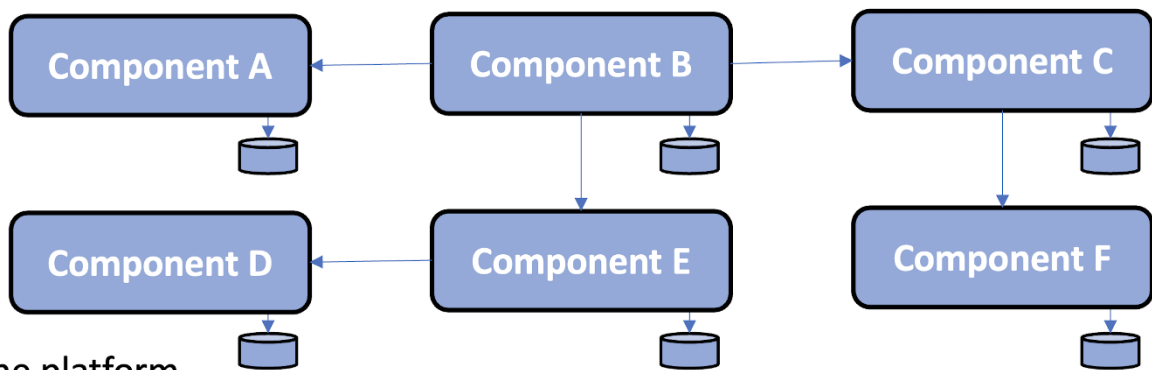
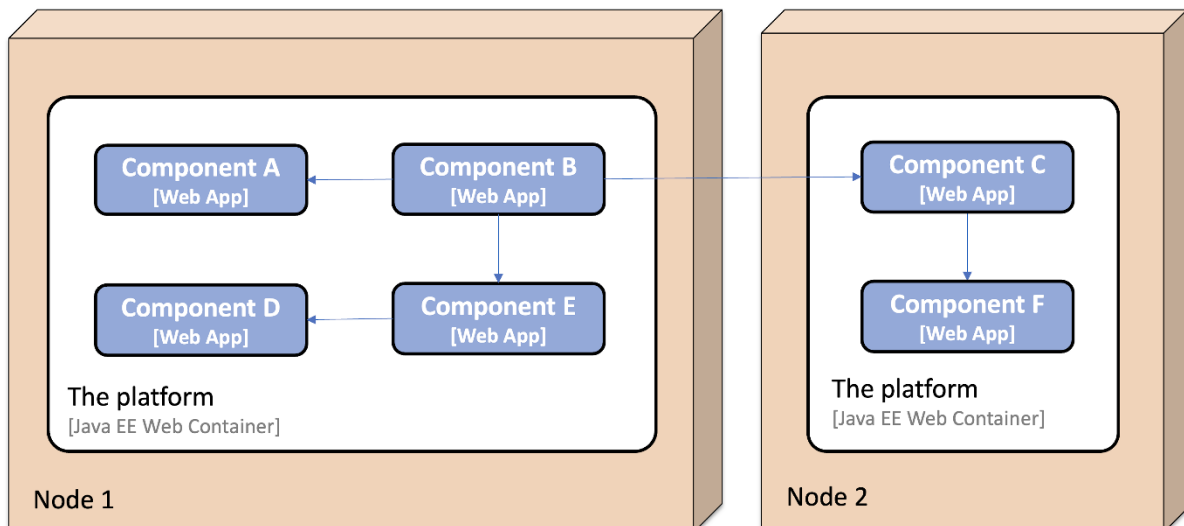
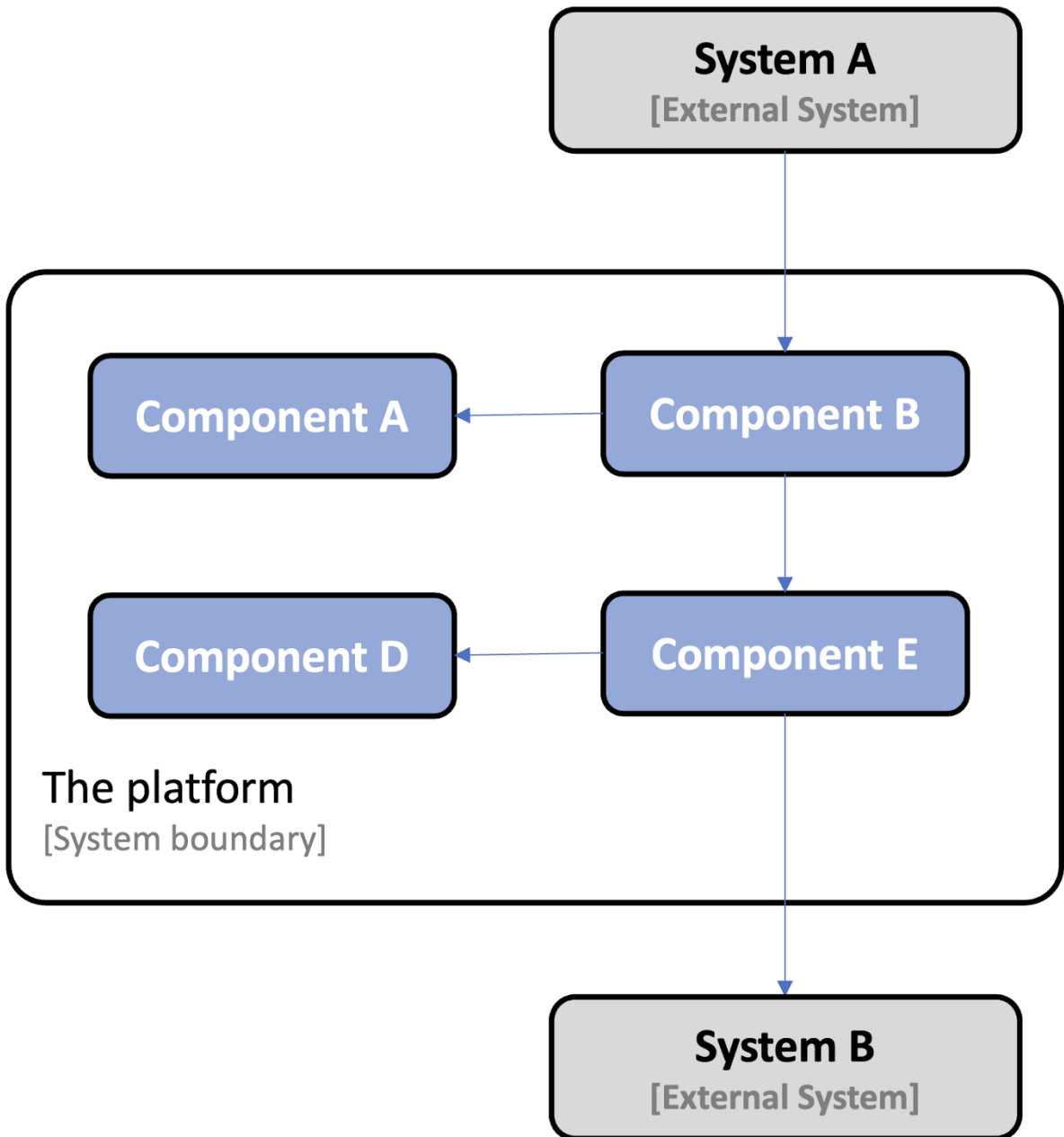


## Chapter 1: Introduction to Microservices

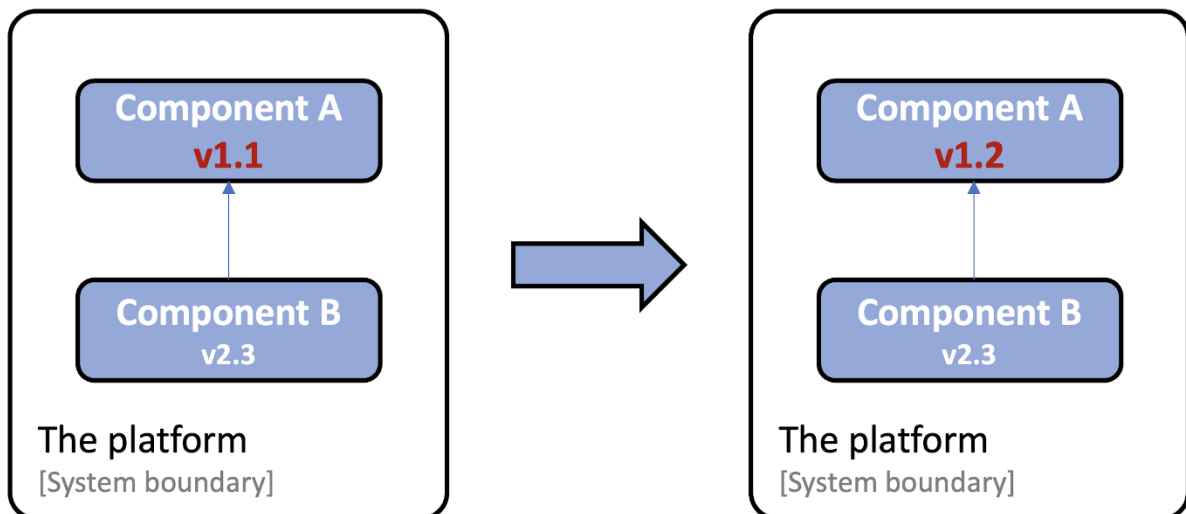
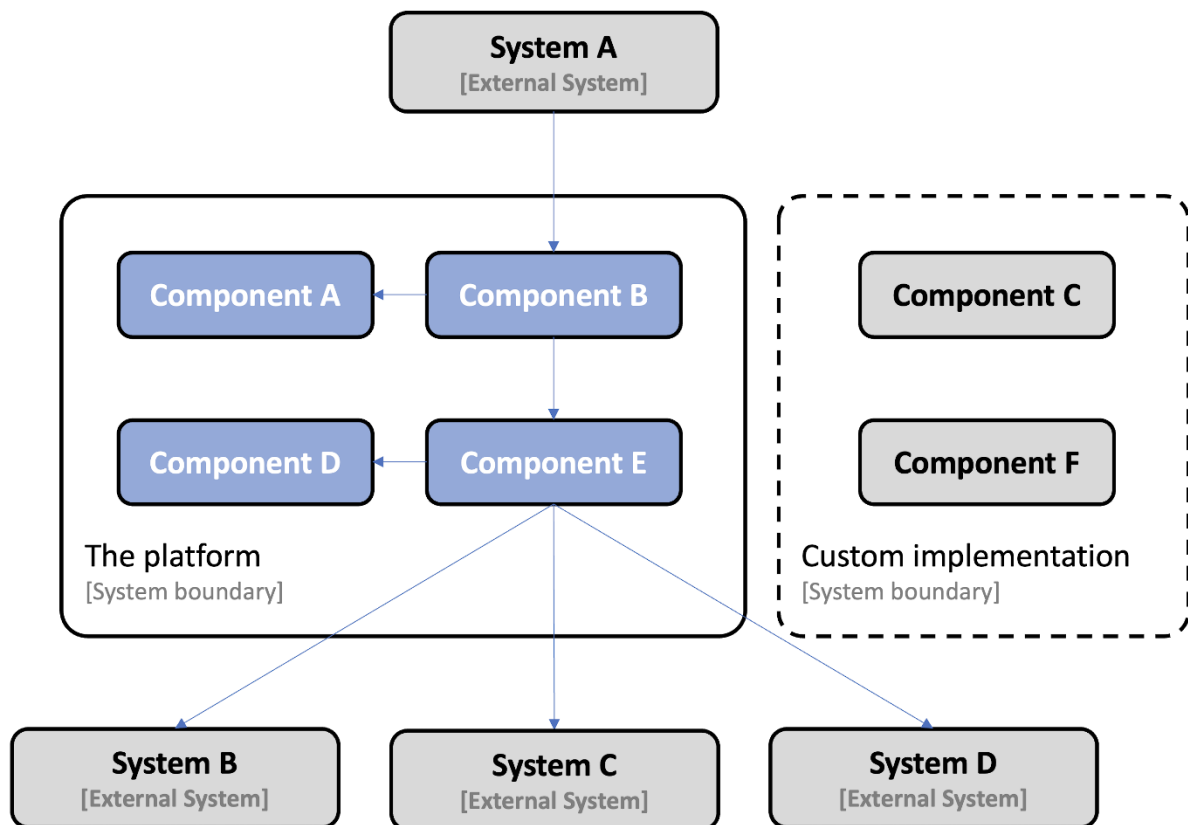


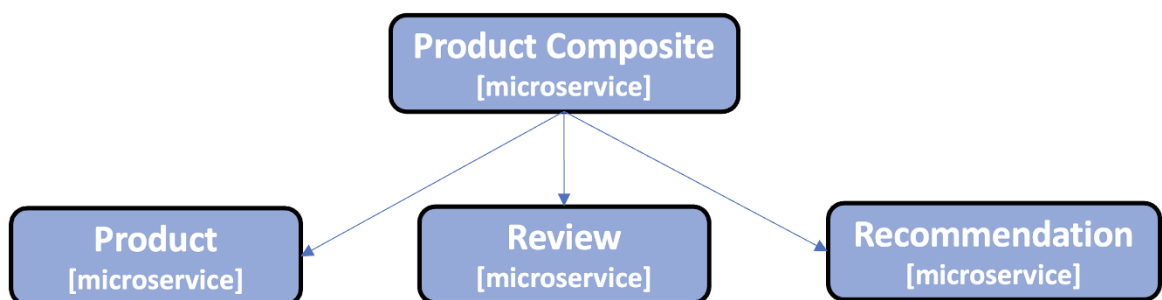
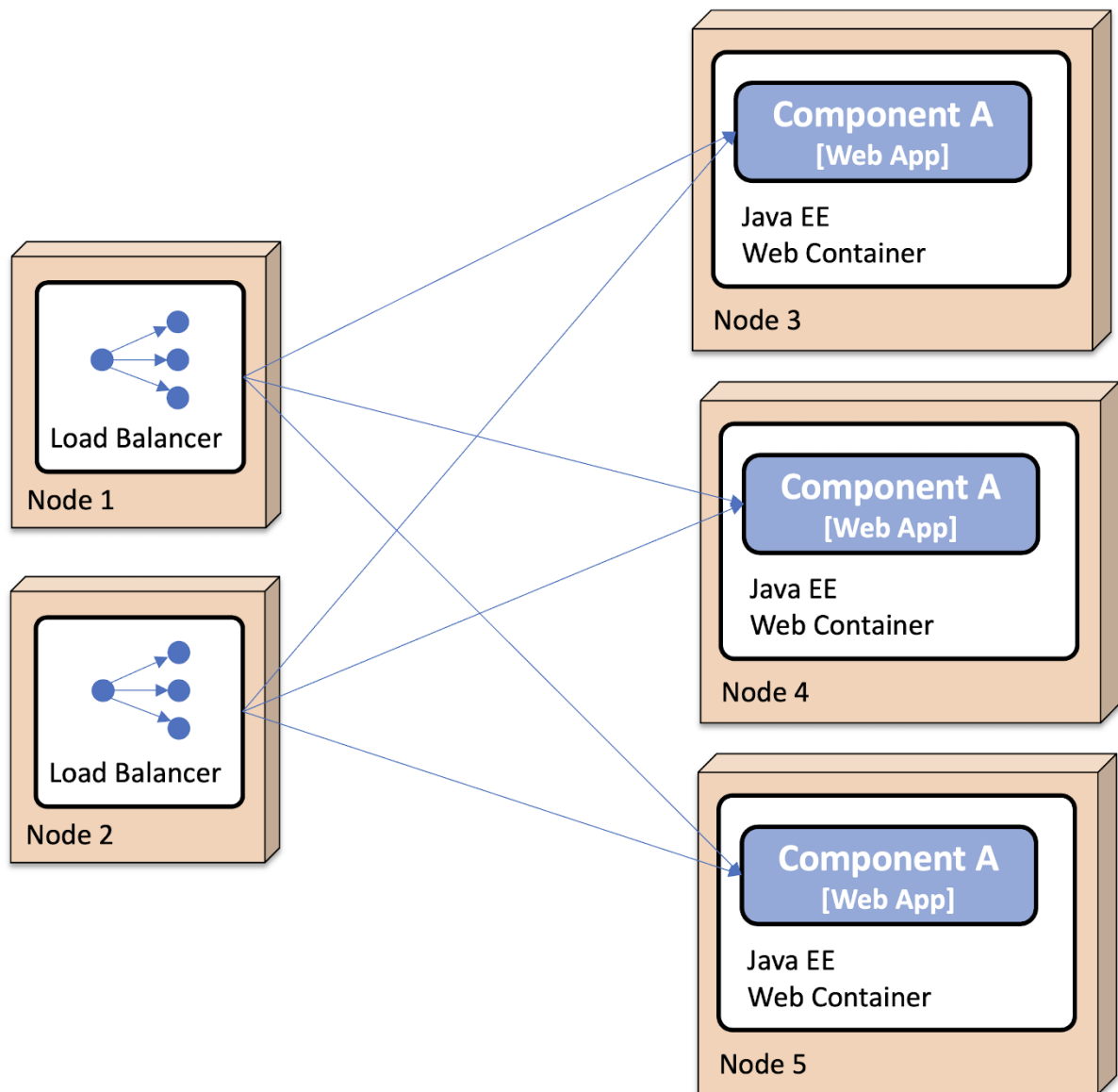
The platform  
[System boundary]



