Shield your cluster

Security with Elasticsearch

elastic

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Agenda

Why?

How?

What?

Who?

Next?

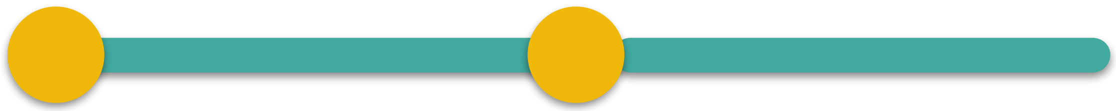
Q & A

About

2012

- Elasticsearch got founded
- Series A investment
- Trainings
- Supports subscriptions

About



2012 2013

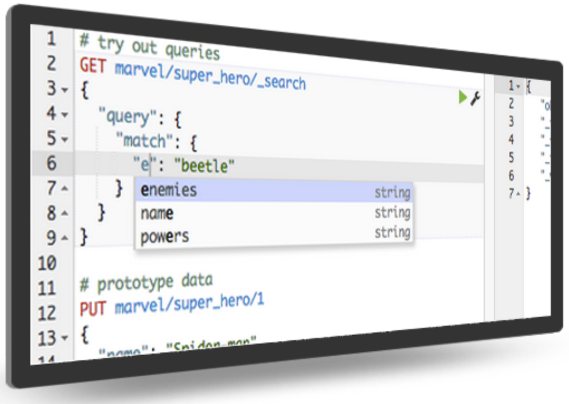
- Series B investment
- Kibana
- Elasticsearch for Apache Hadoop Integration
- Logstash
- Elasticsearch Clients

About

2012

2013

2014

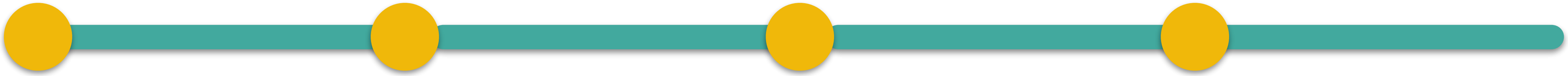


```
# try out queries
GET marvel/super_hero/_search
{
  "query": {
    "match": {
      "e": "beetle"
    }
  }
}

# prototype data
PUT marvel/super_hero/1
{
  "name": "Spider-man"
```

- Series C investment
- Marvel released

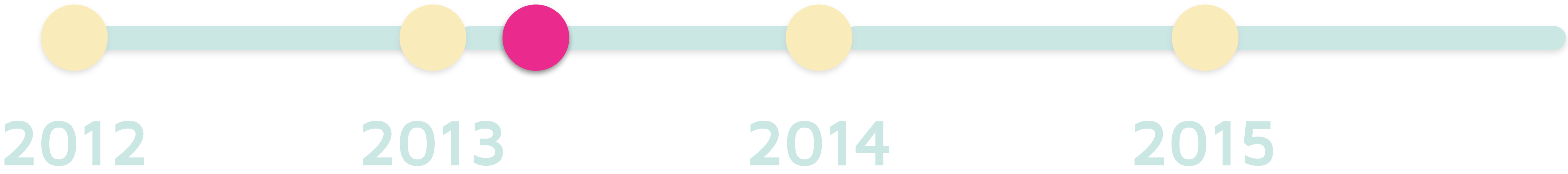
About



2012 2013 2014 2015

- Shield goes GA
- First user conference & rebrand
- Found acquired
- Packetbeat joins
- Watcher in beta

About



- Joined in March 2013
- Working on Elasticsearch & Shield
- Development, Trainings, Conferences, Support, Blog posts
- We're hiring...

Why?

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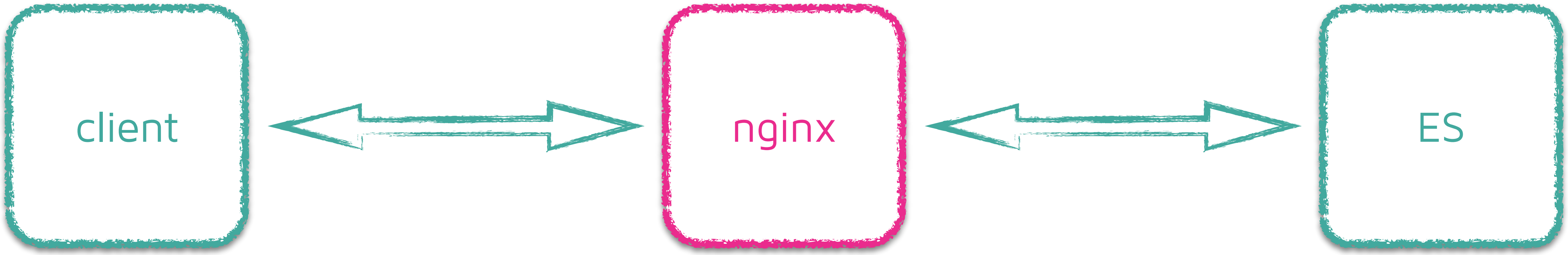
Why?

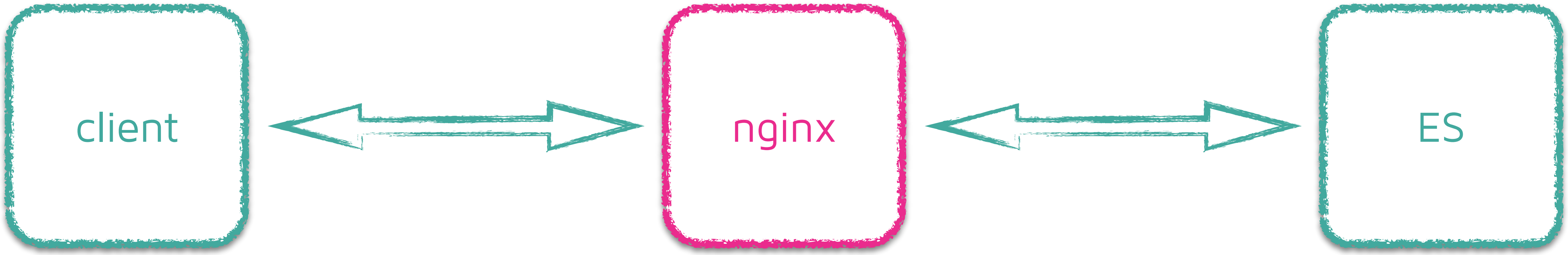
- Elasticsearch: No security OOTB
- No encrypted communication
- No Authorization
- No Authentication
- No Audit Logging

nginx in front



- Filter by HTTP method, URI or IP
- User management via basic auth
- Use aliases & filters

