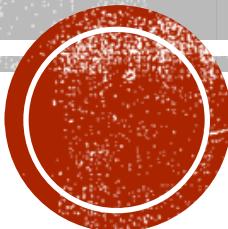


METRICS AND OBSERVABILITY IN .NET CORE: WHY, HOW AND WHAT

Alper HANKENDİ
Hepsiburada



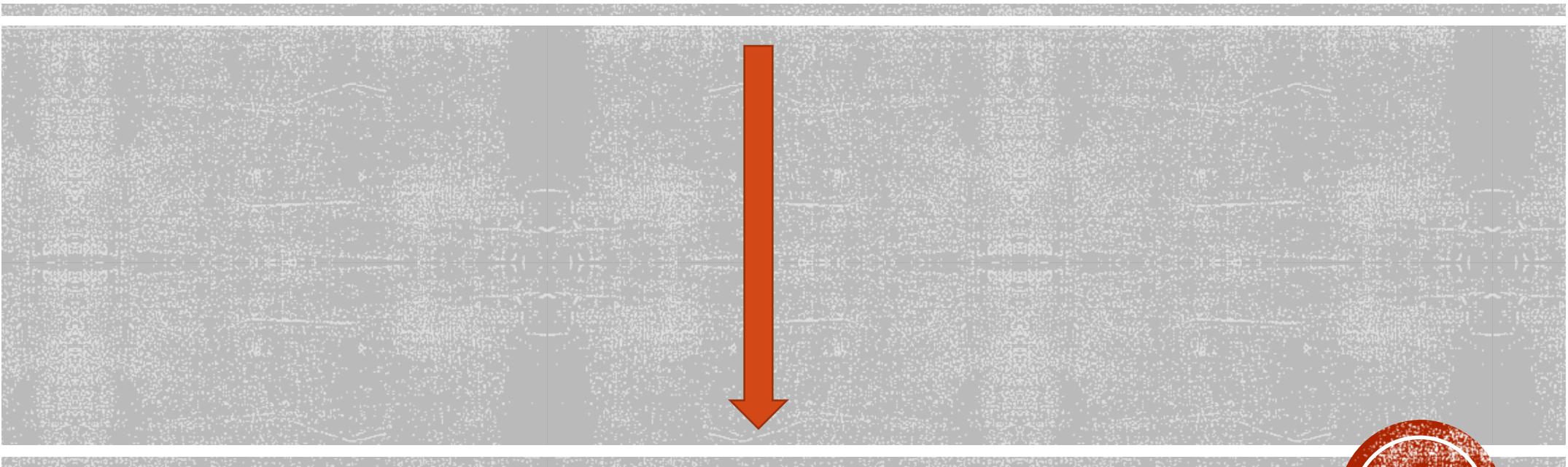
 alper_hankendi

GÜNDEM

- Üretilen İş Değeri (Business Value) nedir?
- İzleme ve gözlemlemeye farklı bir bakış
- Rakamların Önemi
- Gözlemlenenin ana unsurları
 - Log
 - Metrics
 - Alarm / Visualization
 - Distributed Systems Tracing
- Gözlemlenebilir sistem yapısı ve örnekleri

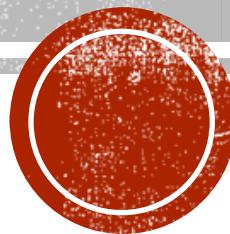


KOD YAZIYORUZ

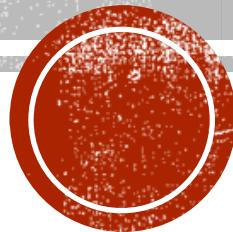


DEĞER YARATIYORUZ

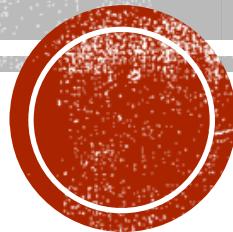
**NEDİR BU “DEĞER” ?
(BUSINESS VALUE)**



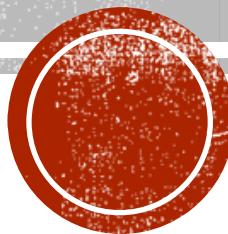
**İŞ DEĞERİ, MÜŞTERİ
MEMNUYETİ VEYA GELİR
ARTIŞINI OLASI KILAR.**



**DAHA FAZLA DEĞER
YARATMAK İSTİYORUZ.**

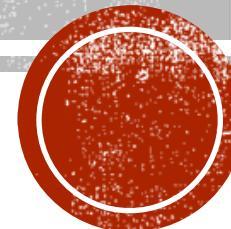


**UYGULAMA/KODUMUZ
ÜZERİNDE DAHA İYİ
KARARLAR ALMAK
ZORUNDAYIZ.**

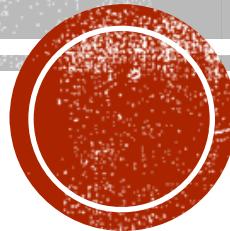


KODUMUZ YAZILDIĞI ZAMAN
“İŞ DEĞERİ” YARATMAZ.

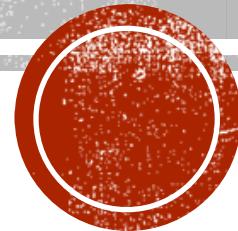
ÇALIŞTIĞI ZAMAN YARATIR...



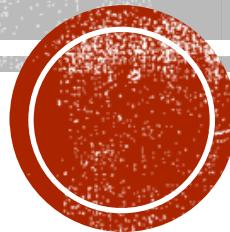
**ÖLÇMEDİKÇE ALDIĞIMIZ
KARARIN DOGRULUNU
BİLEMELYİZ**

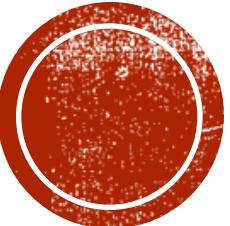


NEDEN ÖLÇMELİYİM?



**YAZDIĞIMIZ KODUN NE
OLDUGU VE NE YAPTIĞI
HAKKINDA BİR **MENTAL**
MODELE SAHİBİZ.**



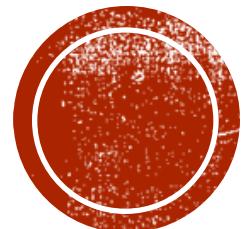


```
orderRepository.GetOrderCount(customerId);
```

```
orderRepository.GetOrder(customerId);
```

Hangi Kod daha hızlı çalışır?

```
public int GetOrderCount(string customerId)
{
    System.Threading.Thread.Sleep(1000); //test için ekledim.
    return session.GetCustomerCount(customerId);
}
```

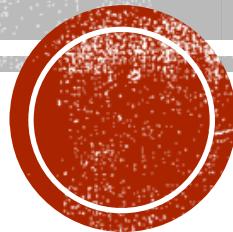


BİLEMİYİZ...

```
public IEnumerator<Order> GetOrder(string customerId)
{
    throw new AccessViolationException();

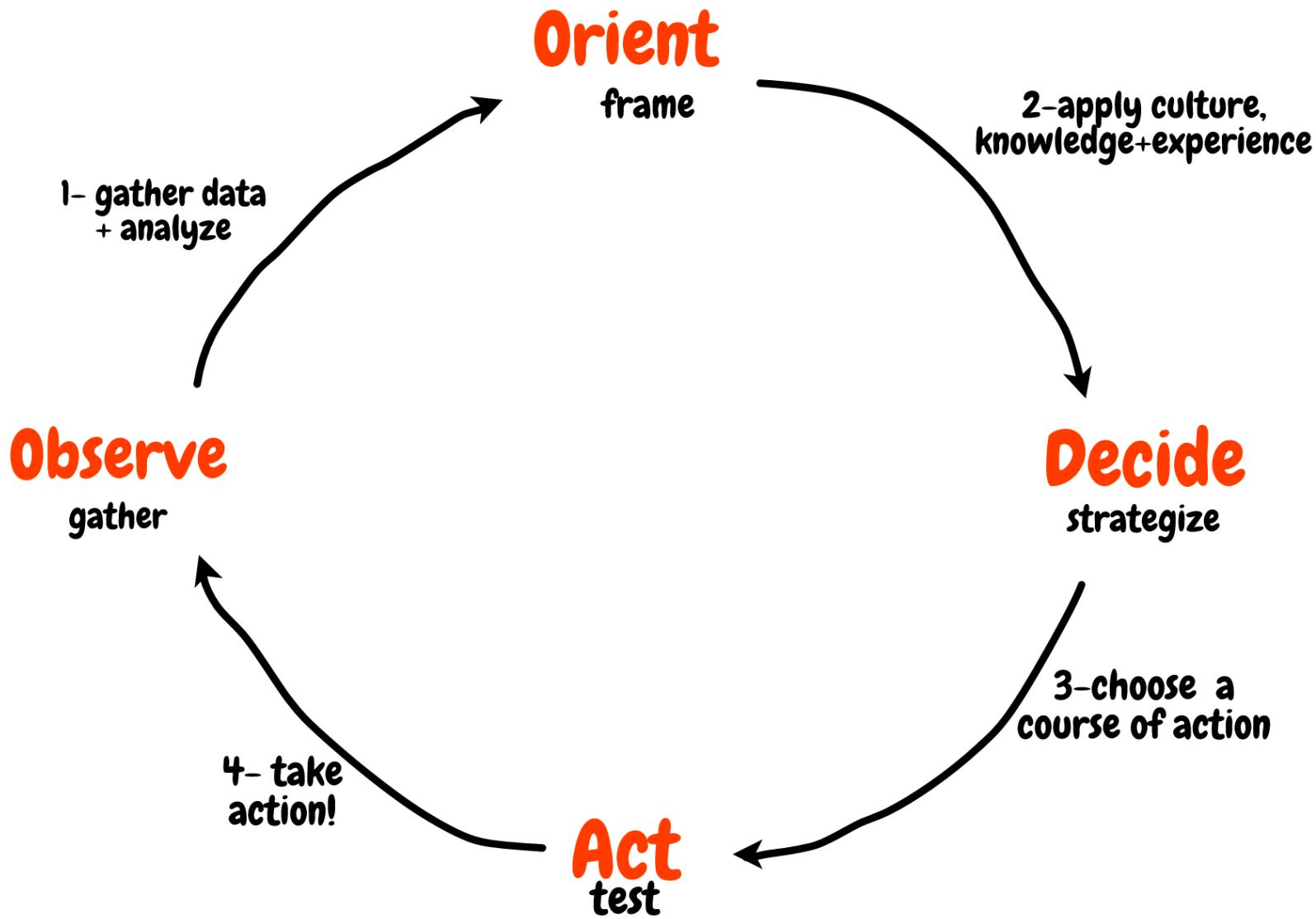
    return session.GetOrder(customerId);
}
```