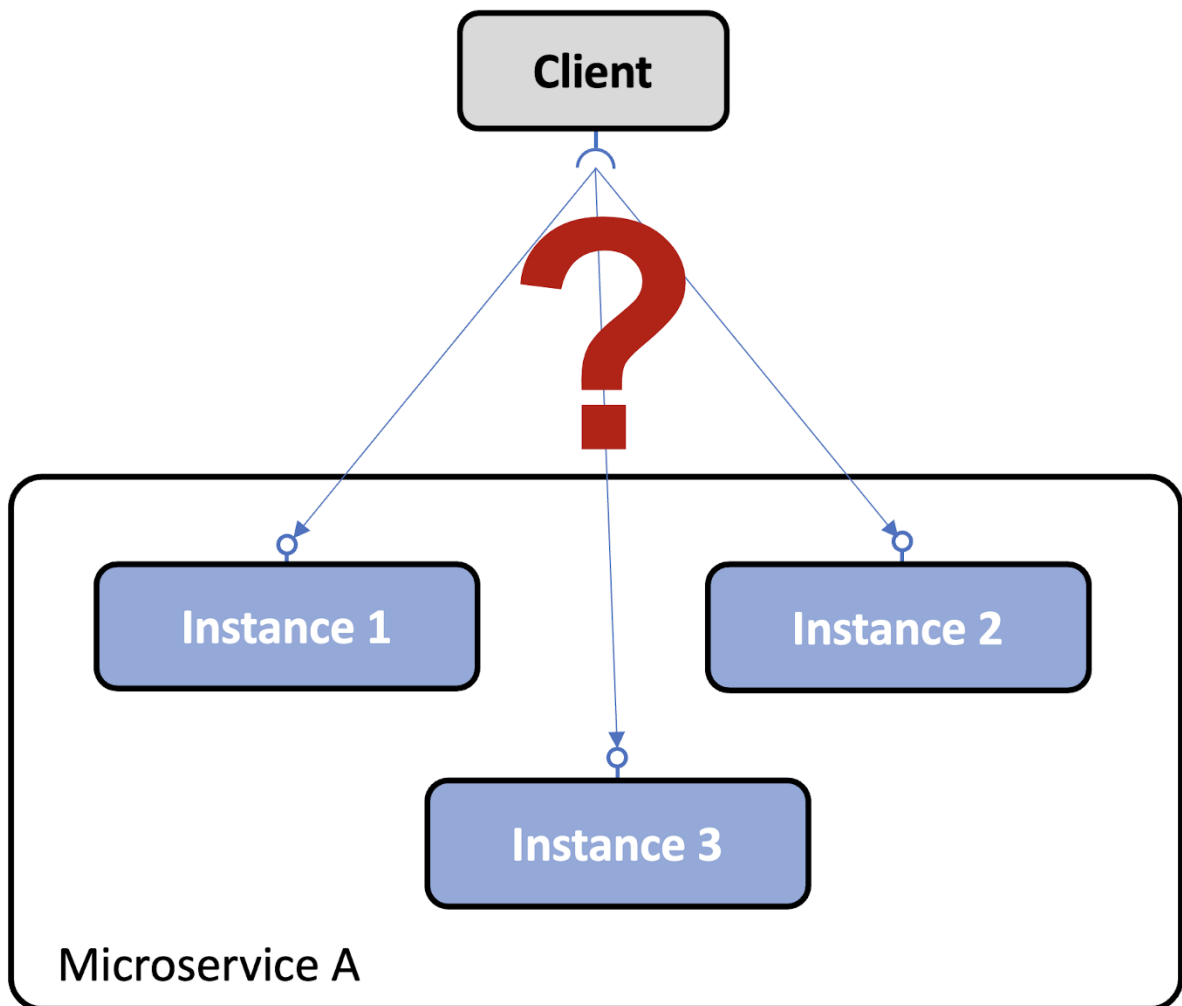
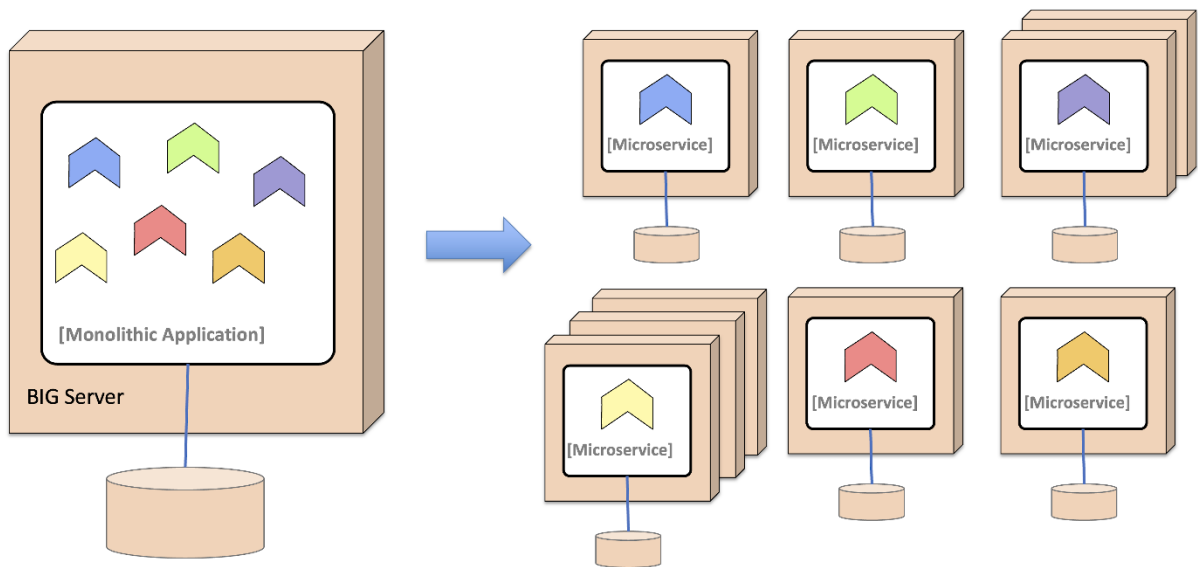


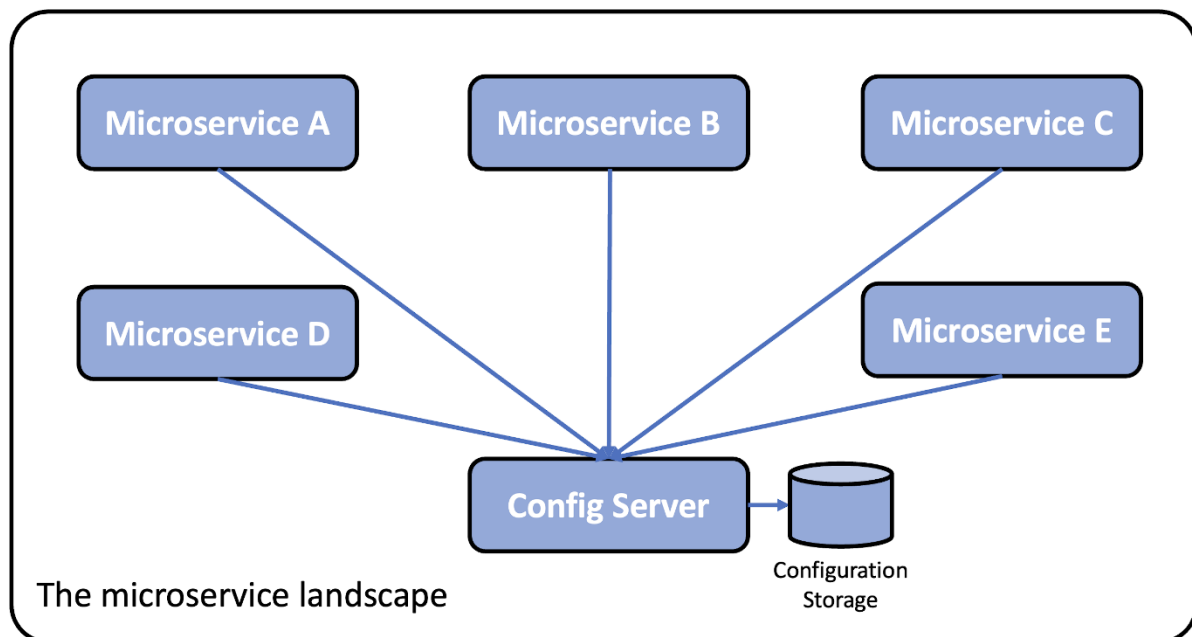
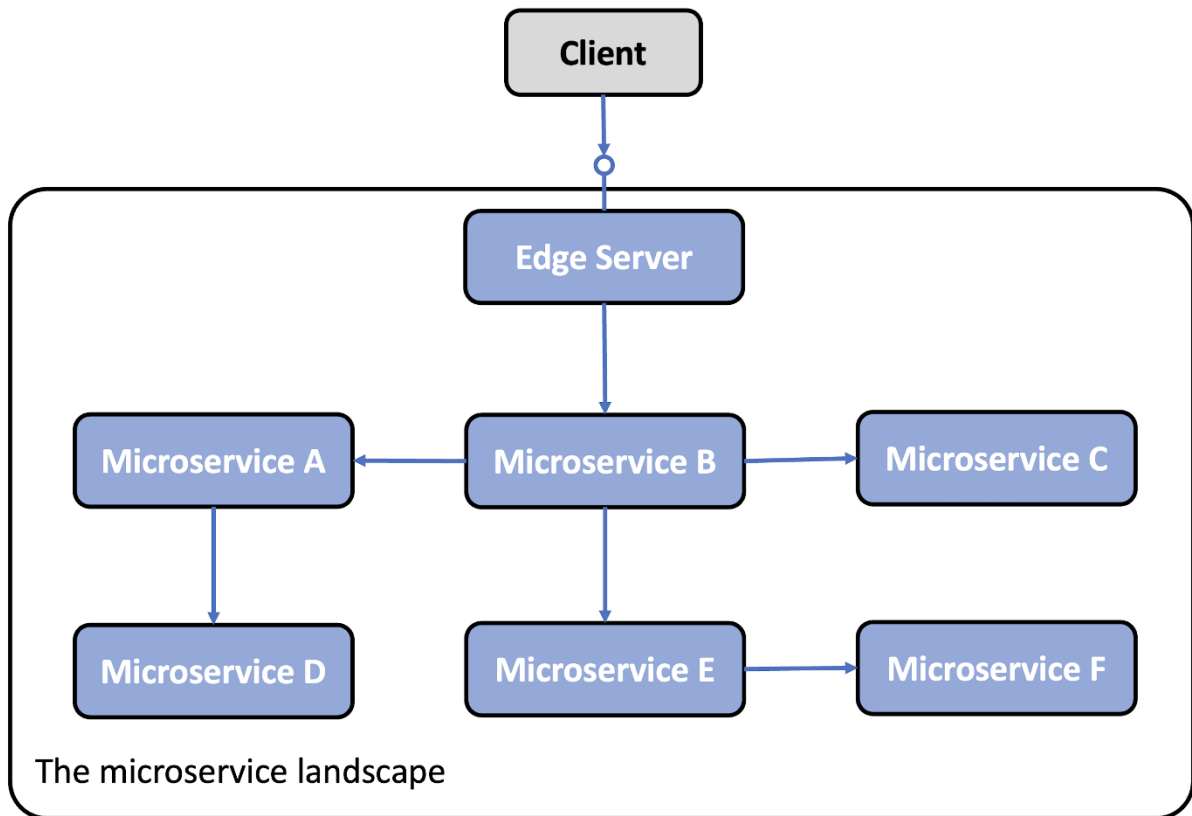


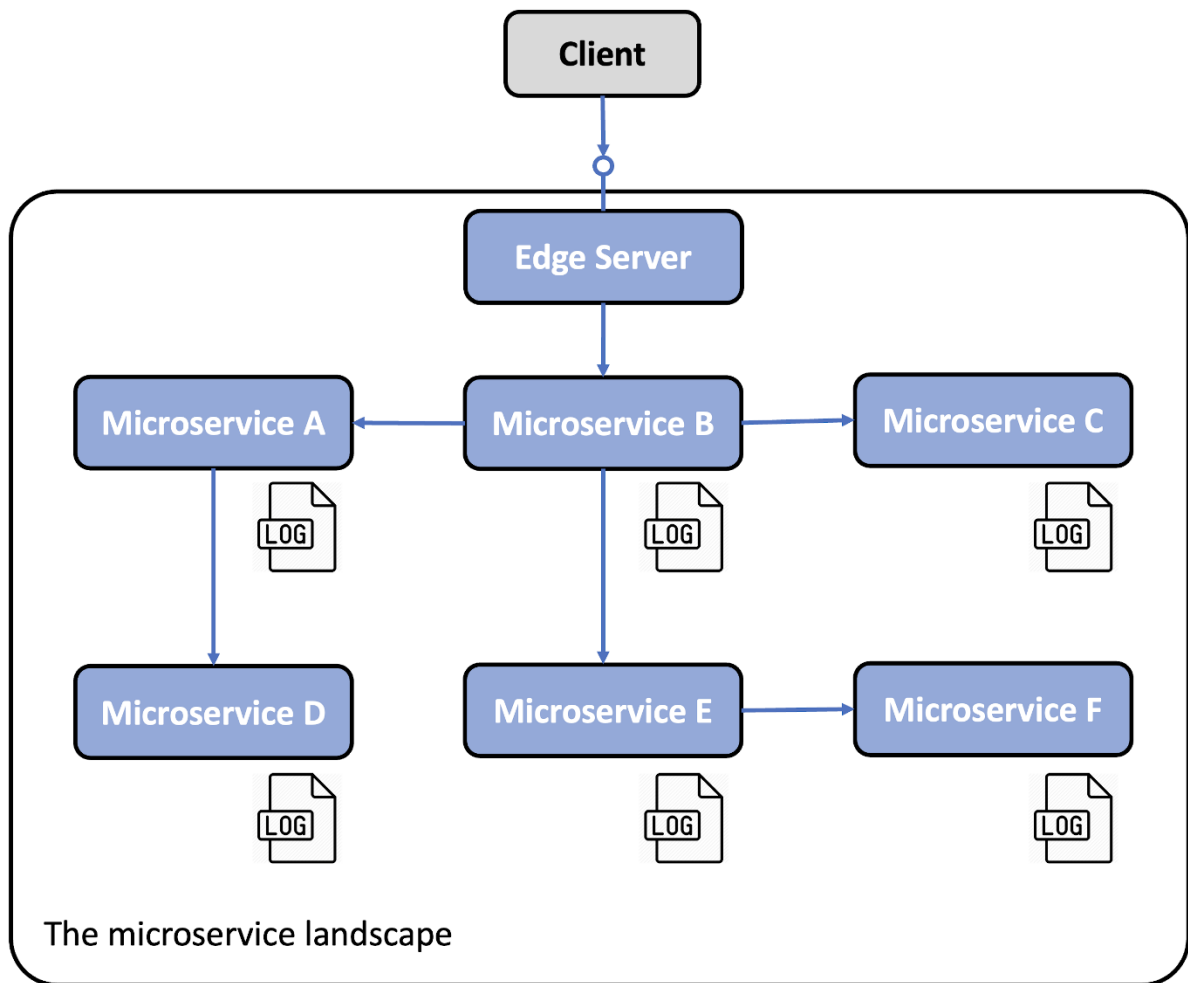


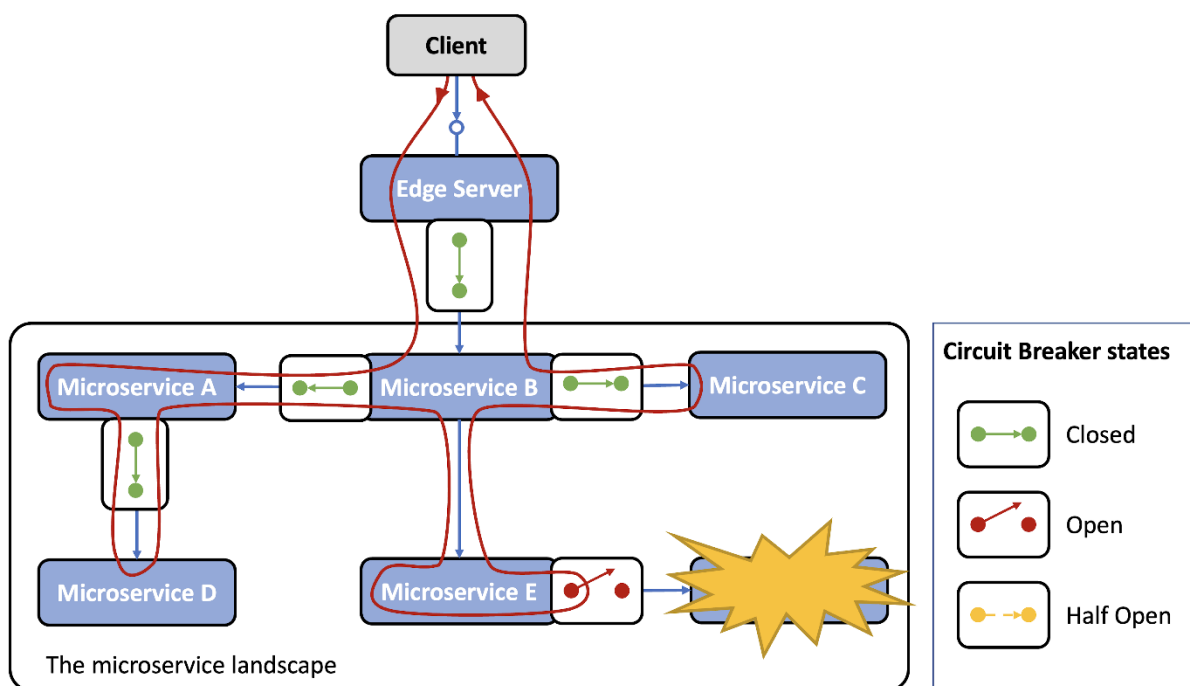
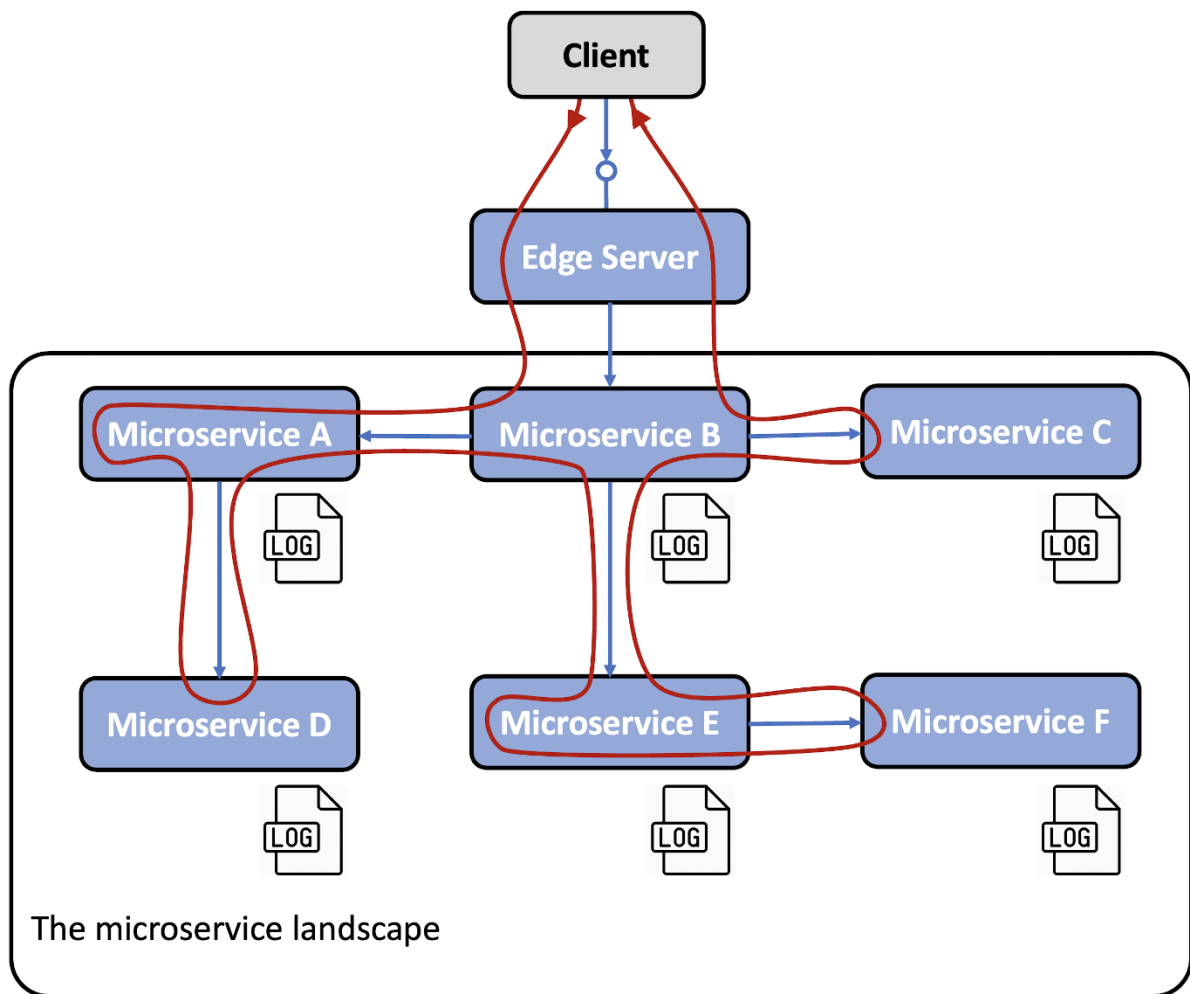