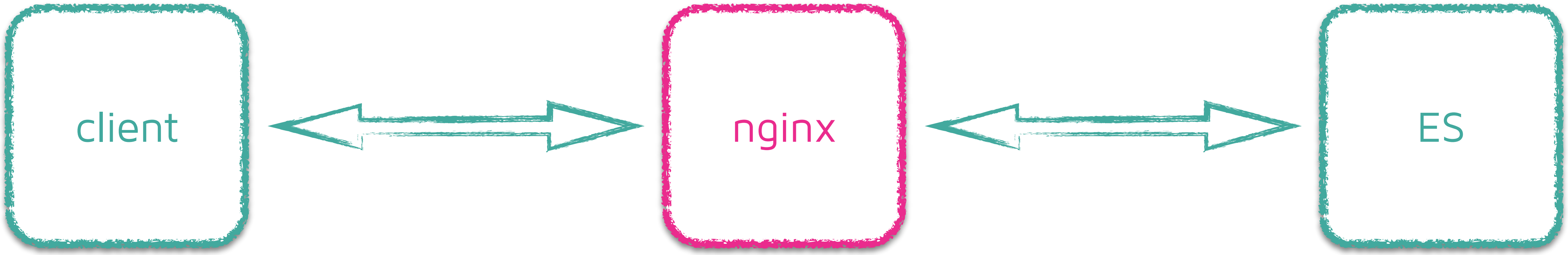
nginx in front



How to solve multi index operations?

```
GET /logs-2015.10.10,evil,logs-2015.10.11
{
  "query" : { "match_all": {} }
}
```

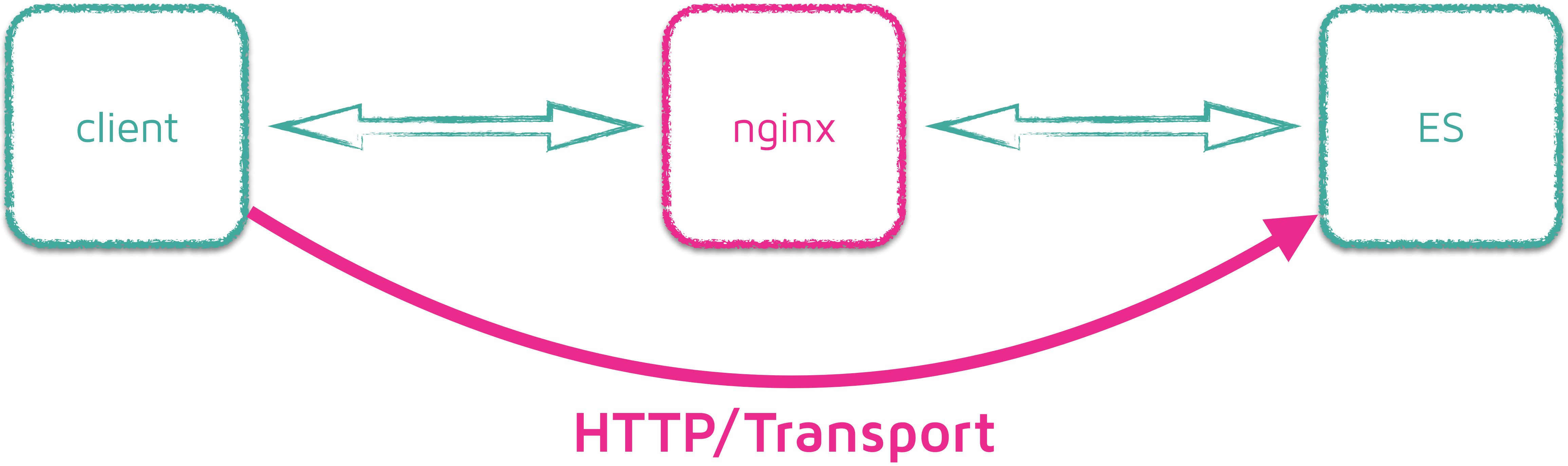
nginx in front



- How to solve bulk/multi operations?

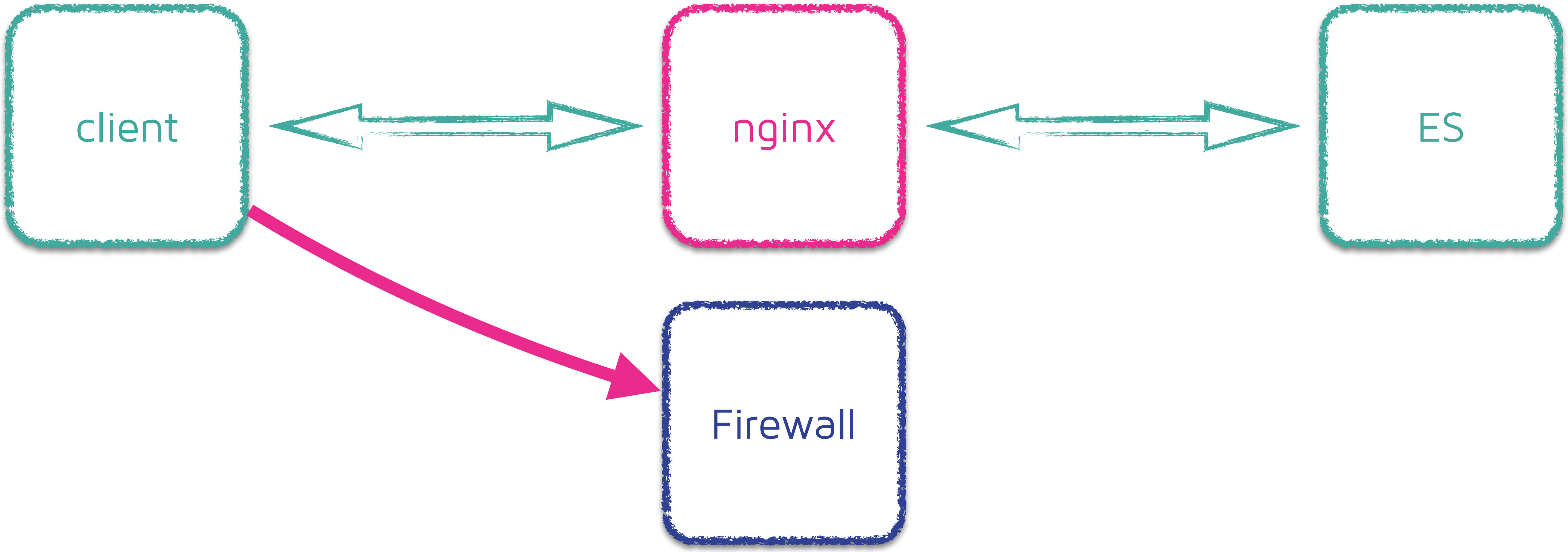
```
{ "index" : { "_index" : "test1", "_type" : "type1", "_id" : "1" } }
{ "field1" : "value1" }
{ "delete" : { "_index" : "test2", "_type" : "type1", "_id" : "2" } }
{ "create" : { "_index" : "test3", "_type" : "type1", "_id" : "3" } }
{ "field1" : "value3" }
{ "update" : {"_id" : "1", "_type" : "type1", "_index" : "test4"} }
{ "doc" : {"field2" : "value2"} }
```