**ÖLÇMEDİKÇE
BUNU BİLEMEMEYİZ.**



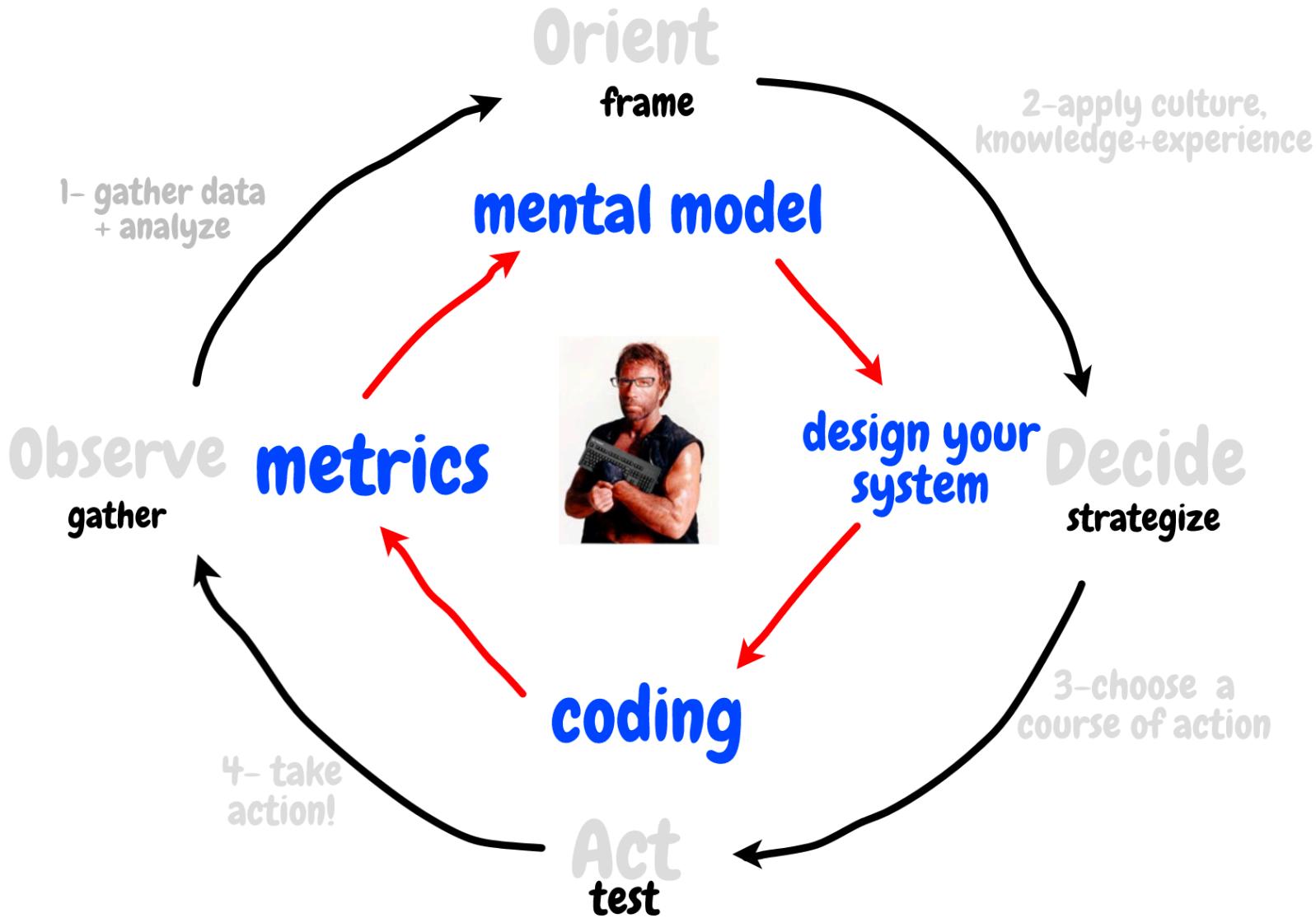
OODA Loop

John Boyd's Framework for action in problem



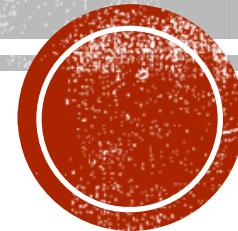
OODA Loop

John Boyd's Framework for action in problem





RAKAMLAR İLE ÖRNEKLER



“1 second of load lag time would cost Amazon \$1.6 billion in sales per year” ¹

- Amazon

“When load times jump from 1 seconds to 4 seconds, conversions decline sharply. For every 1 second of improvement, we experience a 2% conversion increase” ³

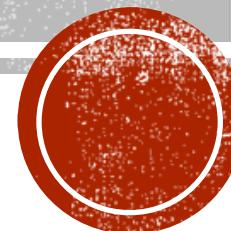
- Walmart

“A lag time of 400ms results in a decrease of 0.44% traffic - In real terms this amounts to 440 million abandoned sessions/month and a massive loss in advertising revenue for Google” ²

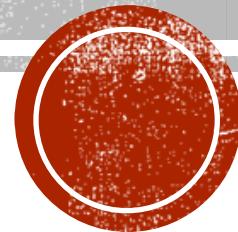
- Google

“An extra 0.5 seconds in each search page generation would cause traffic to drop by 20%” ²

- Google



İZLEME & GÖZLEMLEME ?





alperhankendi Update Readme.md

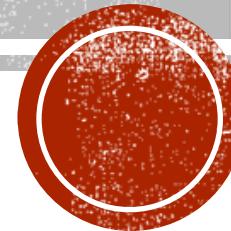
- 📁 01-Metric-Sample/[WebApiTracking.Sample](#)
- 📁 02-Metric-Sample-With-P8S-Grafana/[Metric-Sample](#)
- 📁 03-Health-Sample/[Health-Sample](#)
- 📁 04-Zipkin-Sample
- 📁 lib/[App.Metrics.Formatters.Prometheus](#)
- 📁 monitoring
- 📄 .gitignore
- 📄 Demo.sln
- 📄 Readme.md

<https://github.com/hepsiburada/Observability-Demo>



GÖZLEMLEMENİN 4 ANA BACAGI VARDIR.

- *Log aggregation/analytics*
- *Metrics*
- *Alerting / Visualization*
- *Distributed system tracing*

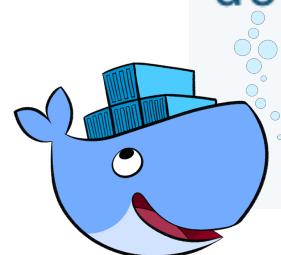


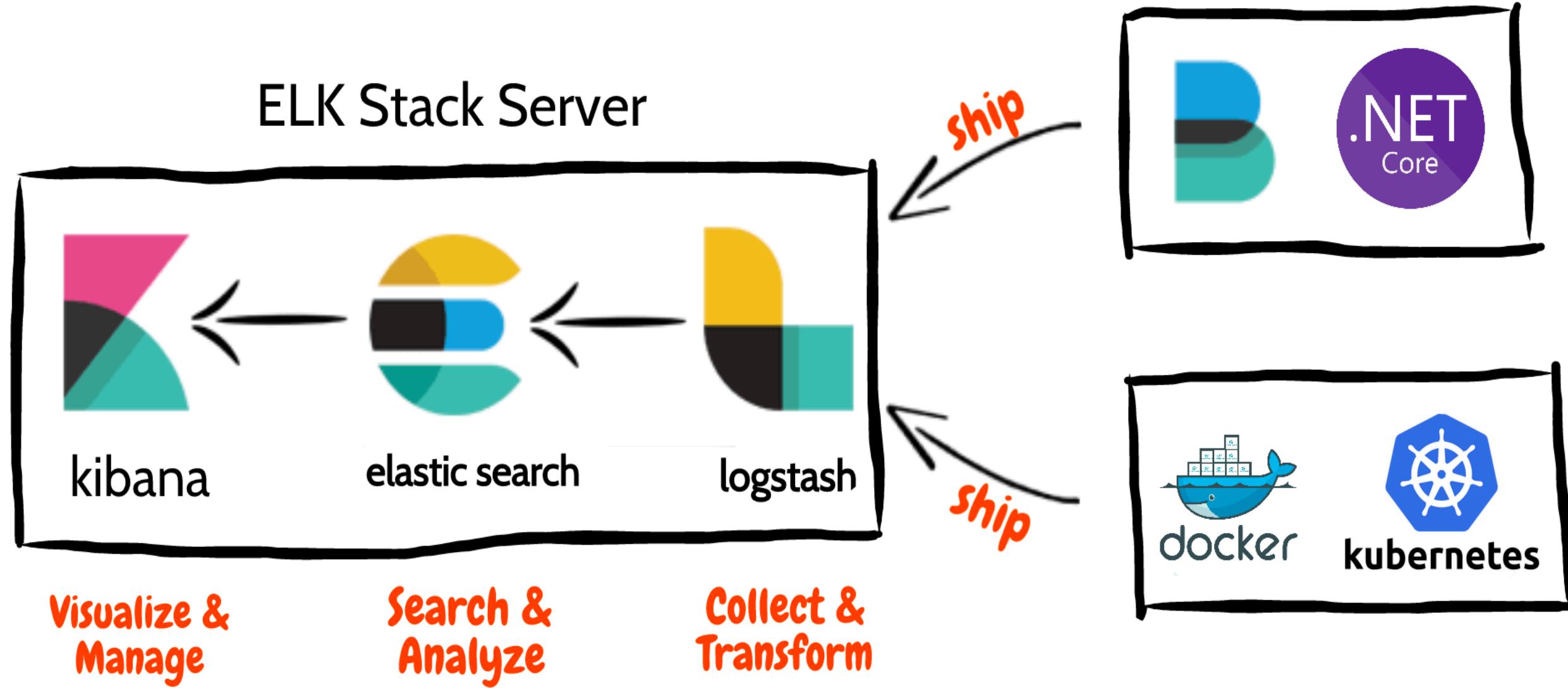
LOGGING

```
public void Configure(IApplicationBuilder app, IHostingEnvironment env, ILoggerFactory loggerFactory)
{
    loggerFactory.AddConsole(Configuration.GetSection("Logging")); //log levels set in your configuration
    loggerFactory.AddDebug(); //does all log levels
    //removed rest of code
}
```



```
docker run \
--log-driver gelf --log-opt gelf-address=udp://1.2.3.4:12201 \
alpine echo hello world
```





