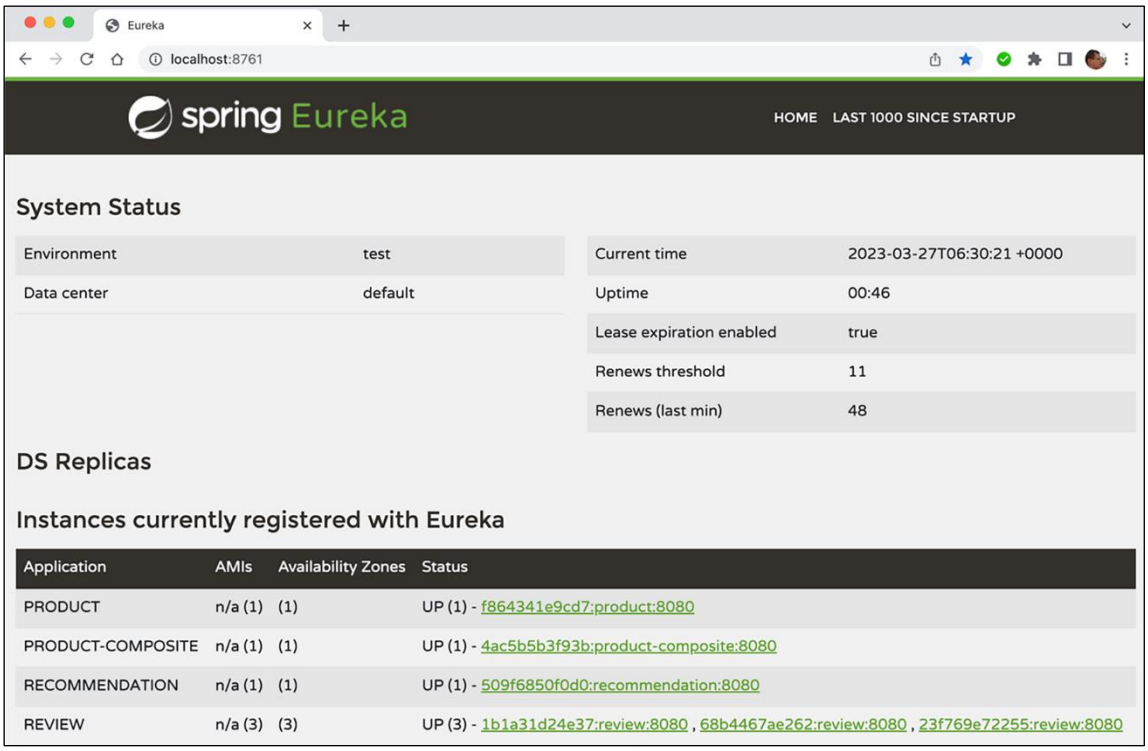
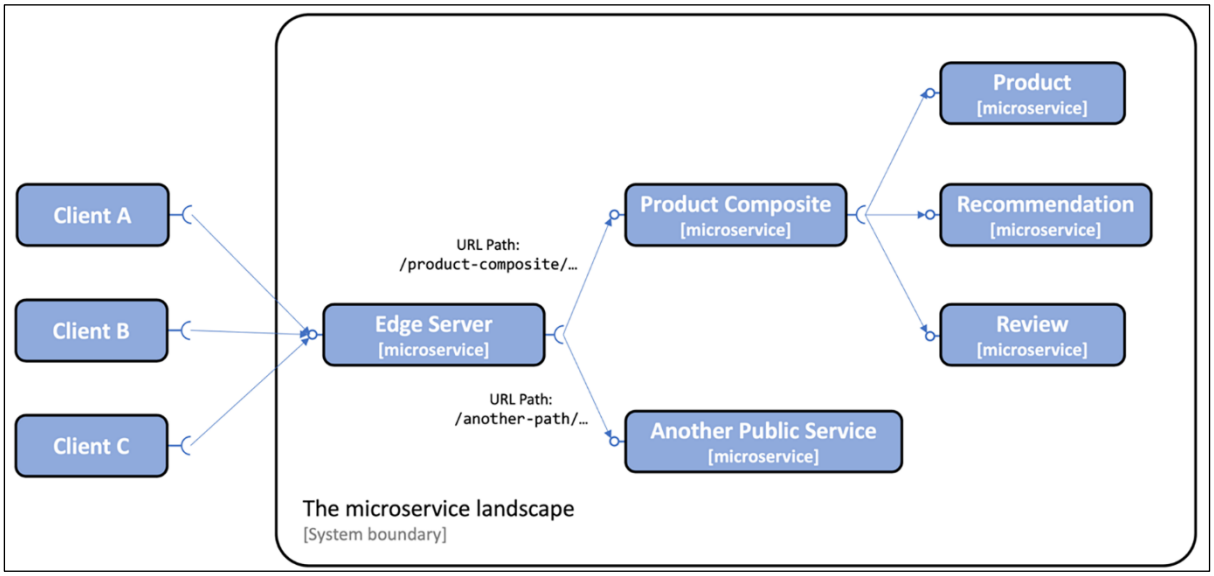
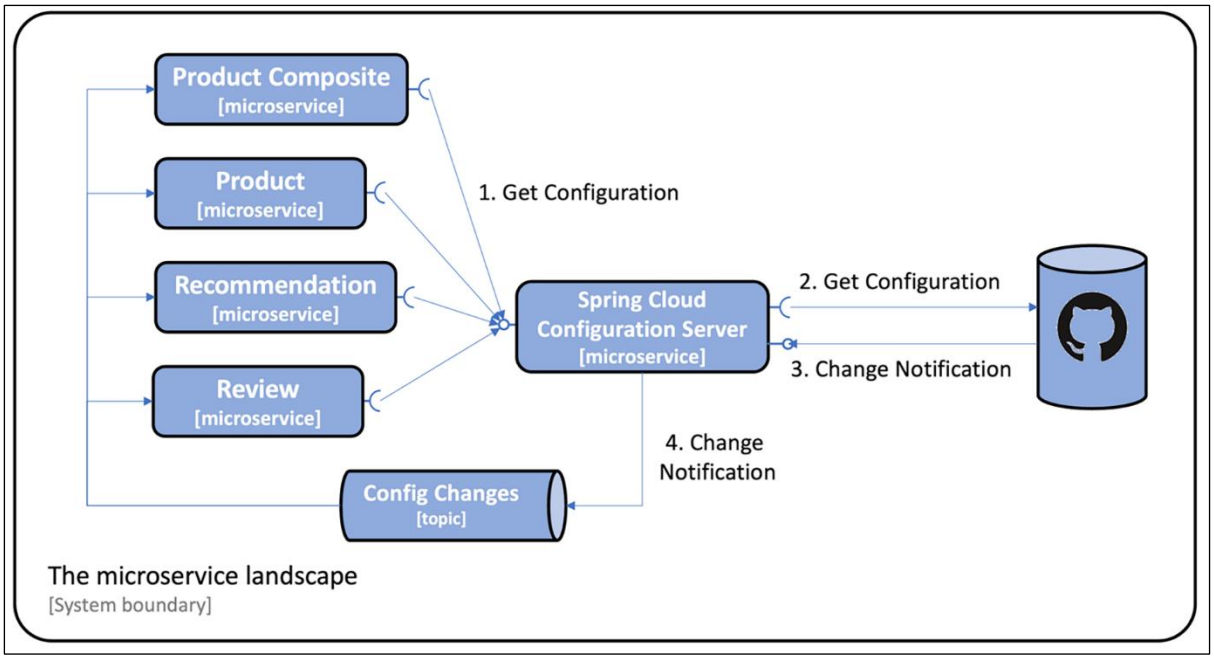
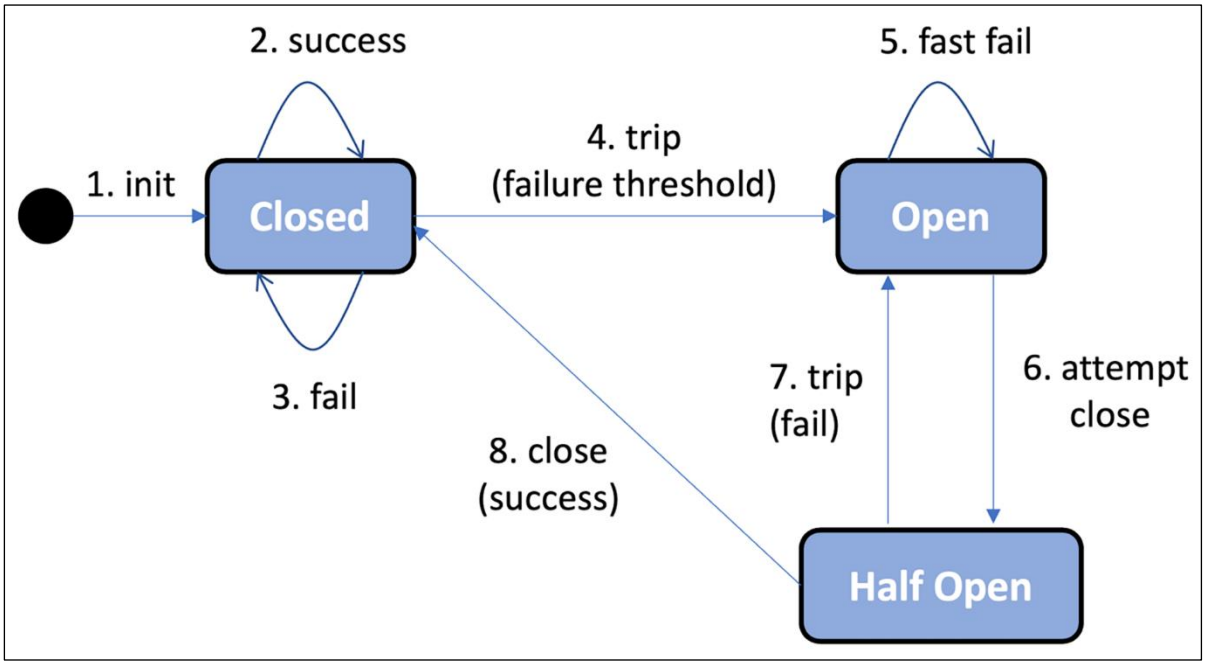
Chapter 8: Introduction to Spring Cloud






Product Composite
[microservice]
Product
[microservice]
Recommendation
[microservice]
Review
[microservice]
1. Get Configuration
Spring Cloud
Configuration Server
[microservice]
2. Get Configuration
3. Change Notification
4. Change
Notification
Config Changes
[topic]
The microservice landscape
[System boundary]

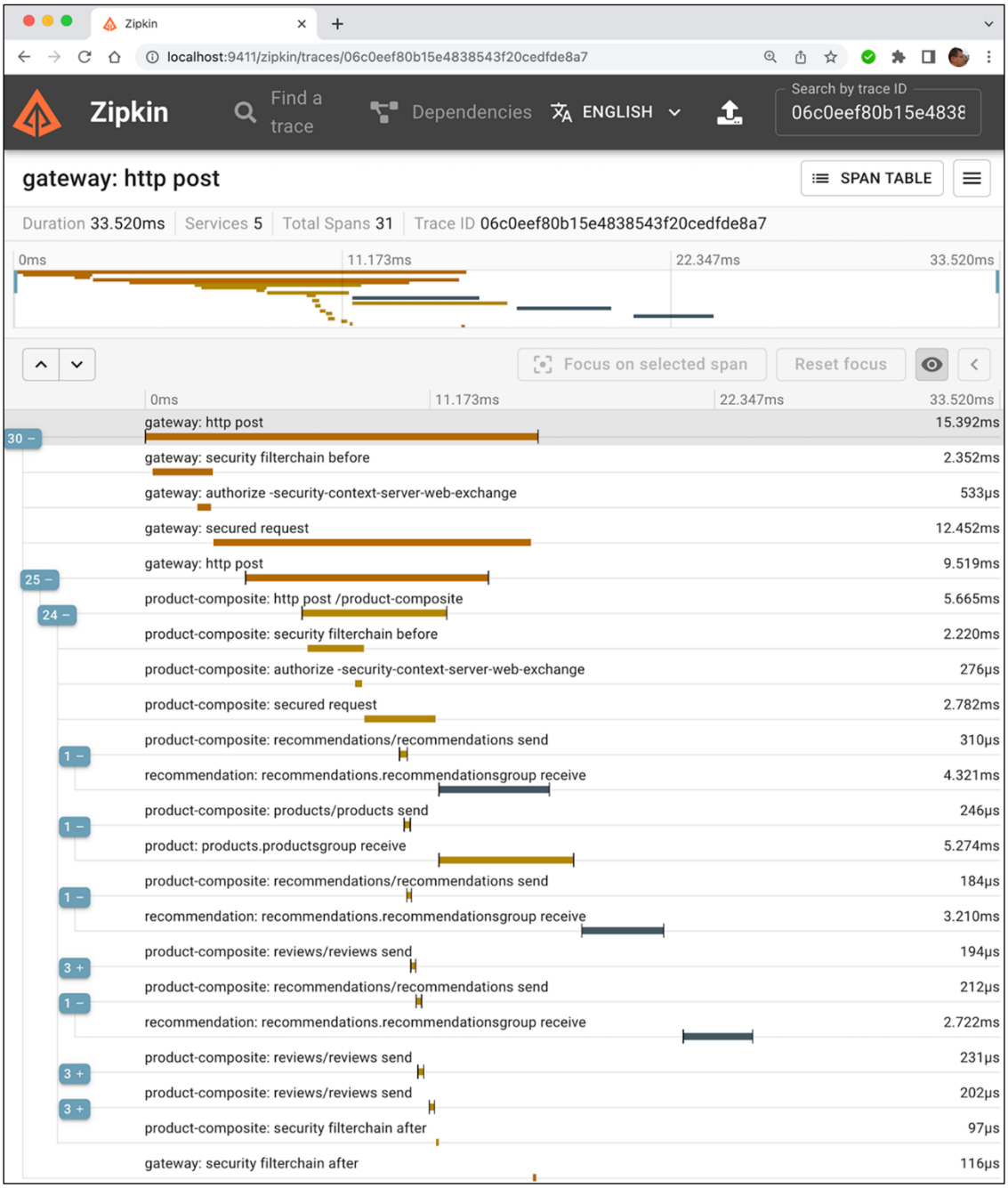

2. success
5. fast fail
1. init
Closed
4. trip
(failure threshold)
Open
3. fail
7. trip
(fail)
6. attempt
close
8. close
(success)
Half Open

bash ⌥⌘2

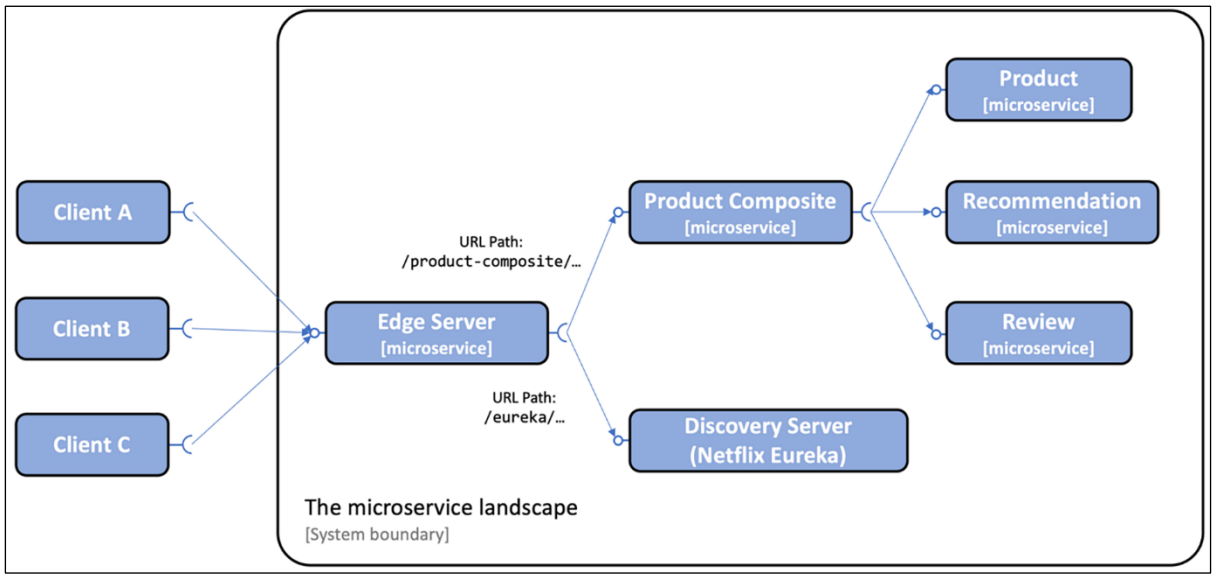

```
{
  "status": "UP",
  "details": {
    "product": {
      "status": "UP",
      "details": {
        "failureRate": "-1.0%",
        "failureRateThreshold": "50.0%",
        "slowCallRate": "-1.0%",
        "slowCallRateThreshold": "100.0%",
        "bufferedCalls": 0,
        "slowCalls": 0,
        "slowFailedCalls": 0,
        "failedCalls": 0,
        "notPermittedCalls": 0,
        "state": "CLOSED"
      }
    }
  }
}
```

bash ⌥⌘2


```
{
  "status": "UNKNOWN",
  "details": {
    "product": {
      "status": "CIRCUIT_OPEN",
      "details": {
        "failureRate": "60.0%",
        "failureRateThreshold": "50.0%",
        "slowCallRate": "0.0%",
        "slowCallRateThreshold": "100.0%",
        "bufferedCalls": 5,
        "slowCalls": 0,
        "slowFailedCalls": 0,
        "failedCalls": 3,
        "notPermittedCalls": 3,
        "state": "OPEN"
      }
    }
  }
}
```


Zipkin
localhost:9411/zipkin/traces/06c0eef80b15e4838543f20cedfde8a7
Zipkin
Find a trace
Dependencies
ENGLISH
Search by trace ID
06c0eef80b15e4838
gateway: http post
SPAN TABLE
Duration 33.520ms
Services 5
Total Spans 31
Trace ID 06c0eef80b15e4838543f20cedfde8a7
0ms
11.173ms
22.347ms
33.520ms
Focus on selected span
Reset focus
gateway: http post 15.392ms
gateway: security filterchain before 2.352ms
gateway: authorize -security-context-server-web-exchange 533µs
gateway: secured request 12.452ms
gateway: http post 9.519ms
product-composite: http post /product-composite 5.665ms
product-composite: security filterchain before 2.220ms
product-composite: authorize -security-context-server-web-exchange 276µs
product-composite: secured request 2.782ms
product-composite: recommendations/recommendations send 310µs
recommendation: recommendations.recommendationsgroup receive 4.321ms
product-composite: products/products send 246µs
product: products.productsgroup receive 5.274ms
product-composite: recommendations/recommendations send 184µs
recommendation: recommendations.recommendationsgroup receive 3.210ms
product-composite: reviews/reviews send 194µs
product-composite: recommendations/recommendations send 212µs
recommendation: recommendations.recommendationsgroup receive 2.722ms
product-composite: reviews/reviews send 231µs
product-composite: reviews/reviews send 202µs
product-composite: security filterchain after 97µs
gateway: security filterchain after 116µs

Chapter 10: Using Spring Cloud Gateway to Hide Microservices behind an Edge Server




```
bash
$ ./test-em-all.bash start
Start Tests: Wed Mar 29 15:42:42 CEST 2023
...
 ⠿ Container chapter10-gateway-1            Started
...
Wait for: curl http://localhost:8080/actuator/health... DONE, continues...
...
Test OK (actual value: http://localhost:8080)
Test OK (HTTP Code: 200)
End, all tests OK: Wed Mar 29 15:43:10 CEST 2023
$
```

```
bash
NAME                          SERVICE            STATUS             PORTS
chapter10-eureka-1            eureka             running            8761/tcp
chapter10-gateway-1           gateway            running            0.0.0.0:8080->8080/tcp
chapter10-product-1           product            running            8080/tcp
chapter10-product-composite-1 product-composite  running            8080/tcp
chapter10-recommendation-1    recommendation     running            8080/tcp
chapter10-review-1            review             running            8080/tcp
$
```

```
bash
  "product-composite": "lb://product-composite"
  "product-composite-swagger-ui": "lb://product-composite"
  "eureka-api": "http://eureka:8761"
  "eureka-web-start": "http://eureka:8761"
  "eureka-web-other": "http://eureka:8761"
  "host_route_200": "http://httpstat.us:80"
  "host_route_418": "http://httpstat.us:80"
  "host_route_501": "http://httpstat.us:80"
```

```
bash
{"productId":1, ... "recommendations":[...],"reviews":[...],"serviceAddresses":{...}}
$
```

```
bash
Pattern "/product-composite/**" matches against value "/product-composite/1"
Route matched: product-composite
...
LoadBalancerClientFilter url chosen: http://2911a48d86ec:8080/product-composite/1
```

Swagger UI

localhost:8080/openapi/webjars/swagger-ui/index.html

Swagger Supported by SMARTBEAR

/openapi/v3/api-docs Explore

Sample API 1.0.0 OAS3

/openapi/v3/api-docs

Description of the API...

Terms of service

NAME OF CONTACT - Website

Send email to NAME OF CONTACT

MY LICENSE

MY WIKI PAGE

Servers

http://localhost:8080 - Generated server url

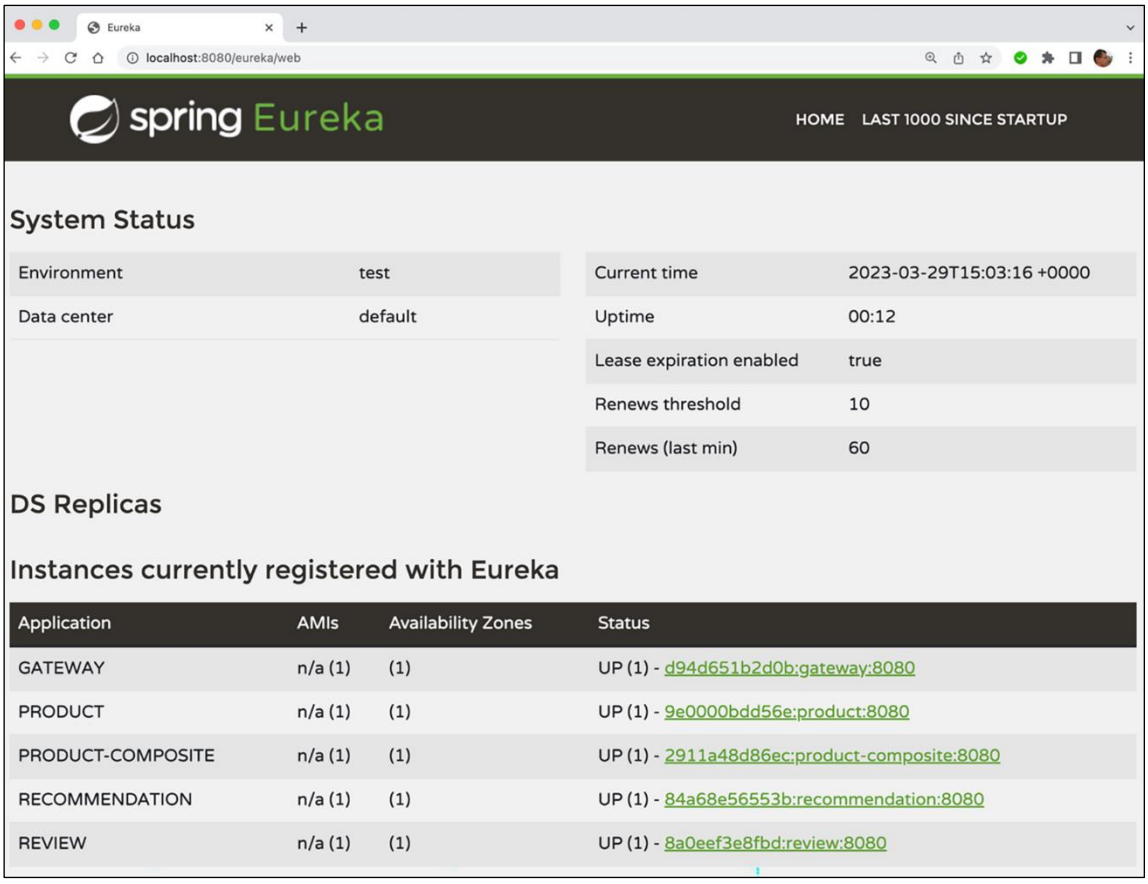
ProductComposite REST API for composite product information.

POST /product-composite Creates a composite product

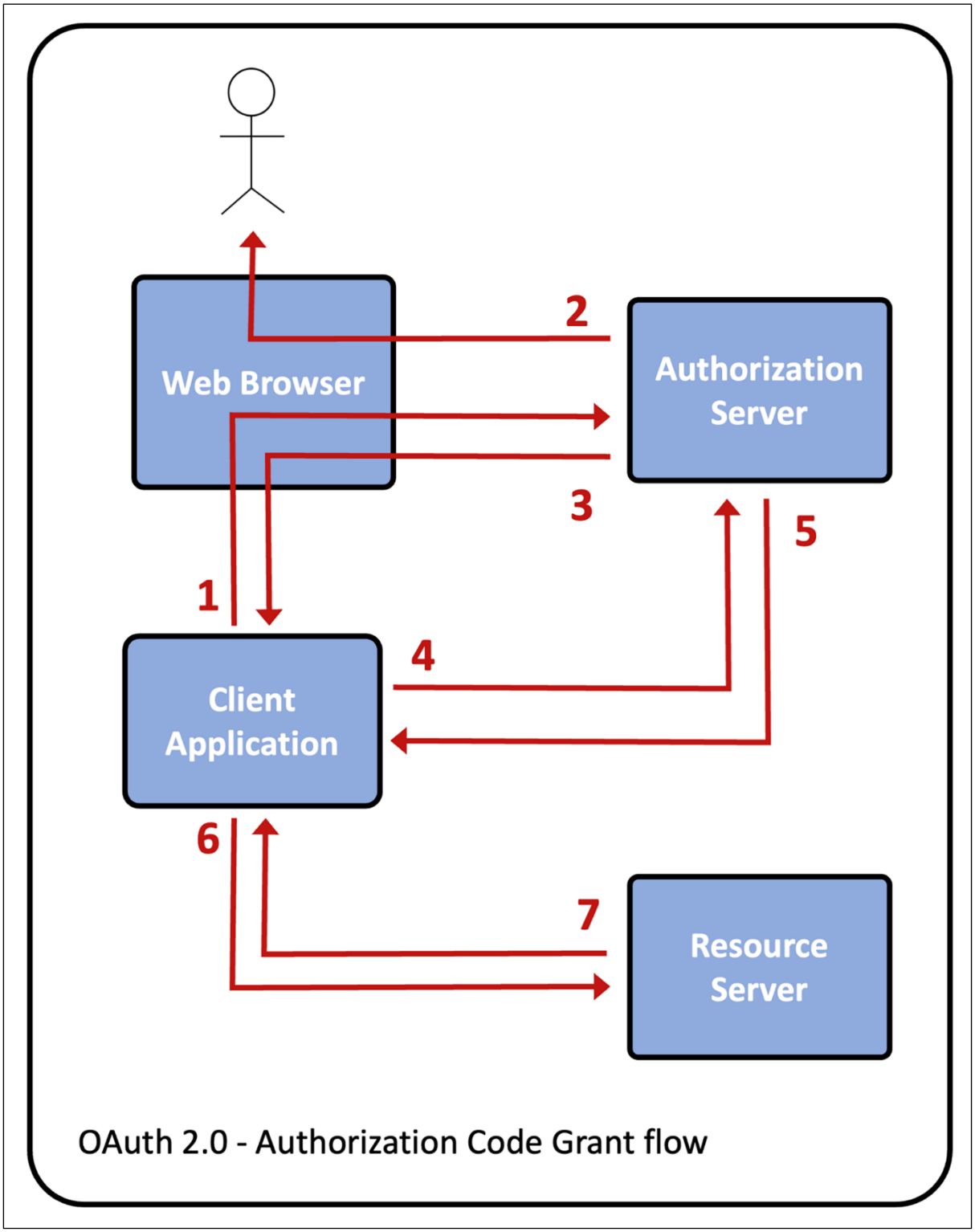
GET /product-composite/{productId} Returns a composite view of the specified product id

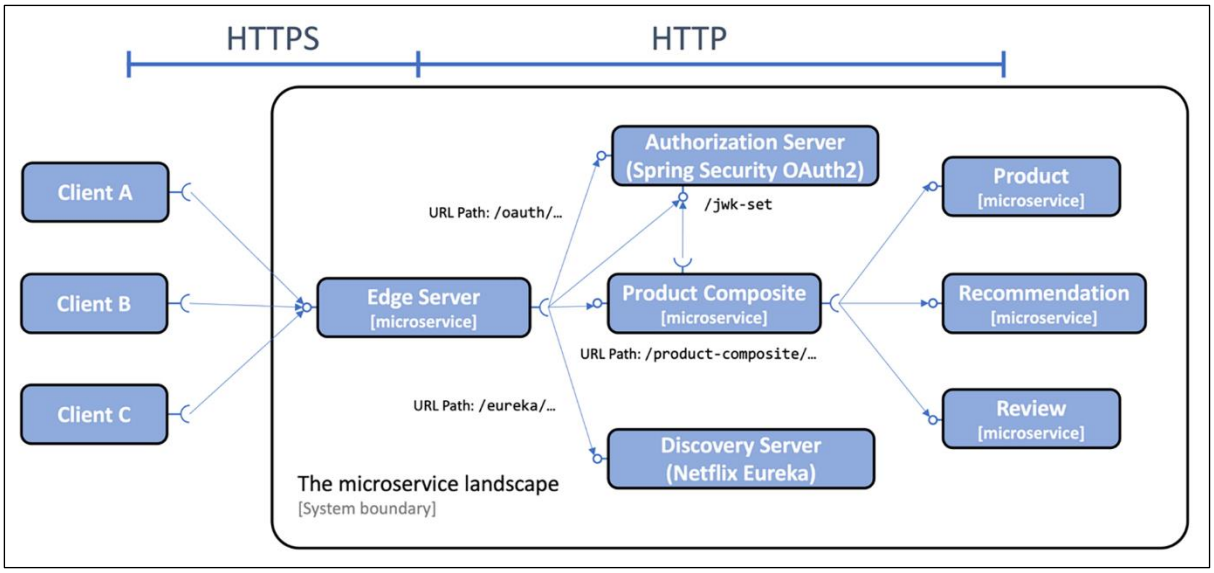
DELETE /product-composite/{productId} Deletes a product composite

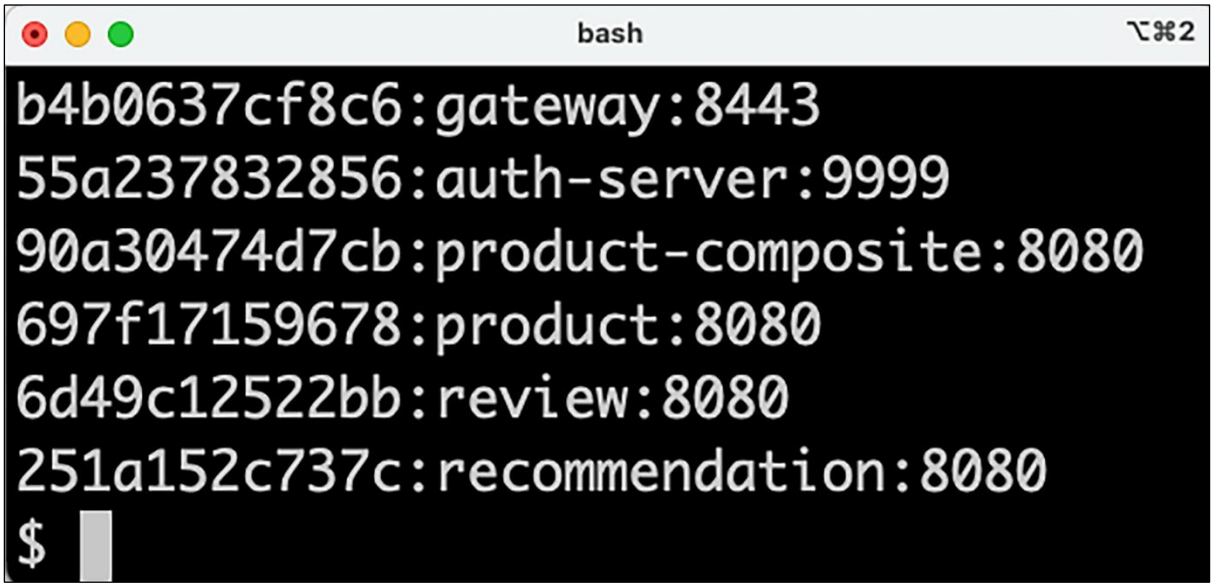
```
bash
d94d651b2d0b:gateway:8080
2911a48d86ec:product-composite:8080
9e0000bdd56e:product:8080
8a0eef3e8fbd:review:8080
84a68e56553b:recommendation:8080
$
```

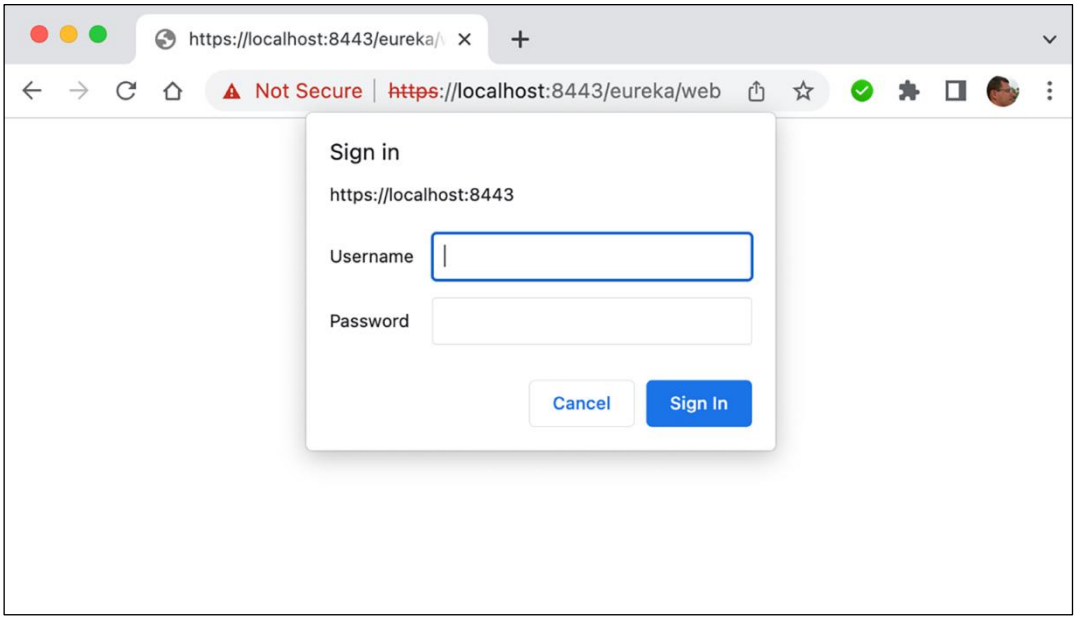

Eureka
localhost:8080/eureka/web
spring Eureka
HOME
LAST 1000 SINCE STARTUP
System Status
Environment
test
Data center
default
Current time
2023-03-29T15:03:16 +0000
Uptime
00:12
Lease expiration enabled
true
Renews threshold
10
Renews (last min)
60
DS Replicas
Instances currently registered with Eureka
Application
AMIs
Availability Zones
Status
GATEWAY
n/a (1)
(1)
UP (1) - d94d651b2d0b:gateway:8080
PRODUCT
n/a (1)
(1)
UP (1) - 9e0000bdd56e:product:8080
PRODUCT-COMPOSITE
n/a (1)
(1)
UP (1) - 2911a48d86ec:product-composite:8080
RECOMMENDATION
n/a (1)
(1)
UP (1) - 84a68e56553b:recommendation:8080
REVIEW
n/a (1)
(1)
UP (1) - 8a0eef3e8fbd:review:8080

Chapter 11: Securing Access to APIs




HTTPS
HTTP
Client A
Client B
Client C
Edge Server
[microservice]
Authorization Server
(Spring Security OAuth2)
/jwk-set
URL Path: /oauth/...
Product Composite
[microservice]
URL Path: /product-composite/...
URL Path: /eureka/...
Discovery Server
(Netflix Eureka)
Product
[microservice]
Recommendation
[microservice]
Review
[microservice]
The microservice landscape
[System boundary]


bash
⌥⌘2
b4b0637cf8c6:gateway:8443
55a237832856:auth-server:9999
90a30474d7cb:product-composite:8080
697f17159678:product:8080
6d49c12522bb:review:8080
251a152c737c:recommendation:8080
$


https://localhost:8443/eureka/
Not Secure
https://localhost:8443/eureka/web
Sign in
https://localhost:8443
Username
Password
Cancel
Sign In

Eureka

Not Secure | https://localhost:8443/eureka/web

Instances currently registered with Eureka

Application	AMIs	Availability Zones	Status
AUTH-SERVER	n/a (1)	(1)	UP (1) - 781f8298fd2f:auth-server:9999
GATEWAY	n/a (1)	(1)	UP (1) - dbf6372880b2:gateway:8443
PRODUCT	n/a (1)	(1)	UP (1) - 9f1deef92da2:product:8080
PRODUCT-COMPOSITE	n/a (1)	(1)	UP (1) - fc578652b403:product-composite:8080
RECOMMENDATION	n/a (1)	(1)	UP (1) - 00bcc1a9954e:recommendation:8080
REVIEW	n/a (1)	(1)	UP (1) - 552632decc14:review:8080

bash ⌥⌘2

```
{
  "access_token": "eyJr...jtDA",
  "scope": "product:write product:read",
  "token_type": "Bearer",
  "expires_in": 3599
}
$
```