nginx in front



- Prevent unwanted accesses

nginx in front



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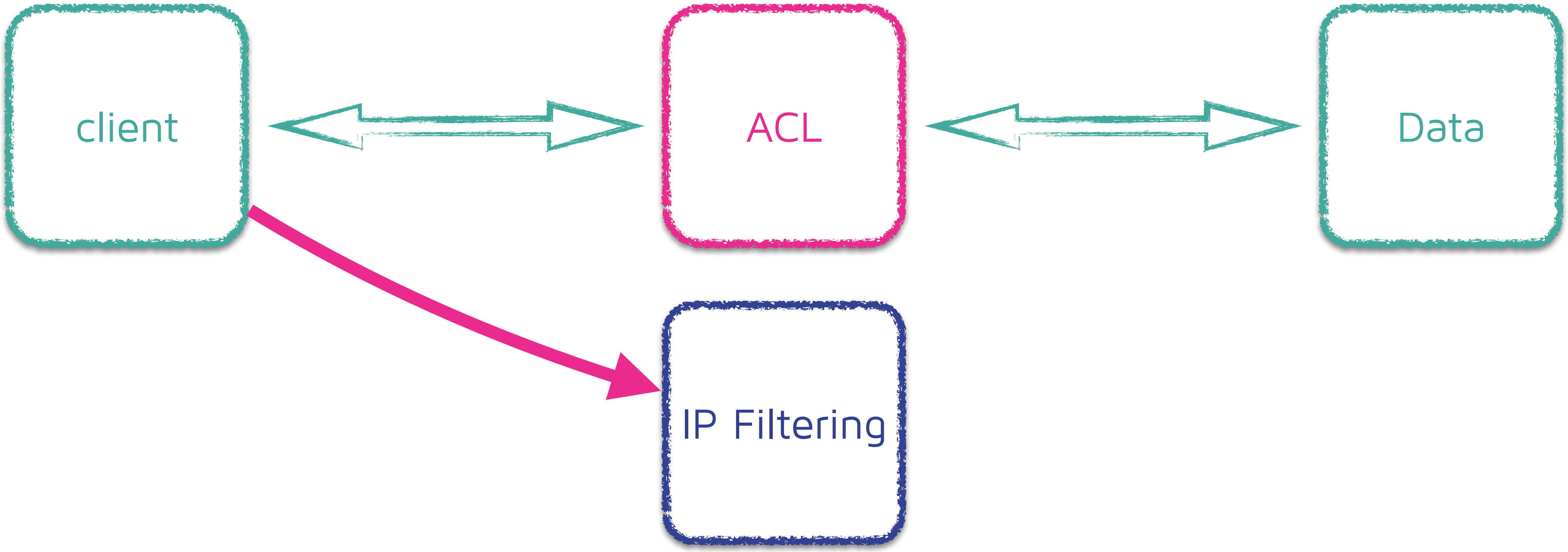
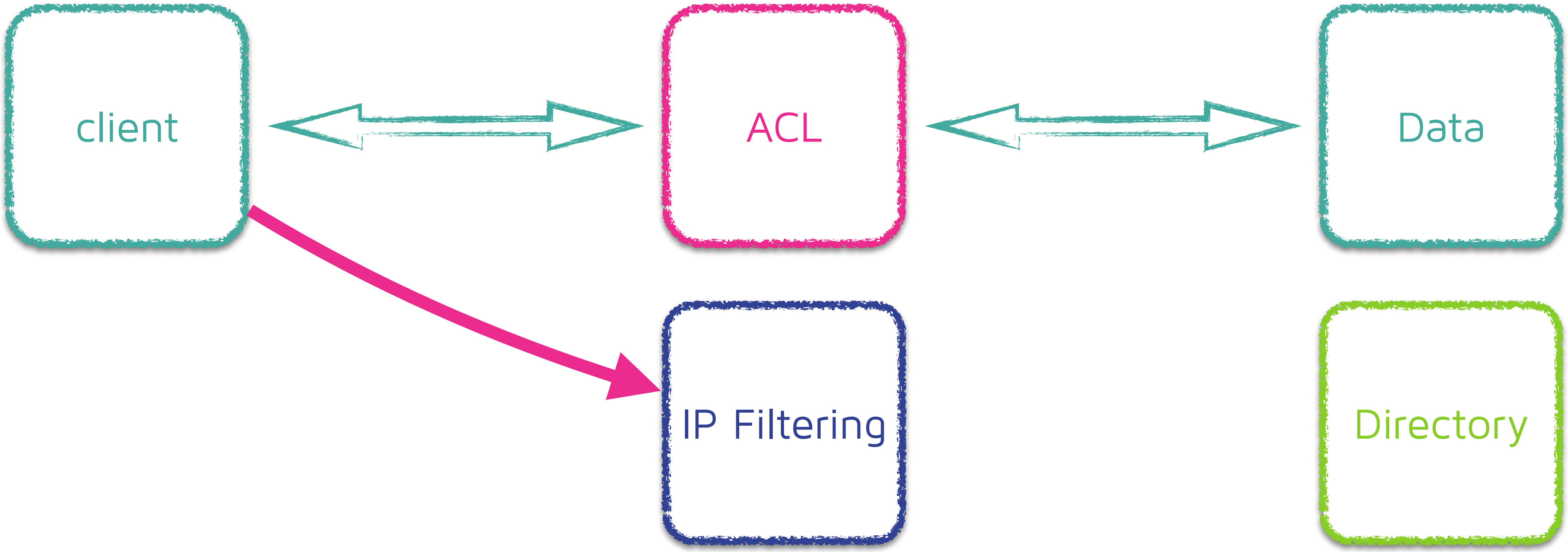
operational overhead



- Configuration scattered across systems

operational overhead



- Configuration scattered across systems

Why?