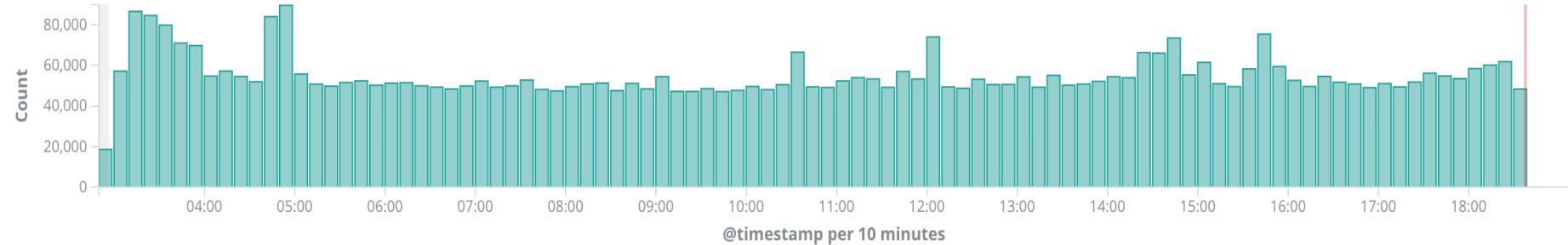


logstash-*

October 21st 2018, 02:56:29.480 - October 21st 2018, 19:06:44.290

Auto

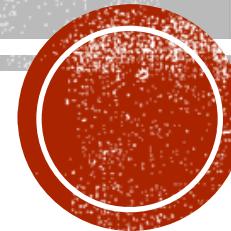
- Discover
- Visualize
- Dashboard
- Timelion
- APM
- Dev Tools
- Monitoring
- Management



Time	_source
▶ October 21st 2018, 18:37:43.720	<pre>image_id: sha256:e0dc833e8aceb87434e10950c39bab9450cdb3383f6908fb56b0b17c00e10ec6 version: 1.1 type: applicationlogs host: sf-mordor-test-01 RequestId: null container_name: navigation Application: null RequestPath: null Environment: null @version: 1 source_host: 192.168.57.22 image_name: 192.168.57.20:5000/navigation:1.1.313 created: October 20th 2018, 00:5 7:34.140 container_id: 68a14ccb3f26c1f42c5157ca30d18352349da36d8cd65318bee011bc1dab71ab severity: null logmsg: 2018-10-21T 8:37:43.7204430+03:00 [Information] [] (NavigationService.Api.Cache.CachingFeatureToggleService) [] Feature toggle cache loade</pre>
▶ October 21st 2018, 18:37:43.407	<pre>image_id: sha256:4c7ed89fc474ab9d57d540b534c661ed7bc4213a14be2af2b6938b599b44c511 version: 1.1 type: applicationlogs host: SF-Mordor-Prod-Nav-02 RequestId: null container_name: navigation.3.gk772flbpnsh70qj55m9eqsno loglevel: Error Application: null RequestPath: null @version: 1 source_host: 10.168.128.52 container_id: 6263bfd65f30826d1ec63bf6c89f5578 1e14be67d880276aff118cfcb54bf90d image_name: 192.168.57.20:5000/navigation@sha256:69b7e19b67a957e9da536b59613d2f3d8d6e3ee7154 f7b1f65672c21688ce422 created: October 11th 2018, 02:58:17.362 Environment: null severity: null log: [/search/searchterm/m</pre>
▶ October 21st 2018, 18:37:43.380	<pre>image_id: sha256:4c7ed89fc474ab9d57d540b534c661ed7bc4213a14be2af2b6938b599b44c511 version: 1.1 type: applicationlogs host: SF-Mordor-Prod-Nav-11 RequestId: null container_name: navigation.1.u0kpahdxwte02lb0nf5fxf9p8 loglevel: Error Application: null RequestPath: null @version: 1 source_host: 10.168.128.61 container_id: 5f5d95229873c05e481de34dca652b20 392428f87e354762018b4b4ed2c59d0c image_name: 192.168.57.20:5000/navigation@sha256:69b7e19b67a957e9da536b59613d2f3d8d6e3ee7154 f7b1f65672c21688ce422 created: October 5th 2018, 16:34:14.896 Environment: null severity: null log: [/categories/categoryi</pre>
▶ October 21st 2018, 18:37:43.279	<pre>image_id: sha256:451b2f57551f67c342be787ce54418f21fcbbdbc386136157c154912ec2ea79a version: 1.1 type: applicationlogs host: sf-mordor-backup-stream-02 RequestId: null container_name: mordorkafkastream_10.168.128.219_2 Application: null RequestPath: null Environment: null @version: 1 source_host: 10.168.128.219 image_name: 192.168.57.20:5000/mordorkafkastr eam:1.0.125 created: October 16th 2018, 13:24:31.012 container_id: 7695c61e1a102e1b7fd6f82e00dad44bb9a234543c66b8526114fadca 0683a15 severity: null logmsg: ProductId processed: HB000007TYEI tag: mordorkafkastream_10.168.128.219_2,backup level: 6</pre>

GÖZLEMLEMENİN 4 ANA BACAGI VARDIR.

- *Log aggregation/analytics*
- **Metrics**
- *Alerting / Visualization*
- *Distributed system tracing*



METRICS

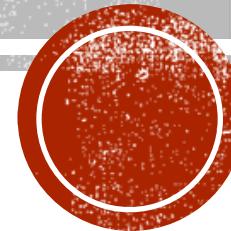
Metrikler, verilerin zaman serisi olarak belli zaman aralıkları boyunca toplanarak ölçülebilen sayılardır.



APP METRICS

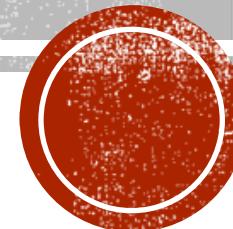
```
//nuget install App.Metrics

var metrics = new MetricsBuilder()
    .Configuration
    .Configure(q =>
{
    q.Enabled = true;
    q.AddAppTag("hb-demo");
    q.AddEnvTag("prod");
    q.AddServerTag("blue");
})
    .Build();
```



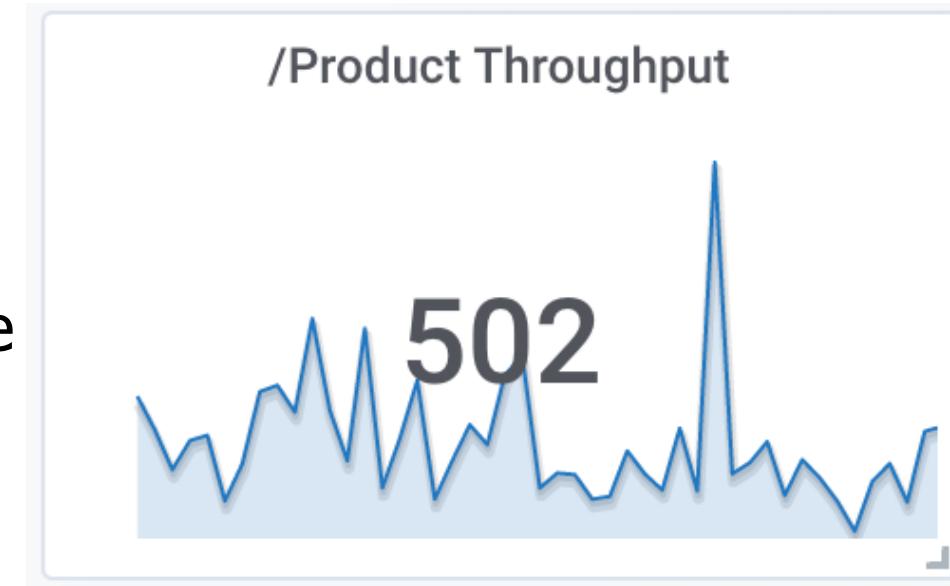
METRIC TİPLERİ

- COUNTER
- GAUGE
- HISTOGRAM
- METER
- TIMER



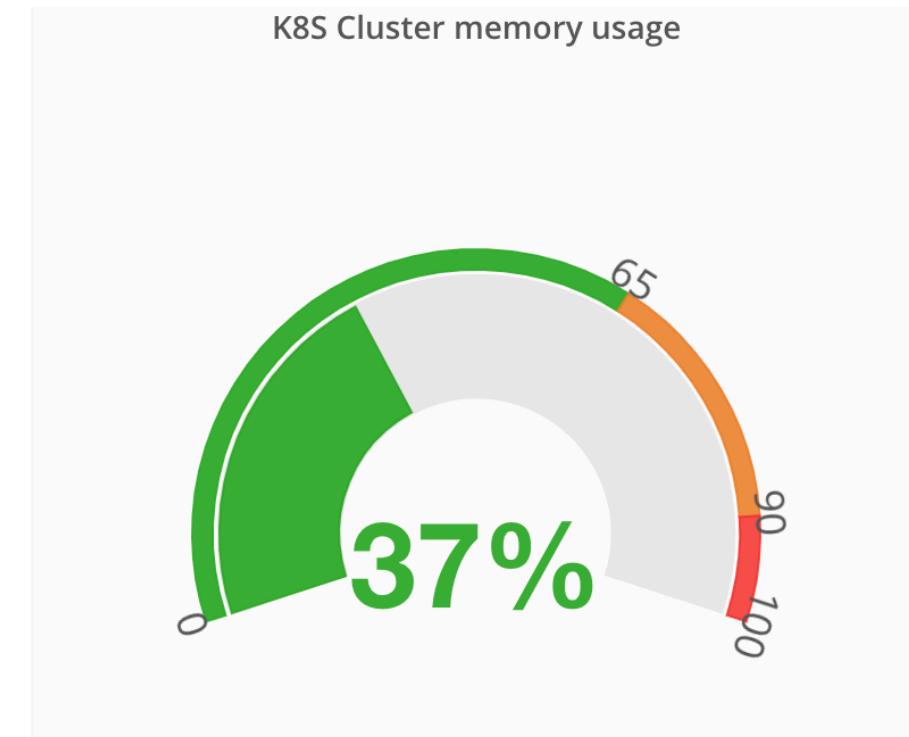
METRIC TİPİ : COUNTER

- En basit metrik tipidir.
- Bir olayın kaç kere gerçekleştiğini takip etmemizi sağlar.
- Atomik 64bit integer tipinde olup sadece artar/azalır.
- Örneğin; uygulamanın kaç kere, hangi tipte mail gönderildiğini takip edebilir.



