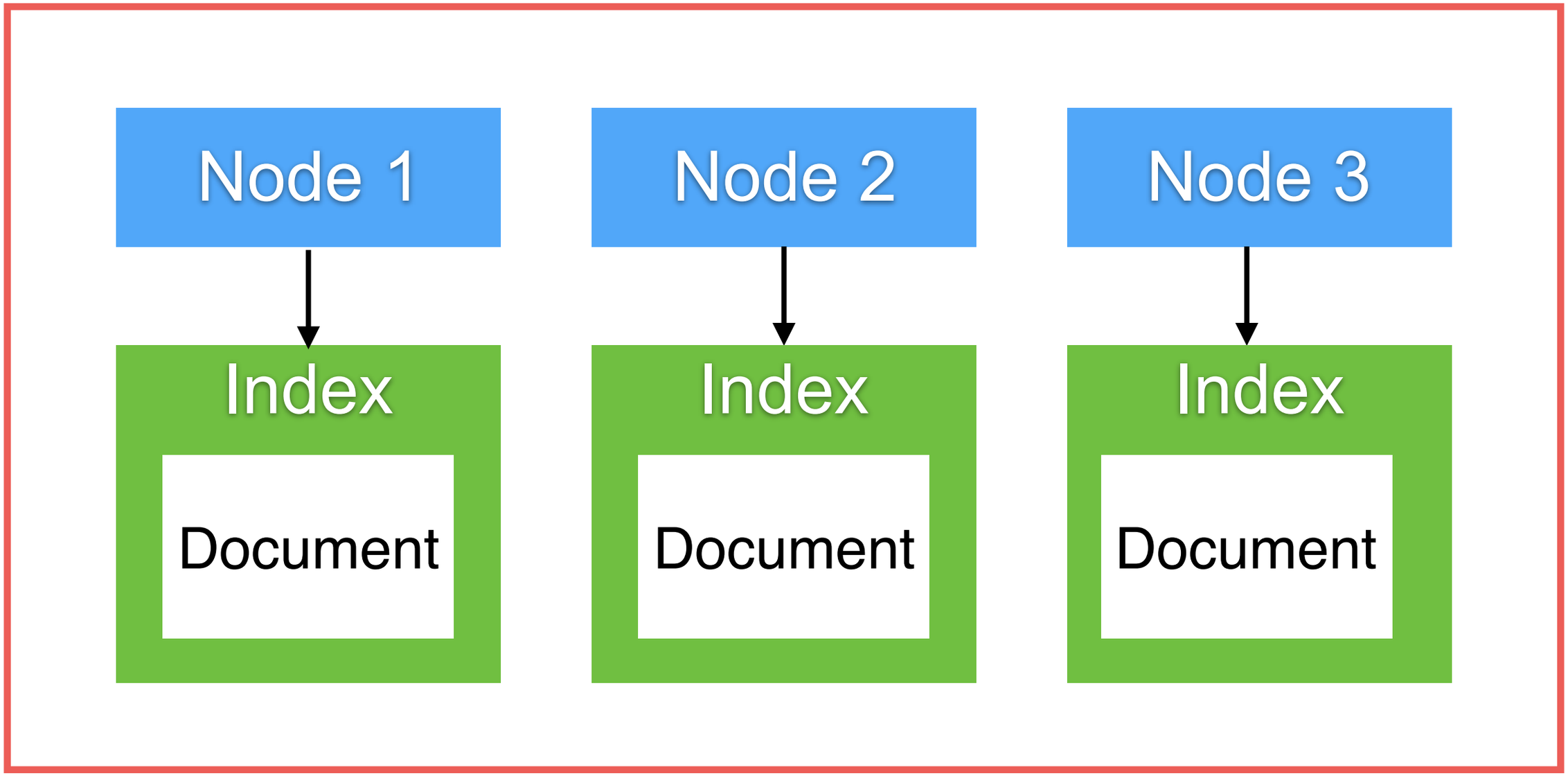
Distributed database



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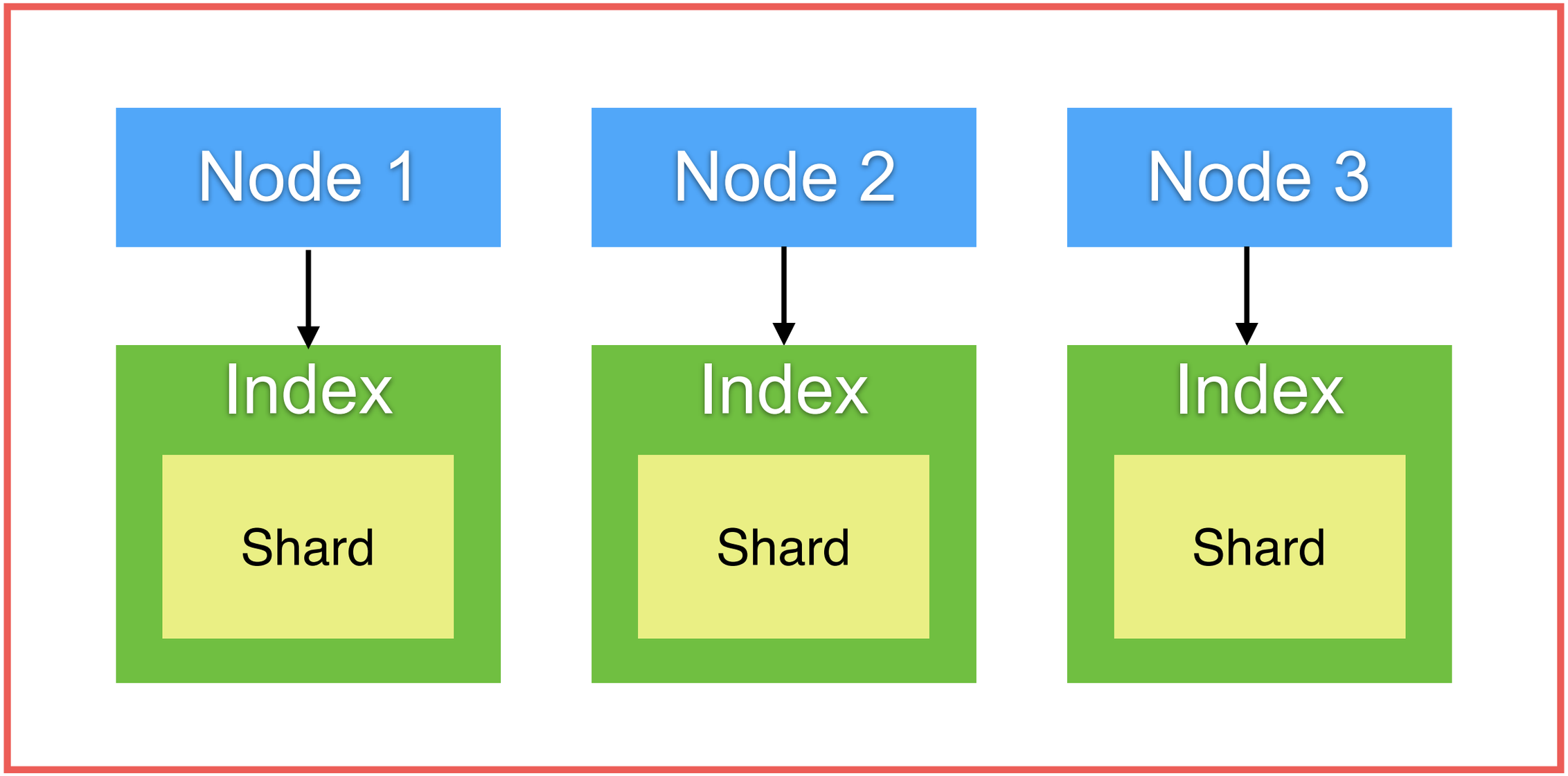
Design for scale (Shard)



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Index is split into shards

Each shard may be on a different node in cluster

Every shard is a self-contained ***Lucene index***

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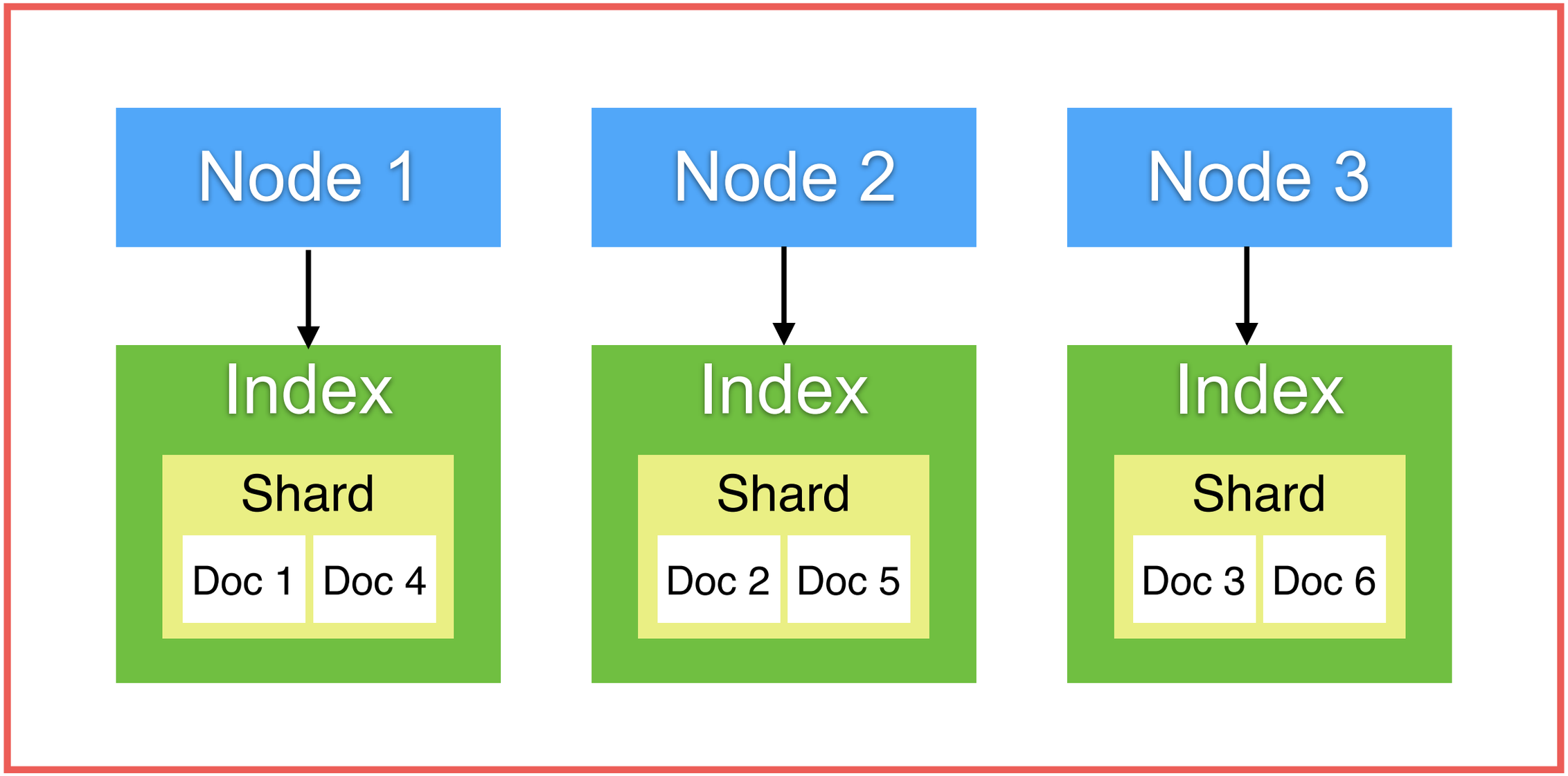
Documents are hashed



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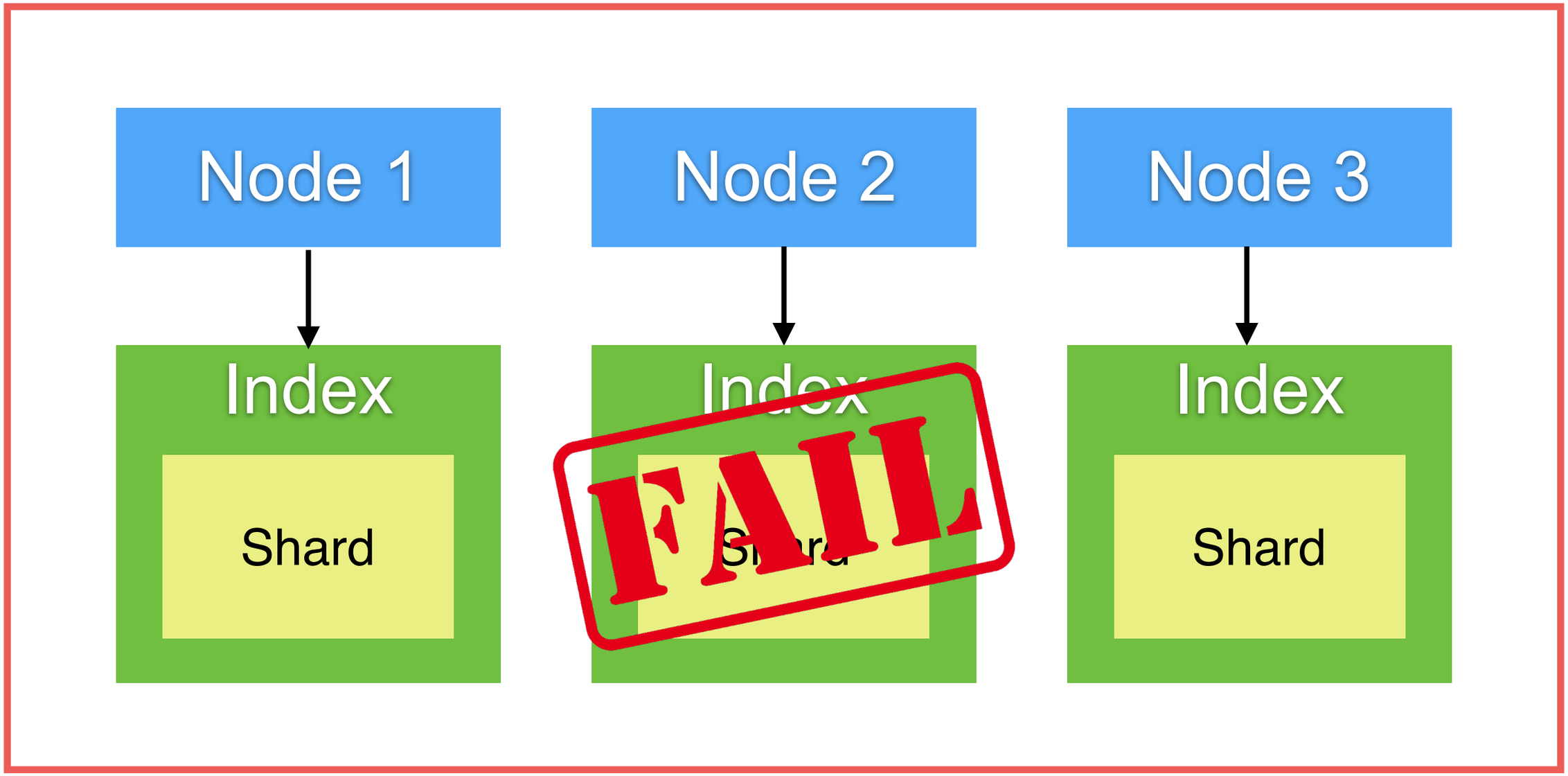
Design for fail (Replica)



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Repica = copy of shards

1 replica = 1 Primary + 1 Replica
2 replicas = 1 Primary + 2 Replicas
3 replicas = 1 Primary + 3 Replicas

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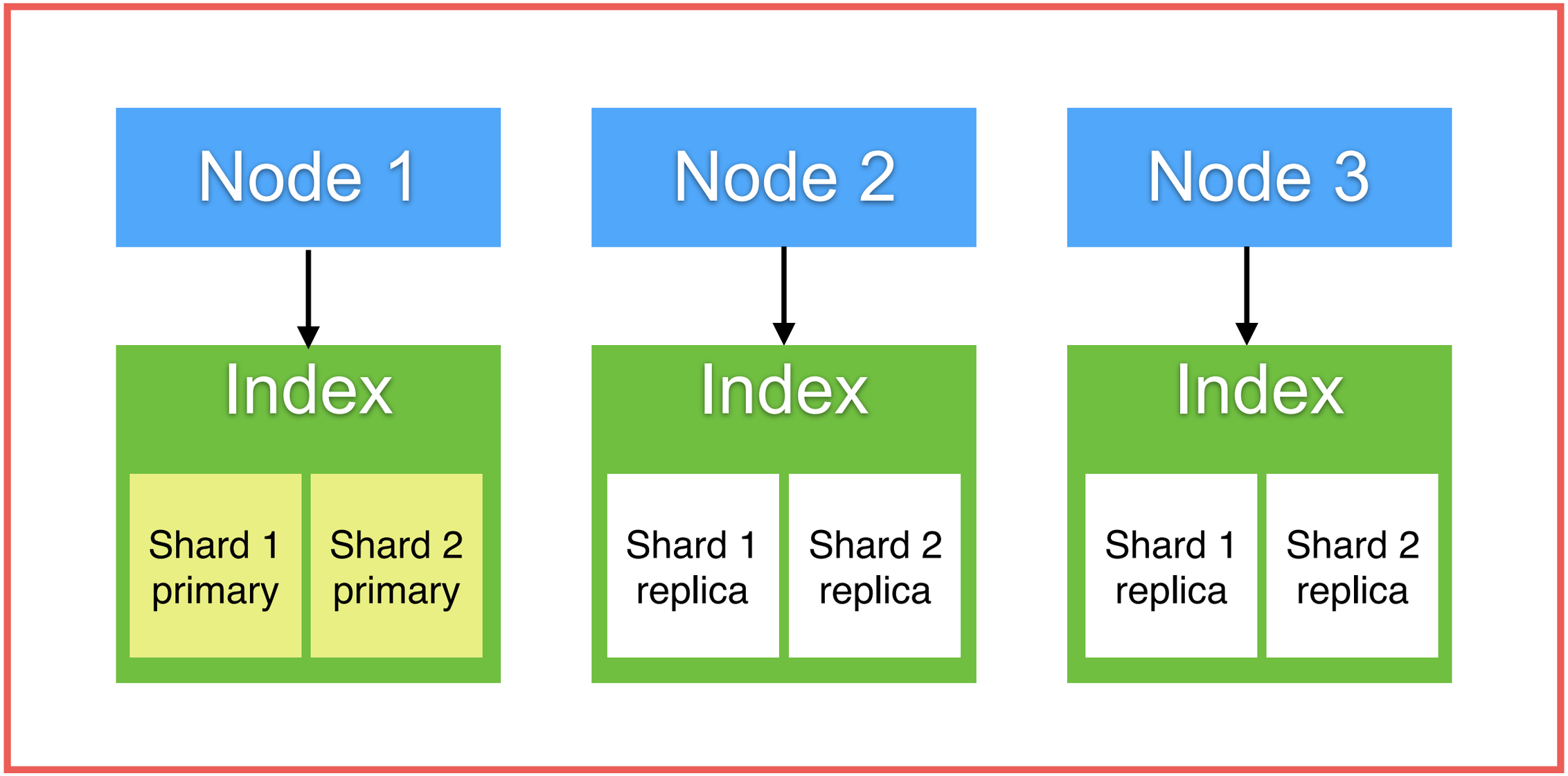
Replica = 2



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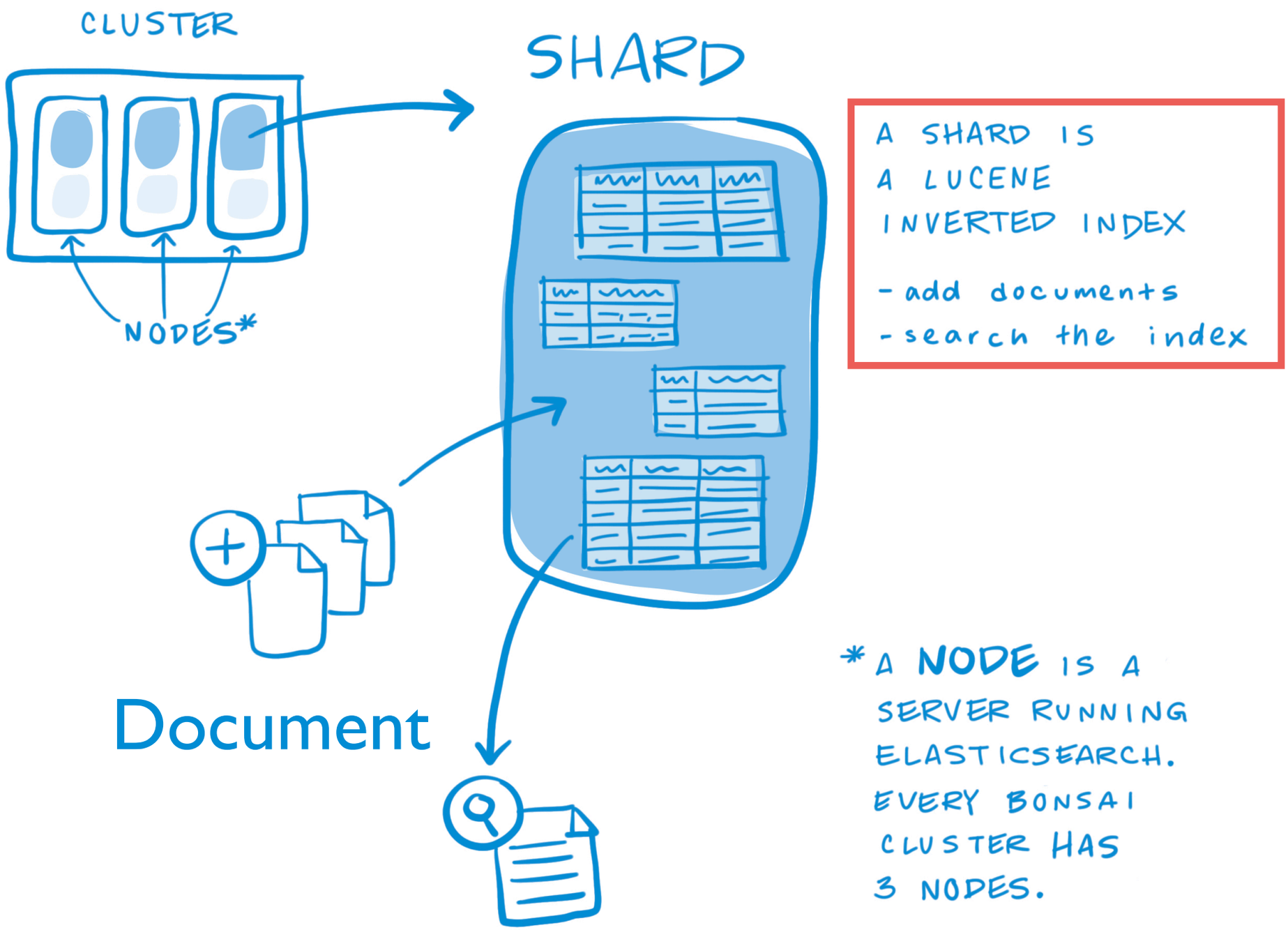
Basic concepts



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Inverted Index

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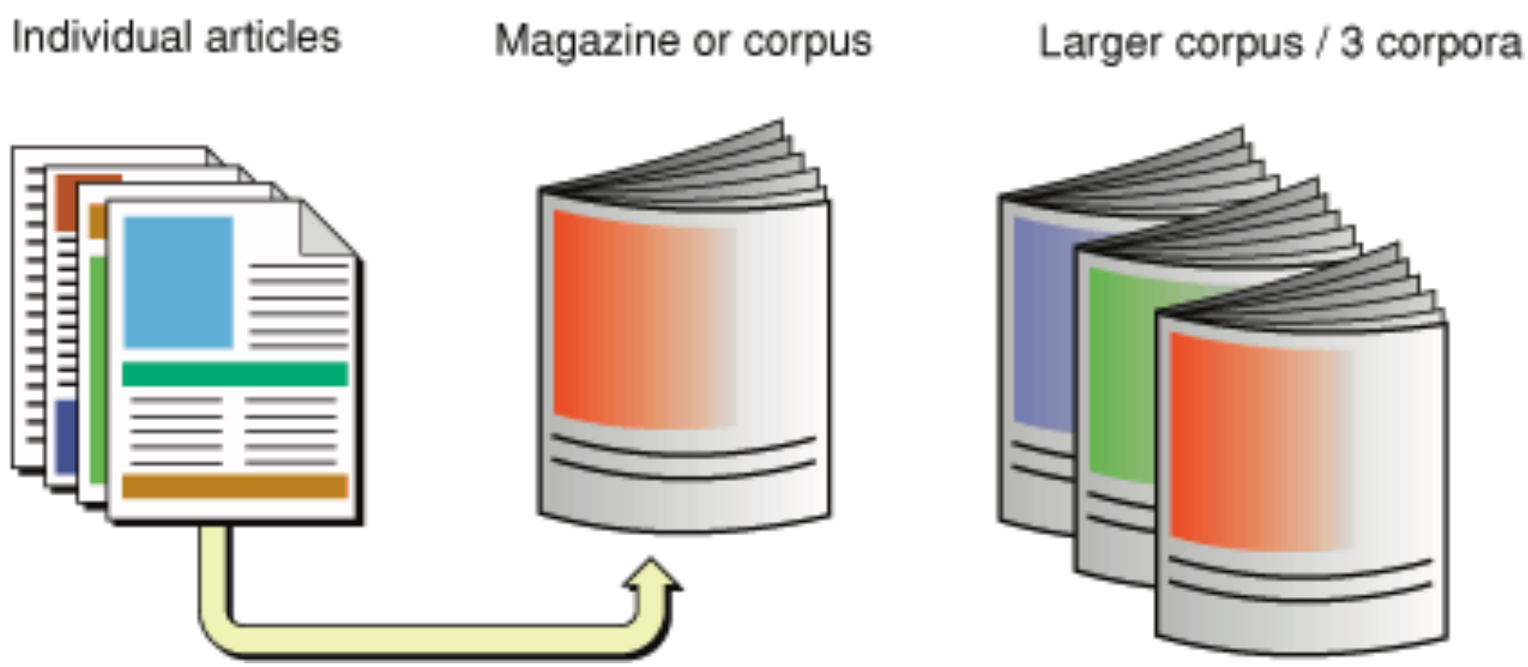
Inverted Index

Corpus is a collection of documents



https://developer.apple.com/library/archive/documentation/UserExperience/Conceptual/SearchKitConcepts/searchKit_basics/searchKit_basics.html#//apple_ref/doc/uid/TP40002843-TPXREF101

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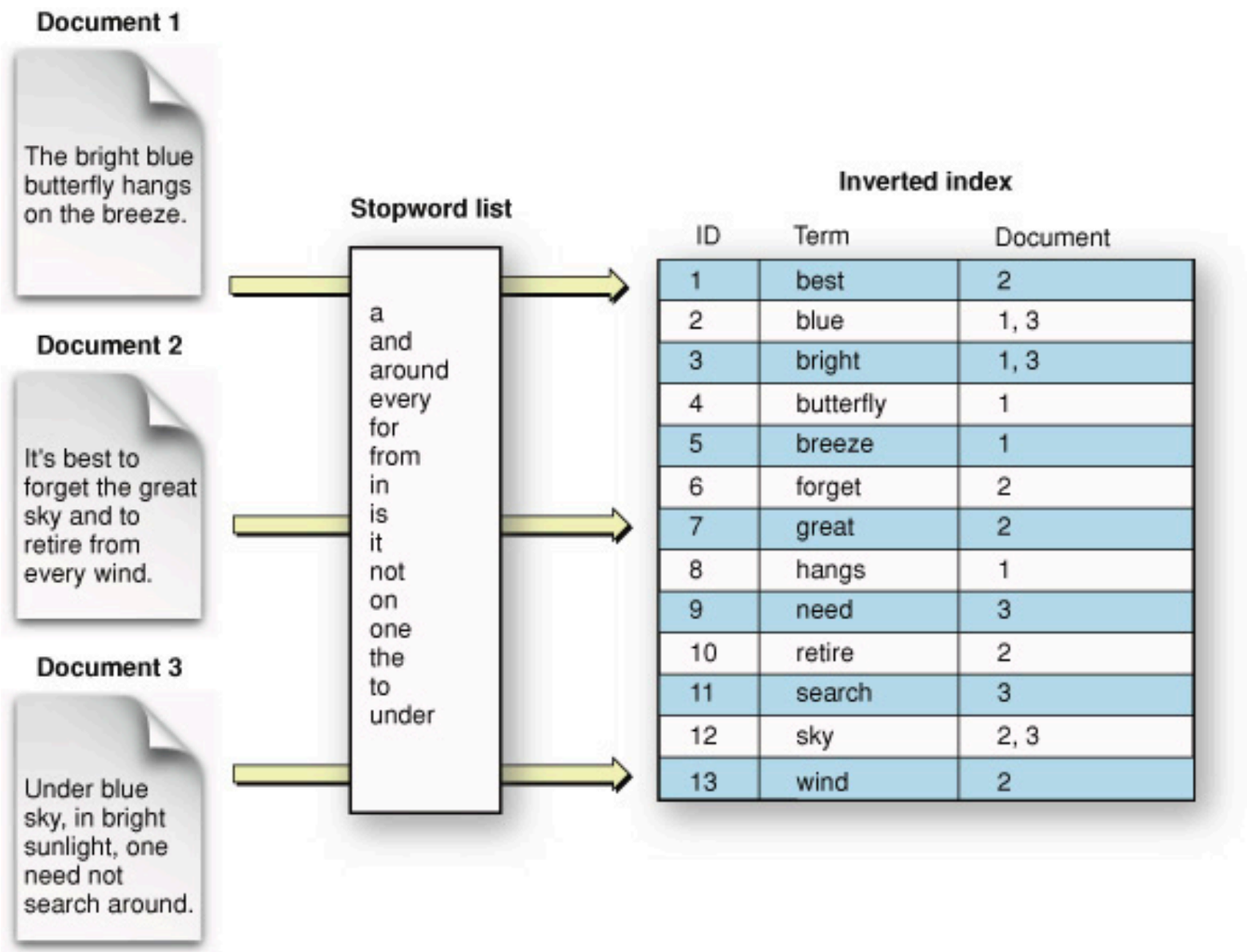
Inverted Index

