



Operating Elasticsearch in Kubernetes

[Container Conf]

MIKKEL LARSEN

[@mikkeloscar](#)

OLIVER TROSIEN

[@otrosien](#)

2019-11-14



WHO ARE WE?



Oliver
Core Search Services
Elasticsearch



Mikkel
Cloud Infrastructure
Kubernetes

SEARCH @ ZALANDO

400k+

Products
per country

65%

Mobile Traffic

~2500

Brands

15K

QPS

~1000

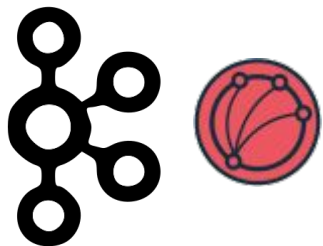
Categories

8K

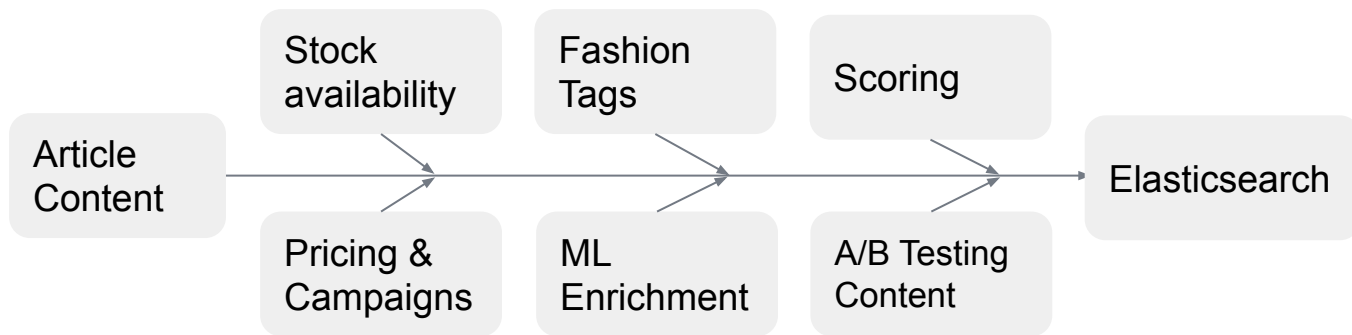
Updates/s



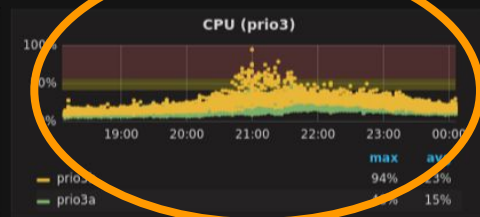
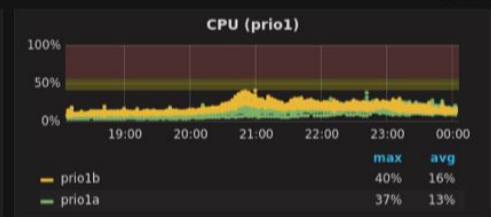
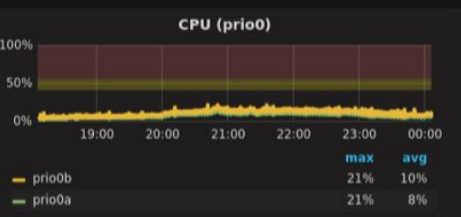
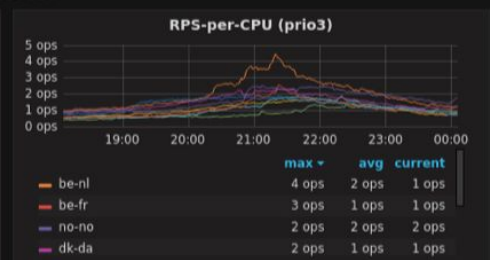
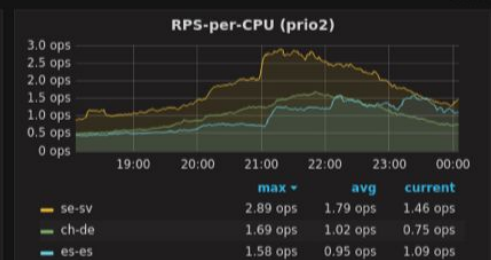
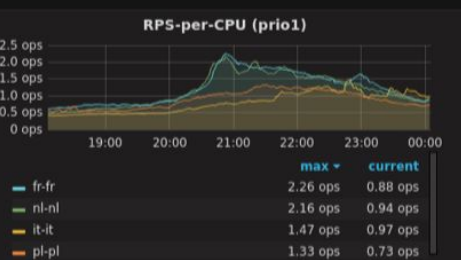