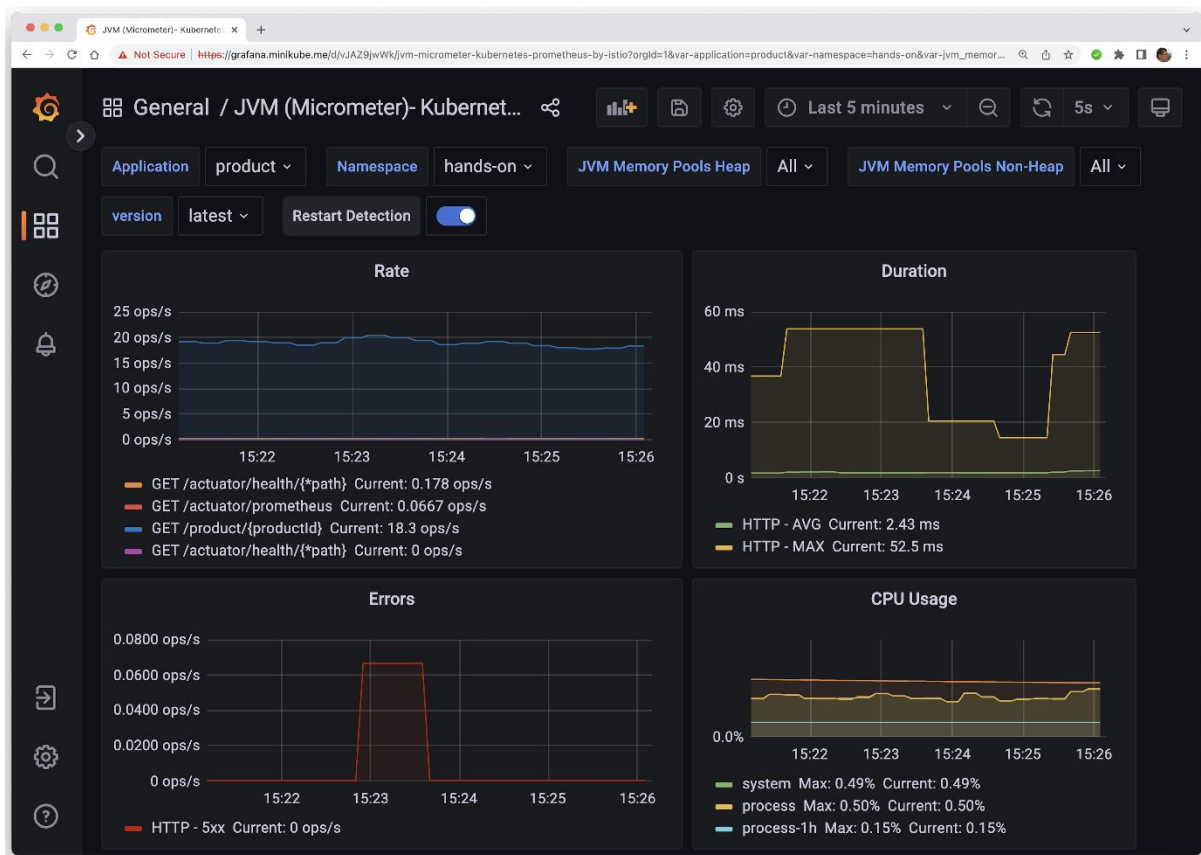
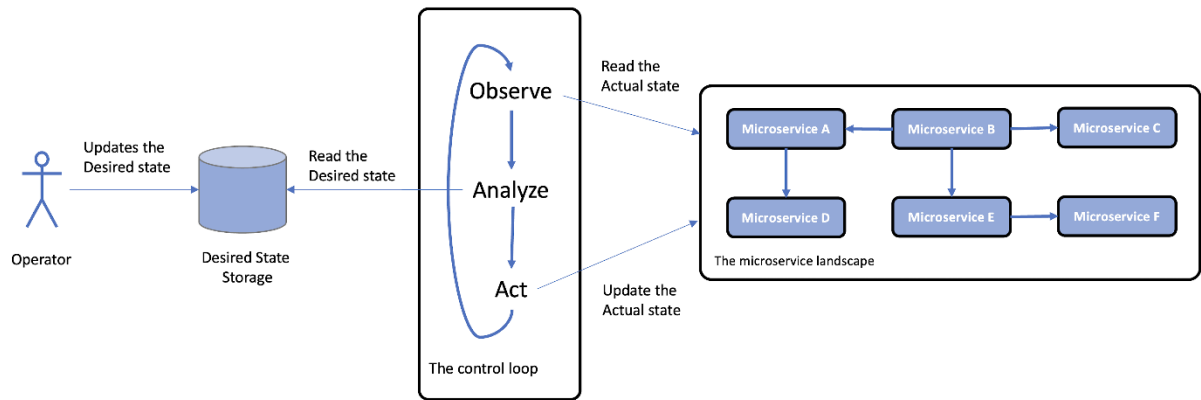
The microservice landscape  
[System boundary]



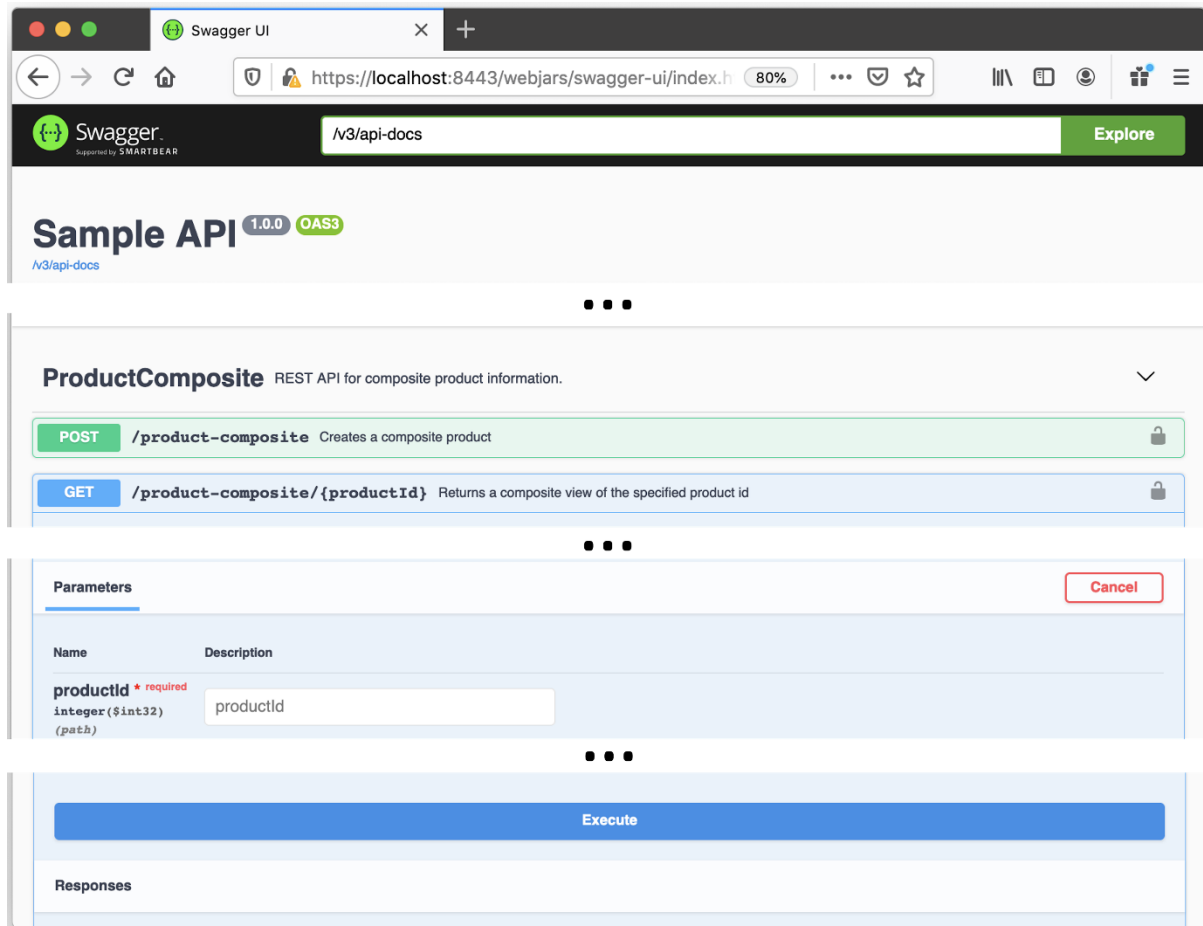






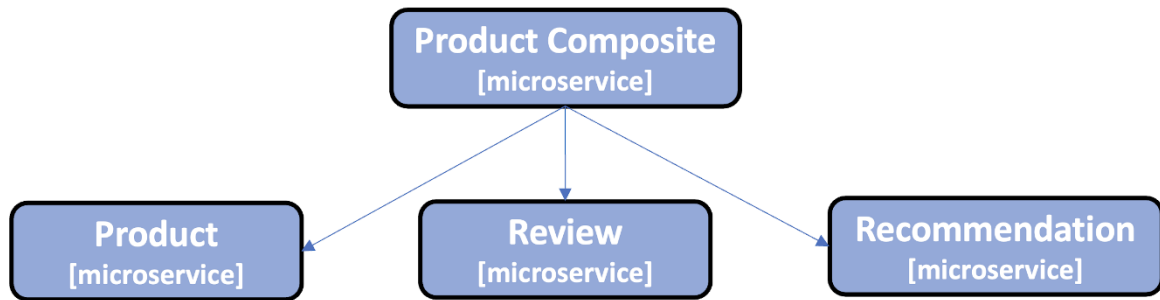


## Chapter 2: Introduction to Spring Boot





## Chapter 3: Creating a Set of Cooperating Microservices



The microservice landscape

[System boundary]

```
bash
$ find microservices/product-service -type f
microservices/product-service/HELP.md
microservices/product-service/gradle/wrapper/gradle-wrapper.jar
microservices/product-service/gradle/wrapper/gradle-wrapper.properties
microservices/product-service/gradlew
microservices/product-service/.gitignore
microservices/product-service/build.gradle
microservices/product-service/gradlew.bat
microservices/product-service/settings.gradle
microservices/product-service/src/test/java/se/magnus/microservices/core/product/ProductServiceApplicationTests.java
microservices/product-service/src/main/resources/application.properties
microservices/product-service/src/main/java/se/magnus/microservices/core/product/ProductServiceApplication.java
$
```

```
bash
$ ./gradlew build
Starting a Gradle Daemon (subsequent builds will be faster)
Download ...
> Task :microservices:product-composite-service:test
...
> Task :microservices:product-service:test
...
> Task :microservices:recommendation-service:test
...
> Task :microservices:review-service:test
...
BUILD SUCCESSFUL in 18s
$
```

```
bash
$ java -jar microservices/product-service/build/libs/*.jar &

  ____  _
 / ___|| | | |
| |___| | | |
|___ \ | | |
    __| | | |
   |___|_|_|_|

:: Spring Boot ::                (v3.0.4)

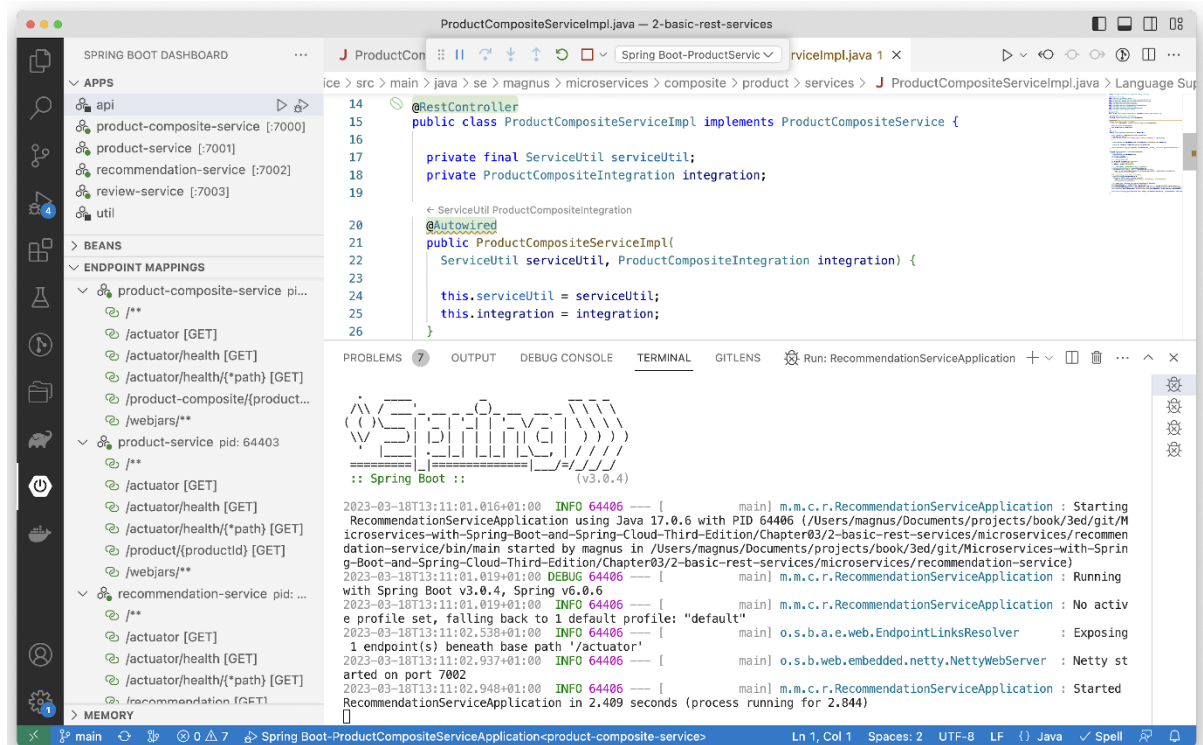
...Started ProductServiceApplication in 1.324 seconds (process running for 1.603)
$
```

```
bash
$ curl http://localhost:7001/product/123
{"productId":123,"name":"name-123","weight":123,"serviceAddress":"MagnusMBP/192.168.50.71:7001"}
$
```

```
bash
...Started ProductCompositeServiceApplication...
...Started RecommendationServiceApplication...
...Started ProductServiceApplication...
...Started ReviewServiceApplication...
$
```

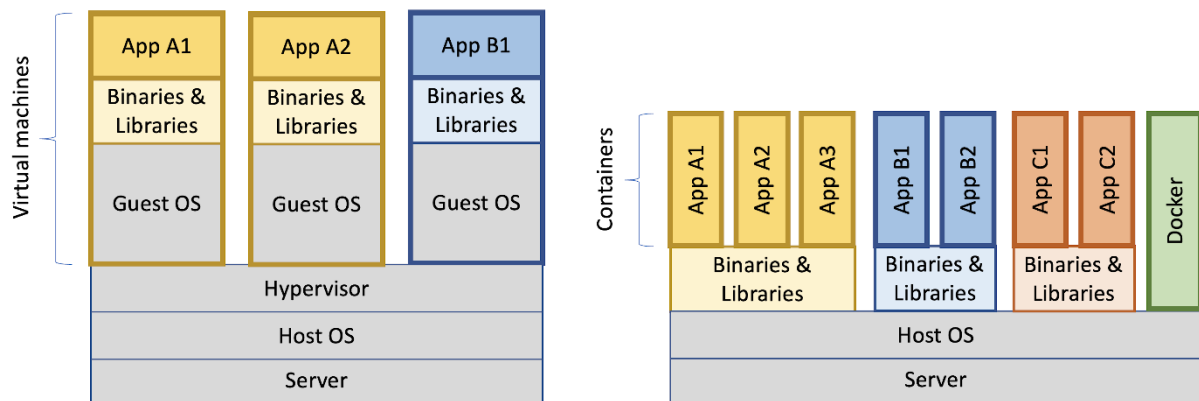
```
bash
$ curl http://localhost:7000/product-composite/1
{"productId":1,"name":"name-1","weight":123,"recommendations":[{"recommendationId":1,"author":"Author 1","rate":1}, {"recommendationId":2,"author":"Author 2","rate":2}, {"recommendationId":3,"author":"Author 3","rate":3}], "reviews":[{"reviewId":1,"author":"Author 1","subject":"Subject 1"}, {"reviewId":2,"author":"Author 2","subject":"Subject 2"}, {"reviewId":3,"author":"Author 3","subject":"Subject 3"}], "serviceAddresses":{"cmp":"MagnusMBP/192.168.50.71:7000", "pro":"MagnusMBP/192.168.50.71:7001", "rev":"MagnusMBP/192.168.50.71:7003", "rec":"MagnusMBP/192.168.50.71:7004"}}
$
```

```
bash
$ curl http://localhost:7000/product-composite/1 -s | jq .
{
  "productId": 123,
  ...
  "recommendations": [ ... ],
  "reviews": [ ... ],
  "serviceAddresses": { ... }
}
```



```
bash
$ ./test-em-all.bash
HOST=localhost
PORT=7000
Test OK (HTTP Code: 200)
Test OK (actual value: 1)
Test OK (actual value: 3)
Test OK (actual value: 3)
Test OK (HTTP Code: 404, {"timestamp":"2023-03-18T16:29:04.133394+01:00",
"path":"/product-composite/13","message":"No product found for productId:
13","status":404,"error":"Not Found"})
Test OK (actual value: No product found for productId: 13)
Test OK (HTTP Code: 200)
Test OK (actual value: 113)
Test OK (actual value: 0)
Test OK (actual value: 3)
Test OK (HTTP Code: 200)
Test OK (actual value: 213)
Test OK (actual value: 3)
Test OK (actual value: 0)
Test OK (HTTP Code: 422, {"timestamp":"2023-03-18T16:29:04.306307+01:00",
"path":"/product-composite/-1","message":"Invalid productId: -1","status"
:422,"error":"Unprocessable Entity"})
Test OK (actual value: "Invalid productId: -1")
Test OK (HTTP Code: 400, {"timestamp":"2023-03-18T15:29:04.344+00:00","pa
th":"/product-composite/invalidProductId","status":400,"error":"Bad Reque
st","message":"Type mismatch.","requestId":"fb22f949-6"})
Test OK (actual value: "Type mismatch.")
End, all tests OK: Sat Mar 18 16:29:04 CET 2023
$
```

## Chapter 4: Deploying Our Microservices Using Docker



```
root@f253a041436f: /
$ docker run -it --rm ubuntu
root@f253a041436f: /#
```

```
root@f253a041436f: /# cat /etc/os-release | grep 'VERSION='
VERSION="22.04.2 LTS (Jammy Jellyfish)"
root@f253a041436f: /#
```

```
@f1e9101e3fb8:/
$ docker run --rm -it centos
[root@f1e9101e3fb8 /]# cat /etc/redhat-release
CentOS Linux release 8.4.2105
[root@f1e9101e3fb8 /]#
```

```
@da92a433f3b6:/
$ echo 'Runtime.getRuntime().availableProcessors()' |
  docker run --rm -i eclipse-temurin:17 jshell -q
jshell> Runtime.getRuntime().availableProcessors()$1 ==> 8
$
```

```
@da92a433f3b6:/
$ docker run -it --rm eclipse-temurin:17 java -XX:+PrintFlagsFinal |
  grep "size_t MaxHeapSize"
size_t MaxHeapSize = 4188012544
$
```

```
bash
$ ls -l microservices/product-service/build/libs
total 46472
-rw-r--r-- 1 magnus staff 23791030 Mar 21 09:41 product-service-1.0.0-SNAPSHOT.jar
$
```

```
bash
$ docker images | grep product-service
product-service latest 1896ce04468b 6 seconds ago 289MB
$
```

```
bash
$ docker run --rm -p8080:8080 -e "SPRING_PROFILES_ACTIVE=docker" product-service

  ____ _
 / ___ \| | | | _ \| | | |
/ /___ \| |_| | |_) | | | |
\____ \|____|_|_|_|____|_|_|_|
:: Spring Boot :: (v3.0.4)

2023-03-21T08:49:42.479Z INFO 1 --- [main] s.m.m.c.p.ProductServiceApplication :
Starting ProductServiceApplication v1.0.0-SNAPSHOT using Java 17.0.5 with PID 1 (/application/BO
OT-INF/classes started by root in /application)
2023-03-21T08:49:42.480Z DEBUG 1 --- [main] s.m.m.c.p.ProductServiceApplication :
Running with Spring Boot v3.0.4, Spring v6.0.6
2023-03-21T08:49:42.481Z INFO 1 --- [main] s.m.m.c.p.ProductServiceApplication :
The following 1 profile is active: "docker"
2023-03-21T08:49:43.122Z INFO 1 --- [main] o.s.b.a.e.web.EndpointLinksResolver :
Exposing 1 endpoint(s) beneath base path '/actuator'
2023-03-21T08:49:43.274Z INFO 1 --- [main] o.s.b.web.embedded.netty.NettyWebServer :
Netty started on port 8080
2023-03-21T08:49:43.286Z INFO 1 --- [main] s.m.m.c.p.ProductServiceApplication :
Started ProductServiceApplication in 1.009 seconds (process running for 1.16)
$
```

```
bash
$ curl localhost:8080/product/3
{"productId":3,"name":"name-3","weight":123,"serviceAddress":"f308fea277a4/172.17.0.2:8080"}$
```

```

bash
$ docker ps
CONTAINER ID   IMAGE                COMMAND                  CREATED        STATUS        PORTS                NAMES
f308fea277a4   product-service      "java org.springfram...  About a minute ago   Up About a minute   0.0.0.0:8080->8080/tcp   interesting_mahavira
$

