Metryki RED dla aplikacji REST z Prometheus + Grafana + AlertManager

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WOJCIECH BARCZYŃSKI

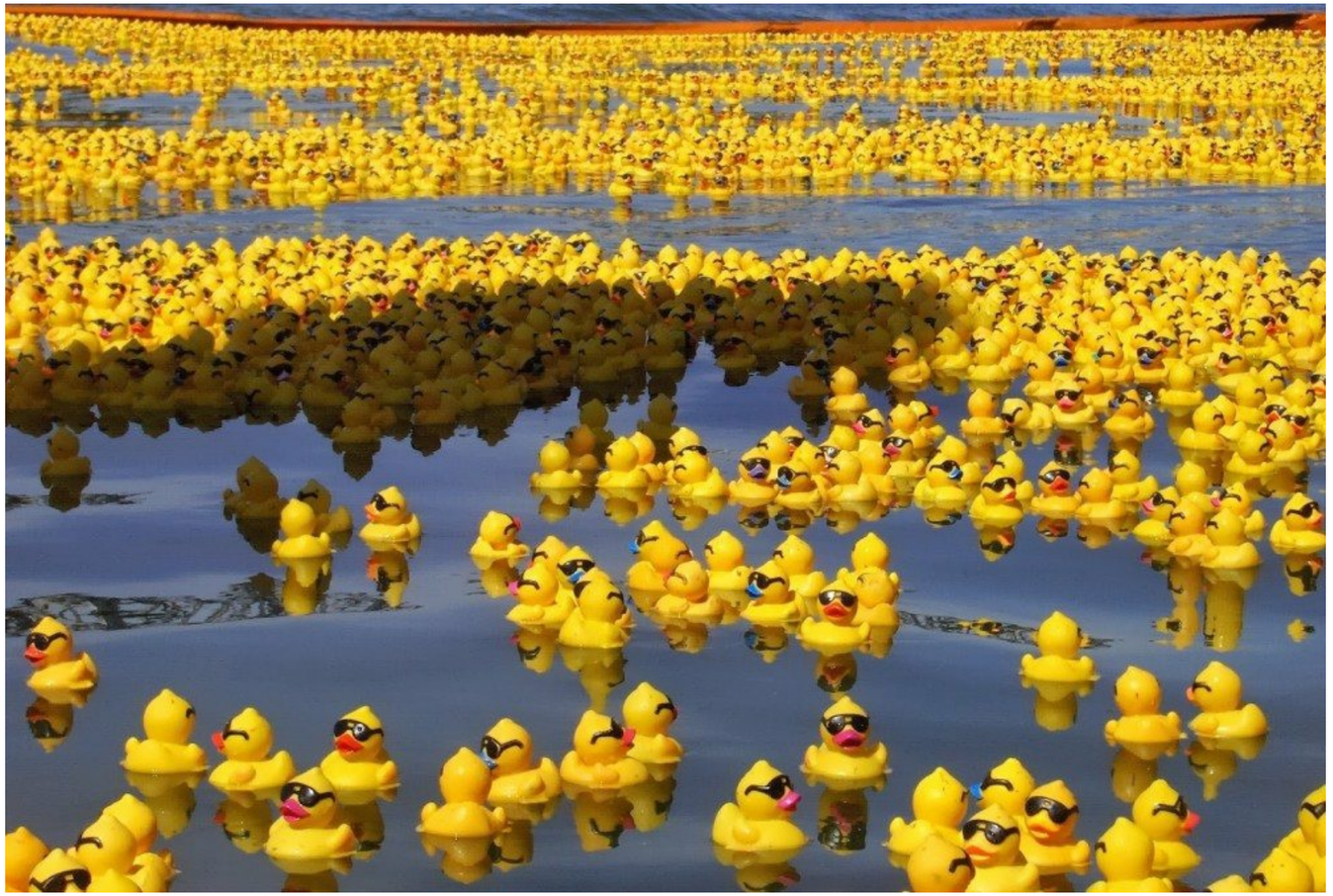
- Lead Software Developer - SMACC (FinTech/AI)
- Before:
  System Engineer i Developer Lyke
- Before:
  1000+ nodes, 20 data centers with Openstack
- Interests:
  Working software, Effective and Satisfied Teams

WHY?