Please sign in

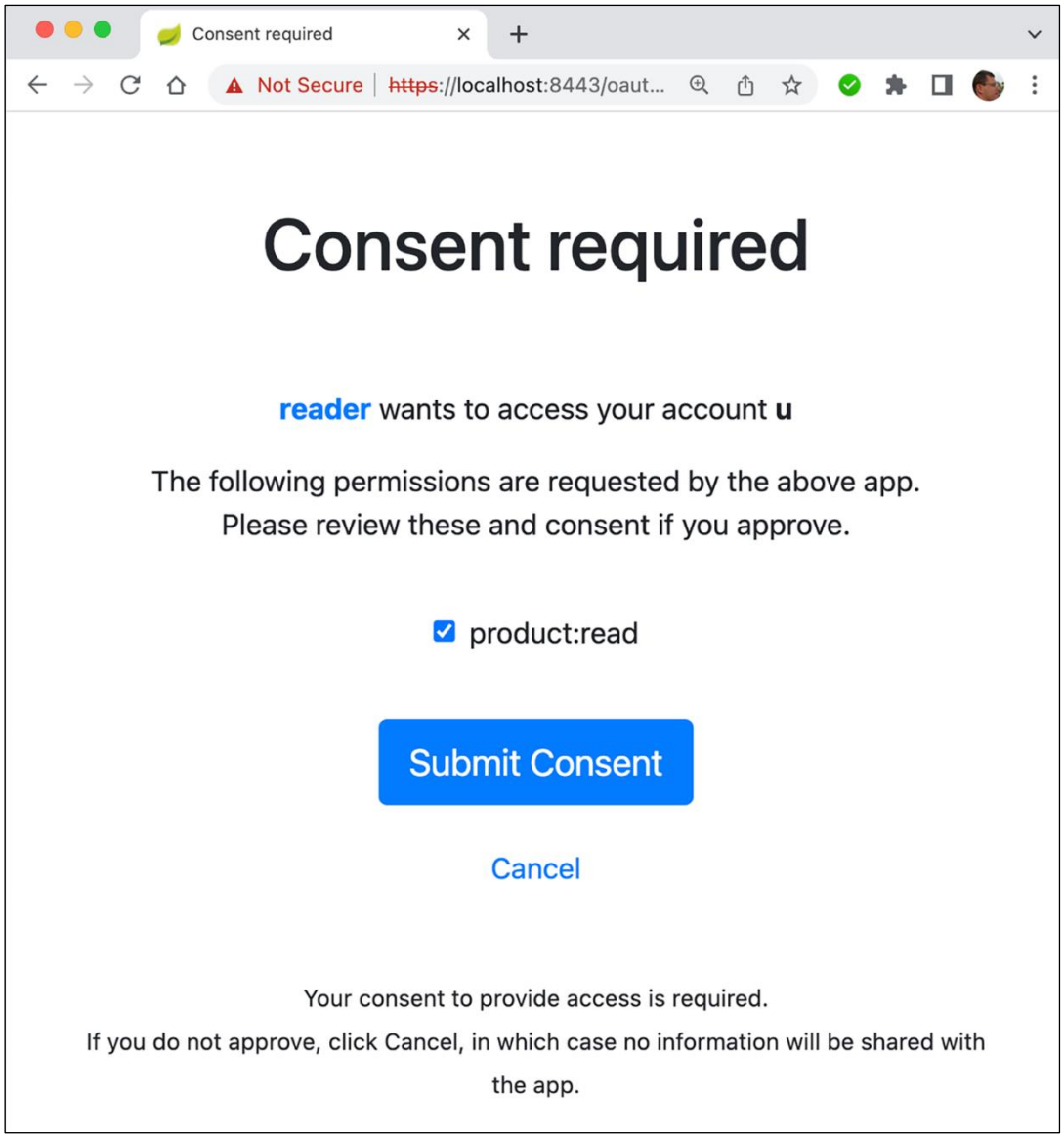
Not Secure | https://localhost:8443/login

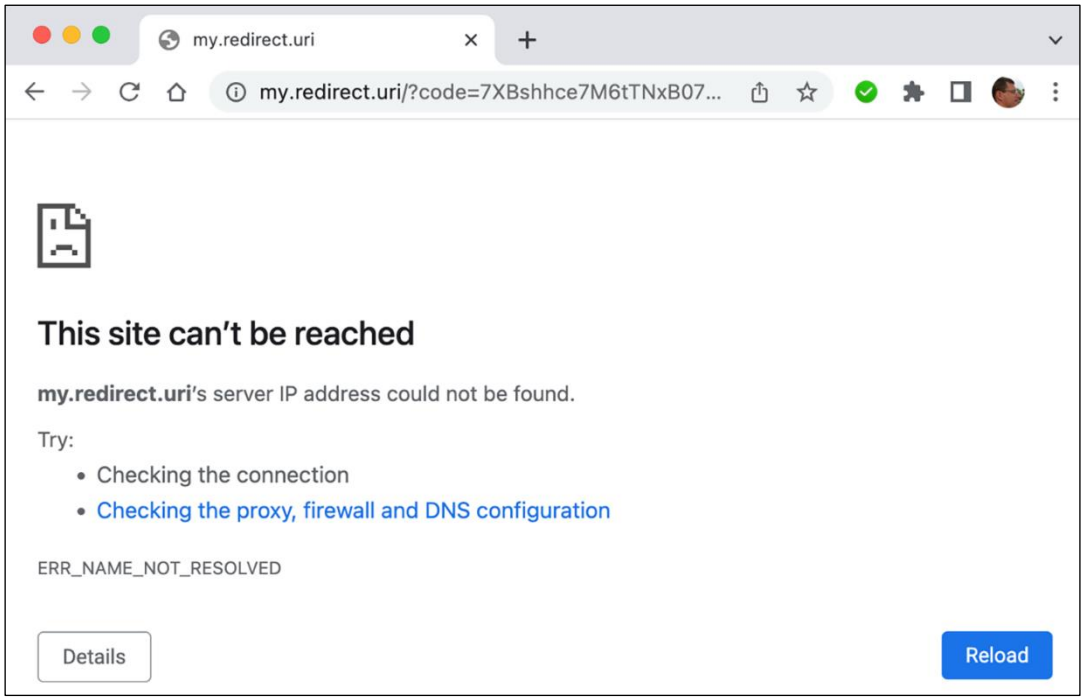
Please sign in

u

•

Sign in


Consent required
Not Secure
https://localhost:8443/oaut...
Consent required
reader wants to access your account u
The following permissions are requested by the above app.
Please review these and consent if you approve.
product:read
Submit Consent
Cancel
Your consent to provide access is required.
If you do not approve, click Cancel, in which case no information will be shared with the app.


my.redirect.uri
my.redirect.uri/?code=7XBshhce7M6tTNxB07...
This site can't be reached
my.redirect.uri's server IP address could not be found.
Try:
Checking the connection
Checking the proxy, firewall and DNS configuration
ERR_NAME_NOT_RESOLVED
Details
Reload

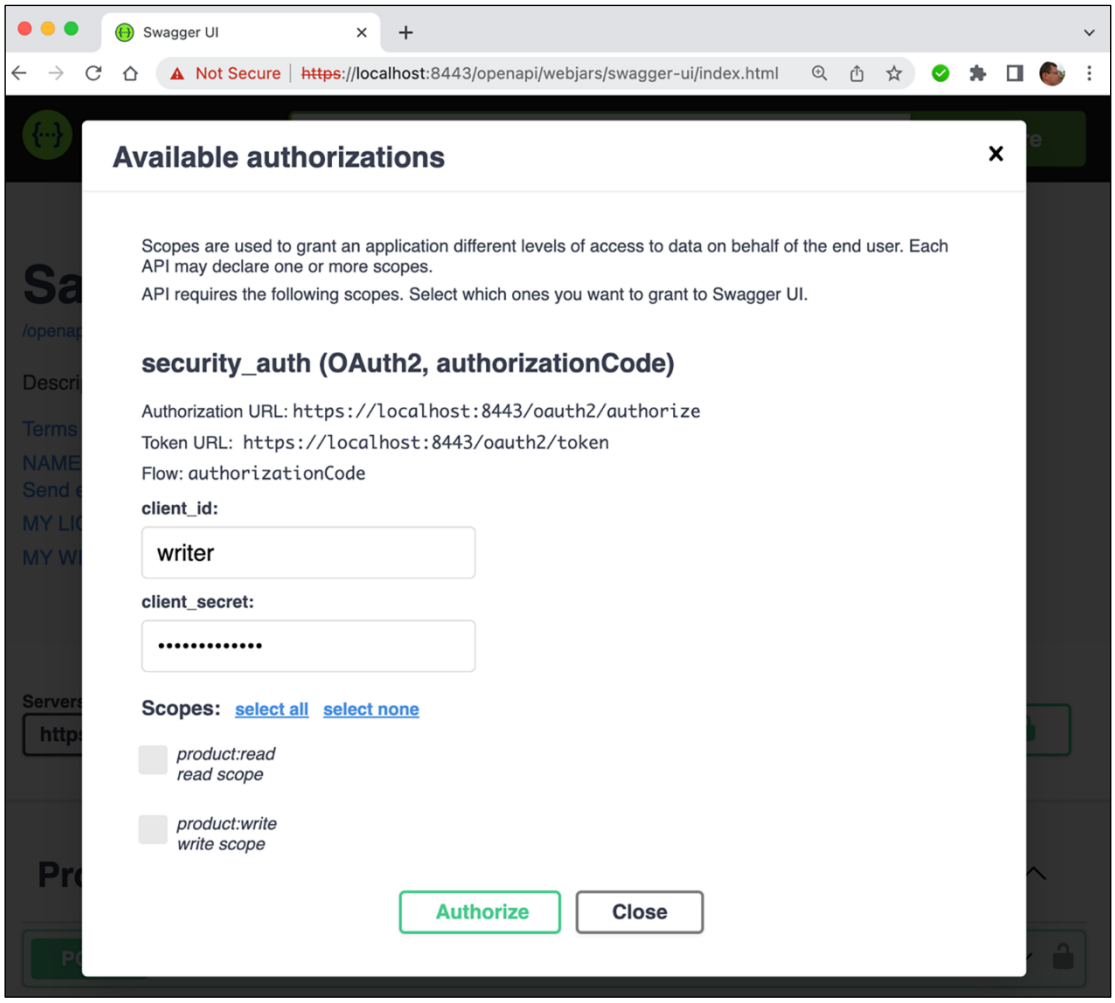
```
bash                                                    ⌥⌘2
{
  "access_token": "eyJr...ciwA",
  "refresh_token": "iCRP...HMvh",
  "scope": "product:read",
  "token_type": "Bearer",
  "expires_in": 3599
}
$
```

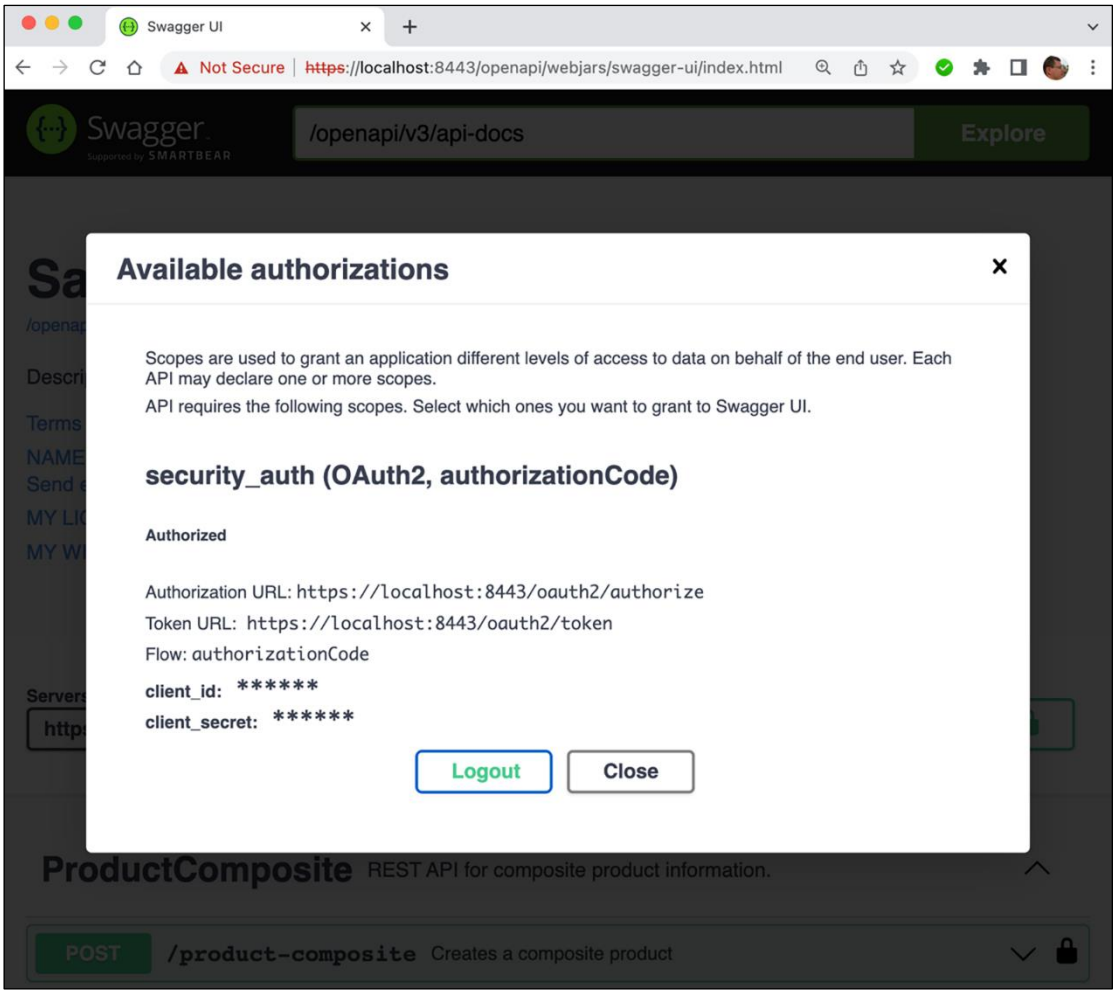
```
bash                                                    ⌥⌘2
HTTP/1.1 401 Unauthorized
WWW-Authenticate: Bearer error="invalid_token",
```

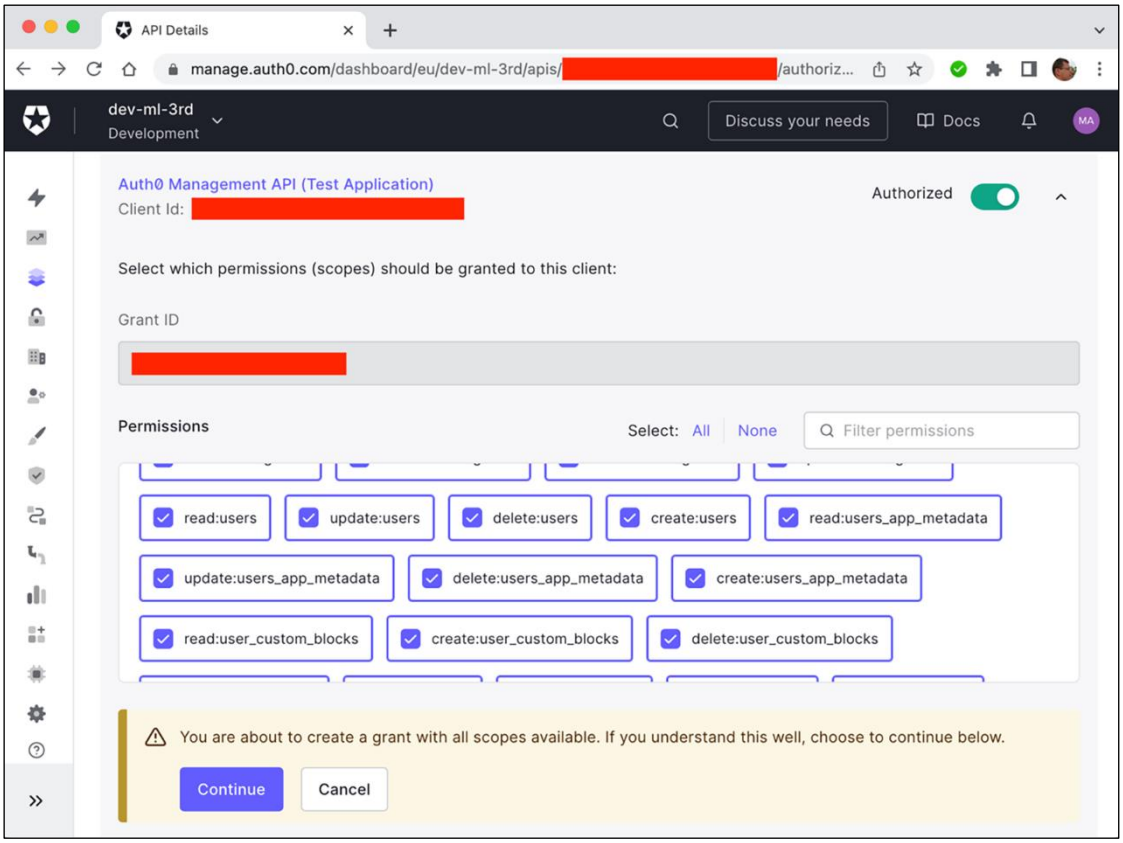
```
bash                                                    ⌥⌘2
HTTP/1.1 200 OK

...
{"productId":1, ...}
$
```

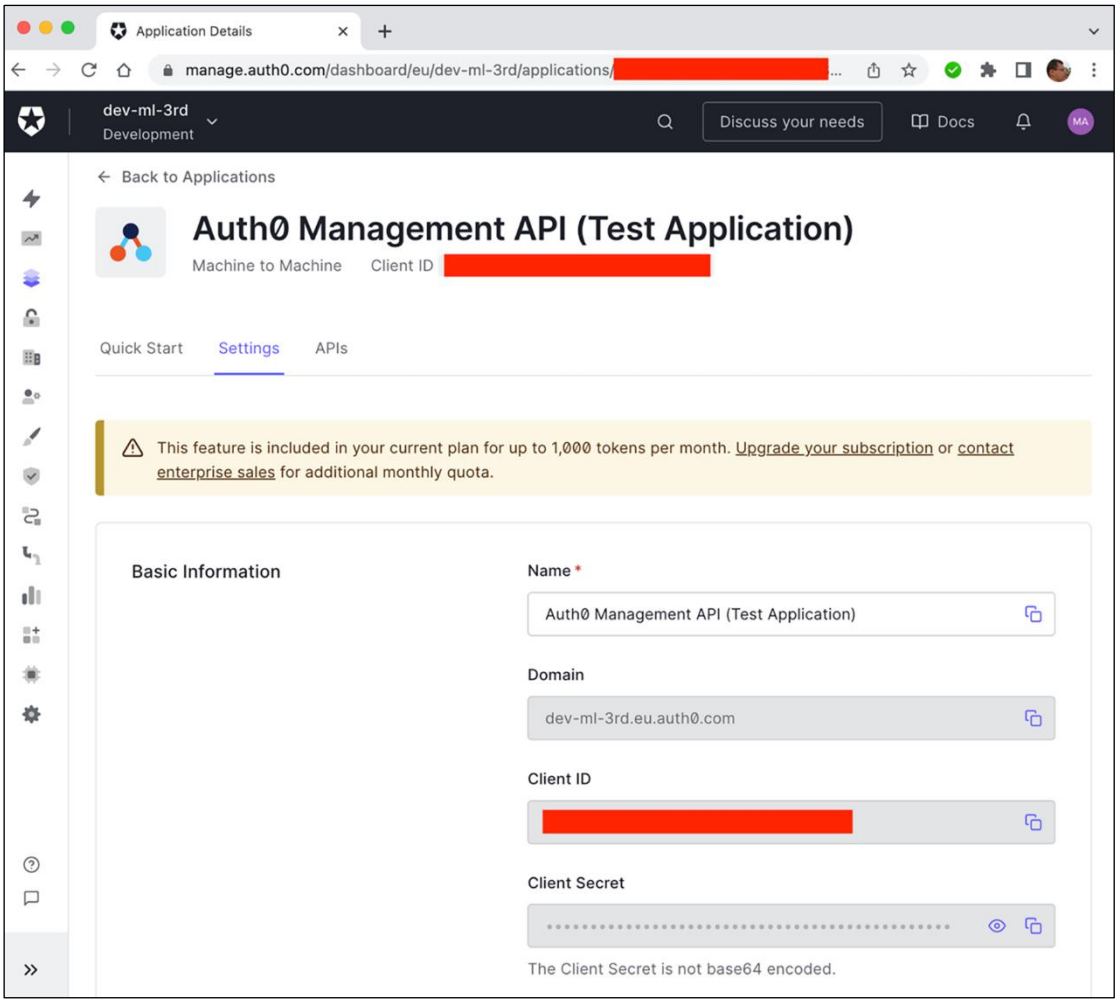
```
bash                                                    ⌥⌘2
HTTP/1.1 403 Forbidden
WWW-Authenticate: Bearer error="insufficient_scope", error_descriptio
n="The request requires higher privileges than provided by the access
 token.", error_uri="https://tools.ietf.org/html/rfc6750#section-3.1"
$
```

```
bash                                                    ⌥⌘2
chapter11-product-composite-1 | ... Authorization info: Subject: u,
scopes: [product:write, product:read], expires 2023-04-07T05:27:38Z:
 issuer: http://auth-server:9999, audience: [writer]
$
```


Swagger UI
Not Secure
https://localhost:8443/openapi/webjars/swagger-ui/index.html
Available authorizations
Scopes are used to grant an application different levels of access to data on behalf of the end user. Each API may declare one or more scopes.
API requires the following scopes. Select which ones you want to grant to Swagger UI.
security_auth (OAuth2, authorizationCode)
Authorization URL: https://localhost:8443/oauth2/authorize
Token URL: https://localhost:8443/oauth2/token
Flow: authorizationCode
client_id:
writer
client_secret:
Scopes: select all select none
product:read
read scope
product:write
write scope
Authorize
Close


Swagger UI
Not Secure | https://localhost:8443/openapi/webjars/swagger-ui/index.html
Swagger
/openapi/v3/api-docs
Explore
Available authorizations
Scopes are used to grant an application different levels of access to data on behalf of the end user. Each API may declare one or more scopes.
API requires the following scopes. Select which ones you want to grant to Swagger UI.
security_auth (OAuth2, authorizationCode)
Authorized
Authorization URL: https://localhost:8443/oauth2/authorize
Token URL: https://localhost:8443/oauth2/token
Flow: authorizationCode
client_id: ******
client_secret: ******
Logout
Close
ProductComposite REST API for composite product information.
POST /product-composite Creates a composite product


API Details
manage.auth0.com/dashboard/eu/dev-ml-3rd/apis/ /authoriz...
dev-ml-3rd
Development
Discuss your needs
Docs
Auth0 Management API (Test Application)
Client Id:
Authorized
Select which permissions (scopes) should be granted to this client:
Grant ID
Permissions
Select: All None
Filter permissions
read:users
update:users
delete:users
create:users
read:users_app_metadata
update:users_app_metadata
delete:users_app_metadata
create:users_app_metadata
read:user_custom_blocks
create:user_custom_blocks
delete:user_custom_blocks
You are about to create a grant with all scopes available. If you understand this well, choose to continue below.
Continue
Cancel

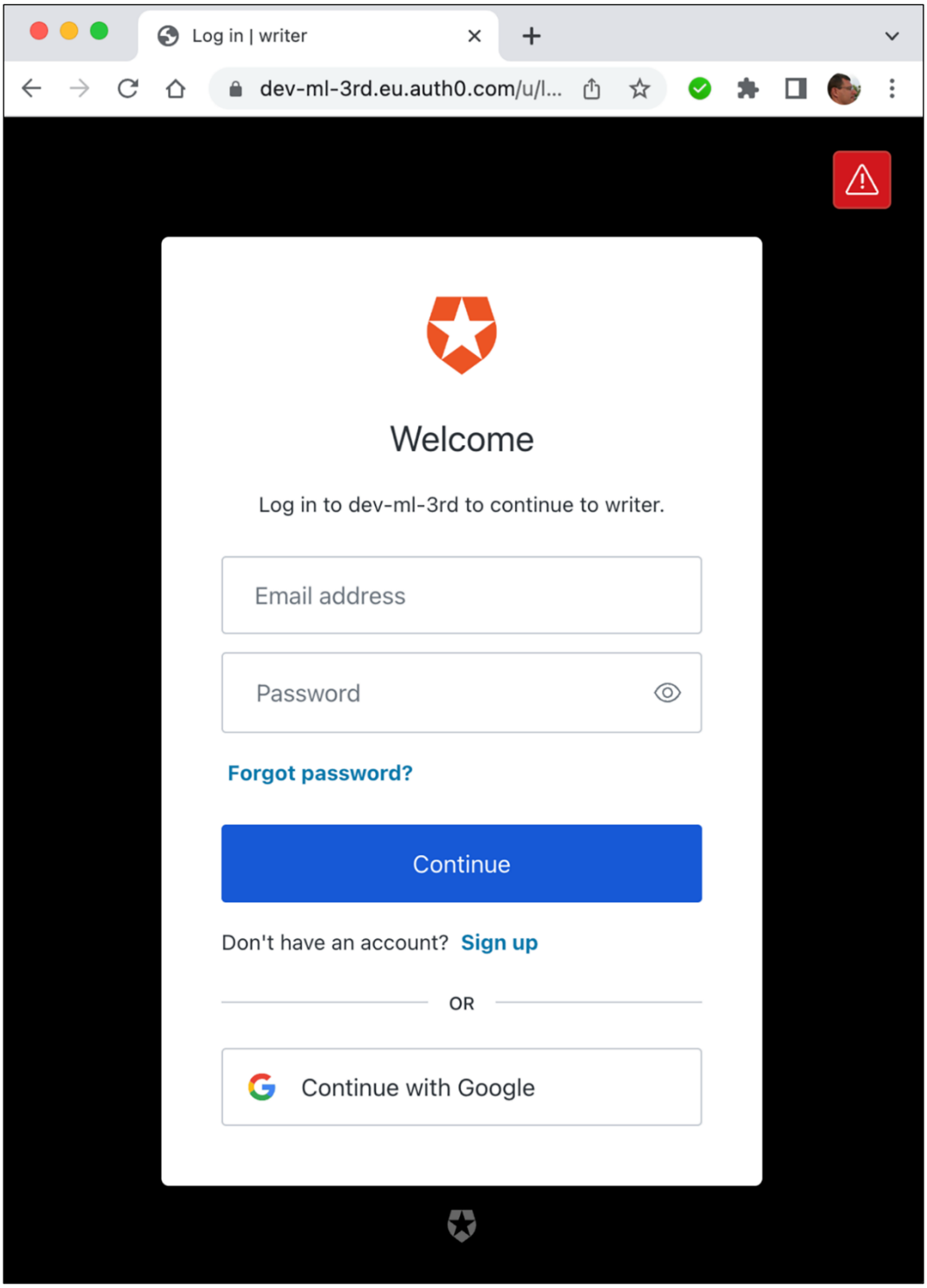


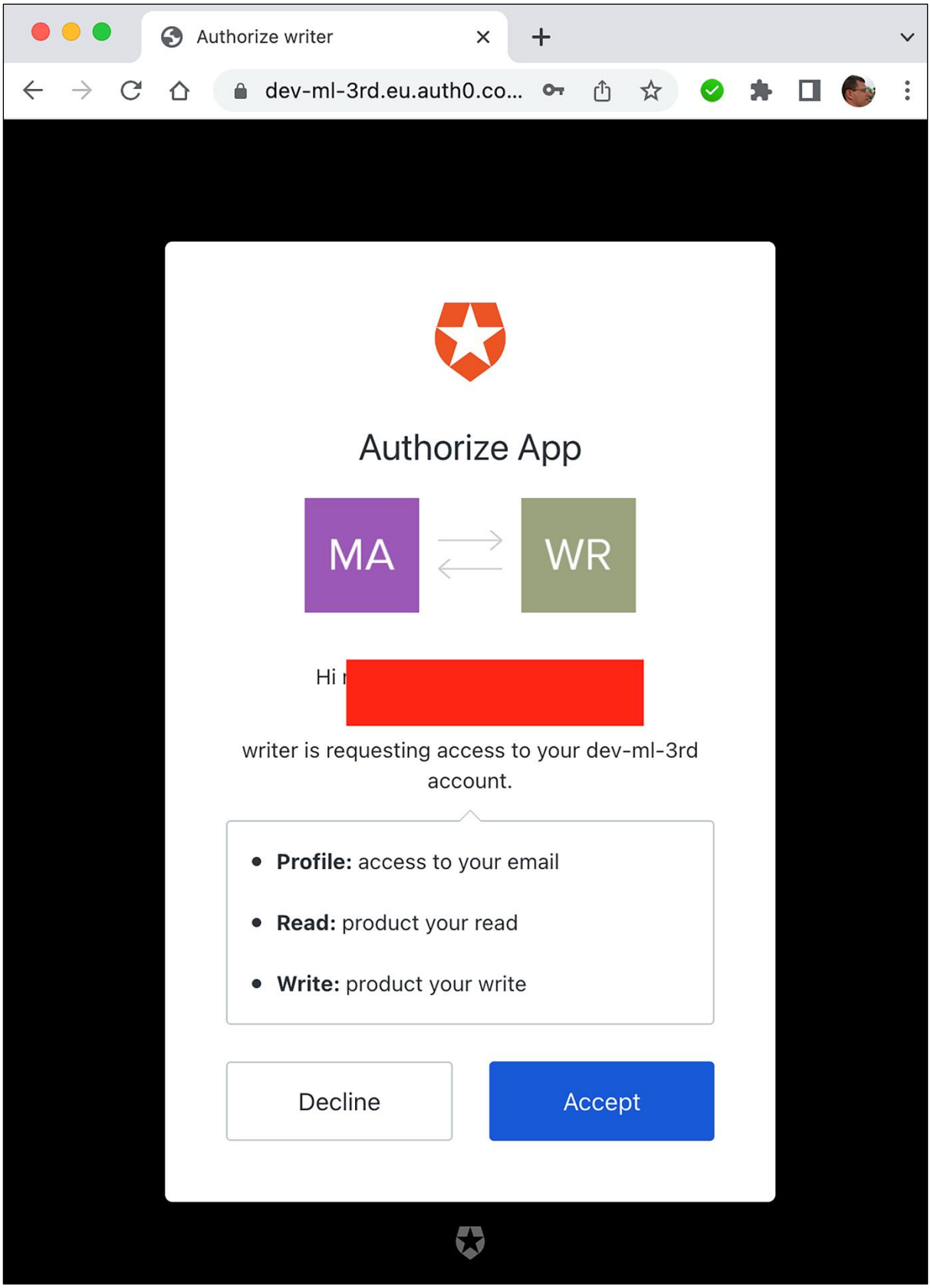

```
bash
Update the tenant, set its default connection to a user dictionary...
...
Creates reader client app...
...
Creates writer client app...
...
Creates API product-composite (https://localhost:8443/product-composite)...
...
Creates user with email NNN...
...
Create client grant for the reader app to access the product-composite API...
...
Create client grant for the writer app to access the product-composite API...
...
Auth0 - OAuth2 settings:

export TENANT=...
export WRITER_CLIENT_ID=...
export WRITER_CLIENT_SECRET=...
export READER_CLIENT_ID=...
export READER_CLIENT_SECRET=...
$
```

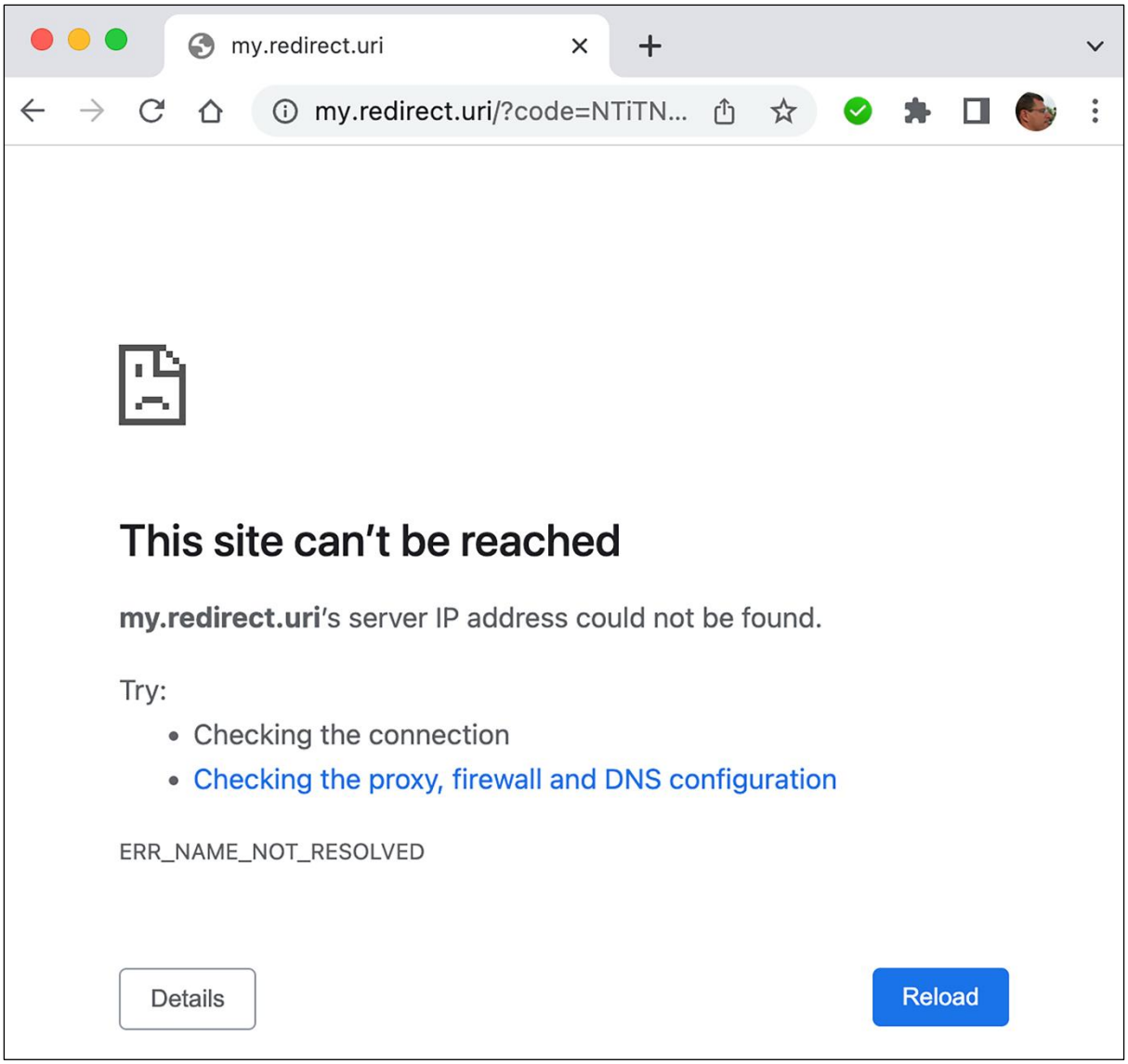
```
-bash
Update the tenant, set its default connection to a user dictionary...
...
Reader client app already exists
Writer client app already exists
API product-composite (https://localhost:8443/product-composite) already exists
User with email NNN already exists
Client grant for the reader app to access the product-composite API already exists
Client grant for the writer app to access the product-composite API already exists

Auth0 - OAuth2 settings:

export TENANT=...
export WRITER_CLIENT_ID=...
export WRITER_CLIENT_SECRET=...
export READER_CLIENT_ID=...
export READER_CLIENT_SECRET=...
$
```

```
bash
chapter11-product-composite-1 | ... Authorization info:
Subject: ...@clients,
scopes: product:read product:write,
expires 2023-04-08T06:09:45Z:
issuer: https://dev-ml-3rd.eu.auth0.com/,
audience: [https://localhost:8443/product-composite]
$
```

```
bash
chapter11-product-composite-1 | ... Authorization info:
Subject: ...@clients,
scopes: product:read,
expires 2023-04-08T06:09:49Z:
issuer: https://dev-ml-3rd.eu.auth0.com/,
audience: [https://localhost:8443/product-composite]
$
```

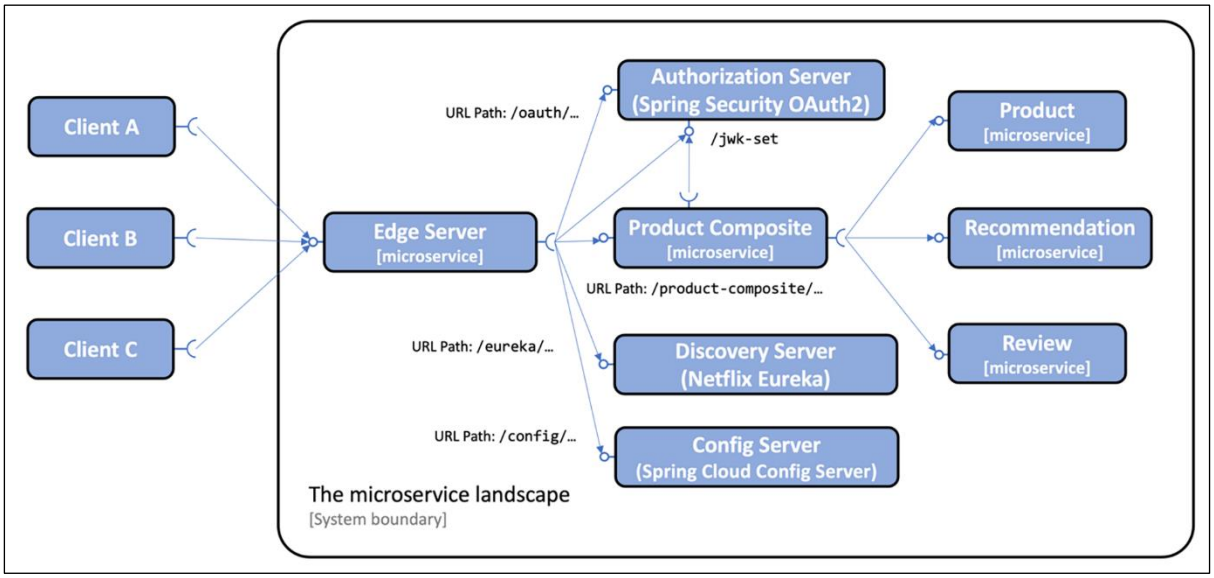

Log in | writer
dev-ml-3rd.eu.auth0.com/u/l...
Welcome
Log in to dev-ml-3rd to continue to writer.
Email address
Password
Forgot password?
Continue
Don't have an account? Sign up
OR
Continue with Google


Authorize writer
dev-ml-3rd.eu.auth0.co...
Authorize App
MA
WR
Hi
writer is requesting access to your dev-ml-3rd account.
Profile: access to your email
Read: product your read
Write: product your write
Decline
Accept