```

```

bash
$ docker ps
CONTAINER ID   IMAGE                COMMAND                  CREATED        STATUS        PORTS                NAMES
327dc680a0e5   product-service      "java org.springfram...  35 seconds ago   Up 35 seconds   0.0.0.0:8080->8080/tcp   my-prd-srv
$

```

```

bash
$ docker images | grep chapter04
chapter04-product-composite   latest   2cf0d012a652   10 seconds ago   289MB
chapter04-review              latest   e8b95c4afec7   10 seconds ago   289MB
chapter04-recommendation      latest   3b1a1be6b5e7   10 seconds ago   289MB
chapter04-product             latest   1896ce04468b   14 minutes ago   289MB
$

```

```

bash
$ docker-compose logs -f
...
chapter04-product-1           ... Started ProductServiceApplication in 1.935 seconds
...
chapter04-review-1           ... Started ReviewServiceApplication in 1.883 seconds
...
chapter04-product-composite-1 ... Started ProductCompositeServiceApplication in 1.993 seconds
...
chapter04-recommendation-1    ... Started RecommendationServiceApplication in 1.904 seconds

```

```
bash
$ curl localhost:8080/product-composite/123 -s | jq .
{
  "productId": 123,
  ...
  "recommendations": [ ... ],
  "reviews": [ ... ],
  "serviceAddresses": { ... }
}
```

```
bash
"serviceAddresses": {
  "cmp": "2ee20b47521b/172.18.0.5:8080",
  "pro": "e5e4907e1332/172.18.0.3:8080",
  "rev": "bde9f32737bf/172.18.0.2:8080",
  "rec": "93bd0c3e02d8/172.18.0.4:8080"
}
```



```

$ ./test-em-all.bash start stop
Start Tests: Tue Mar 21 10:20:03 CET 2023
HOST=localhost
PORT=8080
Restarting the test environment...
$ docker-compose down --remove-orphans
$ docker-compose up -d
[+] Running 5/5
  :: Network chapter04_default          C...          0.0s
  :: Container chapter04-recommendation-1 Started       0.4s
  :: Container chapter04-product-composite-1 Started     0.4s
  :: Container chapter04-review-1       Started     0.6s
  :: Container chapter04-product-1      Started     0.6s
Wait for: curl http://localhost:8080/product-composite/1... , retry #1 DONE, continues...
...Test OK...
We are done, stopping the test environment...
$ docker-compose down
[+] Running 5/5
  :: Container chapter04-review-1       Removed       2.4s
  :: Container chapter04-product-1      Removed       2.2s
  :: Container chapter04-product-composite-1 Removed     2.4s
  :: Container chapter04-recommendation-1 Removed     2.4s
  :: Network chapter04_default          R...          0.1s
End, all tests OK: Tue Mar 21 10:20:10 CET 2023
$

```

```

$ docker-compose ps
NAME                                COMMAND                                SERVICE    STATUS    PORTS
chapter04-product-1                "java org.springfram..."           product    running   8080/tcp
chapter04-product-composite-1      "java org.springfram..."           product-composite running   0.0.0.0:8080->8080/tcp
chapter04-recommendation-1         "java org.springfram..."           recommendation running   8080/tcp
chapter04-review-1                 "java org.springfram..."           review     running   8080/tcp
$

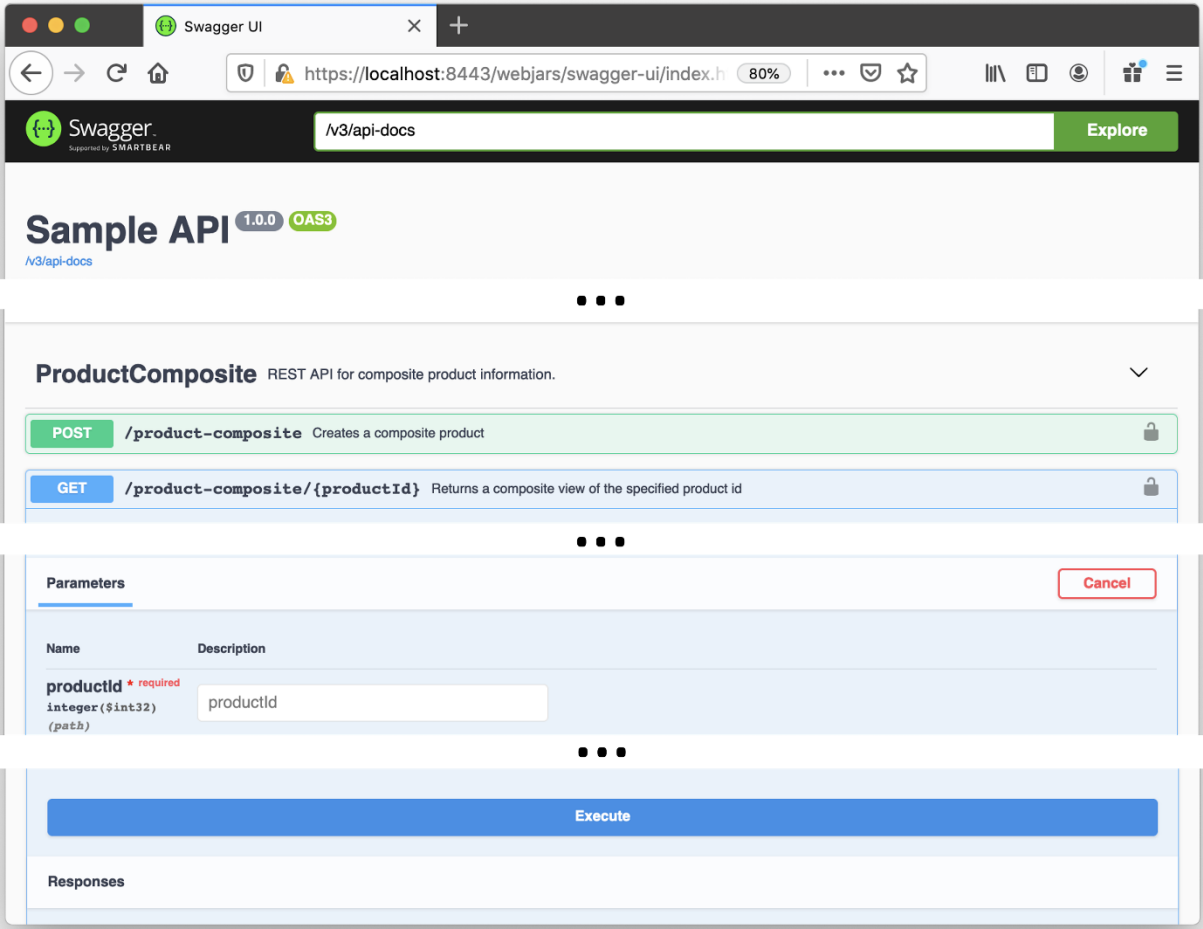
```

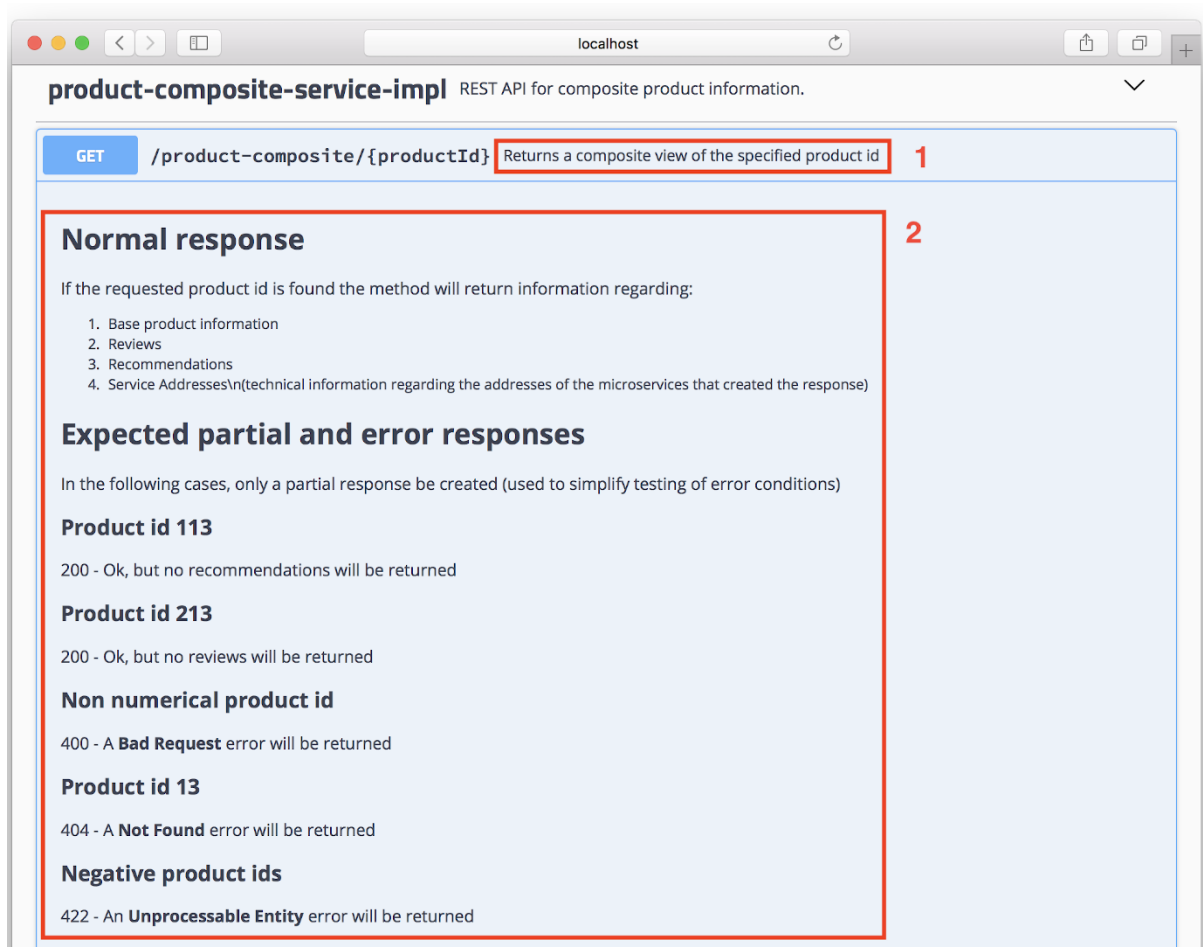
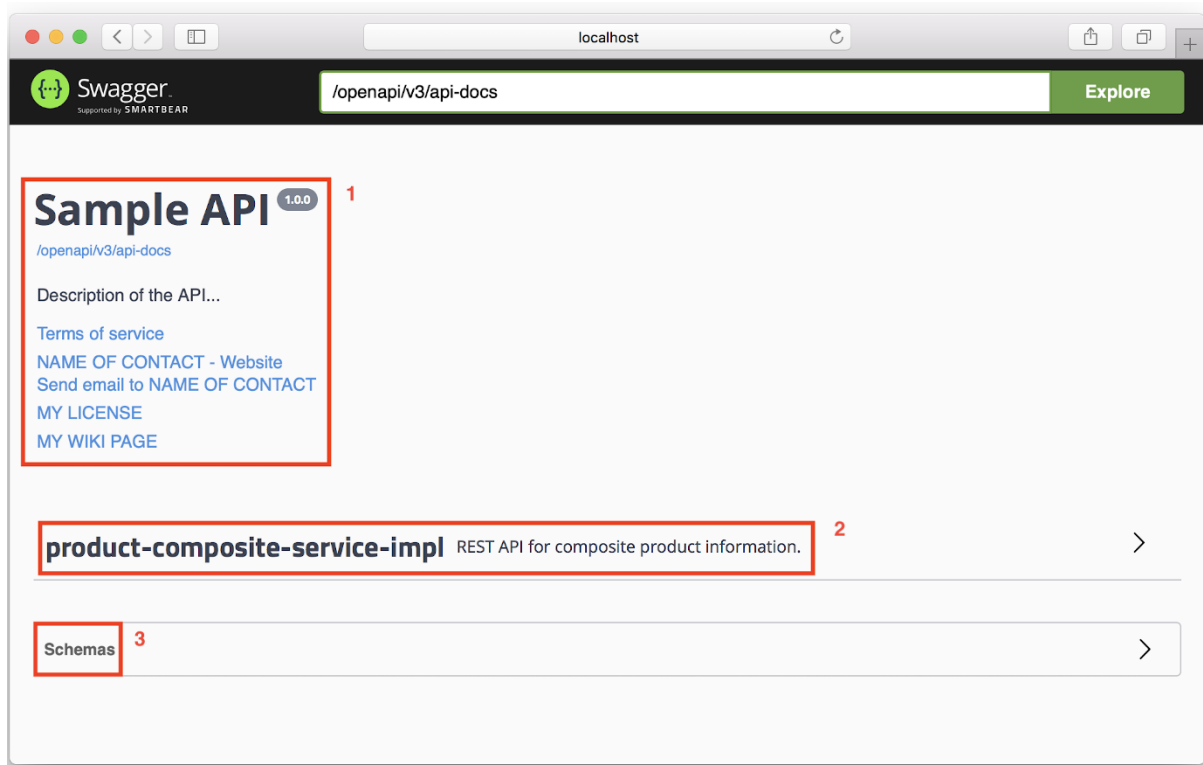
```

...
chapter06-product-1 | 2023-03-21T09:41:27.560Z INFO 1 --- [-mongodb:27017] org.mongodb.driver.cluster
: Exception in monitor thread while connecting to server mongodb:27017
chapter06-product-1 | com.mongodb.MongoSocketException: mongodb: Name or service not known
...

```

# Chapter 5: Adding an API Description Using OpenAPI





localhost

Responses

Code	Description	Links
200	OK	No links

Media type

application/json

Controls Accept header.

Example Value | Schema

```
{
  "productId": 0,
  "name": "string",
  "weight": 0,
  "recommendations": [
    {
      "recommendationId": 0,
      "author": "string",
      "rate": 0
    }
  ],
  "reviews": [
    {
      "reviewId": 0,
      "author": "string",
      "subject": "string"
    }
  ],
  "serviceAddresses": {
    "cmp": "string",
    "pro": "string",
    "rev": "string",
    "rec": "string"
  }
}
```

localhost

400

Bad Request, invalid format of the request. See response message for more information

No links

Media type

\*/\*

Example Value

Schema

```
{
  "timestamp": "2023-03-21T10:49:47.238Z",
  "path": "string",
  "message": "string",
  "status": 0,
  "error": "string"
}
```

404

Not found, the specified id does not exist

No links

Media type

\*/\*

Example Value

Schema

```
{
  "timestamp": "2023-03-21T10:49:47.239Z",
  "path": "string",
  "message": "string",
  "status": 0,
  "error": "string"
}
```

422

Unprocessable entity, input parameters caused the processing to fail. See response message for more information

No links

Media type

\*/\*

Example Value

Schema

```
{
  "timestamp": "2023-03-21T10:49:47.239Z",
  "path": "string",
  "message": "string",
  "status": 0,
  "error": "string"
}
```

localhost

Parameters

Cancel

Name	Description
<b>productId</b> * required integer(\$int32) (path)	<input type="text" value="123"/>

Execute

Clear

Responses

Curl

```
curl -X 'GET' \  
  'http://localhost:8080/product-composite/123' \  
  -H 'accept: application/json'
```

Request URL

```
http://localhost:8080/product-composite/123
```

Server response

Code	Details
200	<div><div>Response body</div><div><pre>{   "productId": 123,   "name": "name-123",   "weight": 123,   "recommendations": [     {       "recommendationId": 1,       "author": "Author 1",       "rate": 1     },   ], }</pre></div></div>

localhost

Parameters

Cancel

Name	Description
<b>productId</b> * required integer(\$int32) (path)	<input type="text" value="-1"/>

Execute

Clear

Responses

Curl

```
curl -X 'GET' \
'http://localhost:8080/product-composite/-1' \
-H 'accept: application/json'
```

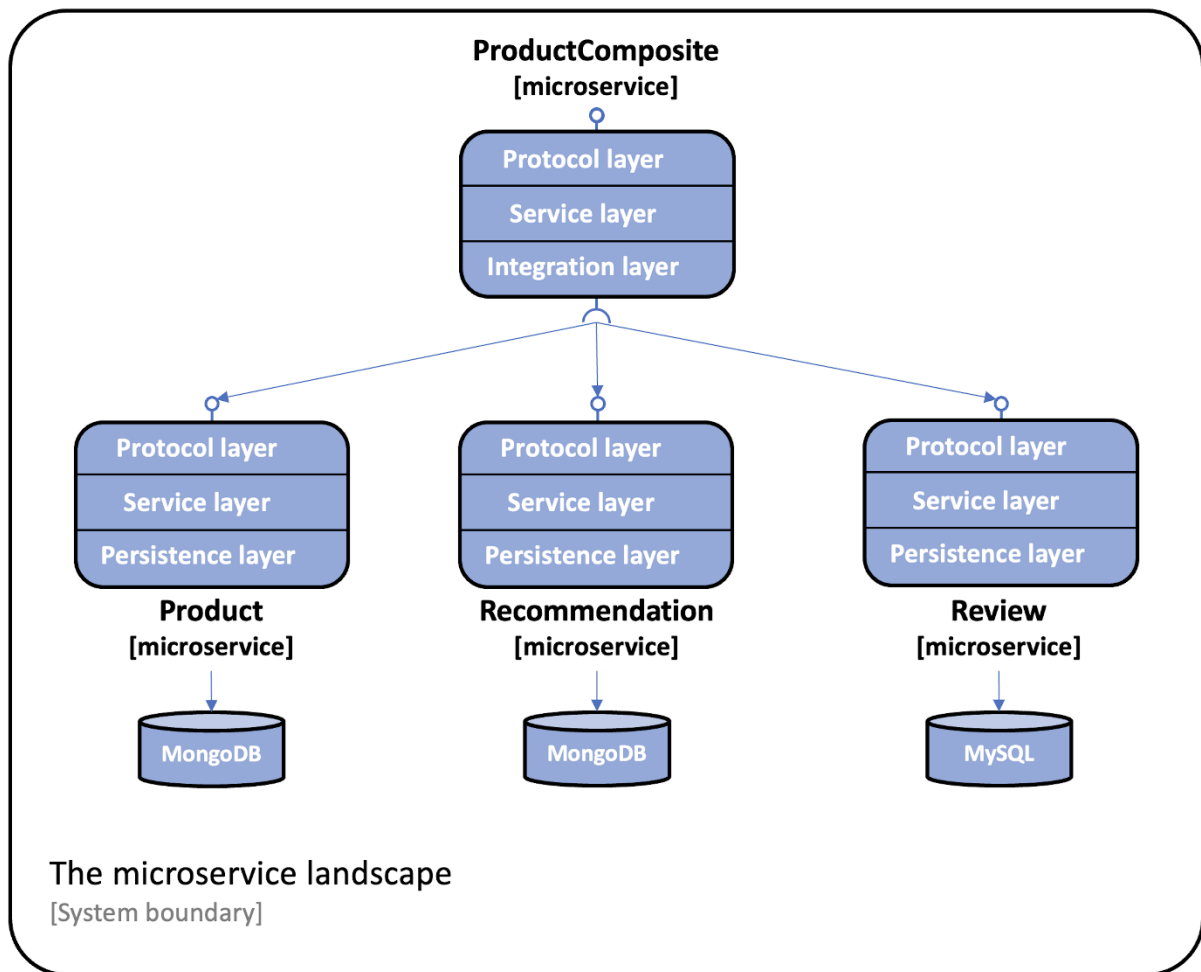
Request URL

```
http://localhost:8080/product-composite/-1
```