MONOLIT ;)

WHY?

MICROSERVICES ;)



	Monitoring	Logging	Tracing
Setup	Easy	Diff	Diff
TCO	Low	Very High	High
Debuging	Low	High	High
Detecting	High	Low	Low

NOT A SILVER-BULLET

but:

- Easy to setup
- Immediately value

Suprisengly: the last one implemented

CENTRALIZED LOGGING

- Usually much too late
- Post-mortem
- Hard to find the needle
- Like a debugging vs testing

MONITORING

- Liczby
- Trendy
- Zależności

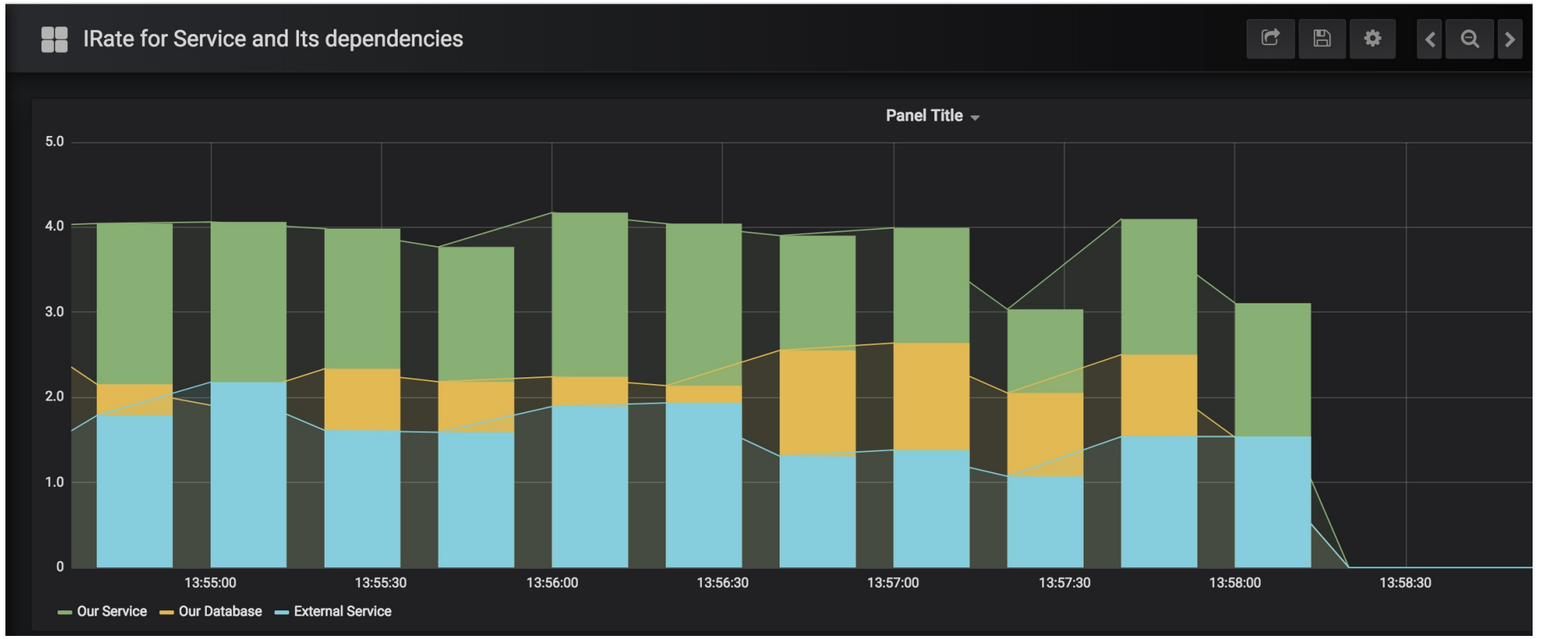
METRYKA

Nazwa	Etykiety	Wartość
traefik_requests_total	code="200", method="GET"	3001

MONITORING

Example from couchbase blog

MONITORING


IRate for Service and Its dependencies
Panel Title
5.0
4.0
3.0
2.0
1.0
0
13:55:00
13:55:30
13:56:00
13:56:30
13:57:00
13:57:30
13:58:00
13:58:30
Our Service
Our Database
External Service

JAK ZNALEŹĆ WŁAŚCIWE METRYKI?

JAK ZNALEŹĆ WŁAŚCIWE METRYKI?

- USE
- RED

USE

Utilization	the average time that the resource was busy servicing work
Saturation	extra work which it can't service, often queued
Errors	the count of error events

Documented and Promoted by Berdan Gregg

USE

- **U**tilization: as a percent over a time interval: "one disk is running at 90% utilization".
- **S**aturation:
- **E**rrors:

USE

- **Utilization**:
- **Saturation**: as a queue length. eg, "the CPUs have an average run queue length of four".
- **Errors**:

USE

- **utilization**:
- **saturation**:
- **errors**: scalar counts. eg, "this network interface drops packages".

USE

- **traditionaly** more instance oriented
- still useful in the microservices world

RED

Rate	How busy is your service?
Error	Errors
Duration	What is the latency of my service?

Tom Wilkie's guideline for instrumenting applications.

RED

- **Rate** - how many request per seconds handled
- **Error**
- **Duration** (distribution)

RED

- **Rate**
- **Error** - how many request per seconds handled we failed
- **Duration**

RED

- **Rate**
- **Error**
- **Duration** - how long the requests took

RED

- Follow Four Golden Signals by Google SREs [1]
- Focus on what matters for end-users

[1] Latency, Traffic, Errors, Saturation (src)

RED

- not recommended for batch-oriented or streaming services

PROMETHEUS

PROMETHEUS STACK

- Prometheus
- Alertmanager
- Grafana

PROMETHEUS

- Wide support for languages
- Metrics collected over HTTP *metrics/*
- Metrics in text

PROMETHEUS

- Large number of prometheus exporters
- Powerful query - PROMQL and alarm rule language
- Pull model [1]

[1] my preference

METRICS

- Counter - just up
- Gauge - up/down
- Summary
- Histogram - with predefined buckets

METRICS

Histogram:

`traefik_duration_seconds_bucket{method="GET,code="200"}`

{le="0.1"}	2229
{le="0.3"}	107
{le="1.2"}	100
{le="5"}	4
{le="+Inf"}	2

METRICS

Histogram / Summary:

- sum `_sum`
- count `_count`
- count / sum per bucket

METRIC COLLECTORS

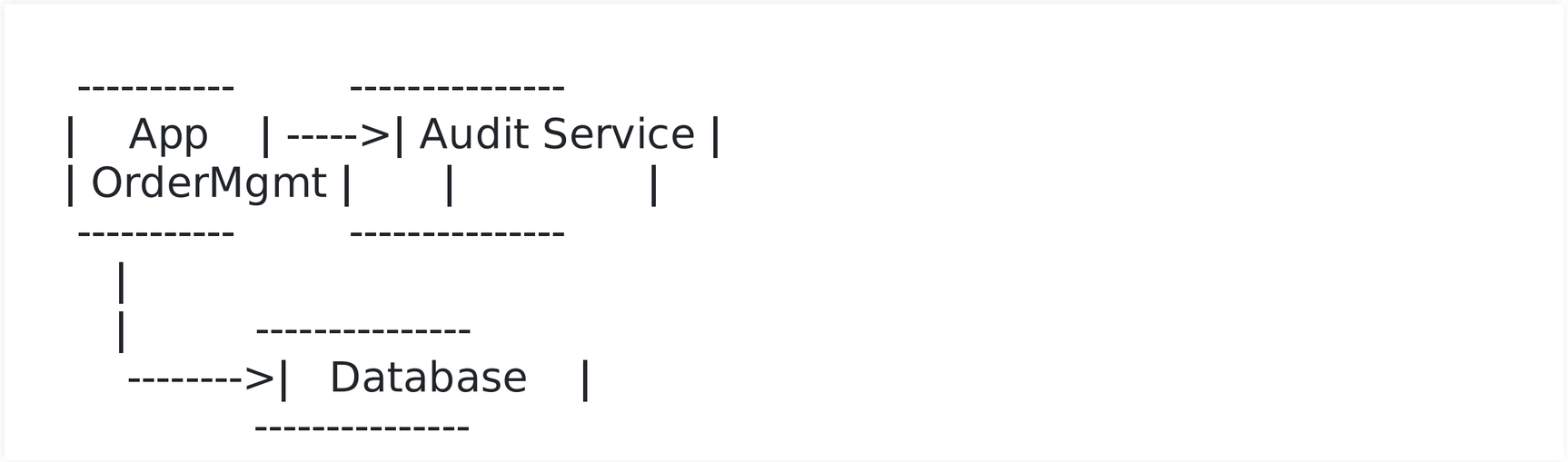
Histogram / Summary:

- latency of services
- Request or Request size

PYTHON CLIENT

- https://github.com/prometheus/client_python
- Counter
- Gauge
- Summary
- Histogram

SIMPLE REST SERVICE



SIMPLE REST SERVICE

```
curl 127.0.0.1:8080/hello
curl 127.0.0.1:8080/world
curl 127.0.0.1:8080/complex
```

SIMPLE REST SERVICE

```
curl 127.0.0.1:8080/complex?is_srv_error=True
curl 127.0.0.1:8080/complex?is_db_error=True
curl 127.0.0.1:8080/complex?db_sleep=3&srv_sleep=2
```

OPERATION ENDPOINTS

`metrics/`

Omited:

- *health/*
- *info/*
- *alertrules/*

DEMO: PYTHON CODE

- Metric Definition
- Metric Collection
- Exposing metrics `metrics/`

DEMO: PROM STACK

- Prometheus dashboard and config
- AlertManager dashboard and config
- Simulate the successful and failed calls
- Simple Queries for rate

PROMETHEUS - PROMQL

```
sum(irate(order_mgmt_duration_seconds_count{job=~".*"}[1m]))
   by (status_code)
```