Try to construct index



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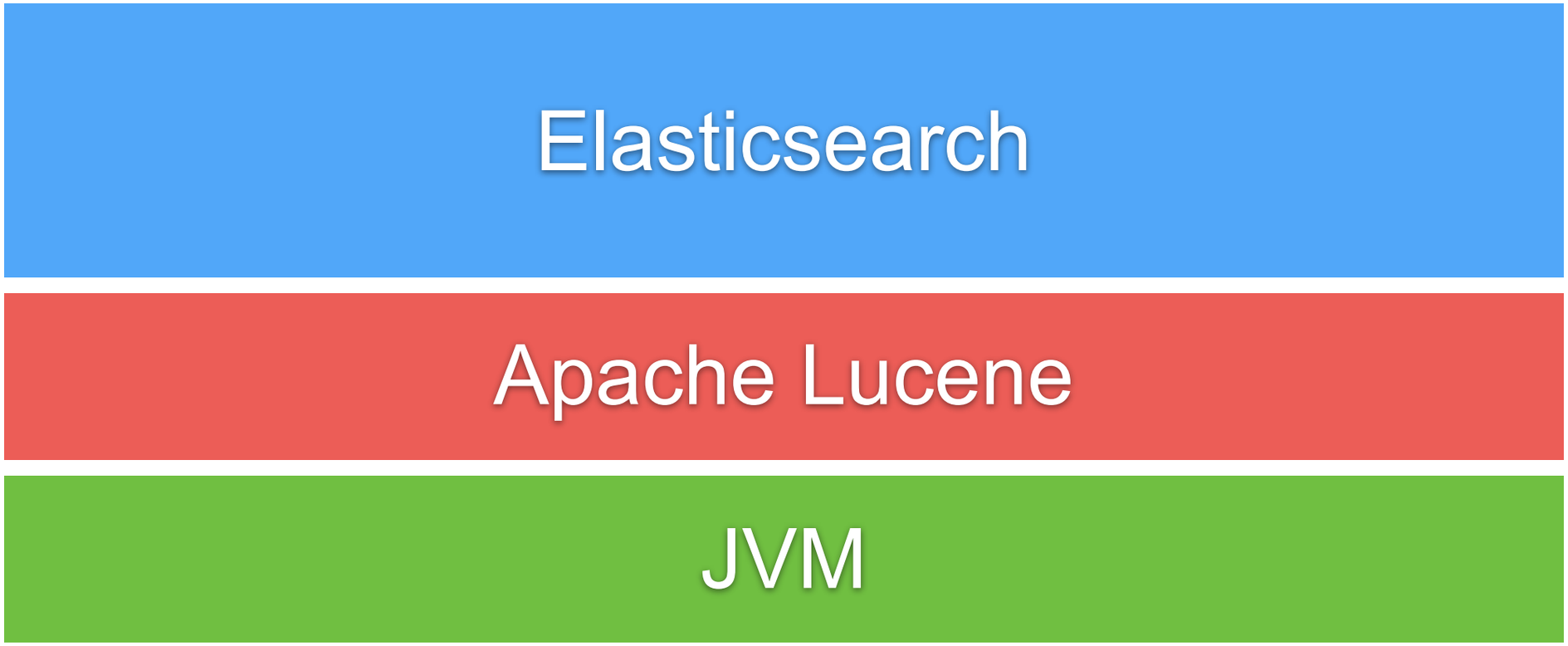
Apache Lucene



https://lucene.apache.org/

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Basic concept

Apache Lucene writes all the information to a structure called **“Inverted Index”**

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Basic concept

Document
Field
Term
Token

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Example

Document no.	Data
1	Elasticsearch Server
2	Mastering Elasticsearch Second Edition
3	Apache Solr Cookbook Third Edition

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Token

Token	Document no.
Elasticsearch	1
Elasticsearch	2
Server	1
Mastering	2
Second	2
Edition	2
Edition	3
Apache	3
Solr	3
Cookbook	3
Third	3

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Term

Token	Count	Document no.
elasticsearch	2	1,2
server	1	1
mastering	1	2
second	1	2
edition	2	2,3
apache	1	3
solr	1	3
cookbook	1	3
third	1	3

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Lucene inverted index

Token	Count	Document no.
elasticsearch	2	1,2
server	1	1
mastering	1	2
second	1	2
edition	2	2,3
apache	1	3
solr	1	3
cookbook	1	3
third	1	3

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Lucene inverted index

Write-once and read-many-times structure
Called “**Segment**”
Can’t be delete (just marked to deleted)

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Input data analysis

Write-once and read-many-times structure

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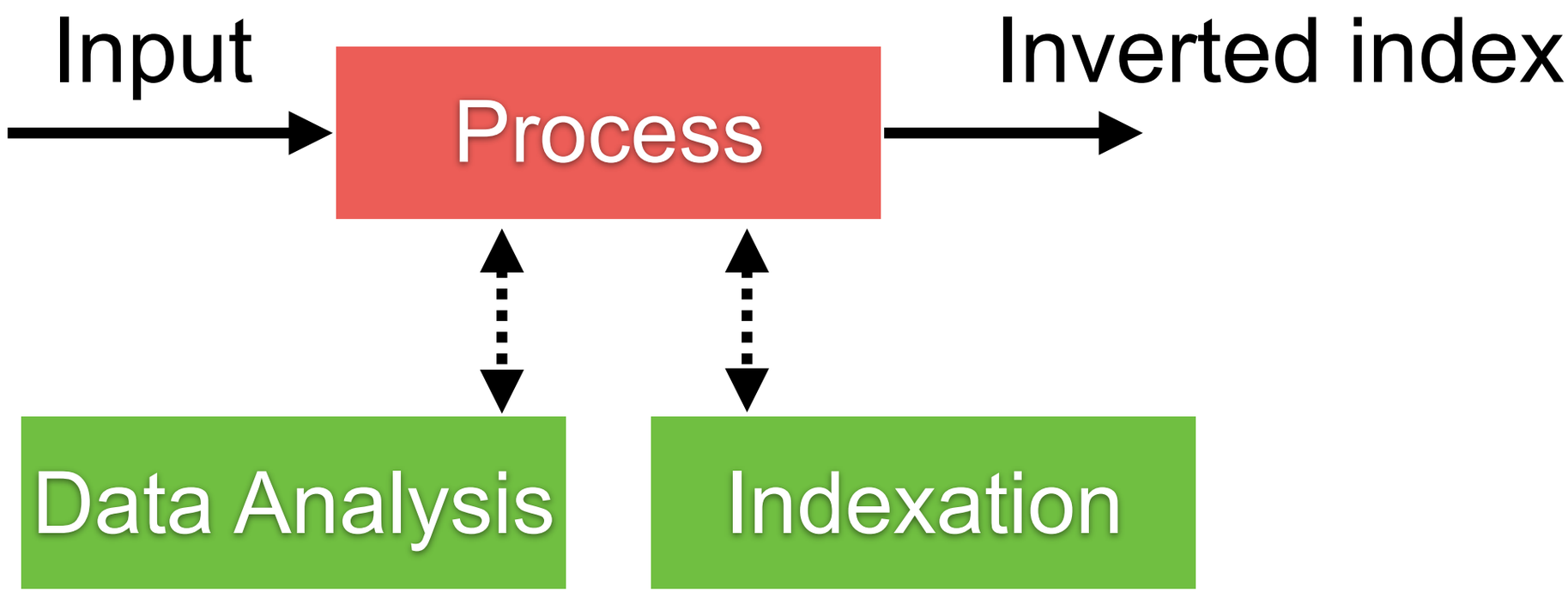
Input data analysis

Write-once and read-many-times structure



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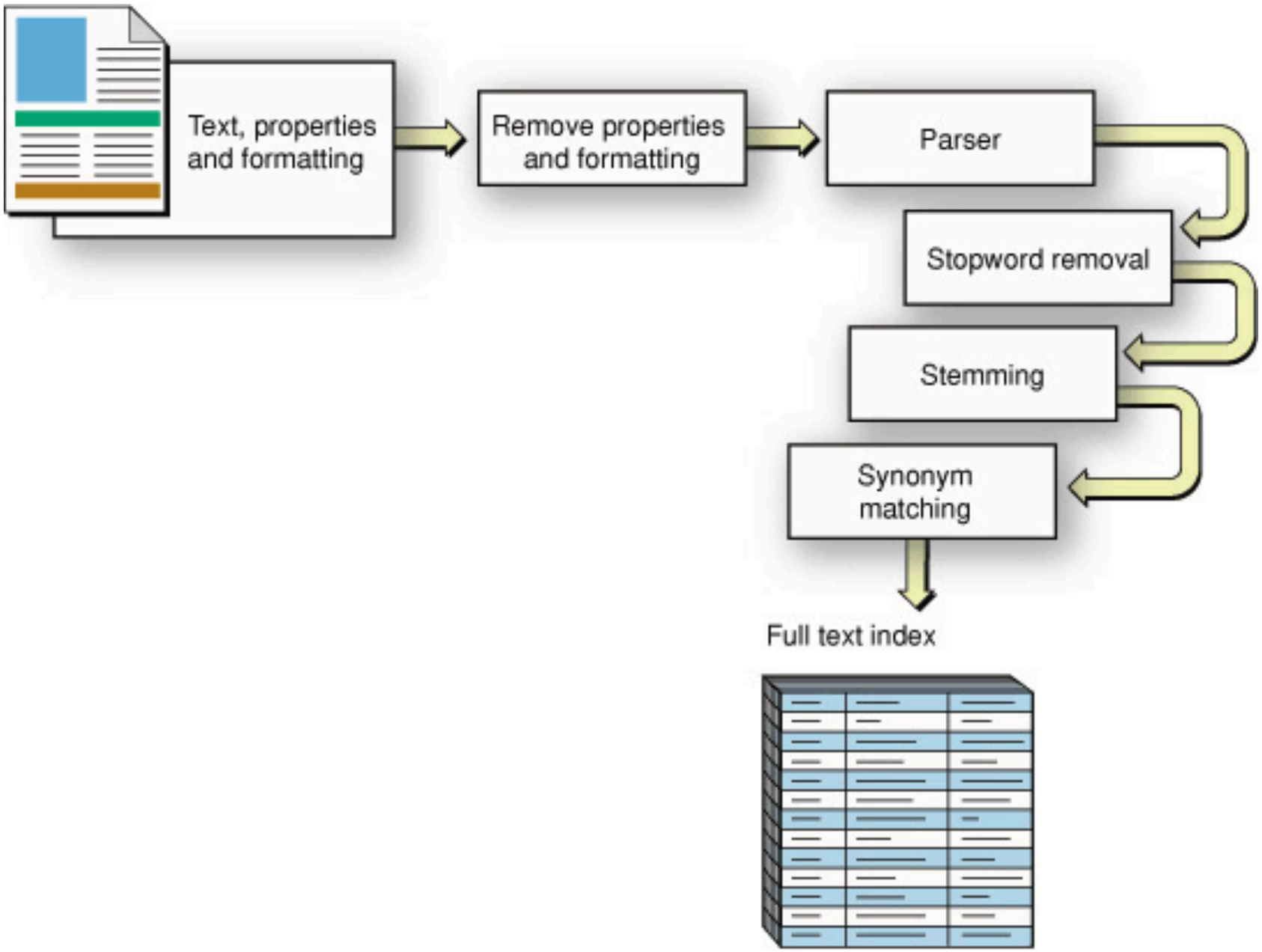
Process ?



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CRUD with Elasticsearch

02-crud/book_document.json

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CRUD with Elasticsearch

Create document
Read document
Update document
Delete document

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Compare with RDBMS

Database	Table	Row	Column
Index	Type*	Document	Field

** Only 1 type per index*

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Create a document

PUT /store/book/1

```
{
  "title": "Elasticsearch: The Definitive Guide",
  "author_name": [
    "Clinton Gormley",
    "Zachary Tong"
  ],
  "tag": [
    "search",
    "computer"
  ],
  "isbn-13": "978-1449358549",
  "isbn-10": "1449358543",
  "price": 44.3,
  "page": 724,
}
```


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Create document

PUT /store/book/1

Index name

Type name

Document ID

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1 Type per Index

Removal of mapping types

edit

IMPORTANT

Indices created in Elasticsearch 6.0.0 or later may only contain a single mapping type. Indices created in 5.x with multiple mapping types will continue to function as before in Elasticsearch 6.x. Mapping types will be completely removed in Elasticsearch 7.0.0.

https://www.elastic.co/guide/en/elasticsearch/reference/6.5/removal-of-types.html

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Create document (1 type)

PUT /store/_doc/1

Index name

Type name

Document ID

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Change in Elasticsearch 7.x

of shard of index change from 5 to 1

```
#! Deprecation: the default number of shards will change
  from [5] to [1] in 7.0.0; if you wish to continue using
  the default of [5] shards, you must manage this on the
  create index request or with an index template
{
    "_index": "store1",
    "_type": "book",
    "_id": "2",
    "_version": 1,
    "result": "created",
    "_shards": {
```


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Read document

GET /store/book/1

```
{
  "_index": "store",
  "_type": "book",
  "_id": "1",
  "_version": 1,
  "found": true,
  "_source": {
      "title": "Elasticsearch: The Definitive Guide",
      "author_name": [
        "Clinton Gormley",
        "Zachary Tong"
      ],
      "tag": [
        "search",
        "computer"
      ]
  }
```

Information of document

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Update document

Whole document
Partial document

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Update whole document

PUT /store/_doc/123

```
{
  "title": "Update",
  "author_name": [
    "user1",
    "user2"
  ],
  "tag": [
    "update",
    "book"
  ]
}
```


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Update partial document

POST /store/_update/123

```
{
  "doc": {
    "title": "partial update",
    "tag": [
      "test",
      "computer"
    ],
    "views": 0
  }
}
```


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Delete document

DELETE /store/_doc/1

```
{
  "_index": "store",
  "_type": "book",
  "_id": "1",
  "_version": 2,
  "result": "deleted",
  "_shards": {
    "total": 2,
    "successful": 1,
    "failed": 0
  },
  "_seq_no": 1,
  "_primary_term": 1
}
```


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More features

Update by query
Delete by query
Partial update document

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Routing

https://www.elastic.co/guide/en/elasticsearch/reference/current/mapping-routing-field.html#

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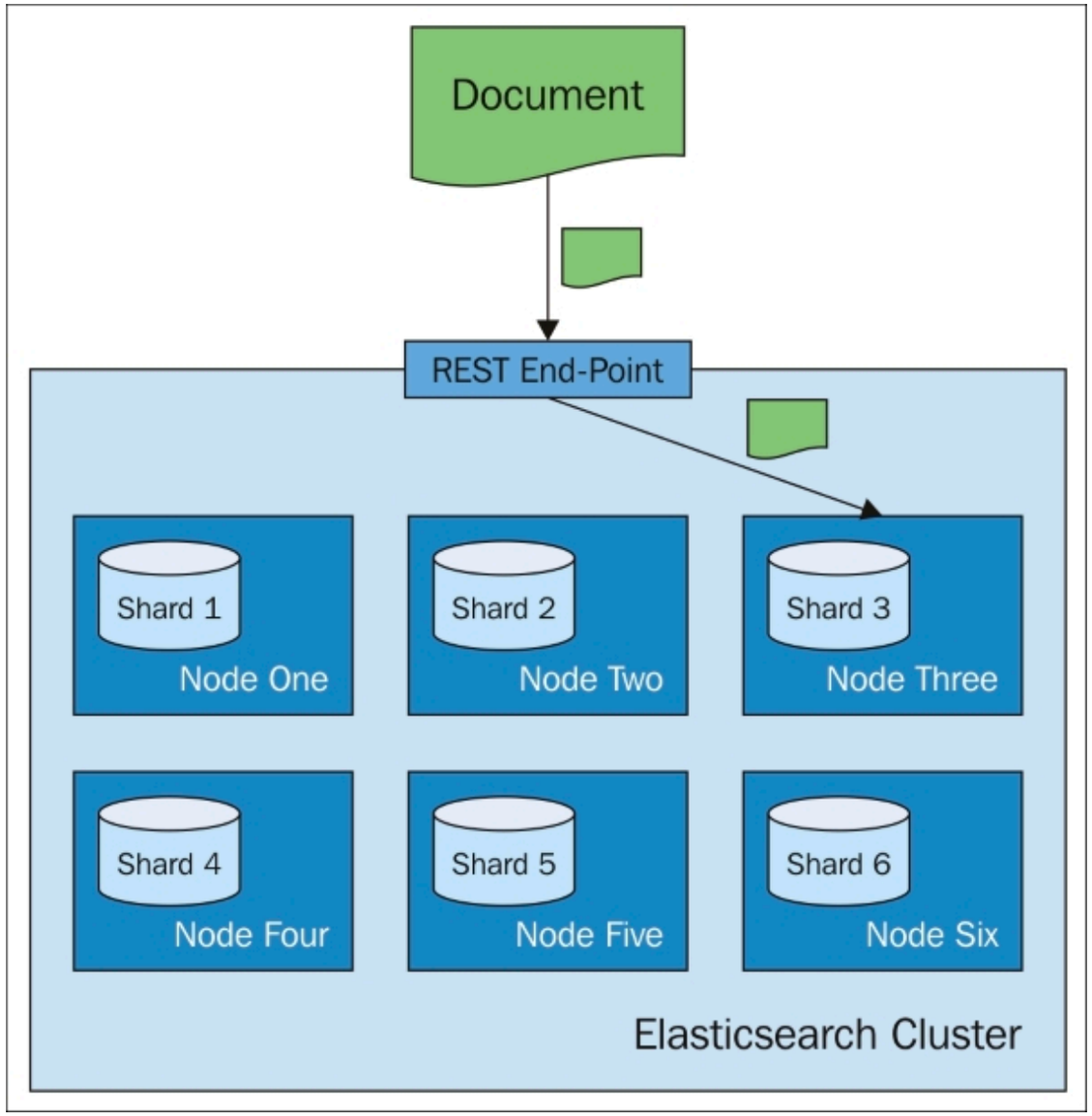
Default indexing

ES calculate the hash value of the doc id



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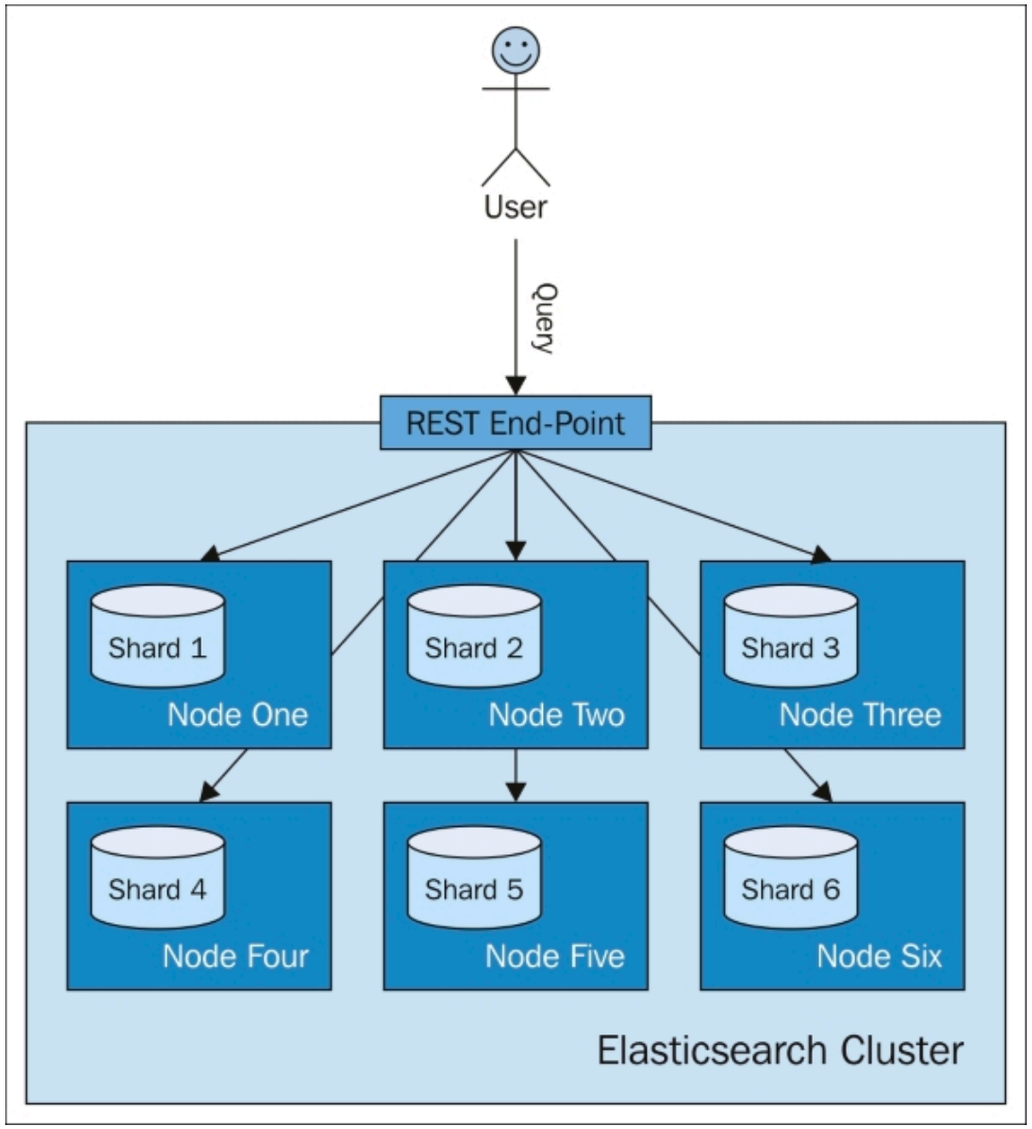
Default searching/query

Query all the shards to get data
(depend on search type)



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Custom routing

Routing field
Routing to index partition

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Routing field

shard_num =

hash(**_routing**) % num_primary_shards

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Routing to index partition

shard_num

=

(hash(**_routing**) + hash(**_id**) % **routing_partition_size**)

%

num_primary_shards

routing_partition_size = 1 (default)

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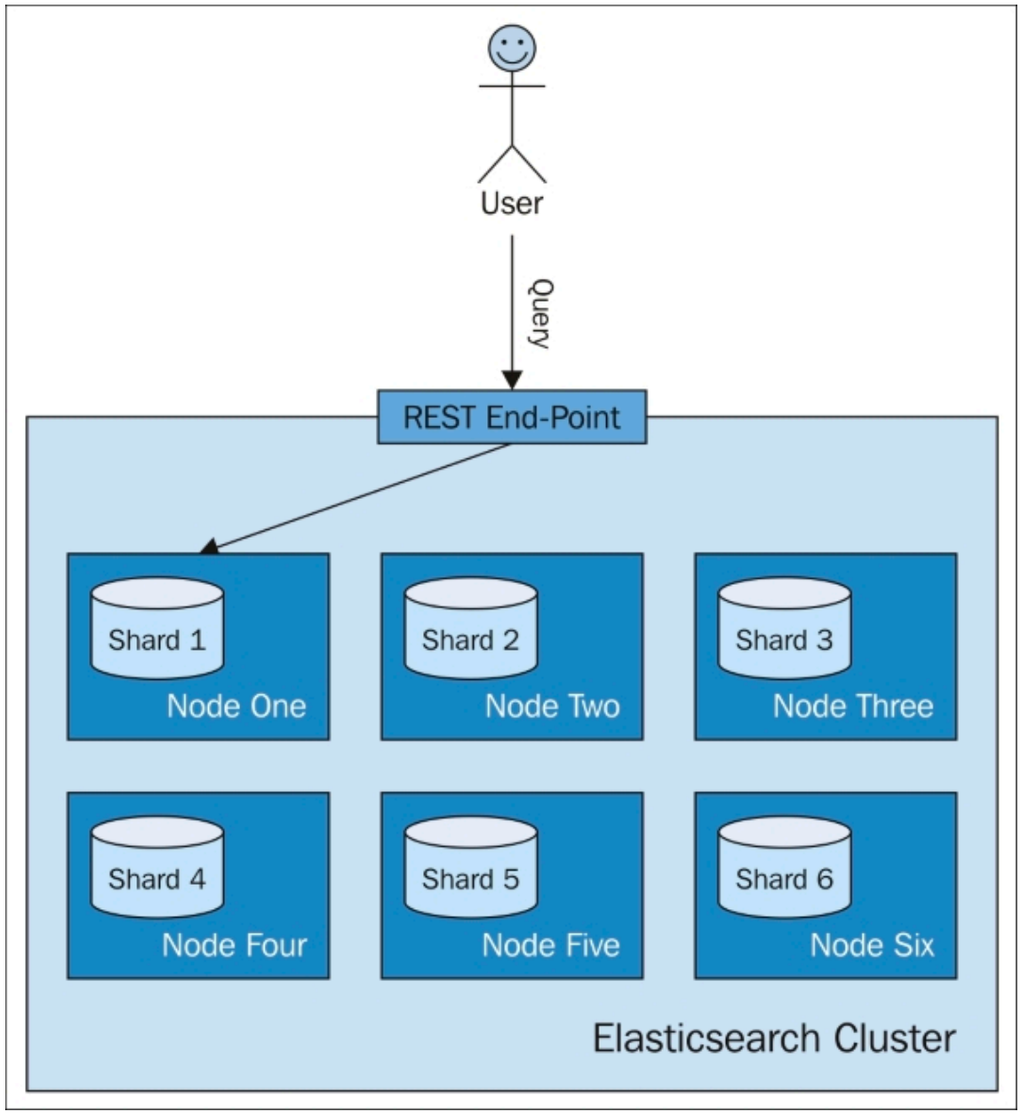
Custom routing

ES will send our query to a single shard



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Bulk API

03-bulk/book_bulk.json

https://www.elastic.co/guide/en/elasticsearch/reference/current/docs-bulk.html

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Bulk API

Perform many index/delete operation in single API call

Increase indexing speed

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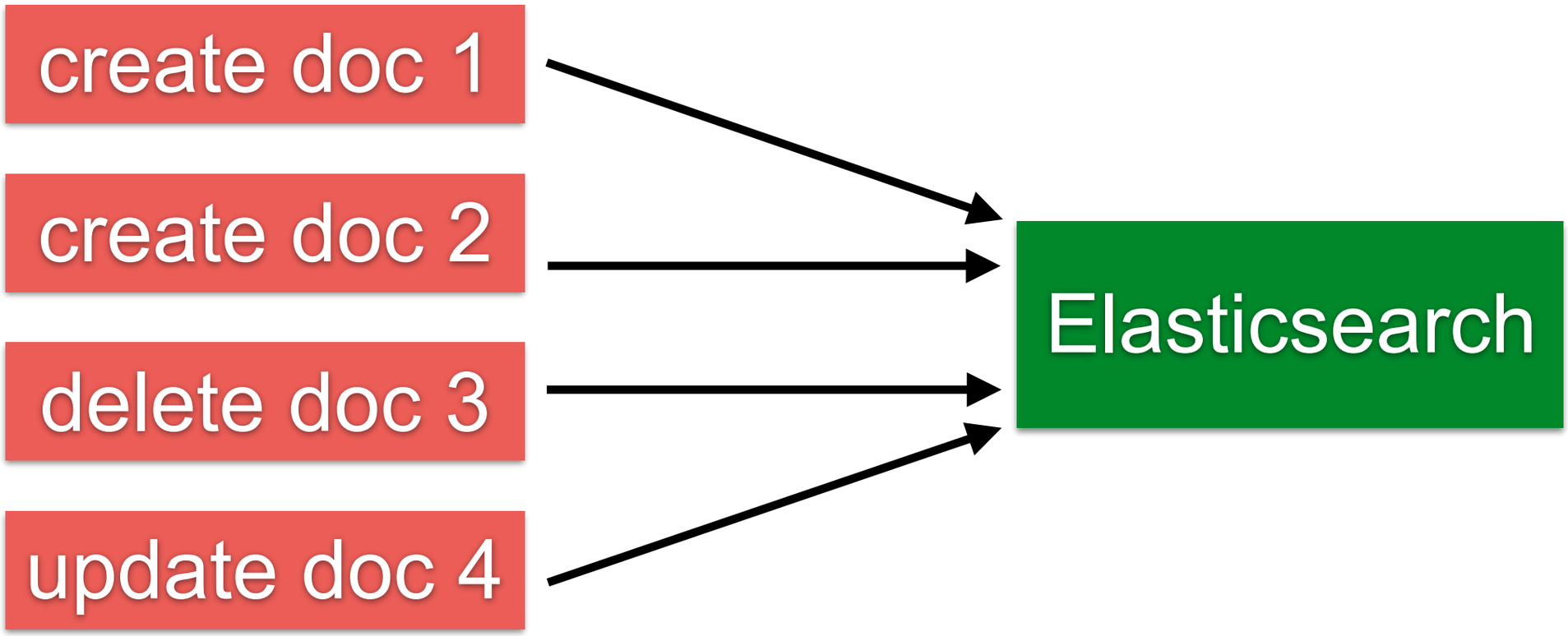
Without Bulk API



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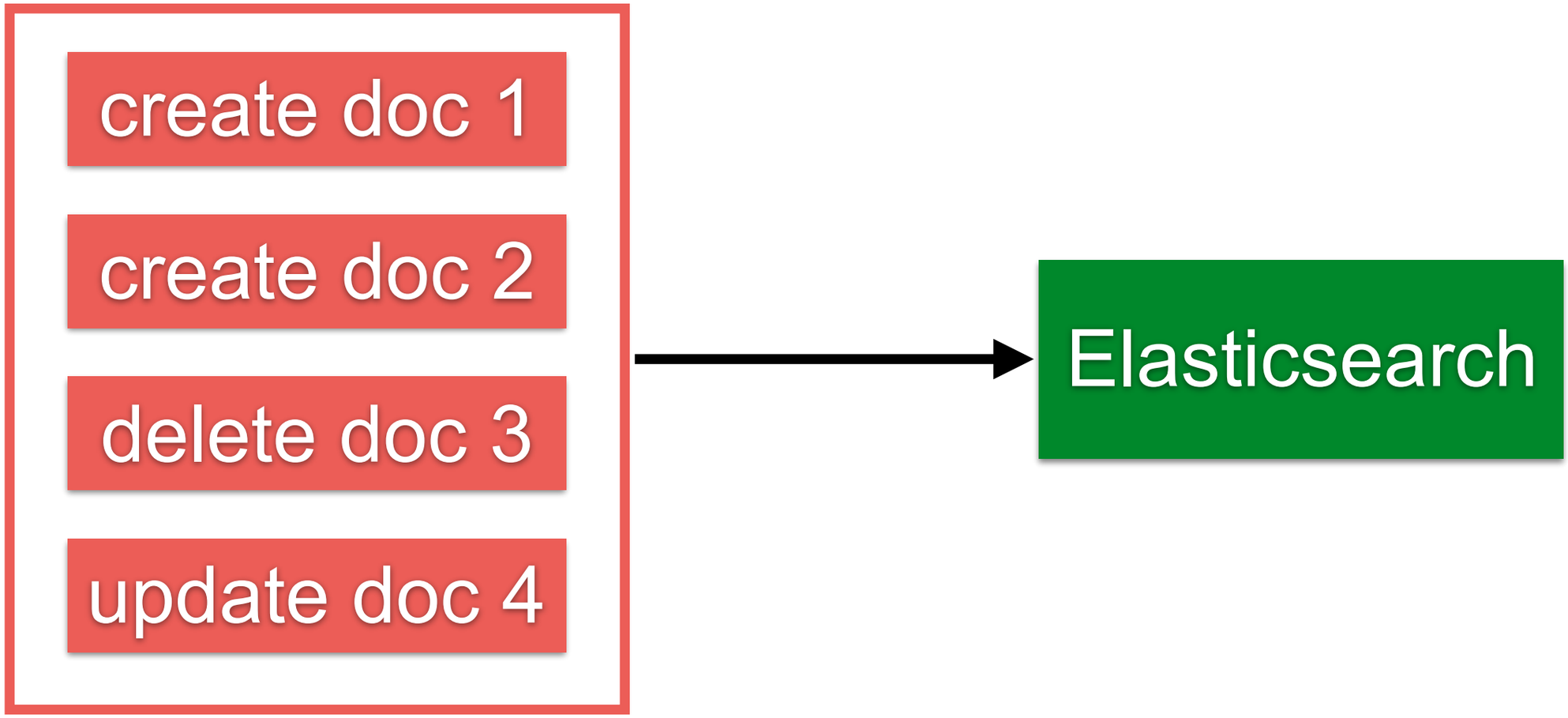
With Bulk API