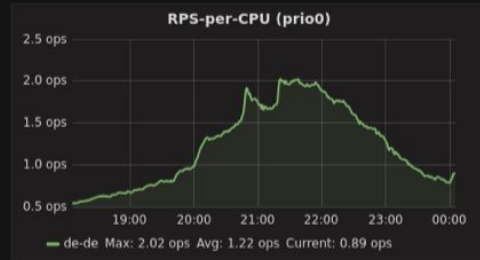
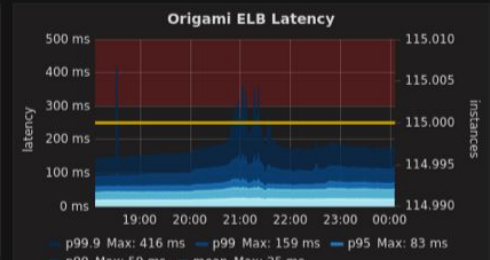
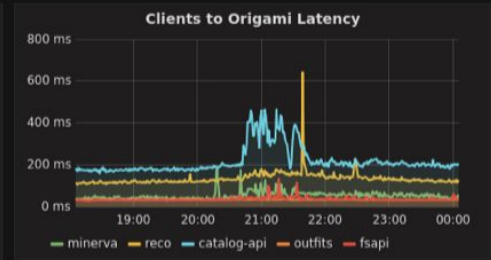
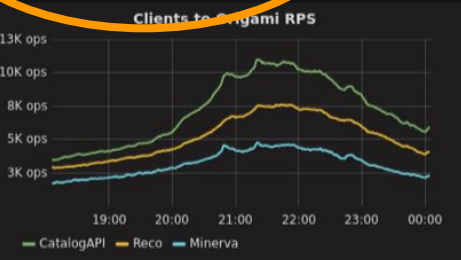
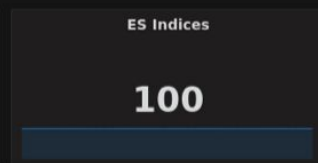
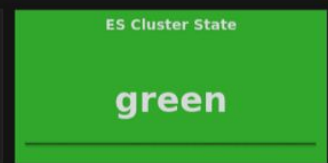
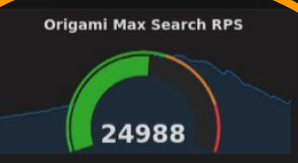
DATA INGESTION



Kafka / Nakadi *



* nakadi.io

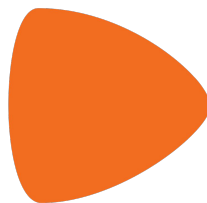


KUBERNETES @ ZALANDO

Default
Deployment
Target

3500~
nodes

Since
Oct 2016



zalando

143
clusters

Node
Autoscaling

From **v1.4**
to **v1.14**

RUNNING ELASTICSEARCH IN KUBERNETES

1. **Safe automatic updates**
(Including Kubernetes cluster updates)
2. **Advanced auto-scaling for operational stability and cost efficiency**