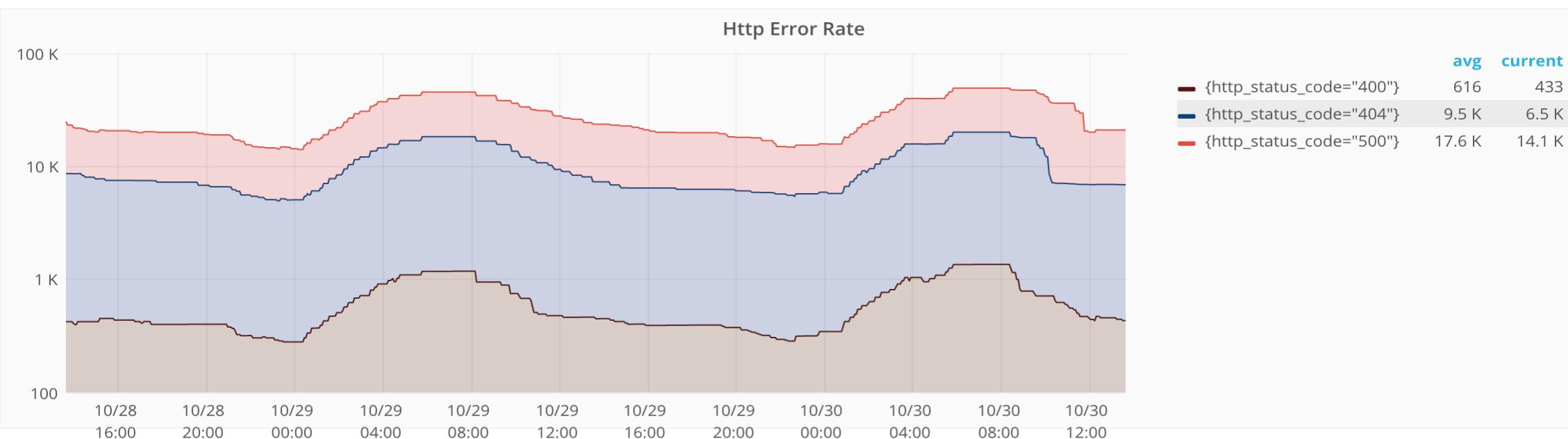
METRIC TİPİ : GAUGE

- Ölçüm yapılmak istenen değerlerin isteğe bağlı olarak aşağı yukarı olarak değiştirilebilen metrik tipidir.
- Örneğin; GAUGE mevcut bellek, işlemci, sıcaklık, disk alanı kullanımı gibi anlık değerli veriler için idealdir.



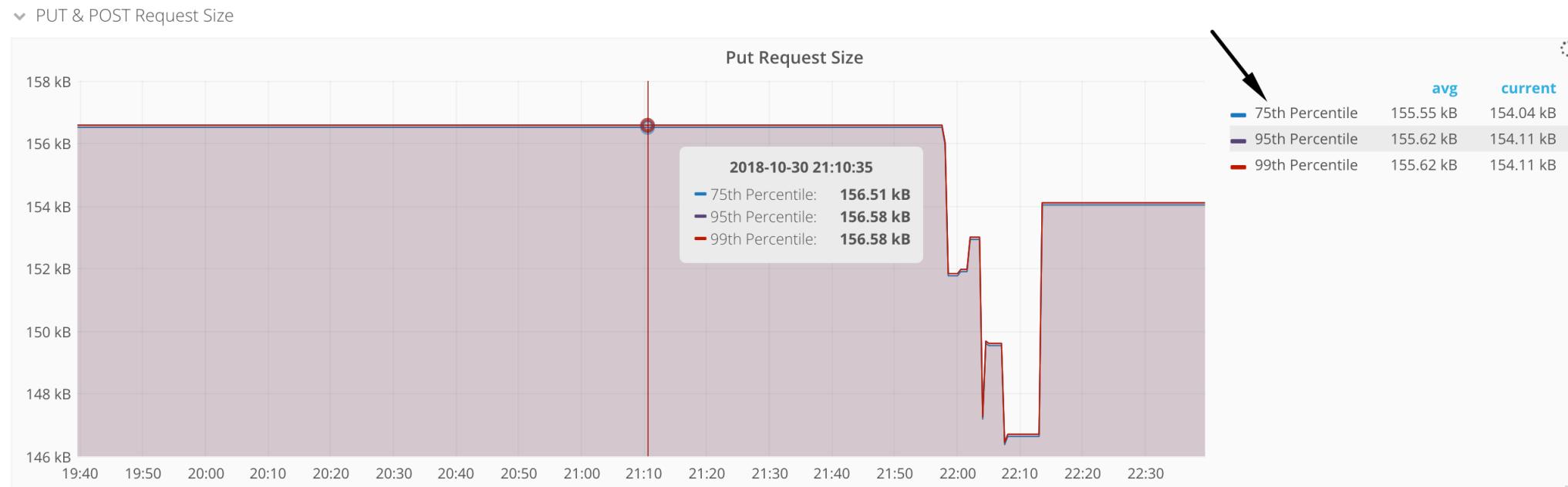
METRIC TIPI : METER

- Bir olayın meydana gelme hızını, toplam olay sayısıyla birlikte ölçer.
- Ölçülen oranlar ortalama, bir dakika, beş dakika ve onbeş dakikadır.
- Örneğin; Bir web servisin hata kodlarının saydırılması.



METRIC TİPİ : HISTOGRAM

- Histogramlar, min, maks, ortalama, medyan, standart sapma ve kuantil (quantile), yani 75. persentil, 90 persentil, 95 persentil, 99 persentil ve 99,9 persentil dahil olmak üzere bir dizi değerin istatistiksel dağılımını ölçmektedir.
- Örneğin; bir web servise yapılan POST ve PUT istekleri boyutlarını izleyebilir veya bir uç noktaya yüklenen dosya boyutlarını izleyebilir.



Quantiles ?

$$q1 = i \rightarrow 25/100 * 12 = 3. \rightarrow 130$$

$$i+1 = 4. \rightarrow + 160$$

290 | 2

145 ms <- %25 quantile

(ms)
100
120
130
160
210
350
410
460

%25

$$q4 = i \rightarrow 75/100 * 12 = 9. \rightarrow 510$$

$$i+1 = 10. \rightarrow + 590$$

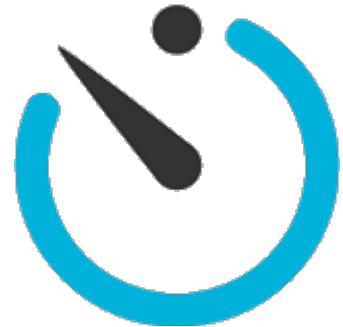
1100 | 2

550 ms <- %75 quantile

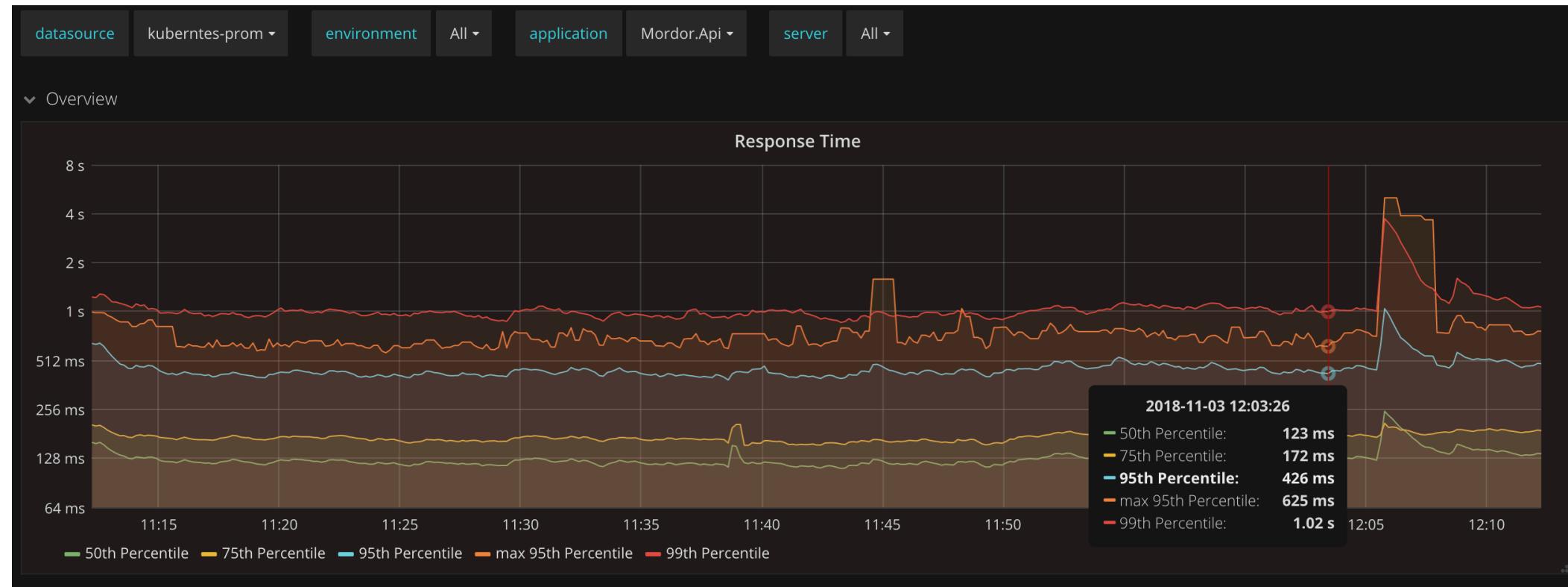
(ms)
100
120
130
160
210
350
410
460
510
590
840
970