Store in memory 5-15 MB

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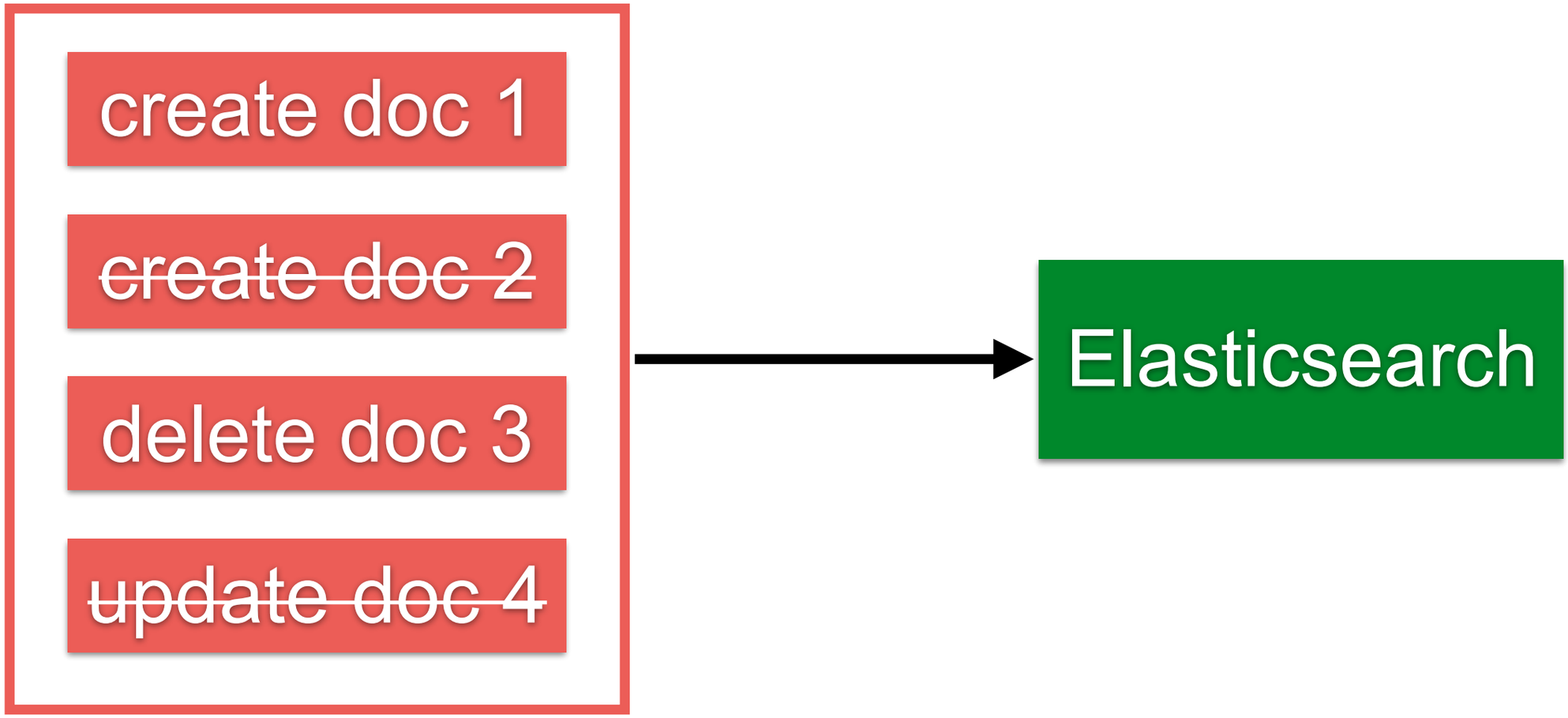
No transaction in bulk api



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Create a document

POST /store/book/**_bulk**

```
{"create":{"_id":"1001"}}
{"title":"new book 1000","description":"my new book"}
```


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Response from Bulk API

```
{
  "took": 89,
  "errors": false,
  "items": [
    {
      "create": {
        "_index": "store",
        "_type": "book",
        "_id": "1001",
        "_version": 1,
        "result": "created",
        "_shards": {
          "total": 2,
          "successful": 1,
          "failed": 0
        },
        "_seq_no": 0,
        "_primary_term": 1,
        "status": 201
```

Time in milliseconds

HTTP Status 201 = Created

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Searching / Query

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Searching

Scattering phase
Gathering phase

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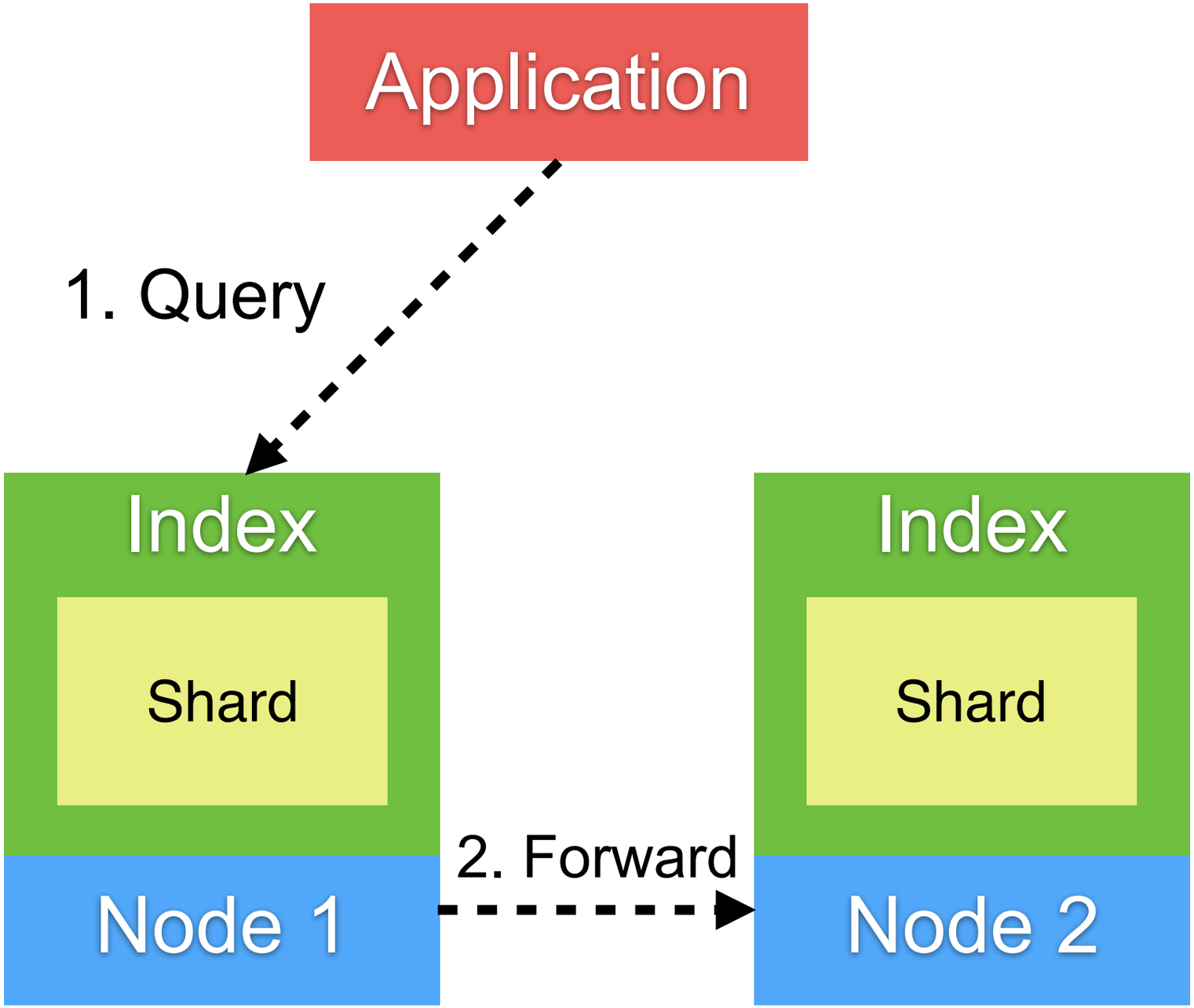
Scattering phase



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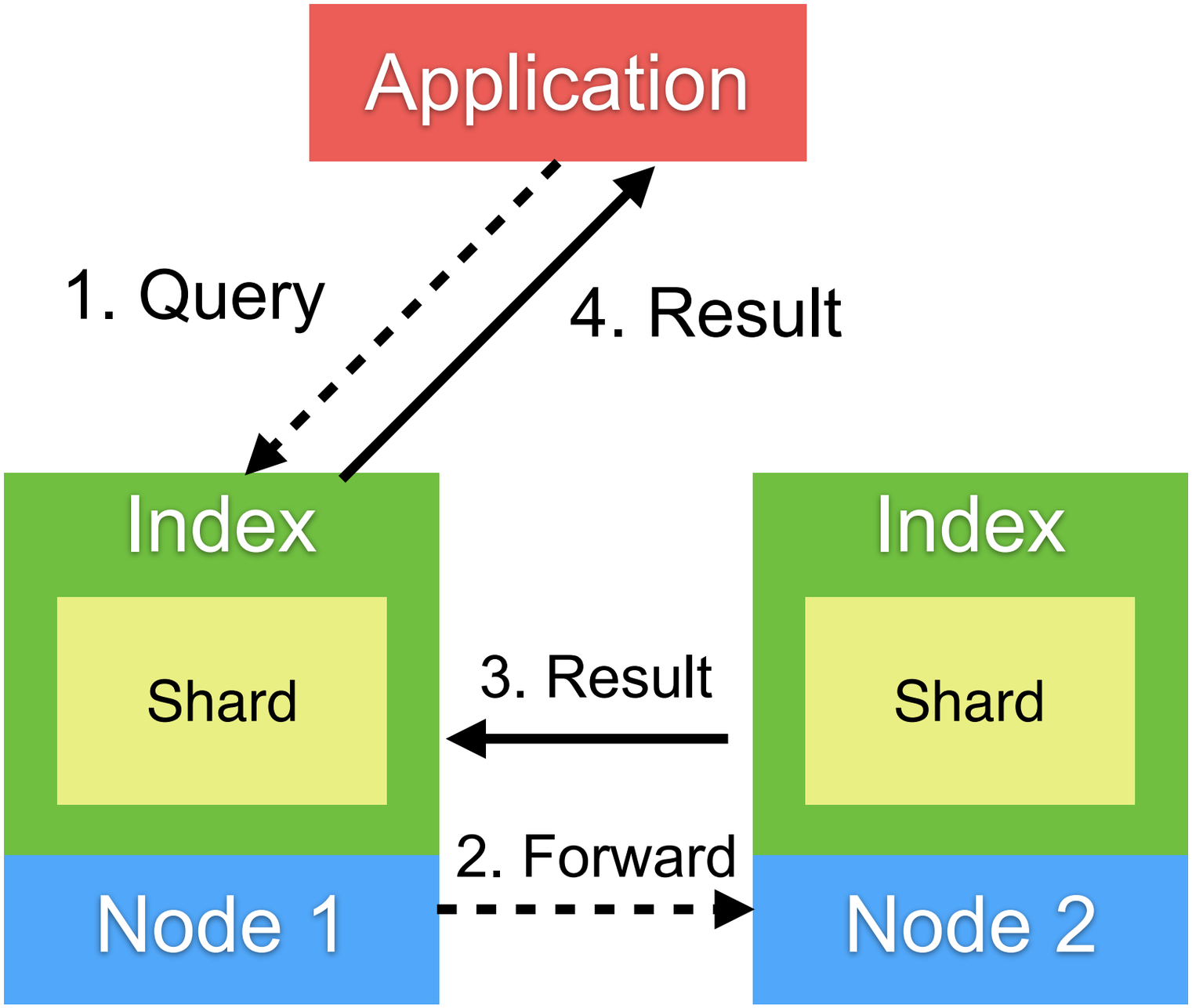
Gathering phase



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Query DSL

04-search/book_search.json

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Query DSL

Domain **S**pecific **L**anguage for query data
Flexible query language
Based on JSON format

https://www.elastic.co/guide/en/elasticsearch/reference/current/query-dsl.html

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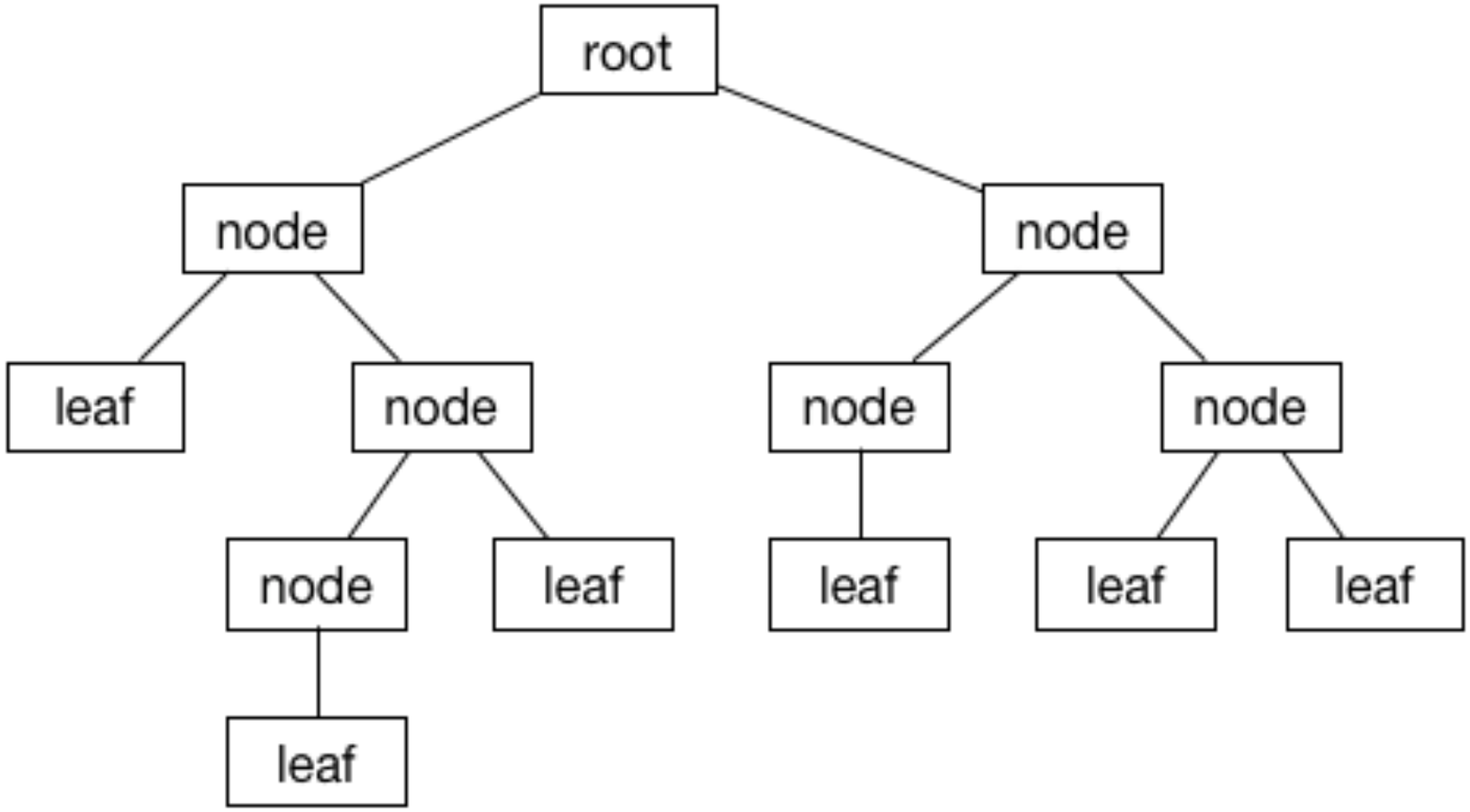
Query DSL

1. Leaf query clause
2. Compound query clause



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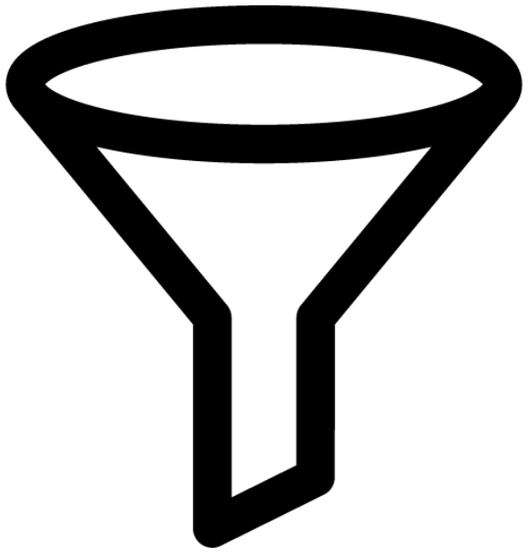
Query DSL

Query (unstructured data)
Filter (structured data)



Query

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Query DSL

Query	Filter
Relevance	Boolean, yes/no
Full text search	Exact values
Not cached	Cached
Slower	Faster

***Filter first**, then query remaining documents*

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Query DSL

Full text query
Term level query
Compound query
Joining query
Geo query
Specialized query
Span query

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Leaf query clause

GET /store/book/_search

```
{
    "query": {
      "match_all": {}
    }
}
```


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Compound query clause

GET /store/book/_search

```
{
  "query": {
    "bool": {
      "must": [{}],
      "should": [{}],
      "must_not": [{}]
    }
  }
}
```


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_all field is disabled (ES 6.0+)

`_all` field

WARNING

Deprecated in 6.0.0.

`_all` may no longer be enabled for indices created in 6.0+, use a custom field and the mapping `copy_to` parameter

Space issue
Analyzer issue
Highlighting issue

https://www.elastic.co/guide/en/elasticsearch/reference/6.5/mapping-all-field.html

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Workshop

amazon

All elasticsearch

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EN Hello. Sign in Account & Lists Orders 0 Cart

1-16 of 119 results for "elasticsearch"

Sort by Featured

Show results for

Books
- Computers & Technology
- Data Processing
- Web Development & Design
- Online Internet Searching
- Databases & Big Data
- See more

Kindle Store
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- Business Software
- Search Engines
- Application Development
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- See more

See All 8 Departments

Refine by

Book Language

English

Book Format

Paperback

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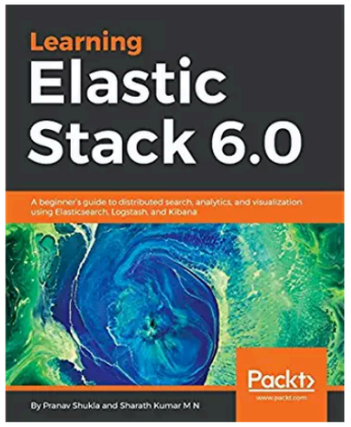

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by Pranav Shukla and Sharath Kumar M N

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Query

Sorting

Filter

amazon

All elasticsearch

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Deliver to Thailand

Departments Your Amazon.com Today's Deals Gift Cards Sell

EN Hello. Sign Account & Lists Orders Cart

1-16 of 119 results for "elasticsearch"

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Books
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Paging

Previous Page 1 2 3 ... 8 Next Page

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Aggregation API

05-aggregation/book_aggregation.json

https://www.elastic.co/guide/en/elasticsearch/reference/current/search-aggregations.html

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```
SELECT count(1), sum(price)
FROM some_table
GROUP BY some_column
```


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Aggregation Types

Bucketing
Metric
Matrix
Pipeline

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Structure

```
"aggregations" : {
    "<aggregation_name>" : {
        "<aggregation_type>" : {
            <aggregation_body>
        }
        [,"meta" : {  [<meta_data_body>] } ]?
        [,"aggregations" : { [<sub_aggregation>]+ } ]?
    }
    [,"<aggregation_name_2>" : { ... } ]*
}
```


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Count by category

GET /store/_search

```
{
 "aggs": {
    "all_book_title": {
      "terms": {
        "field": "category.keyword"
            }
          }
      }
  }
```


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Count by category

GET /store/_search

```
{
 "aggs": {
    "all_book_title": {
      "terms": {
        "field": "category.keyword"
      }
    }
  }
}
```

Aggregation name

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Count by category

GET /store/_search

```
{
 "aggs": {
    "all_book_title": {
     "terms": {
        "field": "category.keyword"
     }
    }
  }
}
```

Aggregation type

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Result of aggregation

Search result

```
{
  "hits": {
    "total": 5,
    "max_score": 1,
    "hits": [
      {
        "_source": {
          "title": "The Logstash Book"
        }
      },
      {
        "_source": {
          "title": "Elasticsearch Server: Second Edition"
        }
      }
    ]
  }}
```


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Result of aggregation

```
"aggregations": {
  "all_book_title": {
    "doc_count_error_upper_bound": 0,
    "sum_other_doc_count": 0,
    "buckets": [
      {
        "key": "Computer & Technology",
        "doc_count": 5
      },
      {
        "key": "Online Searching",
        "doc_count": 3
      },
      {
        "key": "Java Programming",
        "doc_count": 2
      }
    ]
```

Aggregation result

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Show only aggregation result

GET /store/_search

```
{
  "size": 0,
  "aggs": {
    "all_book_title": {
      "terms": {
        "field": "category.keyword"
      }
    }
  }
}
```

Set search result size = 0

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Range of price

GET /store/_search

```
{
  "size": 0,
  "aggs": {
    "price_range": {
      "range": {
        "field": "price",
        "ranges": [
          { "from": 0,"to": 10 },
          { "from": 11,"to": 20 },
          { "from": 21,"to": 50 }
        ]
      }
    }
  }
}
```


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Result of aggregation

```
"buckets": [
    {
      "key": "0.0-10.0",
      "from": 0,
      "to": 10,
      "doc_count": 1
    },
    {
      "key": "11.0-20.0",
      "from": 11,
      "to": 20,
      "doc_count": 0
    },
    {
      "key": "21.0-50.0",
      "from": 21,
      "to": 50,
      "doc_count": 3
    }
```


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Range of price and ordering

GET /store/_search

```
{
  "size": 0,
  "aggs": {
    "price_range": {
      "range": {
        "field": "price",
        "ranges": [
          { "from": 0,"to": 10 },
          { "from": 11,"to": 20 },
          { "from": 21,"to": 50 }
        ]
      }
    }
  }
}
```


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Workshop aggregation with car

05-aggregation/car.json

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Try by yourself

Best seller by color
Statistic of best seller by color
Detail of car in each color
Min/max of price by make

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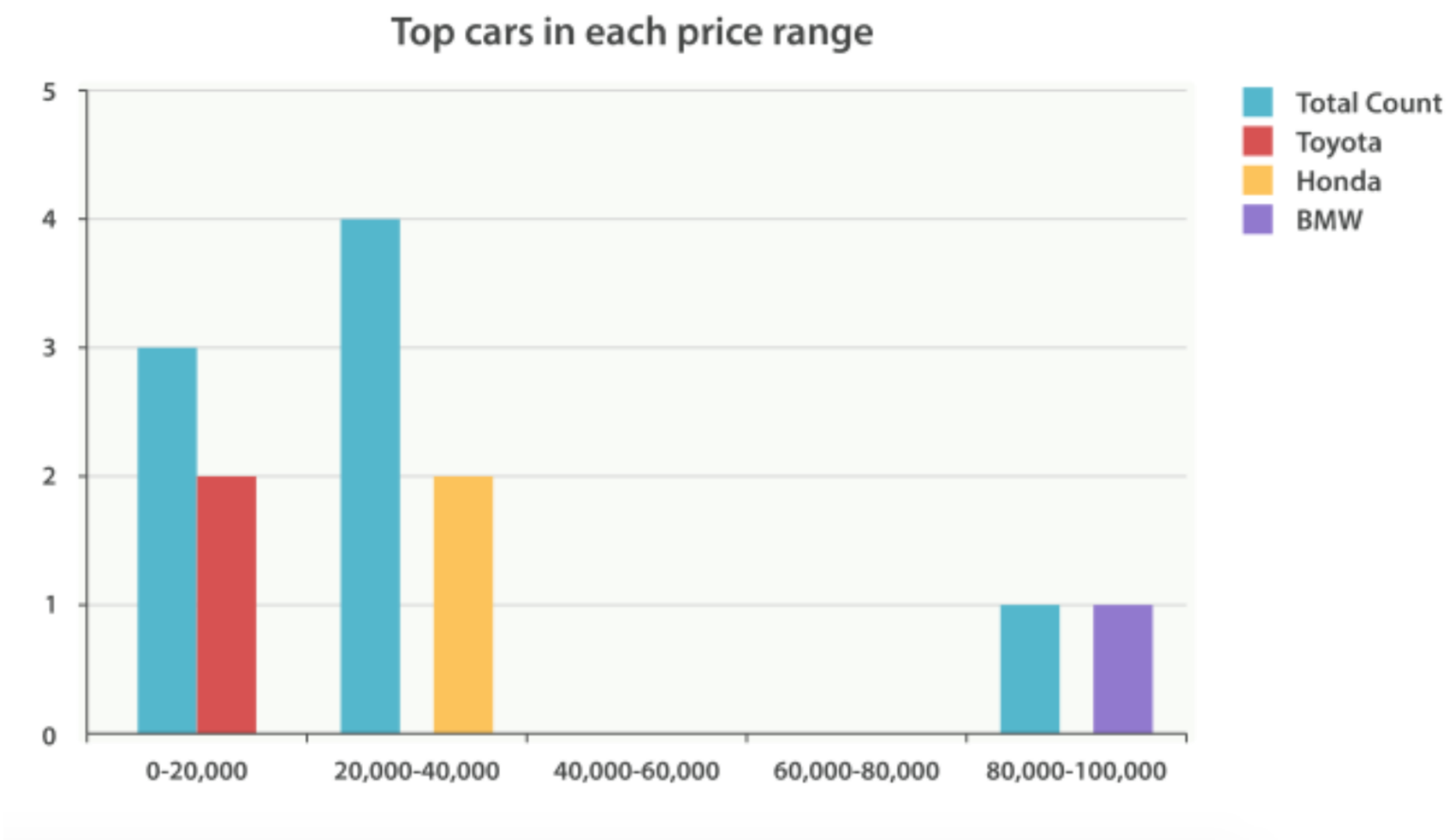
Top cars in each price range ?



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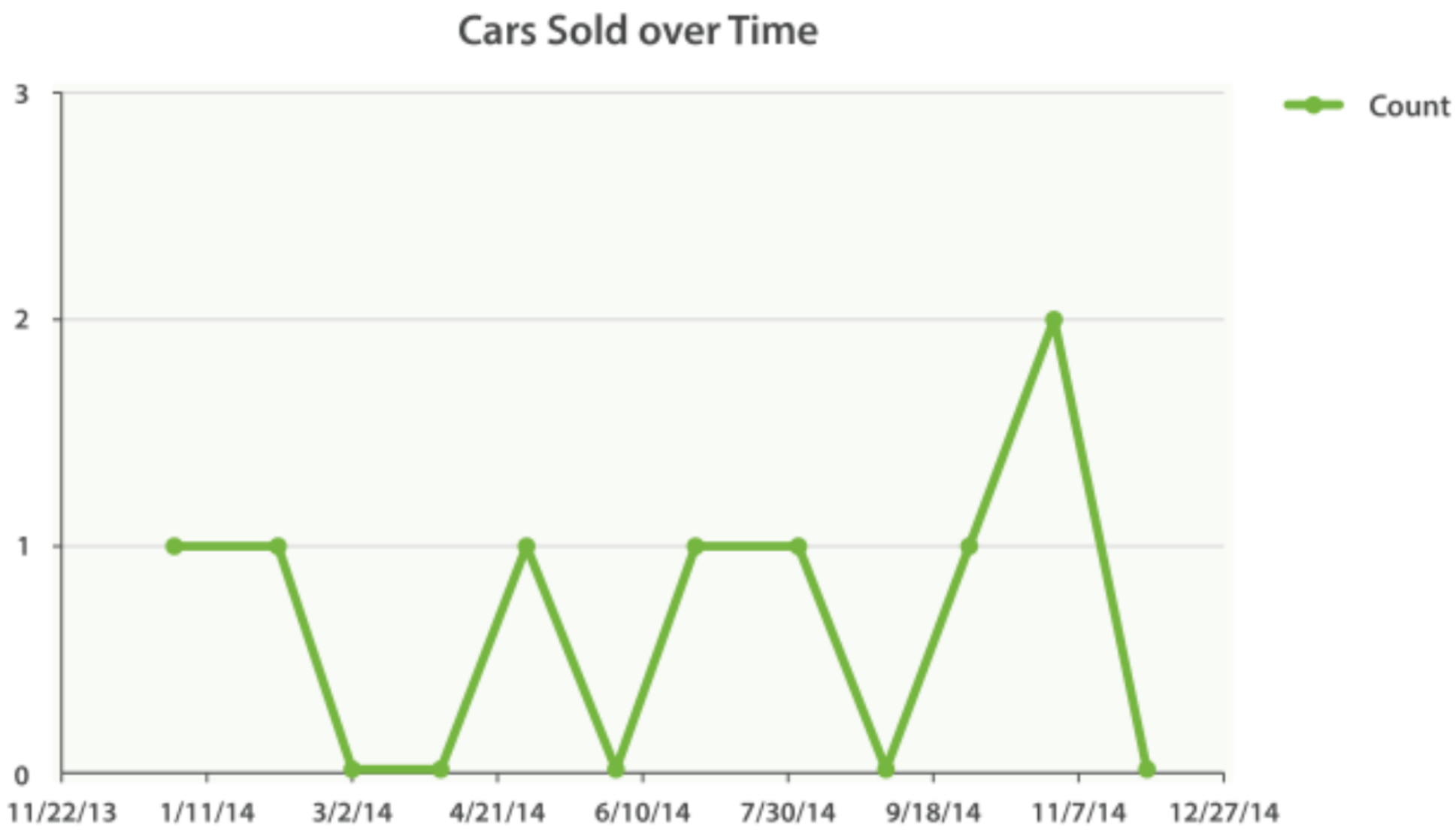
Cars sold over Time ?



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Mapping

https://www.elastic.co/guide/en/elasticsearch/reference/current/mapping.html

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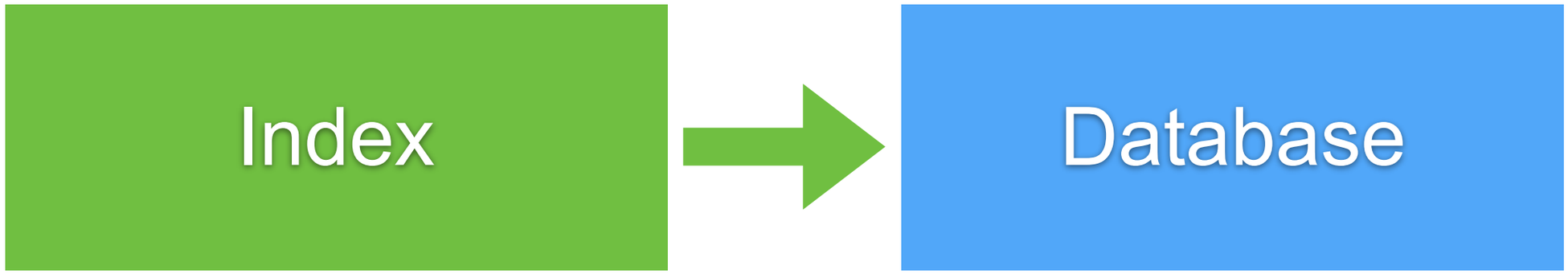
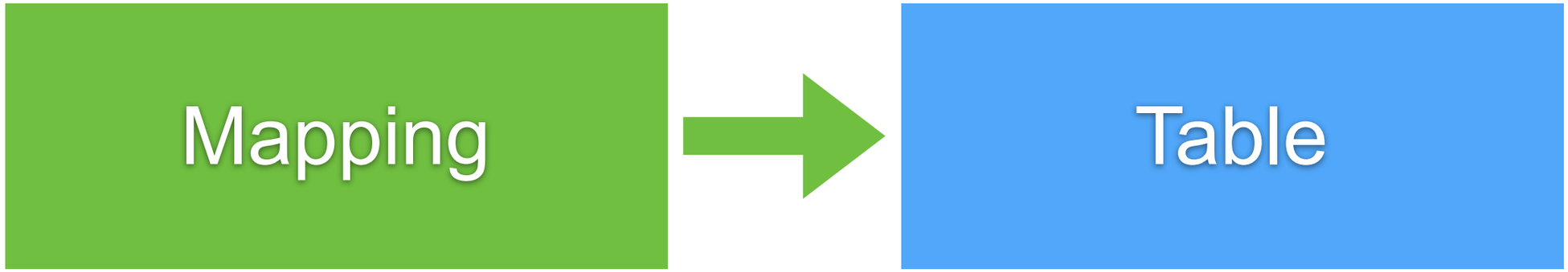
Explicit Mapping





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Mapping type

Meta-fields
Field or properties

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Meta-field

Metadata of document
_index, _type, _id, _source

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Field or properties

List of fields or properties of document

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Mapping/Schema of document

GET /store/_mapping/book

```
"mappings": {
      "book": {
        "properties": {
          "author_name": {
            "type": "text",
          "fields": {
            "keyword": {
              "type": "keyword",
              "ignore_above": 256
            }
          }
        }
```


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Mapping/Schema of document

GET /store/_mapping/book

```
"mappings": {
      "book": {
          "page": {
            "type": "long"
          },
          "price": {
            "type": "float"
          },
          "published_date": {
            "type": "date"
          }
      }
   }
}
```


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Field Datatypes

Core

Complex

Geo

Specialized

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Field Datatypes

text	date
keyword	ip
long	boolean
double	completion
geo_point	geo_shape
array	object
nested	binary

https://www.elastic.co/guide/en/elasticsearch/reference/current/mapping-types.html

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Field Datatypes

text	date
keyword	ip
long	boolean
double	completion
geo_point	geo_shape
array	**object**
nested	binary

https://www.elastic.co/guide/en/elasticsearch/reference/current/mapping-types.html

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Array

No data type **array** in Elasticsearch

[“name”, “title”]	array of string
[1, 2, 3]	array of integer
[{“name”: “up1”, “age”: 30}]	array of object

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Mapping configuration

Maximum number of fields = 1,000

Maximum depth of fields = 20

Maximum depth of nested fields = 50

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Dynamic/Explicit mapping

Fields and mapping types not need to defined before being used

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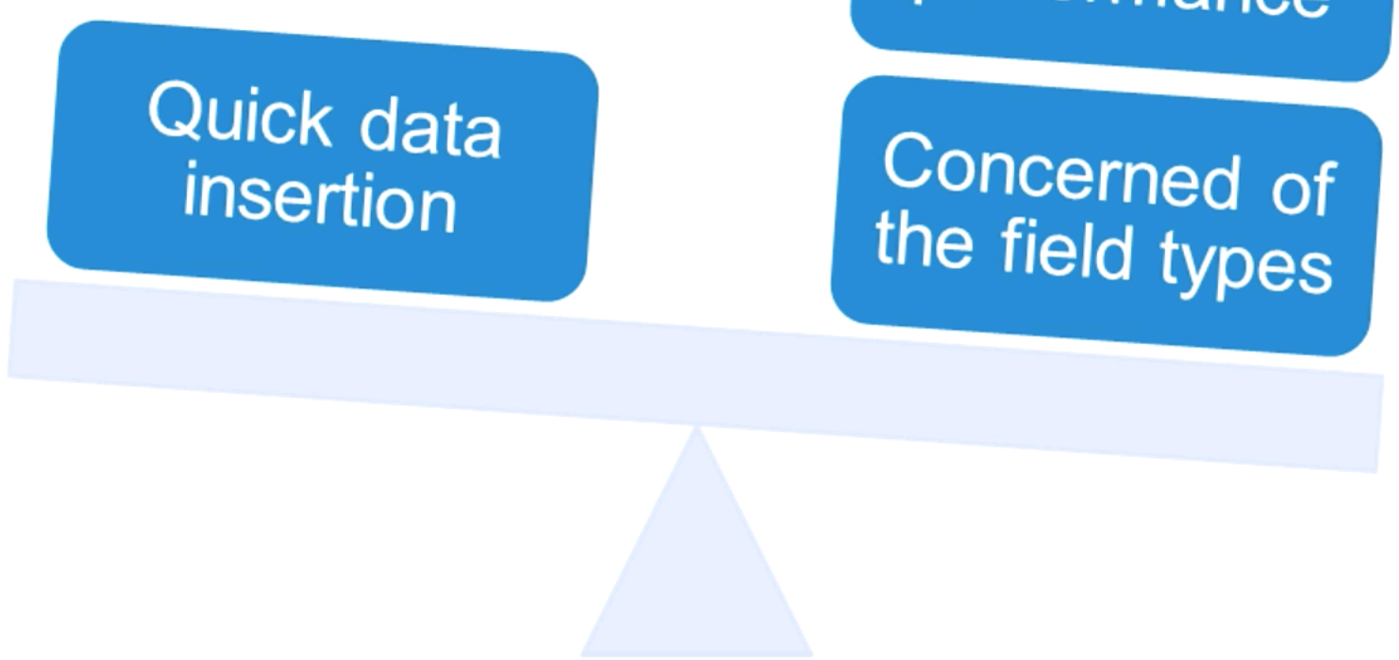
Mapping

Manual mapping

Explicit mapping



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Custom Mapping in ES 7

Don’t specify the type name !!