PROMETHEUS - PROMQL

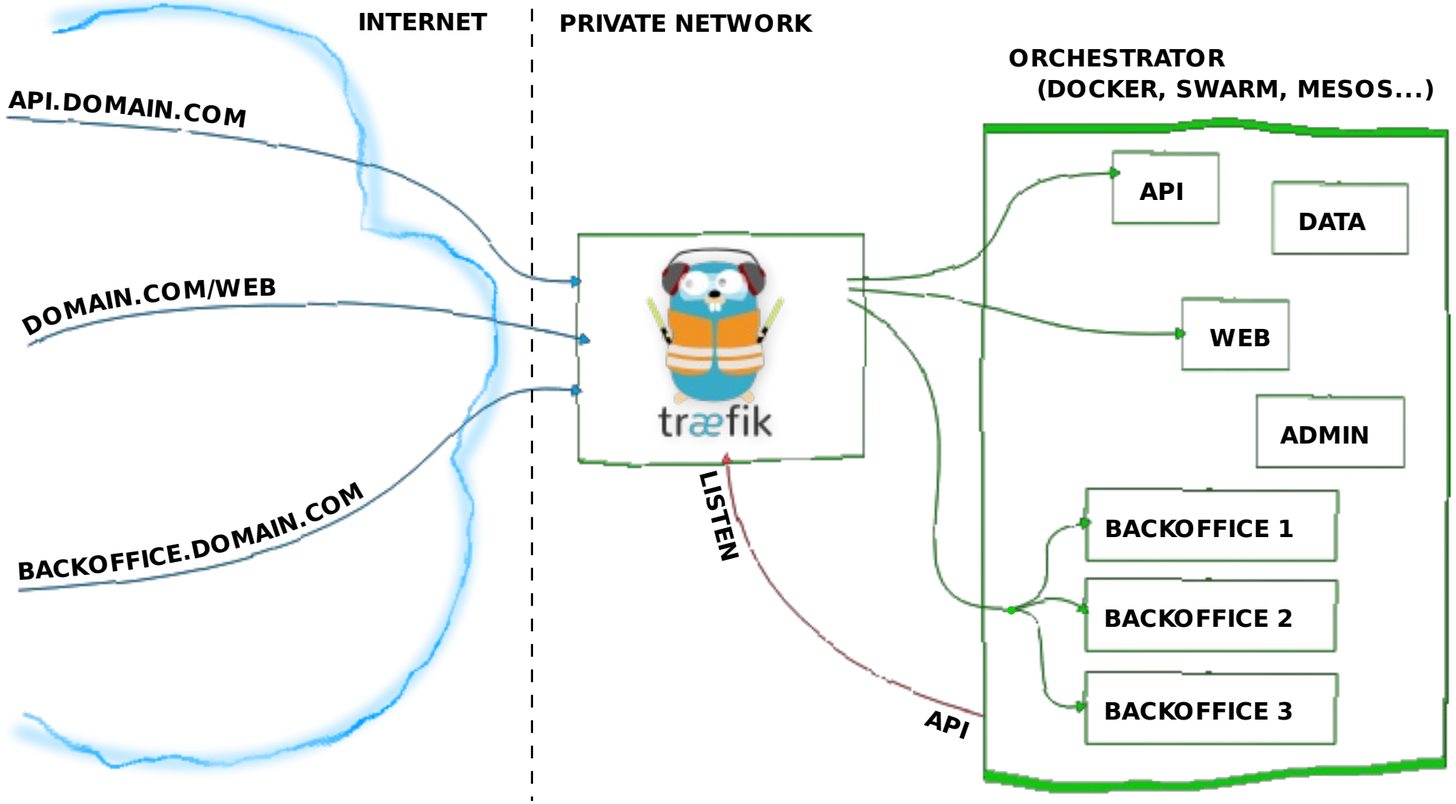
```
order_mgmt_duration_seconds_sum{job=~".*"} or
order_mgmt_database_duration_seconds_sum{job=~".*"} or
order_mgmt_audit_duration_seconds_sum{job=~".*"}
```

PROMETHEUS EXPORTERS

- Mongodb
- Postresql
- ...