%75

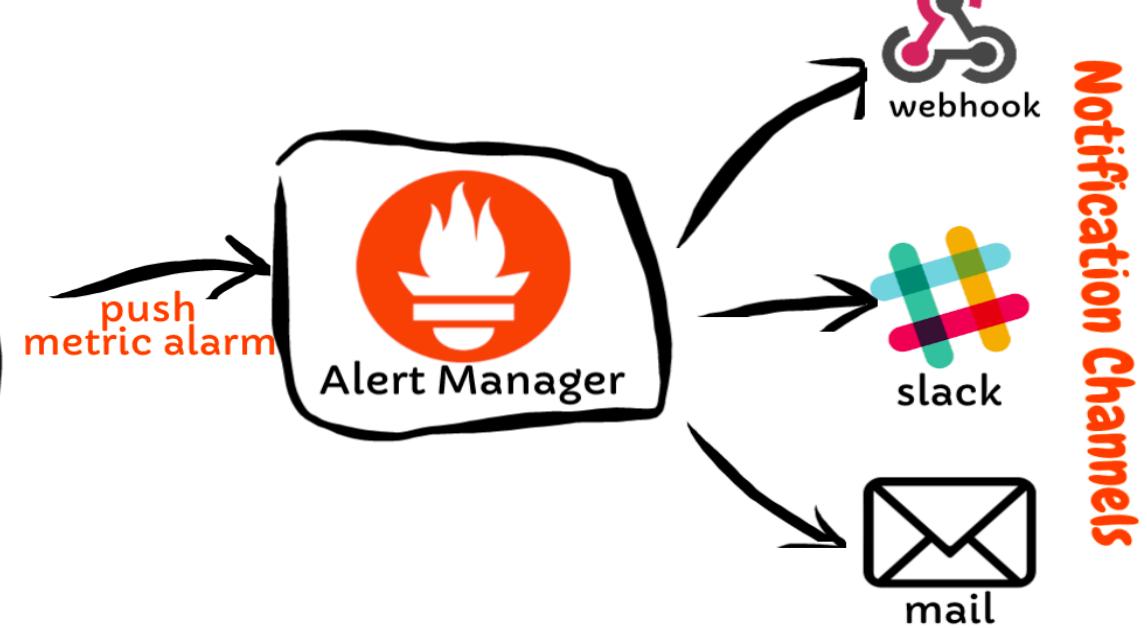
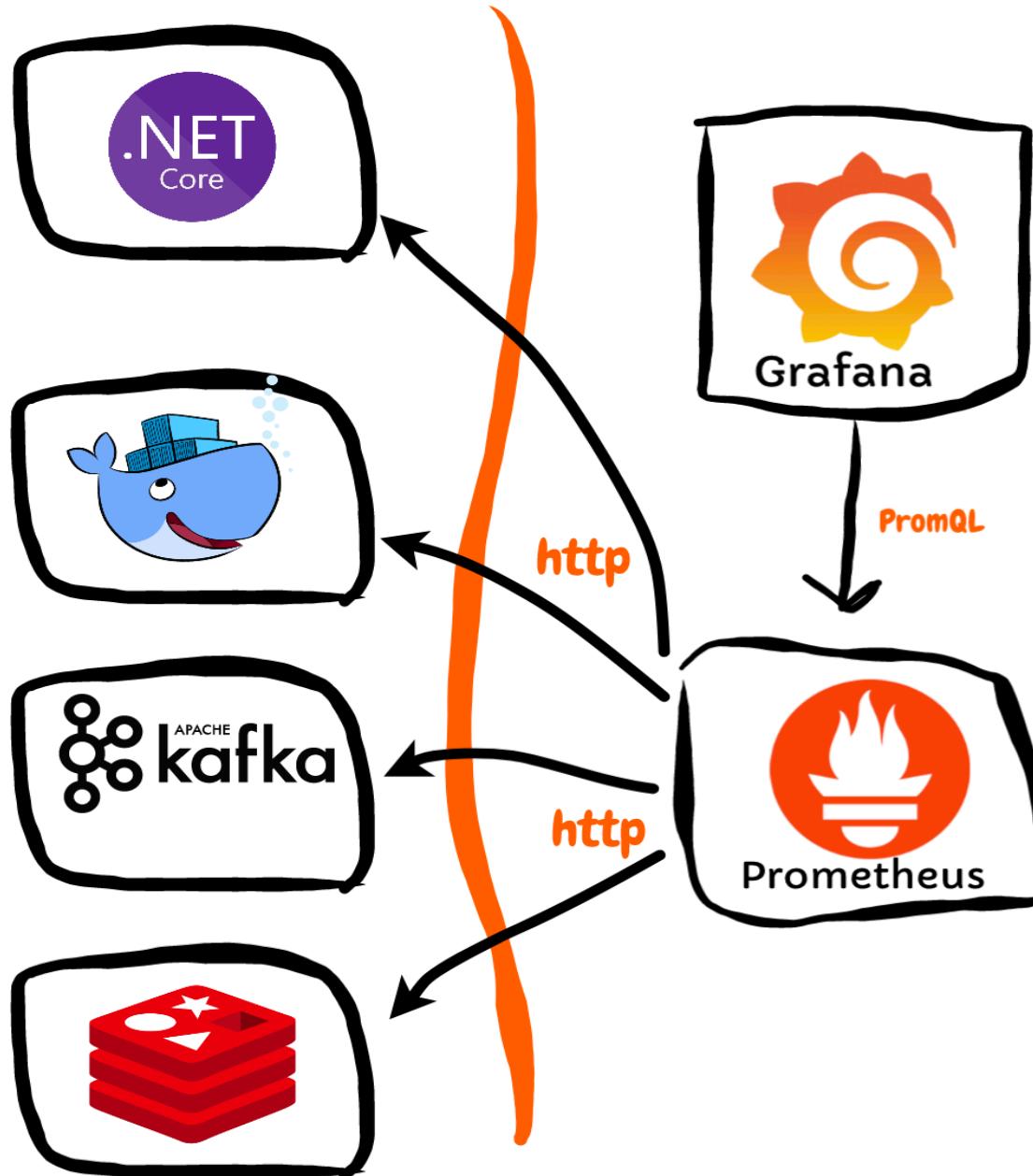
METRIC TIPI : TIMERS



- Timers, bir olayın gerçekleşme süresini ve süre istatistiğini ölçmemizi sağlayan bir Histogram ve “meter” tiplerinin birleşimidir.
- Örneğin, bir web servise yapılan isteğin süresi, kompleks bir işlemin süresi için kullanılabilir.



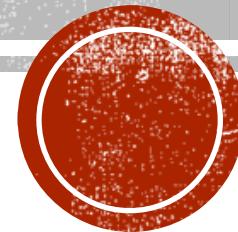
Targets / Exporters



Notification Channels

GÖZLEMLEMENİN 4 ANA BACAGI VARDIR.

- *Log aggregation/analytics*
- *Metrics*
- *Alerting / Visualization*
- *Distributed system tracing*





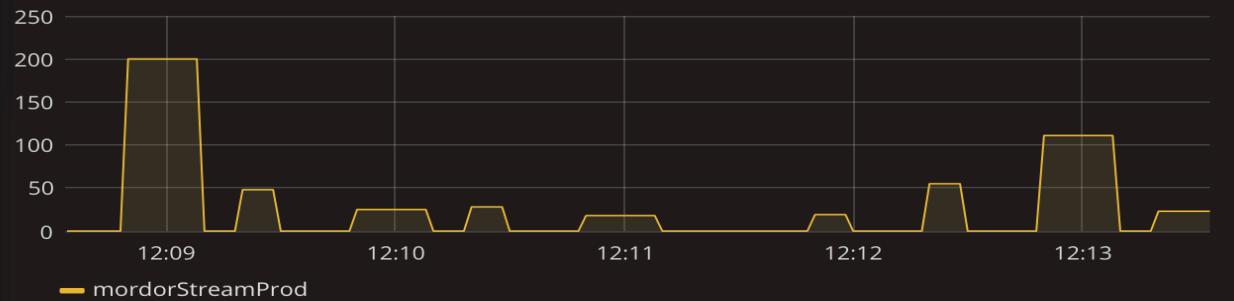
env

prod

products processed per second (based on last 10sec)

19

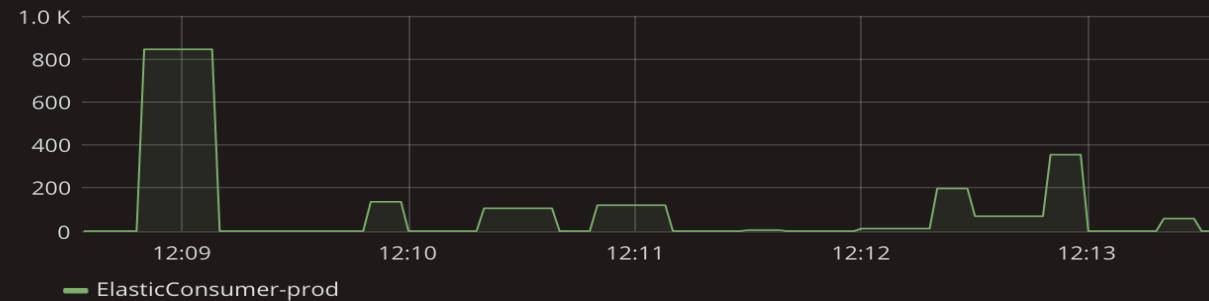
mordorStreamProdTotalLag



AVG Hermes to Mordor Product Update Latency (secs/0.95th percentile)