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Q & A

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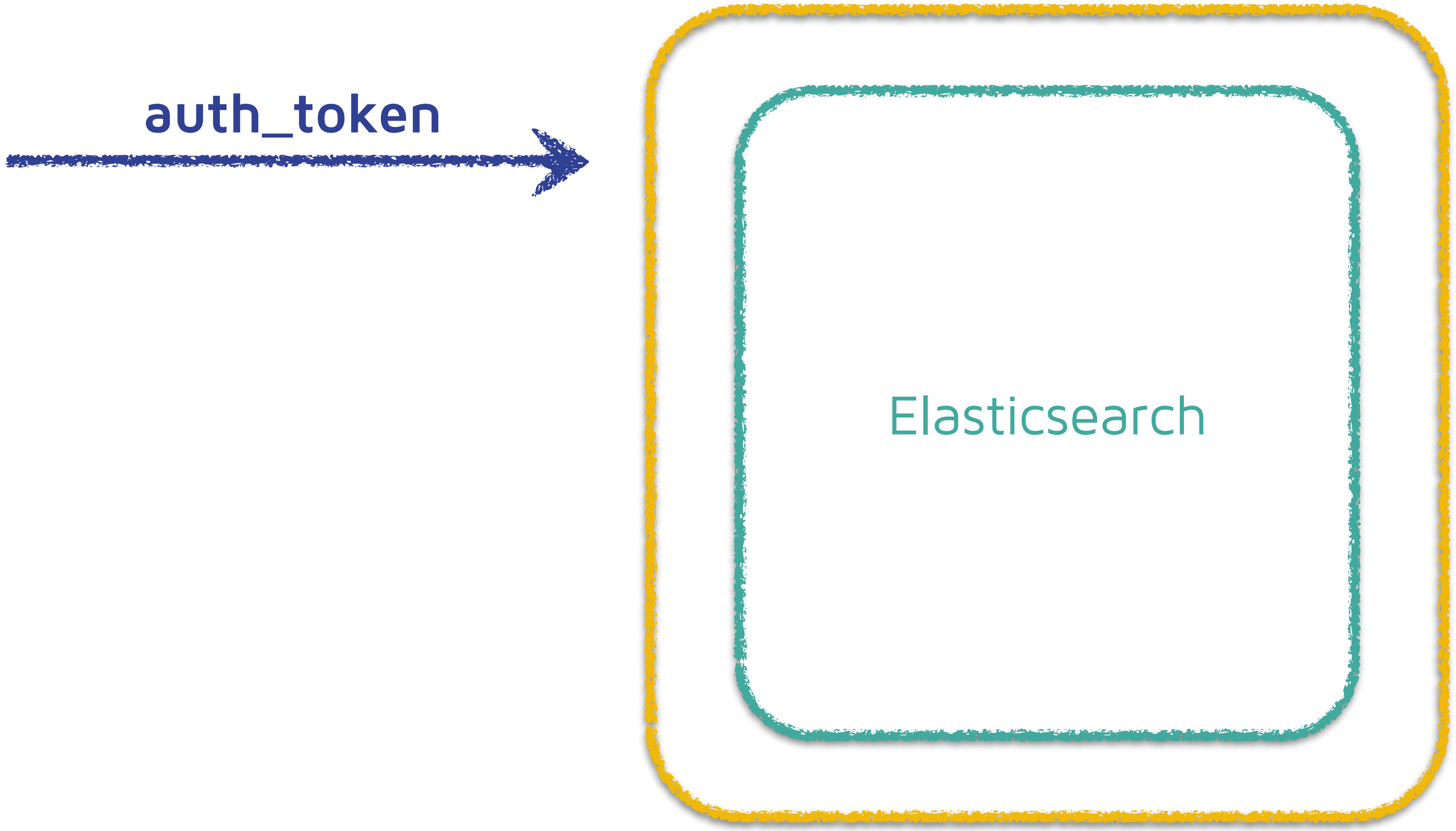
How?

- Elasticsearch modular & pluggable
- Security as a plugin
- HTTP + Transport protocols
- Integration into the ELK stack!

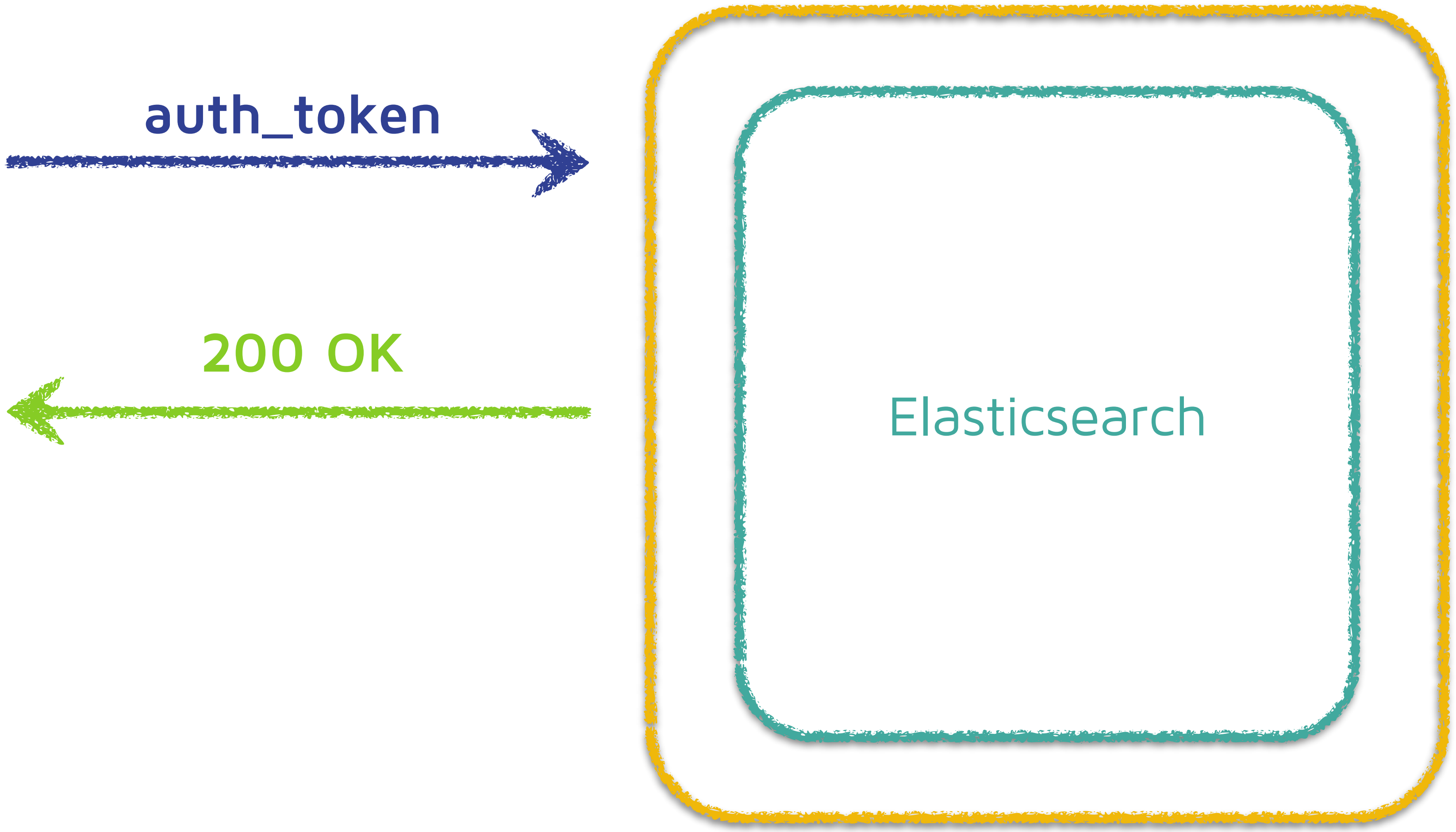
How?