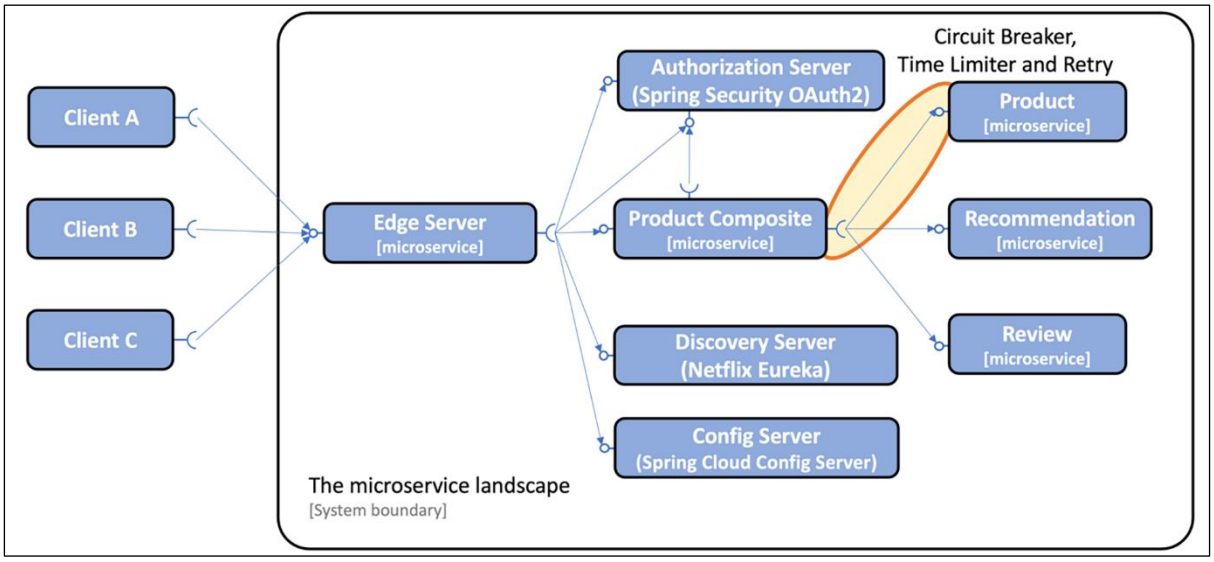

my.redirect.uri
my.redirect.uri/?code=NTiTN...
This site can't be reached
my.redirect.uri's server IP address could not be found.
Try:
Checking the connection
Checking the proxy, firewall and DNS configuration
ERR_NAME_NOT_RESOLVED
Details
Reload

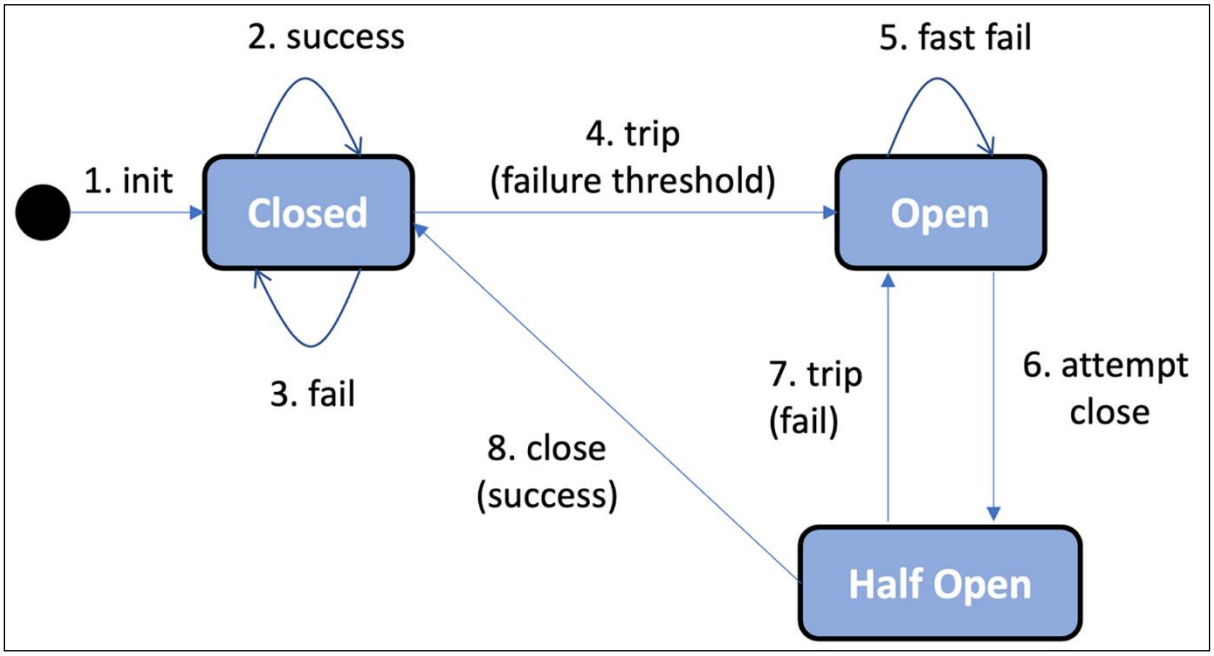
bash
⌥⌘2
{
"sub": "auth0|...",
"email": "...my users email...",
"email_verified": true
}
$

Chapter12: Centralized Configuration



Chapter13: Improving Resilience Using Resilience4j





bash

```
{
  "timestamp": "2023-04-10T07:34:03.548+00:00",
  "path": "/product-composite/1",
  "status": 500,
  "error": "Internal Server Error",
  "message": "Did not observe any item or terminal signal within
2000ms in 'onErrorResume' (and no fallback has been configured)",
  "requestId": "28bc9b3f-42"
}
$
```

bash ⌥⌘2

```
{
  "productId": 1,
  "name": "Fallback product1",
  "weight": 1,
```

bash ⌥⌘2

```
CLOSED_TO_OPEN
OPEN_TO_HALF_OPEN
HALF_OPEN_TO_CLOSED
$
```

bash ⌥⌘2

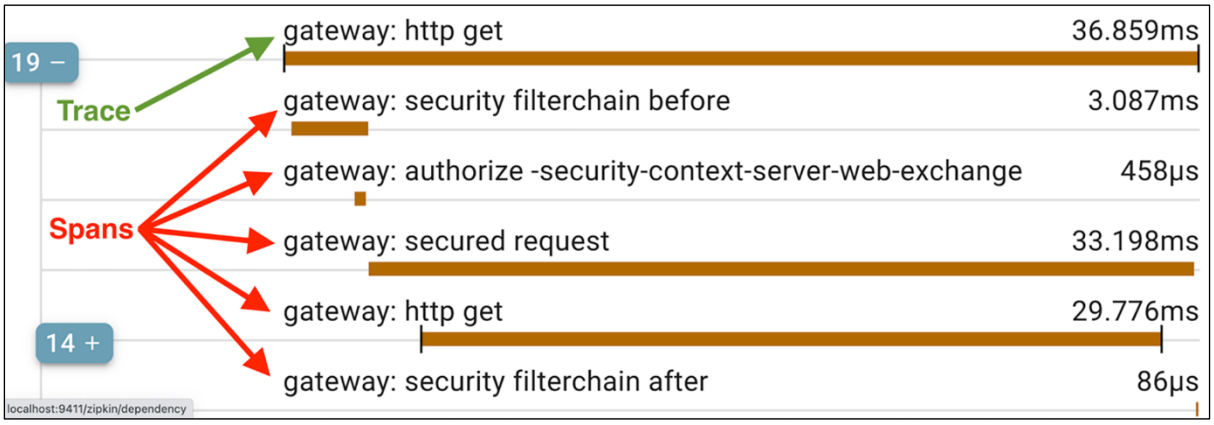
```
200

real    0m0.066s
```

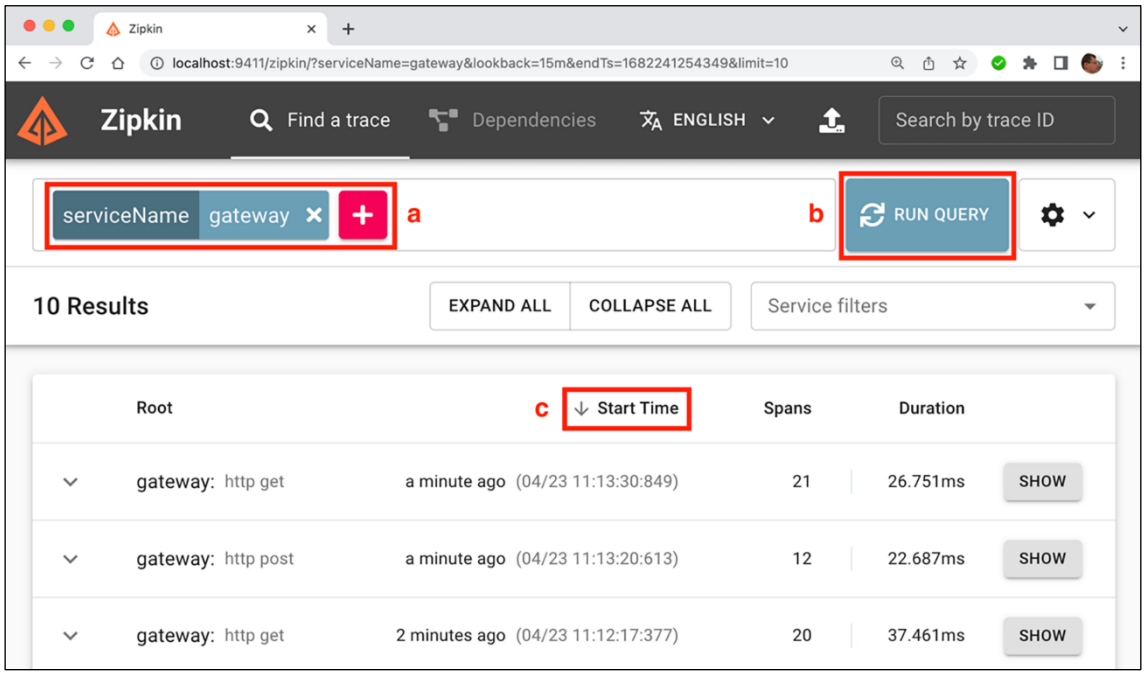
bash ⌥⌘2

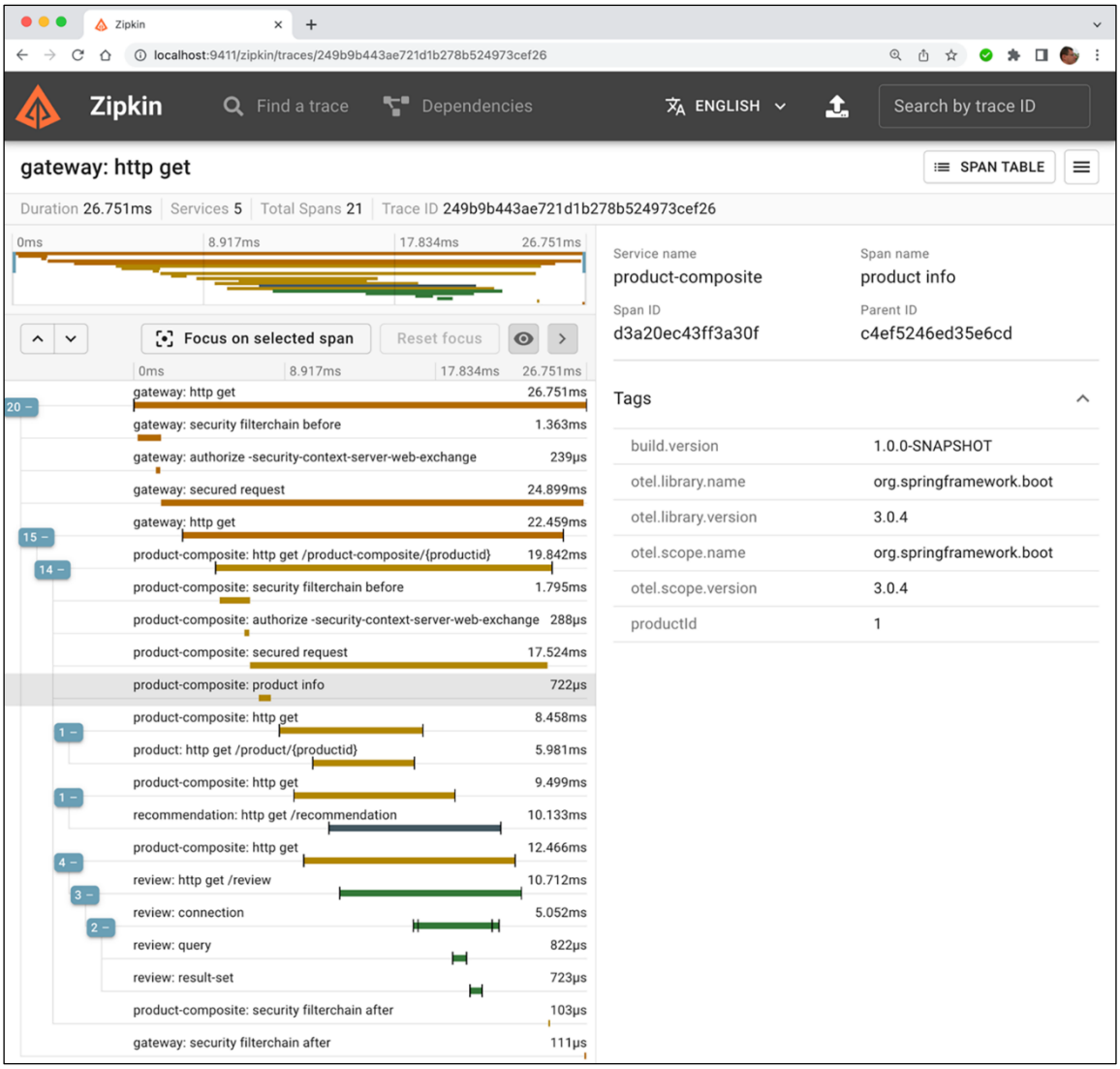
```
200

real    0m1.072s
```

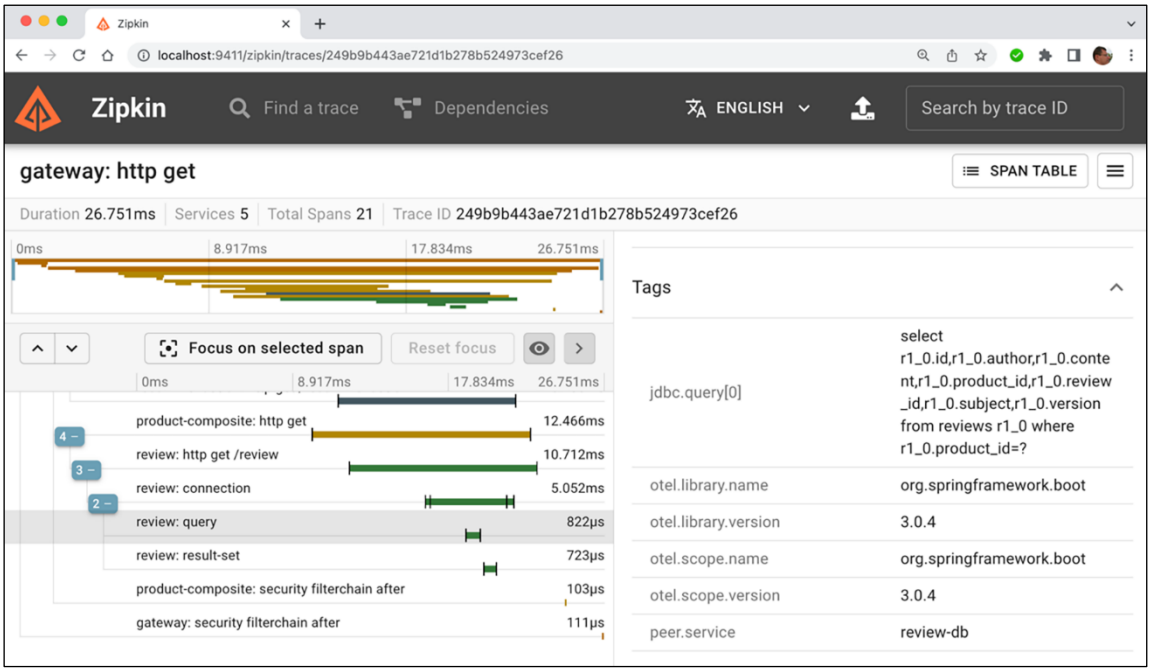
```
bash                                                                    ⌥⌘2
{
  "retryName": "product",
  "type": "RETRY",
  "creationTime": "2023-04-10T07:39:51.136929251Z[Etc/UTC]",
  "errorMessage": "org.springframework.web.reactive.function.client.Web
ClientResponseException$InternalServerError: 500 Internal Server Error
from GET http://c4a5a8bbf39d:8080/product/1?delay=0&faultPercent=25",
  "numberOfAttempts": 1
}
{
  "retryName": "product",
  "type": "SUCCESS",
  "creationTime": "2023-04-10T07:39:52.153598627Z[Etc/UTC]",
  "errorMessage": "org.springframework.web.reactive.function.client.Web
ClientResponseException$InternalServerError: 500 Internal Server Error
from GET http://c4a5a8bbf39d:8080/product/1?delay=0&faultPercent=25",
  "numberOfAttempts": 1
}
$
```

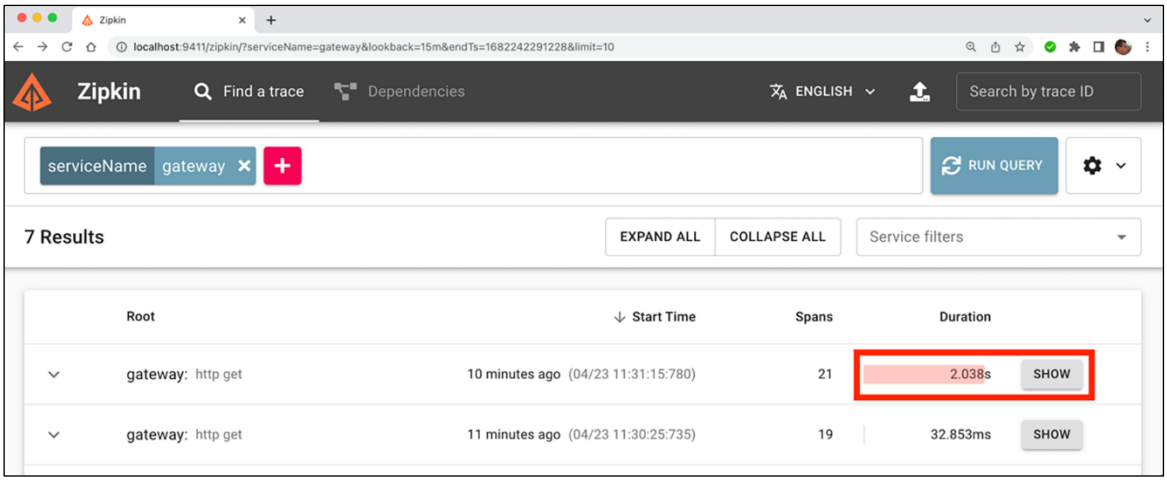
Chapter 14: Understanding Distributed Tracing

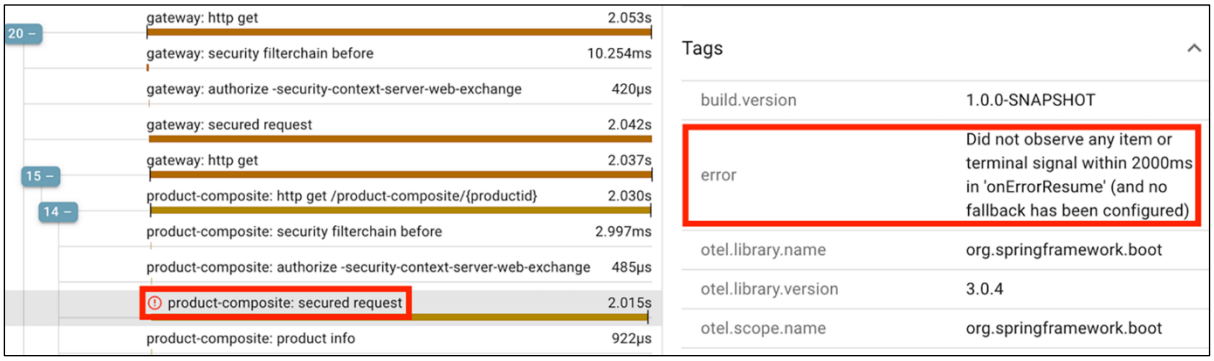


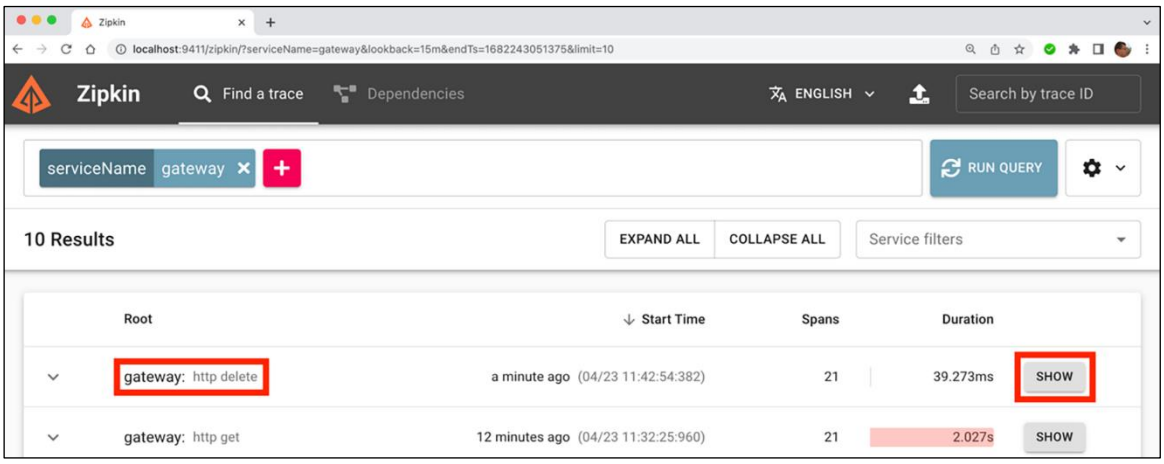


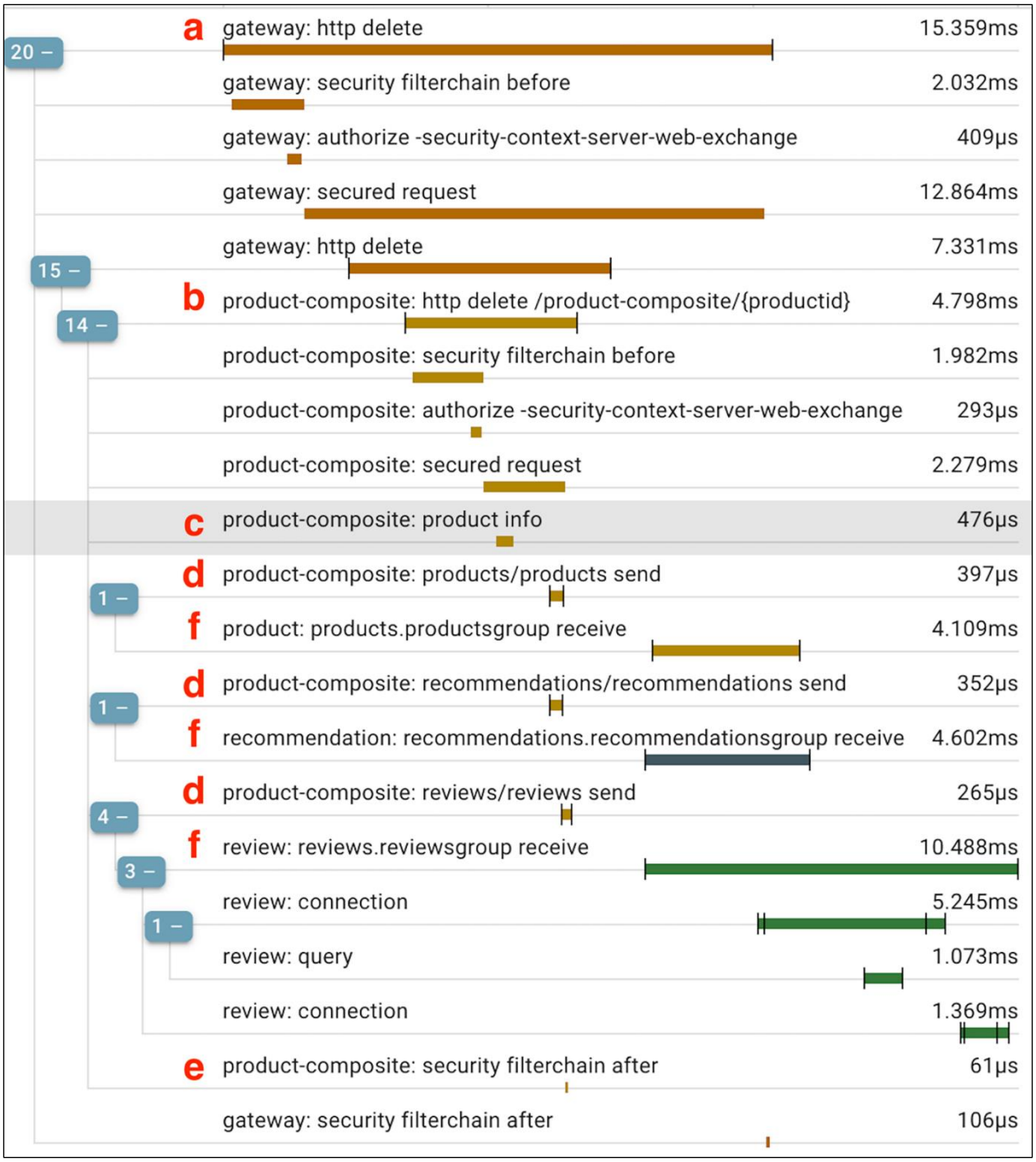

Zipkin
localhost:9411/zipkin/traces/249b9b443ae721d1b278b524973cef26
Zipkin
Find a trace
Dependencies
ENGLISH
Search by trace ID
gateway: http get
SPAN TABLE
Duration 26.751ms
Services 5
Total Spans 21
Trace ID 249b9b443ae721d1b278b524973cef26
0ms
8.917ms
17.834ms
26.751ms
Focus on selected span
Reset focus
gateway: http get 26.751ms
gateway: security filterchain before 1.363ms
gateway: authorize -security-context-server-web-exchange 239µs
gateway: secured request 24.899ms
gateway: http get 22.459ms
product-composite: http get /product-composite/{productid} 19.842ms
product-composite: security filterchain before 1.795ms
product-composite: authorize -security-context-server-web-exchange 288µs
product-composite: secured request 17.524ms
product-composite: product info 722µs
product-composite: http get 8.458ms
product: http get /product/{productid} 5.981ms
product-composite: http get 9.499ms
recommendation: http get /recommendation 10.133ms
product-composite: http get 12.466ms
review: http get /review 10.712ms
review: connection 5.052ms
review: query 822µs
review: result-set 723µs
product-composite: security filterchain after 103µs
gateway: security filterchain after 111µs
Service name
product-composite
Span name
product info
Span ID
d3a20ec43ff3a30f
Parent ID
c4ef5246ed35e6cd
Tags
build.version 1.0.0-SNAPSHOT
otel.library.name org.springframework.boot
otel.library.version 3.0.4
otel.scope.name org.springframework.boot
otel.scope.version 3.0.4
productId 1

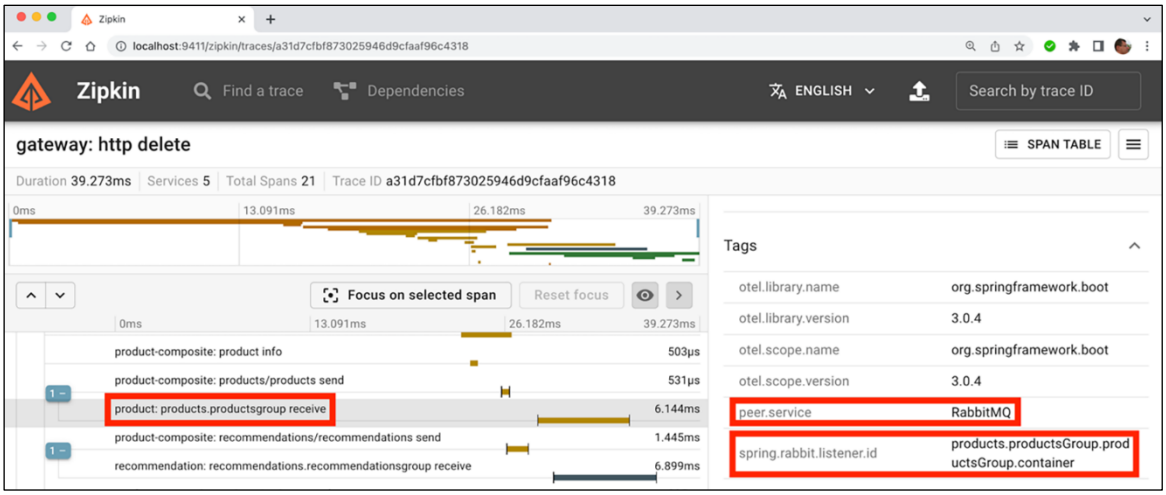

Zipkin
localhost:9411/zipkin/traces/249b9b443ae721d1b278b524973cef26
Zipkin
Find a trace
Dependencies
ENGLISH
Search by trace ID
gateway: http get
SPAN TABLE
Duration 26.751ms
Services 5
Total Spans 21
Trace ID 249b9b443ae721d1b278b524973cef26
0ms
8.917ms
17.834ms
26.751ms
Focus on selected span
Reset focus
product-composite: http get 12.466ms
review: http get /review 10.712ms
review: connection 5.052ms
review: query 822µs
review: result-set 723µs
product-composite: security filterchain after 103µs
gateway: security filterchain after 111µs
Tags
jdbc.query[0] select r1_0.id,r1_0.author,r1_0.content,r1_0.product_id,r1_0.review_id,r1_0.subject,r1_0.version from reviews r1_0 where r1_0.product_id=?
otel.library.name org.springframework.boot
otel.library.version 3.0.4
otel.scope.name org.springframework.boot
otel.scope.version 3.0.4
peer.service review-db


Zipkin
localhost:9411/zipkin/?serviceName=gateway&lookback=15m&endTs=1682242291228&limit=10
Zipkin
Find a trace
Dependencies
ENGLISH
Search by trace ID
serviceName
gateway
RUN QUERY
7 Results
EXPAND ALL
COLLAPSE ALL
Service filters
Root
Start Time
Spans
Duration
gateway: http get
10 minutes ago (04/23 11:31:15:780)
21
2.038s
SHOW
gateway: http get
11 minutes ago (04/23 11:30:25:735)
19
32.853ms
SHOW


gateway: http get 2.053s
gateway: security filterchain before 10.254ms
gateway: authorize -security-context-server-web-exchange 420µs
gateway: secured request 2.042s
gateway: http get 2.037s
product-composite: http get /product-composite/{productid} 2.030s
product-composite: security filterchain before 2.997ms
product-composite: authorize -security-context-server-web-exchange 485µs
product-composite: secured request 2.015s
product-composite: product info 922µs
Tags
build.version 1.0.0-SNAPSHOT
error Did not observe any item or terminal signal within 2000ms in 'onErrorResume' (and no fallback has been configured)
otel.library.name org.springframework.boot
otel.library.version 3.0.4
otel.scope.name org.springframework.boot


Zipkin
localhost:9411/zipkin/?serviceName=gateway&lookback=15m&endTs=1682243051375&limit=10
Zipkin
Find a trace
Dependencies
ENGLISH
Search by trace ID
serviceName
gateway
RUN QUERY
10 Results
EXPAND ALL
COLLAPSE ALL
Service filters
Root
Start Time
Spans
Duration
gateway: http delete
a minute ago (04/23 11:42:54:382)
21
39.273ms
SHOW
gateway: http get
12 minutes ago (04/23 11:32:25:960)
21
2.027s
SHOW


a gateway: http delete 15.359ms
gateway: security filterchain before 2.032ms
gateway: authorize -security-context-server-web-exchange 409µs
gateway: secured request 12.864ms
gateway: http delete 7.331ms
b product-composite: http delete /product-composite/{productid} 4.798ms
product-composite: security filterchain before 1.982ms
product-composite: authorize -security-context-server-web-exchange 293µs
product-composite: secured request 2.279ms
c product-composite: product info 476µs
d product-composite: products/products send 397µs
f product: products.productsgroup receive 4.109ms
d product-composite: recommendations/recommendations send 352µs
f recommendation: recommendations.recommendationsgroup receive 4.602ms
d product-composite: reviews/reviews send 265µs
f review: reviews.reviewsgroup receive 10.488ms
review: connection 5.245ms
review: query 1.073ms
review: connection 1.369ms
e product-composite: security filterchain after 61µs
gateway: security filterchain after 106µs
20
15
14
1
1
4
3
1


Zipkin
localhost:9411/zipkin/traces/a31d7cfbf873025946d9cfaaf96c4318
Find a trace
Dependencies
ENGLISH
Search by trace ID
gateway: http delete
SPAN TABLE
Duration 39.273ms
Services 5
Total Spans 21
Trace ID a31d7cfbf873025946d9cfaaf96c4318
0ms
13.091ms
26.182ms
39.273ms
Focus on selected span
Reset focus
product-composite: product info 503µs
product-composite: products/products send 531µs
product: products.productsgroup receive 6.144ms
product-composite: recommendations/recommendations send 1.445ms
recommendation: recommendations.recommendationsgroup receive 6.899ms
Tags
otel.library.name org.springframework.boot
otel.library.version 3.0.4
otel.scope.name org.springframework.boot
otel.scope.version 3.0.4
peer.service RabbitMQ
spring.rabbit.listener.id products.productsGroup.productsGroup.container

RabbitMQ Management

localhost:15672/#/queues/%2F/products.auditGroup

RabbitMQ™ RabbitMQ 3.11.8 Erlang 25.2.2

Refreshed 2023-04-23 11:50:19 Refresh every 5 seconds

Virtual host All

Cluster **rabbit@c7b9f5a0fcf5**

User **guest** Log out

Overview **Connections** **Channels** **Exchanges** **Queues** **Admin**

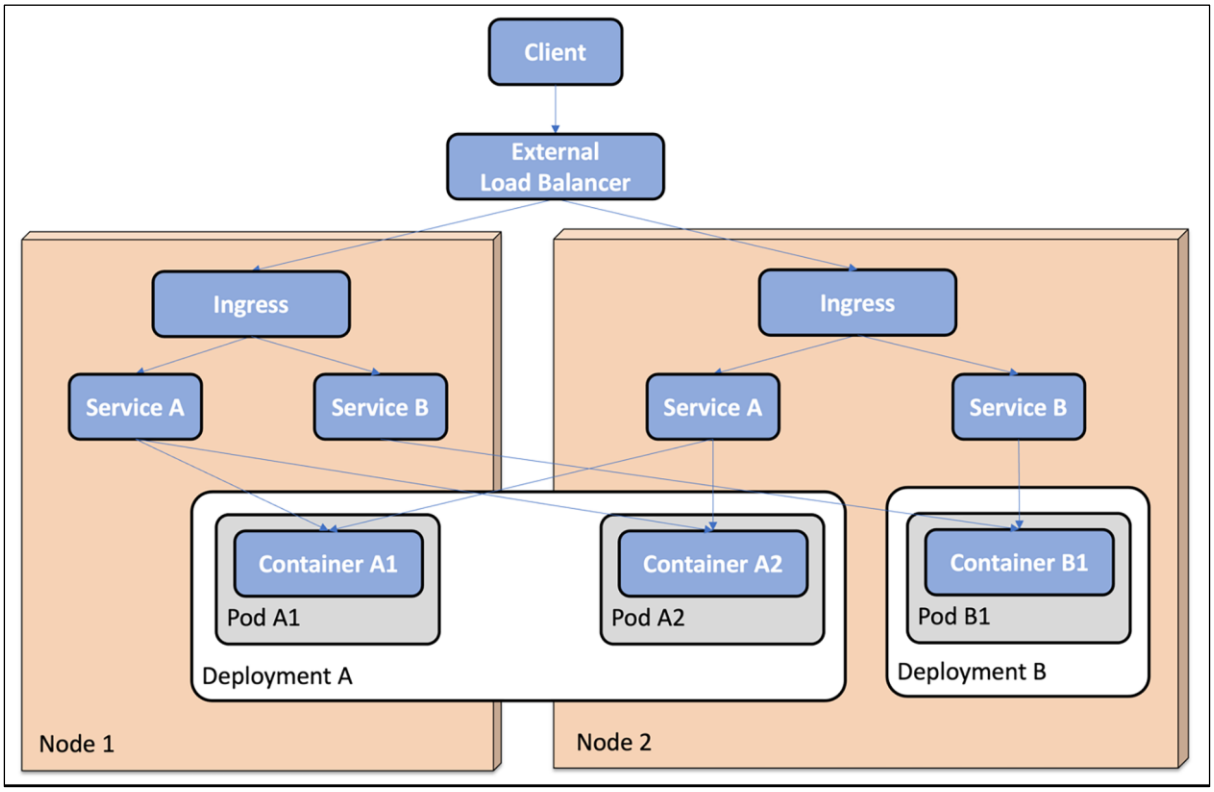
Get Message(s)

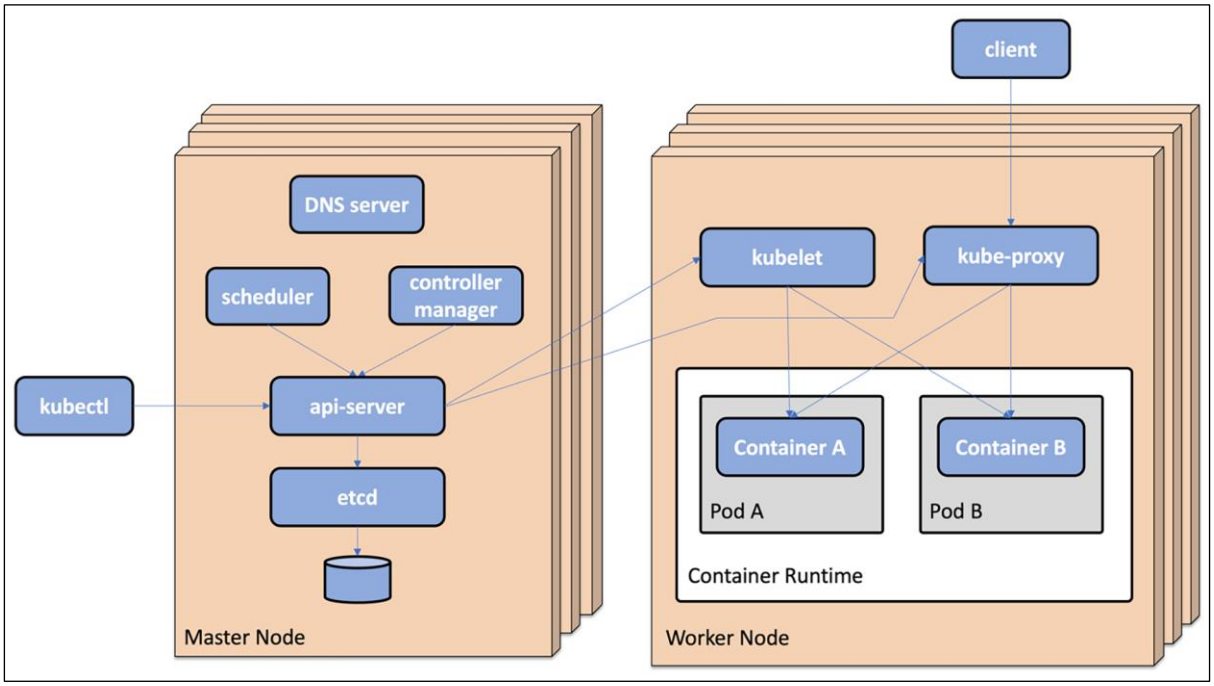
Message 1

The server reported **12** messages remaining.