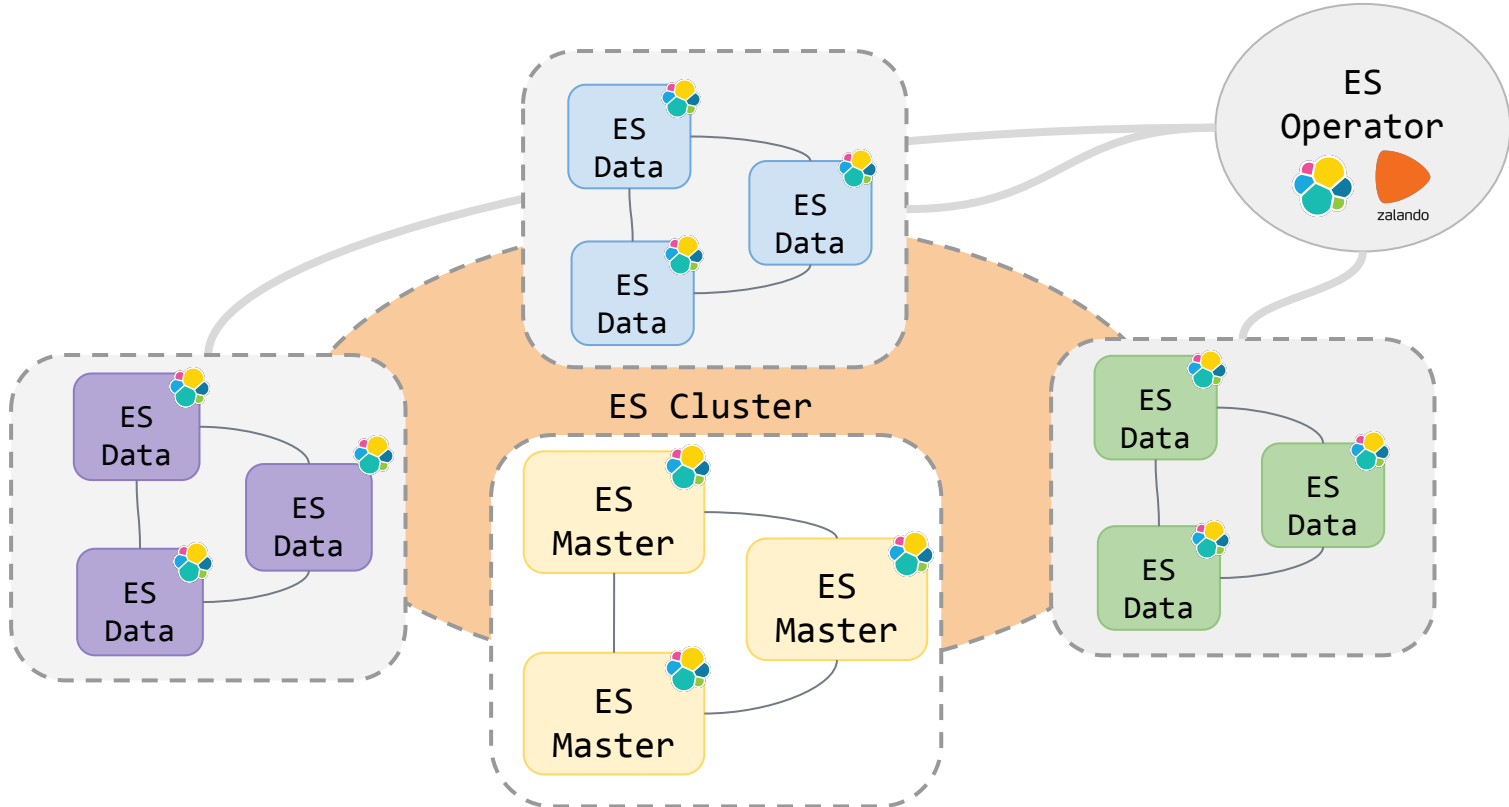


ELASTICSEARCH DATA SETS

```
apiVersion: zalando.org/v1
kind: ElasticsearchDataSet
metadata:
  name: test-cluster
spec:
  scaling:
    {...}
  replicas: 3
  template: # PodTemplate
    {...}
  volumeClaimTemplates:
    {...}
```