Authentication

Authorization

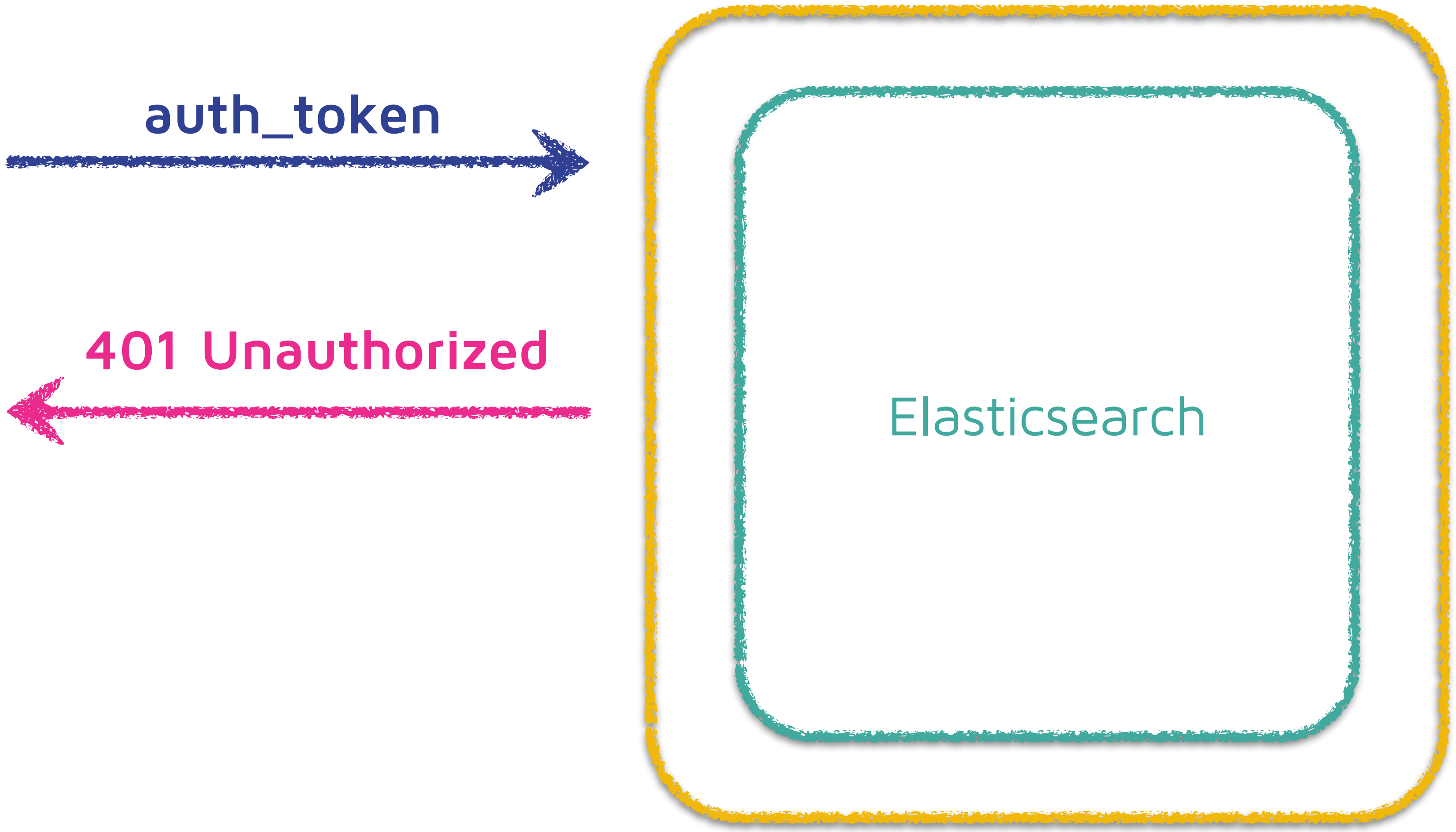
How?



Authentication

Authorization

How?



auth_token

401 Unauthorized

Elasticsearch

Authentication

Authorization

How?

- Getting up and running is easy

- Install elasticsearch 1.6

```
bin/plugin install elasticsearch/license/latest

bin/plugin install elasticsearch/shield/latest
```

Why?

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What?

- IP Filtering
- Encrypted communication
- Authentication
- Authorization
- Audit Trail

IP Filtering

- Configurable in `elasticsearch.yml`
- Can be updated dynamically via cluster update settings API

```
shield.transport.filter:
  allow: "192.168.0.1"
  deny: "192.168.0.0/24"
```

Encrypted communication

- keystore required

- different config for HTTP and transport protocol (+profiles)

```
shield.ssl.keystore.path: /path/to/keystore.jks
shield.ssl.keystore.password: secret
shield.transport.ssl: true
shield.http.ssl: true
```

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Authentication

- "Who are you?"
- Auth mechanisms are called **realms**
- Available: **esusers**, **ldap**, **ad**, **pki**
- Realms can be chained
- Support for caching & API for clearing

Authentication

```
shield.authc:
  realms:
    esusers:
      type: esusers
      order: 0

    ldap1:
      type: ldap
      order: 1
      enabled: false
      url: 'url_to_ldap1'
      ...

    ad1:
      type: active_directory
      order: 3
      url: 'url_to_ad'
```

ESusers realm

- Local files, can be changed via CLI
- Elasticsearch watches file changes & reloads
- `config/shield/users`
- `config/shield/users_roles`

ESusers realm

```
bin/shield/esusers useradd alex

bin/shield/esusers roles alex -a admin -r user

bin/shield/esusers list

bin/shield/esusers userdel alex
```

Anonymous access

- Fallback to configurable user
- Disabled by default

```
shield.authc:
  anonymous:
    username: anonymous_user
    roles: role1, role2
```

Authorization

- "Are you allowed to do that?"
- File: `config/shield/roles.yml`

```
admin:
  cluster: all
  indices:
    '*': all
```