12

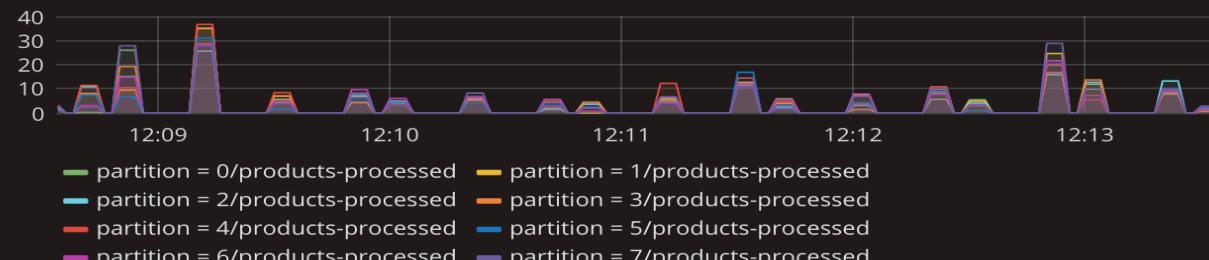
ElasticConsumer-ProdTotalLags



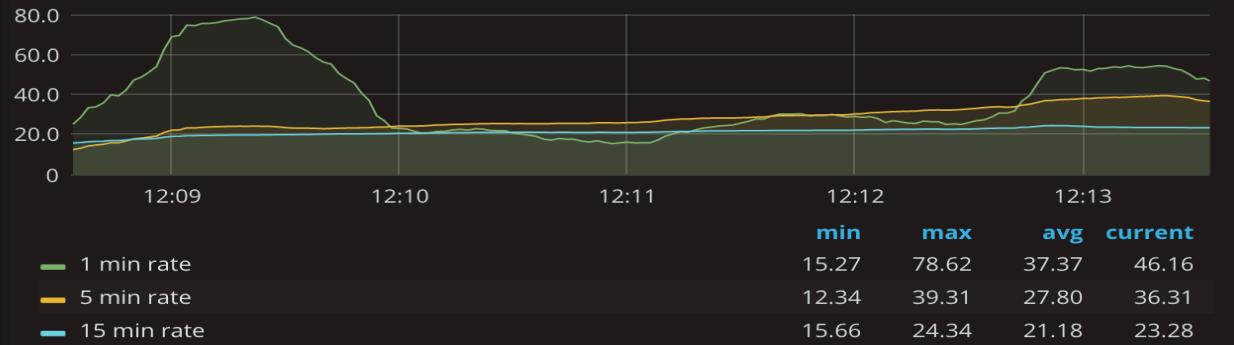
mordorStreamProdCurrentOffset



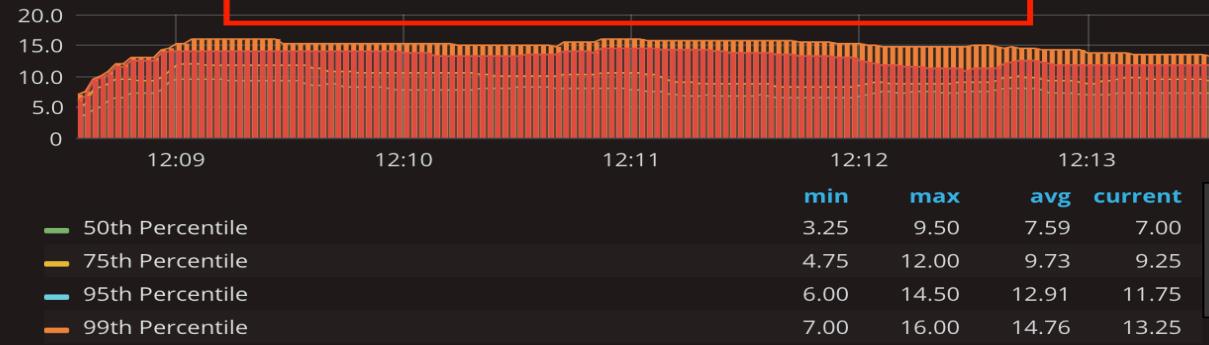
ElasticConsumer-prodCurrentOffset



product_processed_bysink_total (per sec)

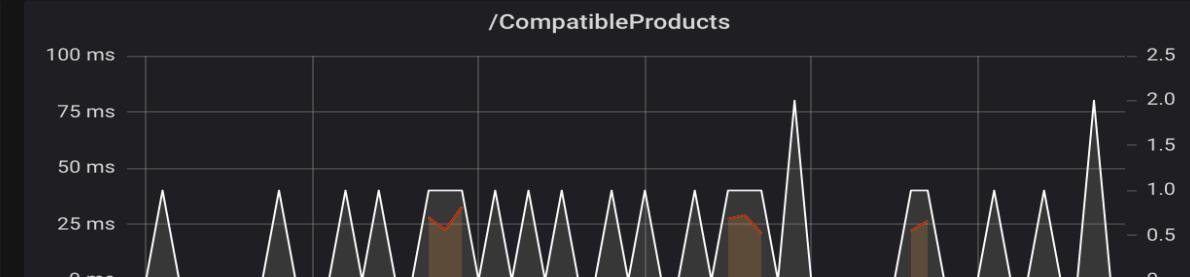
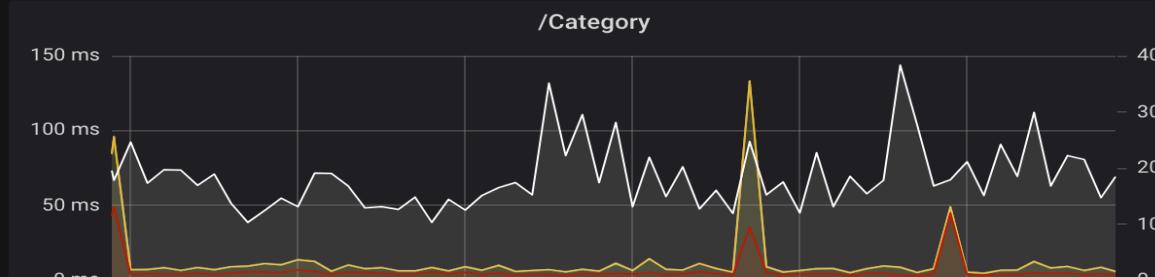
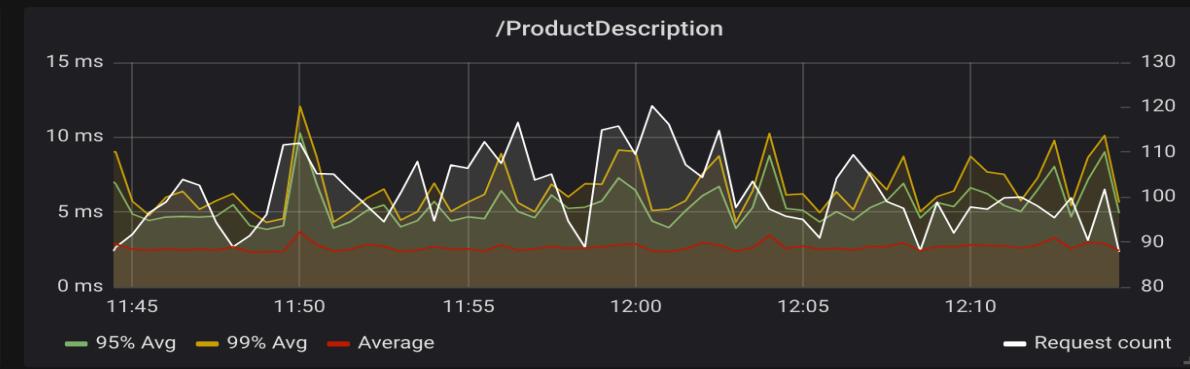
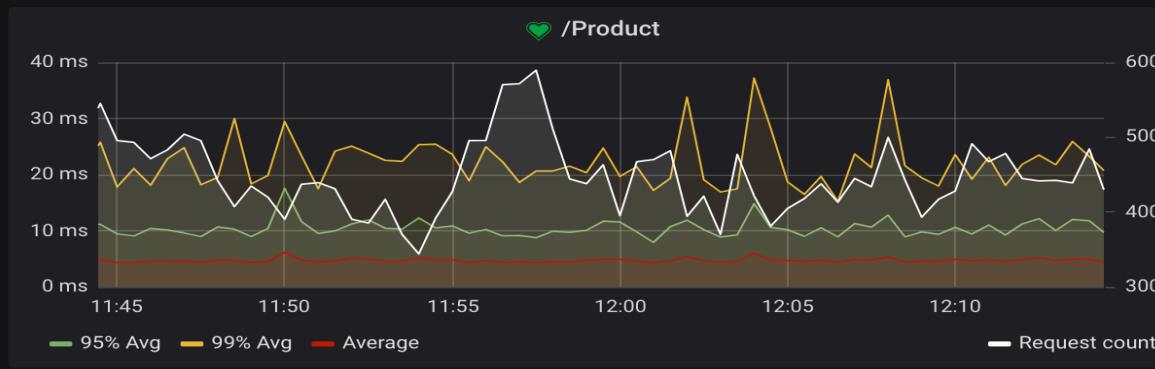
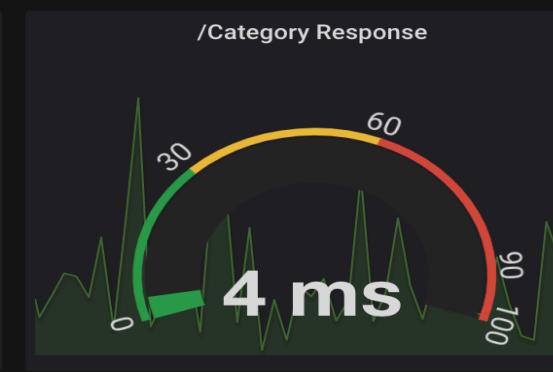
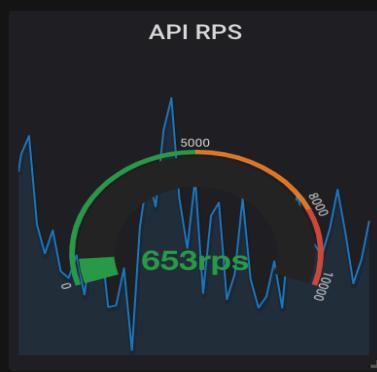
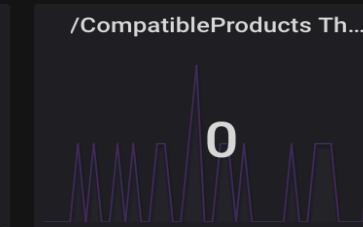
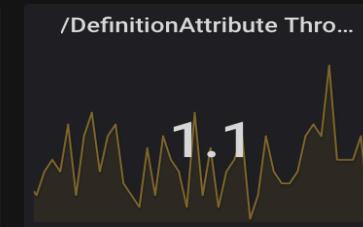
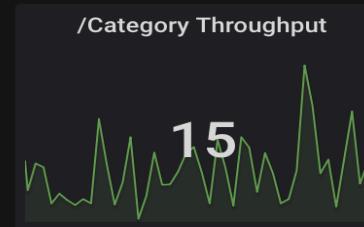
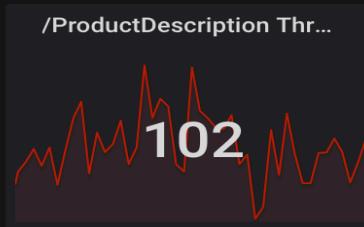