Exchange	products
Routing Key	products
Redelivered	•
Properties	timestamp: 1682241111 message_id: fb695a1c-1ede-d667-7b51-33d714604b29 priority: 0 delivery_mode: 2 headers: partitionKey: 113 target-protocol: amqp traceparent: 00-99a9f2501e4d454643184c6b1cb0a232-7458430fe56d6df1-01 content_type: application/json
Payload 93 bytes Encoding: string	{"eventType":"DELETE","key":113,"data":null,"eventCreatedAt":"2023-04-23T09:11:51.21215301Z"}

Chapter 15: Introduction to Kubernetes






```
$ kubectl config get-contexts
CURRENT   NAME                      CLUSTER                   AUTHINFO                  NAMESPACE
*         handson-spring-boot-cloud handson-spring-boot-cloud handson-spring-boot-cloud first-attempts
          minikube                  minikube                  minikube                  default
$
```

```
$ kubectl get nodes
NAME                        STATUS   ROLES           AGE   VERSION
handson-spring-boot-cloud   Ready    control-plane   40m   v1.26.1
$
```

```
$ kubectl get pods --all-namespaces
NAMESPACE       NAME                                                READY   STATUS      RESTARTS      AGE
ingress-nginx   ingress-nginx-admission-create-88v7k                0/1     Completed   0             41m
ingress-nginx   ingress-nginx-admission-patch-j2xws                 0/1     Completed   1             41m
ingress-nginx   ingress-nginx-controller-77669ff58-qfj5j            1/1     Running     0             41m
kube-system     coredns-787d4945fb-wbp2r                            1/1     Running     0             63m
kube-system     etcd-handson-spring-boot-cloud                      1/1     Running     0             63m
kube-system     kube-apiserver-handson-spring-boot-cloud            1/1     Running     0             63m
kube-system     kube-controller-manager-handson-spring-boot-cloud   1/1     Running     0             63m
kube-system     kube-proxy-prrjn                                    1/1     Running     0             63m
kube-system     kube-scheduler-handson-spring-boot-cloud            1/1     Running     0             63m
kube-system     metrics-server-5f8fcc9bb7-llns9                     1/1     Running     0             40m
kube-system     storage-provisioner                                 1/1     Running     1 (62m ago)   63m
$
```

```
$ kubectl get all
NAME                                    READY   STATUS    RESTARTS   AGE
pod/nginx-deploy-58bfb487f9-l5hkr       1/1     Running   0          86s

NAME                 TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
service/kubernetes   ClusterIP   10.96.0.1    <none>        443/TCP   8m29s

NAME                            READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/nginx-deploy    1/1     1            1           86s

NAME                                       DESIRED   CURRENT   READY   AGE
replicaset.apps/nginx-deploy-58bfb487f9    1         1         1       86s
$
```

```
$ kubectl get pod --watch
NAME                            READY   STATUS    RESTARTS   AGE
nginx-deploy-58bfb487f9-cgc2v   1/1     Running   0          51s
nginx-deploy-58bfb487f9-cgc2v   1/1     Terminating   0          54s
nginx-deploy-58bfb487f9-knhfp   0/1     Pending       0          0s
nginx-deploy-58bfb487f9-knhfp   0/1     Pending       0          0s
nginx-deploy-58bfb487f9-knhfp   0/1     ContainerCreating   0          0s
nginx-deploy-58bfb487f9-cgc2v   0/1     Terminating         0          55s
nginx-deploy-58bfb487f9-cgc2v   0/1     Terminating         0          55s
nginx-deploy-58bfb487f9-cgc2v   0/1     Terminating         0          55s
nginx-deploy-58bfb487f9-knhfp   1/1     Running             0          2s
```

```
8. bash
$ kubectl get all
NAME                                    READY   STATUS    RESTARTS   AGE
pod/nginx-deploy-59b8c5f7cd-mt6pg       1/1     Running   0          46s
pod/nginx-deploy-59b8c5f7cd-pmns9       1/1     Running   0          12s
pod/nginx-deploy-59b8c5f7cd-vtstj       1/1     Running   0          12s

NAME                            READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/nginx-deploy    3/3     3            3           46s

NAME                                       DESIRED   CURRENT   READY   AGE
replicaset.apps/nginx-deploy-59b8c5f7cd    3         3         3       46s
$
```

```
bash
$ kubectl get svc
NAME            TYPE       CLUSTER-IP       EXTERNAL-IP   PORT(S)        AGE
nginx-service   NodePort   10.100.230.194   <none>        80:30080/TCP   30s
$
```

Welcome to nginx!

localhost:30080

Welcome to nginx!

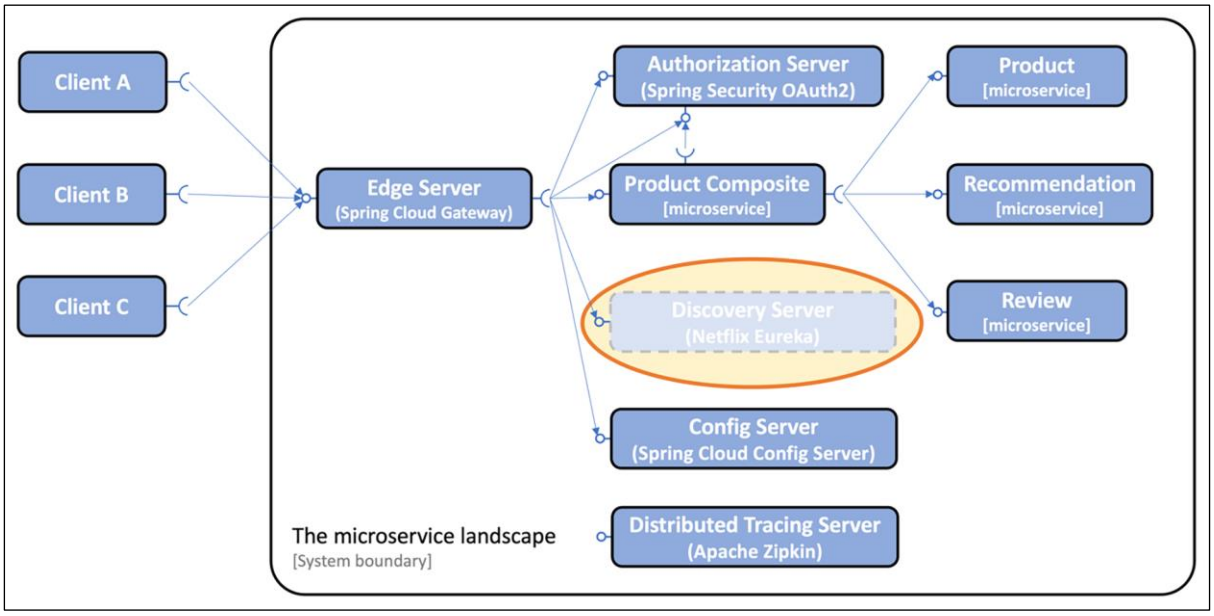
If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

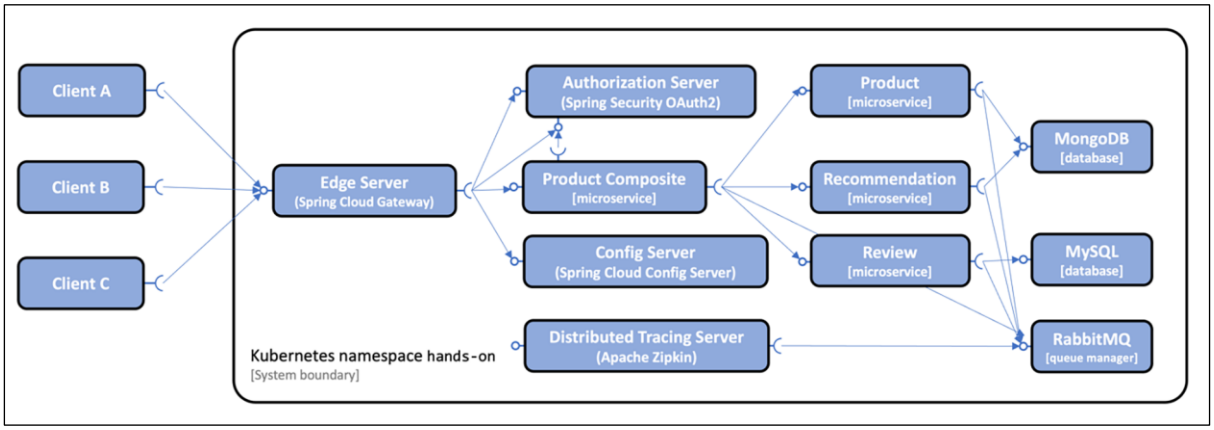
For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

```
bash
$ kubectl run -i --rm --restart=Never \
  curl-client --image=curlimages/curl \
  --command -- curl -s 'http://nginx-service:80'
...
<h1>Welcome to nginx!</h1>
...
pod "curl-client" deleted
$
```

Chapter 16: Deploying Our Microservices to Kubernetes






```
-bash
NAME                    VERSION REPOSITORY                    STATUS
common                  1.0.0 file://../../common                ok
rabbitmq                1.0.0 file://../../components/rabbitmq   ok
mongodb                 1.0.0 file://../../components/mongodb    ok
mysql                   1.0.0 file://../../components/mysql      ok
config-server           1.0.0 file://../../components/config-server ok
gateway                 1.0.0 file://../../components/gateway    ok
auth-server             1.0.0 file://../../components/auth-server ok
product                 1.0.0 file://../../components/product    ok
recommendation          1.0.0 file://../../components/recommendation ok
review                  1.0.0 file://../../components/review     ok
product-composite       1.0.0 file://../../components/product-composite ok
zipkin-server           1.0.0 file://../../components/zipkin-server ok
$
```

```
kubectl
config-server-6b9f6c6988-slt9n      0/1     ContainerCreating   0          5s
product-76bb56d7fc-7qrgf            0/1     ContainerCreating   0          5s
mongodb-d466986f-xtlsj              0/1     ContainerCreating   0          6s
auth-server-5c58bbcb9b-c9npg        0/1     Running             0          6s
rabbitmq-6c7b9bf547-c44dj           0/1     Running             0          7s
gateway-7bdcf586df-pm9l4            0/1     Running             0          7s
product-composite-f45fccdf5-46dpt   0/1     Running             0          7s
mongodb-d466986f-xtlsj              1/1     Running             0          8s
review-777ff7d5b4-g7zrj             0/1     Running             0          8s
product-76bb56d7fc-7qrgf            0/1     Running             0          9s
mysql-5846f7fb7c-kxxd7              1/1     Running             0          9s
zipkin-server-586bcccd96-lgrj7      0/1     Running             0          9s
```

```
bash
"hands-on/auth-server:latest"
"hands-on/config-server:latest"
"hands-on/gateway:latest"
"registry.hub.docker.com/library/mongo:6.0.4"
"registry.hub.docker.com/library/mysql:8.0.32"
"hands-on/product-service:latest"
"hands-on/product-composite-service:latest"
"registry.hub.docker.com/library/rabbitmq:3.11.8-management"
"hands-on/recommendation-service:latest"
"hands-on/review-service:latest"
"registry.hub.docker.com/openzipkin/zipkin:2.24.0"
$
```

```
bash
Start Tests: Mon May 1 16:41:35 CEST 2023
HOST=localhost
PORT=30443
USE_K8S=true
SKIP_CB_TESTS=false
Wait for: curl -k https://localhost:30443/actuator/health...
DONE, continues...
ACCESS_TOKEN=eyJraW...
Test OK (HTTP Code: 200)
.
.
.
End, all tests OK: Mon May 1 16:42:03 CEST 2023
$
```

```
2023-05-02T14:12:30.877Z  INFO [product,,] 1 ---
[ionShutdownHook] o.s.b.w.embedded.netty.GracefulShutdown  :
Commencing graceful shutdown. Waiting for active requests to complete
.
.
.
2023-05-02T14:12:35.245Z  INFO [product,,] 1 ---
[ netty-shutdown] o.s.b.w.embedded.netty.GracefulShutdown  :
Graceful shutdown complete
```

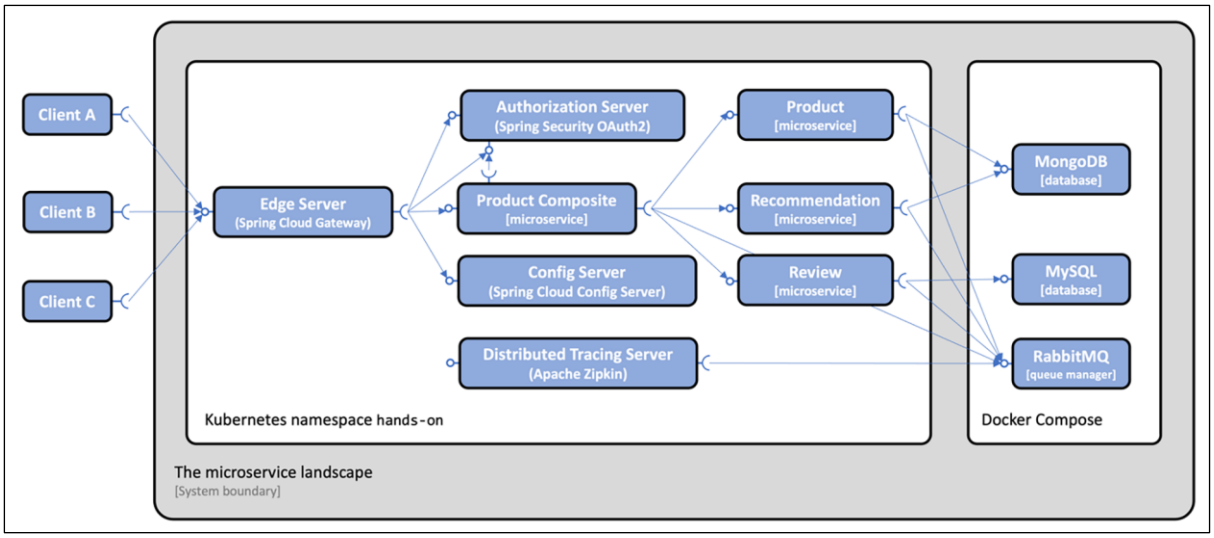
```
2023-05-02T14:38:51.191Z  INFO [product,,] 1 ---
[ionShutdownHook] o.s.b.w.embedded.netty.GracefulShutdown  :
Commencing graceful shutdown. Waiting for active requests to complete
.
.
.
2023-05-02T14:39:01.205Z  INFO [product,,] 1 ---
[ionShutdownHook] o.s.c.support.DefaultLifecycleProcessor  :
Failed to shut down 1 bean with phase value 2147482623 within timeout
of 10000ms: [webServerGracefulShutdown]
2023-05-02T14:39:01.207Z  INFO [product,,] 1 ---
[ netty-shutdown] o.s.b.w.embedded.netty.GracefulShutdown  :
Graceful shutdown aborted with one or more requests still active
```

```
HTTP/1.1 200    15.06 secs:     771 bytes ==> GET  /product-composite/1?delay=15
HTTP/1.1 500    13.76 secs:     205 bytes ==> GET  /product-composite/1?delay=15
HTTP/1.1 200    15.12 secs:     771 bytes ==> GET  /product-composite/1?delay=15
```

```
{
  "status": "UP"
}
$
```

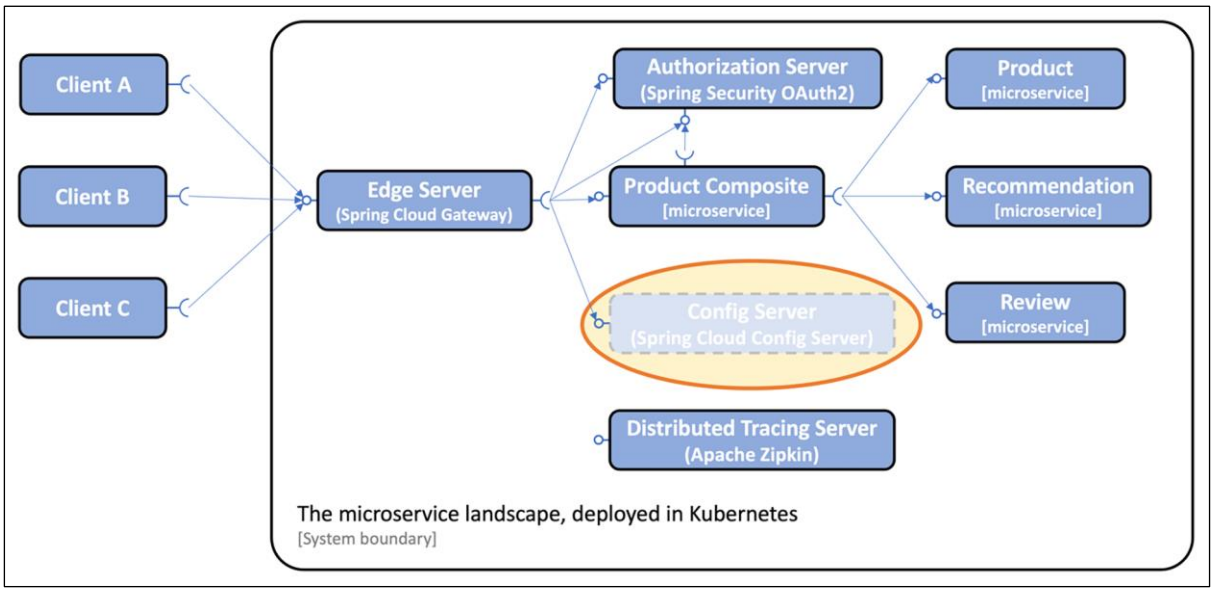
root@81676feda95e: /application ⌥⌘1

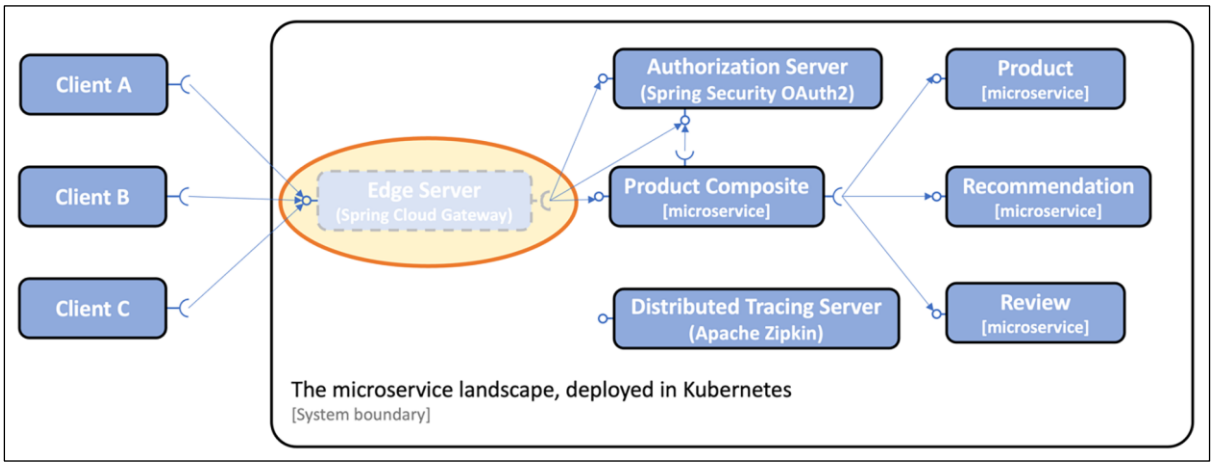

```
{
  "status": "UP",
  "components": {
    "mongo": {
      "status": "UP",
      "details": {
        "maxWireVersion": 17
      }
    },
    "rabbit": {
      "status": "UP",
      "details": {
        "version": "3.11.8"
      }
    },
    "readinessState": {
      "status": "UP"
    }
  }
}
$
```

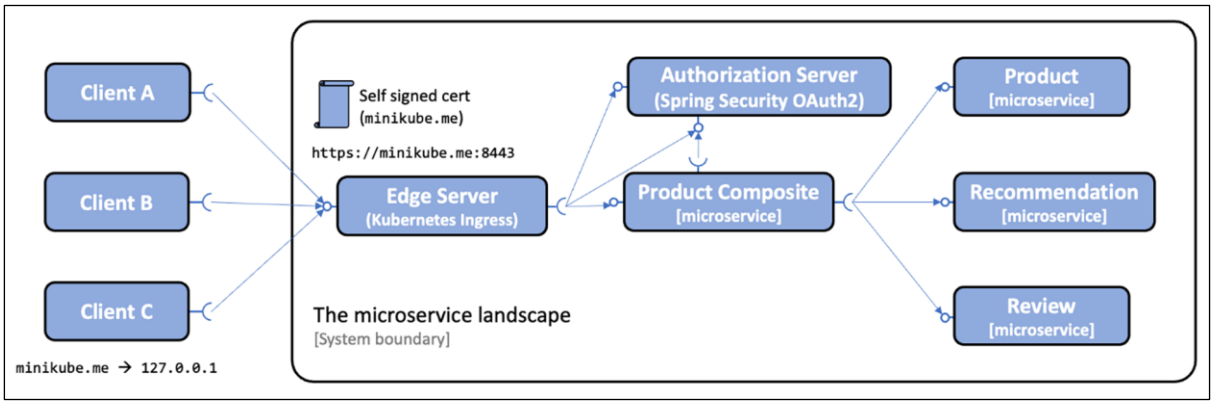

Client A
Client B
Client C
Edge Server
(Spring Cloud Gateway)
Authorization Server
(Spring Security OAuth2)
Product Composite
[microservice]
Config Server
(Spring Cloud Config Server)
Distributed Tracing Server
(Apache Zipkin)
Product
[microservice]
Recommendation
[microservice]
Review
[microservice]
MongoDB
[database]
MySQL
[database]
RabbitMQ
[queue manager]
Kubernetes namespace hands-on
Docker Compose
The microservice landscape
[System boundary]

root@81676feda95e: /application
⌥⌘1
"hands-on/auth-server:v1"
"hands-on/config-server:v1"
"hands-on/gateway:v1"
"hands-on/product-service:v1"
"hands-on/product-composite-service:v1"
"hands-on/recommendation-service:v1"
"hands-on/review-service:v1"
"registry.hub.docker.com/openzipkin/zipkin:2.24.0"
$

Chapter 17: Implementing Kubernetes Features to Simplify the System Landscape








```
bash                                                                    ⌥⌘1
NAME                                      READY   STATUS    RESTARTS   AGE
cert-manager-64f9f45d6f-2dmld             1/1     Running   0          10h
cert-manager-cainjector-56bbdd5c47-krzpw  1/1     Running   0          10h
cert-manager-webhook-d4f4545d7-zrhvf      1/1     Running   0          10h
$
```

```
EVENT      NAME              READY   SECRET            AGE
ADDED      tls-certificate           tls-certificate   0s
...
MODIFIED   tls-certificate   False   tls-certificate   0s
...
MODIFIED   tls-certificate   True    tls-certificate   1s
```

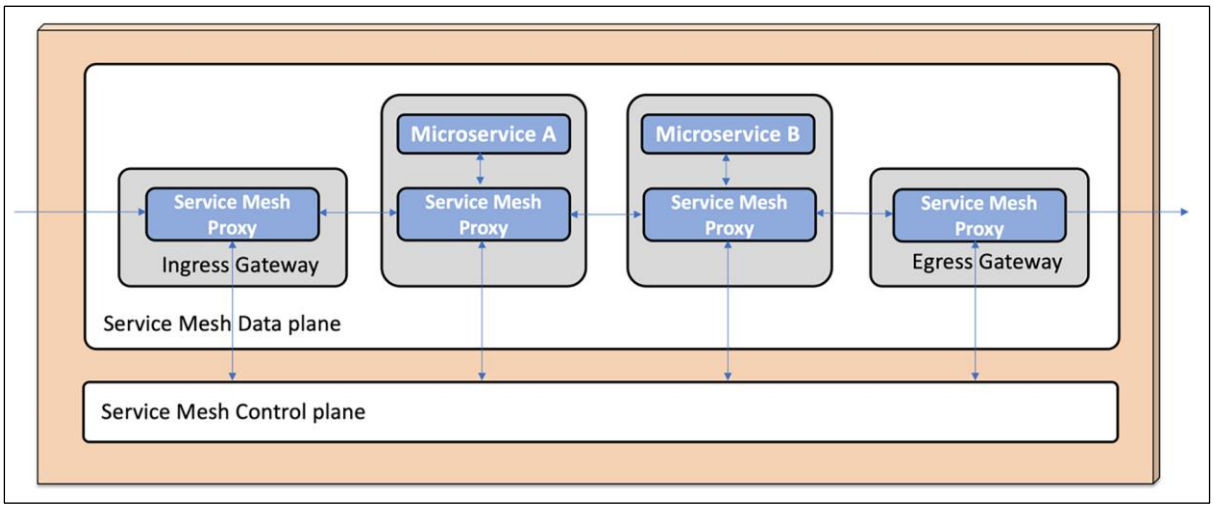
```
Start Tests: Sun May 7 07:48:30 CEST 2023
HOST=minikube.me
PORT=8443
USE_K8S=true
SKIP_CB_TESTS=false
Wait for: curl -k https://minikube.me:8443/actuator/health... DONE, continues...
ACCESS_TOKEN=eyJra
Test OK (HTTP Code: 202, )
...
End, all tests OK: Sun May 7 07:48:58 CEST 2023
$
```

```
Not After:                2023-08-05T05:42:49Z
Not Before:               2023-05-07T05:42:49Z
Renewal Time:             2023-07-06T05:42:49Z
```

```
0s          Normal    Issuing    certificate/tls-certificate
  Renewing certificate as renewal was scheduled at 2023-05-07 05:55:40 +0000 UTC
...
0s          Normal    Issuing    certificate/tls-certificate
  The certificate has been successfully issued
```

```
bash                                                                ⌥⌘1
Start Tests: Sun May 7 08:13:43 CEST 2023
HOST=localhost
PORT=8443
USE_K8S=false
SKIP_CB_TESTS=false
Restarting the test environment...
$ docker-compose down --remove-orphans
$ docker-compose up -d
 ...
 ⠿ Container chapter17-auth-server-1        Healthy    6.1s
 ...
 ⠿ Container chapter17-zipkin-server-1      Started    0.8s
 ...
Wait for: curl -k https://localhost:8443/actuator/health... ,
  retry #1 , retry #2 DONE, continues...
ACCESS_TOKEN=eyJra...
Test OK (HTTP Code: 202, )
...
We are done, stopping the test environment...
$ docker-compose down
 ...
 ⠿ Container chapter17-auth-server-1        Removed    1.3s
 ...
 ⠿ Container chapter17-zipkin-server-1      Removed    2.6s
 ...
End, all tests OK: Sun May 7 08:14:43 CEST 2023
$
```

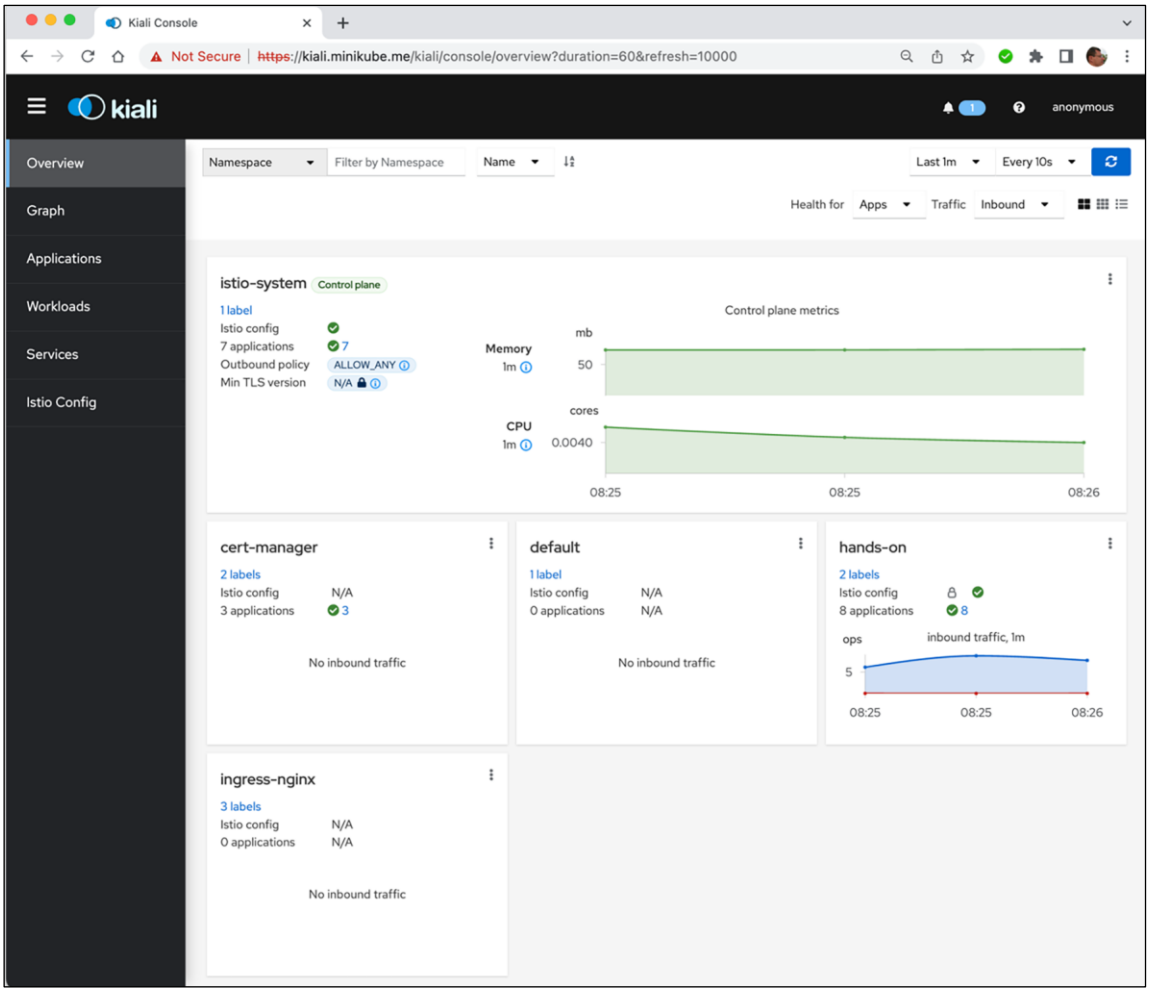
Chapter 18: Using a Service Mesh to Improve Observability and Management

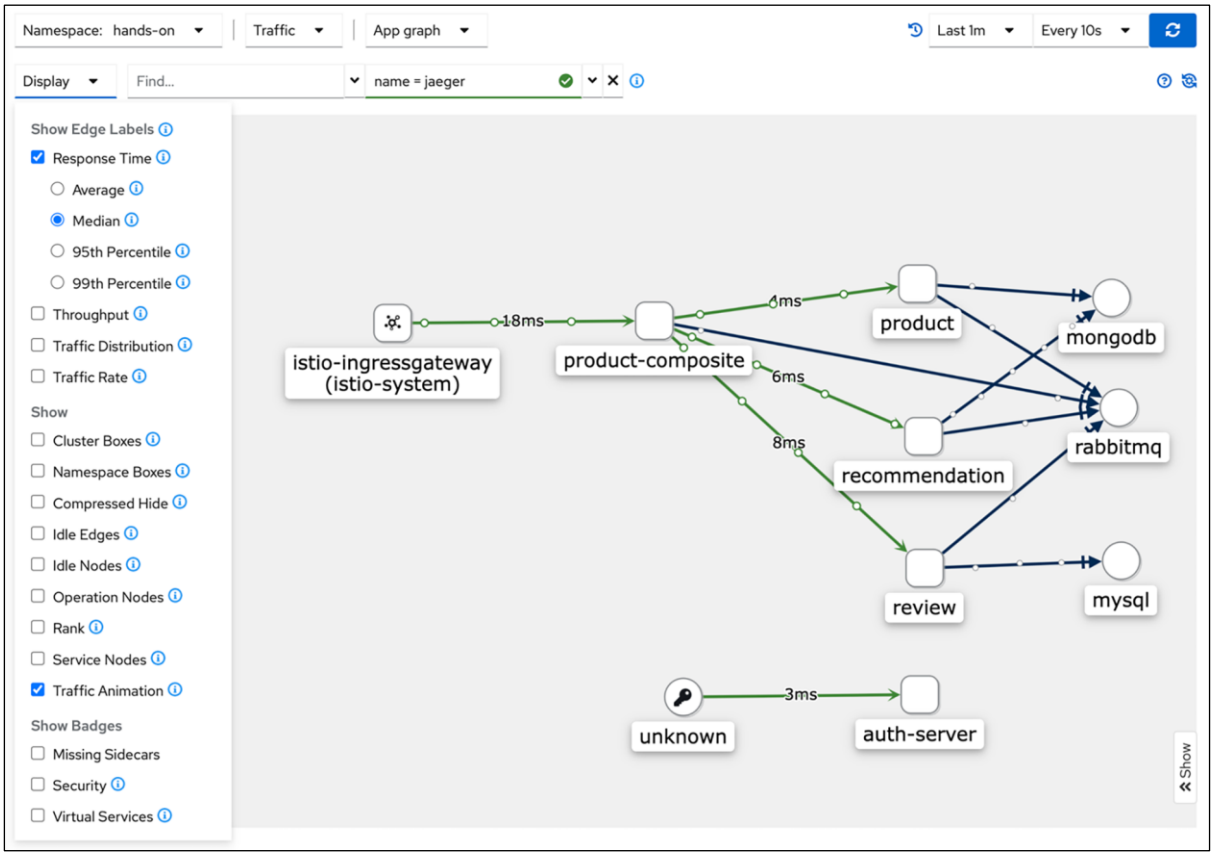


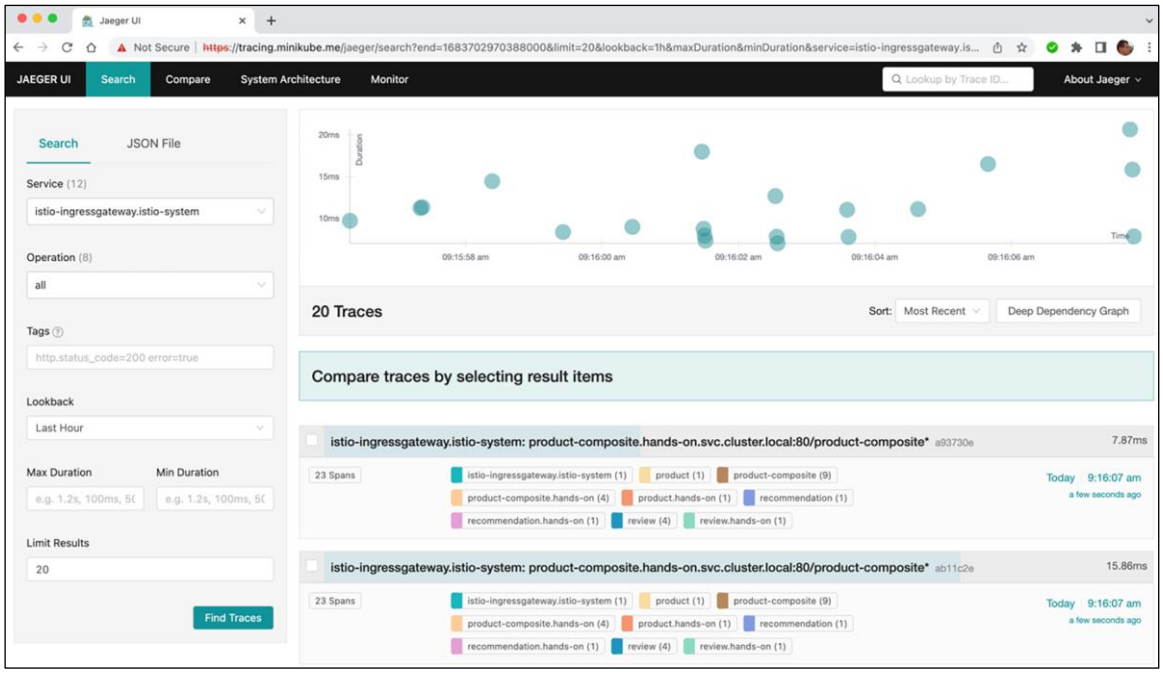

```
bash
NAME                                READY   STATUS    RESTARTS   AGE
auth-server-cf57b9bff-l2wnf         2/2     Running   0          39s
mongodb-6f4b595bbf-kvwnm            1/1     Running   0          39s
mysql-5dd488c7d-l7lvz               1/1     Running   0          39s
product-5454d77458-dvrtz            2/2     Running   0          39s
product-composite-59fb54568c-t8czm  2/2     Running   0          39s
rabbitmq-9cbbbb894-wlkgv            1/1     Running   0          39s
recommendation-96984995d-mpvq9      2/2     Running   0          39s
review-5f965dcd76-dsgsm             2/2     Running   0          39s
$
```