```
PUT project/_mapping
{
  "properties": {
      "user_id": {
        "type": "keyword"
      },
      "image_name": {
        "type": "keyword"
      }
    }
}
```


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Analyzer

07-analyzer

https://www.elastic.co/guide/en/elasticsearch/reference/current/analysis.html

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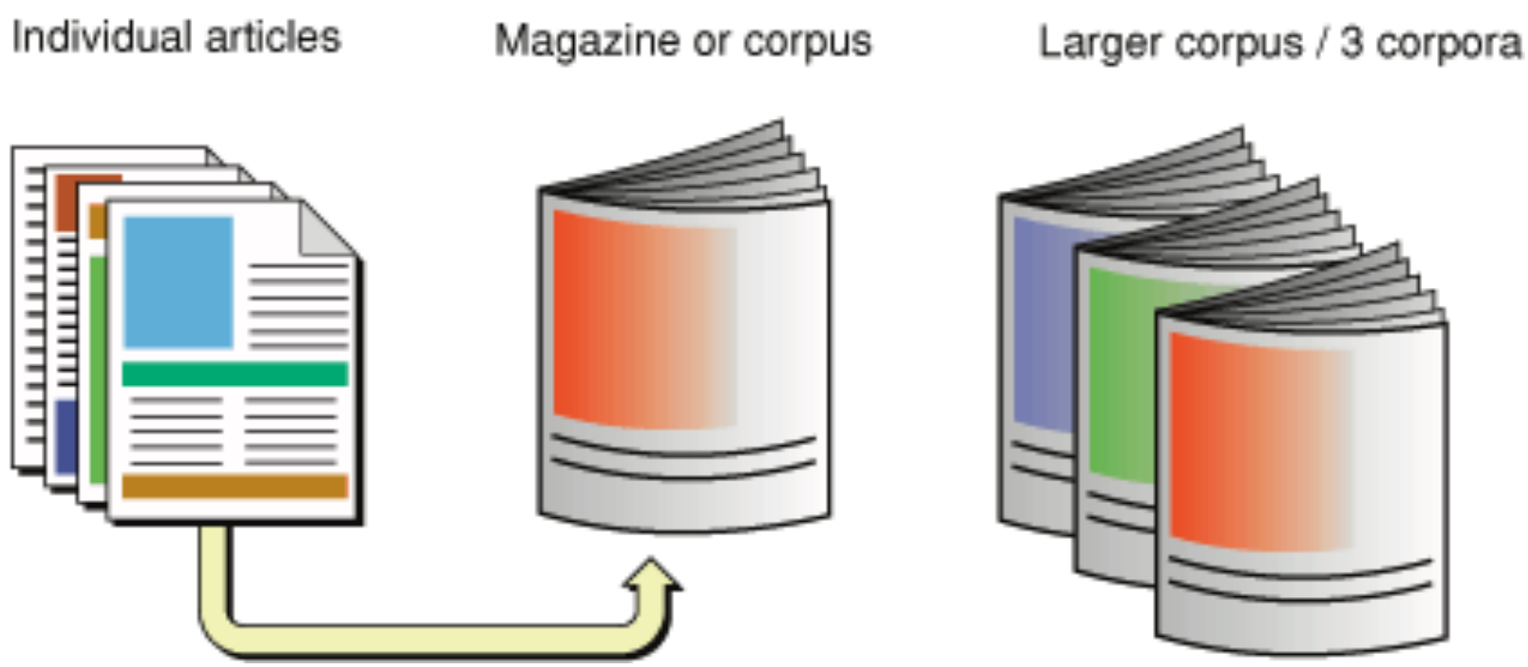
Inverted Index

Corpus is a collection of documents



https://developer.apple.com/library/archive/documentation/UserExperience/Conceptual/SearchKitConcepts/searchKit_basics/searchKit_basics.html#//apple_ref/doc/uid/TP40002843-TPXREF101

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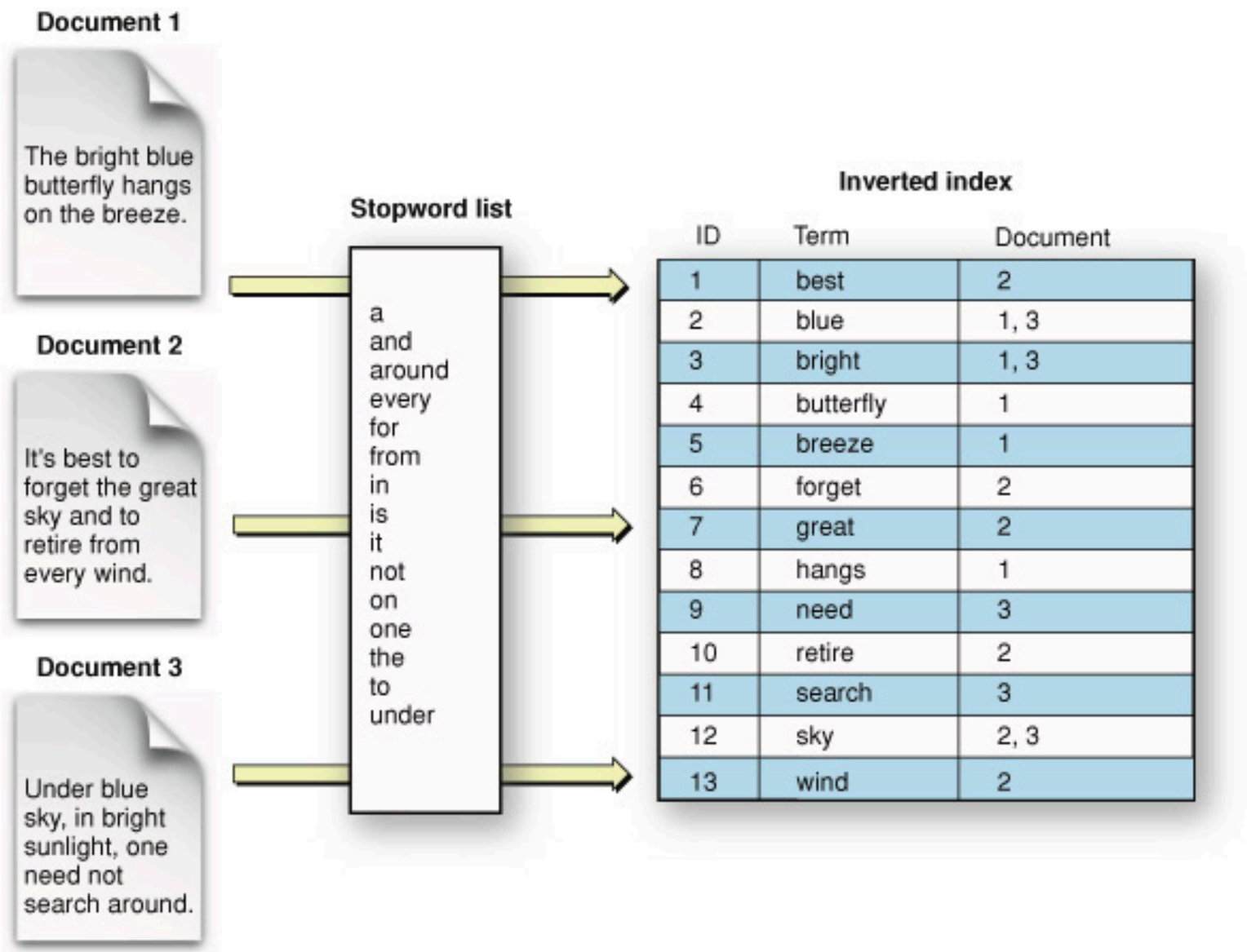
Inverted Index

Try to construct index



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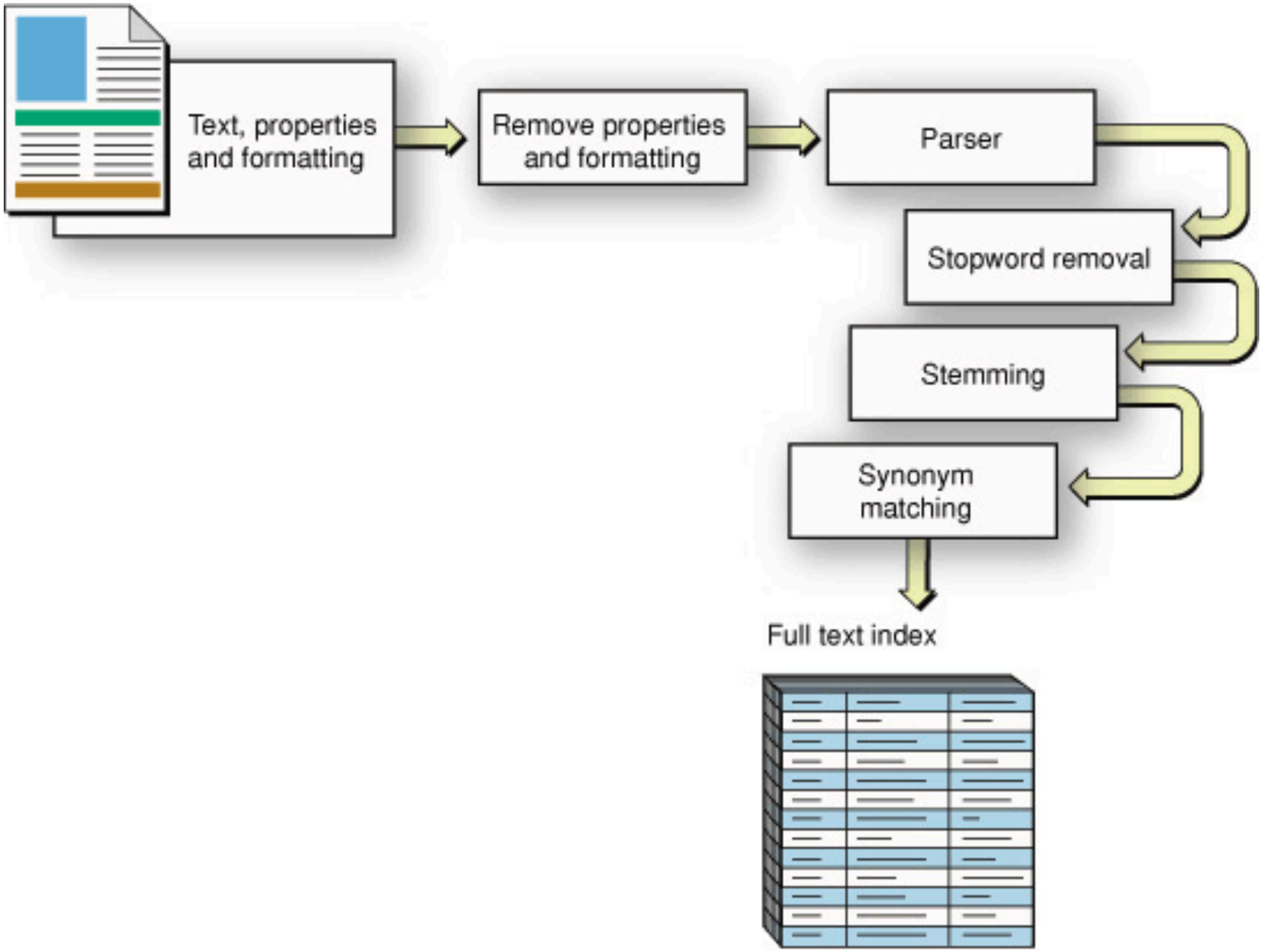
Text extraction



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Analyzer in ES

Analyzer
Tokenizer
Filter

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Testing analyzer !!

Very important

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Testing analyzer !!

```
POST _analyze
{
  "analyzer": "whitespace",
  "text":     "The quick brown fox."
}
```


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Default analyzer !!

```
POST _analyze
{
   "text": "The quick brown fox."
}
```


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Thai analyzer !!

```
POST _analyze
{
  "analyzer": "thai",
  "text":     "สวัสดีประเทศไทย"
}
```


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Tokenizer and filter

```
POST _analyze
{
  "tokenizer": "standard",
  "filter":  [ "lowercase", "asciifolding" ],
  "text":      "Is this déja vu?"
}
```


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Analyze by index

```
POST my_index/_analyze
{
  "analyzer": "your_analyzer",
  "text":     "your text"
}
```


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Analyze by field

```
POST my_index/_analyze
{
  "field": "my_text",
  "text":  "your text"
}
```


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Working with Suggester

https://www.elastic.co/guide/en/elasticsearch/reference/current/search-suggesters.html

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Suggesters in ES

Term
Phrase
Completion
Context

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Basic knowledge

N-gram tokenizer
Edge-ngram tokentizer

https://www.elastic.co/guide/en/elasticsearch/reference/7.1/analysis-ngram-tokenizer.html

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N-Gram

Terms as a sequence of n words

search

Unigram	s,e,a,r,c,h
Bigram	se, ea, ar,rc, ch
Trigram	sea, ear, arc, rch
4-gram	sear, earc, arch
5-gram	searc, earch

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Workshop

ngram/ngram.json

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More tools

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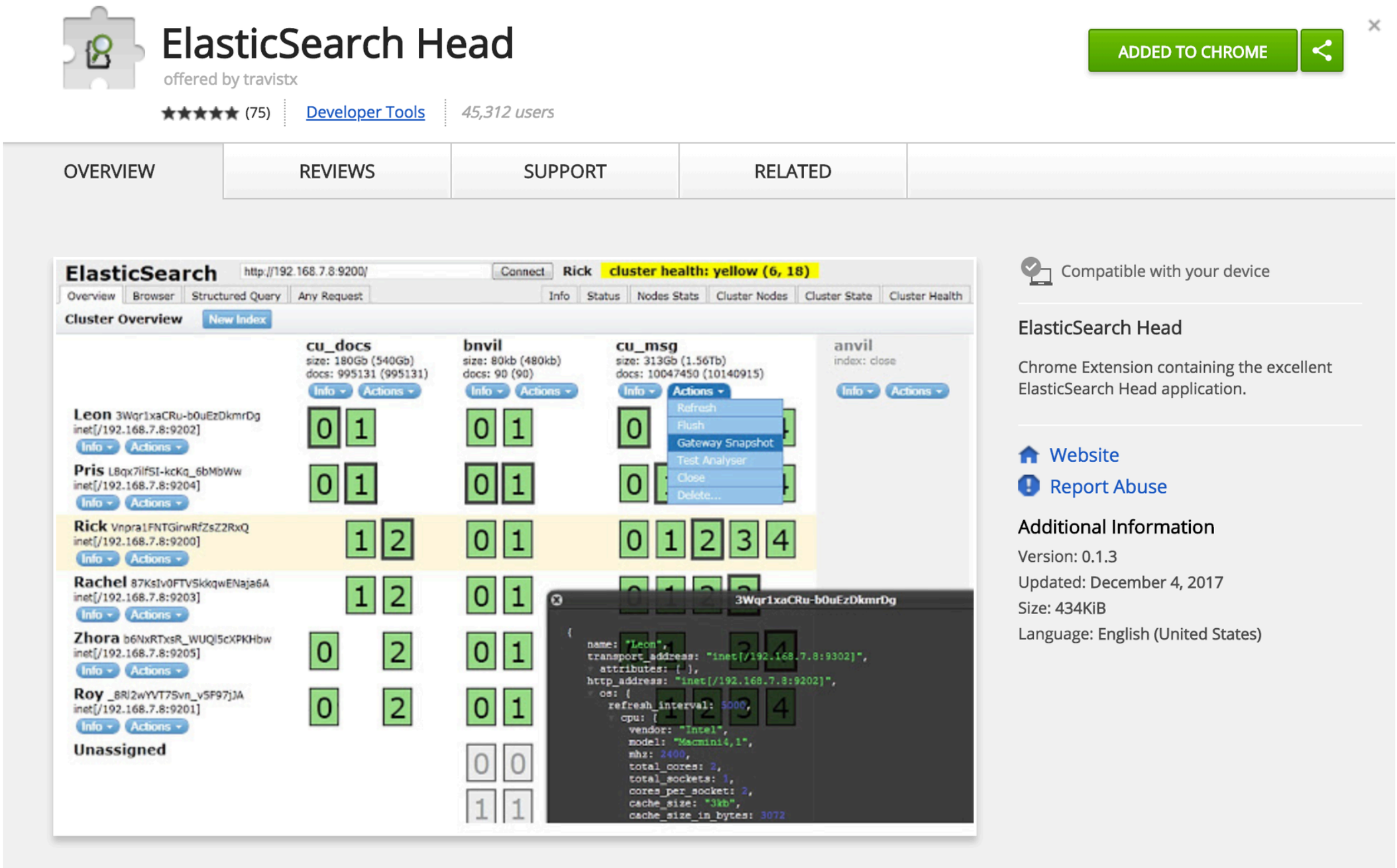
Elasticsearch Head



https://github.com/mobz/elasticsearch-head

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Elasticsearch Dump

https://github.com/taskrabbit/elasticsearch-dump

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Geo Location

08-geo-location/sample_geo.json

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Geo Location Type

Geo-point
Geo-shape

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Geo-point

Must pre-define in mapping of index

```
PUT /my_map
{
  "mappings": {
    "city": {
      "properties": {
        "name": {
          "type": "text"
        },
        "location": {
          "type": "geo_point"
        }
```


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Geo-point Format

Geo-point as object
Geo-point as string
Geo-point as array
Geo-point as geohash

https://www.elastic.co/guide/en/elasticsearch/reference/current/geo-point.html

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Geo-point Format

Type	Format
Object	lat = lon =
String	lat, lon
Array	[lon, lat] ** GeoJSON **

https://en.wikipedia.org/wiki/GeoJSON

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Geohash converter

http://geohash.co/

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Geo-point query

Geo-bounding-box
Geo-distance
Geo-polygon

https://www.elastic.co/guide/en/elasticsearch/reference/current/geo-queries.html

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Bounding Box

https://www.elastic.co/guide/en/elasticsearch/reference/current/query-dsl-geo-bounding-box-query.html

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Geo Distance

https://www.elastic.co/guide/en/elasticsearch/reference/current/query-dsl-geo-distance-query.html

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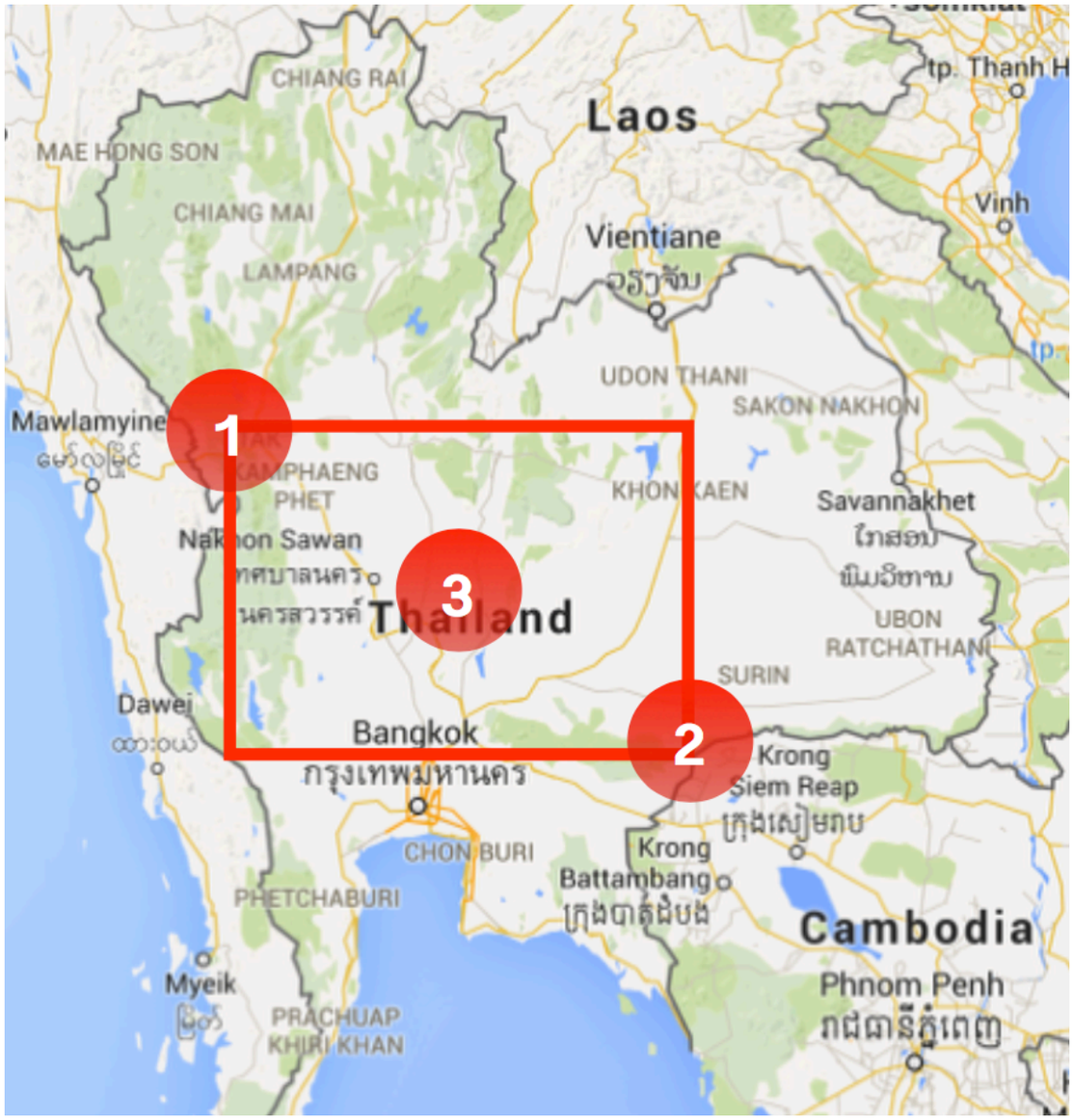
Try to ordering result



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Explain and Profiling your query

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2 ways

Explain API

Profile API

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Explain API

```
GET /my_map/_search
{
  "explain": true,
  "query": {
    "bool": {
```

https://www.elastic.co/guide/en/elasticsearch/reference/6.3/search-explain.html

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Profile API

Debugging tool

Add overhead to search execution

Output is verbose and depend on internal operation

https://www.elastic.co/guide/en/elasticsearch/reference/6.3/search-profile.html

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Profile API

```
GET /my_map/_search
{
  "profile": true,
  "query": {
    "bool": {
```


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Working with Data

https://www.elastic.co/guide/en/kibana/current/tutorial-load-dataset.html

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Working with Data

$elasticsearch-plugin install **ingest-geoip**

https://www.elastic.co/guide/en/elasticsearch/plugins/current/ingest-geoip.html

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GeoIP with Elasticsearch

geoip/instruction.json

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Sample Data