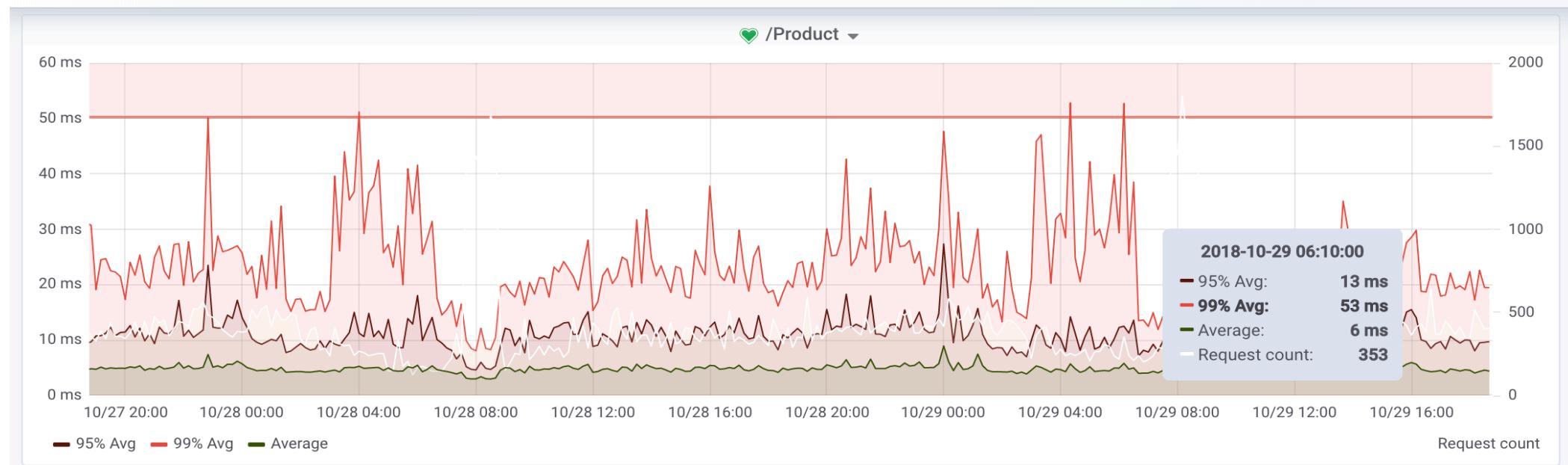
Hermes to Mordor Product Update Latency (secs)





environment All ▾





Graph

General

Metrics

Axes

Legend

Display

Alert

Time range



Alert Config

Alert Config

Notifications (1)

Name Product

Evaluate every 30s

State history

Conditions

Delete

WHEN avg () OF query (B, 30s, now) IS ABOVE 50



If no data or all values are null

SET STATE TO

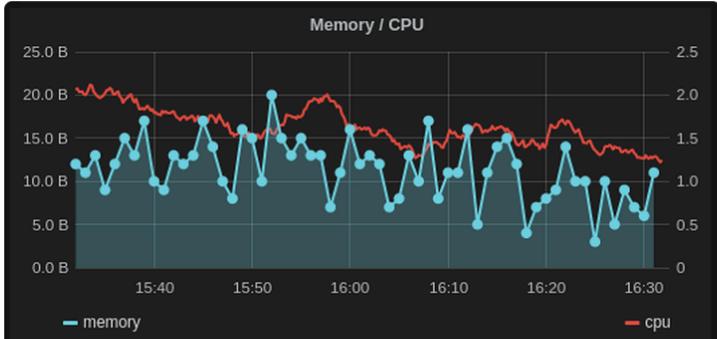
No Data

If execution error or timeout

SET STATE TO

Alerting



incoming-webhook APP 11:16 PM
[Alerting] Test notification
Someone is testing the alert notification within grafana.
High value 100 **Higher Value** 200
Error message
This is only a test
Grafana v5.2.1 | Today at 11:16 PM (30 kB) ▾


The chart displays two metrics: memory (blue line) and CPU (red line). The left Y-axis represents memory usage in bytes, ranging from 0.0 B to 25.0 B. The right Y-axis represents CPU usage, ranging from 0 to 2.5. The X-axis shows time from 15:30 to 16:30. Both metrics fluctuate throughout the period, with memory usage generally staying between 10.0 B and 20.0 B, and CPU usage between 0.5 and 2.0.

new messages

Yücel Çelik 11:16 PM
nabıyonuz la **@here**
alper sen misin
ok gelirim 2 gibi

Alper Hankendi 11:20 PM
sunuma koycam senide ifşa edeceğim.

incoming-webhook APP 5:45 AM
[Alerting] Product
Hermes.Api response time is high!
Average All
158.02039925553
Grafana v5.2.1 | Oct 27th

[OK] Product
Grafana v5.2.1 | Oct 27th

incoming-webhook APP 3:00 AM
[Alerting] product compare gg
rabbitmq_queue_messages{durable
="true",
instance="rabbitexporter_yetim:90
93", job="Hermes.Rabbit.Yetim",
policy="ProductCompareQueuePoli
cy",
queue="ProductCompareForStorefr
ontProductQueue", vhost="/"}
1113
Grafana v5.2.1 | Oct 20th

[OK] product compare gg
Grafana v5.2.1 | Oct 20th

≡ Horizontal Pod Autoscalers > mordorapi-green

EDIT

DELETE

Details

Name: mordorapi-green

Namespace: default

Annotations: autoscaling.alpha.kubernetes.io/conditions: [{"type": "AbleToScale", "status": "True", "lastTransitionTime": "2018-10-31T18:54:15Z", "reason": "R...}]

autoscaling.alpha.kubernetes.io/current-metrics: [{"type": "Pods", "pods": {"metricName": "cpu_usage", "currentAverageValue": "498m"}}]

autoscaling.alpha.kubernetes.io/metrics: [{"type": "Pods", "pods": {"metricName": "cpu_usage", "targetAverageValue": "500m"}}]

[kubectl.kubernetes.io/last-applied-configuration](#)

Creation Time: 2018-10-16T02:16 UTC

Target: Deployment: mordorapi-green

Min Replicas: 5

Max Replicas: 80

Target CPU Utilization: -

Status

Current Replicas: 46

Desired Replicas: 46

Current CPU Utilization: %

Last Scaled: an hour



datasource

kubernetes-prom

Node

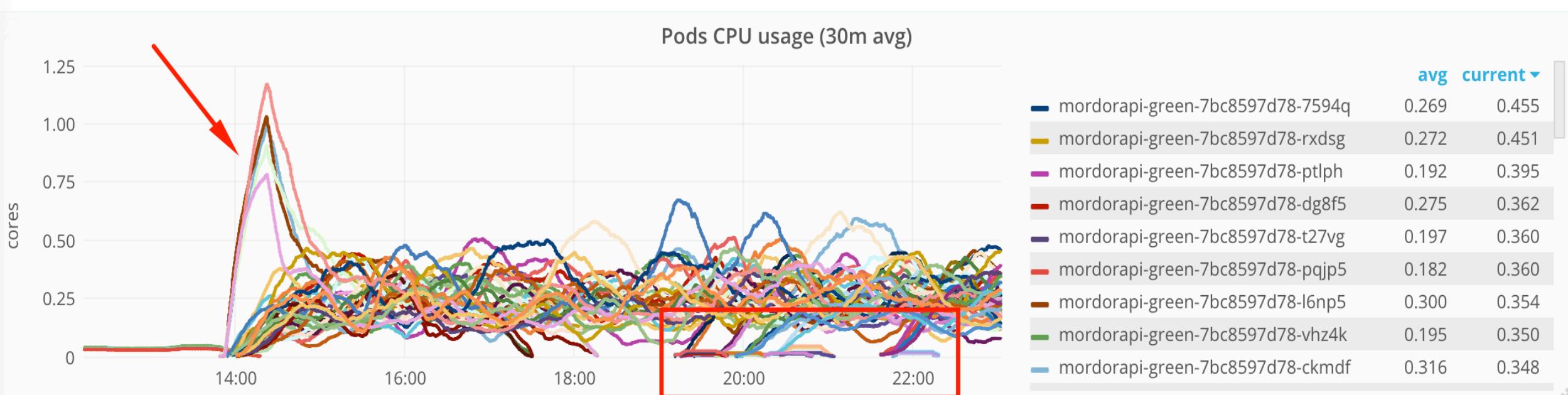
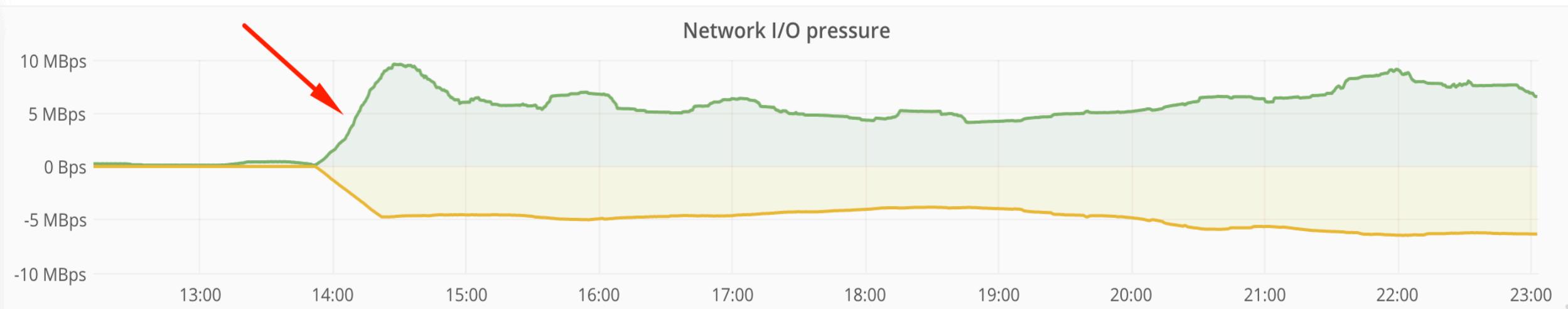
All