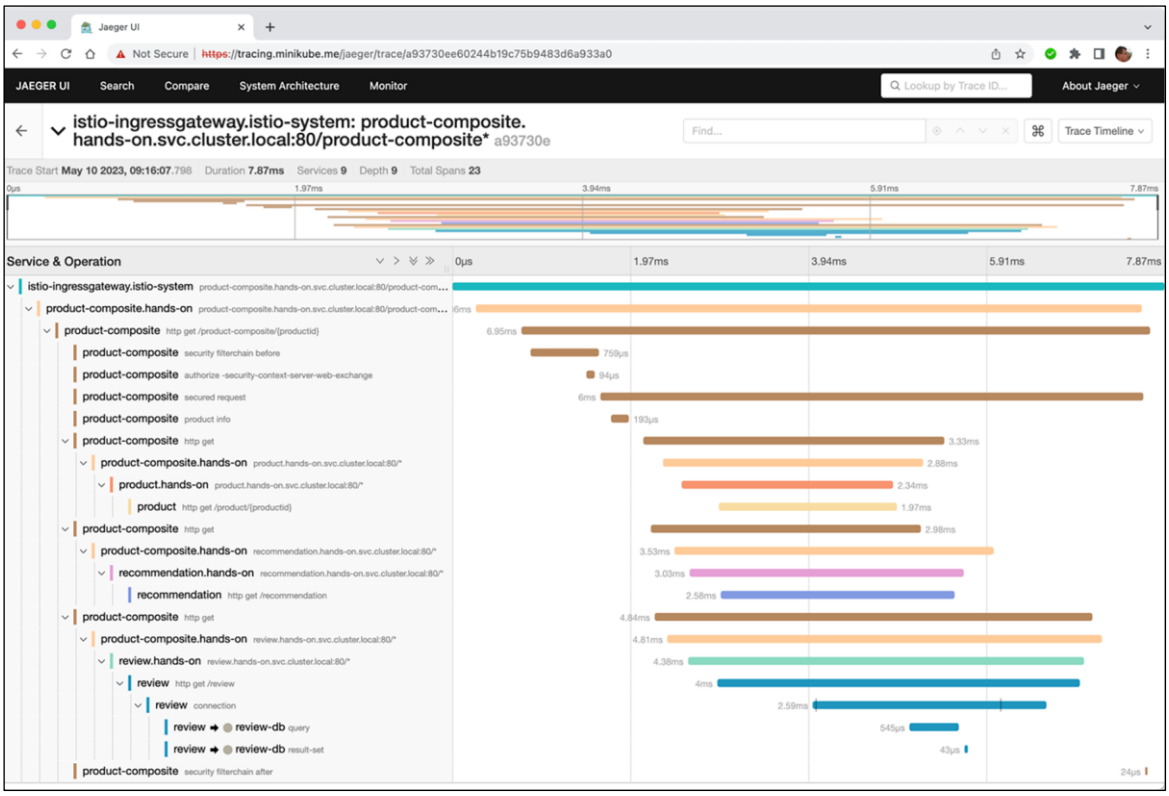
```
bash
Start Tests: Tue May 9 18:12:07 CEST 2023
...
Wait for: curl -k https://health.minikube.me/actuator/health...
DONE, continues...
...
Test OK (HTTP Code: 200)
...
End, all tests OK: Tue May 9 18:12:33 CEST 2023
$
```

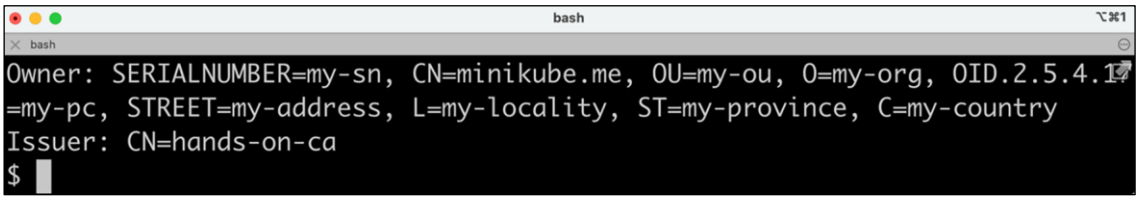
```
bash
** SIEGE 4.1.6
** Preparing 1 concurrent users for battle.
The server is now under siege...
HTTP/1.1 200     0.08 secs:     771 bytes ==> GET  /product-composite/1
HTTP/1.1 200     0.03 secs:     771 bytes ==> GET  /product-composite/1
HTTP/1.1 200     0.03 secs:     771 bytes ==> GET  /product-composite/1
HTTP/1.1 200     0.05 secs:     771 bytes ==> GET  /product-composite/1
HTTP/1.1 200     0.03 secs:     771 bytes ==> GET  /product-composite/1
```

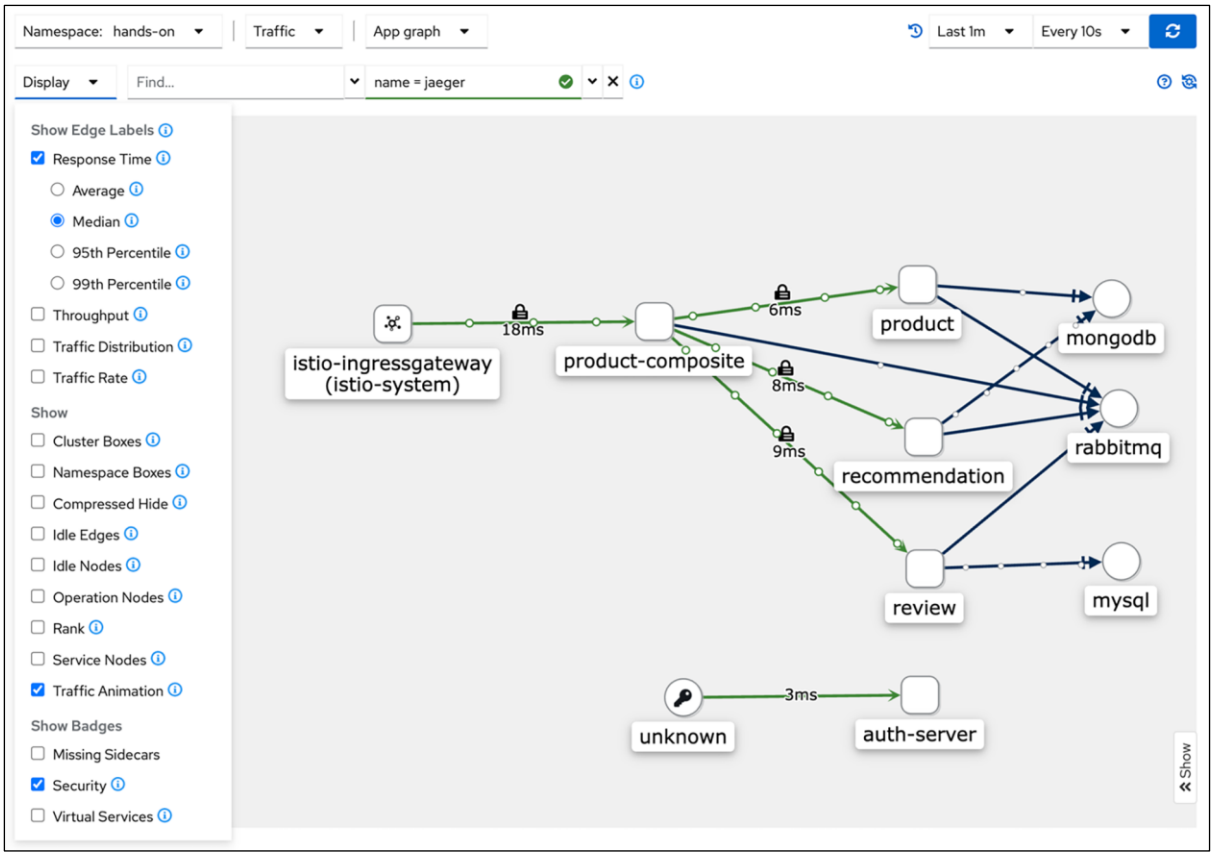

Kiali Console
Not Secure | https://kiali.minikube.me/kiali/console/overview?duration=60&refresh=10000
kiali
anonymous
Overview
Graph
Applications
Workloads
Services
Istio Config
Namespace
Filter by Namespace
Name
Last 1m
Every 10s
Health for
Apps
Traffic
Inbound
istio-system
Control plane
1 label
Istio config
7 applications
Outbound policy
ALLOW_ANY
Min TLS version
N/A
Control plane metrics
Memory
1m
mb
50
CPU
1m
cores
0.0040
08:25
08:25
08:26
cert-manager
2 labels
Istio config
N/A
3 applications
3
No inbound traffic
default
1 label
Istio config
N/A
0 applications
N/A
No inbound traffic
hands-on
2 labels
Istio config
8 applications
8
ops
inbound traffic, 1m
5
08:25
08:25
08:26
ingress-nginx
3 labels
Istio config
N/A
0 applications
N/A
No inbound traffic

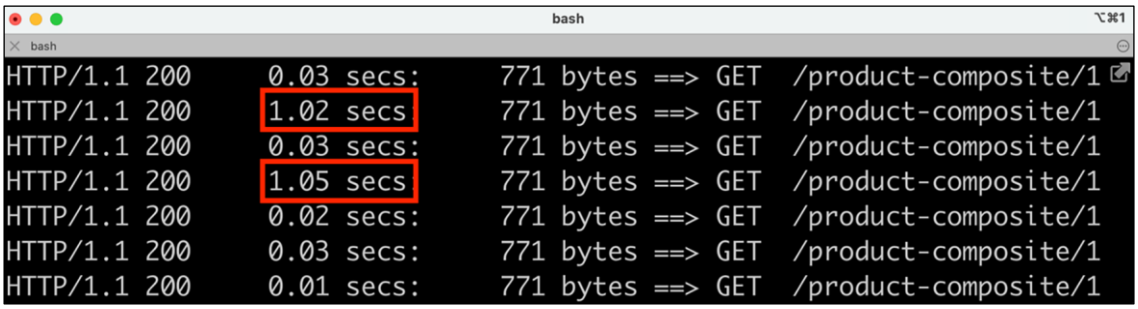

Namespace: hands-on
Traffic
App graph
Last 1m
Every 10s
Display
Find...
name = jaeger
Show Edge Labels
Response Time
Average
Median
95th Percentile
99th Percentile
Throughput
Traffic Distribution
Traffic Rate
Show
Cluster Boxes
Namespace Boxes
Compressed Hide
Idle Edges
Idle Nodes
Operation Nodes
Rank
Service Nodes
Traffic Animation
Show Badges
Missing Sidecars
Security
Virtual Services
istio-ingressgateway
(istio-system)
18ms
product-composite
4ms
product
mongodb
6ms
8ms
recommendation
rabbitmq
review
mysql
unknown
3ms
auth-server
Show

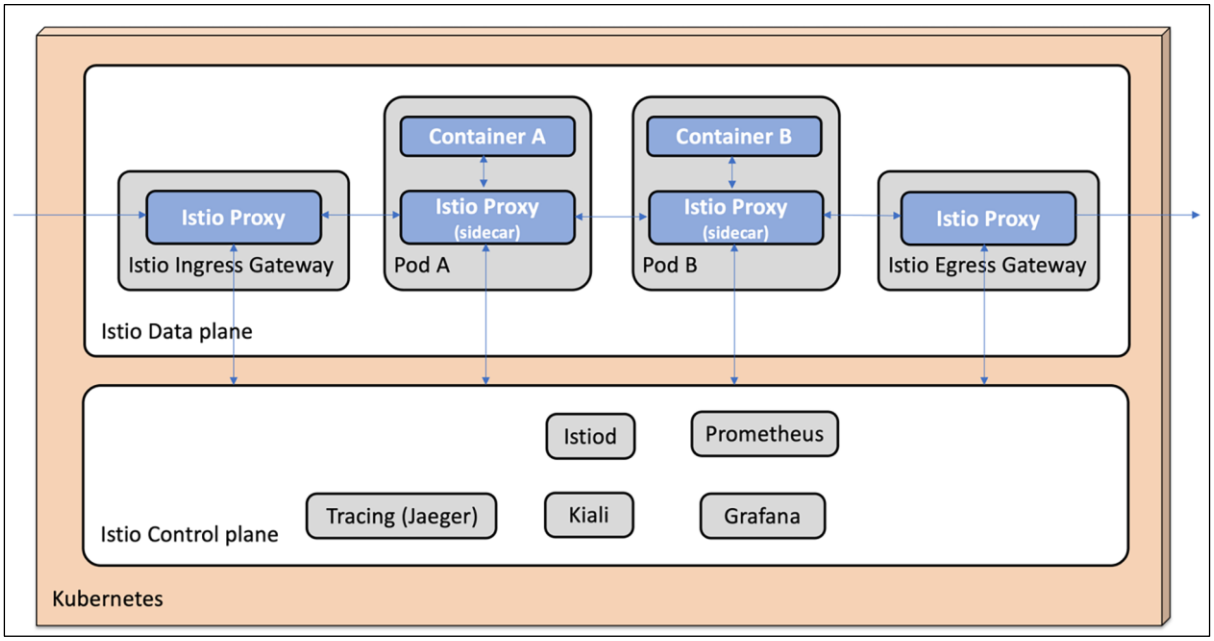

Jaeger UI
Not Secure | https://tracing.minikube.me/jaeger/search?end=1683702970388000&limit=20&lookback=1h&maxDuration&minDuration&service=istio-ingressgateway.is...
JAEGER UI
Search
Compare
System Architecture
Monitor
Lookup by Trace ID...
About Jaeger
Search
JSON File
Service (12)
istio-ingressgateway.istio-system
Operation (8)
all
Tags
http.status_code=200 error=true
Lookback
Last Hour
Max Duration
Min Duration
e.g. 1.2s, 100ms, 5(
e.g. 1.2s, 100ms, 5(
Limit Results
20
Find Traces
20ms
15ms
10ms
Duration
09:15:58 am
09:16:00 am
09:16:02 am
09:16:04 am
09:16:06 am
Time
20 Traces
Sort:
Most Recent
Deep Dependency Graph
Compare traces by selecting result items
istio-ingressgateway.istio-system: product-composite.hands-on.svc.cluster.local:80/product-composite* a93730e
7.87ms
23 Spans
istio-ingressgateway.istio-system (1)
product (1)
product-composite (9)
product-composite.hands-on (4)
product.hands-on (1)
recommendation (1)
recommendation.hands-on (1)
review (4)
review.hands-on (1)
Today 9:16:07 am
a few seconds ago
istio-ingressgateway.istio-system: product-composite.hands-on.svc.cluster.local:80/product-composite* ab11c2e
15.86ms
23 Spans
istio-ingressgateway.istio-system (1)
product (1)
product-composite (9)
product-composite.hands-on (4)
product.hands-on (1)
recommendation (1)
recommendation.hands-on (1)
review (4)
review.hands-on (1)
Today 9:16:07 am
a few seconds ago


Jaeger UI
Not Secure | https://tracing.minikube.me/jaeger/trace/a93730ee60244b19c75b9483d6a933a0
JAEGER UI
Search
Compare
System Architecture
Monitor
Lookup by Trace ID...
About Jaeger
istio-ingressgateway.istio-system: product-composite.hands-on.svc.cluster.local:80/product-composite* a93730e
Find...
Trace Timeline
Trace Start May 10 2023, 09:16:07.798
Duration 7.87ms
Services 9
Depth 9
Total Spans 23
0µs
1.97ms
3.94ms
5.91ms
7.87ms
Service & Operation
istio-ingressgateway.istio-system
product-composite.hands-on
product-composite
product-composite security filterchain before
product-composite authorize -security-context-server-web-exchange
product-composite secured request
product-composite product info
product-composite http get
product-composite.hands-on
product.hands-on
product
product-composite http get
product-composite.hands-on
recommendation.hands-on
recommendation
product-composite http get
product-composite.hands-on
review.hands-on
review
review
review → review-db
review → review-db
product-composite security filterchain after
6.95ms
759µs
94µs
6ms
193µs
3.33ms
2.88ms
2.34ms
1.97ms
2.98ms
3.53ms
3.03ms
2.58ms
4.84ms
4.81ms
4.38ms
4ms
2.59ms
545µs
43µs
24µs


bash
bash
Owner: SERIALNUMBER=my-sn, CN=minikube.me, OU=my-ou, O=my-org, OID.2.5.4.17=my-pc, STREET=my-address, L=my-locality, ST=my-province, C=my-country
Issuer: CN=hands-on-ca
$


Namespace: hands-on
Traffic
App graph
Last 1m
Every 10s
Display
Find...
name = jaeger
Show Edge Labels
Response Time
Average
Median
95th Percentile
99th Percentile
Throughput
Traffic Distribution
Traffic Rate
Show
Cluster Boxes
Namespace Boxes
Compressed Hide
Idle Edges
Idle Nodes
Operation Nodes
Rank
Service Nodes
Traffic Animation
Show Badges
Missing Sidecars
Security
Virtual Services
istio-ingressgateway
(istio-system)
18ms
product-composite
6ms
8ms
9ms
product
recommendation
review
mongodb
rabbitmq
mysql
unknown
3ms
auth-server
Show


bash
HTTP/1.1 200 0.03 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 1.02 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 0.03 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 1.05 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 0.02 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 0.03 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 0.01 secs: 771 bytes ==> GET /product-composite/1

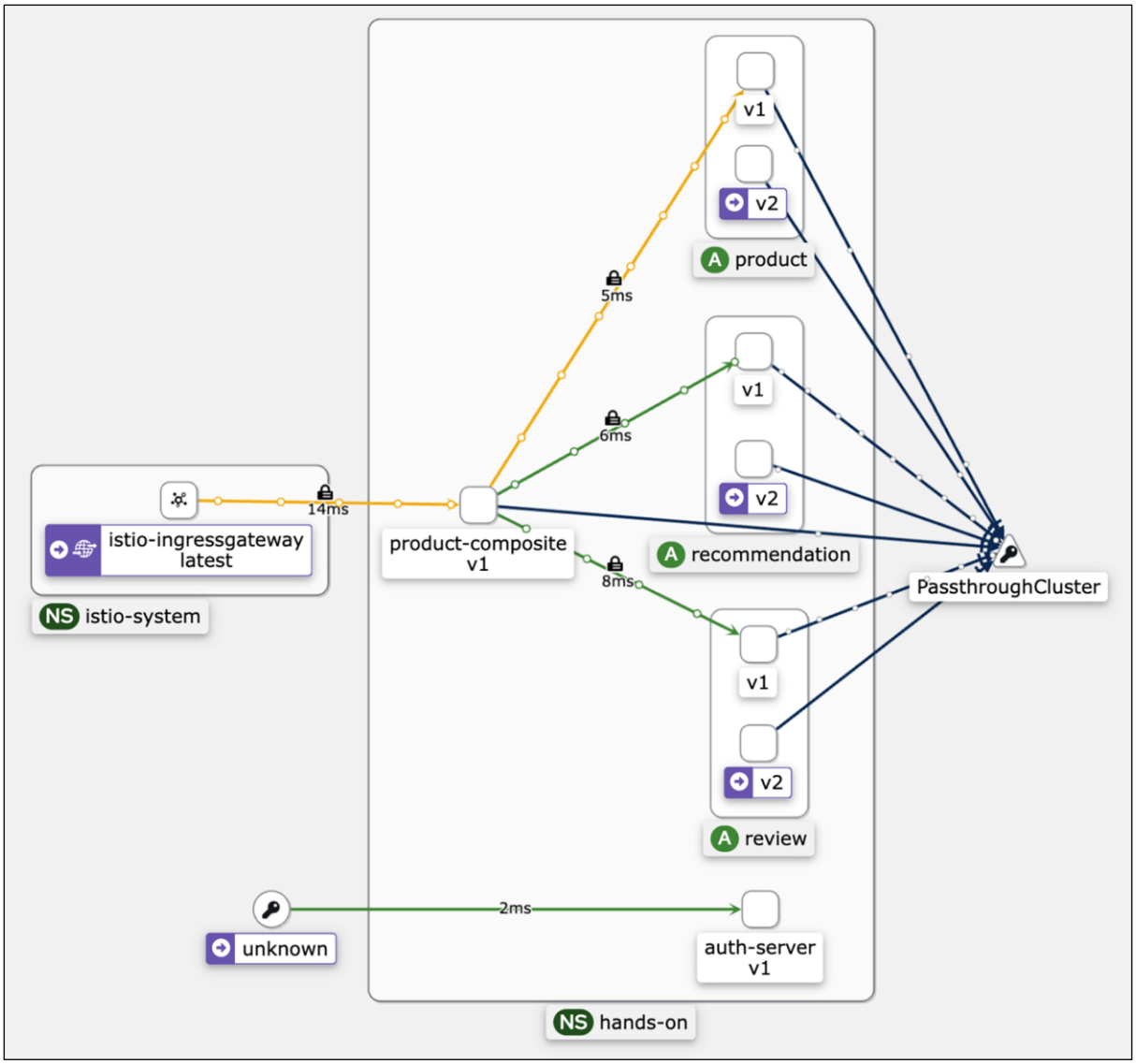

Istio Proxy
Istio Ingress Gateway
Container A
Istio Proxy
(sidecar)
Pod A
Container B
Istio Proxy
(sidecar)
Pod B
Istio Proxy
Istio Egress Gateway
Istio Data plane
Istiod
Prometheus
Tracing (Jaeger)
Kiali
Grafana
Istio Control plane
Kubernetes

```
bash
{"timestamp":"2023-05-10T07:57:51.042+00:00","path":"/product-composite/1",
"status":500,"error":"Internal Server Error","message":"Did not observe any
 item or terminal signal within 2000ms in 'onErrorResume' (and no fallback
has been configured)","requestId":"c1414130-16156"}
real    0m2.272s
```

```
bash
{"productId":1,"name":"Fallback product1",...}
real    0m0.236s
$
```

```
bash
NAME                                  READY   STATUS    RESTARTS   AGE
auth-server-78c4d44b55-ml2rg          2/2     Running   0          47s
product-composite-546597978c-j2cdc    2/2     Running   0          47s
product-v1-76dd48574-hlfgt            2/2     Running   0          47s
product-v2-5ff8575567-s6j2b           2/2     Running   0          47s
recommendation-v1-8fc6456fd-dv92b     2/2     Running   0          47s
recommendation-v2-655b4c4cc7-l7jxz    2/2     Running   0          47s
review-v1-5f5f74b49d-bpprh            2/2     Running   0          47s
review-v2-5d86f74c6f-f7rgm            2/2     Running   0          47s
$
```

```
bash
Start Tests: Wed May 10 10:07:21 CEST 2023
...
Wait for: curl -k https://health.minikube.me/actuator/health...
DONE, continues...
...
Test OK (HTTP Code: 200)
...
End, all tests OK: Wed May 10 10:07:48 CEST 2023
$
```

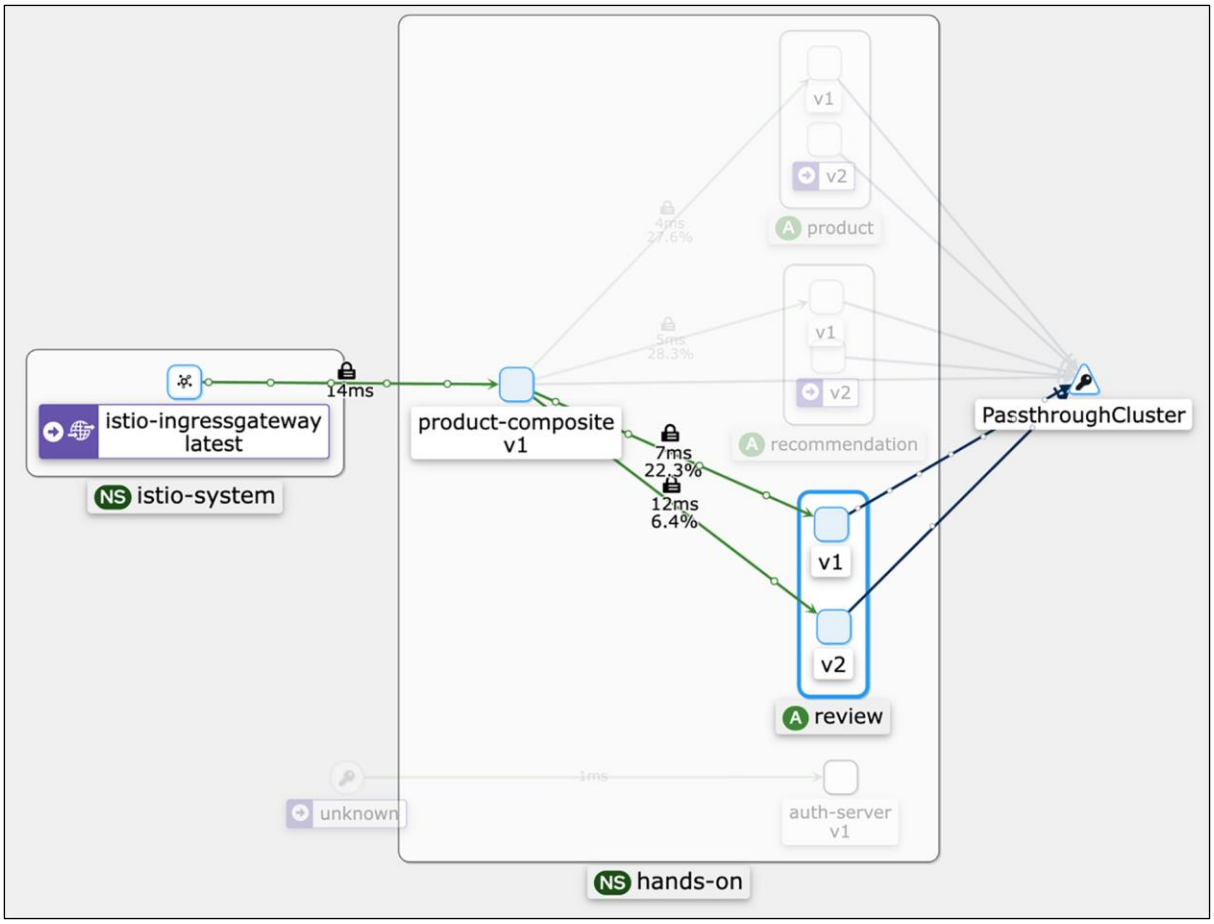


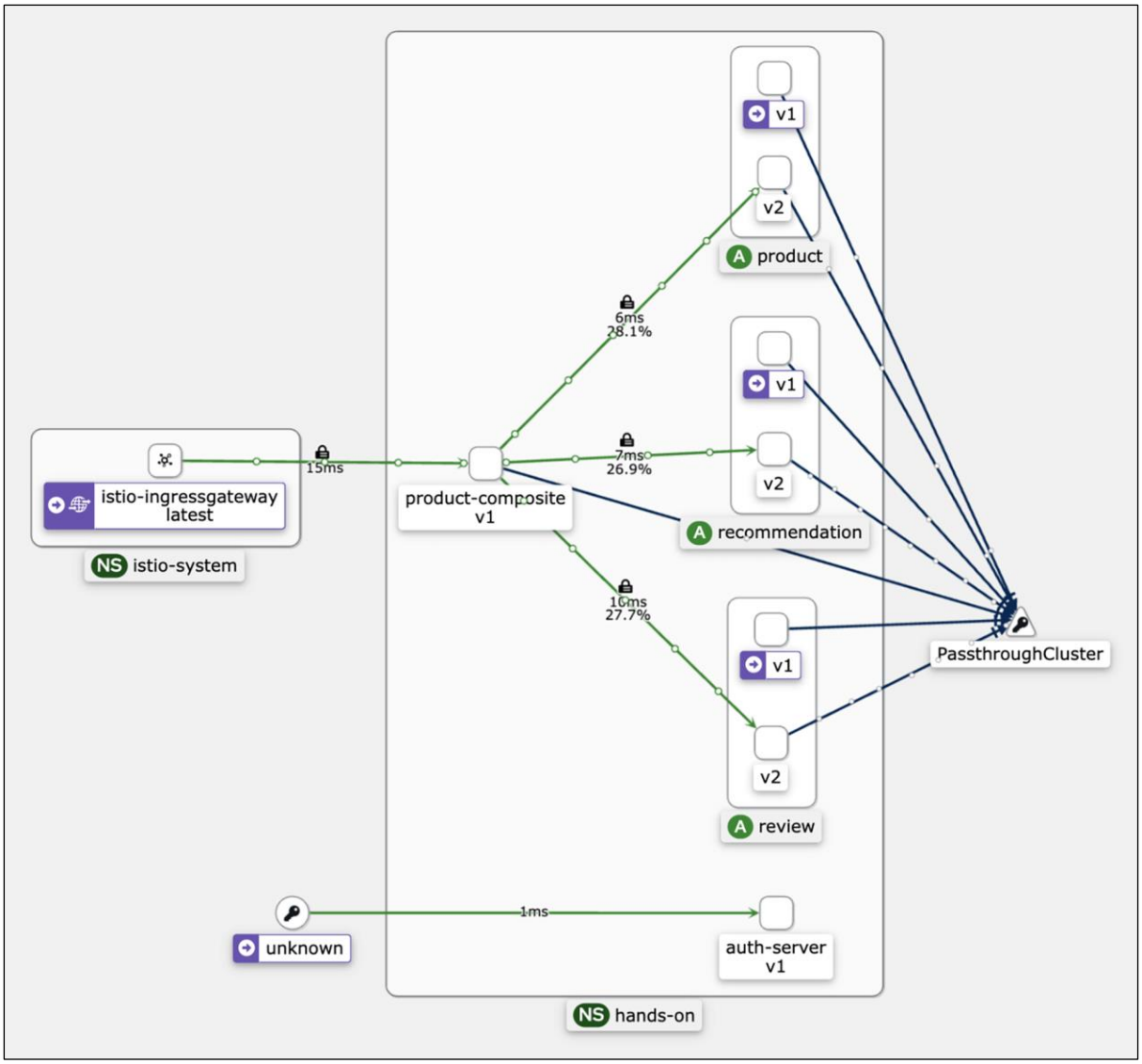
bash

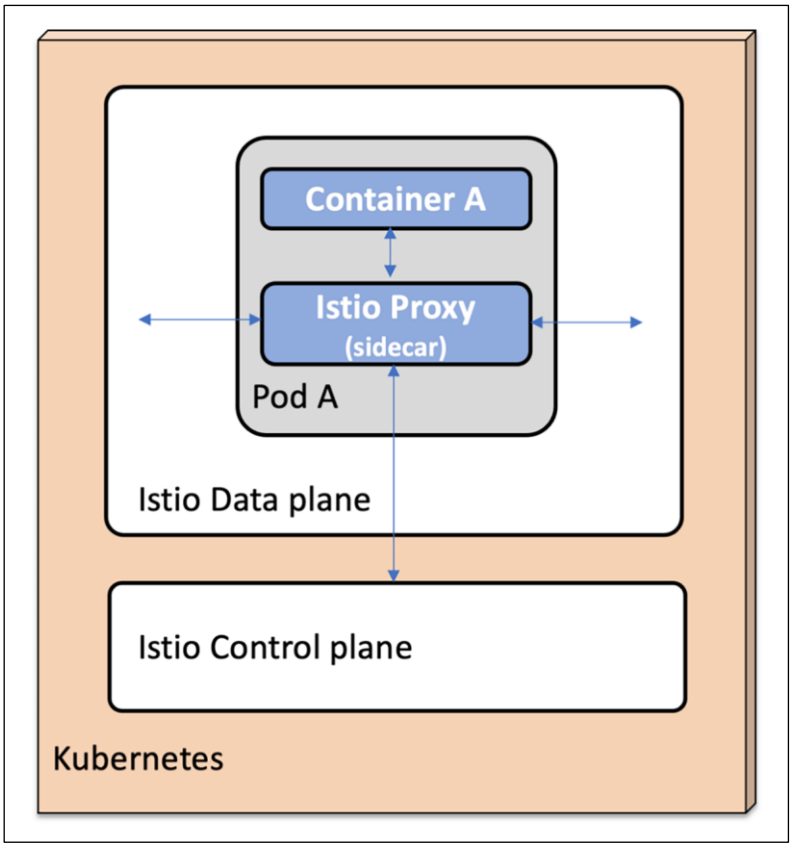
```
{
  "cmp": "product-composite-546597978c-j2cdc/10.244.0.26:80",
  "pro": "product-v1-76dd48574-hlfgt/10.244.0.28:80",
  "rev": "review-v1-5f5f74b49d-bpprh/10.244.0.29:80",
  "rec": "recommendation-v1-8fc6456fd-dv92b/10.244.0.30:80"
}
$
```

bash

```
{
  "cmp": "product-composite-546597978c-j2cdc/10.244.0.26:80",
  "pro": "product-v2-5ff8575567-s6j2b/10.244.0.27:80",
  "rev": "review-v2-5d86f74c6f-f7rgm/10.244.0.31:80",
  "rec": "recommendation-v2-655b4c4cc7-l7jxz/10.244.0.33:80"
}
$
```


v1
v2
product
4ms
27.6%
5ms
28.3%
v1
v2
recommendation
istio-ingressgateway
latest
14ms
istio-system
product-composite
v1
7ms
22.3%
12ms
6.4%
PassthroughCluster
v1
v2
review
1ms
unknown
auth-server
v1
hands-on


v1
v2
product
6ms
28.1%
v1
v2
recommendation
15ms
7ms
26.9%
istio-ingressgateway
latest
istio-system
product-composite
v1
16ms
27.7%
v1
v2
review
PassthroughCluster
1ms
unknown
auth-server
v1
hands-on

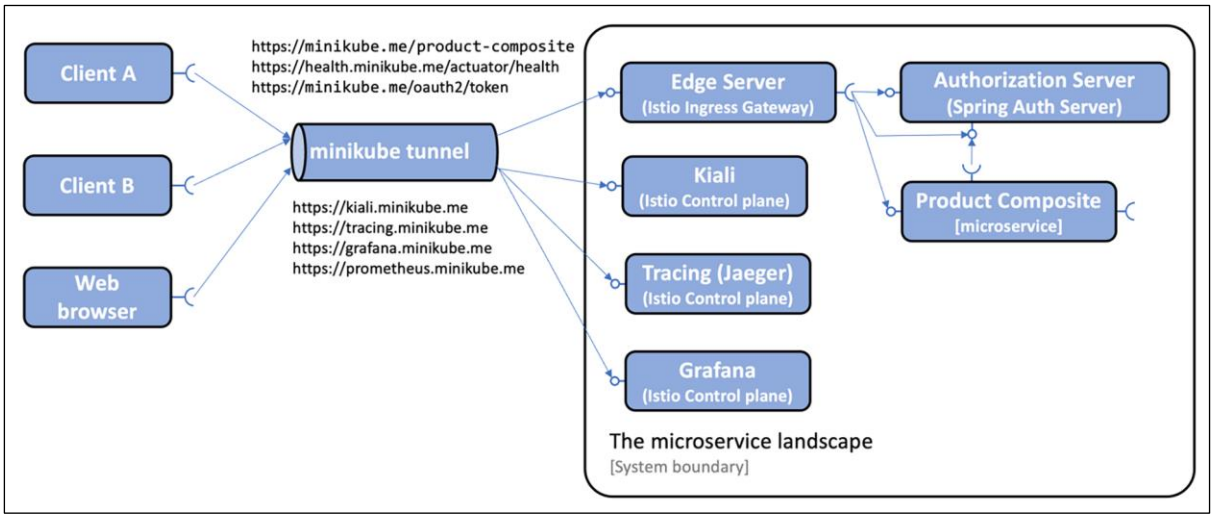



```
bash                                    ⌥⌘1
handson-spring-boot-cloud
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured

$
```

```
bash                                    ⌥⌘1
✔ No issues found when checking the cluster.
Istio is safe to install or upgrade!
  To get started, check out https://istio.io/
latest/docs/setup/getting-started/
$
```

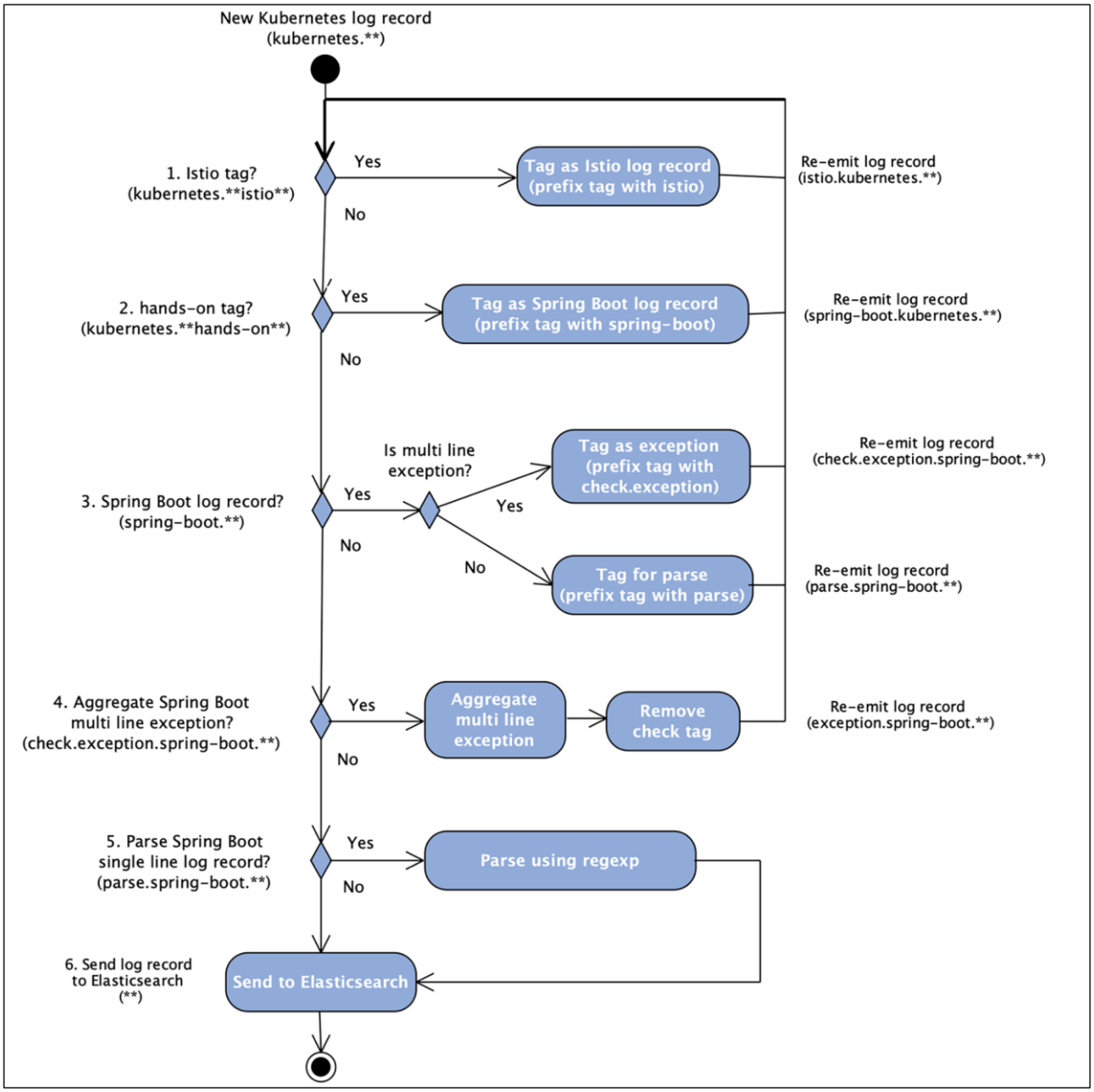
```
NAME                    READY   UP-TO-DATE   AVAILABLE   AGE
grafana                 1/1     1            1           46s
istio-egressgateway     1/1     1            1           3m45s
istio-ingressgateway    1/1     1            1           3m45s
istiod                  1/1     1            1           4m1s
jaeger                  1/1     1            1           62s
kiali                   1/1     1            1           72s
prometheus              1/1     1            1           54s
$
```