```
{"index":{"_index":"logstash-2015.05.18","_type":"log"}}
{"@timestamp":"2015-05-18T09:03:25.877Z","ip":"185.124.182.12
{"index":{"_index":"logstash-2015.05.18","_type":"log"}}
{"@timestamp":"2015-05-18T12:28:25.013Z","ip":"79.1.14.87","e
{"index":{"_index":"logstash-2015.05.18","_type":"log"}}
{"@timestamp":"2015-05-18T17:44:34.357Z","ip":"178.209.1.7","
{"index":{"_index":"logstash-2015.05.18","_type":"log"}}
{"@timestamp":"2015-05-18T13:04:18.120Z","ip":"118.140.92.127
{"index":{"_index":"logstash-2015.05.18","_type":"log"}}
{"@timestamp":"2015-05-18T11:37:40.653Z","ip":"235.154.34.221
{"index":{"_index":"logstash-2015.05.18","_type":"log"}}
{"@timestamp":"2015-05-18T08:46:07.025Z","ip":"228.216.38.41"
```


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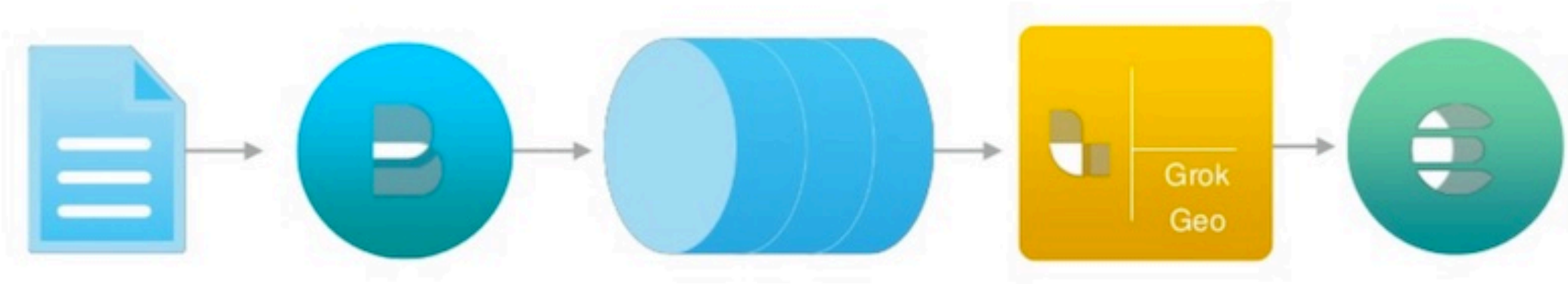
Working with Ingest

Pre-process document before actual indexing



https://www.elastic.co/guide/en/elasticsearch/reference/current/ingest.html

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Install plugin

$elasticsearch-plugin install **ingest-geoip**

https://www.elastic.co/guide/en/elasticsearch/plugins/current/ingest-geoip.html

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Alias Index

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Alias Index

TODO
TODO
TODO

https://www.elastic.co/guide/en/elasticsearch/reference/current/indices-aliases.html

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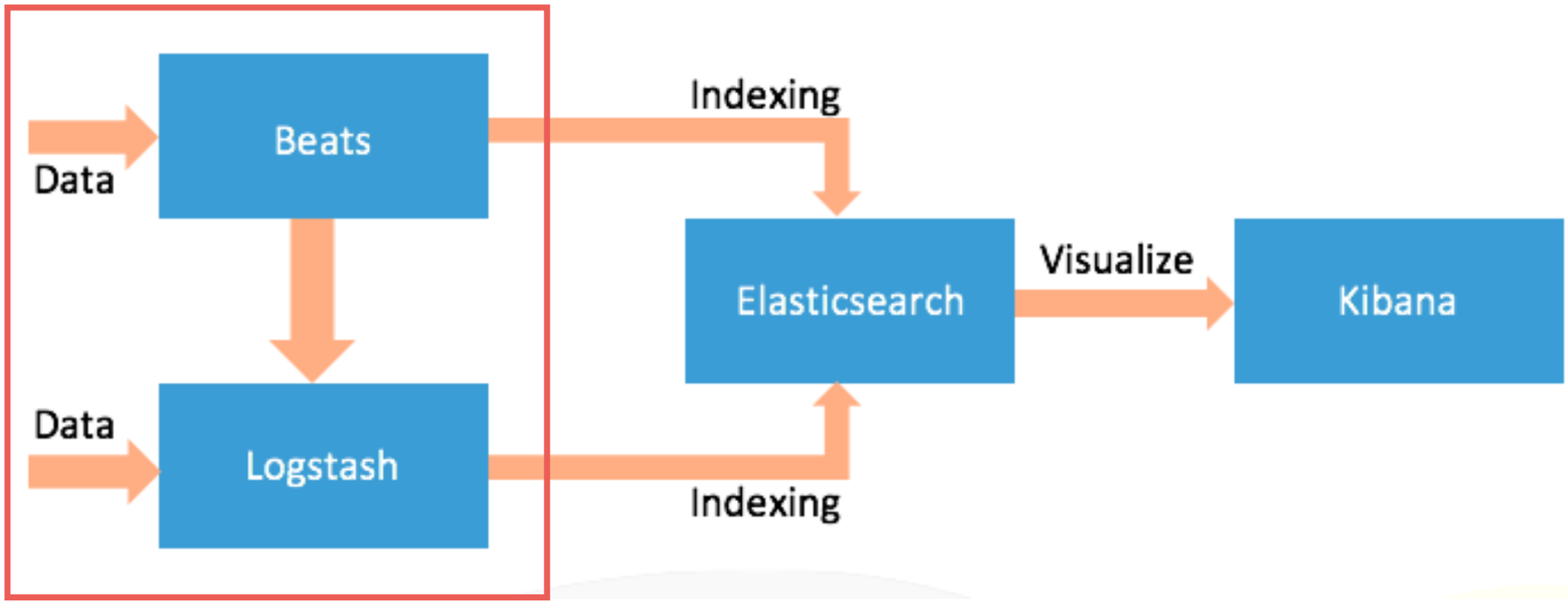
ELK stack



fluentd

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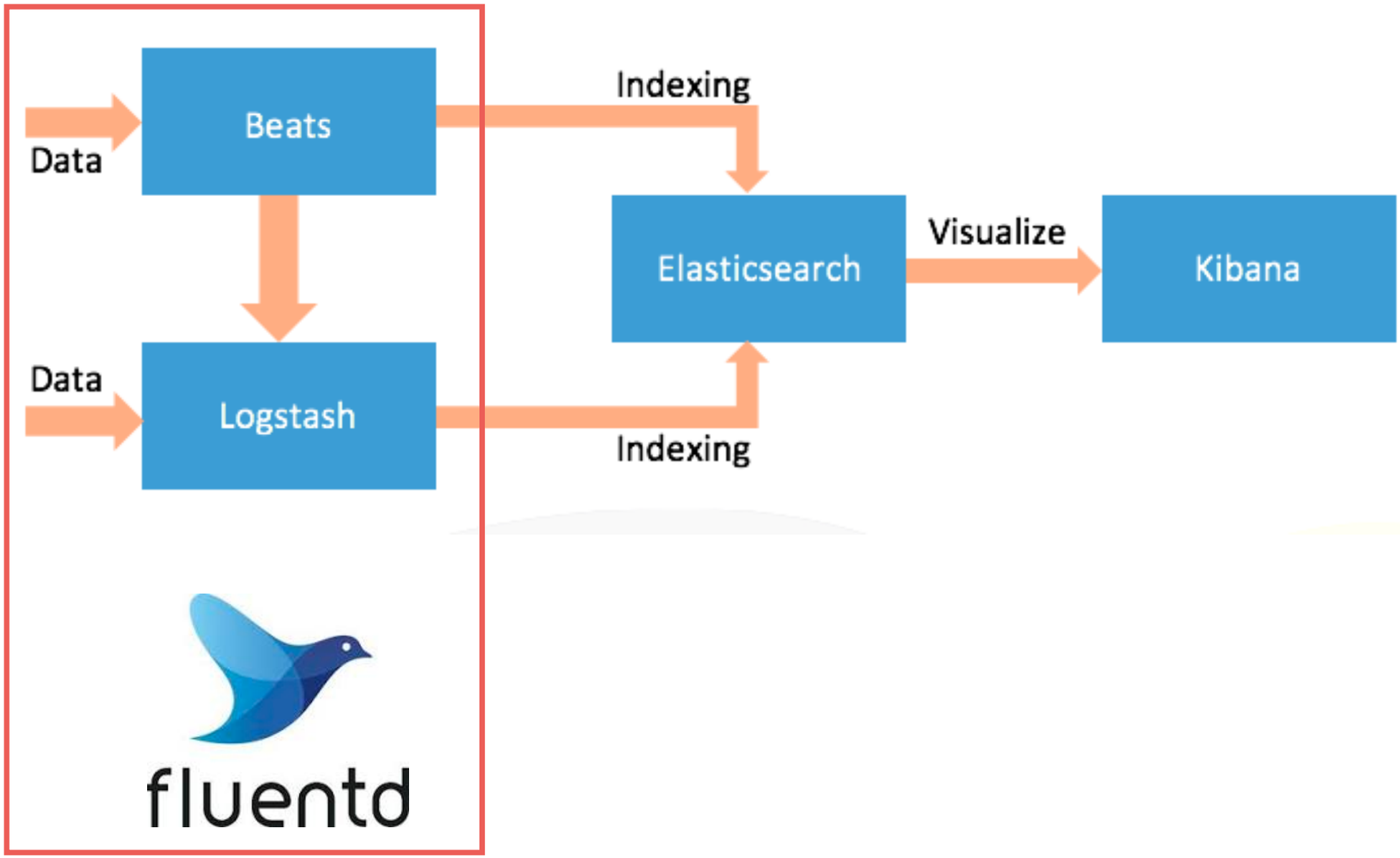
EFK stack



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Working with Logstash

https://www.elastic.co/guide/en/logstash/current/index.html

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Logstash

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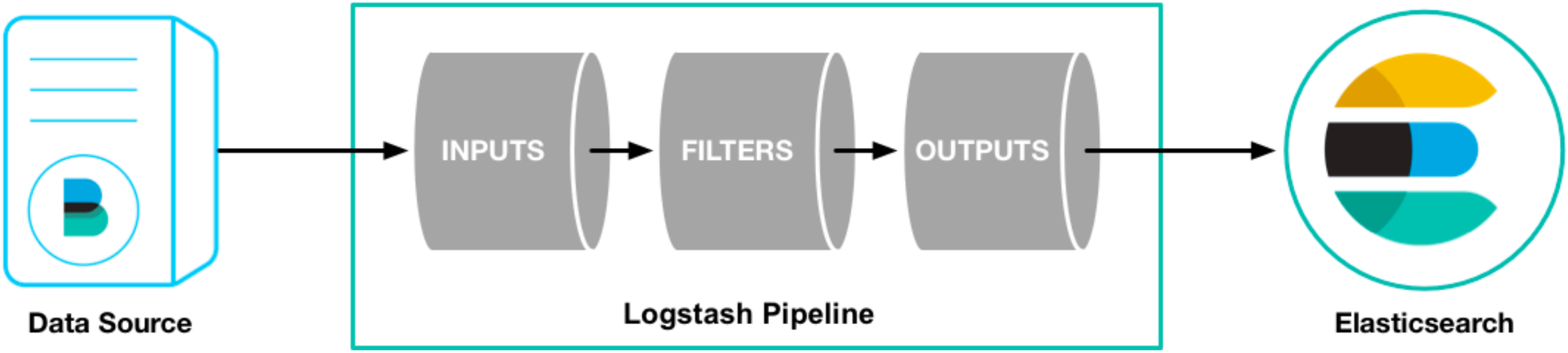
Logstash



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Example

Standard Input

Standard Output

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sample.conf

```
input {
    stdin{}
}

output {
    stdout {
        codec => rubydebug
    }
}
```


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Example

$logstash -f sample.conf

```
hello world
{
        "message" => "hello world",
     "@timestamp" => 2019-06-20T06:01:30.048Z,
       "@version" => "1",
           "host" => "Somkiats-MacBook-Pro"
}
```


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Change output to ES

Standard Input

Standard Output

Elasticsearch

https://www.elastic.co/guide/en/logstash/current/plugins-outputs-elasticsearch.html

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sample.conf

```
input {
    stdin{}
}

output {
    stdout {
        codec => rubydebug
    }

    elasticsearch {
    }
}
```


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Working with Filter

Standard Input

Standard Output

https://www.elastic.co/guide/en/logstash/current/filter-plugins.html

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sample.conf

```
input {
    stdin{}
}

filter {
    grok {
        match => { "message" => "%{WORD:firstname} %
{WORD:lastname}" }
    }
}

output {
    stdout {
        codec => rubydebug
    }
}
```


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Workshop

File system

Standard Output

Elasticsearch

workshop/logstash-beat-fluentd/demo.conf

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try.conf

```
input {
    stdin{}
}

output {
    stdout {
        codec => rubydebug
    }

    elasticsearch {
    }
}
```


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Design your input first !!

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Use beats is better

https://www.elastic.co/products/beats

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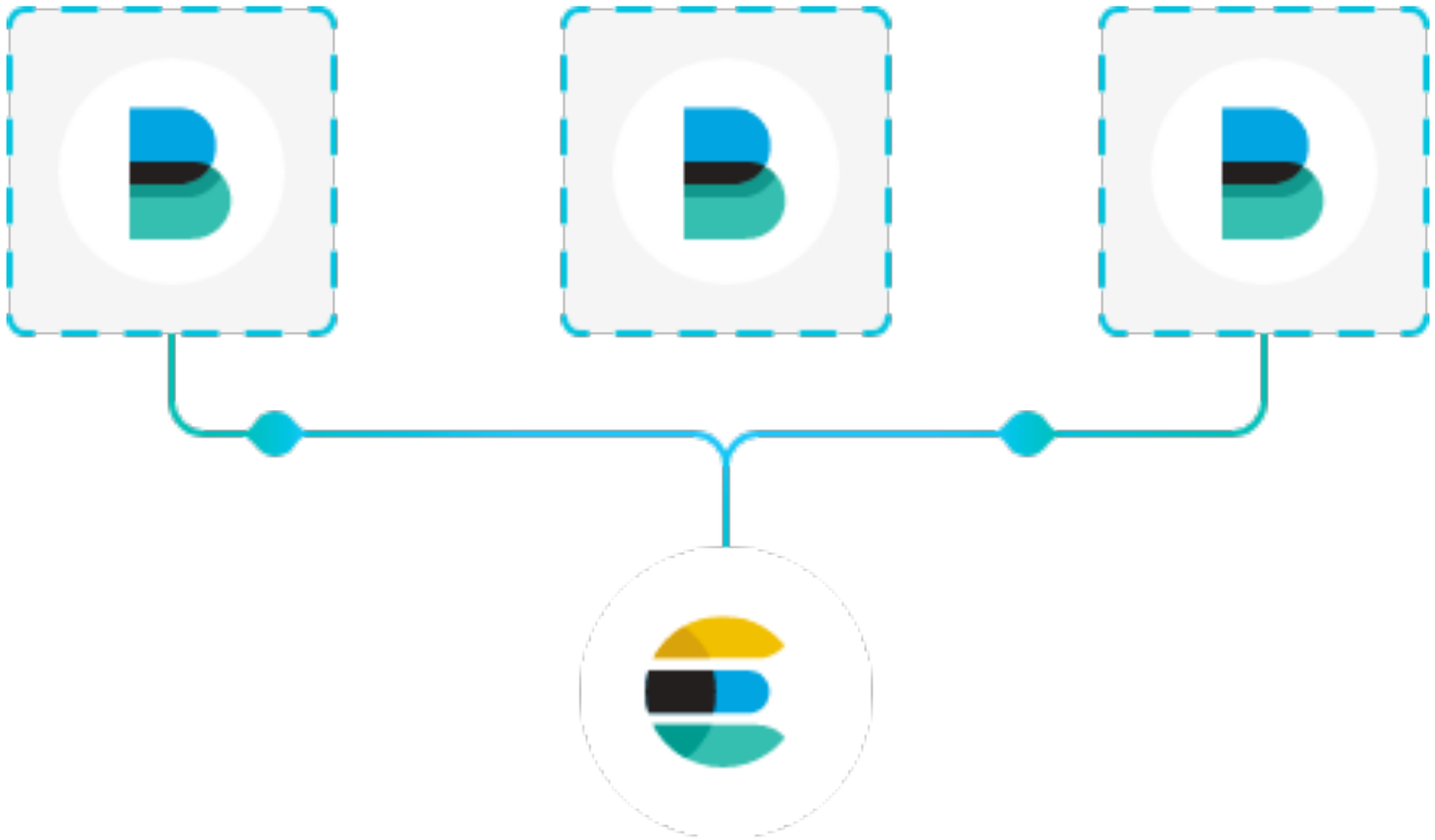
Beat



https://www.elastic.co/guide/en/beats/filebeat/current/index.html

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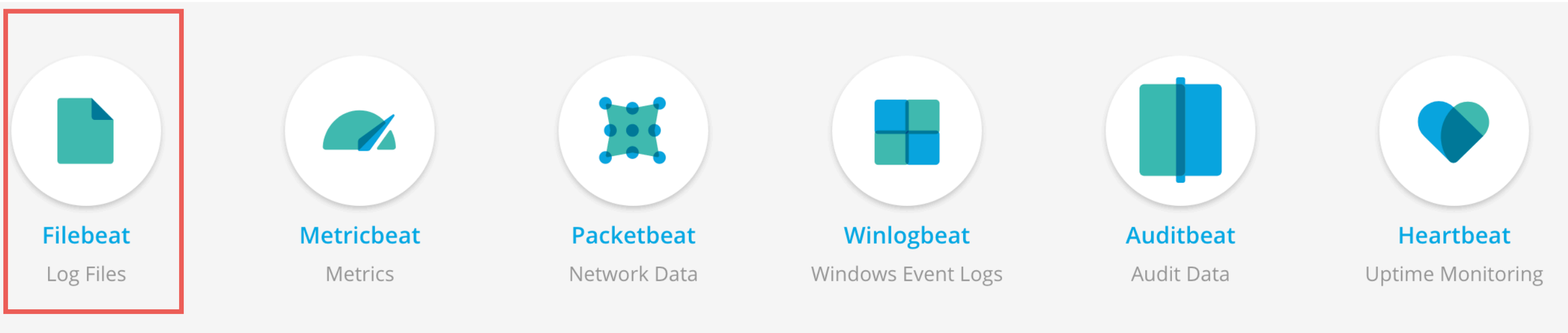
Beat



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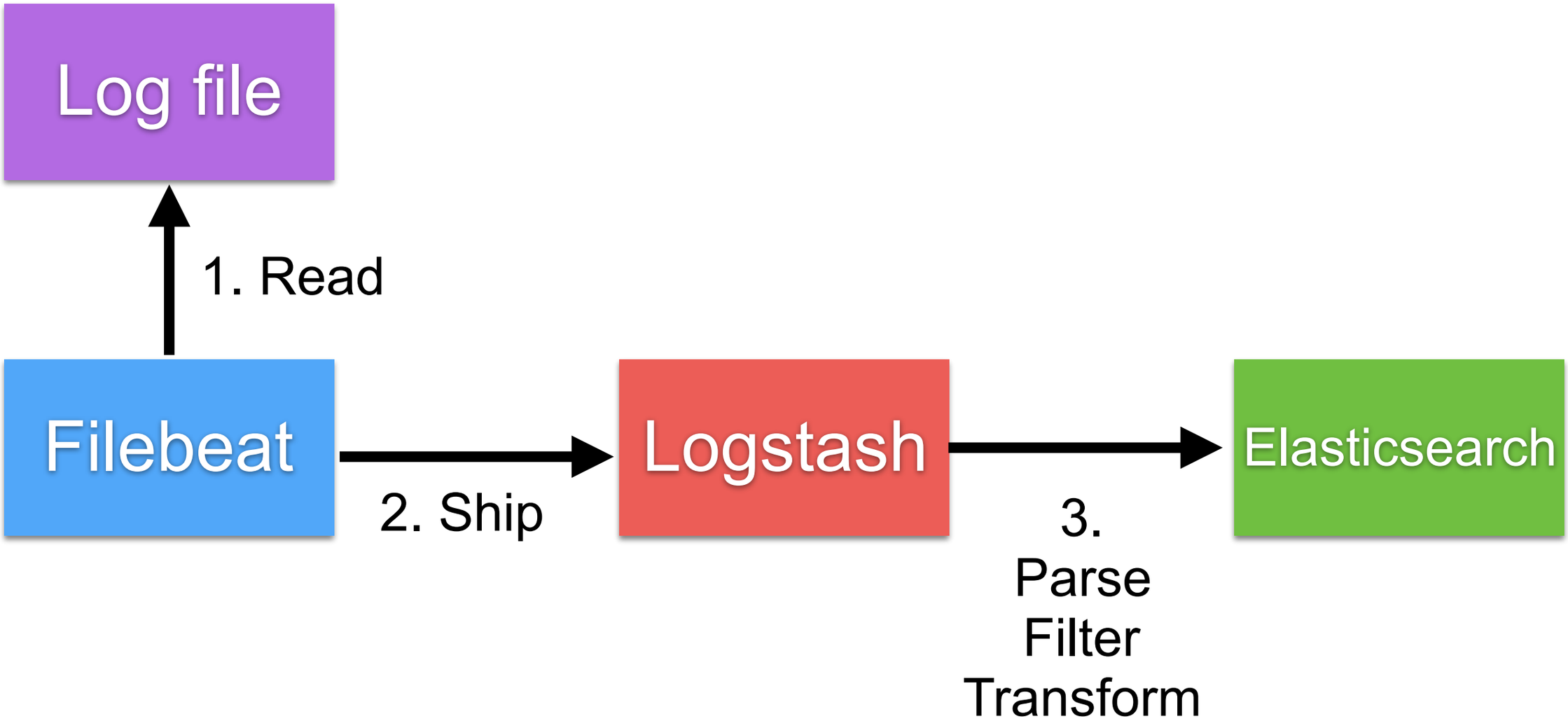
Example of filebeat



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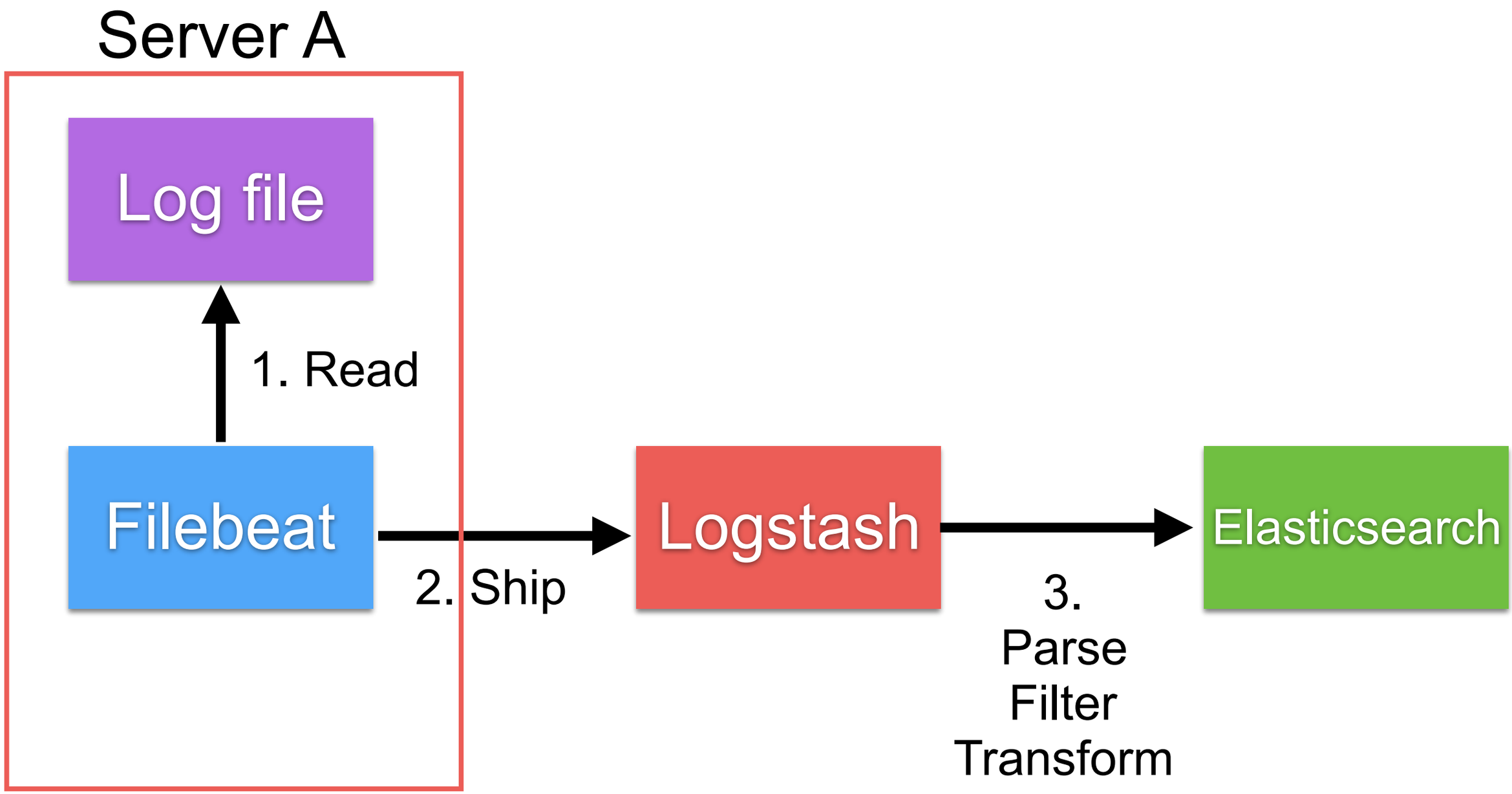
Example of filebeat



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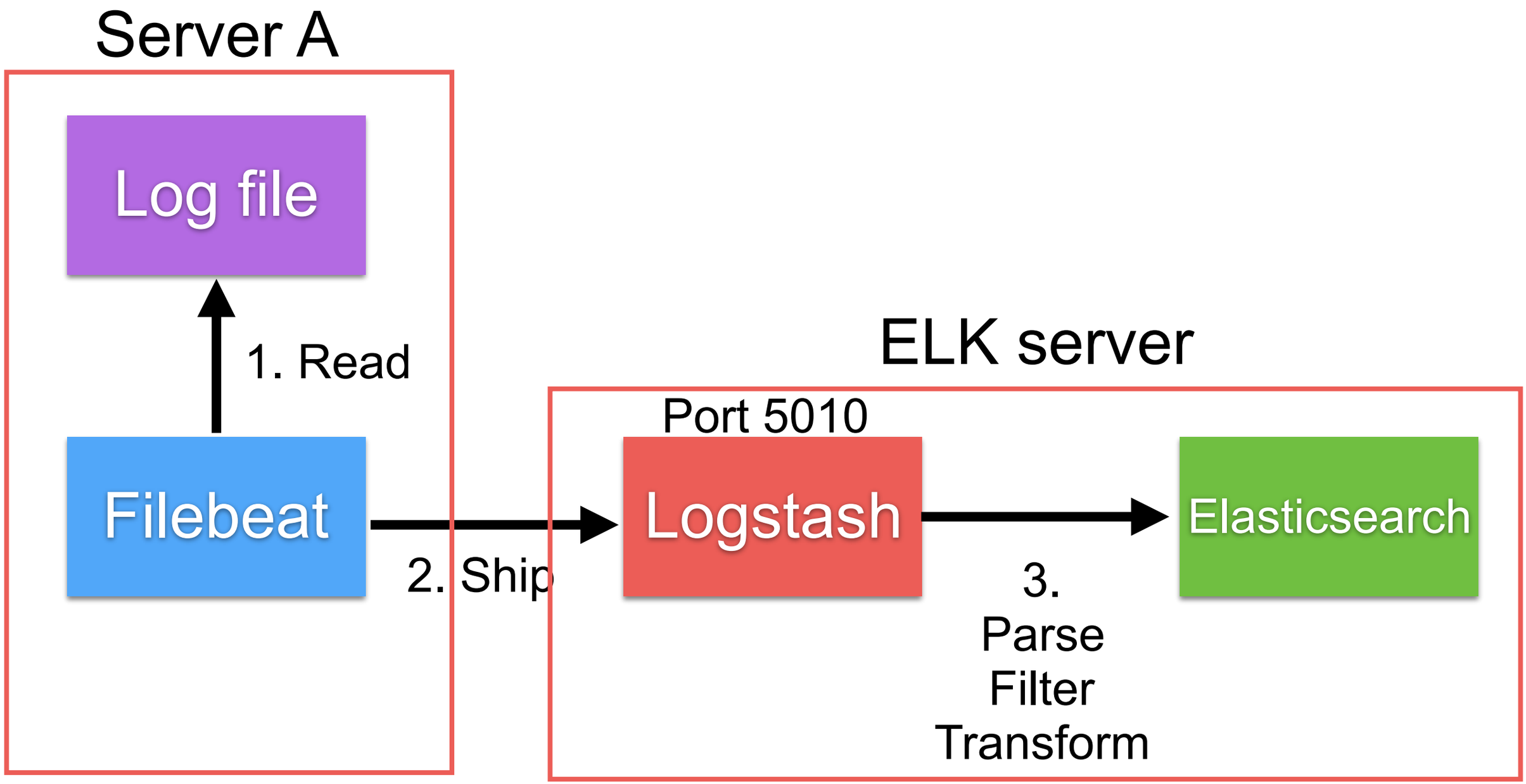
Example of filebeat



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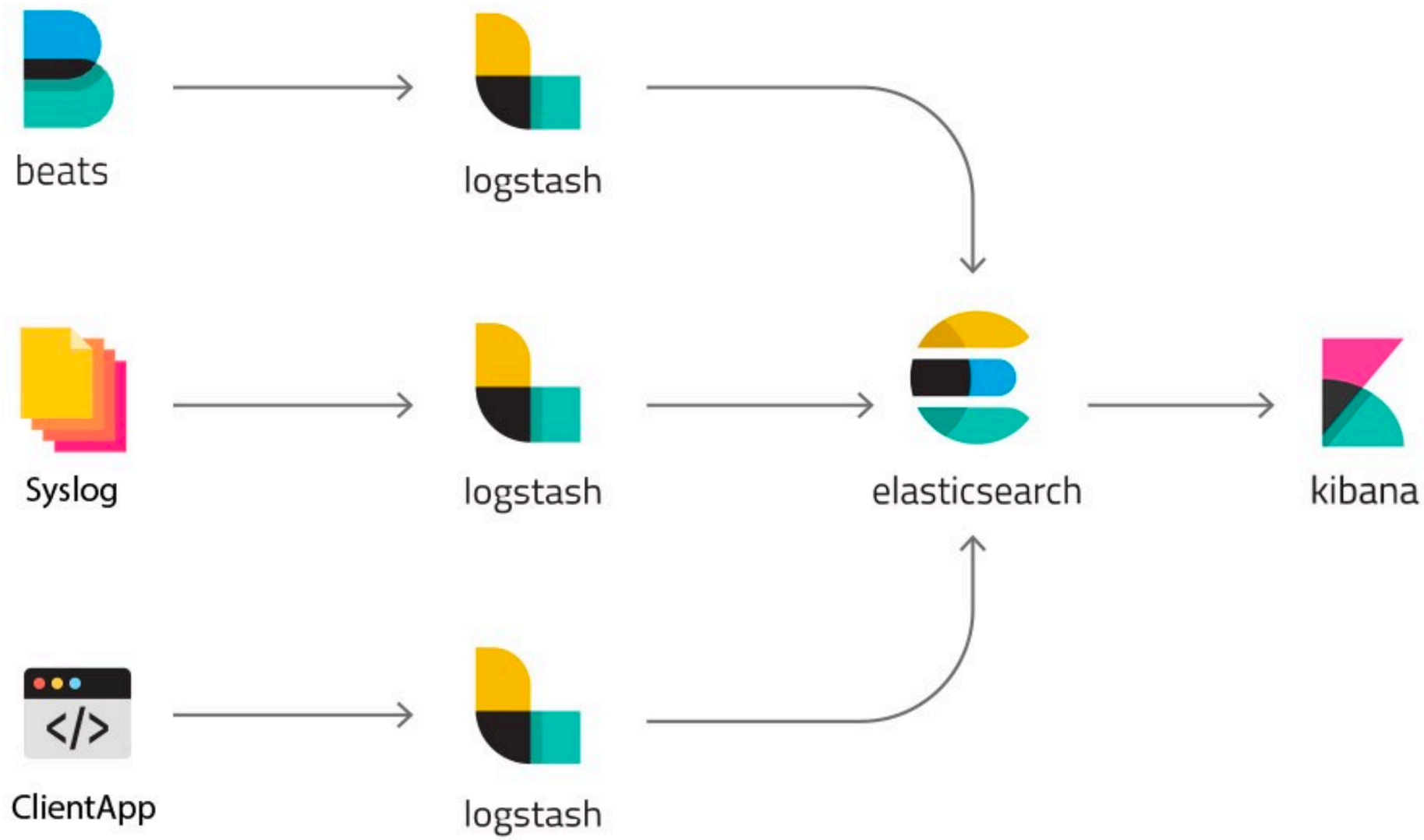
Beat and Logstash



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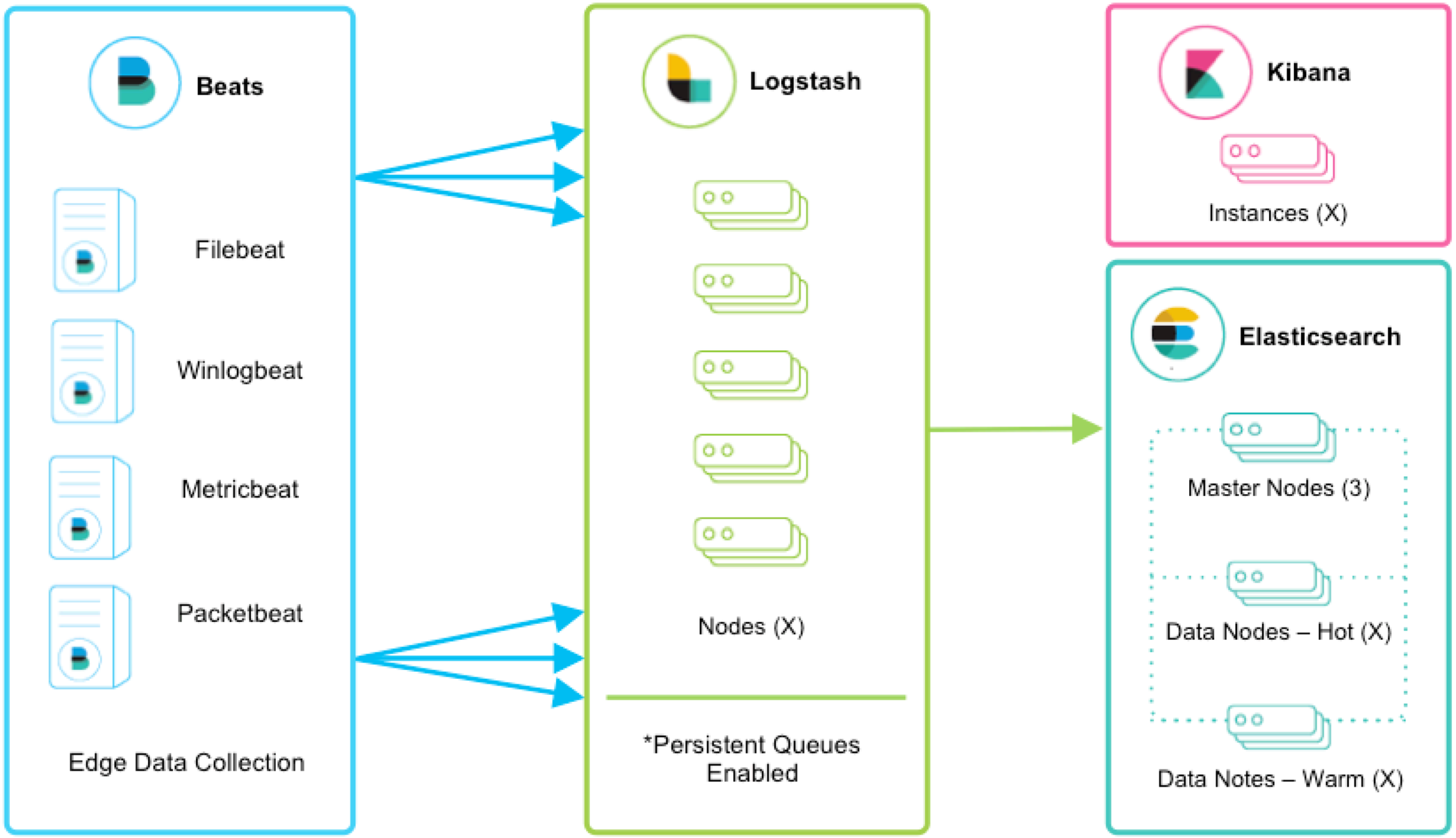
Scaling



https://www.elastic.co/guide/en/logstash/current/deploying-and-scaling.html

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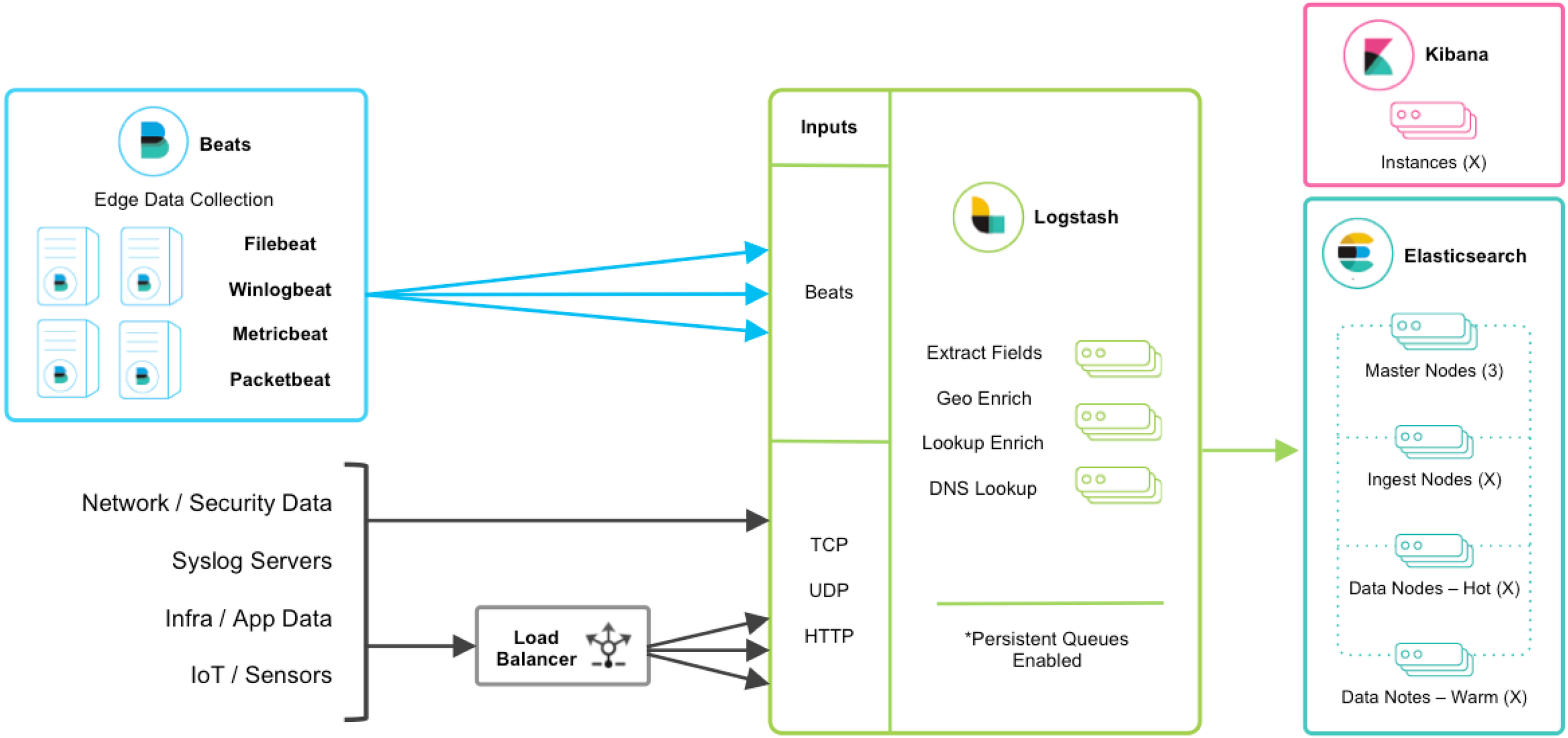
More data sources



https://www.elastic.co/guide/en/logstash/current/deploying-and-scaling.html

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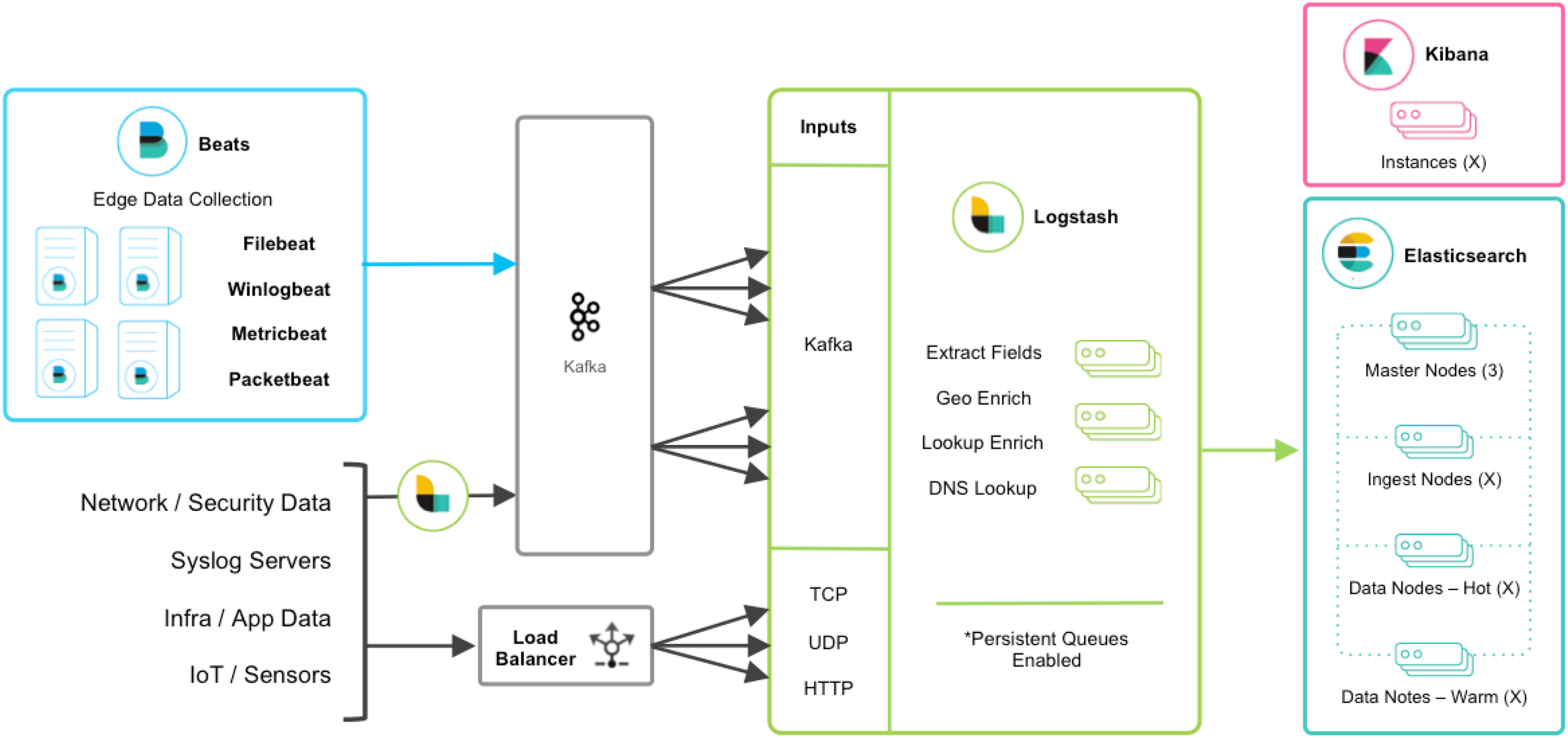
Use messaging Queue



https://www.elastic.co/blog/logstash-persistent-queue

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Working with Fluentd

https://www.fluentd.org/

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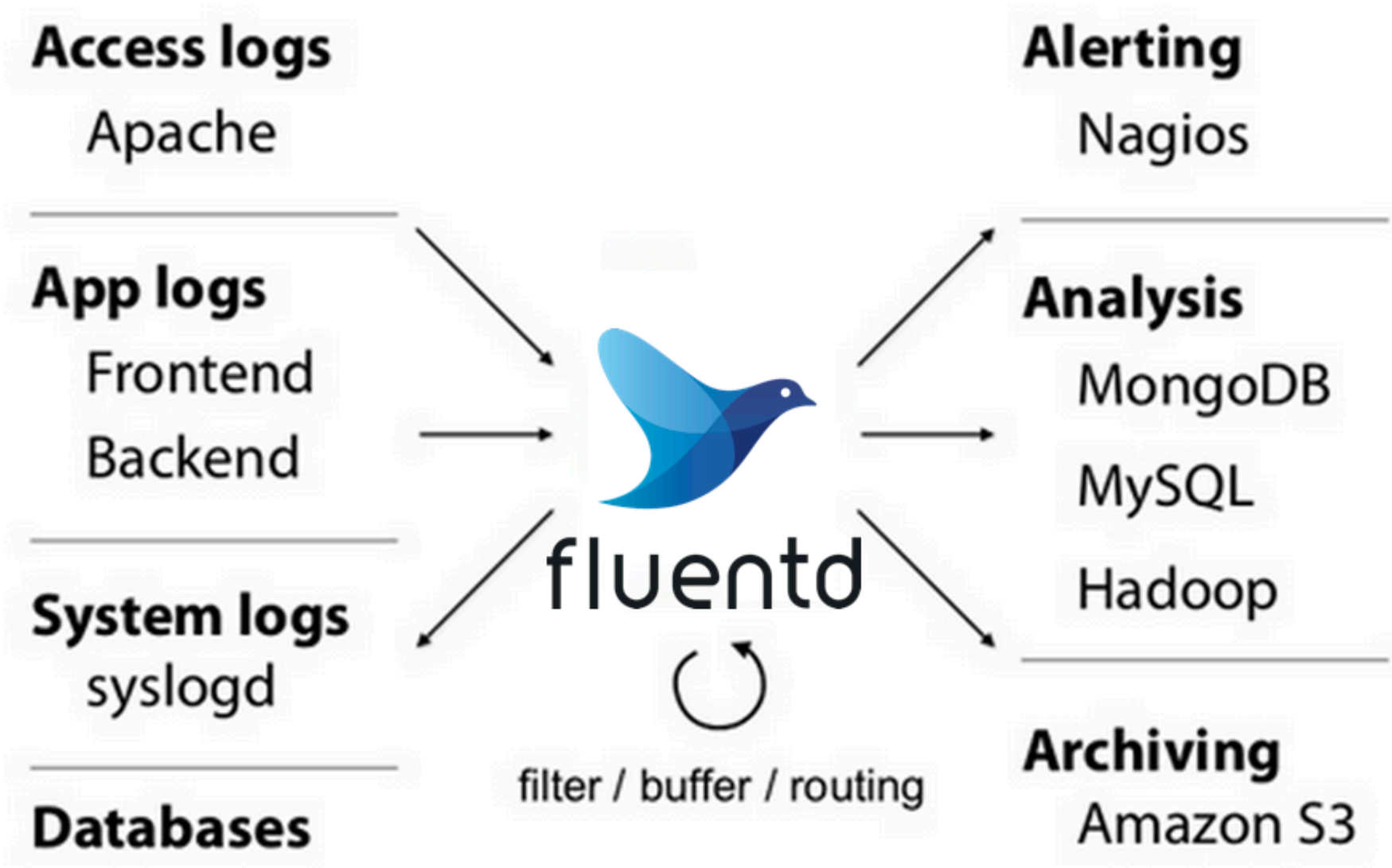
Fluentd



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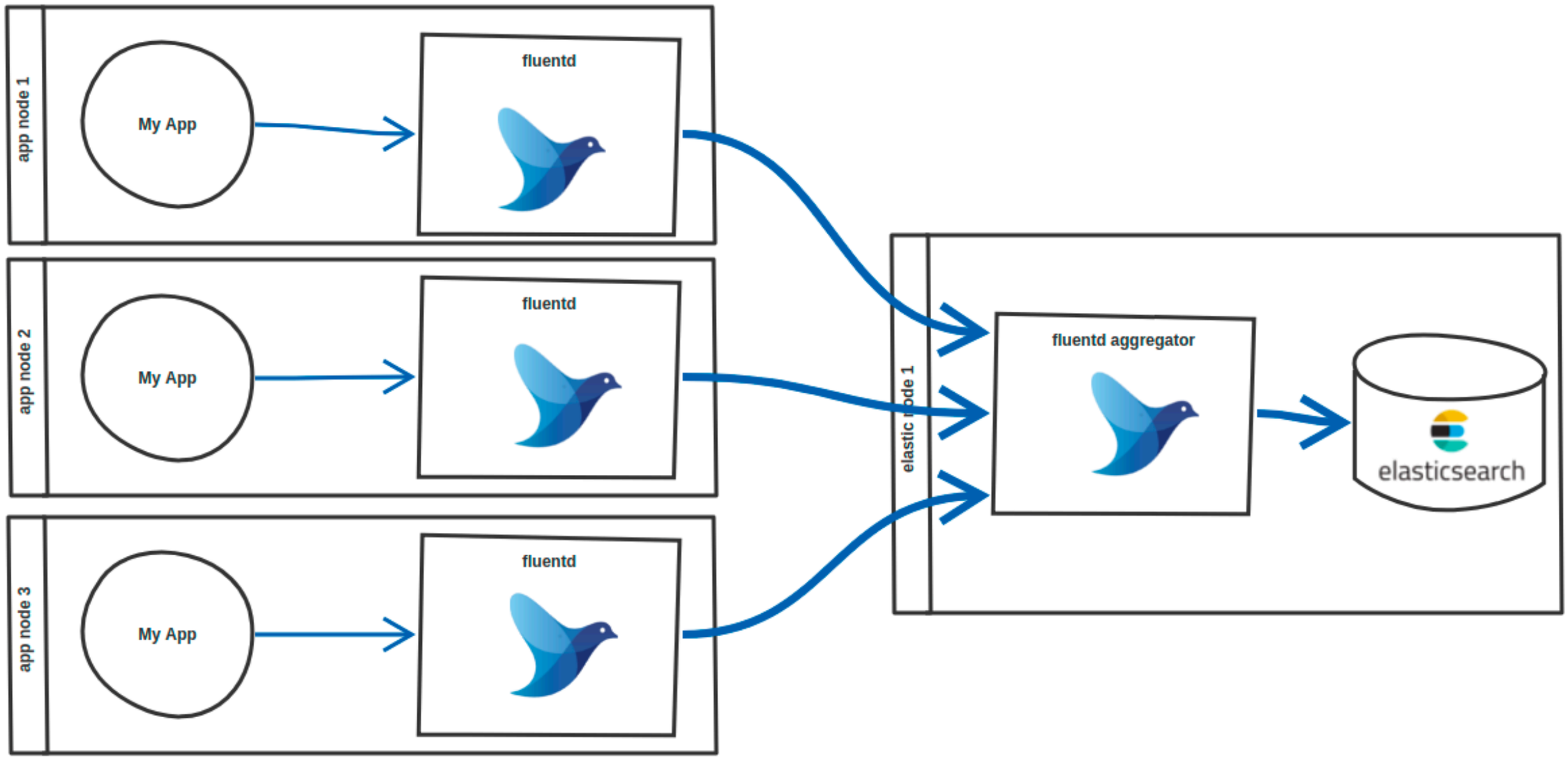
EFK stack



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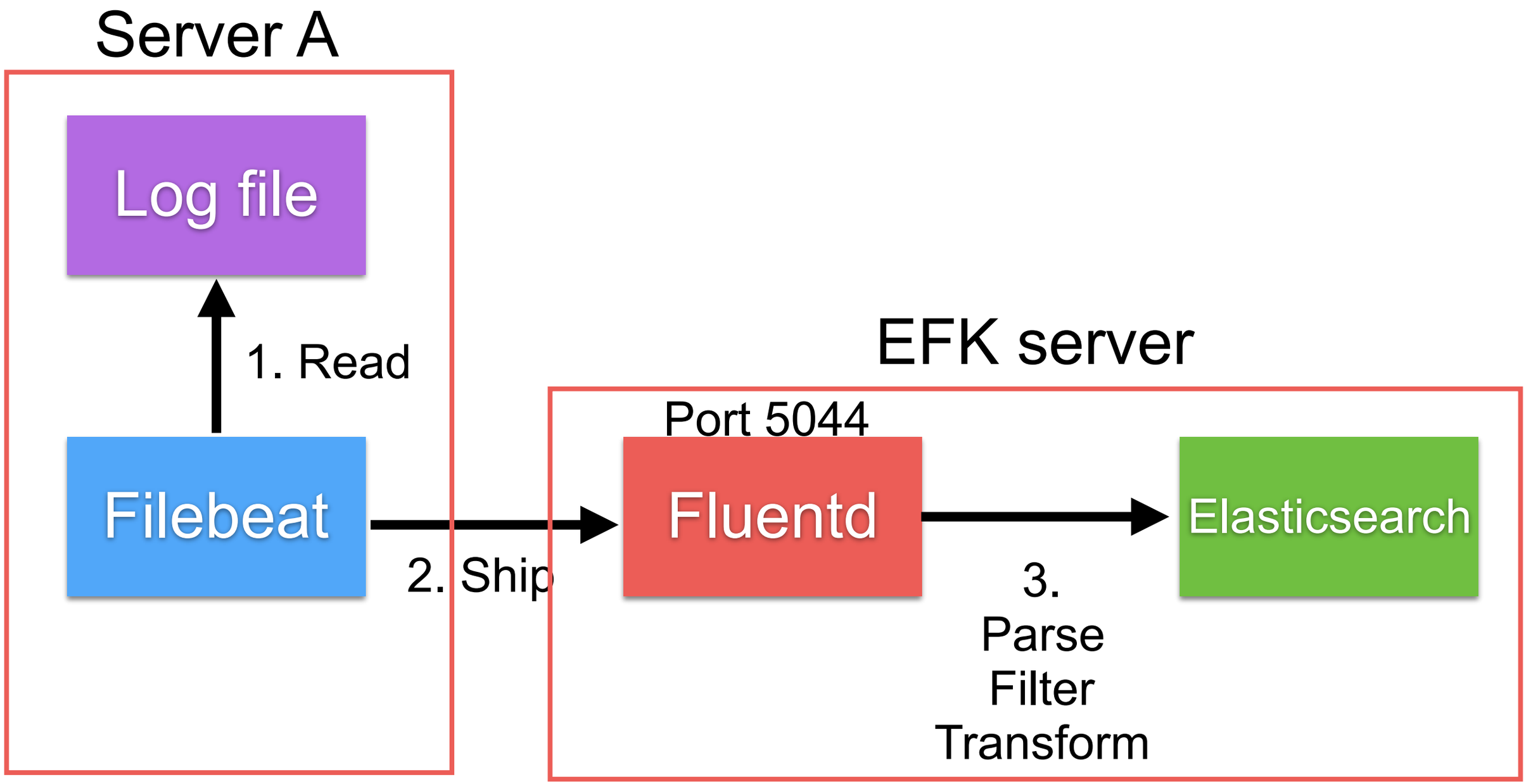
Example of fluentd



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Fluentd regex editor

Fluentular fluentd v1.5.2

a Fluentd regular expression editor

</> Regular Expression

Test String

Custom Time Format (See also ruby document; strptime)

Parse

Example (Apache)

Regular expression:

```
^(?<host>[^ ]*) [^ ]* (?<user>[^ ]*) \[(?<time>[^\]]*)\] "(?<method>\S+)(?: +(?<path>[^ ]*) +\S*)?" (?<code>[^ ]*) (?<size>[^ ]*)(?: "(?<referer>[^\"]*)" "(?<agent>[^\"]*)")?$
```

Time Format:

```
%d/%b/%Y:%H:%M:%S %z
```

http://fluentular.herokuapp.com/

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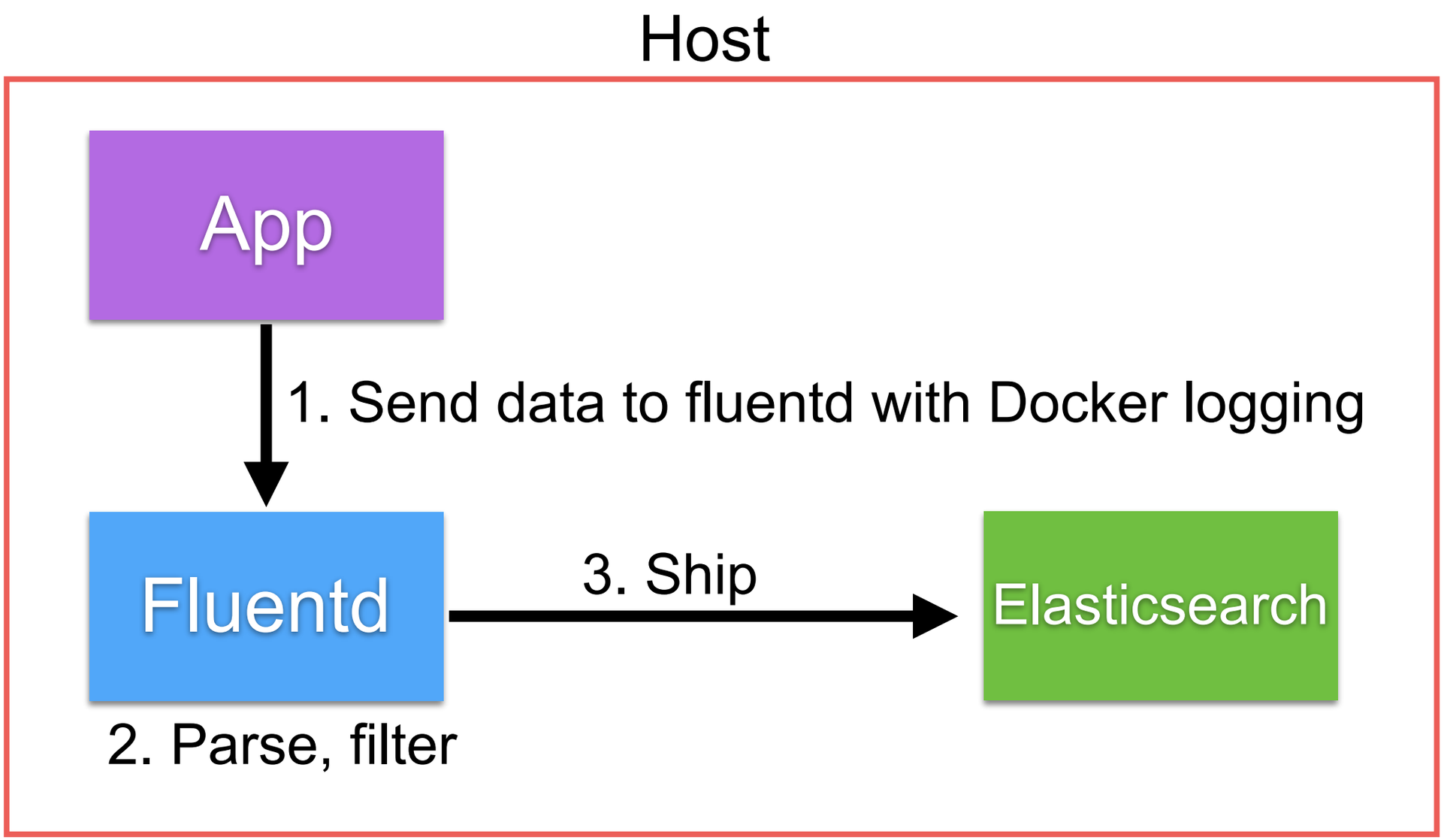
Fluentd with Docker

Using docker-compose



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Design for Failure

09-cluster

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Elasticsearch Nodes

Node Type	Description
Master	Control the cluster
Data	Keep/store data
HTTP/Query	Run your query
Coordinating	Smart Load Balancer
Ingest	Pre-processing documents before indexing
Machine Learning	Required subscription !!

https://www.elastic.co/guide/en/elasticsearch/reference/current/modules-node.html

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Elasticsearch Nodes

Not Secure | 35.240.161.188:9200/_cat/nodes?v&h=ip,name,node.role,master,heap.percent,ram.percent