Application

mordorapi

env

green



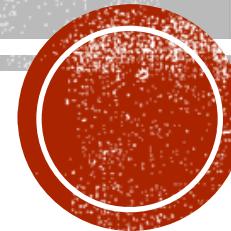
PROMETHEUS ANOMALİ TESPİTİ

```
ALERT InstanceLatencyOutlier
  IF
    (
      instance:latency_seconds:mean5m
      > on (job) group_left()
        (
          avg by (job)(instance:latency_seconds:mean5m)
          + on (job)
            2 * stddev by (job)(instance:latency_seconds:mean5m)
        )
    )
    > on (job) group_left()
      1.2 * avg by (job)(instance:latency_seconds:mean5m)
  and on (job)
    avg by (job)(instance:latency_seconds_count:rate5m)
  >
    1
FOR 30m
```

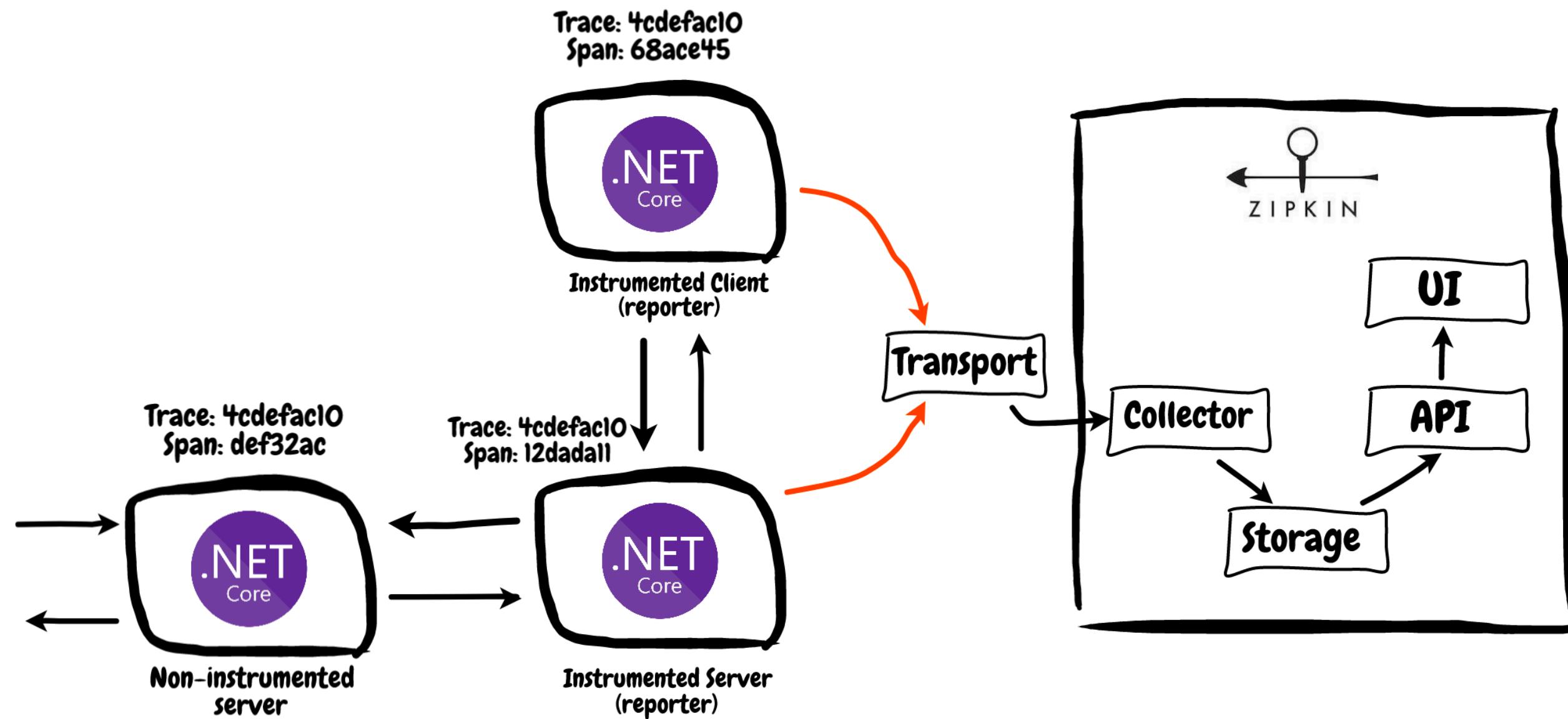


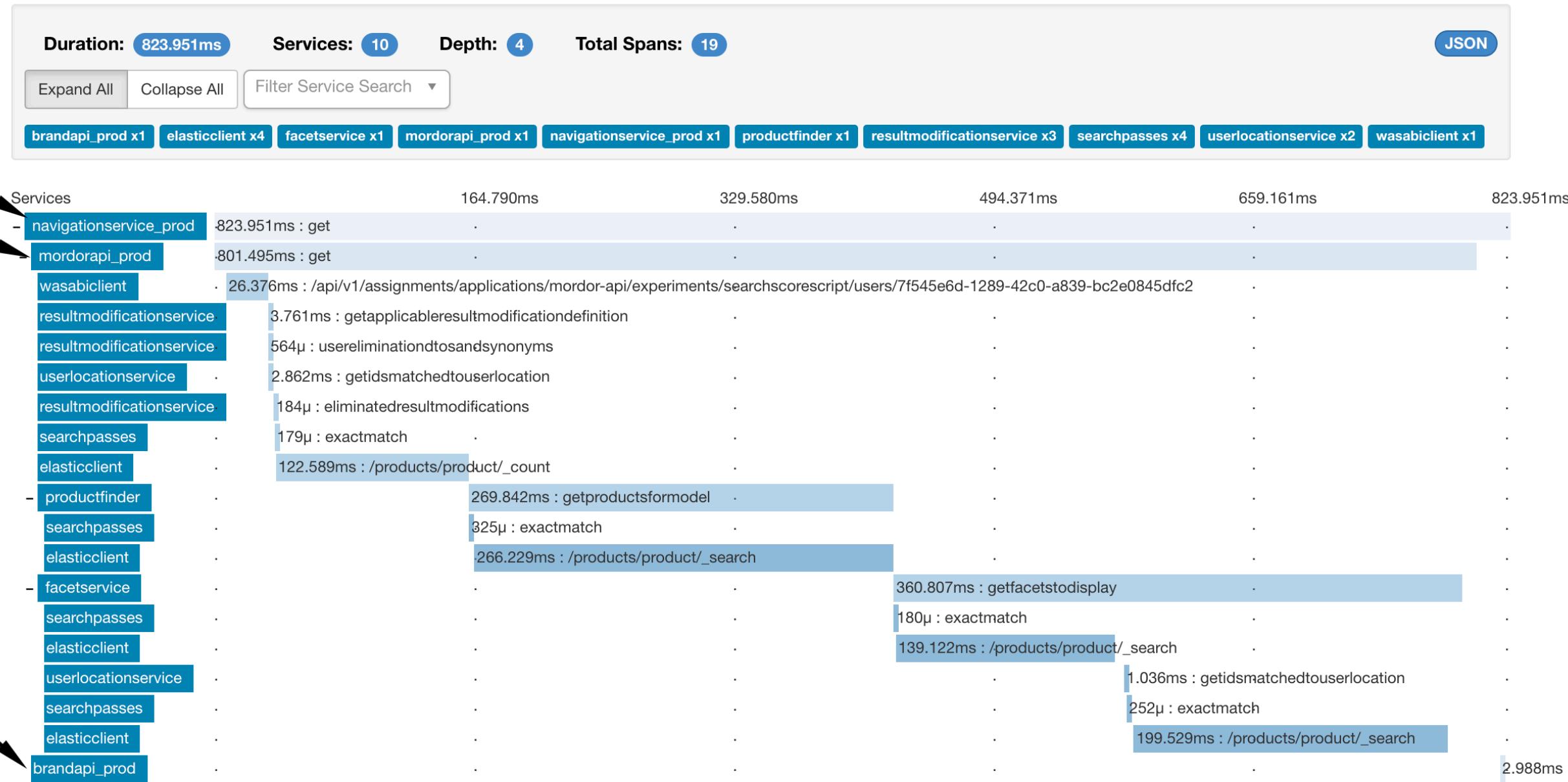
GÖZLEMLEMENİN 4 ANA BACAGI VARDIR.

- *Log aggregation/analytics*
- *Metrics*
- *Alerting / Visualization*
- *Distributed system tracing*



ZIPKIN YAPISI





navigationservice_prod.get: 823.951ms

AKA: navigationservice_prod

Services:

Filter Service S...

ent x4 facetser...

23.951ms : get

01.495ms : get

26.376ms : /api/v1/a...

3.761ms : ge...

564μ : usere...

2.862ms : ge...

184μ : elimi...

179μ : exec...

122.589ms

Date	Time	Relative Time	Annotation	Address
10/28/2018	7:44:39 PM		Server Receive	undefined:0 (navigationservice_prod)
10/28/2018	7:44:40 PM	823.951ms	Server Send	undefined:0 (navigationservice_prod)

Key	Value
http.host	navigation.hepsiburada.com
http.path	/search/searchterm/duvar+saati/products
http.uri	http://navigation.hepsiburada.com/search/searchterm/duvar+saati/products?filters=%5b%7b%22type%22%3a%22category%22%2c%22value%22%3a%5b%2260002028_18021300_18021458_18032553%22%5d%7d%5d&page=18&sortBy=NONE

xcall-2018-10-28 16:44:39.320	http://mordor-api.hepsiburada.com/products?Q=duvar+saati&Page=18&Filter=AllCategories.CategoryId%3A60002028%3BAllCategories.Child.CategoryId%3A18021300%3BAllCategories.Child.Child.CategoryId%3A18021458%3BAllCategories.Child.Child.Child.CategoryId%3A18032553%3B&VariantSort=_score%3BVariantList.SortOrder%3BVariantList.VariantListing.BuyboxPrice&ListingSort=_score%3BVariantList.VariantListing.BuyboxSortId&PageType=Search
-------------------------------	---

xcall-2018-10-28 16:44:40.137	http://brands.hepsiburada.com/brand/nameList?nameList=AntiQa Arc+Gallery Cadran Cadran+Luxury Clockmaker+By+Cadran Clocktime+By+Cadran DecorLux Flamingo fotografiyabask%C4%B1 Galaxy Hediye+Mania If+Dizayn K%C3%BCstebek M3+Decorium Montaine+By+Cadran Regal Rikon Tablomega Time+Gold Ultima
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[More Info](#)

traceId d80cdc5fcbe399ec

spanId a548ad2656d664b0

parentId

TEŞEKKÜRLER
WE WANT