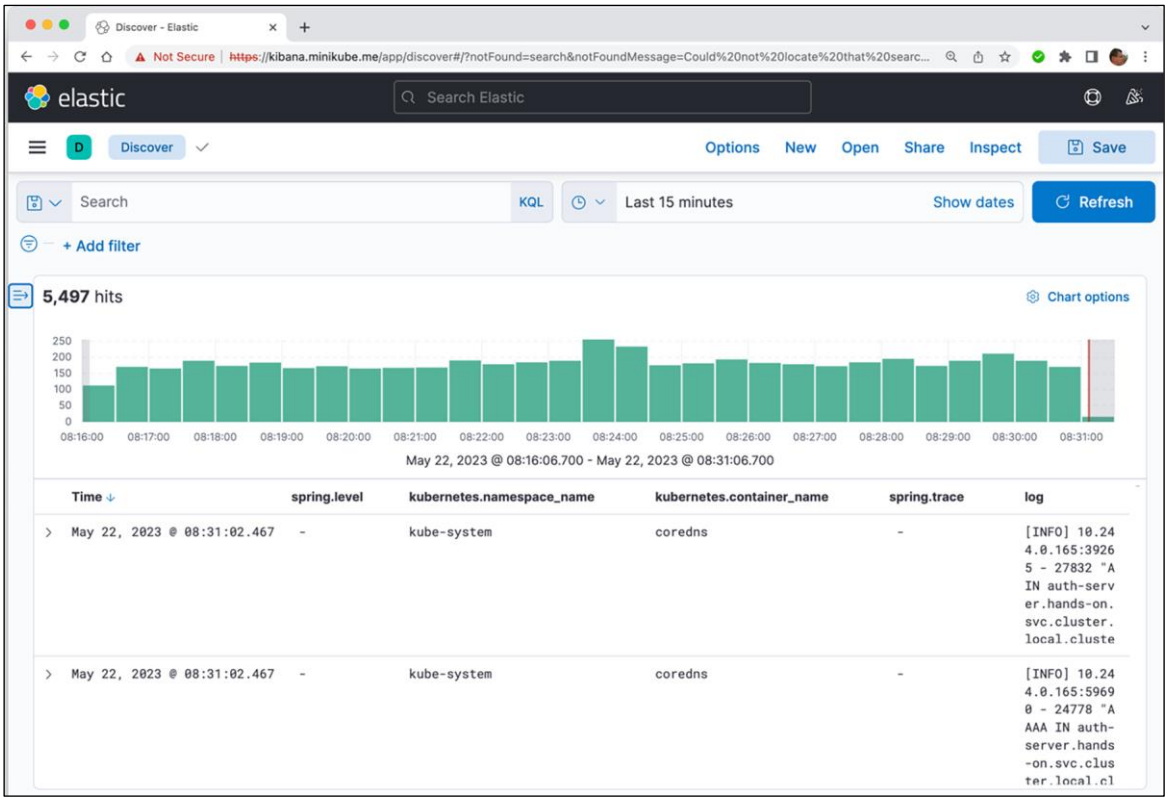
```
NAME                    TYPE                  DATA   AGE
hands-on-certificate    kubernetes.io/tls     3      59s

NAME                    READY   SECRET                  AGE
hands-on-certificate    True    hands-on-certificate    65s
$
```

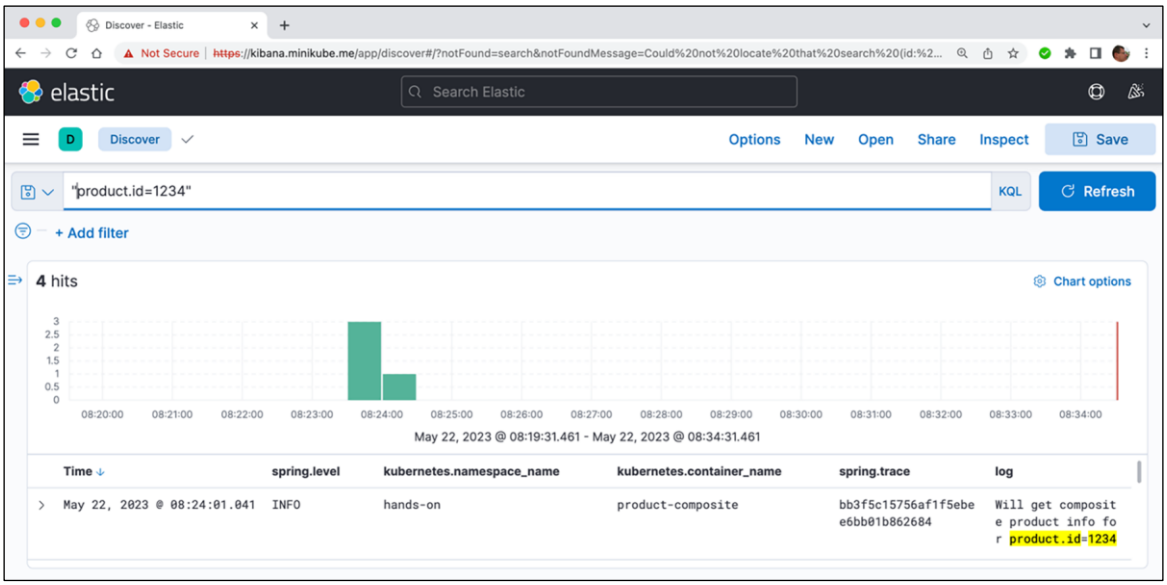


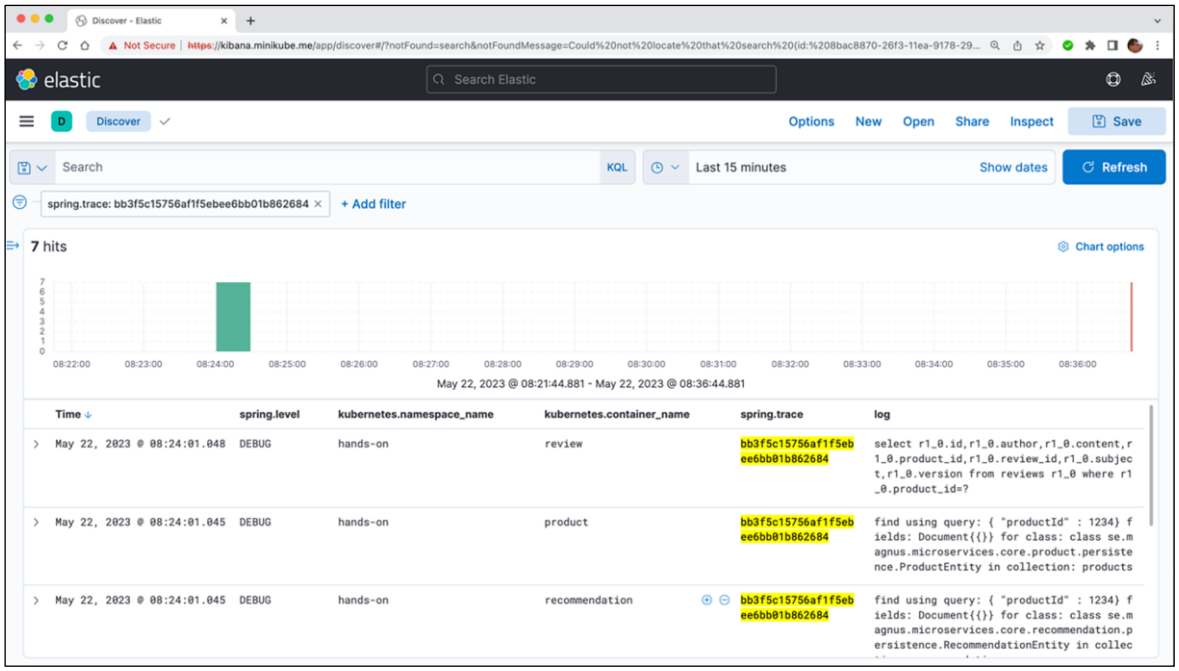

```
$ cat /etc/hosts
...
127.0.0.1 minikube.me grafana.minikube.me kiali.minikube.me
prometheus.minikube.me tracing.minikube.me kibana.minikube.me
elasticsearch.minikube.me mail.minikube.me health.minikube.me
$
```

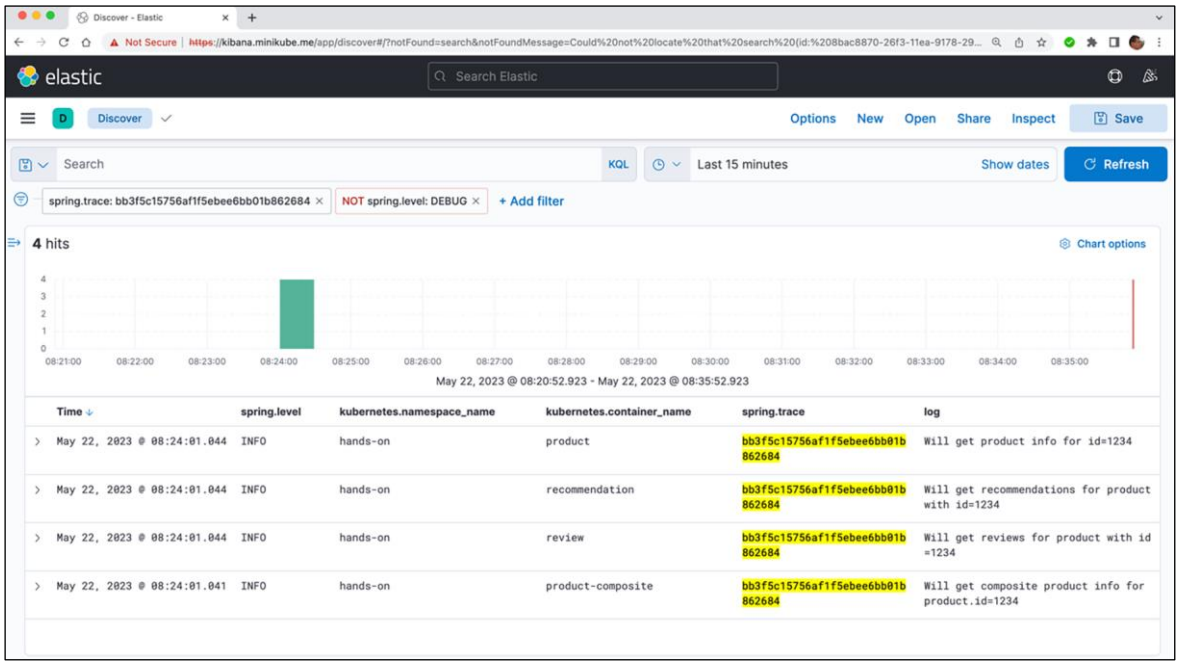
Chapter 19: Centralized Logging with the EFK Stack

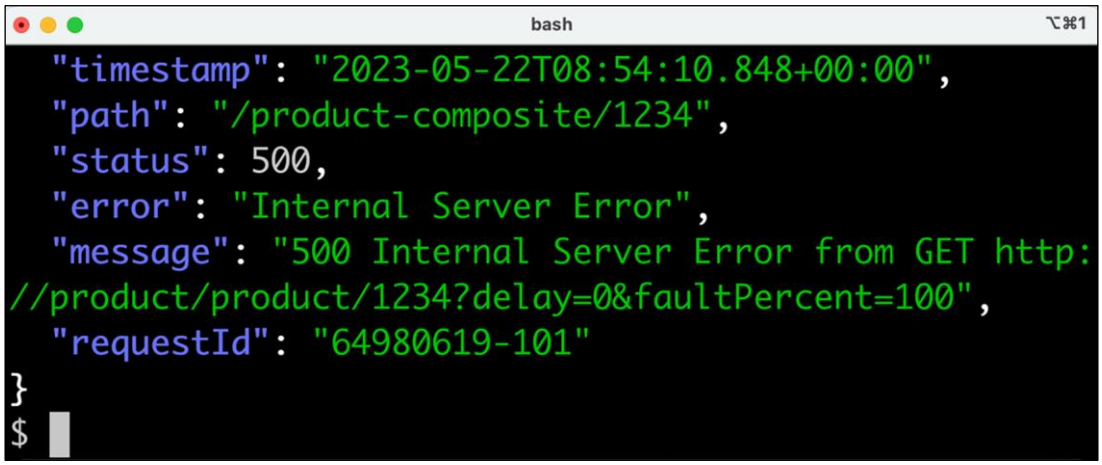



Discover - Elastic
Not Secure | https://kibana.minikube.me/app/discover#/?notFound=search&notFoundMessage=Could%20not%20locate%20that%20searc...
elastic
Search Elastic
Discover
Options
New
Open
Share
Inspect
Save
Search
KQL
Last 15 minutes
Show dates
Refresh
+ Add filter
5,497 hits
Chart options
250
200
150
100
50
0
08:16:00
08:17:00
08:18:00
08:19:00
08:20:00
08:21:00
08:22:00
08:23:00
08:24:00
08:25:00
08:26:00
08:27:00
08:28:00
08:29:00
08:30:00
08:31:00
May 22, 2023 @ 08:16:06.700 - May 22, 2023 @ 08:31:06.700
Time
spring.level
kubernetes.namespace_name
kubernetes.container_name
spring.trace
log
May 22, 2023 @ 08:31:02.467
-
kube-system
coredns
-
[INFO] 10.24 4.0.165:3926 5 - 27832 "A IN auth-serv er.hands-on. svc.cluster. local.cluste
May 22, 2023 @ 08:31:02.467
-
kube-system
coredns
-
[INFO] 10.24 4.0.165:5969 0 - 24778 "A AAA IN auth- server.hands -on.svc.clus ter.local.cl


Discover - Elastic
Not Secure | https://kibana.minikube.me/app/discover#/?notFound=search&notFoundMessage=Could%20not%20locate%20that%20search%20(id:%2...
elastic
Search Elastic
Discover
Options
New
Open
Share
Inspect
Save
"product.id=1234"
KQL
Refresh
+ Add filter
4 hits
Chart options
3
2.5
2
1.5
1
0.5
0
08:20:00
08:21:00
08:22:00
08:23:00
08:24:00
08:25:00
08:26:00
08:27:00
08:28:00
08:29:00
08:30:00
08:31:00
08:32:00
08:33:00
08:34:00
May 22, 2023 @ 08:19:31.461 - May 22, 2023 @ 08:34:31.461
Time
spring.level
kubernetes.namespace_name
kubernetes.container_name
spring.trace
log
May 22, 2023 @ 08:24:01.041
INFO
hands-on
product-composite
bb3f5c15756af1f5ebe e6bb01b862684
Will get composit e product info fo r product.id=1234


Discover - Elastic
Not Secure | https://kibana.minikube.me/app/discover#/?notFound=search&notFoundMessage=Could%20not%20locate%20that%20search%20(id:%208bac8870-26f3-11ea-9178-29...
elastic
Search Elastic
Discover
Options
New
Open
Share
Inspect
Save
Search
KQL
Last 15 minutes
Show dates
Refresh
spring.trace: bb3f5c15756af1f5ebee6bb01b862684
+ Add filter
7 hits
Chart options
May 22, 2023 @ 08:21:44.881 - May 22, 2023 @ 08:36:44.881
Time
spring.level
kubernetes.namespace_name
kubernetes.container_name
spring.trace
log
May 22, 2023 @ 08:24:01.048 DEBUG hands-on review bb3f5c15756af1f5ebee6bb01b862684 select r1_0.id,r1_0.author,r1_0.content,r1_0.product_id,r1_0.review_id,r1_0.subject,r1_0.version from reviews r1_0 where r1_0.product_id=?
May 22, 2023 @ 08:24:01.045 DEBUG hands-on product bb3f5c15756af1f5ebee6bb01b862684 find using query: { "productId" : 1234} fields: Document{{}} for class: class se.magnus.microservices.core.product.persistence.ProductEntity in collection: products
May 22, 2023 @ 08:24:01.045 DEBUG hands-on recommendation bb3f5c15756af1f5ebee6bb01b862684 find using query: { "productId" : 1234} fields: Document{{}} for class: class se.magnus.microservices.core.recommendation.persistence.RecommendationEntity in collec


Discover - Elastic
Not Secure | https://kibana.minikube.me/app/discover#/?notFound=search&notFoundMessage=Could%20not%20locate%20that%20search%20(id:%208bac8870-26f3-11ea-9178-29...
elastic
Search Elastic
Discover
Options
New
Open
Share
Inspect
Save
Search
KQL
Last 15 minutes
Show dates
Refresh
spring.trace: bb3f5c15756af1f5ebee6bb01b862684
NOT spring.level: DEBUG
+ Add filter
4 hits
Chart options
May 22, 2023 @ 08:20:52.923 - May 22, 2023 @ 08:35:52.923
Time
spring.level
kubernetes.namespace_name
kubernetes.container_name
spring.trace
log
May 22, 2023 @ 08:24:01.044 INFO hands-on product bb3f5c15756af1f5ebee6bb01b862684 Will get product info for id=1234
May 22, 2023 @ 08:24:01.044 INFO hands-on recommendation bb3f5c15756af1f5ebee6bb01b862684 Will get recommendations for product with id=1234
May 22, 2023 @ 08:24:01.044 INFO hands-on review bb3f5c15756af1f5ebee6bb01b862684 Will get reviews for product with id=1234
May 22, 2023 @ 08:24:01.041 INFO hands-on product-composite bb3f5c15756af1f5ebee6bb01b862684 Will get composite product info for product.id=1234


bash
⌥⌘1
"timestamp": "2023-05-22T08:54:10.848+00:00",
"path": "/product-composite/1234",
"status": 500,
"error": "Internal Server Error",
"message": "500 Internal Server Error from GET http://product/product/1234?delay=0&faultPercent=100",
"requestId": "64980619-101"
}
$

Discover - Elastic

Not Secure | https://kibana.minikube.me/app/discover#/?_g=(filters:!(),refreshInterval:(pause:!t,value:10000),time:(from:now-15m,to:now))&_a=(columns:!(spring.level,kubernetes.na...

elastic | Search Elastic

Discover | Options | New | Open | Share | Inspect | Save

1234 | KQL | Last 15 minutes | Show dates | Refresh

kubernetes.namespace_name: hands-on × | spring.level: WARN × | + Add filter

14 hits | Chart options

May 22, 2023 @ 12:24:15.129 - May 22, 2023 @ 12:39:15.129

Time	spring.level	kubernetes.namespace_name	kubernetes.container_name	spring.trace	log
May 22, 2023 @ 12:32:56.775	WARN	hands-on	product-composite	9a67a7c6e57d8957b6f34d86184ea258	Error body: {"timestamp":"2023-05-22T10:32:56.769+00:00","path":"/product/1234","status":500,"error":"Internal Server Error","message":"Something went wrong...","requestId":"183e3fa8-49"}
May 22, 2023 @ 12:32:56.775	WARN	hands-on	product-composite	9a67a7c6e57d8957b6f34d86184ea258	getCompositeProduct failed: org.springframework.web.reactive.function.client.WebClientResponseException$InternalServerError: 500 Internal Server Error from GET http://product/product/1234?delay=0&faultPercent=100

Discover - Elastic

Not Secure | https://kibana.minikube.me/app/discover#/?_g=(filters:!(),refreshInterval:(pause:!t,value:10000),time:(from:now-15m,to:now))&_a=(columns:!(spring.level,kubernetes.na...

elastic | Search Elastic

Discover | Options | New | Open | Share | Inspect | Save

1234 | KQL | Last 15 minutes | Show dates | Refresh

kubernetes.namespace_name: hands-on × | spring.trace: 9a67a7c6e57d8957b6f34d86184ea258 × | + Add filter

14 hits | Chart options

May 22, 2023 @ 12:31:17.834 - May 22, 2023 @ 12:46:17.834

Time	spring.level	kubernetes.namespace_name	kubernetes.container_name	spring.trace	log
May 22, 2023 @ 12:32:56.775	WARN	hands-on	product-composite	9a67a7c6e57d8957b6f34d86184ea258	Error body: {"timestamp":"2023-05-22T10:32:56.769+00:00","path":"/product/1234","status":500,"error":"Internal Server Error","message":"Something went wrong...","requestId":"183e3fa8-49"}
May 22, 2023 @ 12:32:56.775	WARN	hands-on	product-composite	9a67a7c6e57d8957b6f34d86184ea258	getCompositeProduct failed: org.springframework.web.reactive.function.client.WebClientResponseException$InternalServerError: 500 Internal Server Error from GET http://product/product/1234?delay=0&faultPercent=100
May 22, 2023 @ 12:32:56.766	DEBUG	hands-on	product	9a67a7c6e57d8957b6f34d86184ea258	find using query: { "productId" : 1234} fields: Document{{}} for class: class se.magnus.microservices.core.product.persistence.ProductEntity in collection: products

Discover - Elastic

Not Secure | https://kibana.minikube.me/app/discover#/?_g=(filters:!(),refreshInterval:(pause:!t,value:10000),time:(from:now-15m,to:now))&_a=(columns:!(spring.level,kubernetes.na...

elastic | Search Elastic

Discover | Options | New | Open | Share | Inspect | Save

1234 | KQL | Last 15 minutes | Show dates | Refresh

kubernetes.namespace_name: hands-on × | spring.trace: 9a67a7c6e57d8957b6f34d86184ea258 × | + Add filter

14 hits | Chart options

May 22, 2023 @ 12:31:17.834 - May 22, 2023 @ 12:46:17.834

Time	spring.level	kubernetes.namespace_name	kubernetes.container_name	spring.trace	log
May 22, 2023 @ 12:32:56.775	WARN	hands-on	product-composite	9a67a7c6e57d8957b6f34d86184ea258	Error body: {"timestamp":"2023-05-22T10:32:56.769+00:00","path":"/product/1234","status":500,"error":"Internal Server Error","message":"Something went wrong...","requestId":"183e3fa8-49"}

Expanded document | View surrounding documents | View single document

Table | JSON

Actions	Field	Value
	t _id	xpsEQ4gB_j4ptToB_nsF
	t _index	logstash-2023.05.22
	# _score	-

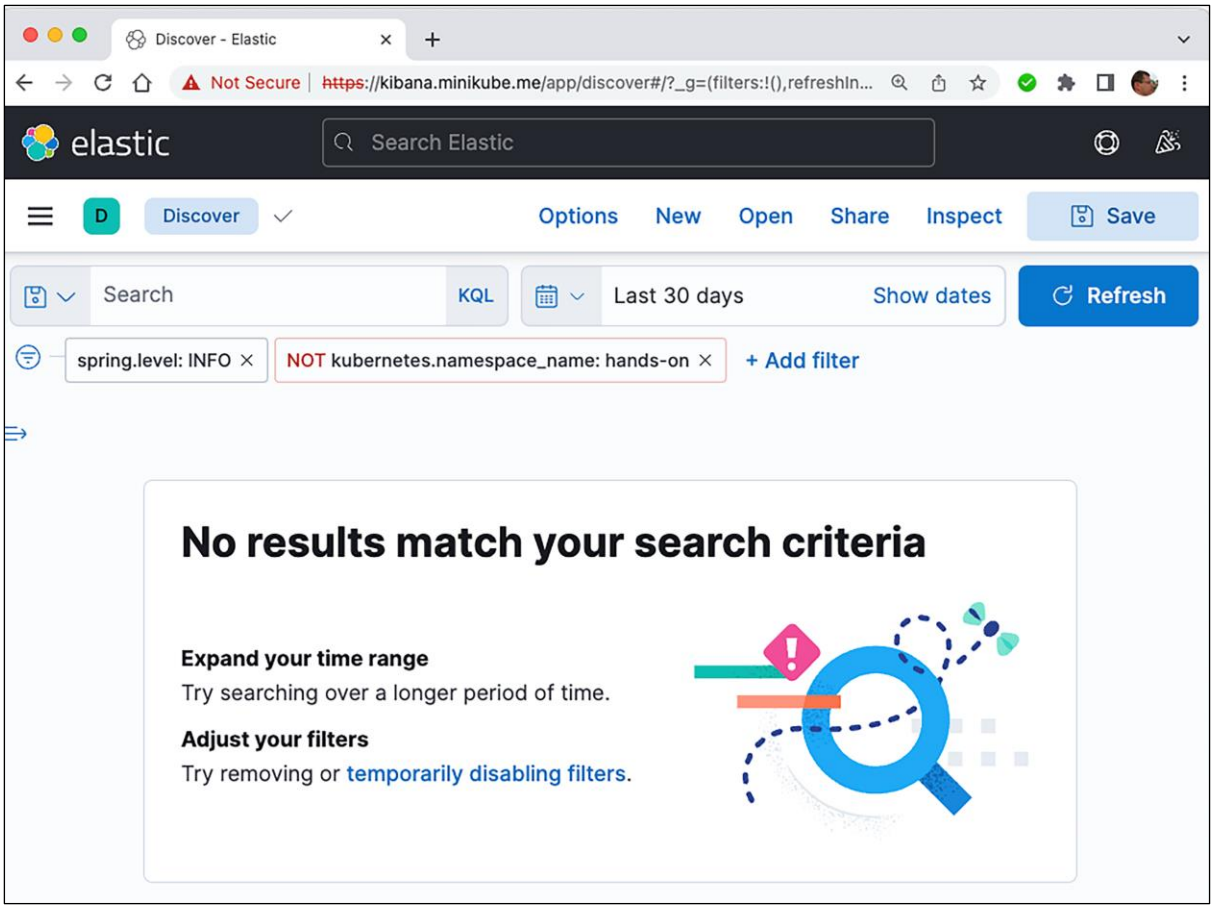
Discover - Elastic

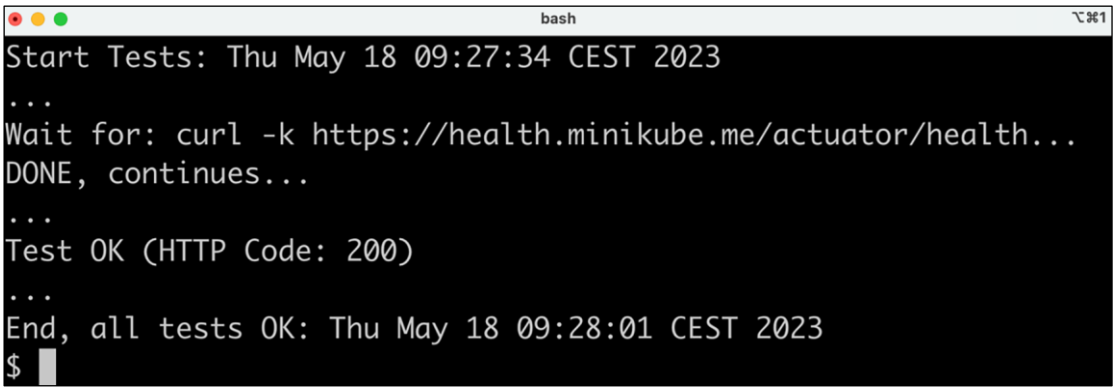
Not Secure | https://kibana.minikube.me/app/discover#/context/5265e0d0-f7f5-11ed-84e1-e35f6fc1e46a/xpsEQ4gB_j4ptToB_nsF?_g=(filters:!())&_a=(columns:!(spring.level,kubern...

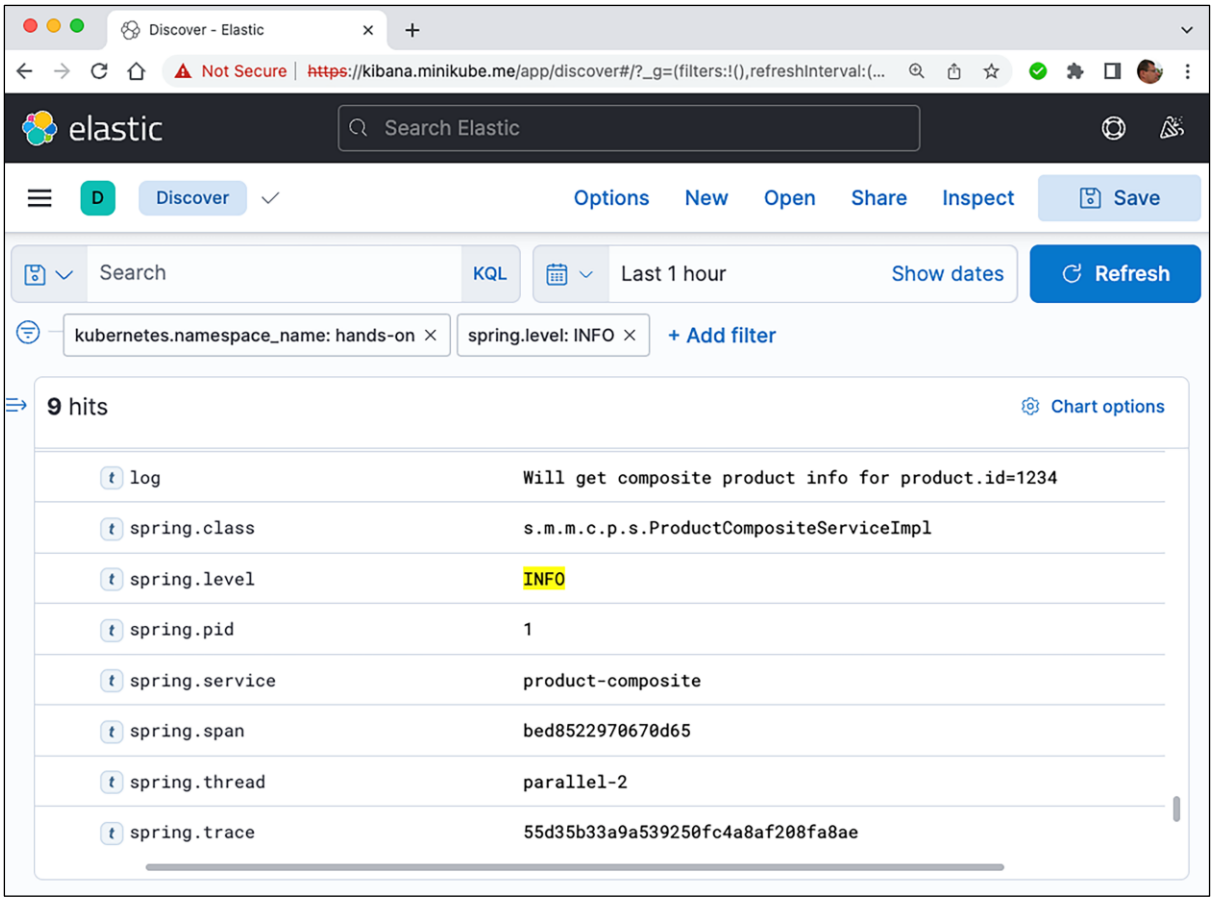
elastic | Search Elastic

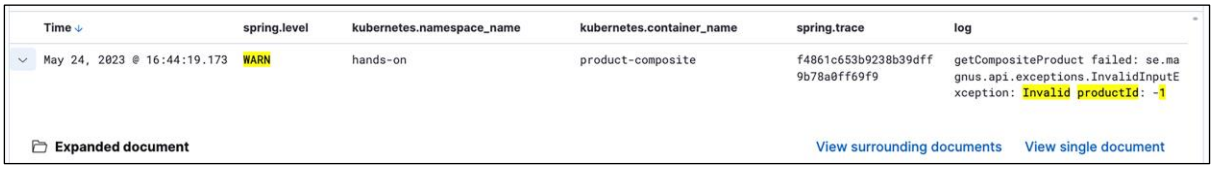
Discover | Surrounding documents

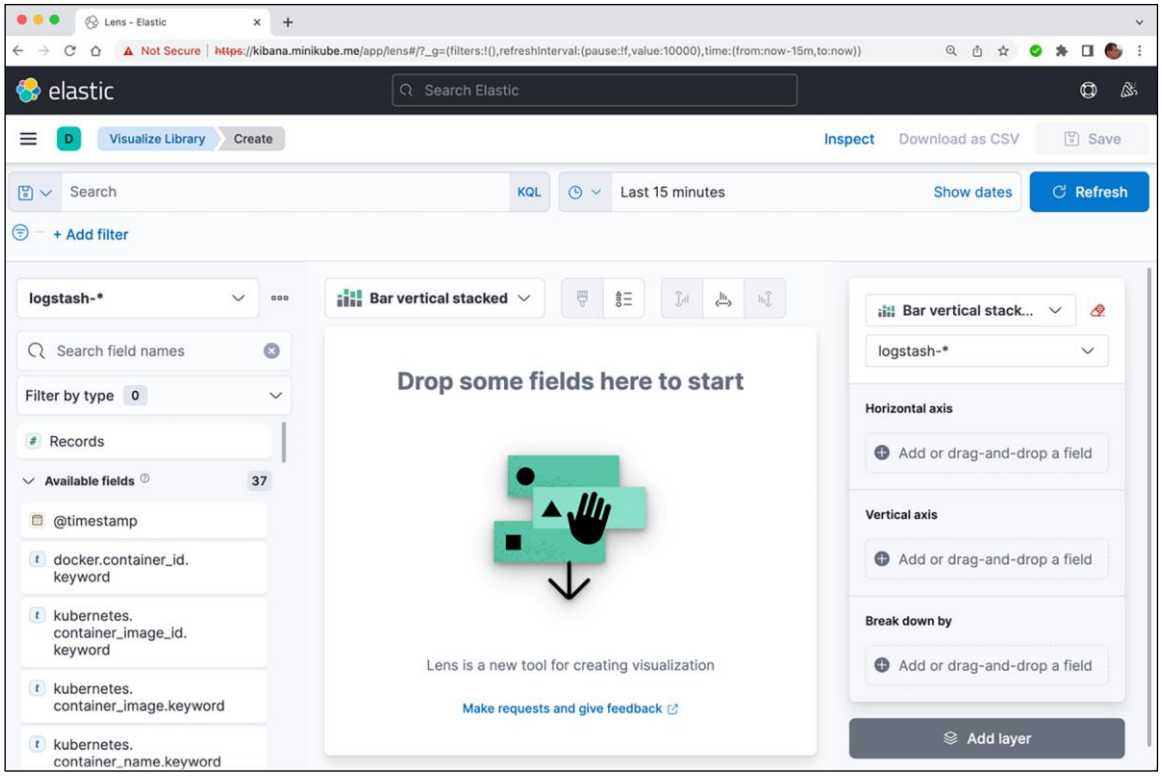
				957b6f34d86184ea258	ctive.function.client.WebClientResponseException$InternalServerError: 500 Internal Server Error from GET http://product/product/1234?delay=0&faultPercent=100
May 22, 2023 @ 12:32:56.775	WARN	hands-on	product-composite	9a67a7c6e57d8957b6f34d86184ea258	Error body: {"timestamp":"2023-05-22T10:32:56.769+00:00","path":"/product/1234","status":500,"error":"Internal Server Error","message":"Something went wrong...","requestId":"183e3fa8-49"}
May 22, 2023 @ 12:32:56.775	WARN	hands-on	product-composite	9a67a7c6e57d8957b6f34d86184ea258	Got an unexpected HTTP error: 500 INTERNAL_SERVER_ERROR, will rethrow it
May 22, 2023 @ 12:32:56.771	-	hands-on	product	-	
May 22, 2023 @ 12:32:56.770	-	hands-on	product	-	java.lang.RuntimeException: Something went wrong... at se.magnus.microservices.core.product.services.ProductServiceImpl.throwErrorIfBadLuck(ProductServiceImpl.java:104) ~[classes/:1.0.0-SNAPSHOT] at se.magnus.microservices.core.product.services.ProductServiceImpl.throwErrorIfBadLuck(ProductServiceImpl.java:104) ~[classes/:1.0.0-SNAPSHOT]
May 22, 2023 @ 12:32:56.770	-	hands-on	product	-	
May 22, 2023 @ 12:32:56.770	ERROR	hands-on	product	(empty)	[183e3fa8-49] 500 Server Error for HTTP GET "/product/1234?delay=0&faultPercent=100"
May 22, 2023 @ 12:32:56.769	INFO	hands-on	product	(empty)	Bad luck, an error occurred, 100 >= 94
May 22, 2023 @ 12:32:56.766	DEBUG	hands-on	product	9a67a7c6e57d8957b6f34d86184ea258	find using query: { "productId" : 1234} fields: Document{{}} for class: class se.magnus.microservices.core.product.persistence.ProductEntity in collection: products
May 22, 2023 @ 12:32:56.765	INFO	hands-on	product	9a67a7c6e57d8957b6f34d86184ea258	Will get product info for id=1234

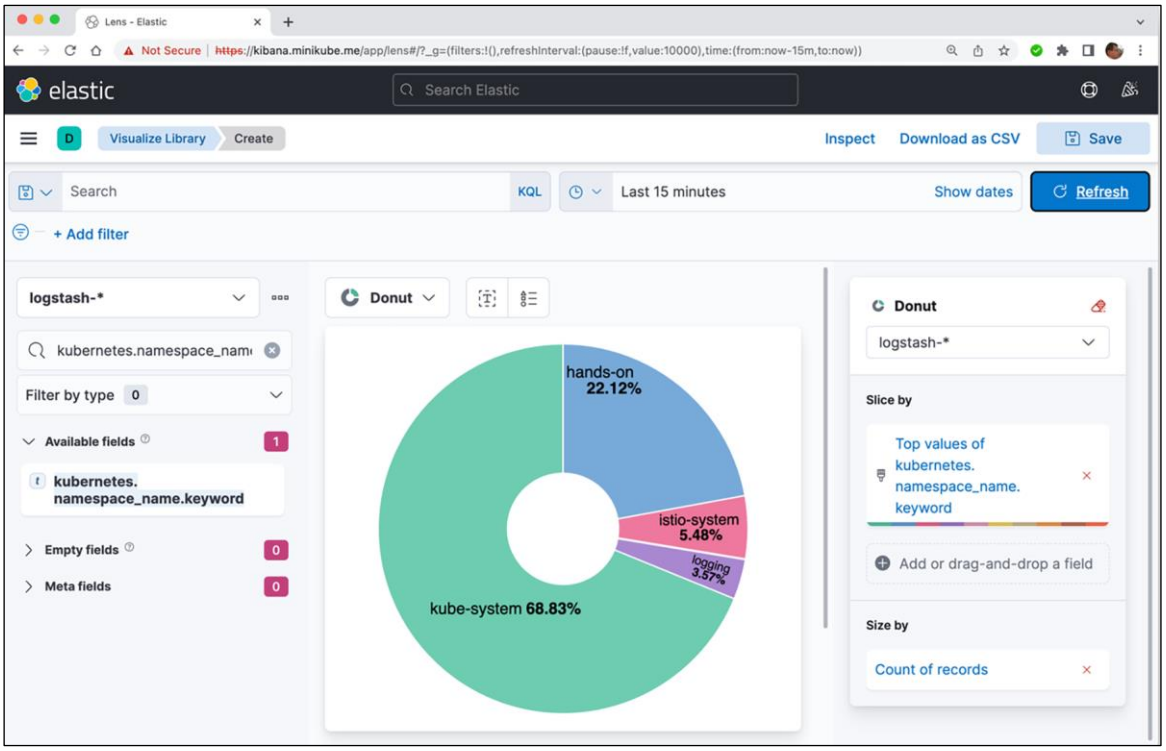

Discover - Elastic
Not Secure
https://kibana.minikube.me/app/discover#/?_g=(filters:!(),refreshIn...
elastic
Search Elastic
D
Discover
Options
New
Open
Share
Inspect
Save
Search
KQL
Last 30 days
Show dates
Refresh
spring.level: INFO
NOT kubernetes.namespace_name: hands-on
+ Add filter
No results match your search criteria
Expand your time range
Try searching over a longer period of time.
Adjust your filters
Try removing or temporarily disabling filters.