Server response

Code	Details
422	<div>Error: Unprocessable Entity</div> <div>Response body</div> <div><pre>{   "timestamp": "2023-03-21T11:02:57.195240423Z",   "path": "/product-composite/-1",   "message": "Invalid productId: -1",   "status": 422,   "error": "Unprocessable Entity" }</pre></div> <div><div>Download</div></div>

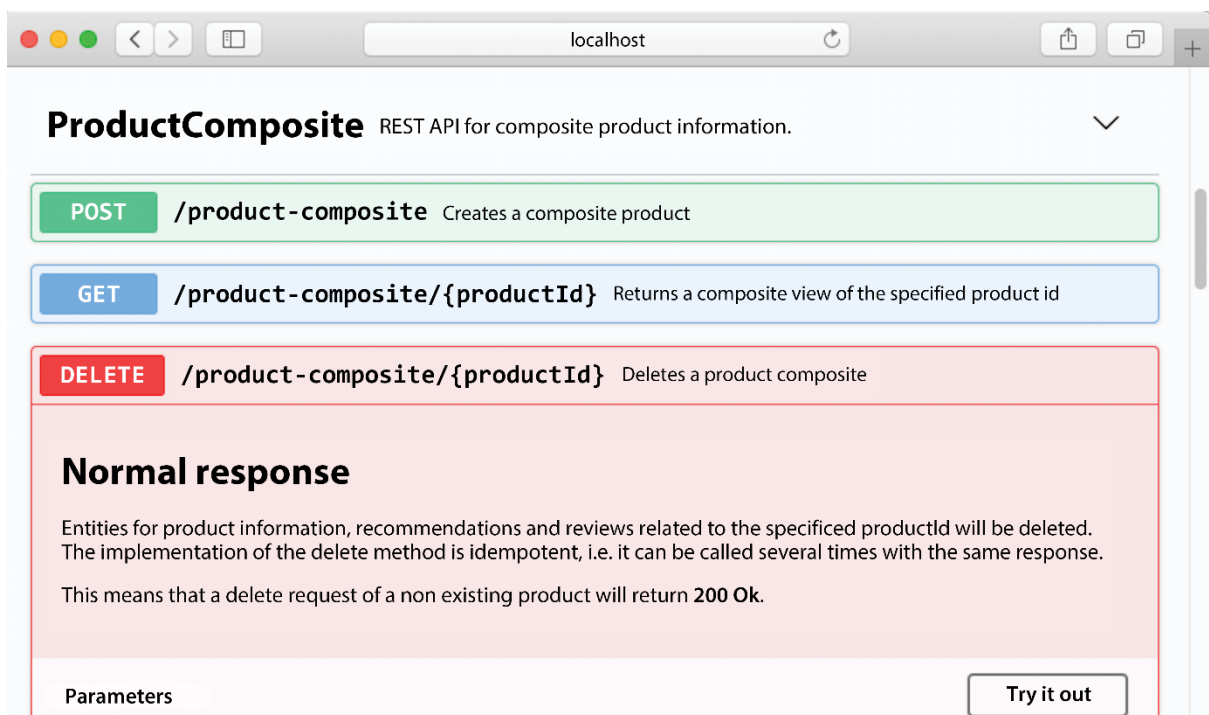
## Chapter 6: Adding Persistence

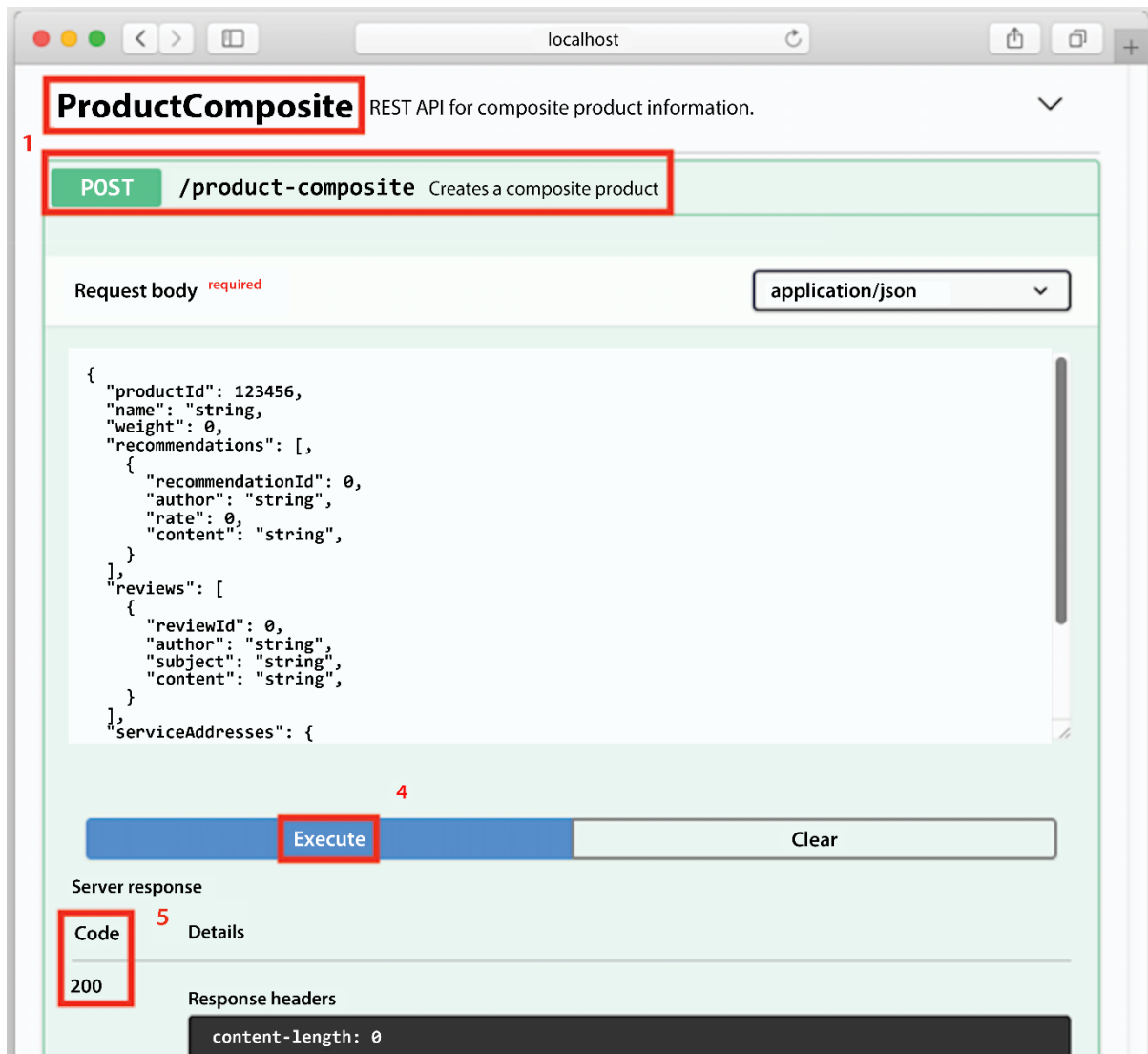


```
2. bash
{ "_id" : ..., "productId" : 1, "name" : "product 1", "weight" : 1 }
{ "_id" : ..., "productId" : 113, "name" : "product 113", "weight" : 113 }
{ "_id" : ..., "productId" : 213, "name" : "product 213", "weight" : 213 }
$
```

```
2. bash
+---+---+---+---+---+---+---+---+---+
| id | author | content | product_id | review_id |
+---+---+---+---+---+---+---+---+
| 1 | author 1 | content 1 | 1 | 1 |
| 2 | author 2 | content 2 | 1 | 2 |
+---+---+---+---+---+---+---+---+
$
```







```
2. bash
product-composite_1 | ... createCompositeProduct: creates a new composite entity for productId: 123456
product_1 | ... createProduct: entity created for productId: 123456
recommendation_1 | ... createRecommendation: created a recommendation entity: 123456/0
review_1 | ... createReview: created a review entity: 123456/0
```

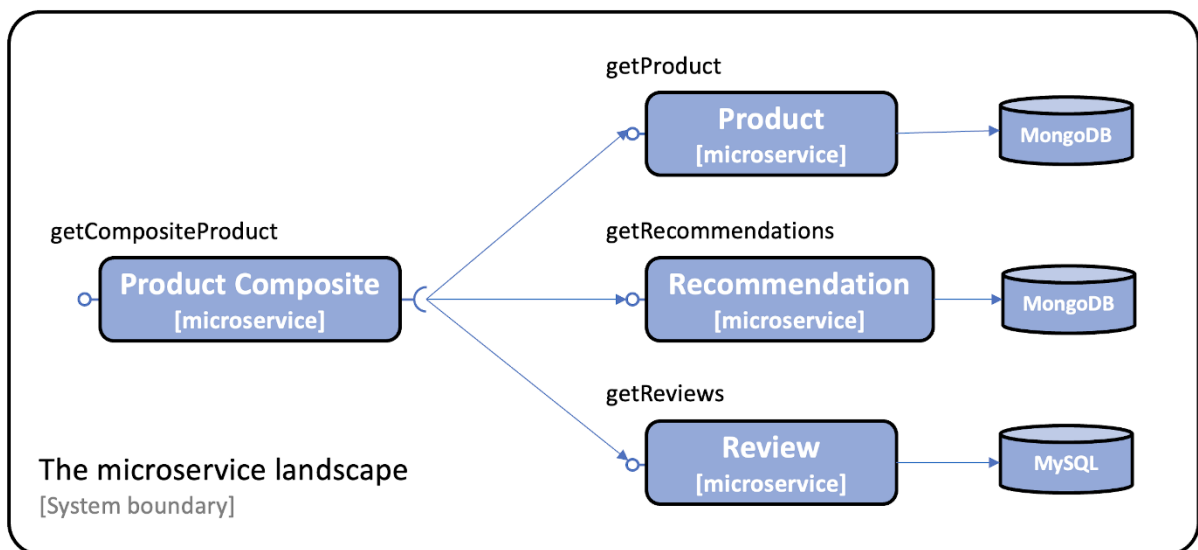
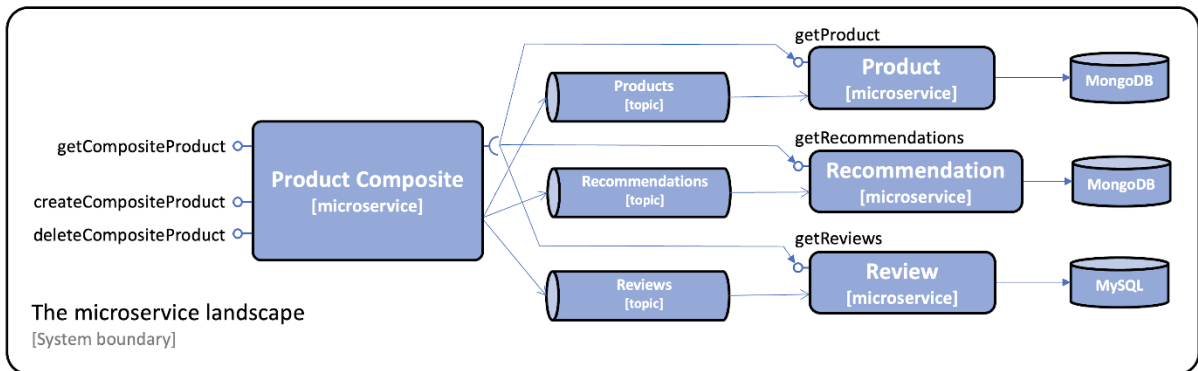
```
bash
$ docker-compose exec mongodb mongosh product-db --quiet --eval "db.products.find()"
[
  {
    _id: ObjectId("6419b93a92fb2164e15efc96"),
    version: 0,
    productId: 123456,
    name: 'string',
    weight: 0,
    _class: 'se.magnus.microservices.core.product.persistence.ProductEntity'
  }
]
```

```
bash
$ docker-compose exec mongodb mongosh recommendation-db --quiet --eval "db.recommendations.find()"
[
  {
    _id: ObjectId("6419b93af26d383b0b75a31f"),
    version: 0,
    productId: 123456,
    recommendationId: 0,
    author: 'string',
    rating: 0,
    content: 'string',
    _class: 'se.magnus.microservices.core.recommendation.persistence.RecommendationEntity'
  }
]
$
```

```
2. bash
+-----+-----+-----+-----+-----+-----+-----+
| id | author | content | product_id | review_id | subject | version |
+-----+-----+-----+-----+-----+-----+-----+
| 1 | string | string | 123456 | 0 | string | 0 |
+-----+-----+-----+-----+-----+-----+-----+
$
```

```
bash
End, all tests OK: Tue Mar 21 15:07:11 CET 2023
$
```

## Chapter 7: Developing Reactive Microservices



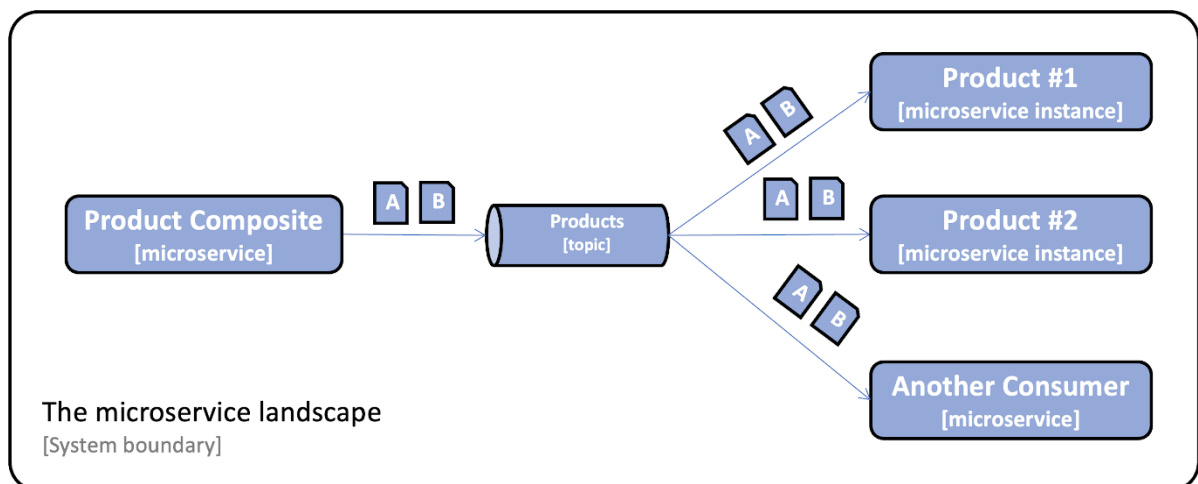
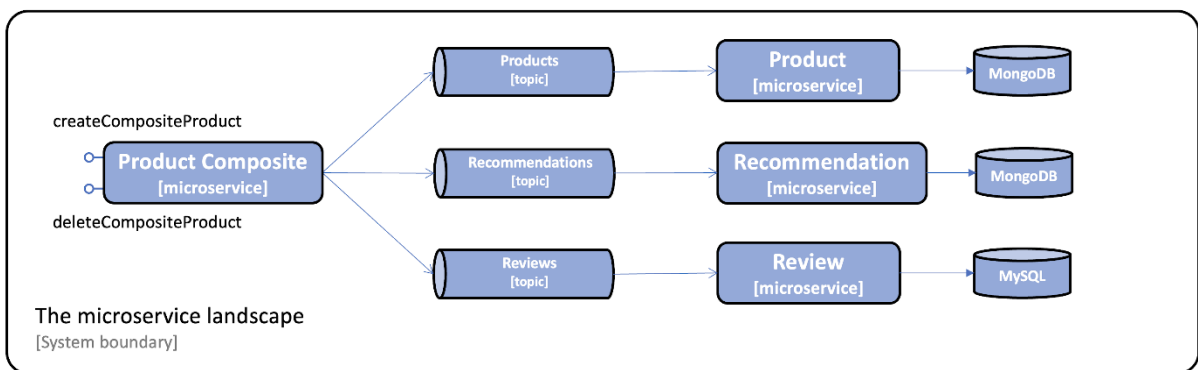
```
bash
17:01:09.603 [Test worker] INFO reactor.Flux.MapFuseable.1 - | onSubscribe([Fuseable]
  FluxMapFuseable.MapFuseableSubscriber)
17:01:09.604 [Test worker] INFO reactor.Flux.MapFuseable.1 - | request(unbounded)
17:01:09.604 [Test worker] INFO reactor.Flux.MapFuseable.1 - | onNext(4)
17:01:09.604 [Test worker] INFO reactor.Flux.MapFuseable.1 - | onNext(8)
17:01:09.605 [Test worker] INFO reactor.Flux.MapFuseable.1 - | onComplete()
```

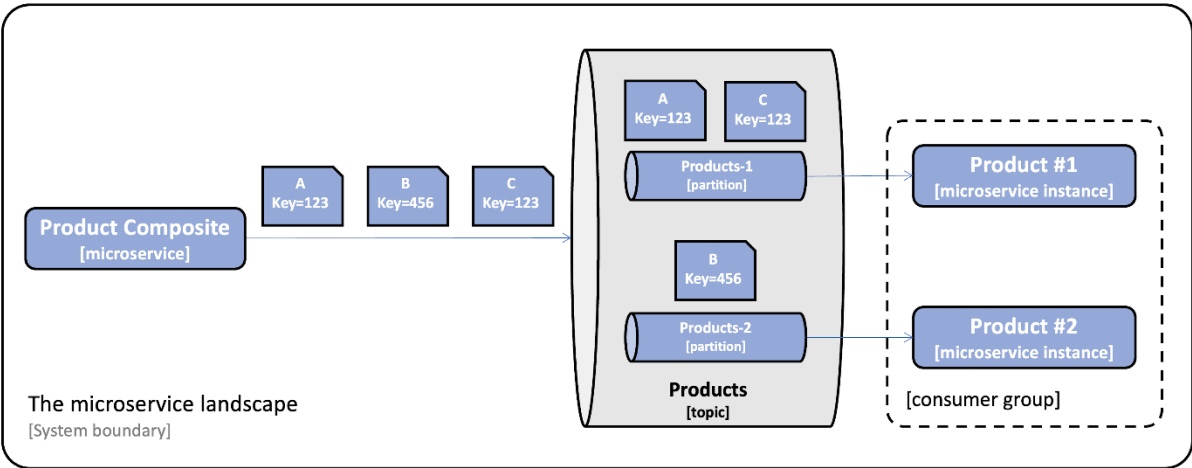
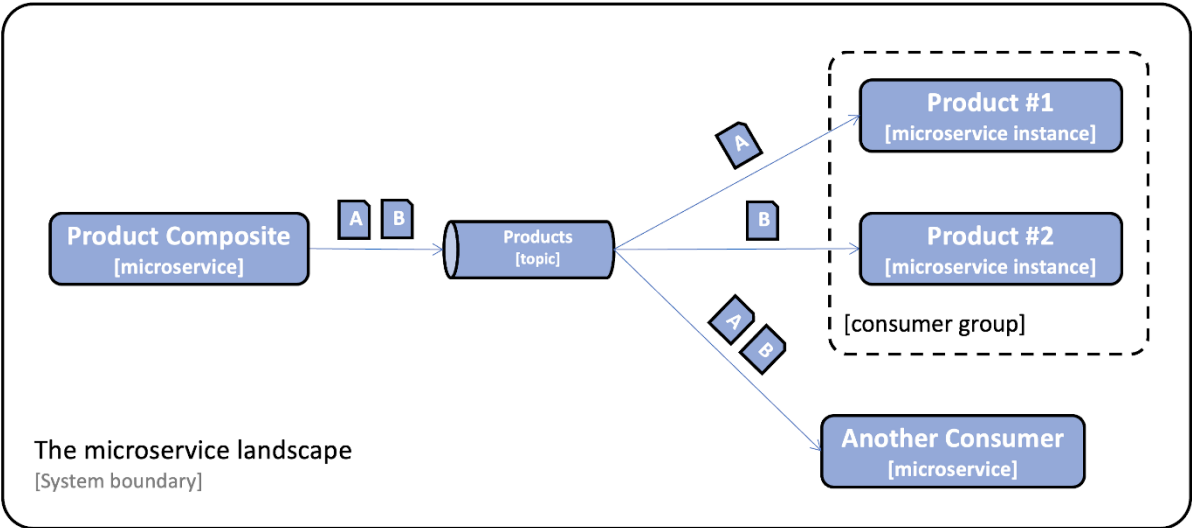
```
bash
2023-03-21 17:08:47.006 INFO 62314 --- [ctor-http-nio-2] reactor.Mono.SwitchIfEmpty.1 : onSubscribe(FluxSwitchIf
Empty.SwitchIfEmptySubscriber)
2023-03-21 17:08:47.007 INFO 62314 --- [ctor-http-nio-2] reactor.Mono.SwitchIfEmpty.1 : request(unbounded)
2023-03-21 17:08:47.034 INFO 62314 --- [ntLoopGroup-2-2] reactor.Mono.SwitchIfEmpty.1 : onNext(ProductEntity: 1)
2023-03-21 17:08:47.048 INFO 62314 --- [ntLoopGroup-2-2] reactor.Mono.SwitchIfEmpty.1 : onComplete()
```

```
2023-03-21 17:09:52.643 INFO 62314 --- [ctor-http-nio-3] reactor.Mono.SwitchIfEmpty.2 : onSubscribe(FluxSwitchIfEmpty.SwitchIfEmptySubscriber)
2023-03-21 17:09:52.643 INFO 62314 --- [ctor-http-nio-3] reactor.Mono.SwitchIfEmpty.2 : request(unbounded)
2023-03-21 17:09:52.648 ERROR 62314 --- [ntLoopGroup-2-2] reactor.Mono.SwitchIfEmpty.2 : onError(se.magnus.util.exceptions.NotFoundException: No product found for productId: 2)
2023-03-21 17:09:52.654 ERROR 62314 --- [ntLoopGroup-2-2] reactor.Mono.SwitchIfEmpty.2 :

se.magnus.util.exceptions.NotFoundException: No product found for productId: 2
    at se.magnus.microservices.core.product.services.ProductServiceImpl.getProduct(ProductServiceImpl.java:58) ~[classes/:na]
    ...
```

```
2023-03-21 17:10:13.376 INFO --- [ctor-http-nio-4] s.m.m.c.r.services.ReviewServiceImpl: Will get reviews for product with id=1
2023-03-21 17:10:13.423 DEBUG --- [jdbc-pool-1] org.hibernate.SQL :
select ... from reviews reviewenti0_ where reviewenti0_.product_id=?
```





```
bash 2
{
  "status": "UP",
  "components": {
    "coreServices": {
      "status": "UP",
      "components": {
        "product": {
          "status": "UP"
        },
        "recommendation": {
          "status": "UP"
        },
        "review": {
          "status": "UP"
        }
      }
    },
    ...
  }
}
```