```
ip          name        node.role master heap.percent ram.percent
10.148.0.2  master      m         *               17          33
10.148.0.4  query       -         -               10          63
10.148.0.5  coordinator -         -                9          78
10.148.0.3  data        d         -               13          63
```


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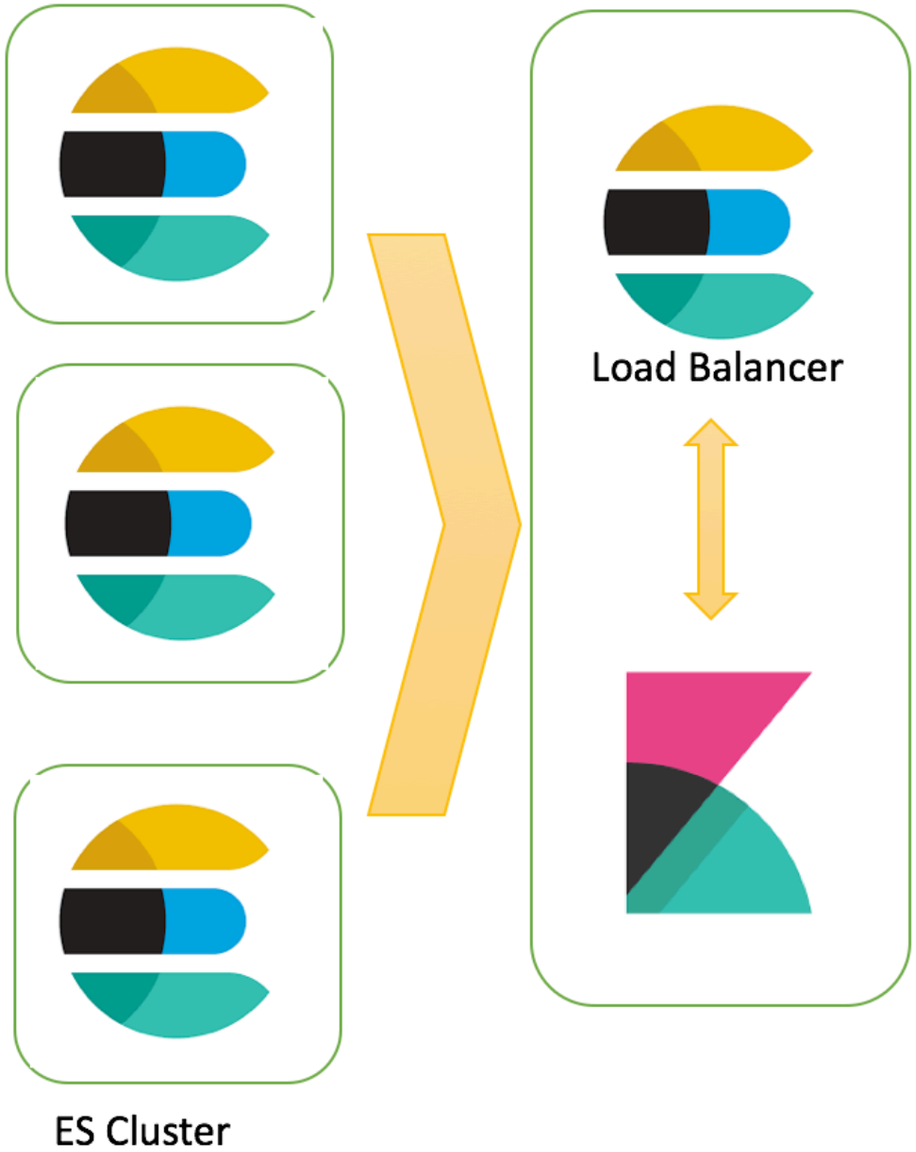
Elasticsearch Nodes



https://www.elastic.co/guide/en/kibana/current/production.html#load-balancing

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Elasticsearch Nodes

Master

Data

Query

Master

Data

Query

Ingest

ML

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Apache Lucene

http://lucene.apache.org/

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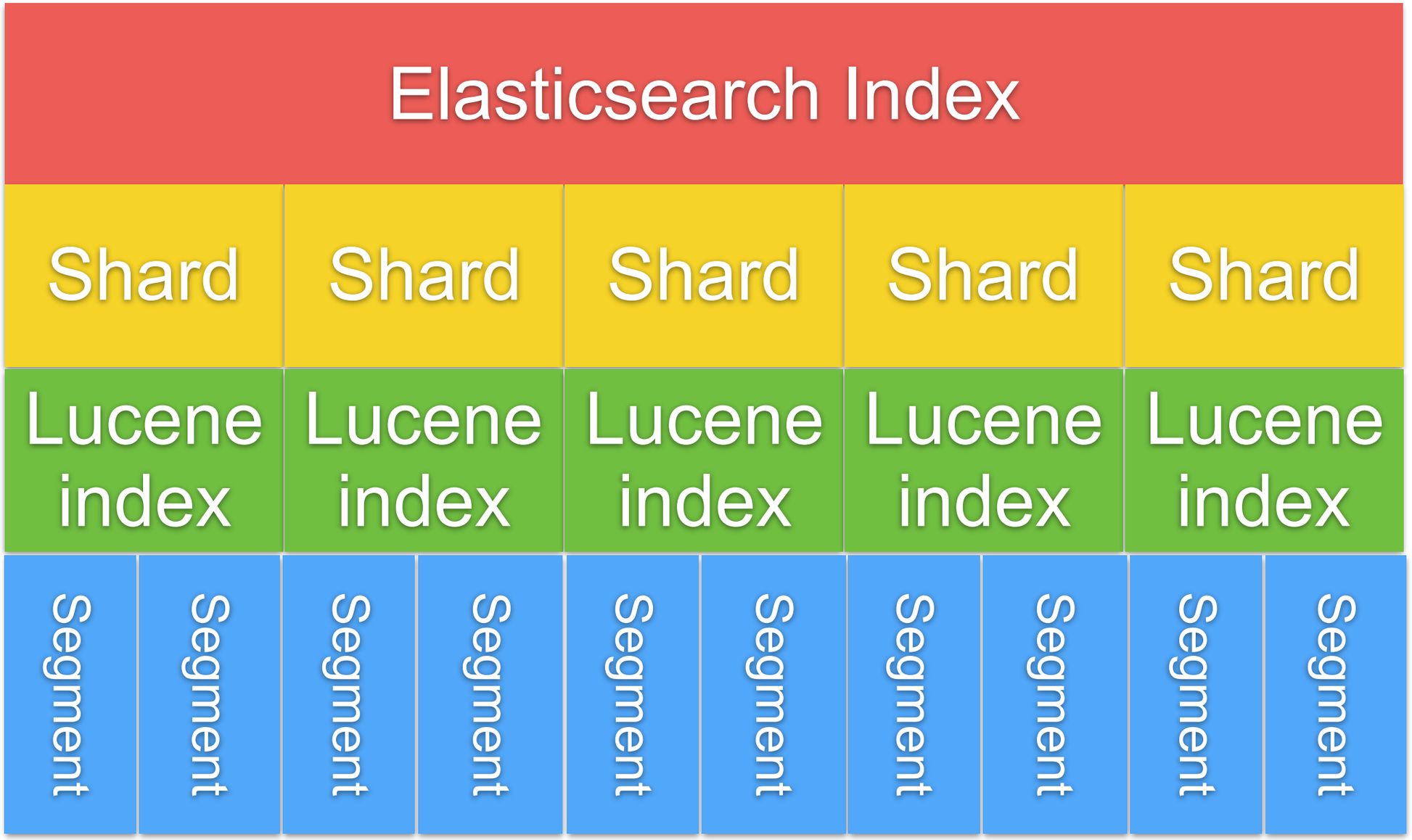
Apache Lucene



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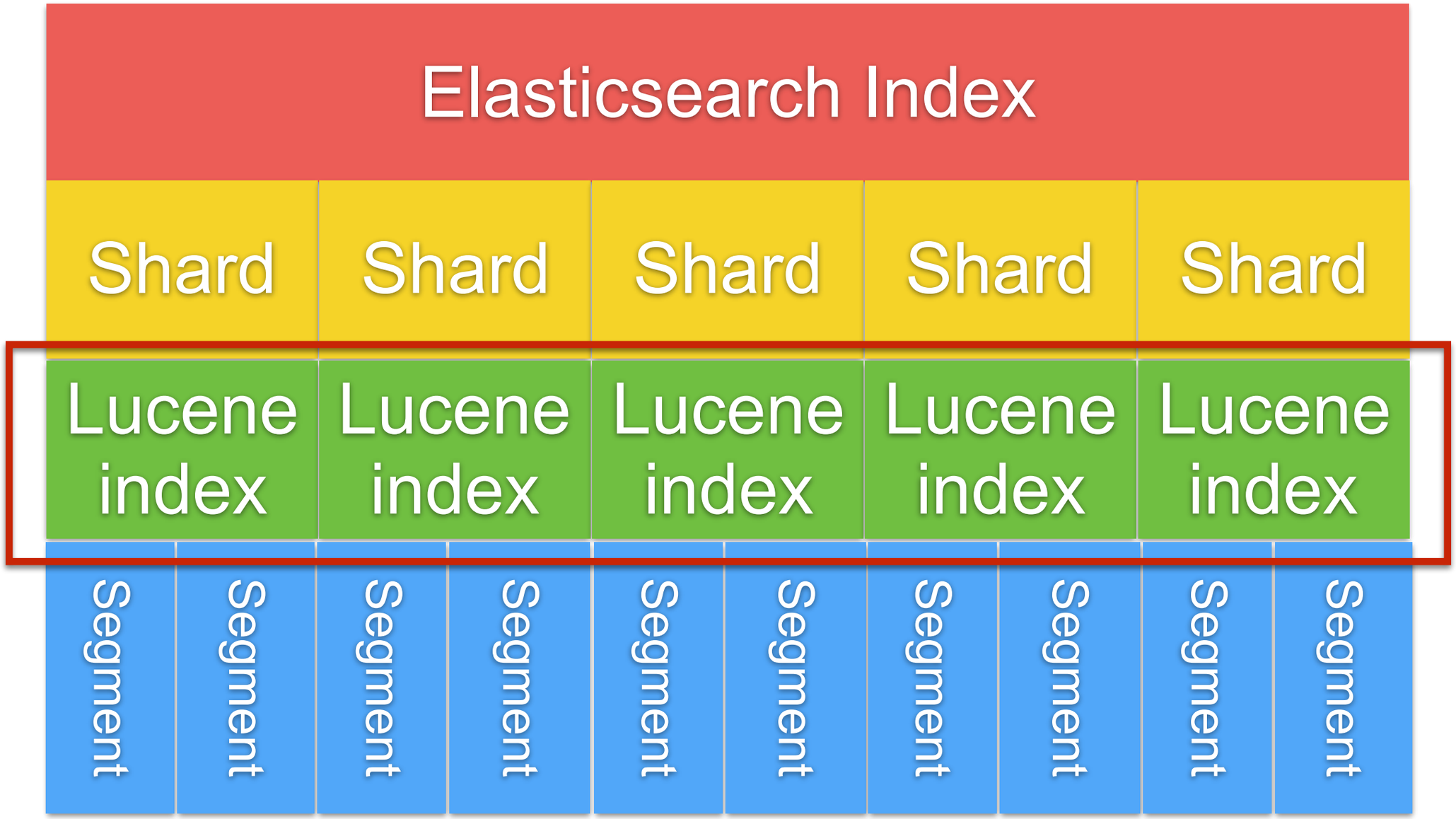
Apache Lucene



Max # of document of Lucene index = 2,147,483,519

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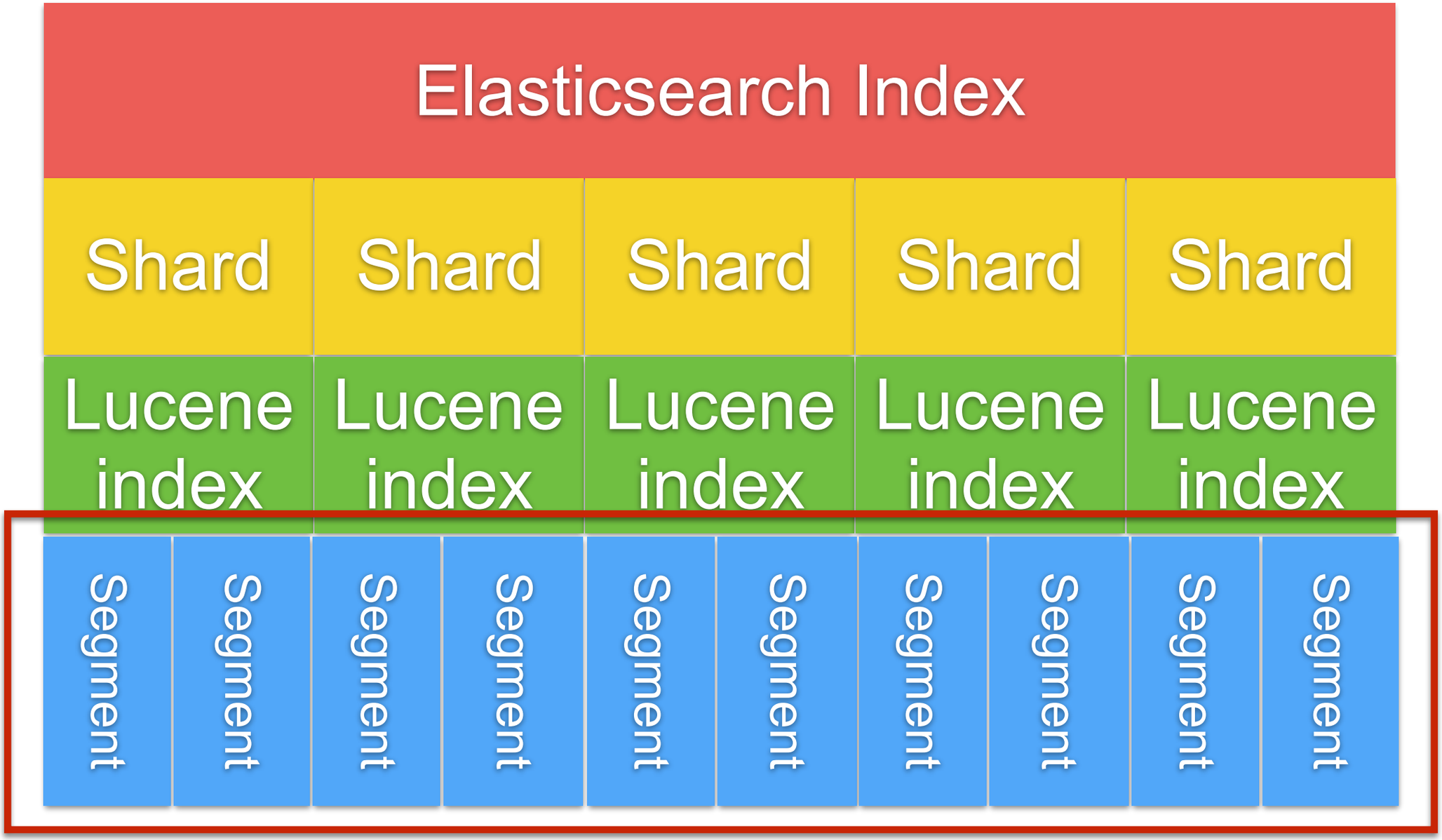
Apache Lucene



Segments are immutable

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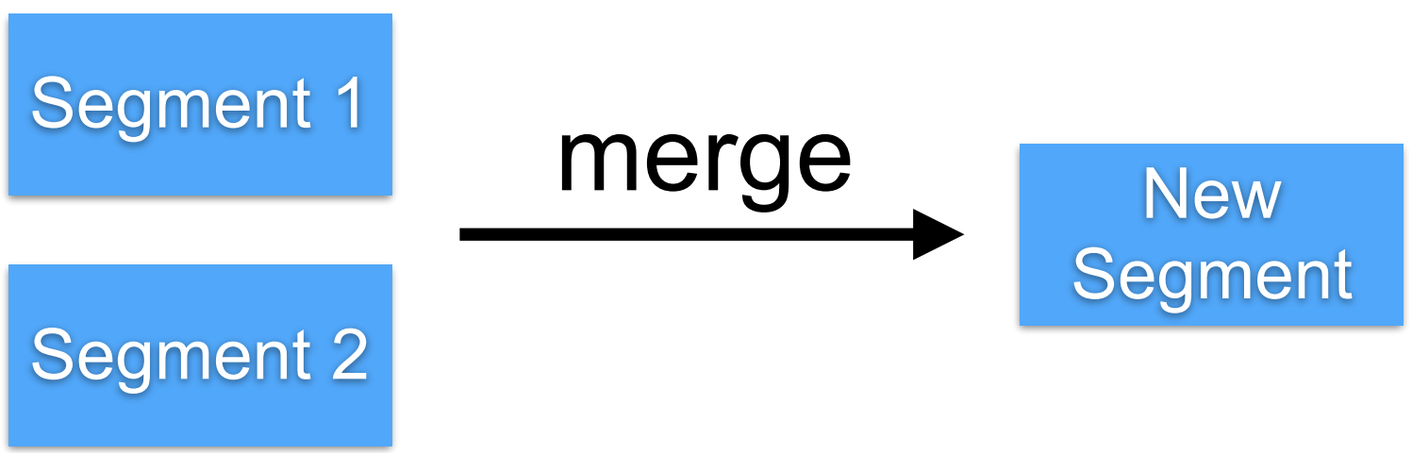
Segment

More shards, more segments
Documents are never delete !!
Lucene segment **merge** use more CPU/IO
Segments are immutable



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Hardware

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Hardware

CPU

Memory

Network

Storage

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Memory

Enable bootstrap.memorylock
Disable all swap files
Change ES_HEAP_SIZE (default 1G)

https://www.elastic.co/guide/en/elasticsearch/reference/current/setup-configuration-memory.html

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Design your index

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Design your index

Sharding
Replication

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Sharding

Elasticsearch divides the data in **logical** parts

# of sharding is define when index created

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How many shard ?

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Need to know your size of data

Data Size	# of shard
< 3M	1
>3M <5M	2
>5M	(# of document / 5M) + 1

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Sharding

Small shards on multiple nodes make the cluster recovery faster

Small shards on a lot of nodes solve memory mgt problem when query on large data

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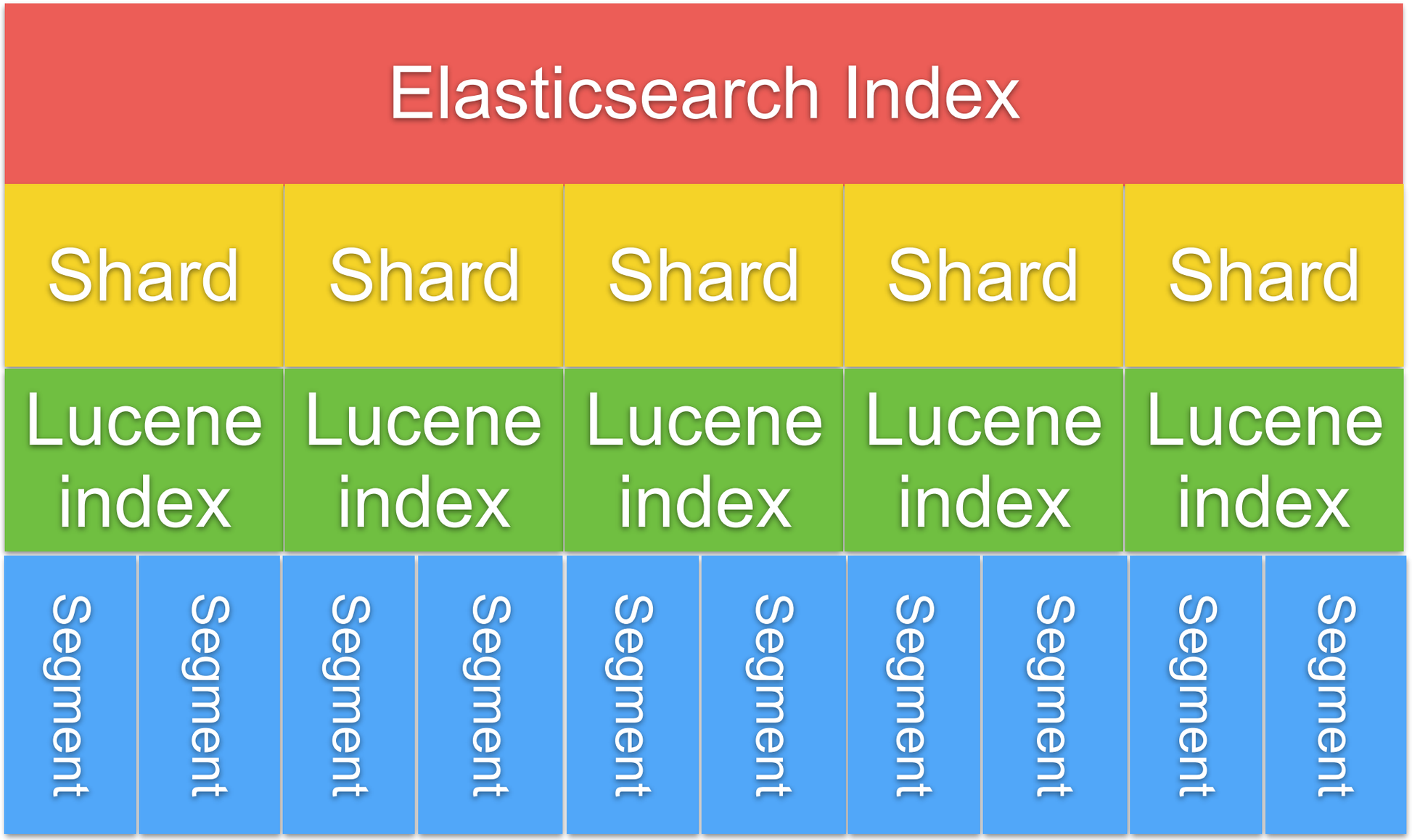
More shard, more Segment !!



Need to config file descriptor

https://www.elastic.co/guide/en/elasticsearch/reference/current/system-config.html

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Don’t create more shard than you need !!

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Replication

Prevent data loss

Default = 1

nodes = [(primary + # replication) /2] + 1

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Problems with scaling

CPU consumption
Load average
Request rate
Search latency

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Slow log

```
PUT /myindex/_settings
{
    "index.search.slowlog.threshold.query.warn: 1s",
    "index.search.slowlog.threshold.query.info: 500ms",
    "index.search.slowlog.threshold.query.debug: 1500ms",
    "index.search.slowlog.threshold.query.trace: 300ms",
    "index.search.slowlog.threshold.fetch.warn: 500ms",
    "index.search.slowlog.threshold.fetch.info: 400ms",
    "index.search.slowlog.threshold.fetch.debug: 300ms",
    "index.search.slowlog.threshold.fetch.trace: 200ms"
}
```

If can’t optimize then add more resources or rewrite

https://www.elastic.co/guide/en/elasticsearch/reference/current/index-modules-slowlog.html

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Indexing Data

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Indexing data

Must be define data schema for your need
Default mapping == more cost (Memory/Disk)
Default for data is “text” + “keyword”
Understand analyzer and tokenizer
Use auto generated IDs if possible

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Indexing data

Prefer bulk indexing

Change refresh interval

Time based index for log data

https://www.elastic.co/guide/en/elasticsearch/reference/current/indices-update-settings.html

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For Large data

Increase refresh interval
Decrease replica number

```
PUT /logstash-2015.05.20/_settings
{
    "index" : {
        "refresh_interval" : "-1",
        "number_of_replicas" : 0
    }
}
```

https://www.elastic.co/guide/en/elasticsearch/reference/current/indices-update-settings.html

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Query Data

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Query data

Use filters as much as possible
Use scan and scroll for dumping large data
Node query cache
Shard query cache
Retrieve only necessary fields

https://www.elastic.co/guide/en/elasticsearch/reference/current/query-cache.html

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Use cases

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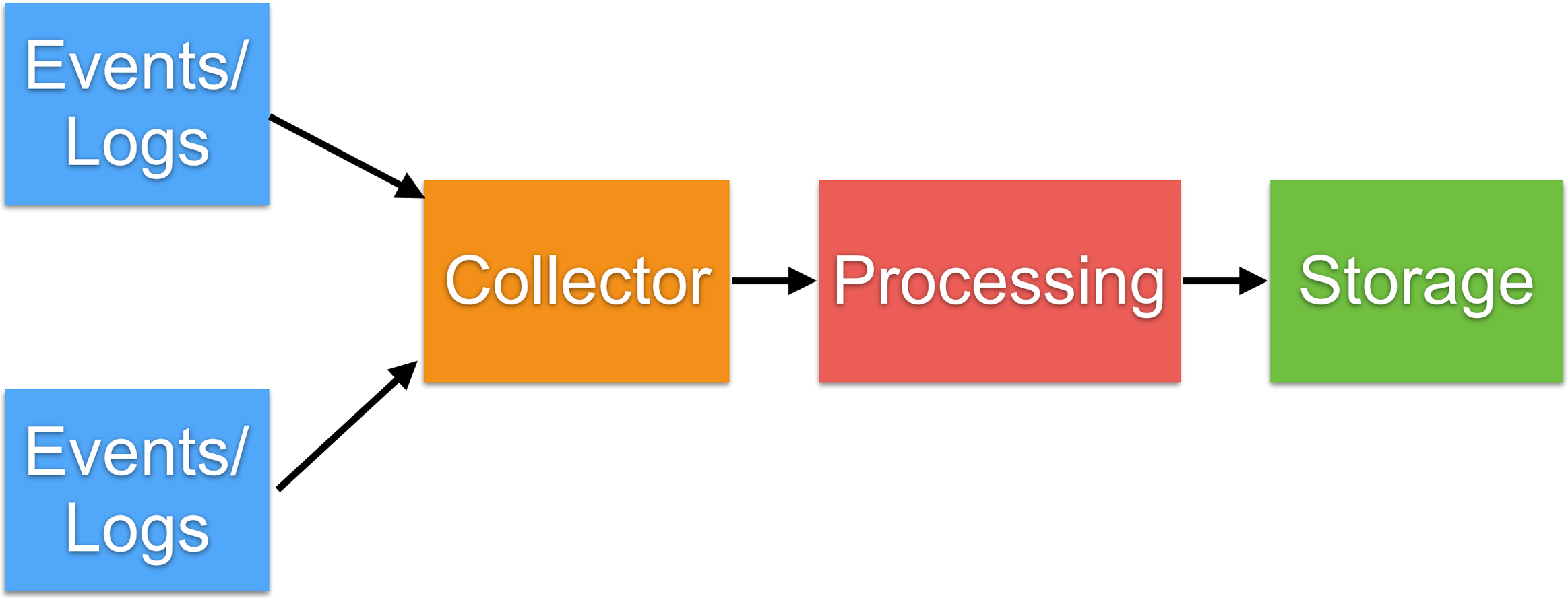
Event or Logging from Servers



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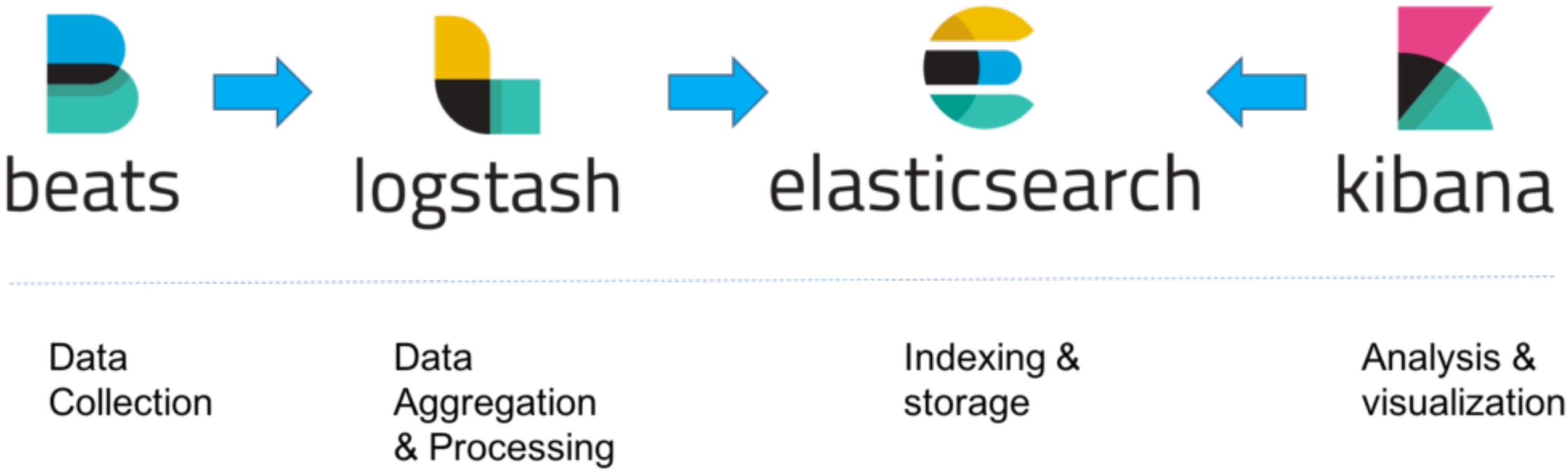
Event or Logging from Servers



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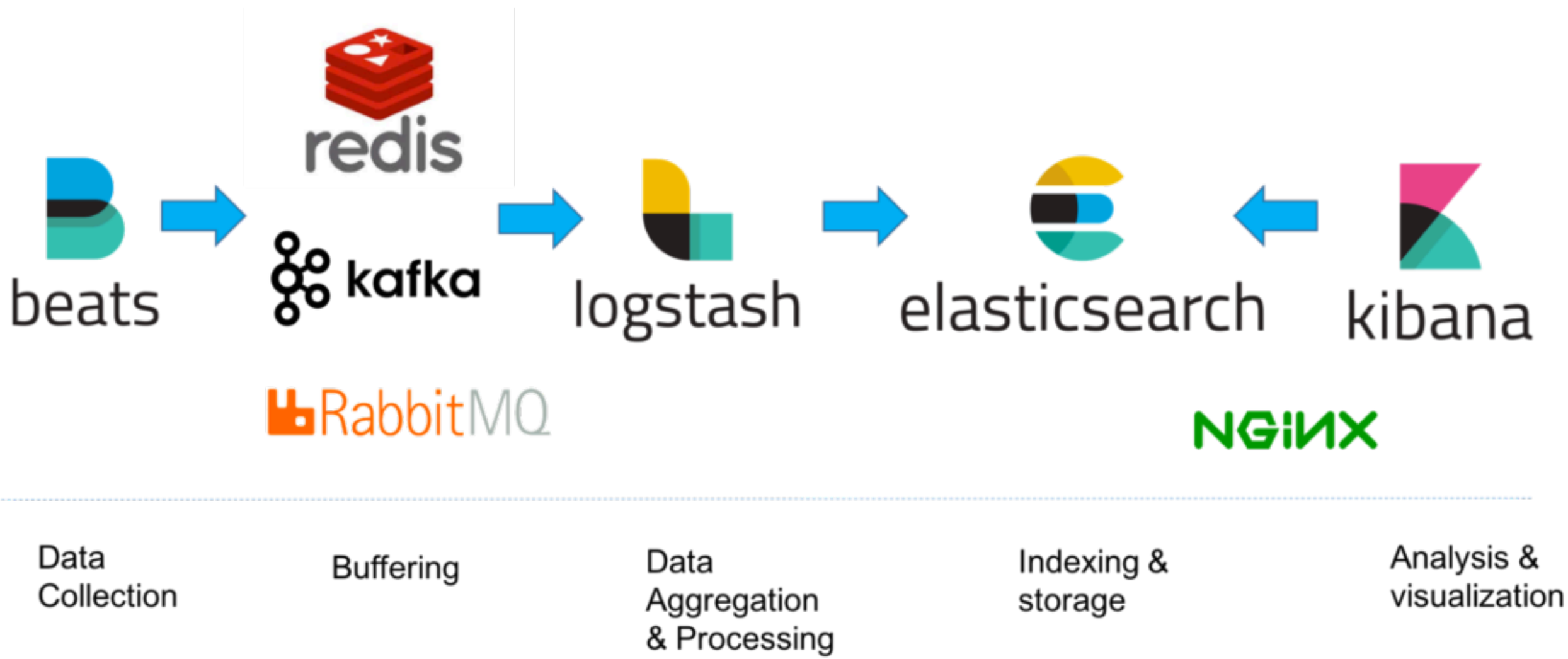
Event or Logging from Servers



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Monitoring

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Collect data from ?

Elasticsearch nodes
Logstash nodes
Kibana instances

https://www.elastic.co/guide/en/elastic-stack-overview/6.5/xpack-monitoring.html

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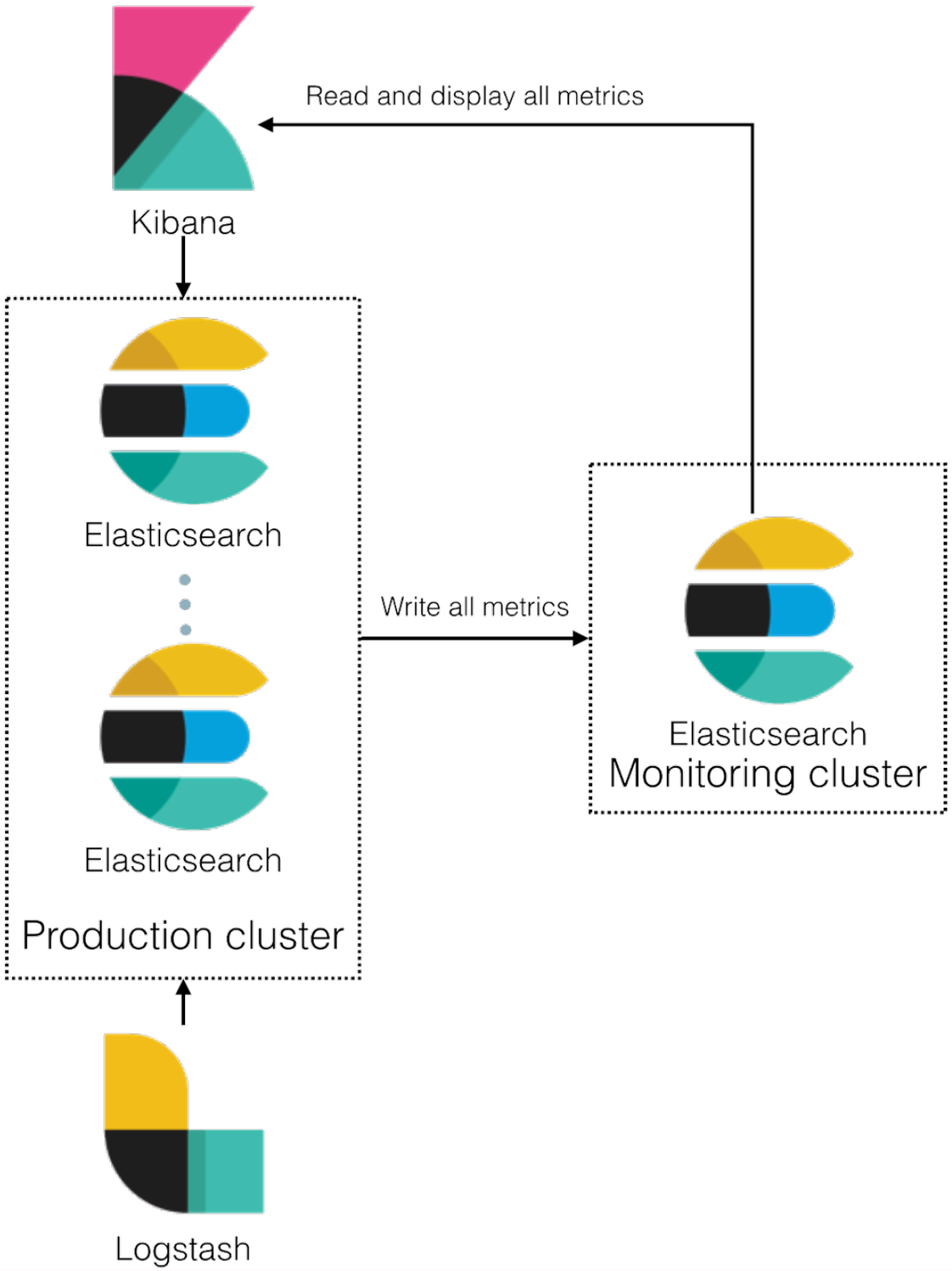
Recommend architecture



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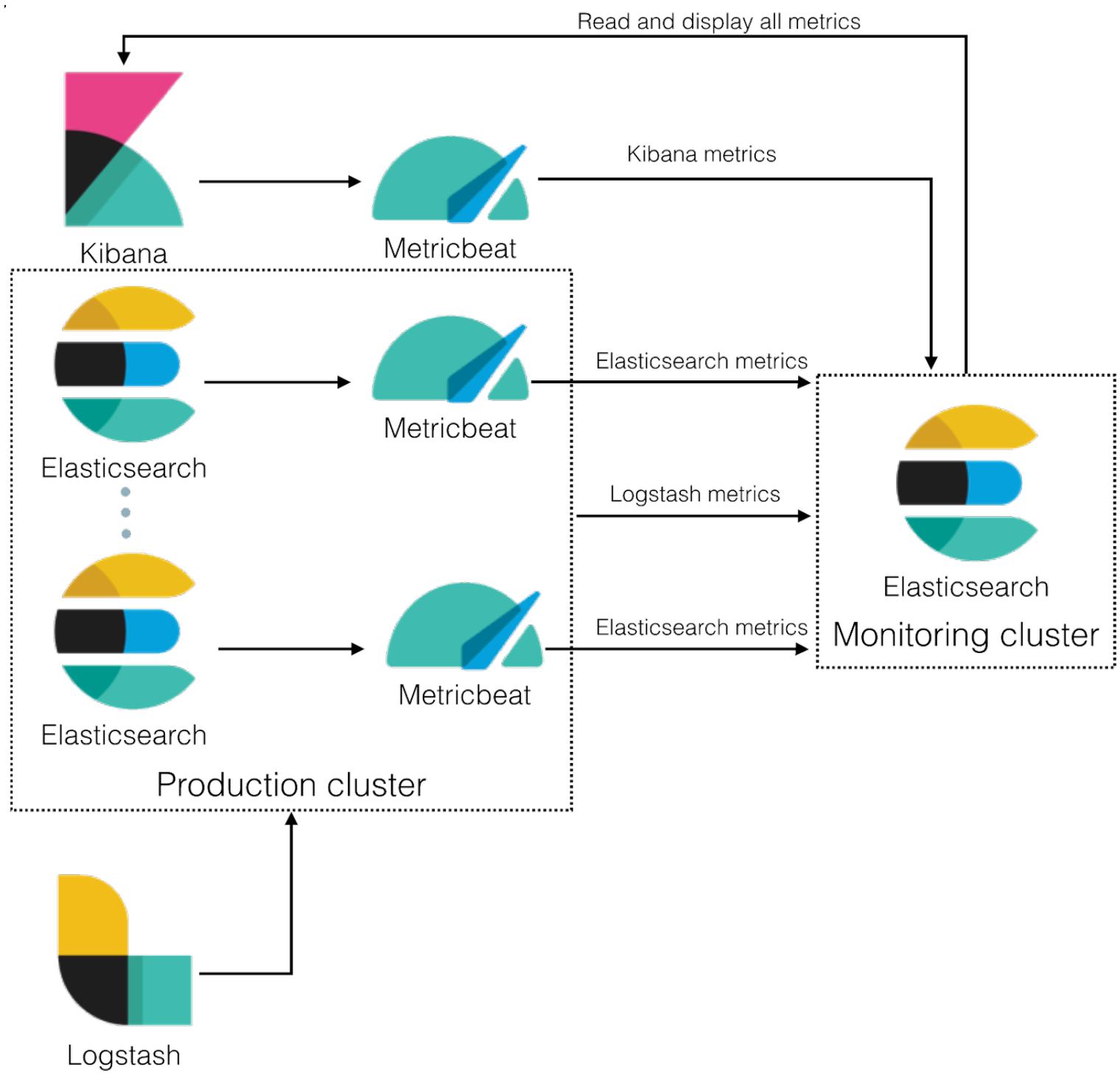
Elasticsearch 6.4 + (beta)



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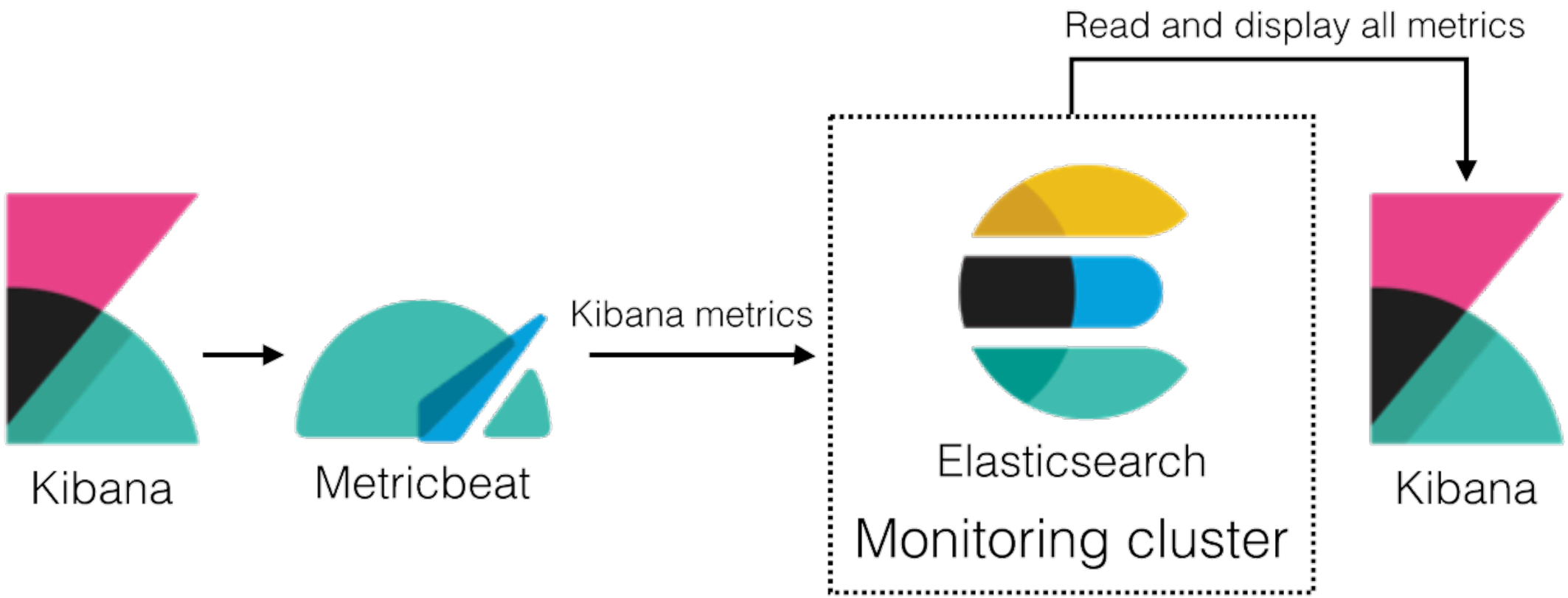
Try to separate kibana



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Metrics

workshop/prometheus-grafana

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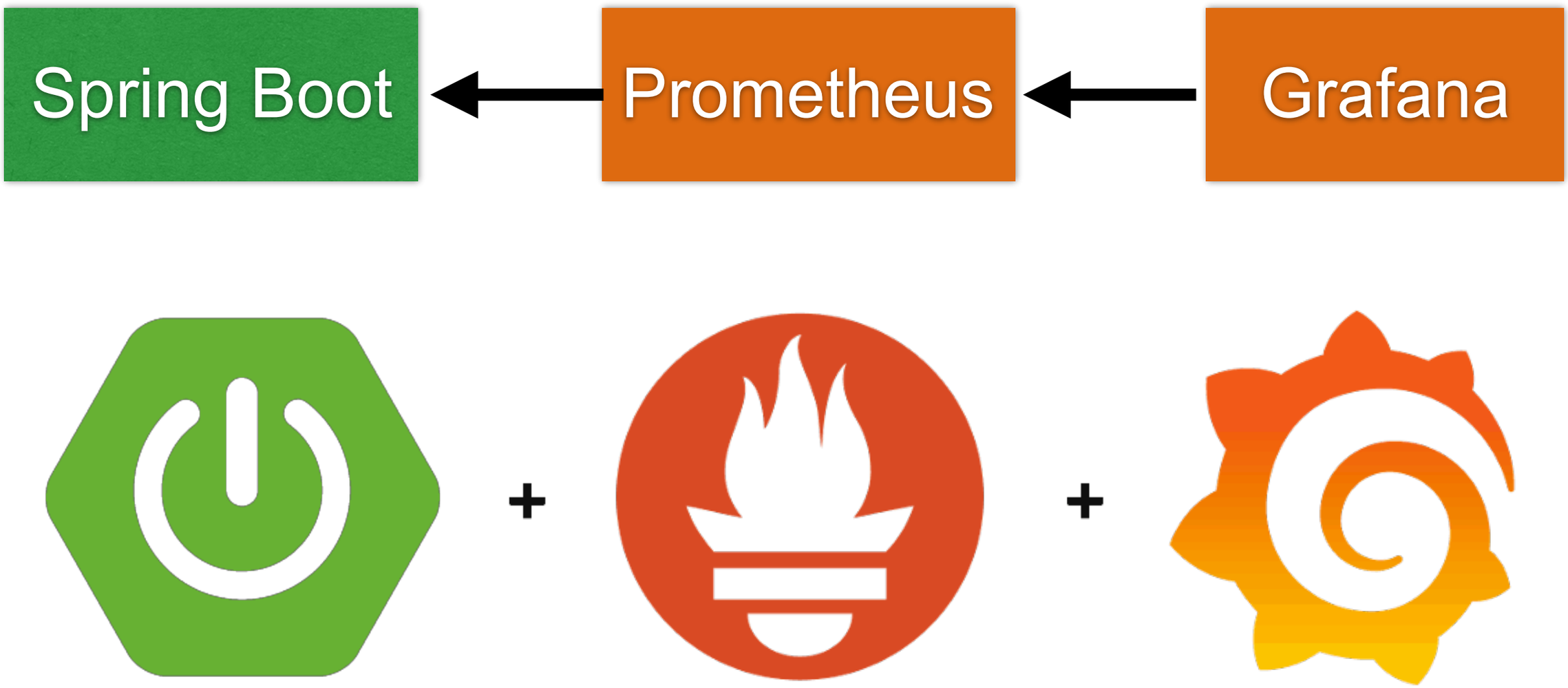
Sample Architecture



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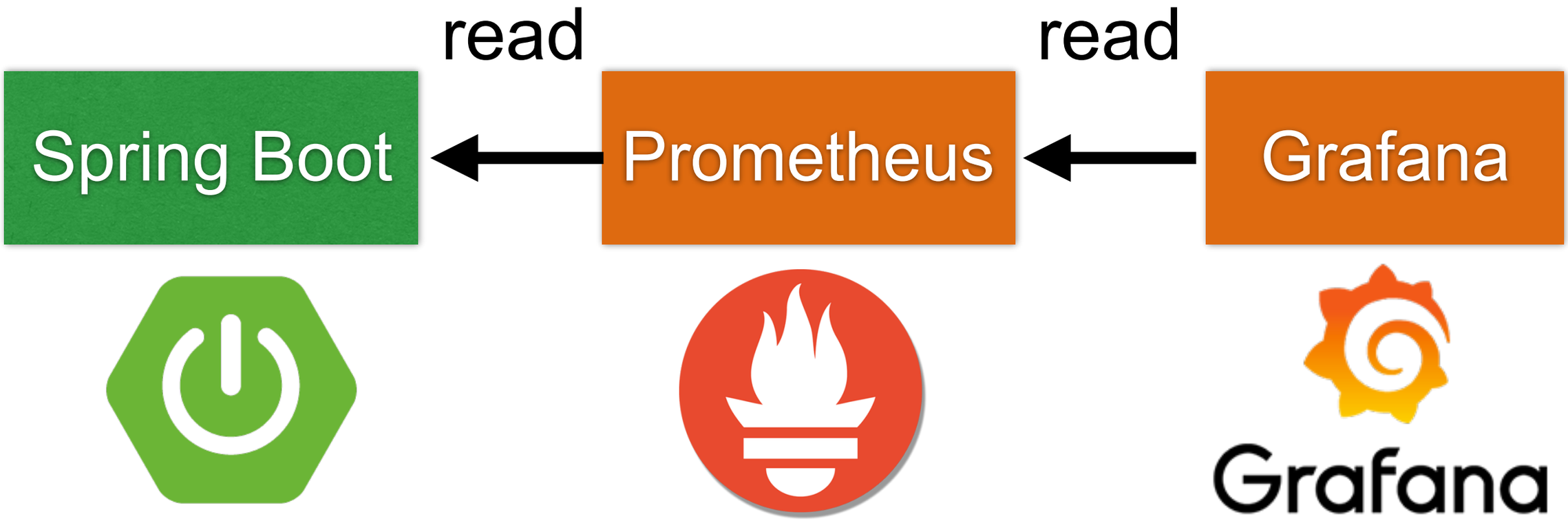
Sample Architecture



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Metric in Spring Boot

Spring Boot **Actuator** for Spring Boot 1.x
MicroMeter for Spring Boot 2.0

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Spring Boot Actuator (1)

Add library to pom.xml