Role Based Access Control

- role

  named set of permissions

- permission

  set of cluster wide privileges

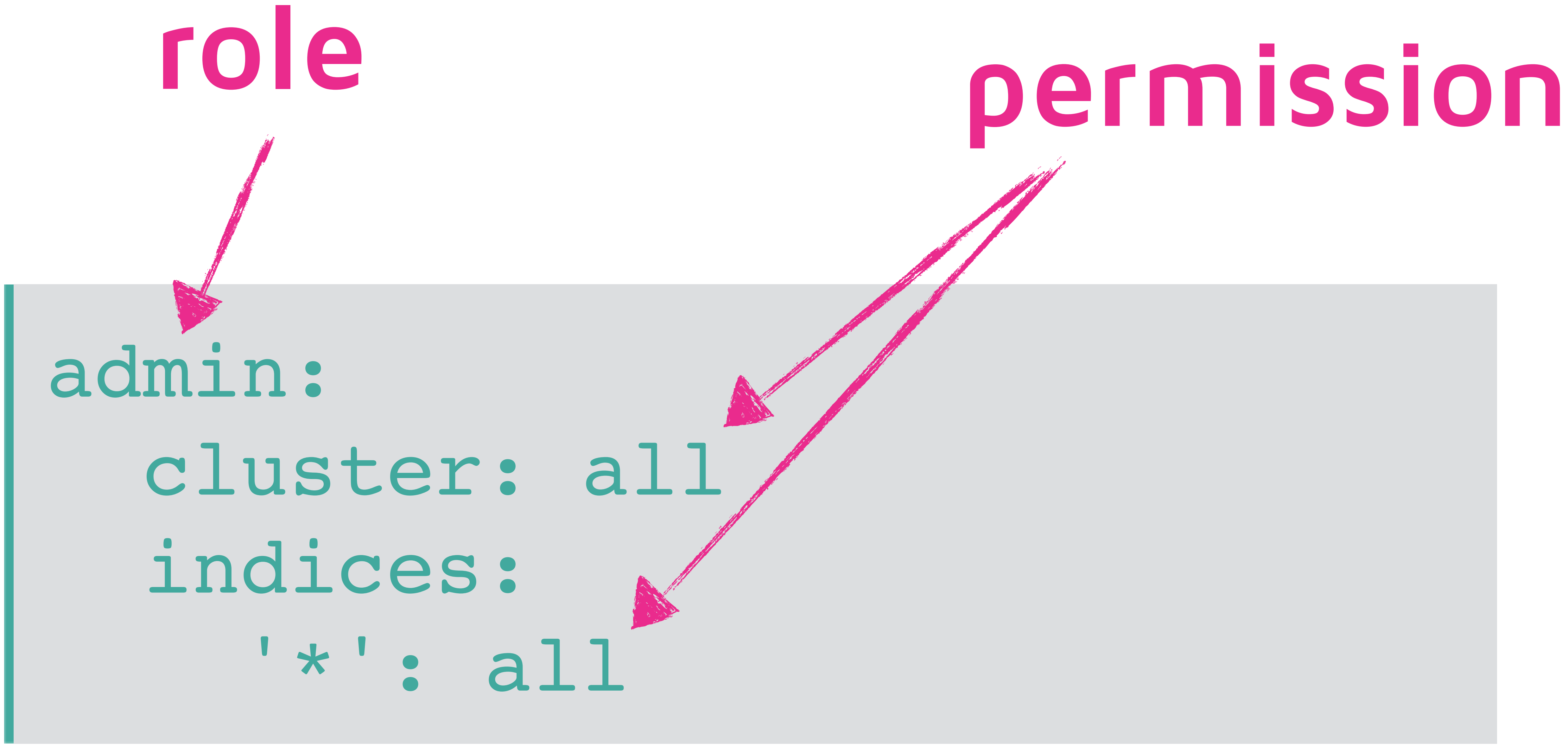
  set of indices/aliases specific privileges

- privilege

  set of one or more action names

  `/_search ↔ indices:data/read/search`

Role Based Access Control



```
admin:
  cluster: all
  indices:
    '*': all
```

Authorization

```
user:
  indices:
    '*': read
```

```
events_user:
  indices:
    'events_*': read
```

Authorization

```
logfile_user_readonly:
  indices:
    "logstash-201?-*": read
```

```
get_user:
  indices:
    'events_index': 'indices:data/read/get'
```

Audit Trail

- Writes an own audit log file
- Implemented as logger
- Logs different types of event based on log level

  (ip filtering, tampered requests, access denied, auth failed)

```
shield.audit.enabled: true
```

elastic

Integration

- Transport Client
- Logstash
- Kibana 3/4
- Watcher
- Marvel

Transport Client

```
TransportClient client = new TransportClient(builder()
  .put("cluster.name", "myClusterName")

  .put("shield.user", "test_user:changeme")

  .put("shield.ssl.keystore.path", "/path/to/client.jks")
  .put("shield.ssl.keystore.password", "password")
  .put("shield.transport.ssl", "true"))

  .addTransportAddress(new
InetSocketTransportAddress("localhost", 9300));
```

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Who?

- Use-case 1: Monitoring application

- No write access

- Cluster Health
- Nodes stats/info
- Indices Stats

Use-case 2: Logstash

- No read access (unless input is used)
- Indices: Indexing
- Cluster: Index templates

Use-case 3: Marvel

```
marvel_user:
  cluster: cluster:monitor/nodes/info,
           cluster:admin/plugin/license/get
  indices:
    '.marvel-*': all

marvel_agent:
  cluster: indices:admin/template/get,
           indices:admin/template/put
  indices:
    '.marvel-*': indices:data/write/bulk, create_index
```

Use-case 4: Ecommerce

```
bulk:
  indices:
    'products_*': write, manage, read

updater:
  indices:
    'products': index, delete, indices:admin/optimize

webshop:
  indices:
    'products': search, get
```

Use-case 4: Ecommerce

```
monitoring:
  cluster: monitor
  indices:
    '*': monitor

sales_rep :
  indices:
      'sales_*' : all
      'social_events' : data_access, monitor
```

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Next?

- Simplify SSL configuration
- API driven user/role management
- Open up realms API
- Field-level security
- Index Audit Trail into ES

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Thanks for listening!