localhost

RabbitMQ™

RabbitMQ 3.11.8

Erlang 25.2.2

Refreshed 2023-03-21 17:56:10

Refresh every 5 seconds

Virtual host

All

Cluster

rabbit@148f97bbebf8

User

guest

Log out

Overview

Connections

Channels

Exchanges

Queues

Admin

Queues

▼ All queues (9)

Page 1 of 1 - Filter:

Regex ?

Displaying 9 items , page size up to: 100

Overview

Name	Type	Features	State	Messages			Message rates			+/-
				Ready	Unacked	Total	incoming	deliver / get	ack	
products.auditGroup	classic	D	idle	1	0	1	0.00/s			
products.productsGroup	classic	D DLX DLK	idle	0	0	0	0.00/s	0.00/s	0.00/s	
products.productsGroup.dlq	classic	D	idle	0	0	0				
recommendations.auditGroup	classic	D	idle	3	0	3	0.00/s			
recommendations.recommendationsGroup	classic	D DLX DLK	idle	0	0	0	0.00/s	0.00/s	0.00/s	
recommendations.recommendationsGroup.dlq	classic	D	idle	0	0	0				
reviews.auditGroup	classic	D	idle	3	0	3	0.00/s			
reviews.reviewsGroup	classic	D DLX DLK	idle	0	0	0	0.00/s	0.00/s	0.00/s	
reviews.reviewsGroup.dlq	classic	D	idle	0	0	0				

► Add a new queue

HTTP API

Server Docs

Tutorials

Community Support

Community Slack

Commercial Support


Plugins

GitHub

Changelog



localhost

 RabbitMQ™

RabbitMQ 3.11.8 Erlang 25.2.2

Refreshed 2023-03-21 17:57:07 

Refresh every 5 seconds

Virtual host 

All

Cluster **rabbit@148f97bbebf8**

User **guest**

Log out

Overview

Connections

Channels

Exchanges

Queues

Admin

▼ Get messages

Warning: getting messages from a queue is a destructive action. ?

Ack Mode:

Nack message requeue true

Encoding:

Auto string / base64 ?

Messages:

1

Get Message(s)

Message 1

The server reported 0 messages remaining.

Exchange

products

Routing Key

products

Redelivered

o

Properties

timestamp: 1679417733

message\_id: c4045a79-c2dc-69c0-c247-18e9faacbfd

priority: 0

delivery\_mode: 2

headers:

partitionKey: 1

target-protocol: amqp

content\_type: application/json

Payload

162 bytes

Encoding: string

{"eventType": "CREATE", "key": 1, "data": {"productId": 1, "name": "product name C", "weight": 300, "serviceAddress": null}, "eventCreateda

RabbitMQ™

RabbitMQ 3.11.8 Erlang 25.2.2

Refreshed 2023-03-21 18:46:24

Refresh every 5 seconds

Virtual host All

Cluster rabbit@4c521b2d1579

User guest Log out

Overview
Connections
Channels
Exchanges
Queues
Admin

## Queues

All queues (15)

Page 1 of 1 - Filter:

Regex ?

Displaying 15 items , page size up to: 100

Overview				Messages			Message rates			+/-
Name	Type	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
products.auditGroup-0	classic	D	idle	1	0	1	0.00/s			
products.auditGroup-1	classic	D	idle	1	0	1	0.00/s			
products.productsGroup-0	classic	D DLX DLK	idle	0	0	0	0.00/s	0.00/s	0.00/s	
products.productsGroup-1	classic	D DLX DLK	idle	0	0	0	0.00/s	0.00/s	0.00/s	
products.productsGroup.dlq	classic	D	idle	0	0	0				
recommendations.auditGroup-0	classic	D	idle	3	0	3	0.00/s			
recommendations.auditGroup-1	classic	D	idle	3	0	3	0.00/s			
recommendations.recommendationsGroup-0	classic	D DLX DLK	idle	0	0	0	0.00/s	0.00/s	0.00/s	
recommendations.recommendationsGroup-1	classic	D DLX DLK	idle	0	0	0	0.00/s	0.00/s	0.00/s	
recommendations.recommendationsGroup.dlq	classic	D	idle	0	0	0				
reviews.auditGroup-0	classic	D	idle	3	0	3	0.00/s			
reviews.auditGroup-1	classic	D	idle	3	0	3	0.00/s			
reviews.reviewsGroup-0	classic	D DLX DLK	idle	0	0	0	0.00/s	0.00/s	0.00/s	
reviews.reviewsGroup-1	classic	D DLX DLK	idle	0	0	0	0.00/s	0.00/s	0.00/s	
reviews.reviewsGroup.dlq	classic	D	idle	0	0	0				

Add a new queue

[HTTP API](#)
[Server Docs](#)
[Tutorials](#)
[Community Support](#)
[Community Slack](#)
[Commercial Support](#)
[Plugins](#)
[GitHub](#)
[Changelog](#)

bash

```

error.products.productsGroup
error.recommendations.recommendationsGroup
error.reviews.reviewsGroup
products
recommendations
reviews
$

```

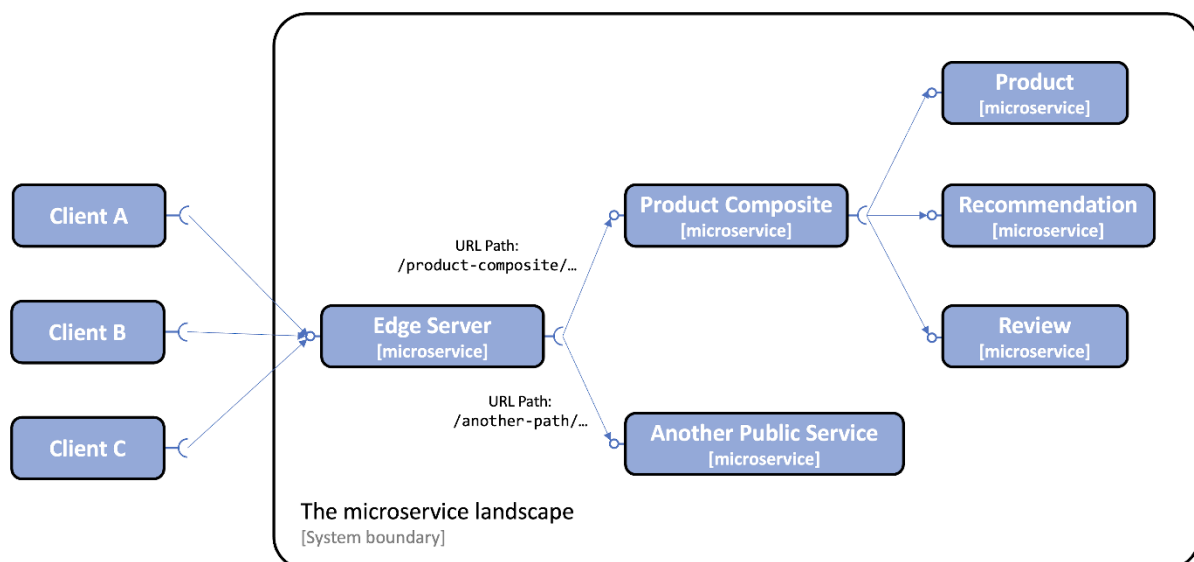
```
bash
Topic: products TopicId: awodZFheRTmPAQwHC0FOBQ PartitionCount: 2
ReplicationFactor: 1 Configs:
    Topic: products Partition: 0 Leader: 1 Replicas: 1 Isr: 1
    Topic: products Partition: 1 Leader: 1 Replicas: 1 Isr: 1
$
```

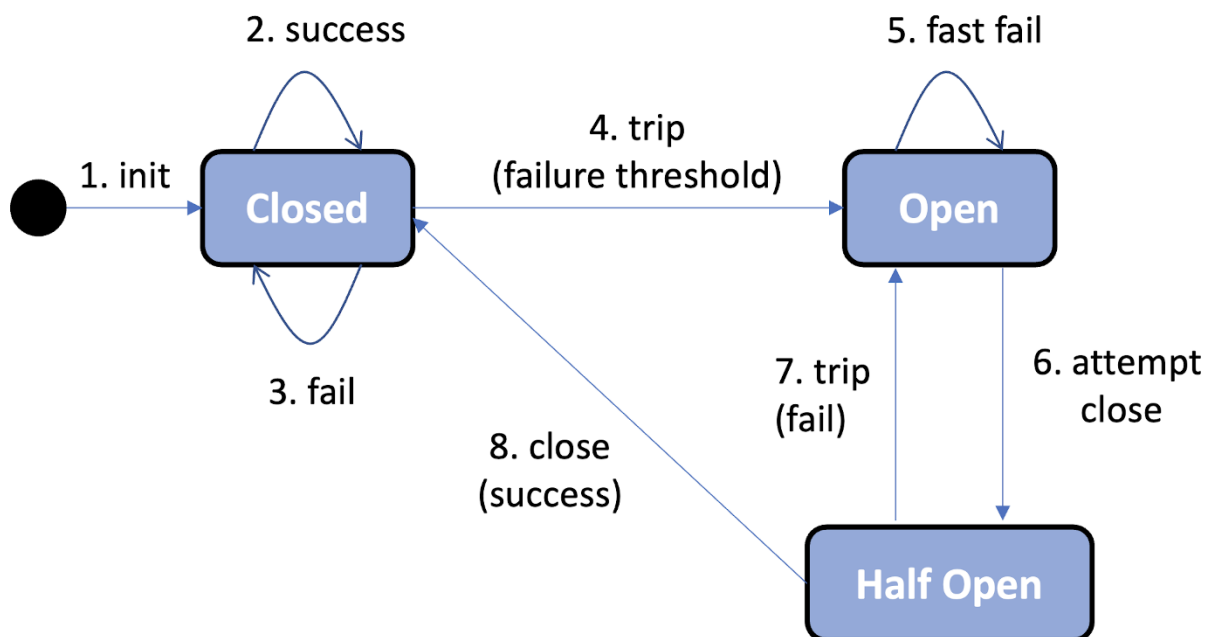
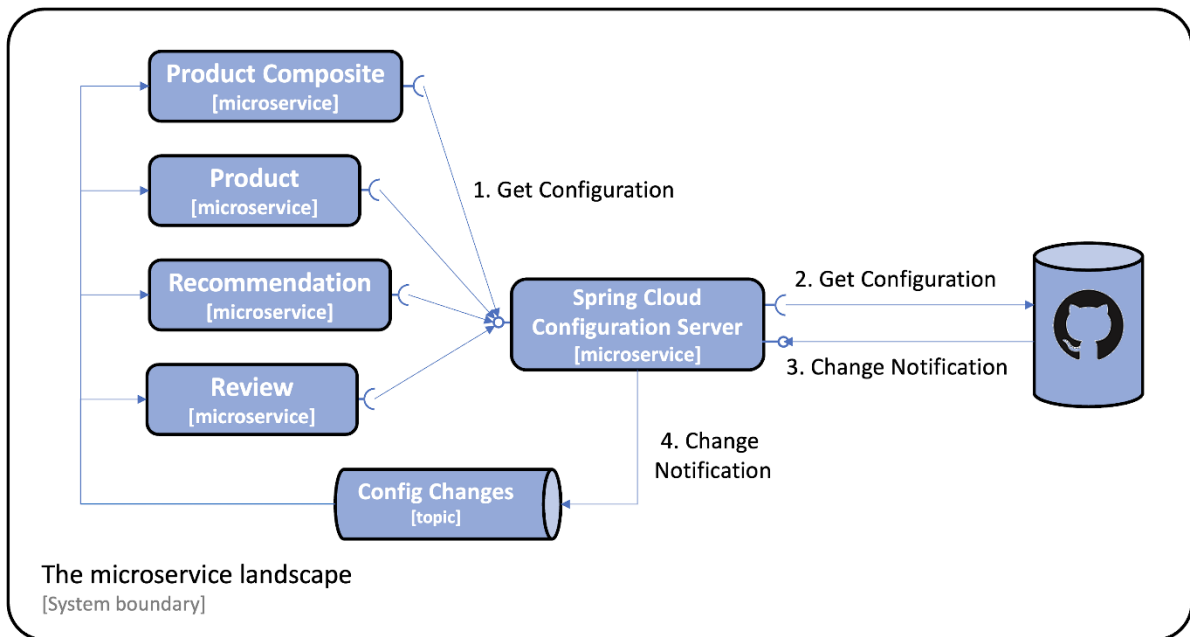
```
bash
{"eventType":"CREATE","key":1,"data":{"productId":1,"name":"product name C","weight":300,"serviceAddress":null},"eventCreatedAt":"2023-03-21T18:58:12.71942305Z"}
[2023-03-21 18:59:28,573] ERROR Error processing message, terminating consumer process:
(kafka.tools.ConsoleConsumer$)
org.apache.kafka.common.errors.TimeoutException
Processed a total of 1 messages
$
```

## Chapter 8: Introduction to Spring Cloud

The screenshot shows the Spring Eureka web interface in a browser window. The page has a dark header with the 'spring Eureka' logo and navigation links for 'HOME' and 'LAST 1000 SINCE STARTUP'. Below the header, the 'System Status' section displays two tables. The first table shows 'Environment: test' and 'Data center: default'. The second table shows 'Current time: 2023-03-27T06:30:21 +0000', 'Uptime: 00:46', 'Lease expiration enabled: true', 'Renews threshold: 11', and 'Renews (last min): 48'. The 'DS Replicas' section is empty. The 'Instances currently registered with Eureka' section contains a table with the following data:

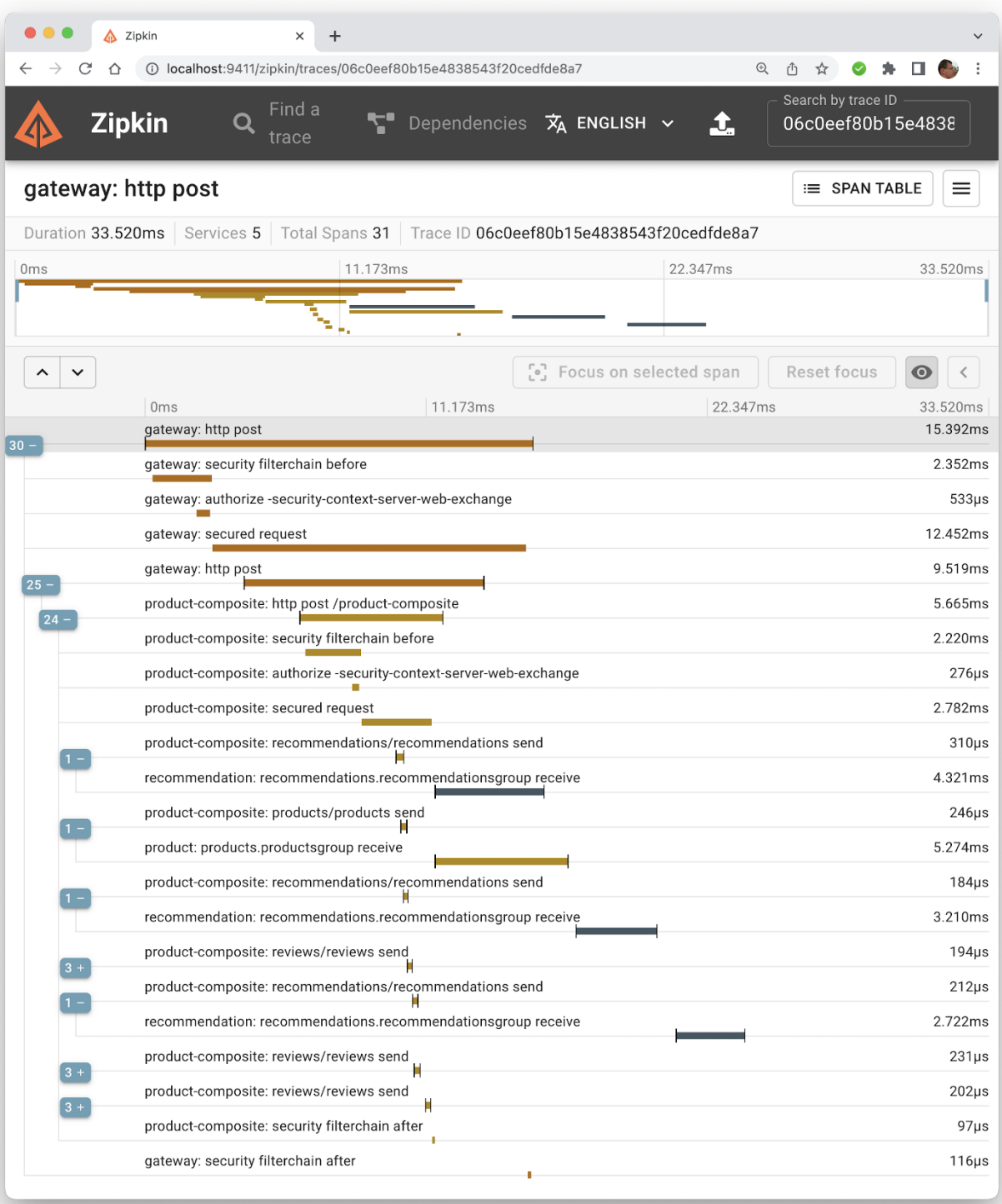
Application	AMIs	Availability Zones	Status
PRODUCT	n/a (1) (1)	UP (1) - <a href="#">f864341e9cd7;product:8080</a>	
PRODUCT-COMPOSITE	n/a (1) (1)	UP (1) - <a href="#">4ac5b5b3f93b;product-composite:8080</a>	
RECOMMENDATION	n/a (1) (1)	UP (1) - <a href="#">509f6850f0d0;recommendation:8080</a>	
REVIEW	n/a (3) (3)	UP (3) - <a href="#">1b1a31d24e37;review:8080</a> , <a href="#">68b4467ae262;review:8080</a> , <a href="#">23f769e72255;review:8080</a>	





```
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
{
  "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"
      }
    }
  }
}
```