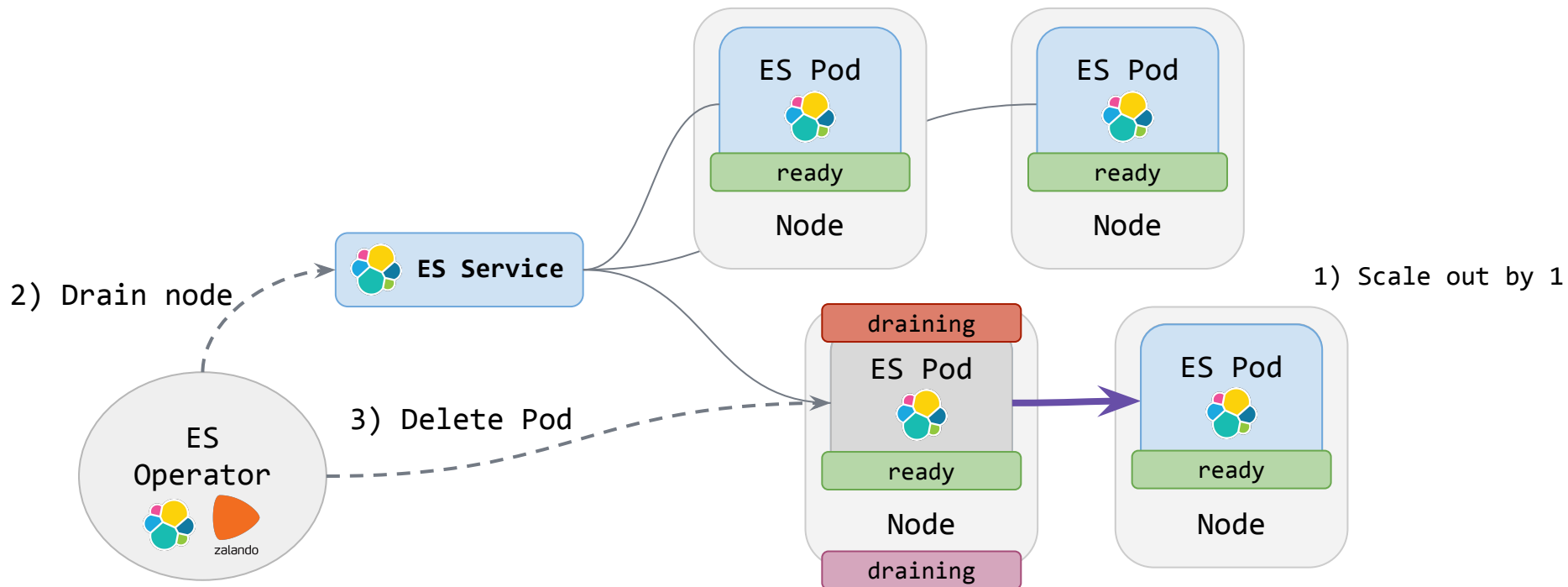
github.com/zalando-incubator/es-operator

ELASTICSEARCH DATA SETS



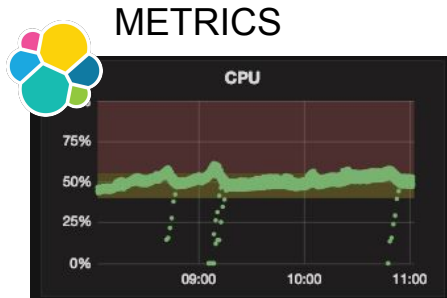
github.com/zalando-incubator/es-operator

UPDATING ELASTICSEARCH (OPERATOR)



github.com/zalando-incubator/es-operator

SCALING UP ELASTICSEARCH (1)