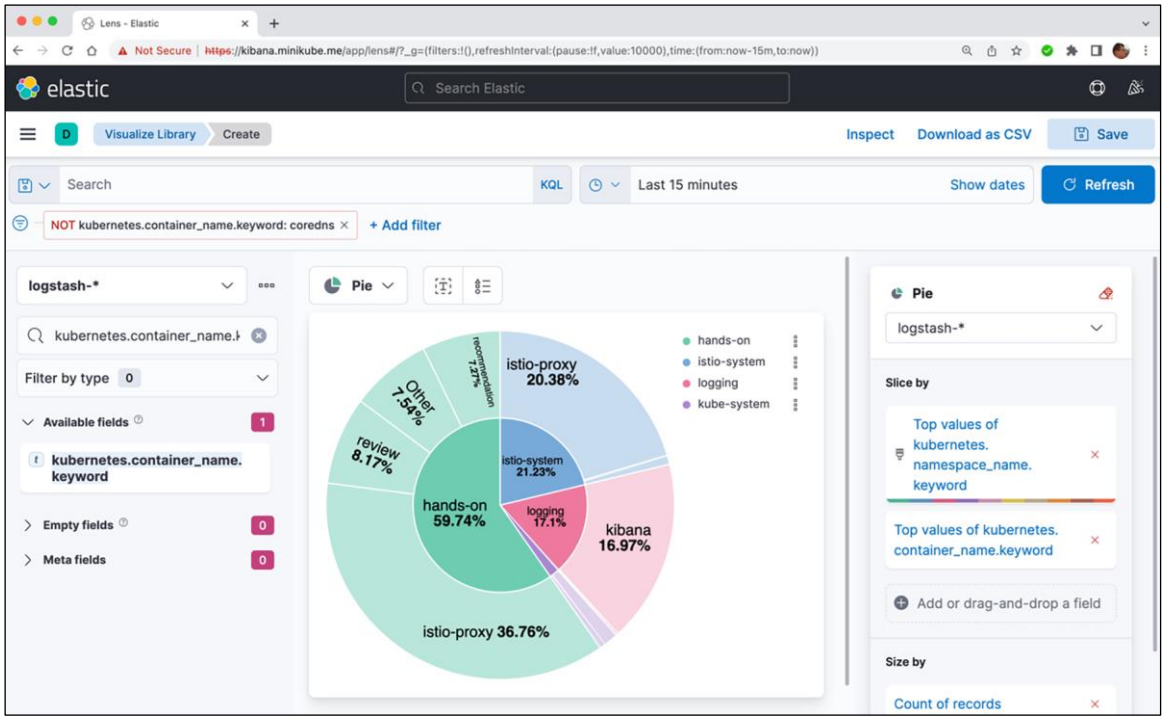

bash
Start Tests: Thu May 18 09:27:34 CEST 2023
...
Wait for: curl -k https://health.minikube.me/actuator/health...
DONE, continues...
...
Test OK (HTTP Code: 200)
...
End, all tests OK: Thu May 18 09:28:01 CEST 2023
$

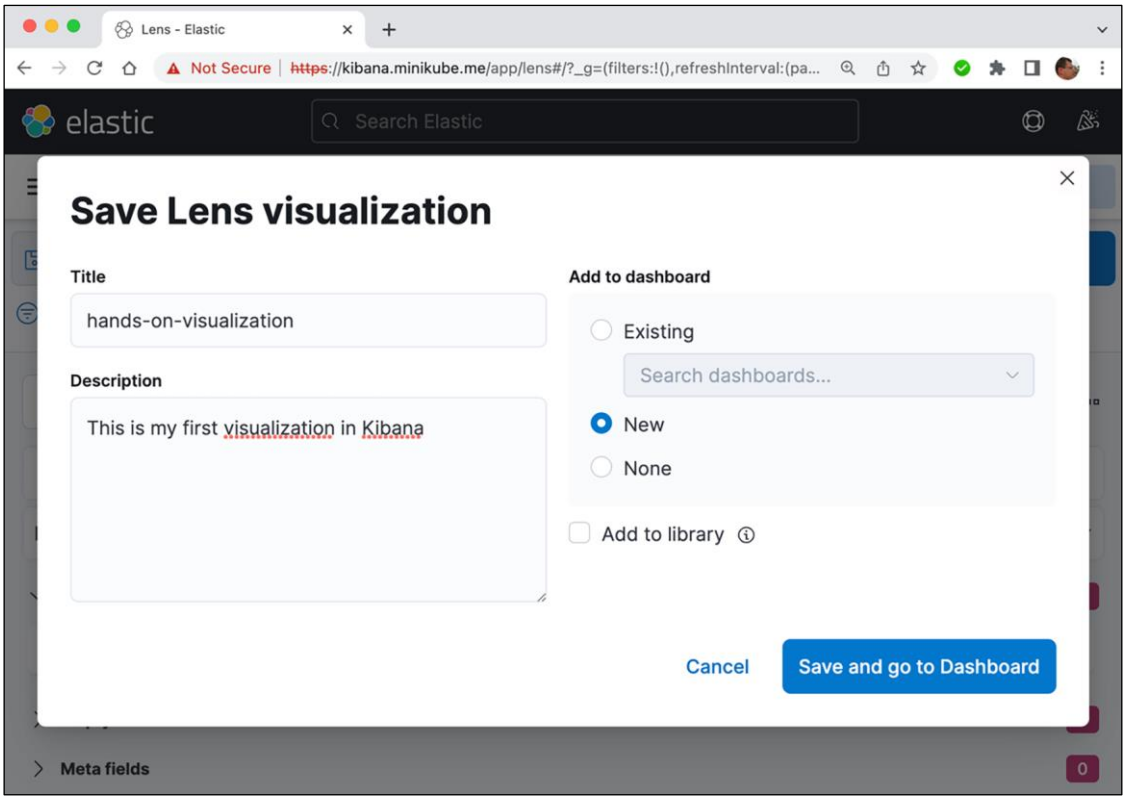

Discover - Elastic
Not Secure | https://kibana.minikube.me/app/discover#/?_g=(filters:!(),refreshInterval:(...
elastic
Search Elastic
Discover
Options
New
Open
Share
Inspect
Save
Search
KQL
Last 1 hour
Show dates
Refresh
kubernetes.namespace_name: hands-on
spring.level: INFO
+ Add filter
9 hits
Chart options
log
Will get composite product info for product.id=1234
spring.class
s.m.m.c.p.s.ProductCompositeServiceImpl
spring.level
INFO
spring.pid
1
spring.service
product-composite
spring.span
bed8522970670d65
spring.thread
parallel-2
spring.trace
55d35b33a9a539250fc4a8af208fa8ae

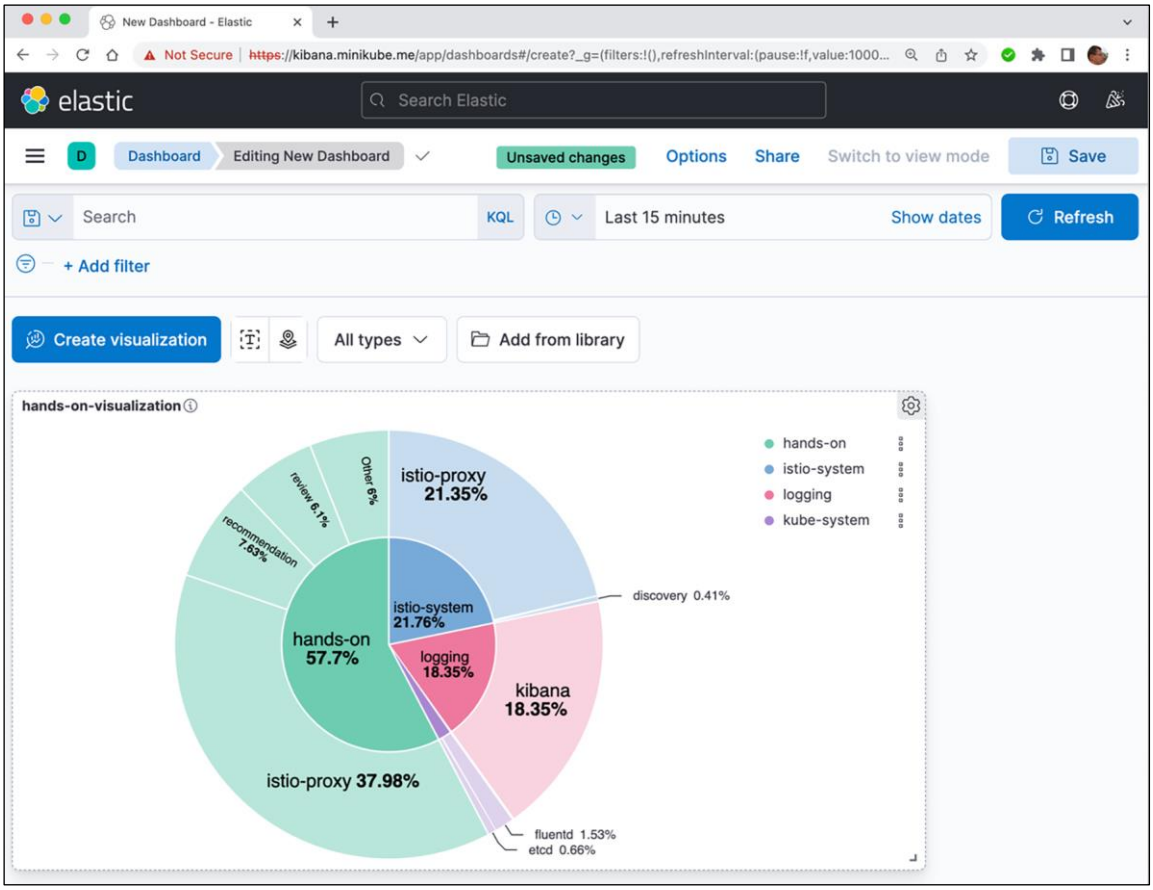

Time
spring.level
kubernetes.namespace_name
kubernetes.container_name
spring.trace
log
May 24, 2023 @ 16:44:19.173
WARN
hands-on
product-composite
f4861c653b9238b39dff9b78a0ff69f9
getCompositeProduct failed: se.magnus.api.exceptions.InvalidInputException: Invalid productId: -1
Expanded document
View surrounding documents
View single document


Lens - Elastic
Not Secure | https://kibana.minikube.me/app/lens#/?_g=(filters:!(),refreshInterval:(pause:!f,value:10000),time:(from:now-15m,to:now))
elastic
Search Elastic
Visualize Library
Create
Inspect
Download as CSV
Save
Search
KQL
Last 15 minutes
Show dates
Refresh
+ Add filter
logstash-*
Search field names
Filter by type 0
Records
Available fields 37
@timestamp
docker.container_id.keyword
kubernetes.container_image_id.keyword
kubernetes.container_image.keyword
kubernetes.container_name.keyword
Bar vertical stacked
Drop some fields here to start
Lens is a new tool for creating visualization
Make requests and give feedback
Bar vertical stack...
logstash-*
Horizontal axis
Add or drag-and-drop a field
Vertical axis
Add or drag-and-drop a field
Break down by
Add or drag-and-drop a field
Add layer


Lens - Elastic
Not Secure | https://kibana.minikube.me/app/lens#/?_g=(filters:!(),refreshInterval:(pause:!f,value:10000),time:(from:now-15m,to:now))
elastic
Search Elastic
Visualize Library
Create
Inspect
Download as CSV
Save
Search
KQL
Last 15 minutes
Show dates
Refresh
+ Add filter
logstash-*
kubernetes.namespace_nam
Filter by type 0
Available fields 1
kubernetes.namespace_name.keyword
Empty fields 0
Meta fields 0
Donut
hands-on 22.12%
istio-system 5.48%
logging 3.57%
kube-system 68.83%
Donut
logstash-*
Slice by
Top values of kubernetes.namespace_name.keyword
Add or drag-and-drop a field
Size by
Count of records


Lens - Elastic
Not Secure | https://kibana.minikube.me/app/lens#/?_g=(filters:!(),refreshInterval:(pause:!f,value:10000),time:(from:now-15m,to:now))
elastic
Search Elastic
Visualize Library
Create
Inspect
Download as CSV
Save
Search
KQL
Last 15 minutes
Show dates
Refresh
NOT kubernetes.container_name.keyword: coredns
+ Add filter
logstash-*
kubernetes.container_name.k
Filter by type 0
Available fields 1
kubernetes.container_name.keyword
Empty fields 0
Meta fields 0
Pie
hands-on
istio-system
logging
kube-system
istio-proxy 20.38%
Other 7.54%
review 8.17%
istio-system 21.23%
hands-on 59.74%
logging 17.1%
kibana 16.97%
istio-proxy 36.76%
Pie
logstash-*
Slice by
Top values of kubernetes.namespace_name.keyword
Top values of kubernetes.container_name.keyword
Add or drag-and-drop a field
Size by
Count of records


Lens - Elastic
Not Secure
https://kibana.minikube.me/app/lens#/?_g=(filters:!(),refreshInterval:(pa...
elastic
Search Elastic
Save Lens visualization
Title
hands-on-visualization
Description
This is my first visualization in Kibana
Add to dashboard
Existing
Search dashboards...
New
None
Add to library
Cancel
Save and go to Dashboard
Meta fields
0


New Dashboard - Elastic
Not Secure
https://kibana.minikube.me/app/dashboards#/create?_g=(filters:!(),refreshInterval:(pause:!f,value:1000...
elastic
Search Elastic
D
Dashboard
Editing New Dashboard
Unsaved changes
Options
Share
Switch to view mode
Save
Search
KQL
Last 15 minutes
Show dates
Refresh
+ Add filter
Create visualization
All types
Add from library
hands-on-visualization
hands-on
istio-system
logging
kube-system
istio-proxy
21.35%
Other 6%
review 6.1%
recommendation
7.63%
discovery 0.41%
istio-system
21.76%
hands-on
57.7%
logging
18.35%
kibana
18.35%
istio-proxy 37.98%
fluentd 1.53%
etcd 0.66%

bash


```
{
  "productId": 1234,
  "name": "product name 1234",
  "weight": 1234,
  "recommendations": [],
  "reviews": [],
  "serviceAddresses": {
    "cmp": "product-composite-59fb54568c-p8kzd/10.244.0.166:80",
    "pro": "product-5454d77458-9b565/10.244.0.156:80",
    "rev": "",
    "rec": ""
  }
}
$
```


Discover - Elastic

Not Secure | https://kibana.minikube.me/app/discover#/?notFound=search&notFoundMessage=Could%20not%20lo...

elastic | Search Elastic

Discover | Options | New | Open | Share | Inspect | Save

Search | KQL | Last 15 minutes | Show dates | Refresh

+ Add filter

logstash-*

Search field names

Filter by type 0

Available fields 40

- _id
- _index
- _score
- _type
- @timestamp
- docker.container_id
- kubernetes.container_image
- kubernetes.container_image_id
- kubernetes.container_name
- kubernetes.host
- kubernetes.labels.app

5,350 hits | Chart options

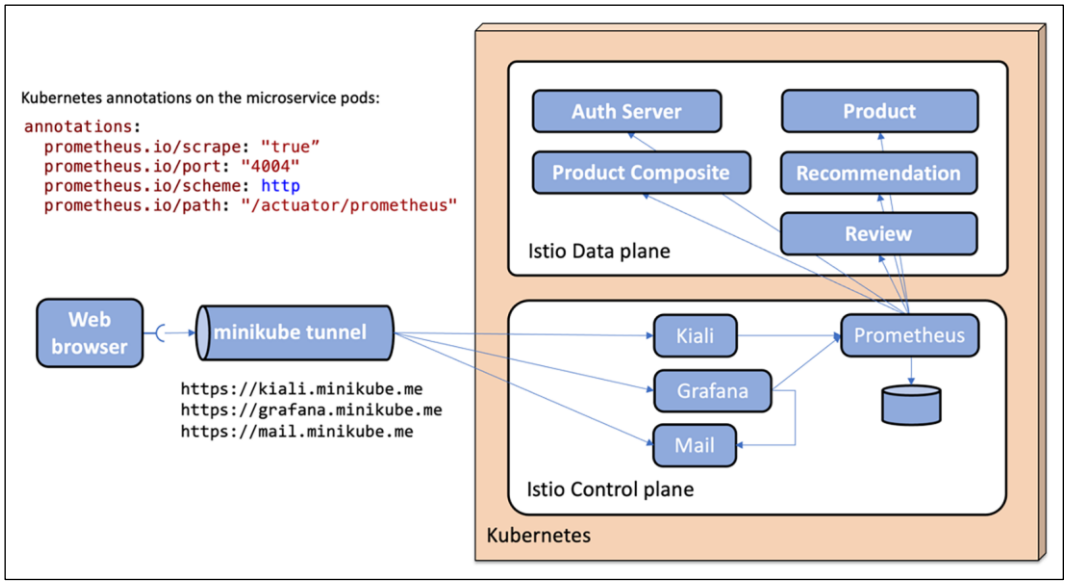
250 200 150 100 50 0

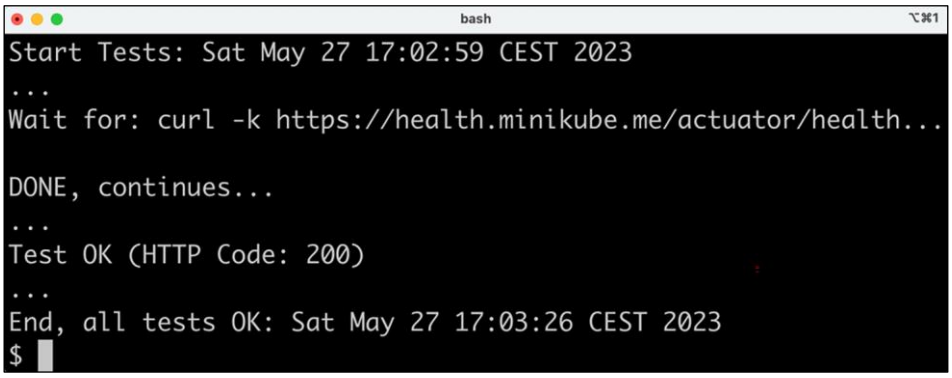
08:15:00 08:20:00 08:25:00

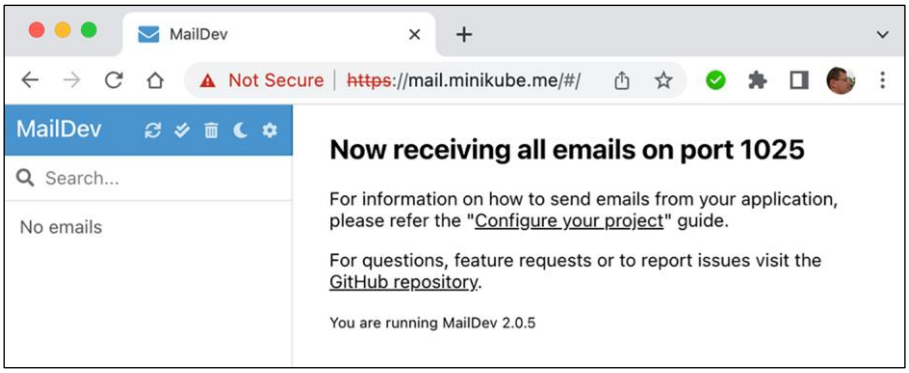
May 22, 2023 @ 08:10:52.232 - May 22, 2023 @ 08:25:52.232

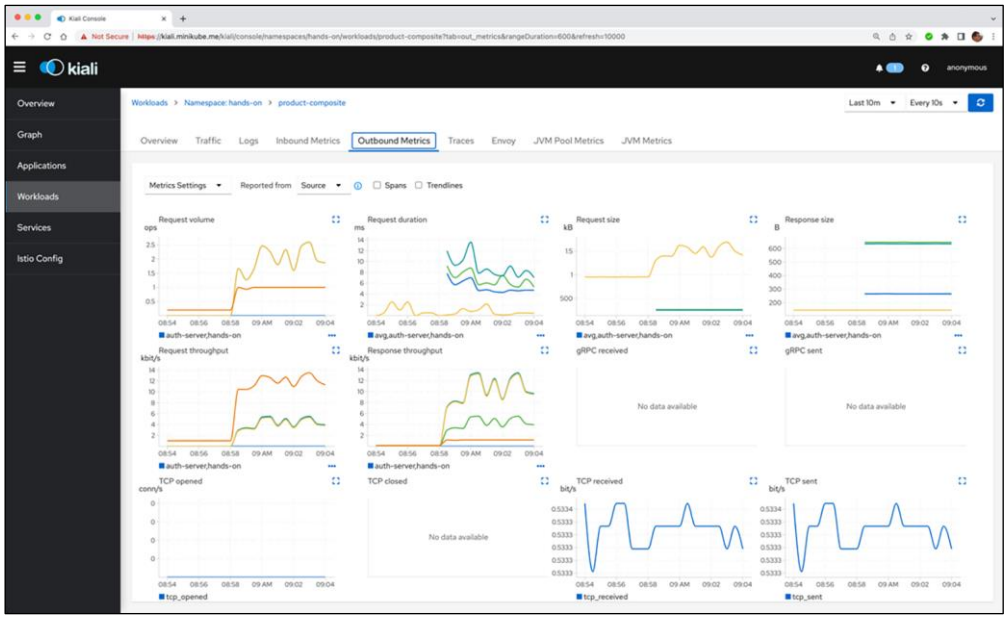
Time	Document
May 22, 2023 @ 08:25:47.463	@timestamp: May 22, 2023 @ 08:25:47.463 docker.container_id: f984f76fae5ae0d7b25406454ea8c57 2726ab956ffe096a965a147dfb1b kubernetes.container_image: istio/proxyv2:1.17.0 kubernetes.container_image_id: docker-
May 22, 2023 @ 08:25:47.463	@timestamp: May 22, 2023 @ 08:25:47.463 docker.container_id: f984f76fae5ae0d7b25406454ea8c57 2726ab956ffe096a965a147dfb1b kubernetes.container_image: istio/proxyv2:1.17.0

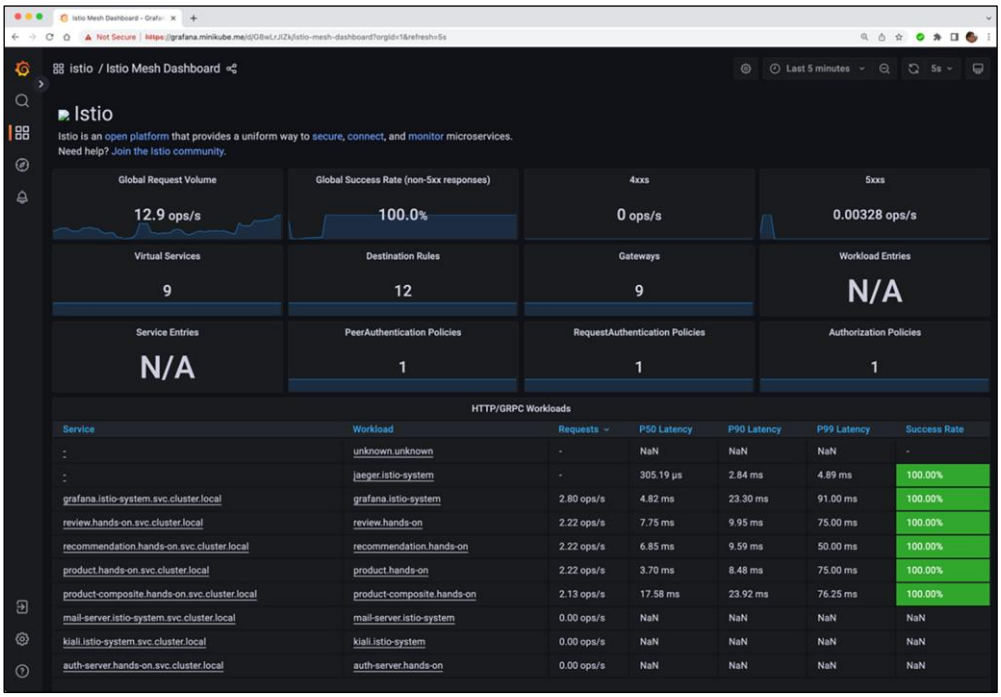
Chapter 20: Monitoring Microservices

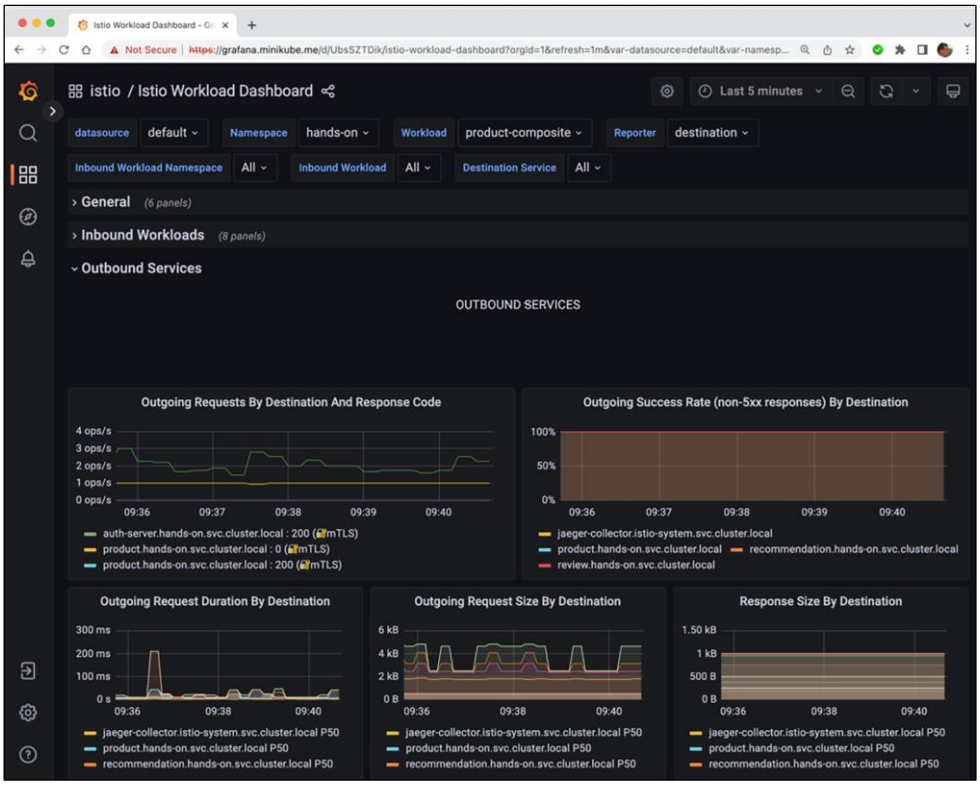


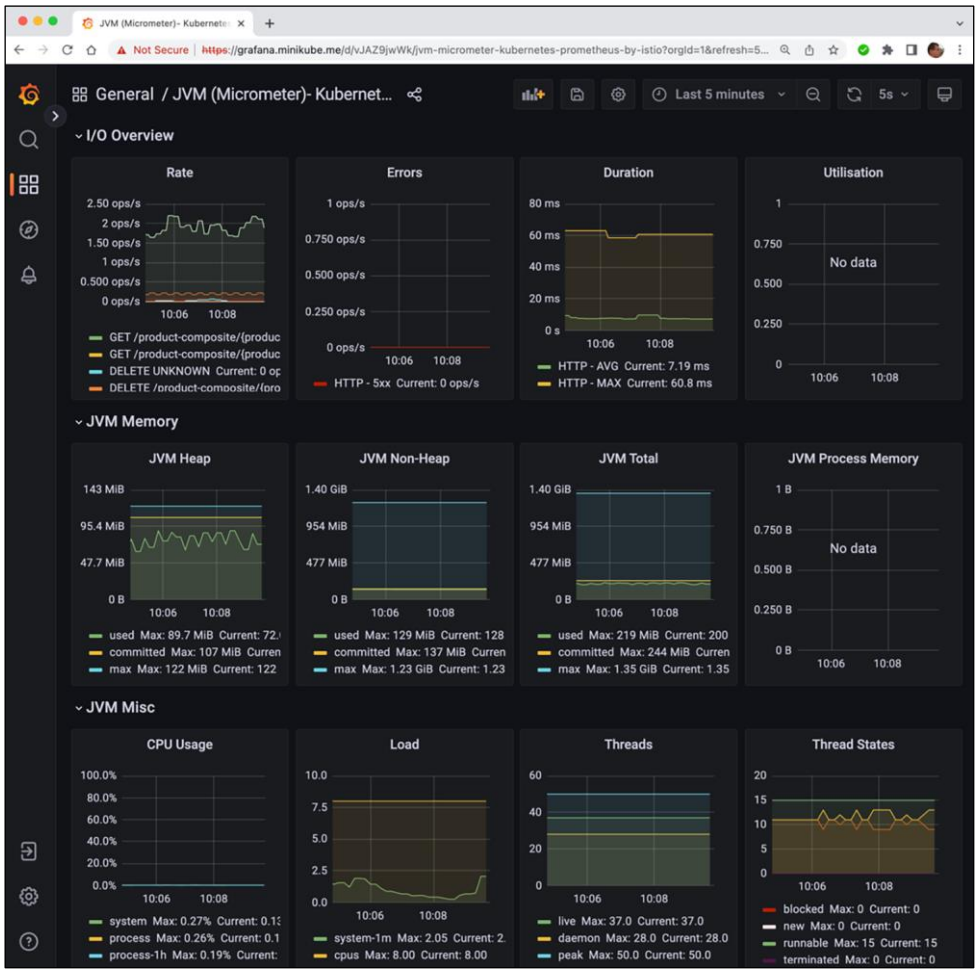




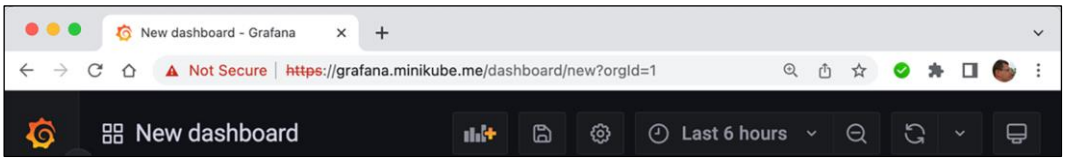

kiali
Overview
Graph
Applications
Workloads
Services
Istio Config
Workloads > Namespace: hands-on > product-composite
Overview
Traffic
Logs
Inbound Metrics
Outbound Metrics
Traces
Envoy
JVM Pool Metrics
JVM Metrics
Metrics Settings
Reported from
Source
Spans
Trendlines
Request volume
Request duration
Request size
Response size
Request throughput
Response throughput
gRPC received
gRPC sent
No data available
TCP opened
TCP closed
TCP received
TCP sent

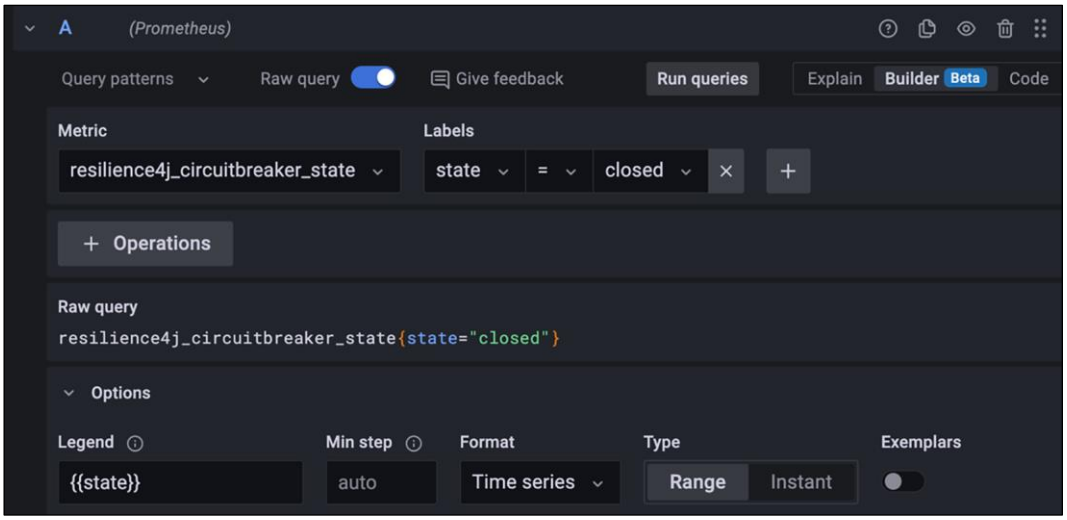

istio / Istio Mesh Dashboard
Last 5 minutes
5s
Istio
Istio is an open platform that provides a uniform way to secure, connect, and monitor microservices.
Need help? Join the Istio community.
Global Request Volume
12.9 ops/s
Global Success Rate (non-5xx responses)
100.0%
4xxs
0 ops/s
5xxs
0.00328 ops/s
Virtual Services
9
Destination Rules
12
Gateways
9
Workload Entries
N/A
Service Entries
N/A
PeerAuthentication Policies
1
RequestAuthentication Policies
1
Authorization Policies
1
HTTP/GRPC Workloads
Service | Workload | Requests | P50 Latency | P90 Latency | P99 Latency | Success Rate
- | unknown.unknown | - | NaN | NaN | NaN | -
- | jaeger.istio-system | - | 305.19 µs | 2.84 ms | 4.89 ms | 100.00%
grafana.istio-system.svc.cluster.local | grafana.istio-system | 2.80 ops/s | 4.82 ms | 23.30 ms | 91.00 ms | 100.00%
review.hands-on.svc.cluster.local | review.hands-on | 2.22 ops/s | 7.75 ms | 9.95 ms | 75.00 ms | 100.00%
recommendation.hands-on.svc.cluster.local | recommendation.hands-on | 2.22 ops/s | 6.85 ms | 9.59 ms | 50.00 ms | 100.00%
product.hands-on.svc.cluster.local | product.hands-on | 2.22 ops/s | 3.70 ms | 8.48 ms | 75.00 ms | 100.00%
product-composite.hands-on.svc.cluster.local | product-composite.hands-on | 2.13 ops/s | 17.58 ms | 23.92 ms | 76.25 ms | 100.00%
mail-server.istio-system.svc.cluster.local | mail-server.istio-system | 0.00 ops/s | NaN | NaN | NaN | NaN
kiali.istio-system.svc.cluster.local | kiali.istio-system | 0.00 ops/s | NaN | NaN | NaN | NaN
auth-server.hands-on.svc.cluster.local | auth-server.hands-on | 0.00 ops/s | NaN | NaN | NaN | NaN

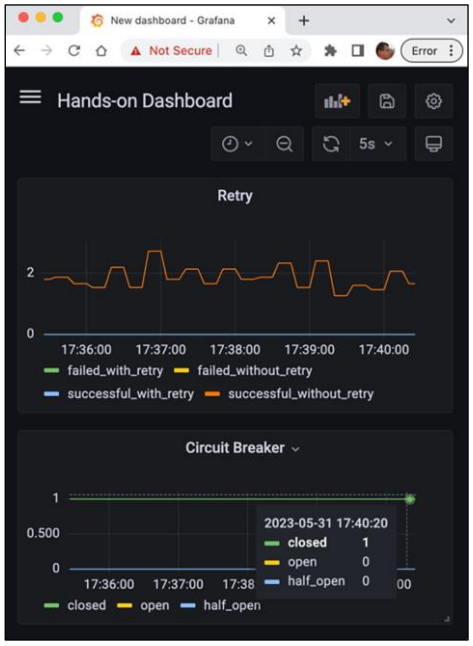

Istio Workload Dashboard
Not Secure | https://grafana.minikube.me/d/UbsSZTDik/istio-workload-dashboard?orgId=1&refresh=1m&var-datasource=default&var-namesp...
istio / Istio Workload Dashboard
Last 5 minutes
datasource default
Namespace hands-on
Workload product-composite
Reporter destination
Inbound Workload Namespace All
Inbound Workload All
Destination Service All
General (6 panels)
Inbound Workloads (8 panels)
Outbound Services
OUTBOUND SERVICES
Outgoing Requests By Destination And Response Code
4 ops/s
3 ops/s
2 ops/s
1 ops/s
0 ops/s
09:36 09:37 09:38 09:39 09:40
auth-server.hands-on.svc.cluster.local : 200 (mTLS)
product.hands-on.svc.cluster.local : 0 (mTLS)
product.hands-on.svc.cluster.local : 200 (mTLS)
Outgoing Success Rate (non-5xx responses) By Destination
100%
50%
0%
09:36 09:37 09:38 09:39 09:40
jaeger-collector.istio-system.svc.cluster.local
product.hands-on.svc.cluster.local
recommendation.hands-on.svc.cluster.local
review.hands-on.svc.cluster.local
Outgoing Request Duration By Destination
300 ms
200 ms
100 ms
0 s
09:36 09:38 09:40
jaeger-collector.istio-system.svc.cluster.local P50
product.hands-on.svc.cluster.local P50
recommendation.hands-on.svc.cluster.local P50
Outgoing Request Size By Destination
6 kB
4 kB
2 kB
0 B
09:36 09:38 09:40
jaeger-collector.istio-system.svc.cluster.local P50
product.hands-on.svc.cluster.local P50
recommendation.hands-on.svc.cluster.local P50
Response Size By Destination
1.50 kB
1 kB
500 B
0 B
09:36 09:38 09:40
jaeger-collector.istio-system.svc.cluster.local P50
product.hands-on.svc.cluster.local P50
recommendation.hands-on.svc.cluster.local P50