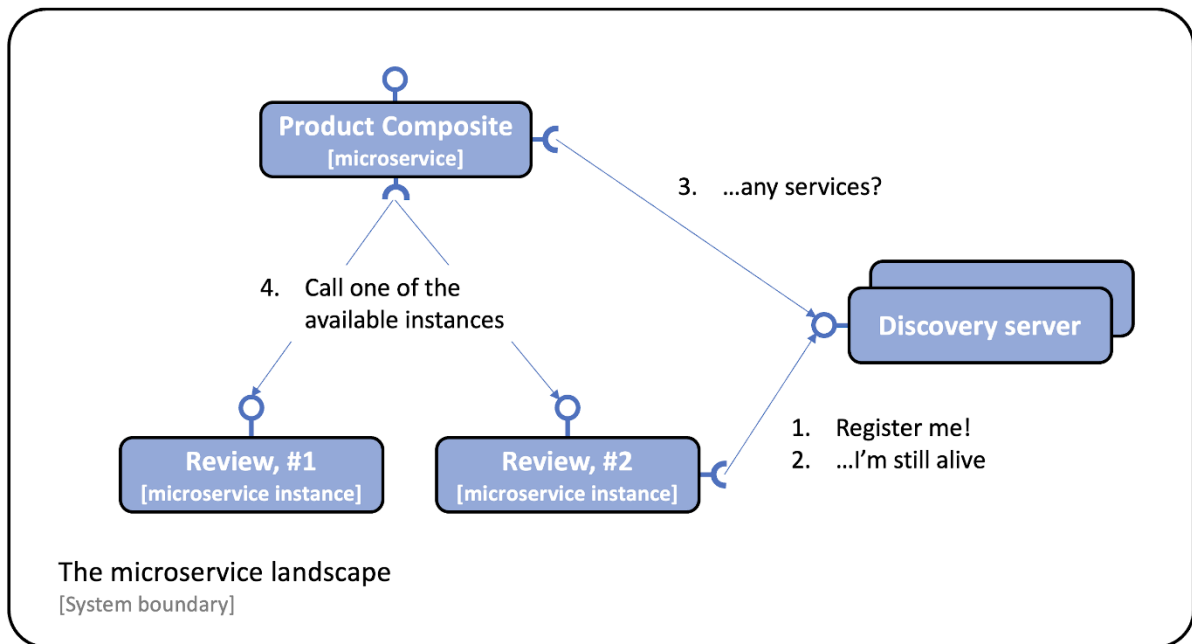


## Chapter 9: Adding Service Discovery Using Netflix Eureka

```
bash ㉿%3
192.168.96.9      review
192.168.96.8      review
```

```
bash ㉿%3
192.168.96.8      70eb82fc7e61
$ █
```

```
bash ㉿%3
70eb82fc7e61/192.168.96.8:8080
$ █
```



```
bash
$ ./test-em-all.bash start
Start Tests: Wed Mar 29 11:45:59 CEST 2023
...
:: Container chapter09-eureka-1          Started
...
Wait for: curl http://localhost:8080/actuator/health... DONE, continues...
Test OK ...
End, all tests OK: Wed Mar 29 11:46:22 CEST 2023
$
```

Eureka

localhost:8761

spring Eureka

HOME LAST 1000 SINCE STARTUP

### System Status

Environment	test	Current time	2023-03-27T06:30:21 +0000
Data center	default	Uptime	00:46
		Lease expiration enabled	true
		Renews threshold	11
		Renews (last min)	48

### DS Replicas

### Instances currently registered with Eureka

Application	AMIs	Availability Zones	Status
PRODUCT	n/a (1) (1)	UP (1) - <a href="#">f864341e9cd7:product:8080</a>	
PRODUCT-COMPOSITE	n/a (1) (1)	UP (1) - <a href="#">4ac5b5b3f93b:product-composite:8080</a>	
RECOMMENDATION	n/a (1) (1)	UP (1) - <a href="#">509f6850f0d0:recommendation:8080</a>	
REVIEW	n/a (3) (3)	UP (3) - <a href="#">1b1a31d24e37:review:8080</a> , <a href="#">68b4467ae262:review:8080</a> , <a href="#">23f769e72255:review:8080</a>	

```
chapter09-review-2 ... Started ReviewServiceApplication in 5.254 seconds
chapter09-review-3 ... Started ReviewServiceApplication in 5.202 seconds
```

```
c983c84cd214:product-composite:8080
3e2583567ff7:product:8080
d2583dfd2c6d:review:8080
2f19e5a1695b:review:8080
283ab4318911:review:8080
ce425f147212:recommendation:8080
$
```

```
bash
d2583dfd2c6d/192.168.112.10:8080
2f19e5a1695b/192.168.112.9:8080
283ab4318911/192.168.112.11:8080
```

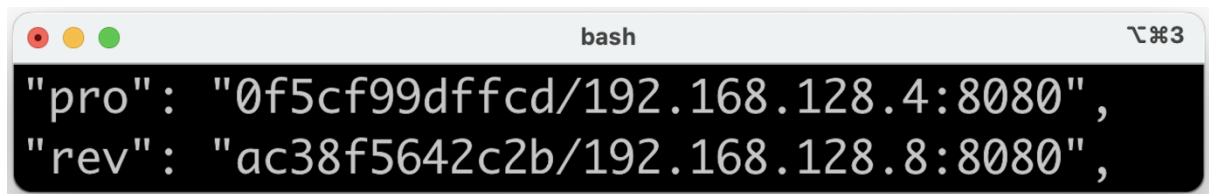
```
bash
chapter09-review-2 ... DEBUG ... Response size: 3
chapter09-review-3 ... DEBUG ... Response size: 3
chapter09-review-1 ... DEBUG ... Response size: 3
```

```
bash
curl: (28) Operation timed out after 2005 milliseconds with 0 bytes received
$
```

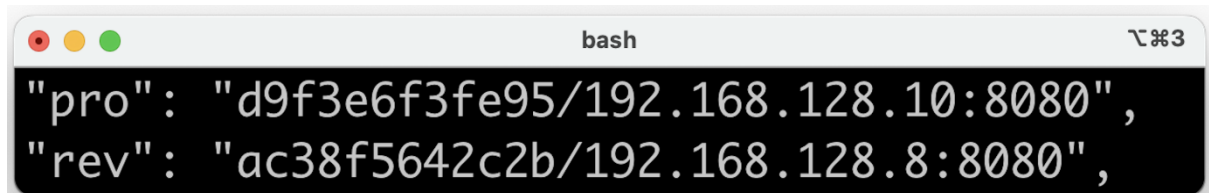
```
bash
"rev": "3d71f0dade20/192.168.112.9:8080"
"rev": "81308b0a3bcb/192.168.112.10:8080"
```

```
bash
3d71f0dade20/192.168.112.9:8080
81308b0a3bcb/192.168.112.10:8080
```

```
bash
"pro": "0f5cf99dfcd/192.168.128.4:8080"
```

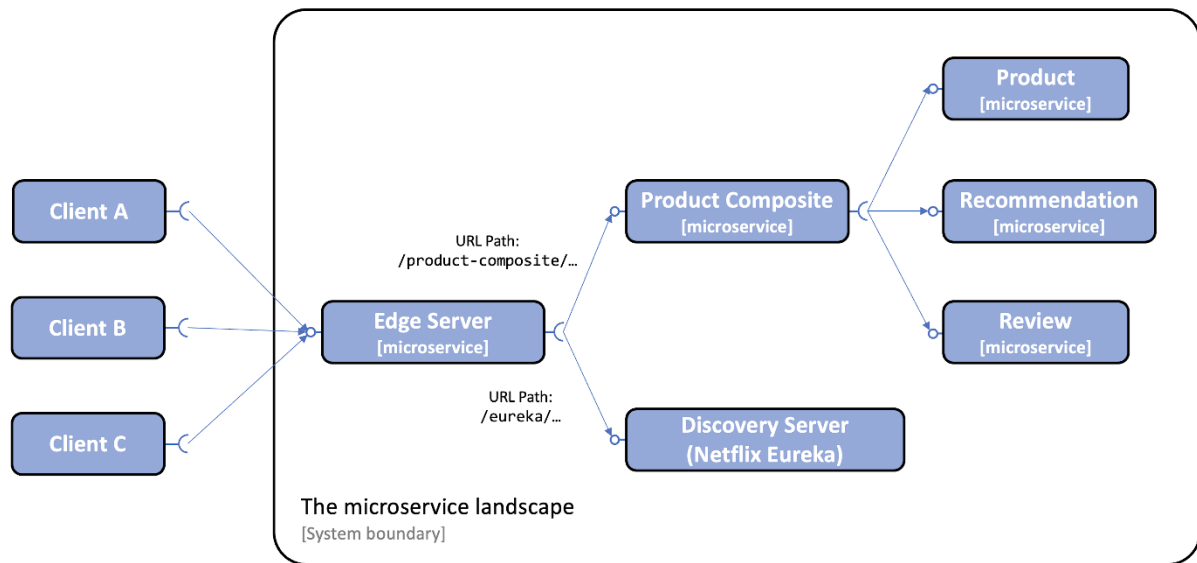
A terminal window with a title bar containing three colored circles (red, yellow, green) on the left, the text "bash" in the center, and a zoom icon followed by "#3" on the right. The terminal content is on a black background with white text.

```
"pro": "0f5cf99dffcd/192.168.128.4:8080",  
"rev": "ac38f5642c2b/192.168.128.8:8080",
```

A terminal window with a title bar containing three colored circles (red, yellow, green) on the left, the text "bash" in the center, and a zoom icon followed by "#3" on the right. The terminal content is on a black background with white text.

```
"pro": "d9f3e6f3fe95/192.168.128.10:8080",  
"rev": "ac38f5642c2b/192.168.128.8:8080",
```

## 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

🔍 🏠 ☆ 🟢 ⚙️ 🖨️ 👤

HOME   LAST 1000 SINCE STARTUP

### System Status

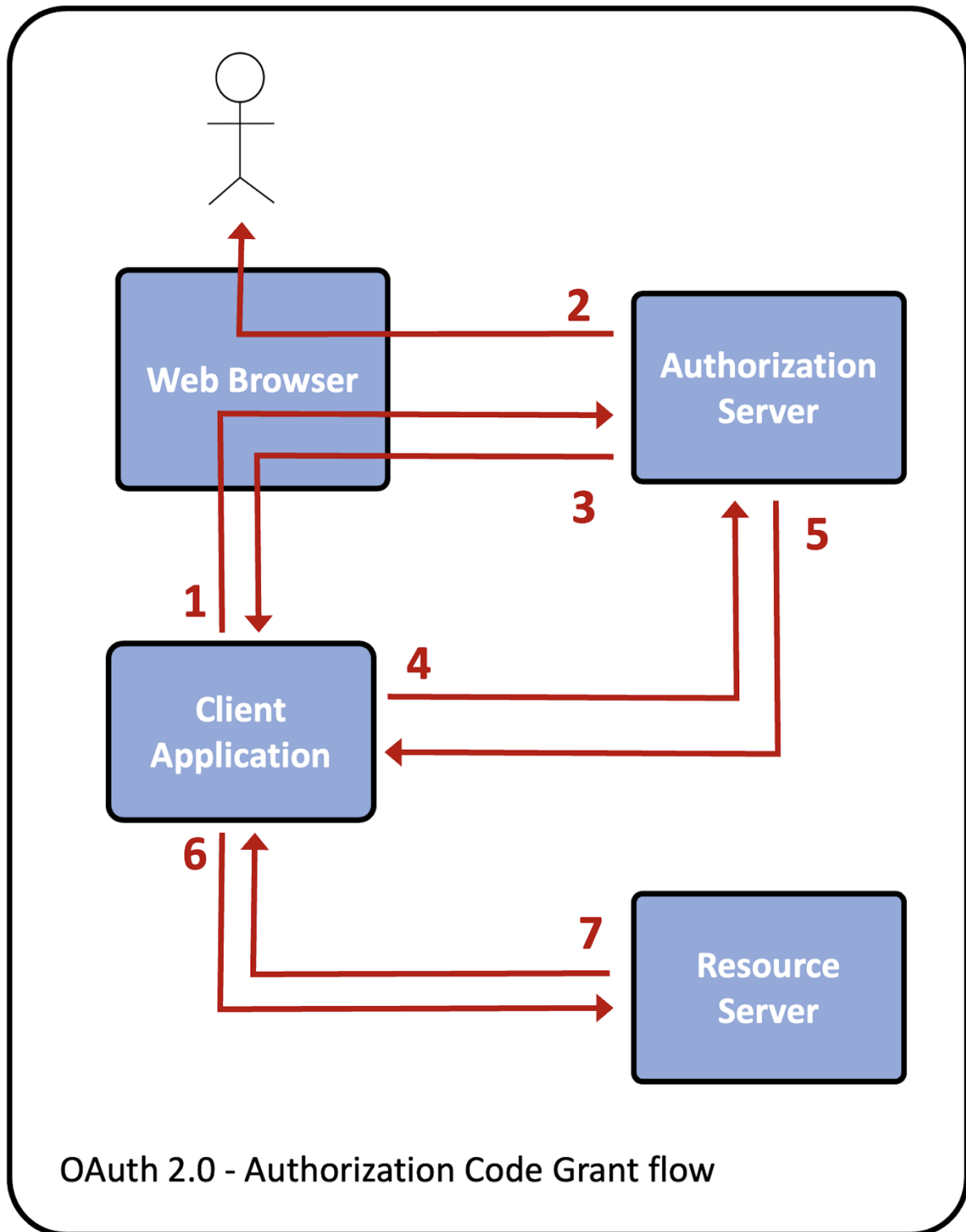
Environment	test	Current time	2023-03-29T15:03:16 +0000
Data center	default	Uptime	00:12
		Lease expiration enabled	true
		Renews threshold	10
		Renews (last min)	60

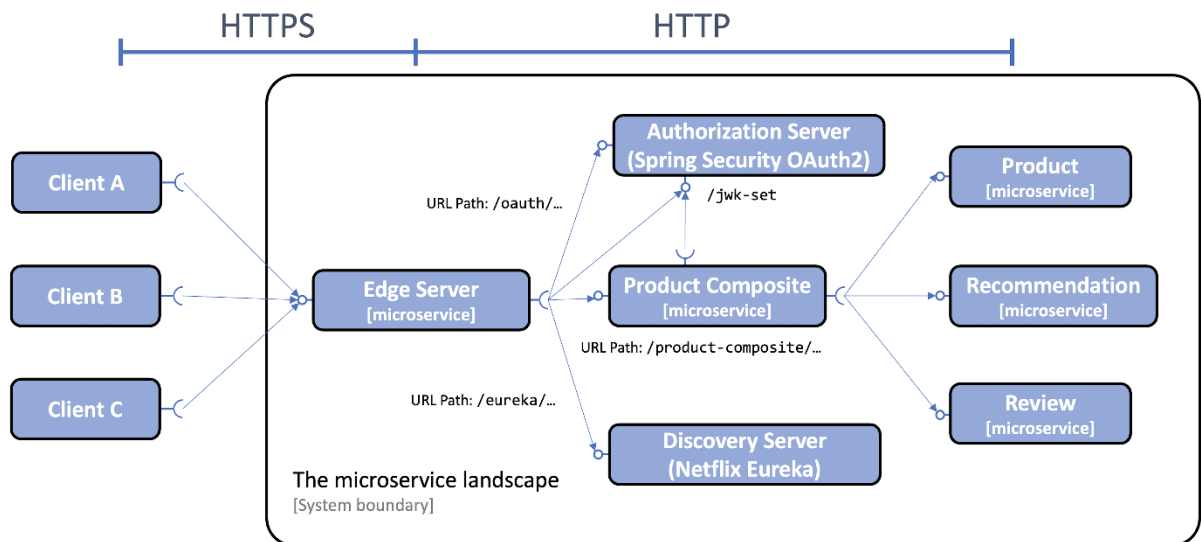
### DS Replicas

### Instances currently registered with Eureka

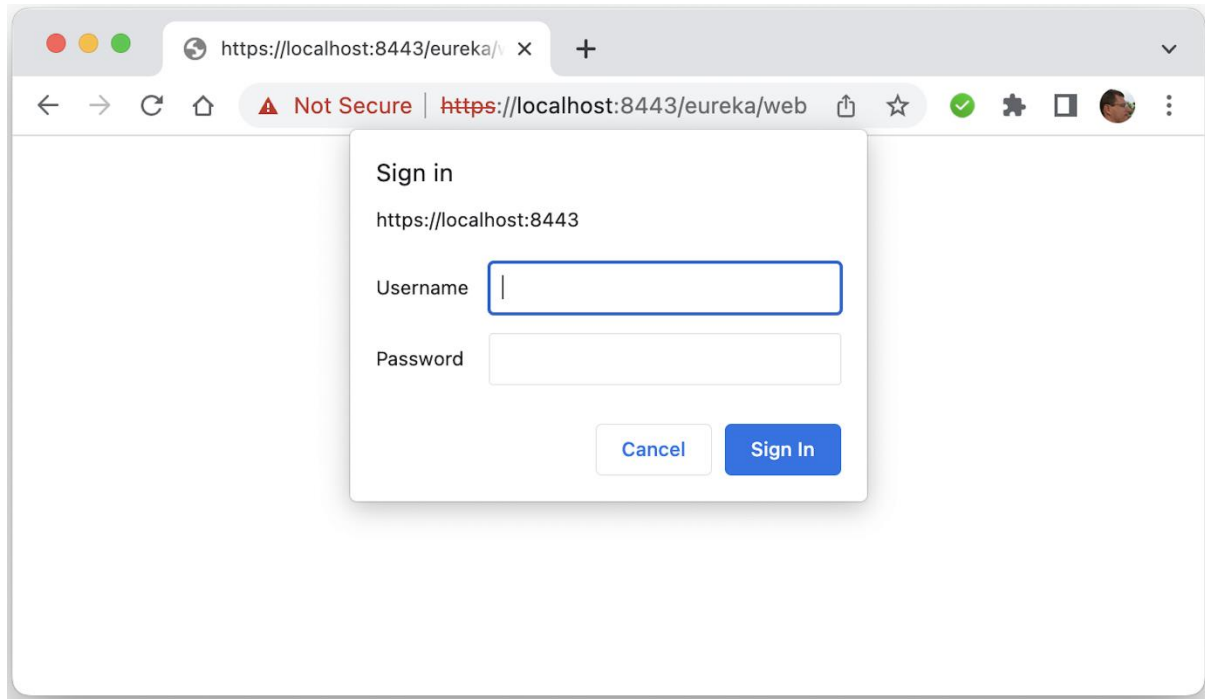
Application	AMIs	Availability Zones	Status
GATEWAY	n/a (1)	(1)	UP (1) - <a href="#">d94d651b2d0b:gateway:8080</a>
PRODUCT	n/a (1)	(1)	UP (1) - <a href="#">9e000bdd56e:product:8080</a>
PRODUCT-COMPOSITE	n/a (1)	(1)	UP (1) - <a href="#">2911a48d86ec:product-composite:8080</a>
RECOMMENDATION	n/a (1)	(1)	UP (1) - <a href="#">84a68e56553b:recommendation:8080</a>
REVIEW	n/a (1)	(1)	UP (1) - <a href="#">8a0eef3e8fbd:review:8080</a>

## Chapter 11: Securing Access to APIs





```
bash
89852f1ceb7c:gateway:8443
781f8298fd2f:auth-server:9999
d71737b31d97:product-composite:8080
9f1deef92da2:product:8080
552632decc14:review:8080
00bcc1a9954e:recommendation:8080
$
```



A screenshot of a web browser window showing the 'Instances currently registered with Eureka' page. The page has a header 'Instances currently registered with Eureka' and a table below it. The table has four columns: 'Application', 'AMIs', 'Availability Zones', and 'Status'. The table lists several applications and their details.