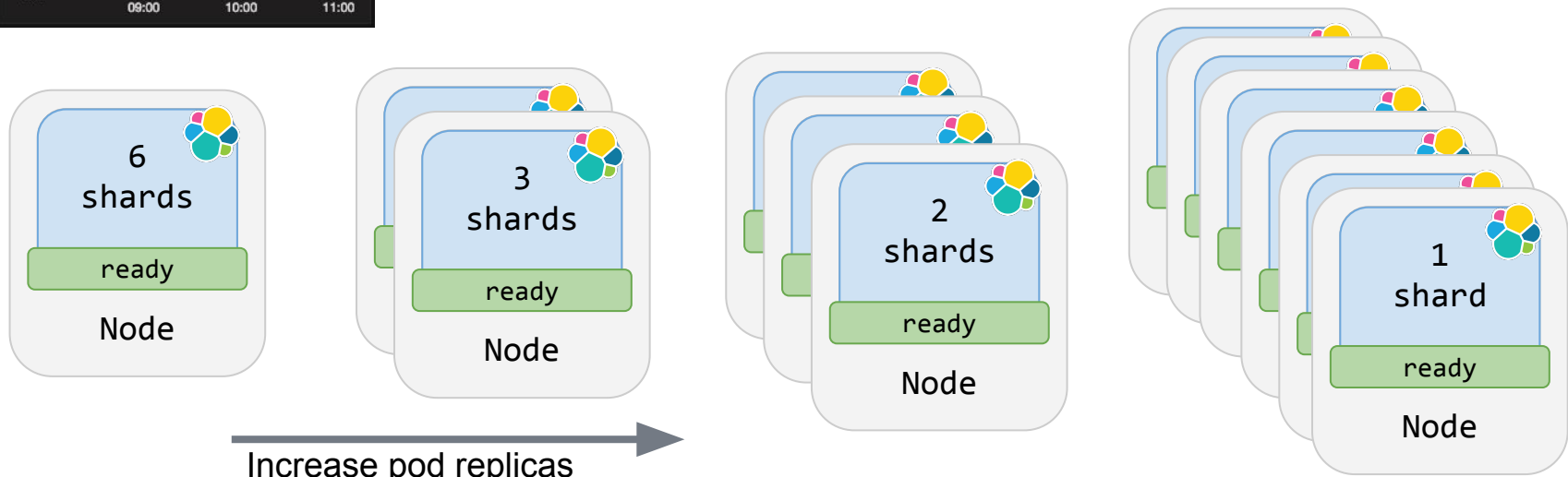


Thresholds

- CPU
- Duration
- Cooldown

Boundaries

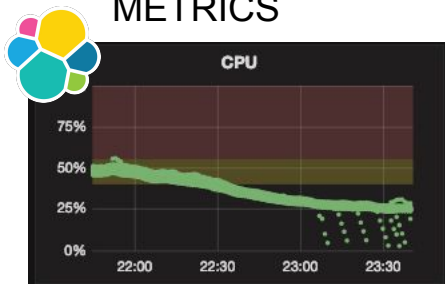
- Max # Pod replicas



SCALING DOWN ELASTICSEARCH

**DON'T OPERATE
WHEN CLUSTER
IS NOT GREEN!**

METRICS

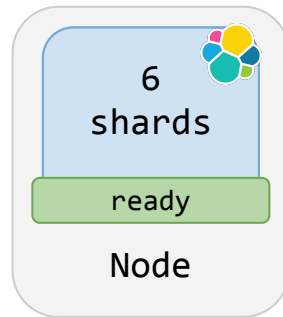
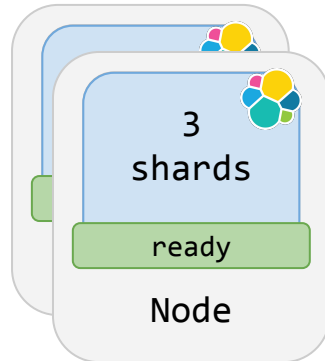
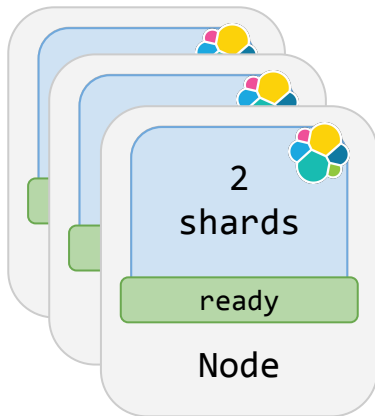
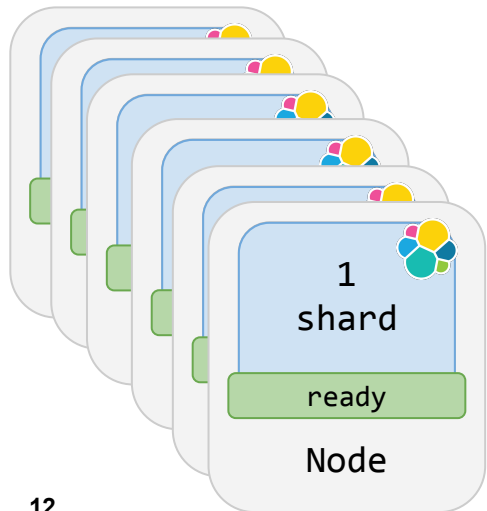