Example

MONITORING INGRESS

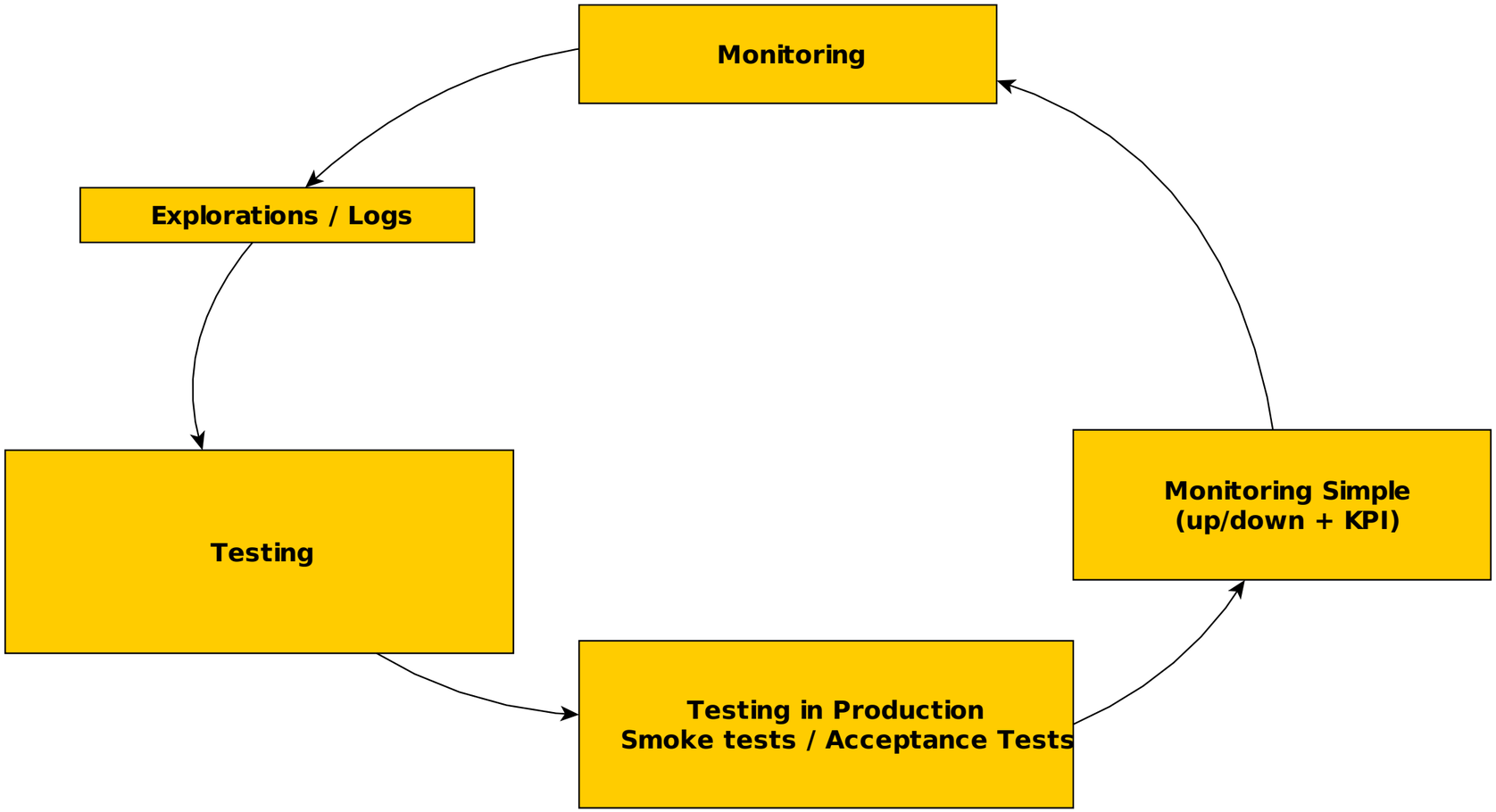


- --web.metrics.prometheus

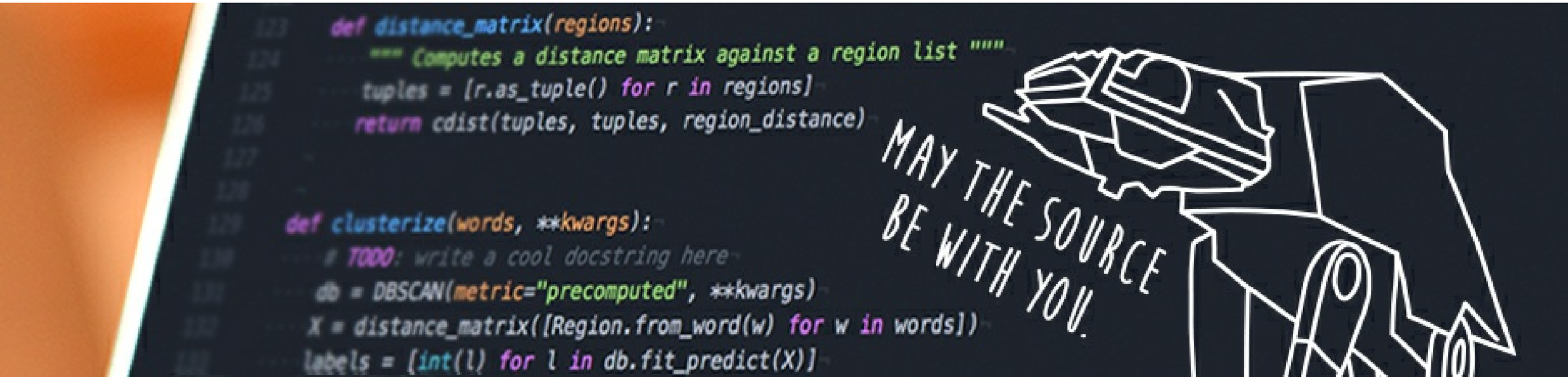
SUMMARY

- Monitoring saves your time
- Checking logs **Kibana** to check whether your component works is like debuging vs having tests
- Logging -> high TCO

SUMMARY


Monitoring
Explorations / Logs
Testing
Testing in Production
Smoke tests / Acceptance Tests
Monitoring Simple
(up/down + KPI)

THANK YOU


def distance_matrix(regions):
""" Computes a distance matrix against a region list """
tuples = [r.as_tuple() for r in regions]
return cdist(tuples, tuples, region_distance)
def clusterize(words, **kwargs):
# TODO: write a cool docstring here
db = DBSCAN(metric="precomputed", **kwargs)
X = distance_matrix([Region.from_word(w) for w in words])
labels = [int(l) for l in db.fit_predict(X)]
MAY THE SOURCE
BE WITH YOU.

Warsaw Office in BL Astoria:

SMACC

Go

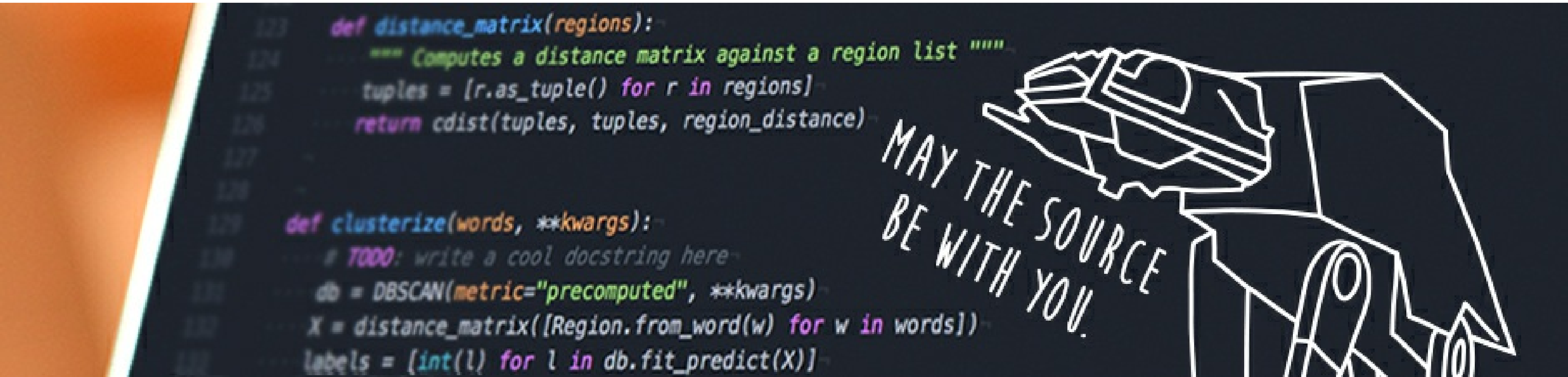
PYTORCH

TensorFlow™

amazon web services™

Azure

QUESTIONS?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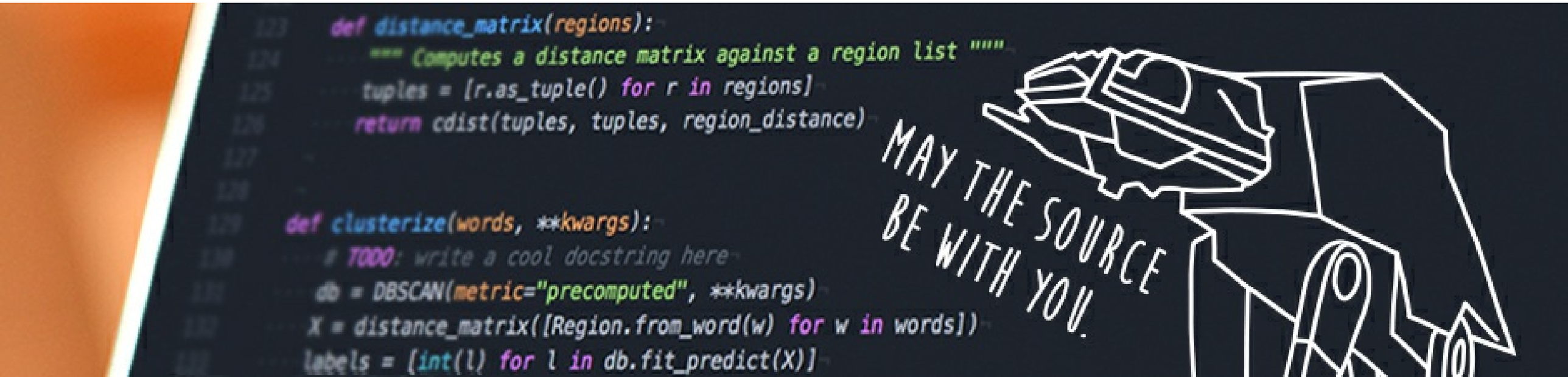
MAY THE SOURCE
BE WITH YOU.

BACKUP SLIDES



USE LABELS IN ALERT RULES

```
ALERT ProductionAppServiceInstanceDown
  IF up { environment = "production", app =~ ".+"} == 0
  FOR 4m
  ANNOTATIONS {
      summary = "Instance of {{$labels.app}} is down",
      description = " Instance  {{$labels.instance}} of app {{$labels.app}}
  }
```

see ../src/prometheus/etc/alert.rules

USE LABELS IN ALERT ROUTING

Call somebody if the label is `severity=page`:

```
---
 group_by: [cluster]
 # If an alert isn't caught by a route, send it to the pager.
 receiver: team-pager
 routes:
  - match:
      severity: page
    receiver: team-pager

receivers:
- name: team-pager
  opsgenie_configs:
  - api_key: $API_KEY
    teams: example_team
```

see ../src/alertmanager/*.conf

PUSHING METRICS

- See: https://prometheus.io/docs/instrumenting/pushing/

METRIC NAMES

Which one is better?

- request_duration{app=my_app}
- my_app_request_duration

METRIC NAMES

Which one is better?

- order_mgmt_db_duration_seconds_sum
- order_mgmt_duration_seconds_sum{dep_name='db'}

PROMETHEUS + K8S = :)

LABELS ARE PROPAGATED FROM K8S TO PROMETHEUS

INTEGRATION WITH PROMETHEUS

`cat memcached-0-service.yaml`

```
---
  apiVersion: v1
  kind: Service
  metadata:
    name: memcached-0
    labels:
      app: memcached
      kubernetes.io/name: "memcached"
      role: shard-0
    annotations:
      prometheus.io/scrape: "true"
      prometheus.io/scheme: "http"
      prometheus.io/path: "metrics"
      prometheus.io/port: "9150"
  spec:
```

https://github.com/skarab7/kubernetes-memcached