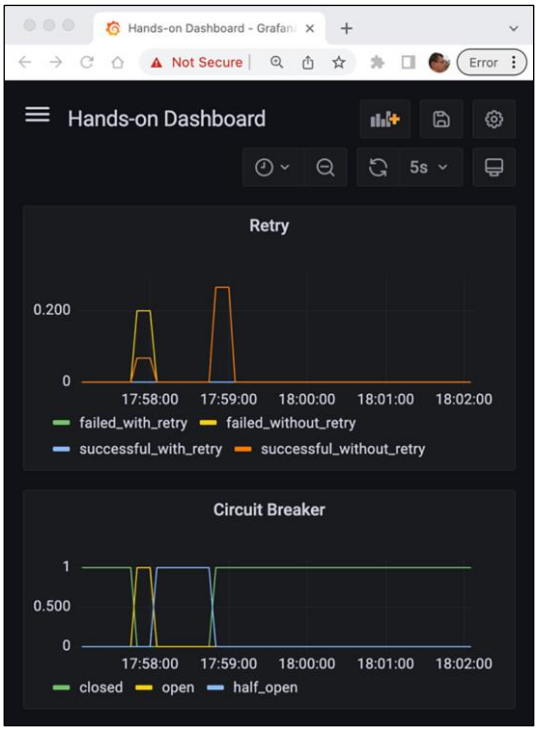

JVM (Micrometer)- Kubernete
Not Secure | https://grafana.minikube.me/d/vJAZ9jwWk/jvm-micrometer-kubernetes-prometheus-by-istio?orgId=1&refresh=5...
General / JVM (Micrometer)- Kubernet...
Last 5 minutes
5s
I/O Overview
Rate
2.50 ops/s
2 ops/s
1.50 ops/s
1 ops/s
0.500 ops/s
0 ops/s
10:06 10:08
GET /product-composite/(produc
GET /product-composite/(produc
DELETE UNKNOWN Current: 0 op
DELETE /product-composite/(pro
Errors
1 ops/s
0.750 ops/s
0.500 ops/s
0.250 ops/s
0 ops/s
10:06 10:08
HTTP - 5xx Current: 0 ops/s
Duration
80 ms
60 ms
40 ms
20 ms
0 s
10:06 10:08
HTTP - AVG Current: 7.19 ms
HTTP - MAX Current: 60.8 ms
Utilisation
1
0.750
0.500
0.250
0
No data
10:06 10:08
JVM Memory
JVM Heap
143 MiB
95.4 MiB
47.7 MiB
0 B
10:06 10:08
used Max: 89.7 MiB Current: 72.
committed Max: 107 MiB Curren
max Max: 122 MiB Current: 122
JVM Non-Heap
1.40 GiB
954 MiB
477 MiB
0 B
10:06 10:08
used Max: 129 MiB Current: 128
committed Max: 137 MiB Curren
max Max: 1.23 GiB Current: 1.23
JVM Total
1.40 GiB
954 MiB
477 MiB
0 B
10:06 10:08
used Max: 219 MiB Current: 200
committed Max: 244 MiB Curren
max Max: 1.35 GiB Current: 1.35
JVM Process Memory
1 B
0.750 B
0.500 B
0.250 B
0 B
No data
10:06 10:08
JVM Misc
CPU Usage
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
10:06 10:08
system Max: 0.27% Current: 0.1
process Max: 0.26% Current: 0.1
process-1h Max: 0.19% Current:
Load
10.0
7.5
5.0
2.5
0.0
10:06 10:08
system-1m Max: 2.05 Current: 2.
cpus Max: 8.00 Current: 8.00
Threads
60
40
20
0
10:06 10:08
live Max: 37.0 Current: 37.0
daemon Max: 28.0 Current: 28.0
peak Max: 50.0 Current: 50.0
Thread States
20
15
10
5
0
10:06 10:08
blocked Max: 0 Current: 0
new Max: 0 Current: 0
runnable Max: 15 Current: 15
terminated Max: 0 Current: 0

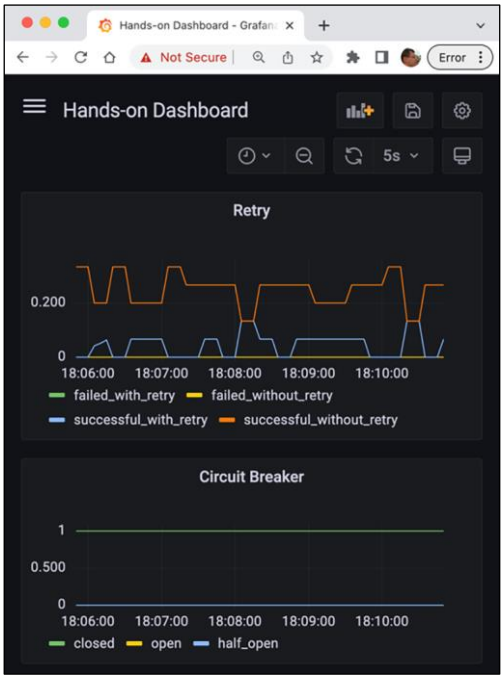
```
...
resilience4j_retry_calls_total{application="product-composite",kind="successful_with_retry",name="product",} 0.0
resilience4j_retry_calls_total{application="product-composite",kind="failed_with_retry",name="product",} 0.0
resilience4j_retry_calls_total{application="product-composite",kind="successful_without_retry",name="product",} 11978.0
resilience4j_retry_calls_total{application="product-composite",kind="failed_without_retry",name="product",} 6.0
...
resilience4j_circuitbreaker_state{application="product-composite",name="product",state="open",} 0.0
resilience4j_circuitbreaker_state{application="product-composite",name="product",state="forced_open",} 0.0
resilience4j_circuitbreaker_state{application="product-composite",name="product",state="half_open",} 0.0
resilience4j_circuitbreaker_state{application="product-composite",name="product",state="closed",} 1.0
...
$
```

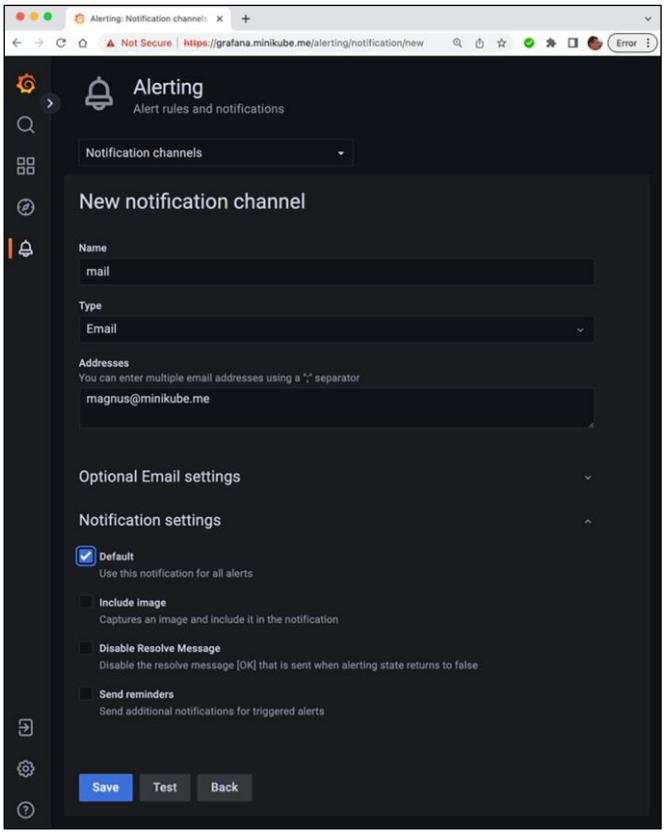


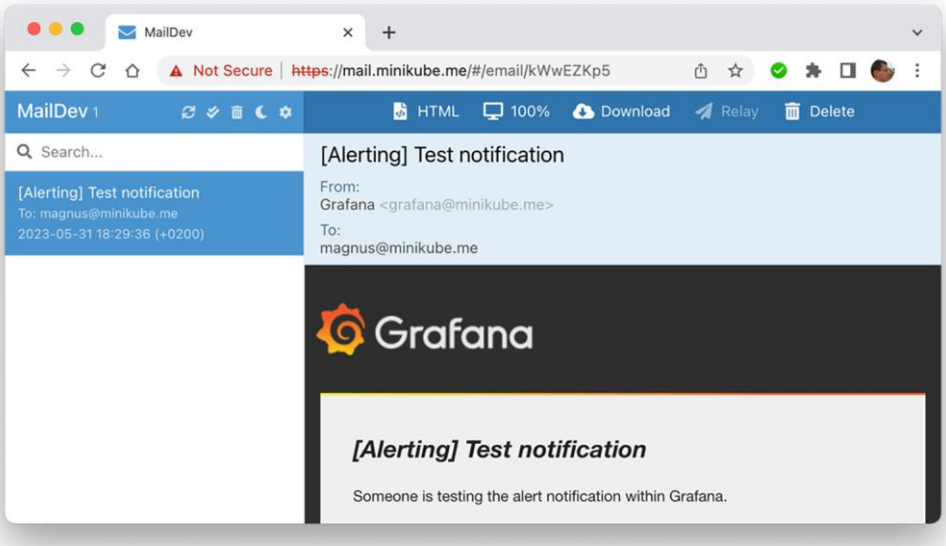


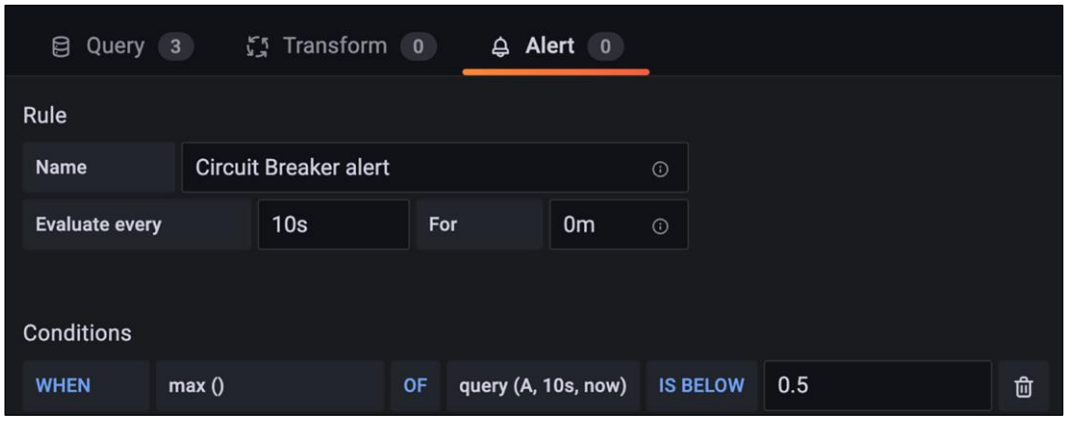


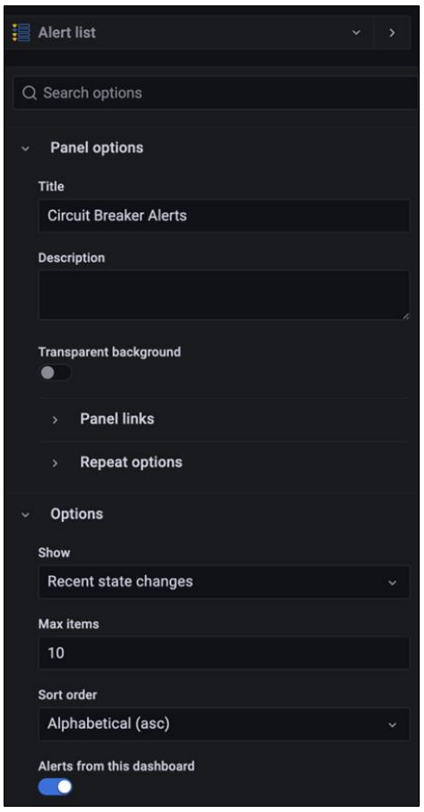

Hands-on Dashboard - Grafan
Not Secure
Error
Hands-on Dashboard
5s
Retry
0.200
0
17:58:00
17:59:00
18:00:00
18:01:00
18:02:00
failed_with_retry
failed_without_retry
successful_with_retry
successful_without_retry
Circuit Breaker
1
0.500
0
17:58:00
17:59:00
18:00:00
18:01:00
18:02:00
closed
open
half_open


Hands-on Dashboard - Grafan
Not Secure
Error
Hands-on Dashboard
5s
Retry
0.200
0
18:06:00
18:07:00
18:08:00
18:09:00
18:10:00
failed_with_retry
failed_without_retry
successful_with_retry
successful_without_retry
Circuit Breaker
1
0.500
0
18:06:00
18:07:00
18:08:00
18:09:00
18:10:00
closed
open
half_open

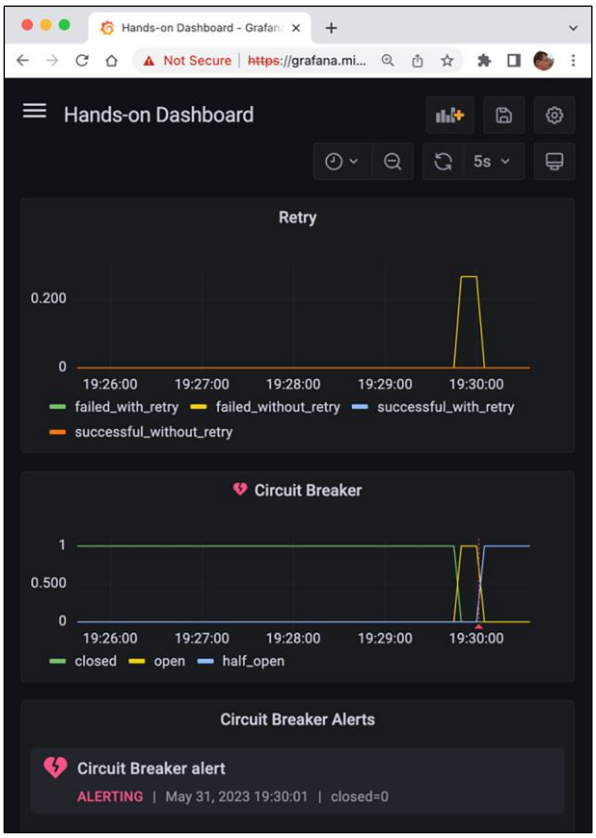

Alerting: Notification channels
Not Secure | https://grafana.minikube.me/alerting/notification/new
Error
Alerting
Alert rules and notifications
Notification channels
New notification channel
Name
mail
Type
Email
Addresses
You can enter multiple email addresses using a ";" separator
magnus@minikube.me
Optional Email settings
Notification settings
Default
Use this notification for all alerts
Include image
Captures an image and include it in the notification
Disable Resolve Message
Disable the resolve message [OK] that is sent when alerting state returns to false
Send reminders
Send additional notifications for triggered alerts
Save
Test
Back

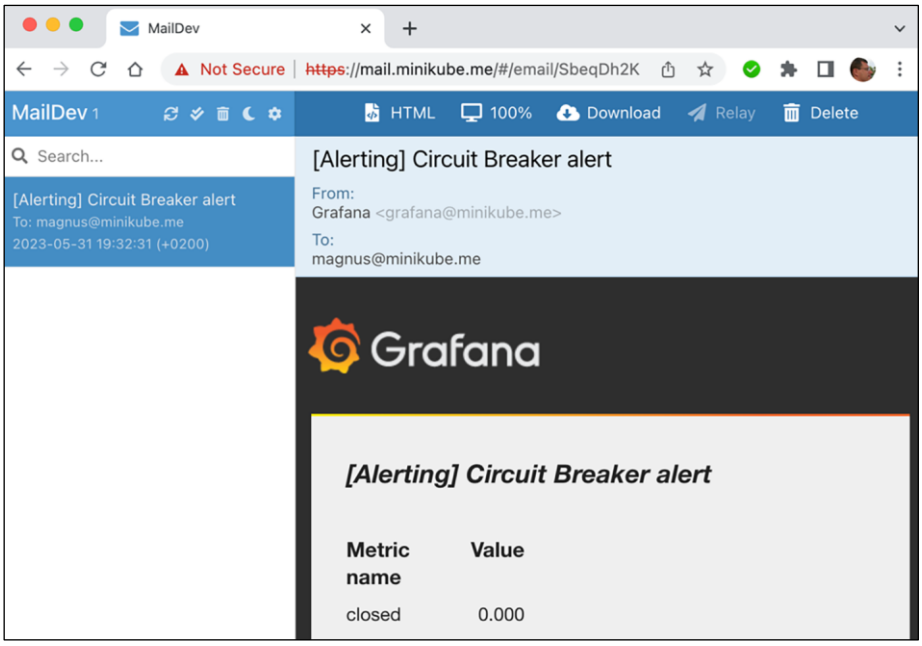

MailDev
Not Secure | https://mail.minikube.me/#/email/kWwEZKp5
MailDev 1
HTML
100%
Download
Relay
Delete
Search...
[Alerting] Test notification
To: magnus@minikube.me
2023-05-31 18:29:36 (+0200)
[Alerting] Test notification
From:
Grafana <grafana@minikube.me>
To:
magnus@minikube.me
Grafana
[Alerting] Test notification
Someone is testing the alert notification within Grafana.

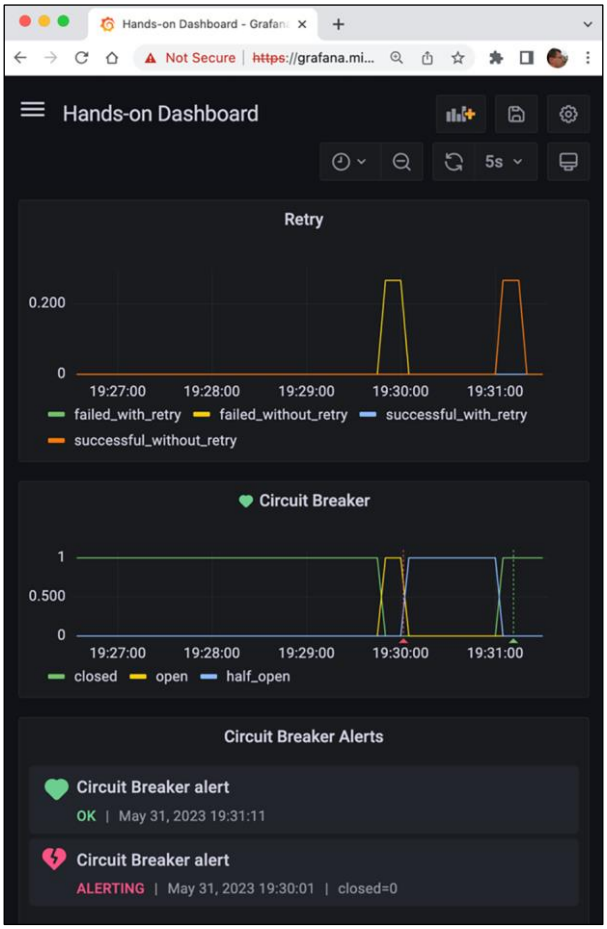

Query 3
Transform 0
Alert 0
Rule
Name
Circuit Breaker alert
Evaluate every
10s
For
0m
Conditions
WHEN
max ()
OF
query (A, 10s, now)
IS BELOW
0.5

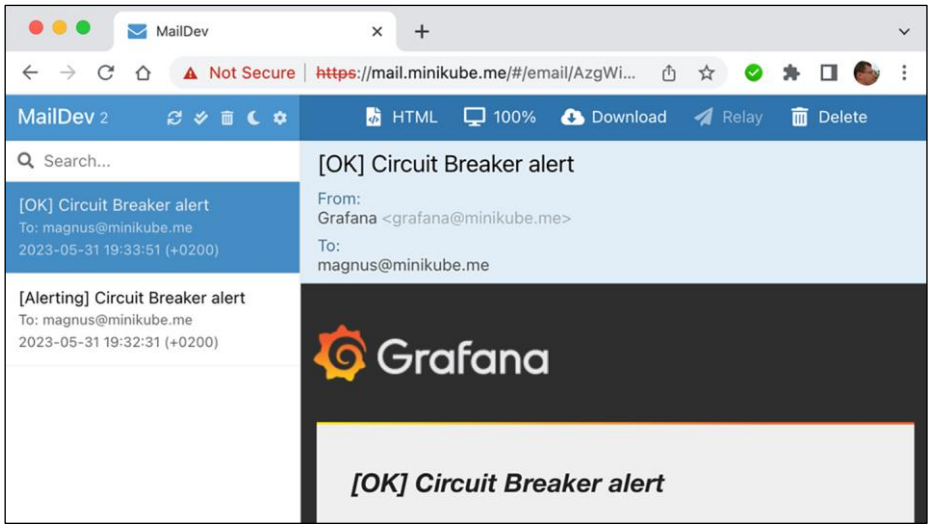

Alert list
Search options
Panel options
Title
Circuit Breaker Alerts
Description
Transparent background
Panel links
Repeat options
Options
Show
Recent state changes
Max items
10
Sort order
Alphabetical (asc)
Alerts from this dashboard

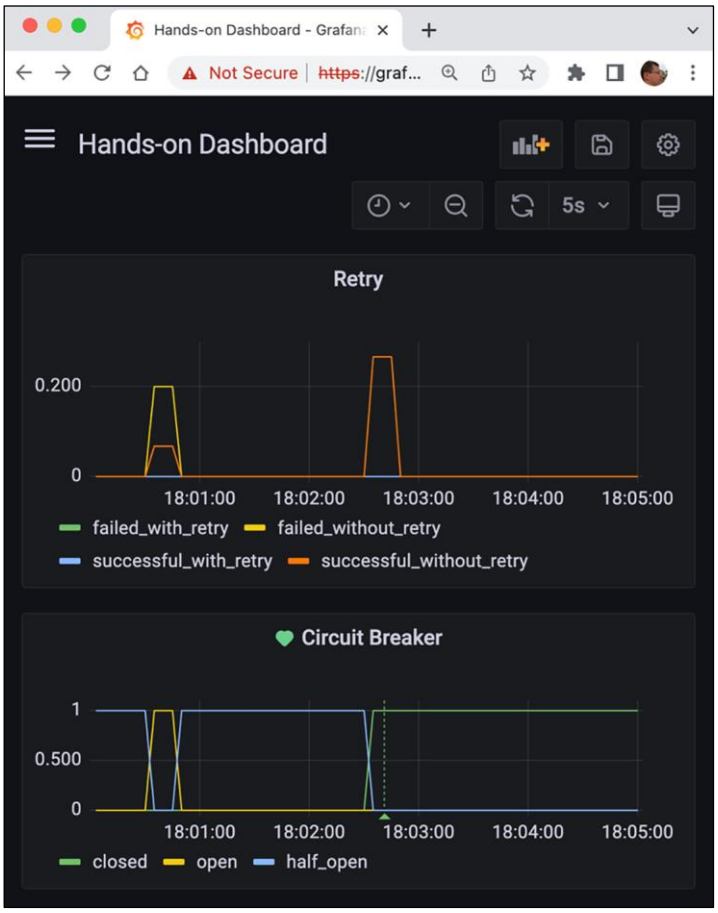
Hands-on Dashboard - Grafan
Not Secure
Hands-on Dashboard
Retry
100
50
0
18:55
failed_with_retry
failed_without_retry
successful_with_retry
successful_without_retry
Circuit Breaker
1
0.500
0
18:55
closed
open
half_open
Circuit Breaker Alerts
No alerts in current time range


Hands-on Dashboard - Grafan
Not Secure
https://grafana.mi...
Hands-on Dashboard
5s
Retry
0.200
0
19:26:00
19:27:00
19:28:00
19:29:00
19:30:00
failed_with_retry
failed_without_retry
successful_with_retry
successful_without_retry
Circuit Breaker
1
0.500
0
19:26:00
19:27:00
19:28:00
19:29:00
19:30:00
closed
open
half_open
Circuit Breaker Alerts
Circuit Breaker alert
ALERTING | May 31, 2023 19:30:01 | closed=0

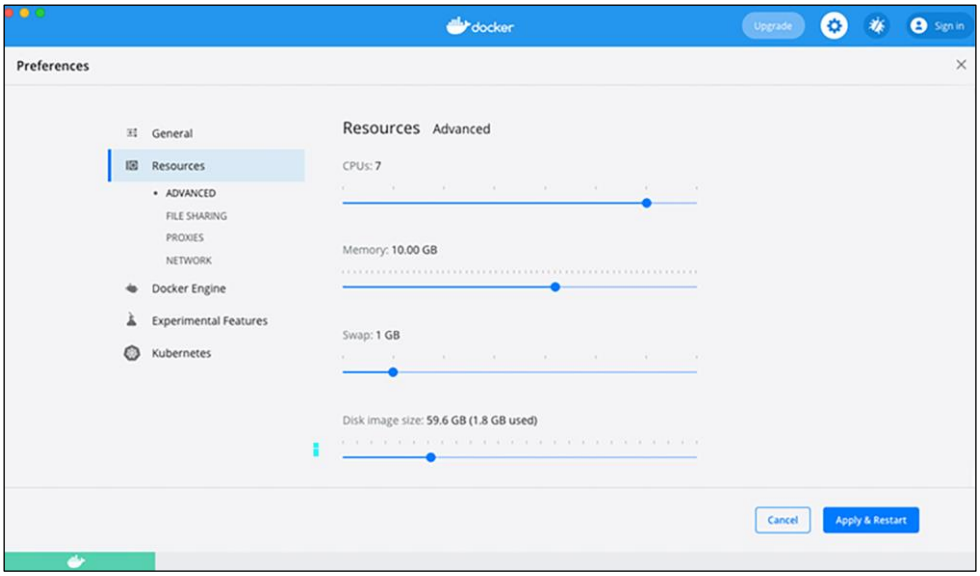

MailDev
Not Secure | https://mail.minikube.me/#/email/SbeqDh2K
MailDev 1
HTML
100%
Download
Relay
Delete
Search...
[Alerting] Circuit Breaker alert
To: magnus@minikube.me
2023-05-31 19:32:31 (+0200)
[Alerting] Circuit Breaker alert
From:
Grafana <grafana@minikube.me>
To:
magnus@minikube.me
Grafana
[Alerting] Circuit Breaker alert
Metric name
Value
closed
0.000

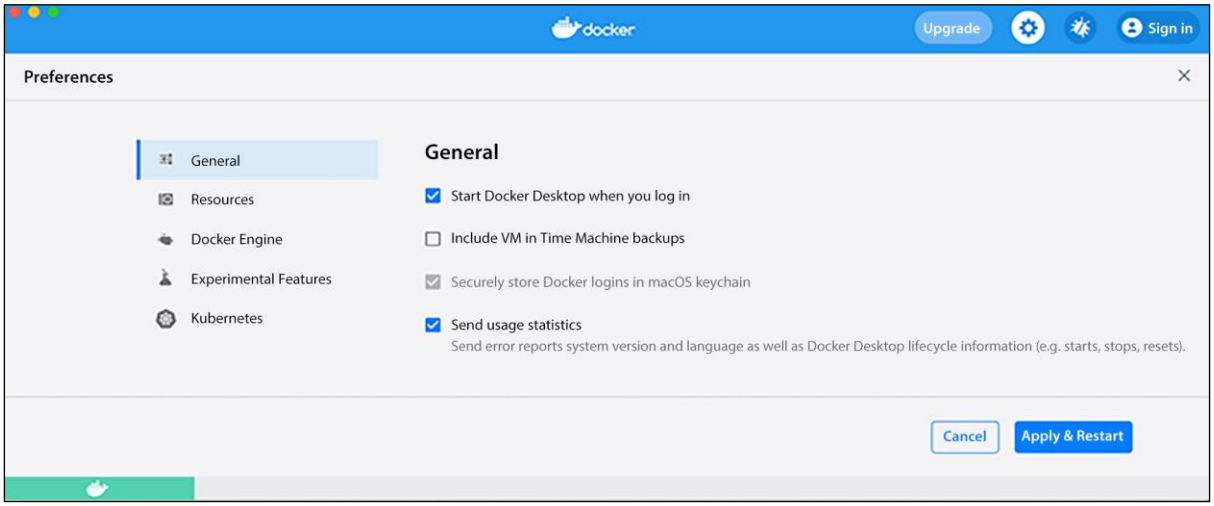

Hands-on Dashboard - Grafan
Not Secure | https://grafana.mi...
Hands-on Dashboard
5s
Retry
0.200
0
19:27:00
19:28:00
19:29:00
19:30:00
19:31:00
failed_with_retry
failed_without_retry
successful_with_retry
successful_without_retry
Circuit Breaker
1
0.500
0
19:27:00
19:28:00
19:29:00
19:30:00
19:31:00
closed
open
half_open
Circuit Breaker Alerts
Circuit Breaker alert
OK | May 31, 2023 19:31:11
Circuit Breaker alert
ALERTING | May 31, 2023 19:30:01 | closed=0


MailDev
Not Secure
https://mail.minikube.me/#/email/AzgWi...
MailDev 2
HTML
100%
Download
Relay
Delete
Search...
[OK] Circuit Breaker alert
To: magnus@minikube.me
2023-05-31 19:33:51 (+0200)
[Alerting] Circuit Breaker alert
To: magnus@minikube.me
2023-05-31 19:32:31 (+0200)
[OK] Circuit Breaker alert
From:
Grafana <grafana@minikube.me>
To:
magnus@minikube.me
Grafana
[OK] Circuit Breaker alert


Hands-on Dashboard - Grafana
Not Secure
https://graf...
Hands-on Dashboard
5s
Retry
0.200
0
18:01:00
18:02:00
18:03:00
18:04:00
18:05:00
failed_with_retry
failed_without_retry
successful_with_retry
successful_without_retry
Circuit Breaker
1
0.500
0
18:01:00
18:02:00
18:03:00
18:04:00
18:05:00
closed
open
half_open

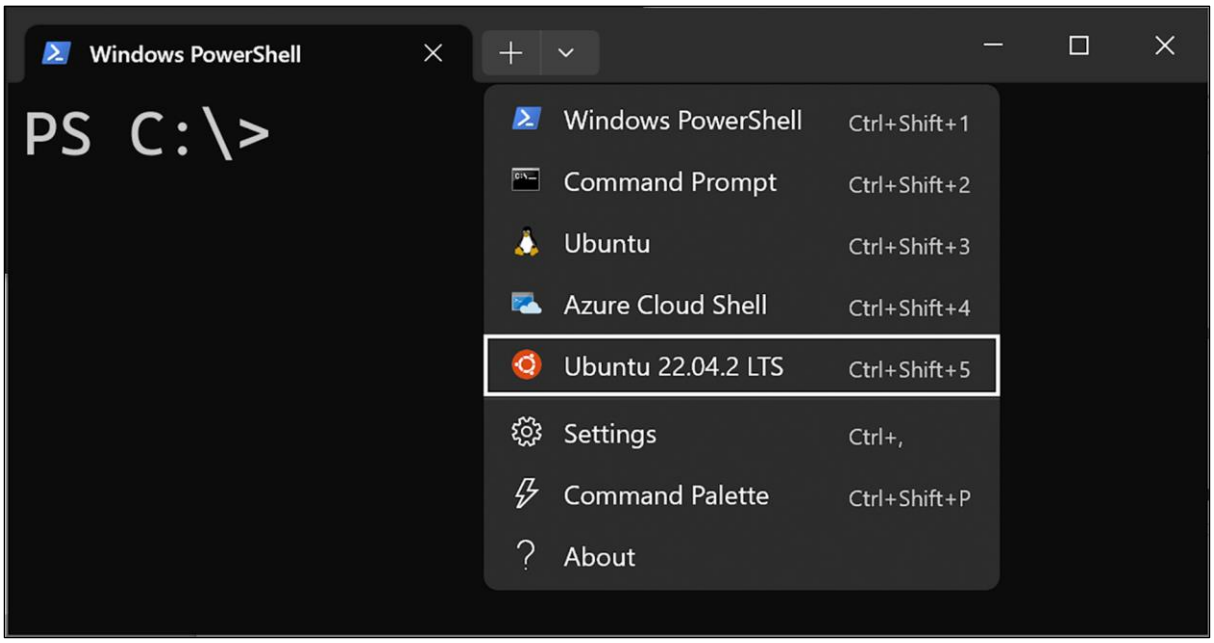
Chapter 21: Installation Instructions for macOS

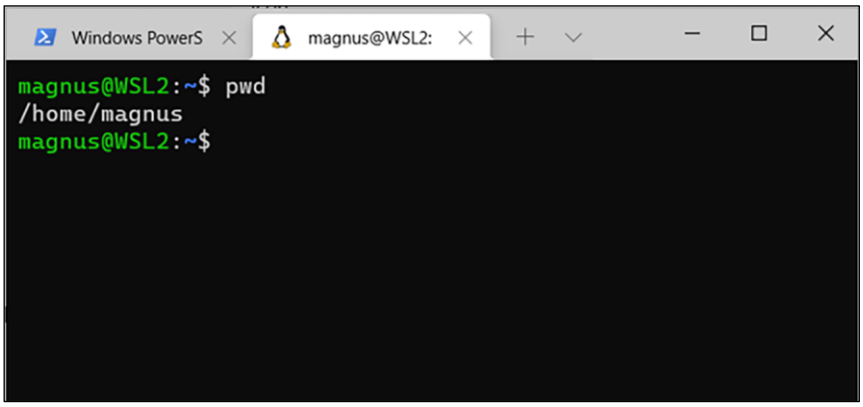




```
-zsh                                                    ⌥⌘3
git version 2.37.1 (Apple Git-137.1)
20.10.17
openjdk version "17.0.6" 2023-01-17
curl 7.86.0
jq-1.6
Spring CLI v3.0.3
SIEGE 4.1.6
v3.11.1+g293b50c
v1.26.1
minikube version: v1.29.0
1.17.0
$
```

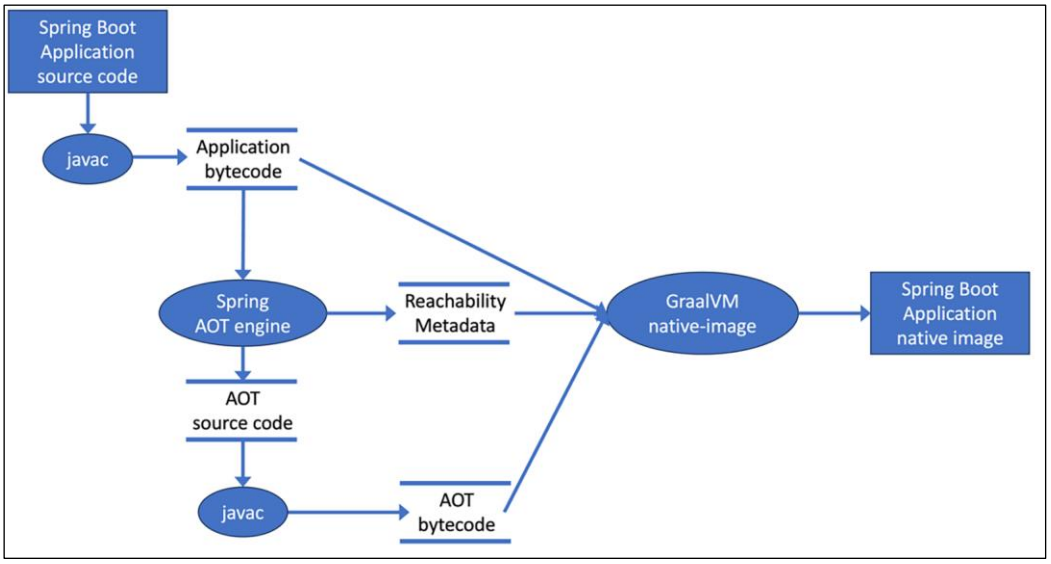
Chapter 22: Installation Instructions for Microsoft Windows with WSL 2 and Ubuntu





```
Windows PowerShell    magnus@wsl2: ~
git version 2.34.1
20.10.21
openjdk version "17.0.6" 2023-01-17
curl 7.81.0
jq-1.6
Spring CLI v3.0.3
SIEGE 4.0.7
v3.11.2+g912ebc1
v1.26.1
minikube version: v1.29.0
1.17.0
magnus@wsl2:~$
```

Chapter 23: Native Compiled Java Microservices




```
-bash
hands-on/native-product-composite-service latest ...
hands-on/native-recommendation-service    latest ...
hands-on/native-product-service           latest ...
hands-on/native-review-service            latest ...
$
```

```
bash
recommendation-1     | ... Started RecommendationServiceApplication in 5.809 seconds
product-composite-1  | ... Started ProductCompositeServiceApplication in 6.696 seconds
product-1            | ... Started ProductServiceApplication in 5.611 seconds
review-1             | ... Started ReviewServiceApplication in 6.901 seconds
$
```

```
bash
Start Tests: Sat Jun 17 09:36:19 CEST 2023
...
Wait for: curl -k https://health.minikube.me/actuator/health...
DONE, continues...
...
Test OK (HTTP Code: 200)
...
End, all tests OK: Sat Jun 17 09:36:40 CEST 2023
$
```

```
bash
CONTAINER ID   NAME                                    CPU %     MEM USAGE ...
c2fd8c3cf276   chapter23-review-1                      0.14%     307.7MiB  ...
ecb84348619f   chapter23-recommendation-1              0.13%     251.4MiB  ...
d276f9d9c4bf   chapter23-product-composite-1           0.16%     293.6MiB  ...
0aa87dcc0145   chapter23-product-1                     0.19%     245.2MiB  ...
8a37a5918b2f   chapter23-jaeger-collector.istio-system-1  0.13%  198.4MiB  ...
6ee062ef5073   chapter23-gateway-1                     0.12%     232.9MiB  ...
efc90cd09472   chapter23-auth-server-1                 0.20%     164.2MiB  ...
32cf0ffa6870   chapter23-mongodb-1                     1.17%     164.7MiB  ...
7ead773af325   chapter23-mysql-1                       0.85%     394.6MiB  ...
b46099e0b2ab   chapter23-rabbitmq-1                    7.96%     122.8MiB  ...
$
```

```
bash
product-composite-1  | ... Started ProductCompositeServiceApplication in 0.482 seconds
product-1            | ... Started ProductServiceApplication in 0.205 seconds
recommendation-1     | ... Started RecommendationServiceApplication in 0.198 seconds
review-1             | ... Started ReviewServiceApplication in 0.269 seconds
$
```

```
CONTAINER ID   NAME                                       CPU %     MEM USAGE ...
bc0db067daef   chapter23-review-1                         0.03%     98.16MiB  ...
5dd4faceb8ab   chapter23-product-1                        0.04%     81.8MiB   ...
f2add10d08de   chapter23-recommendation-1                 0.03%     87.82MiB  ...
b5fa5e14d4a6   chapter23-product-composite-1              0.02%     131.8MiB  ...
aedcef0006a5   chapter23-jaeger-collector.istio-system-1  0.58%     202.4MiB  ...
29051d43ede6   chapter23-gateway-1                        0.22%     238.7MiB  ...
960630b2ecf0   chapter23-auth-server-1                    0.39%     160.1MiB  ...
2ba3e34a60a8   chapter23-mongodb-1                        3.11%     164.4MiB  ...
ab50716bc791   chapter23-rabbitmq-1                       0.72%     119.7MiB  ...
d505bd4e5713   chapter23-mysql-1                          1.33%     397.3MiB  ...
$
```

```
2023-06-17T08:20:50.759Z ... Started ProductCompositeServiceApplication in 0.442 seconds
$
```

```
hands-on/auth-server:latest
hands-on/native-product-service:latest
hands-on/native-product-composite-service:latest
hands-on/native-recommendation-service:latest
hands-on/native-review-service:latest
$
```