Thresholds

- CPU
- Duration
- Cooldown

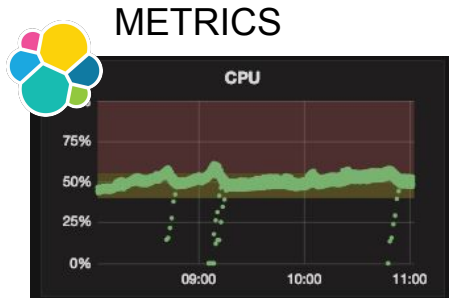
Boundaries

- Min # Replica
- Max # Shards per node
- Max disk usage (%)



Decrease Pod replicas →

SCALING UP ELASTICSEARCH (2)

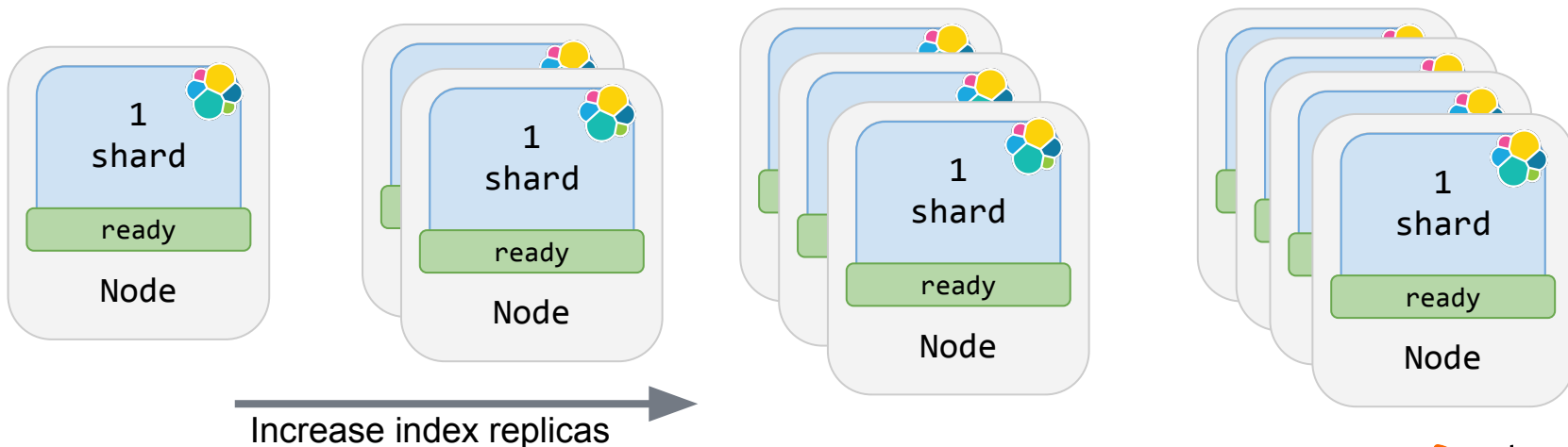


Thresholds

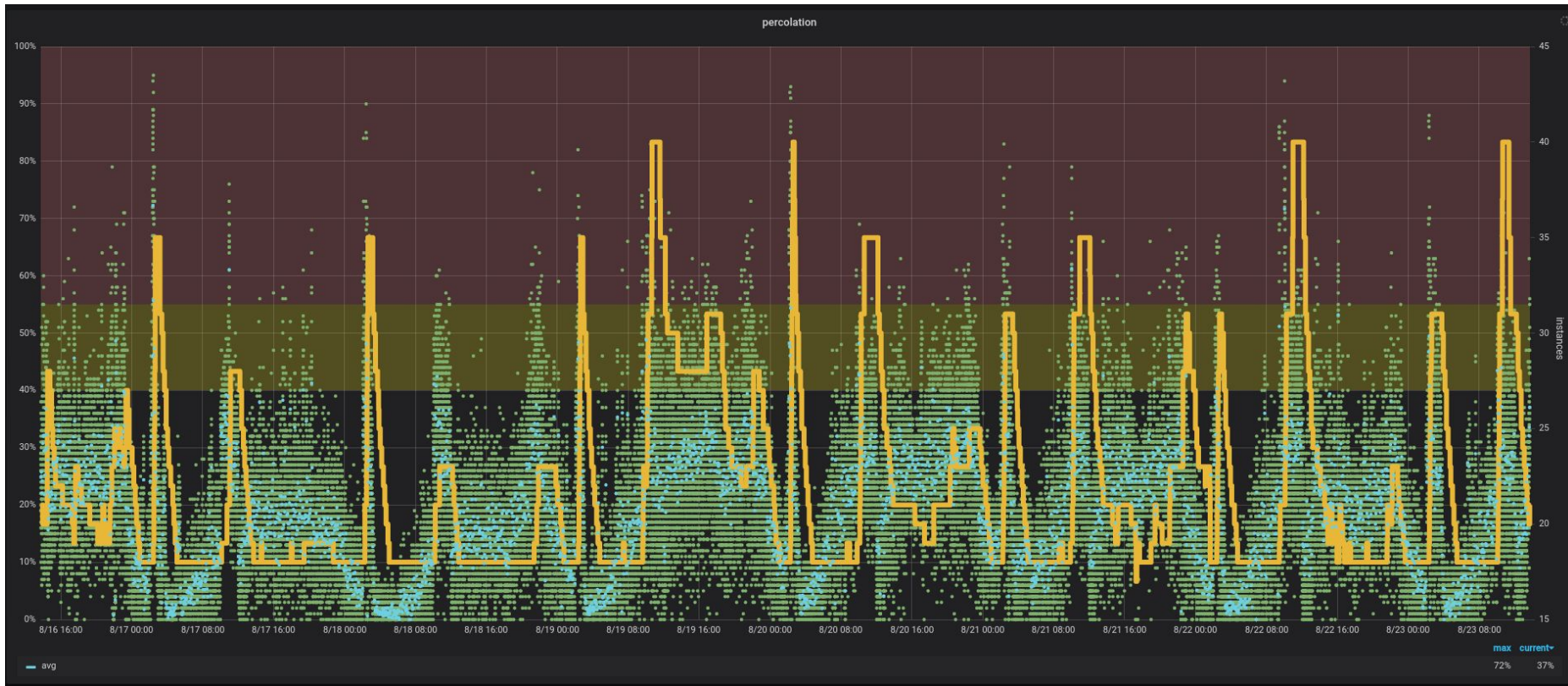
- CPU
- Duration
- Cooldown

Boundaries

- Min # Shards per node
- Max # Pod replicas



AUTO-SCALING STACK (7d)



SAFE SCALING IN PRODUCTION (7d)



HIGHLIGHTS / LOWLIGHTS

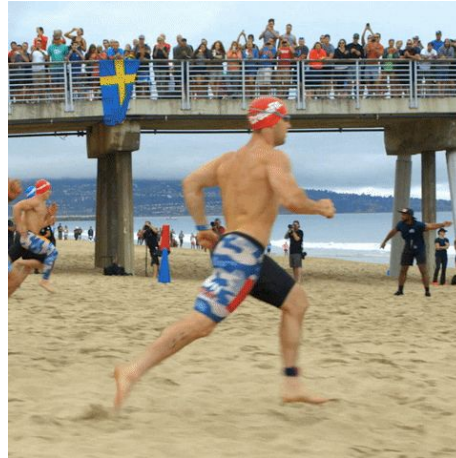


- Stacks more sensitive to sudden load spikes (Push Notifications, bot traffic, DDOS)
- Incidents



- Cost reduction
- Improved time-to-rollout of new features / upgrades
- Greatly reduced operational effort
- Helped other teams migrate their ES

DEMO



REFERENCES

ES Operator

github.com/zalando-incubator/es-operator

Demo

github.com/otrosien/es-operator-demo





MIKKEL LARSEN

mikkel.larsen@zalando.de

[@mikkeloscar](https://www.instagram.com/mikkeloscar)



OLIVER TROSIEN

oliver.trosien@zalando.de

[@otrosien](https://www.instagram.com/otrosien)



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