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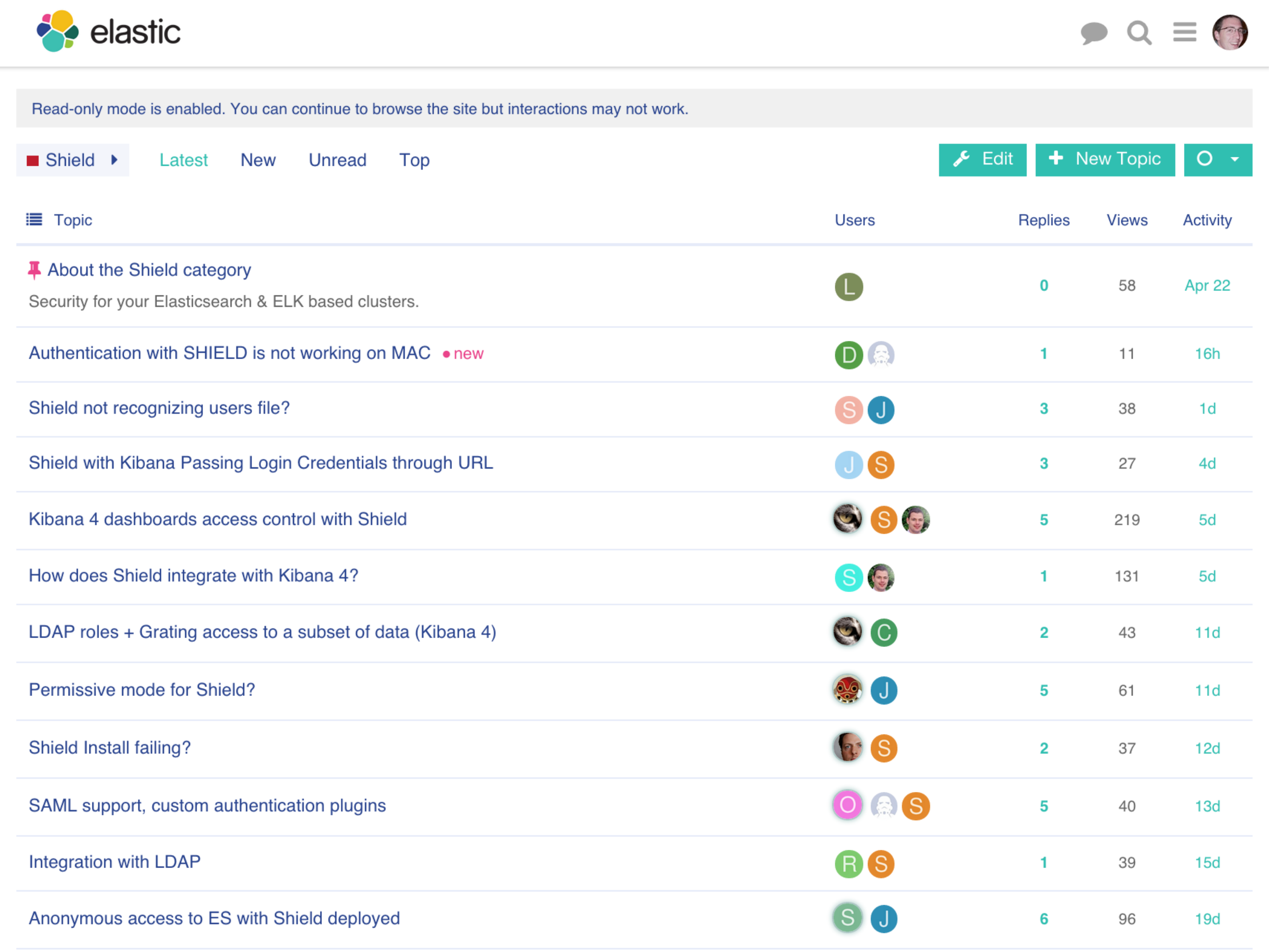
Resources

- Shield documentation
  https://www.elastic.co/guide/en/shield/current/index.html

- Shield: Security in ELK
  https://www.elastic.co/elasticon/2015/sf/security-in-elk

- Shield and Beyond: Recommendations for a Secure ELK Environment
  https://www.elastic.co/webinars/shield-and-beyond

Resources

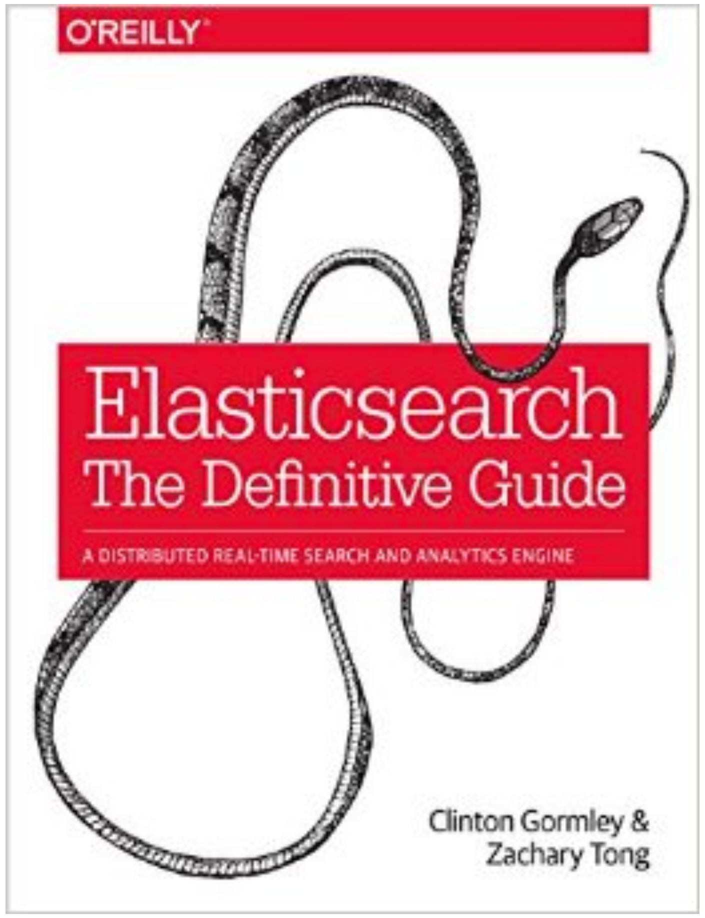


Read-only mode is enabled. You can continue to browse the site but interactions may not work.

Topic	Users	Replies	Views	Activity
About the Shield category Security for your Elasticsearch & ELK based clusters.	L	0	58	Apr 22
Authentication with SHIELD is not working on MAC ● new	D	1	11	16h
Shield not recognizing users file?	S J	3	38	1d
Shield with Kibana Passing Login Credentials through URL	J S	3	27	4d
Kibana 4 dashboards access control with Shield	S	5	219	5d
How does Shield integrate with Kibana 4?	S	1	131	5d
LDAP roles + Grating access to a subset of data (Kibana 4)	C	2	43	11d
Permissive mode for Shield?	J	5	61	11d
Shield Install failing?	S	2	37	12d
SAML support, custom authentication plugins	O S	5	40	13d
Integration with LDAP	R S	1	39	15d
Anonymous access to ES with Shield deployed	S J	6	96	19d