```
<dependency>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-actuator</artifactId>
</dependency>
```


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Spring Boot Actuator (2)

Enabled endpoint in application.properties

```
info.app.name=Toy Store
info.app.description=This is my first spring boot application
info.app.version=1.0.0

management.endpoints.web.exposure.include=health,info,metrics,httptrace
```


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Spring Boot Actuator (3)

List of endpoints = /actuator/

localhost:8080/actuator/


```
{
  - _links: {
      - self: {
            href: "http://localhost:8080/actuator",
            templated: false
        },
      - health: {
            href: "http://localhost:8080/actuator/health",
            templated: false
        },
      - info: {
            href: "http://localhost:8080/actuator/info",
            templated: false
        },
      - metrics-requiredMetricName: {
            href: "http://localhost:8080/actuator/metrics/{requiredMetricName}",
            templated: true
        },
      - metrics: {
            href: "http://localhost:8080/actuator/metrics",
            templated: false
        },
      - httptrace: {
            href: "http://localhost:8080/actuator/httptrace",
            templated: false
        }
    }
}
```


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Spring Boot Actuator (4)

Info endpoint = /actuator/info

localhost:8080/actuator/info


```
{
  - app: {
        name: "Toy Store",
        description: "This is my first spring boot application",
        version: "1.0.0"
    }
}
```


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Spring Boot Actuator (5)

Info endpoint = /actuator/info

localhost:8080/actuator/info


```
{
  - app: {
        name: "Toy Store",
        description: "This is my first spring boot application",
        version: "1.0.0"
    }
}
```


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Spring Boot Actuator (6)

Info endpoint = /actuator/httptrace

localhost:8080/actuator/httptrace


```
{
  - traces: [
      - {
            timestamp: "2018-03-06T13:33:02.800Z",
            principal: null,
            session: null,
          - request: {
              method: "GET",
              uri: "http://localhost:8080/prometheus",
            - headers: {
              - host: [
                  "localhost:8080"
                ],
              - user-agent: [
                  "Prometheus/2.0.0"
                ],
              - accept: [
                  "text/plain;version=0.0.4;q=1,*/*;q=0.1"
                ],
              - accept-encoding: [
                  "gzip"
                ],
              - x-prometheus-scrape-timeout-seconds: [
                  "5.000000"
                ]
            },
            remoteAddress: null
        },
```


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Spring Boot Actuator (7)

List of metrics endpoint = /actuator/metrics

localhost:8080/actuator/metrics


```
{
  - names: [
        "jvm.buffer.memory.used",
        "jvm.memory.used",
        "jvm.gc.memory.allocated",
        "jvm.memory.committed",
        "http.server.requests",
        "jdbc.connections.min",
        "tomcat.sessions.created",
        "tomcat.sessions.expired",
        "hikaricp.connections.usage",
        "tomcat.global.request.max",
        "tomcat.global.error",
        "jvm.gc.max.data.size",
        "logback.events",
        "system.cpu.count",
        "jvm.memory.max",
        "jdbc.connections.active",
        "jvm.buffer.total.capacity",
        "jvm.buffer.count",
        "process.files.max",
        "jvm.threads.daemon",
```


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Spring Boot Actuator (8)

/actuator/metrics/http.server.requests

localhost:8080/actuator/metrics/http.server.requests


```
{
    name: "http.server.requests",
  - measurements: [
      - {
            statistic: "COUNT",
            value: 269
        },
      - {
            statistic: "TOTAL_TIME",
            value: 1.1072010200000002
        },
      - {
            statistic: "MAX",
            value: 0.04373569
        }
    ],
  - availableTags: [
      - {
            tag: "exception",
          - values: [
                "None"
            ]
        },
      - {
            tag: "method",
          - values: [
                "GET"
            ]
        },
```


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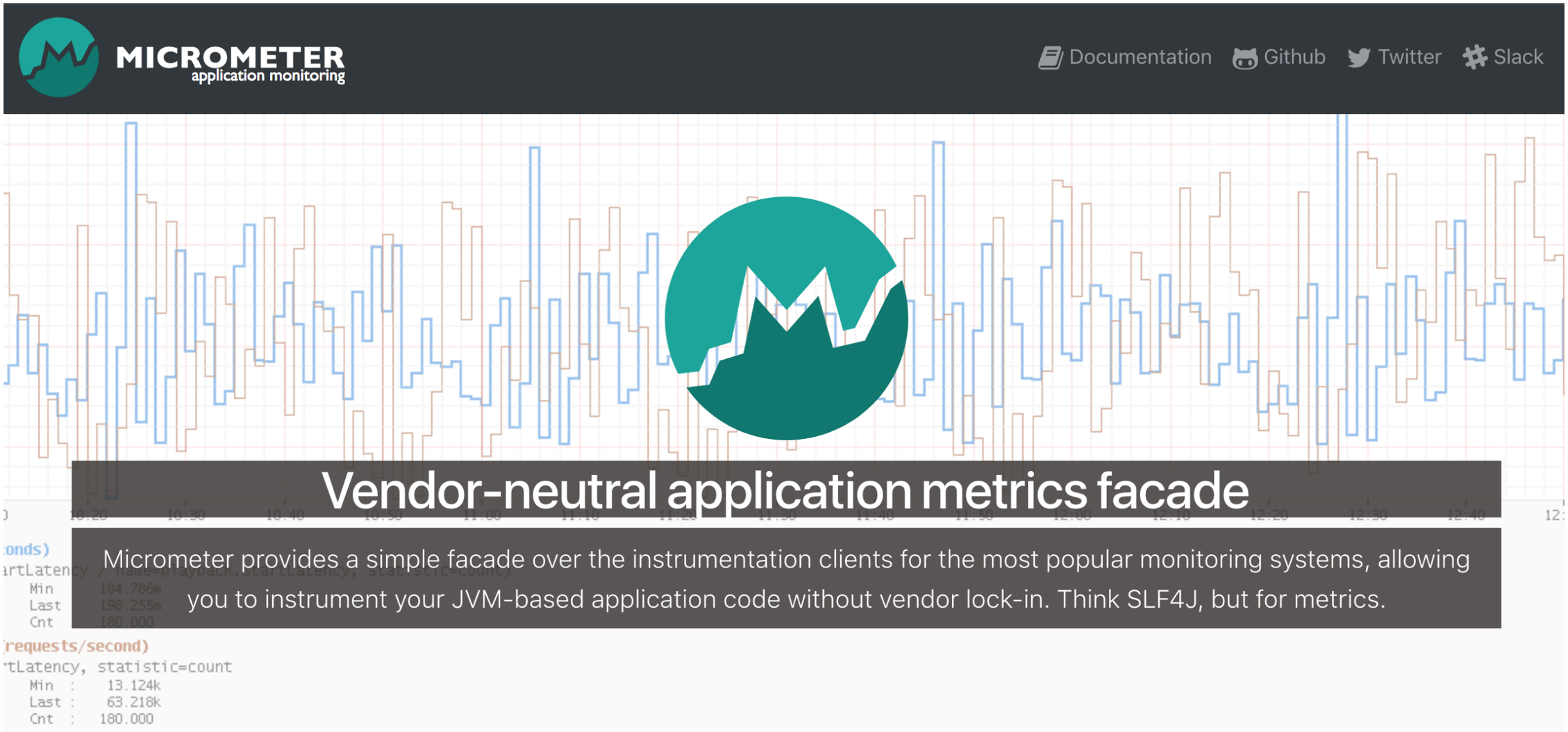
Spring Boot 2.0 with MicroMeter



https://micrometer.io/

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Service metric for Prometheus

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Enable Prometheus (1)

Add library to pom.xml

```
<dependency>
    <groupId>io.micrometer</groupId>
    <artifactId>micrometer-registry-prometheus</artifactId>
    <version>1.0.1</version>
</dependency>
```


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Enable Prometheus (2)

Enabled endpoint in application.properties

management.endpoints.web.exposure.include =….,**prometheus**

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Enable Prometheus (3)

New endpoint = actuator/prometheus

localhost:8080/actuator/prometheus

```
# HELP jvm_memory_used_bytes The amount of used memory
# TYPE jvm_memory_used_bytes gauge
jvm_memory_used_bytes{area="nonheap",id="Code Cache",} 1.49056E7
jvm_memory_used_bytes{area="nonheap",id="Metaspace",} 5.6766712E7
jvm_memory_used_bytes{area="nonheap",id="Compressed Class Space",} 7617096.0
jvm_memory_used_bytes{area="heap",id="PS Eden Space",} 1.7135864E7
jvm_memory_used_bytes{area="heap",id="PS Survivor Space",} 1.6235192E7
jvm_memory_used_bytes{area="heap",id="PS Old Gen",} 2.1936456E7
# HELP hikaricp_connections_idle Idle connections
# TYPE hikaricp_connections_idle gauge
hikaricp_connections_idle{pool="HikariPool-1",} NaN
# HELP tomcat_threads_config_max
# TYPE tomcat_threads_config_max gauge
tomcat_threads_config_max{name="http-nio-8080",} 200.0
# HELP tomcat_servlet_error_total
# TYPE tomcat_servlet_error_total counter
tomcat_servlet_error_total{name="default",} 0.0
# HELP jvm_threads_peak The peak live thread count since the Java virtual machine start
# TYPE jvm_threads_peak gauge
jvm_threads_peak 28.0
# HELP hikaricp_connections_pending Pending threads
# TYPE hikaricp_connections_pending gauge
hikaricp_connections_pending{pool="HikariPool-1",} NaN
# HELP system_cpu_count The number of processors available to the Java virtual machine
```


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Keep data in Prometheus

https://prometheus.io/

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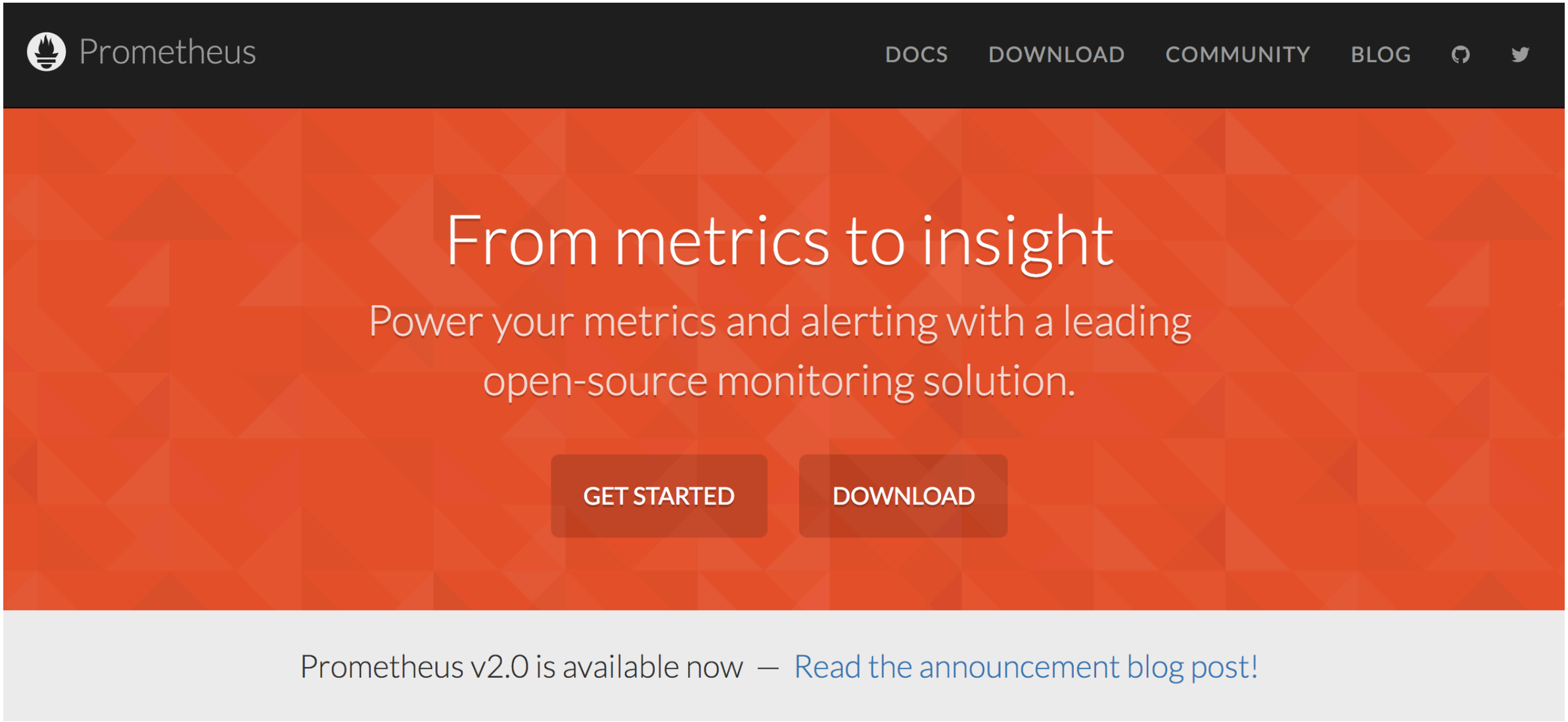
Prometheus



https://prometheus.io/

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Prometheus

PUBLIC | AUTOMATED BUILD

prom/prometheus

Last pushed: 17 hours ago

Repo Info | Tags | Dockerfile | Build Details

Short Description

Short description is empty for this repo.

Docker Pull Command

```
docker pull prom/prometheus
```

Owner

prom

Source Repository

prometheus/prometheus

Full Description

Prometheus build passing

circleci passing
container ready
docker pulls 63M

Visit prometheus.io for the full documentation,
examples and guides.

Prometheus is a systems and service monitoring system. It collects metrics

https://hub.docker.com/r/prom/prometheus/

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Create container of Prometheus

```
$docker container run --rm
  -p 9090:9090
  -v $(pwd)/prometheus.yml:/etc/prometheus/prometheus.yml
  --name monitor prom/prometheus
```


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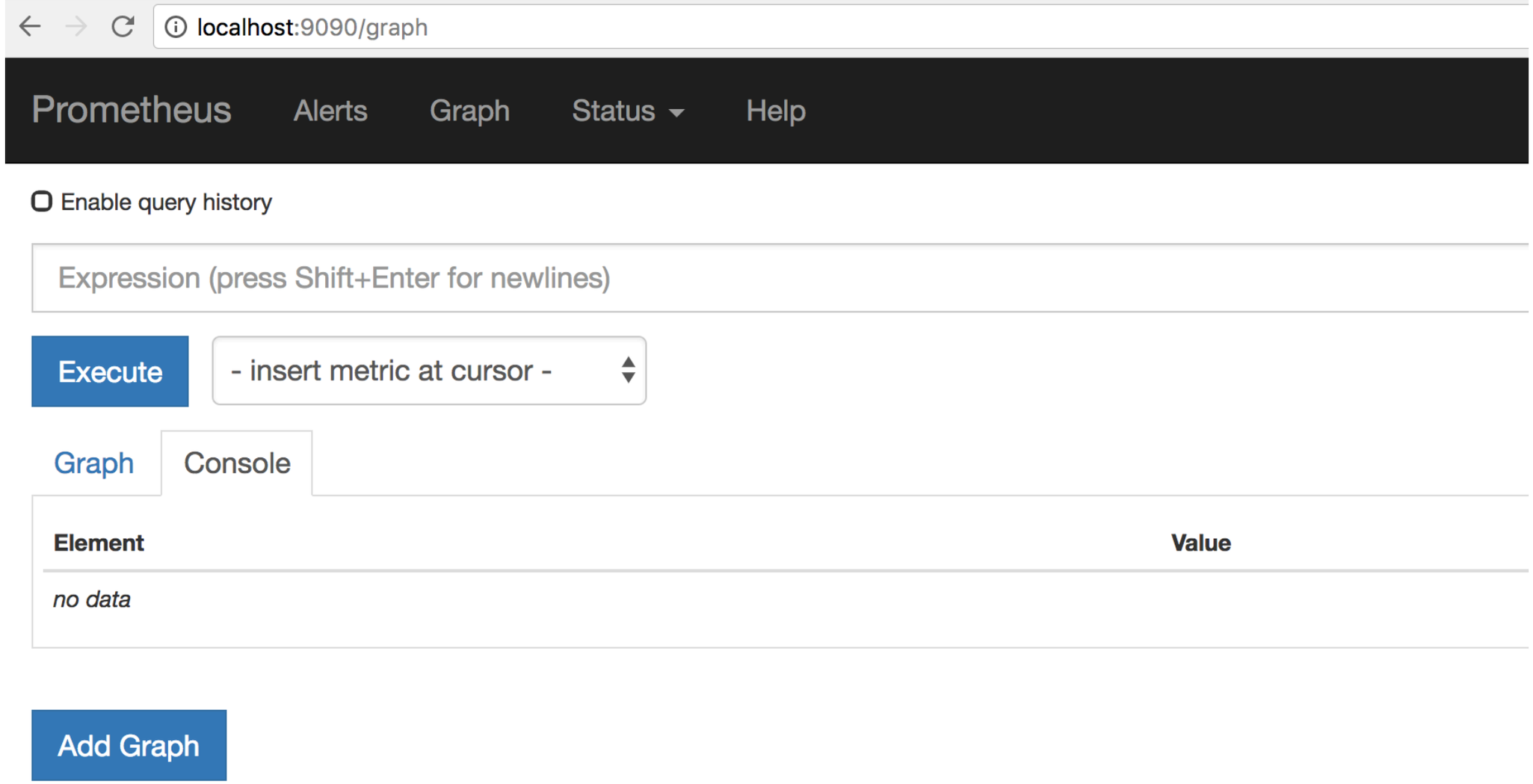
Check Data in Prometheus

http://localhost:9090/



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Check Target in Prometheus

Status -> Targets

localhost:9090/targets

Prometheus Alerts Graph Status Help

Targets

Only unhealthy jobs

spring-boot (1/1 up) show less

Endpoint	State	Labels	Last Scrape	Error
http://10.10.99.59:8080/actuator/prometheus	UP	instance="10.10.99.59:8080"	2.355s ago	

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Show data in Grafana

https://grafana.com/

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Grafana

https://grafana.com/

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Grafana

PUBLIC REPOSITORY

grafana/grafana ☆

Last pushed: 25 minutes ago

Repo Info Tags

Short Description

The official Grafana docker container

Docker Pull Command

```
docker pull grafana/grafana
```

Full Description

Grafana Docker image

This project builds a Docker image with the latest master build of Grafana.

Running your Grafana container

Start your container binding the external port `3000`.

```
docker run -d --name=grafana -p 3000:3000 grafana/grafana
```

Owner

grafana

https://hub.docker.com/r/grafana/grafana/

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Create container of Grafana

```
$docker container run
  --name=grafana
  -p 3000:3000 grafana/grafana
```


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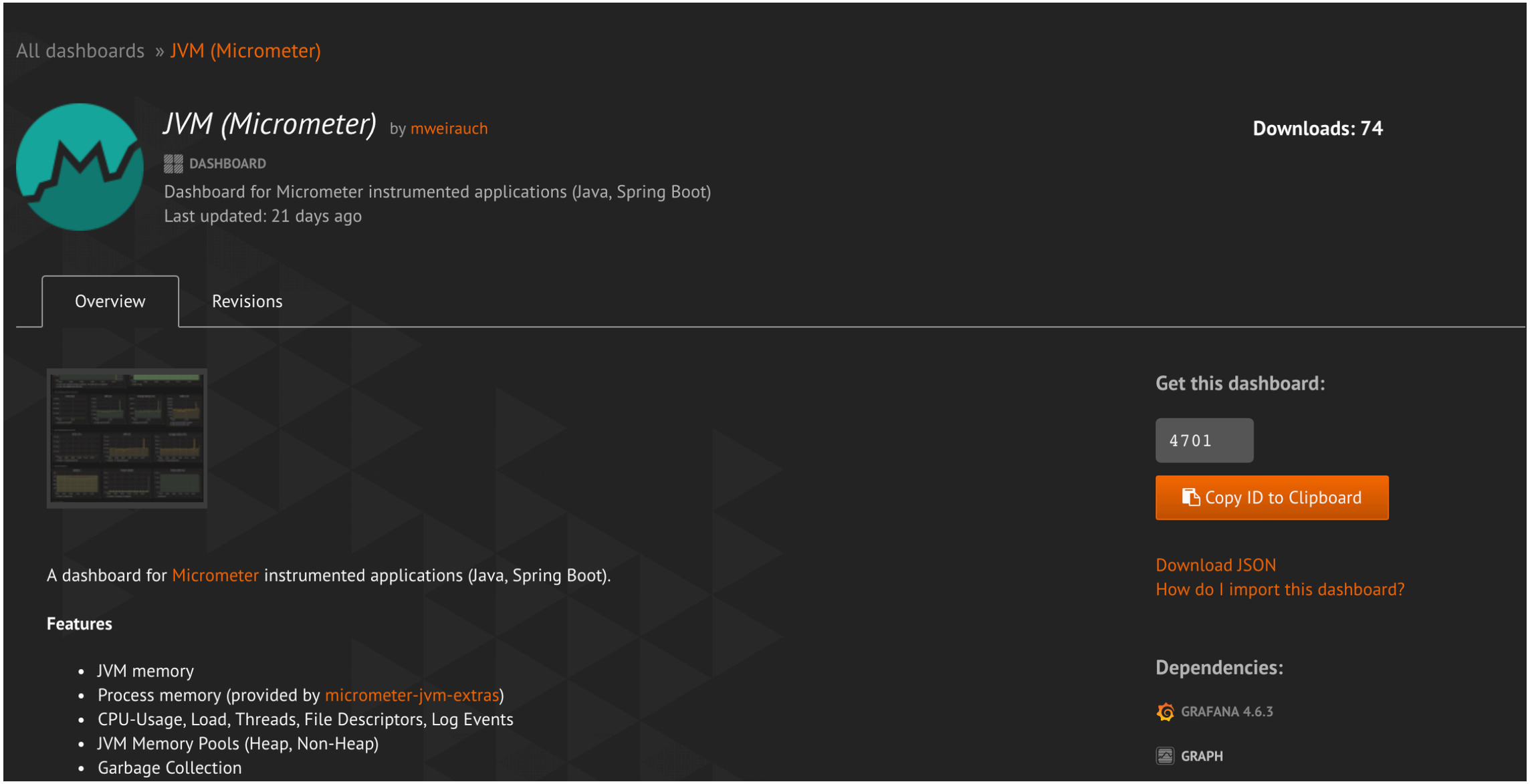
Grafana Dashboard

https://grafana.com/dashboards/4701



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Always improve, always practice

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