https://discuss.elastic.co/c/shield

Resources

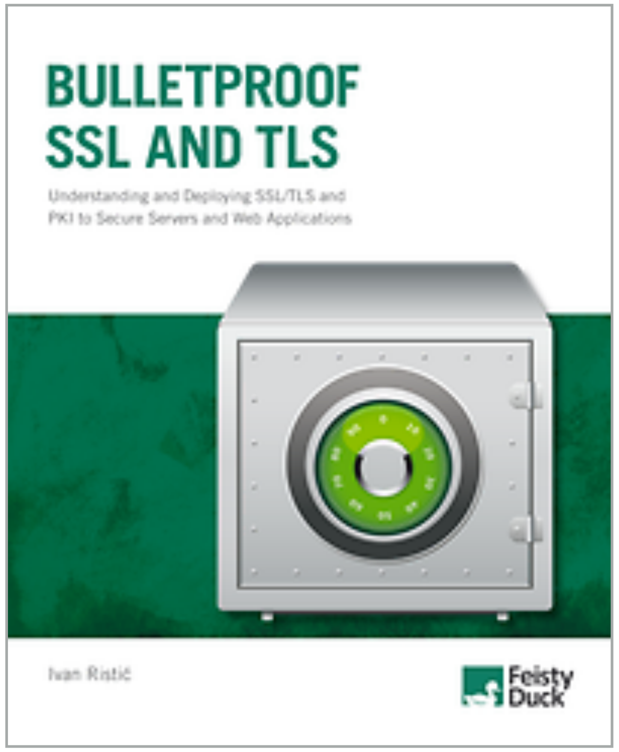


O'REILLY

Elasticsearch The Definitive Guide

A DISTRIBUTED REAL-TIME SEARCH AND ANALYTICS ENGINE

Clinton Gormley & Zachary Tong

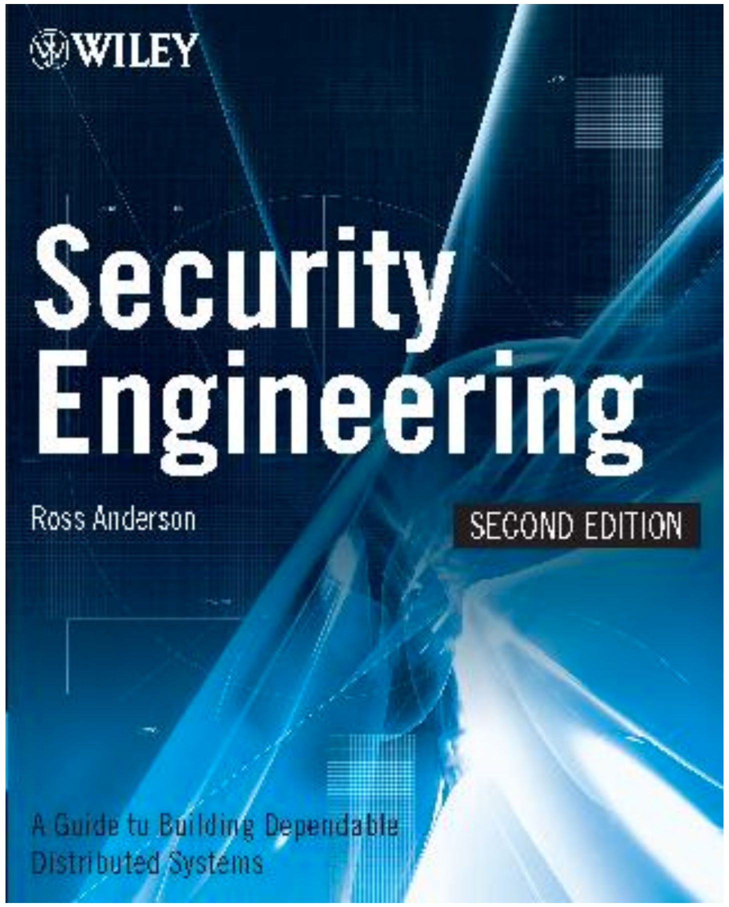


BULLETPROOF SSL AND TLS

Understanding and Deploying SSL/TLS and PKI to Secure Servers and Web Applications

Ivan Ristić

Feisty Duck



WILEY

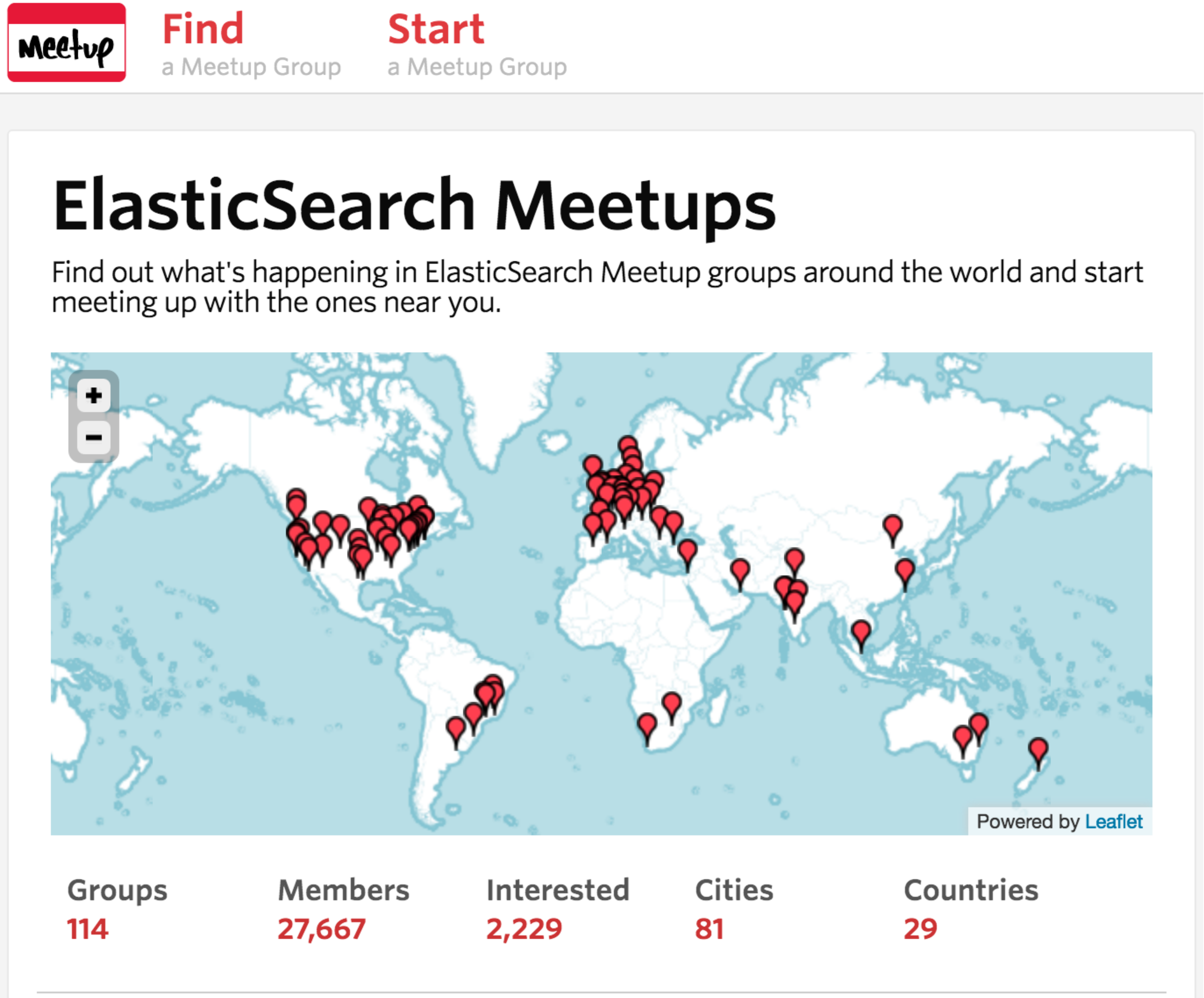
Security Engineering

Ross Anderson

SECOND EDITION

A Guide to Building Dependable Distributed Systems

Resources



Find a Meetup Group

Start a Meetup Group

ElasticSearch Meetups

Find out what's happening in ElasticSearch Meetup groups around the world and start meeting up with the ones near you.

Groups	Members	Interested	Cities	Countries
114	27,667	2,229	81	29

Q & A

Thanks for listening!

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