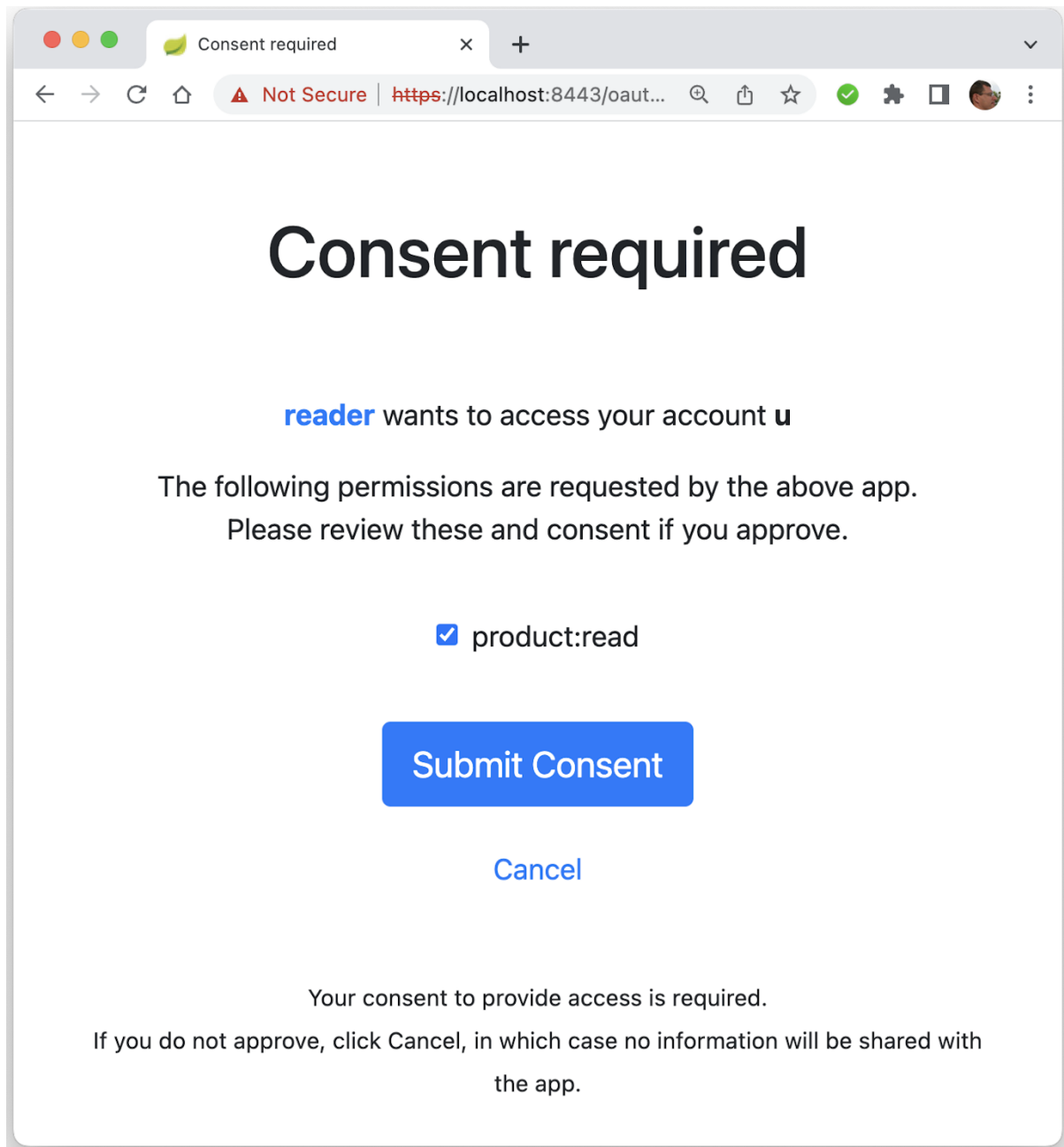
Application	AMIs	Availability Zones	Status
AUTH-SERVER	n/a (1)	(1)	UP (1) - <a href="#">781f8298fd2f:auth-server:9999</a>
GATEWAY	n/a (1)	(1)	UP (1) - <a href="#">dbf6372880b2:gateway:8443</a>
PRODUCT	n/a (1)	(1)	UP (1) - <a href="#">9f1deef92da2:product:8080</a>
PRODUCT-COMPOSITE	n/a (1)	(1)	UP (1)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

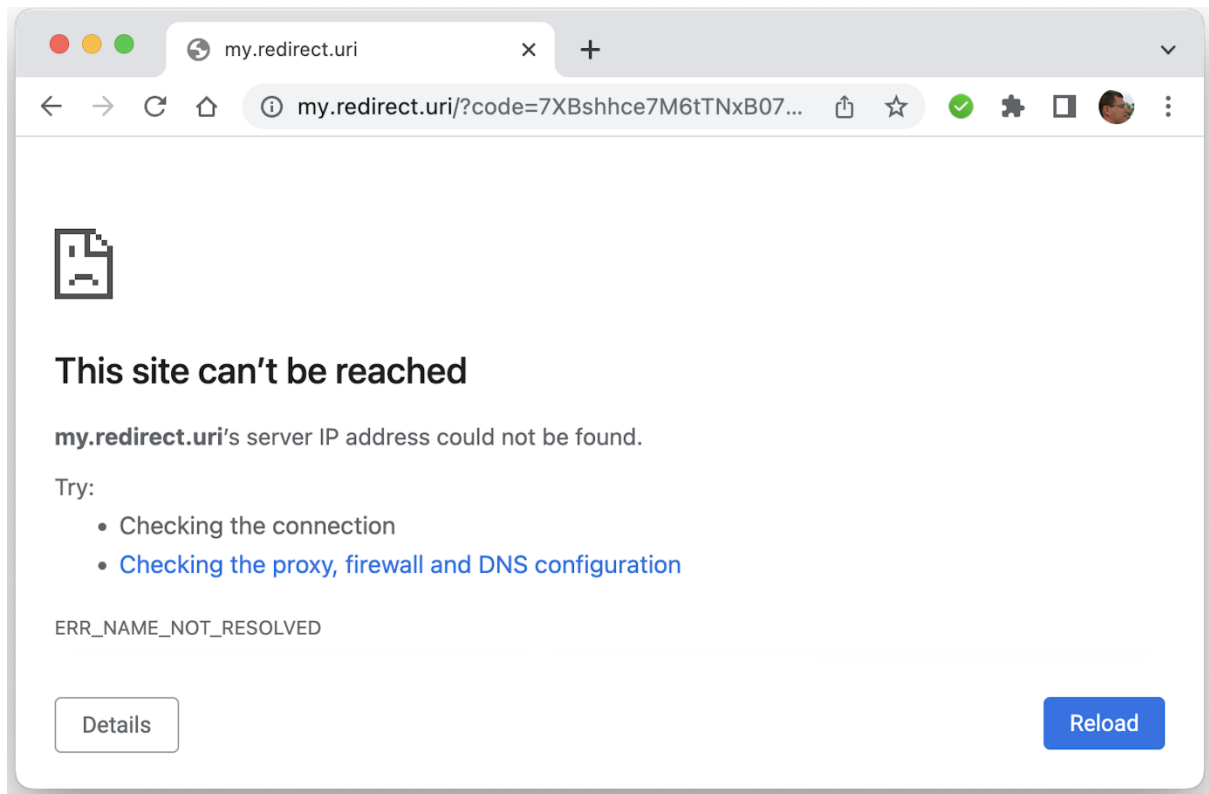
```
bash
{
  "access_token": "eyJr...jtDA",
  "scope": "product:write product:read",
  "token_type": "Bearer",
  "expires_in": 3599
}
$
```

Please sign in

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

## Please sign in





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

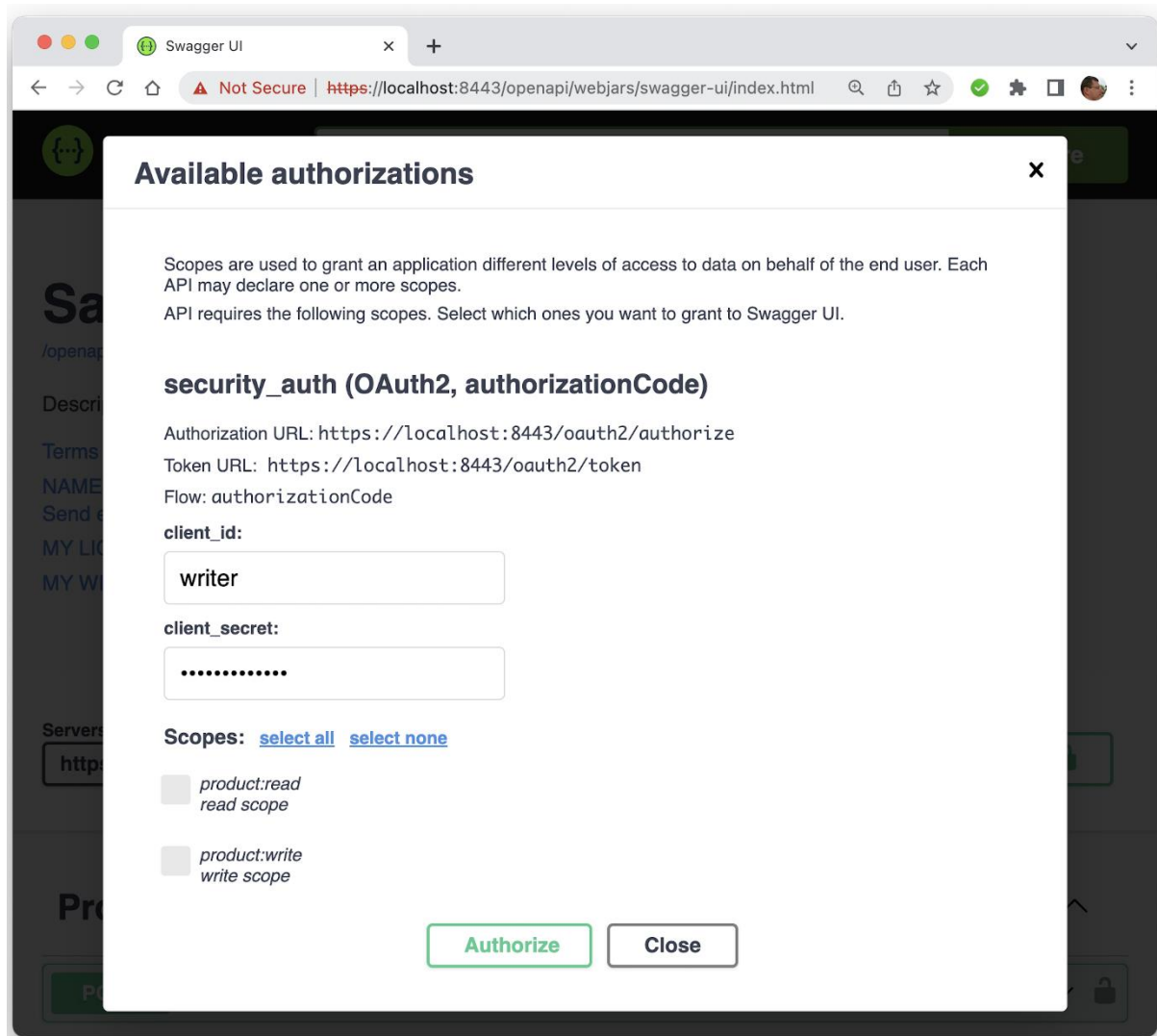
```
bash
HTTP/1.1 200 OK

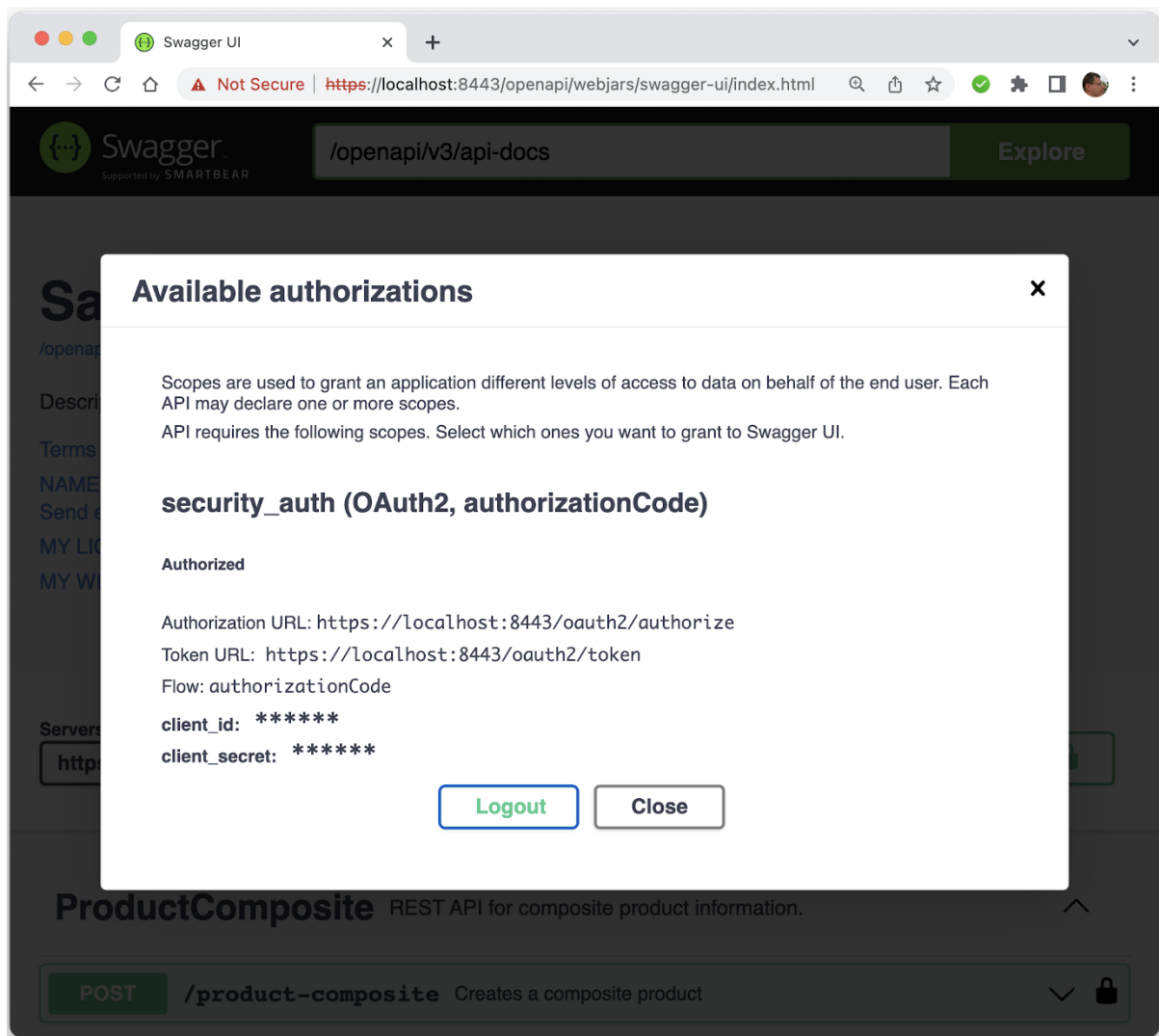
...
{"productId":1, ...}
$
```

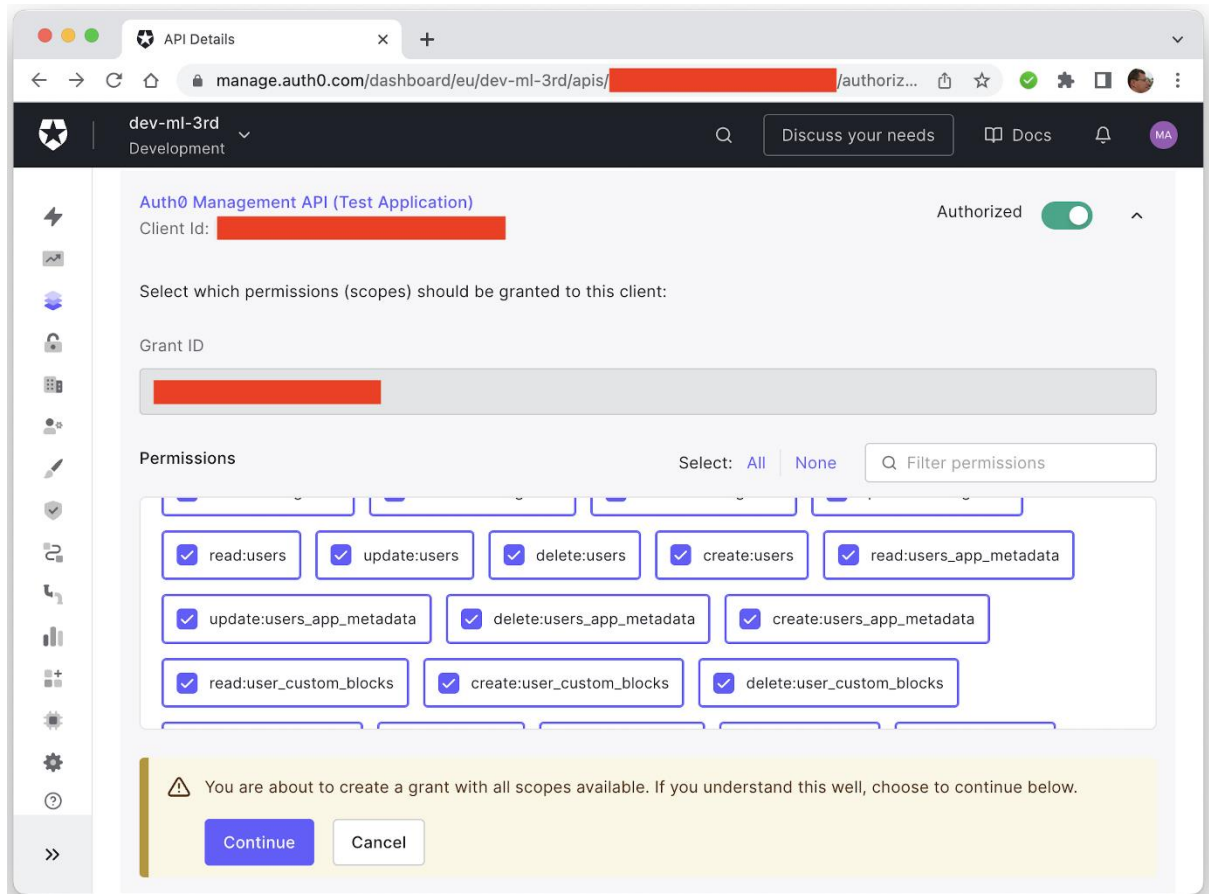
```
bash
HTTP/1.1 403 Forbidden
WWW-Authenticate: Bearer error="insufficient_scope", error_description="The request requires higher privileges than provided by the access token.", error_uri="https://tools.ietf.org/html/rfc6750#section-3.1"
$
```

```
bash
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]
$
```









Application Details

manage.auth0.com/dashboard/eu/dev-ml-3rd/applications/


dev-ml-3rd  
Development

Discuss your needs

Docs

MA

Back to Applications




# Auth0 Management API (Test Application)

Machine to Machine   Client ID

Quick Start

Settings

APIs



This feature is included in your current plan for up to 1,000 tokens per month. [Upgrade your subscription](#) or [contact enterprise sales](#) for additional monthly quota.

Basic Information

Name \*

Auth0 Management API (Test Application)

Domain

dev-ml-3rd.eu.auth0.com

Client ID

Client Secret

.....

The Client Secret is not base64 encoded.

```
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=...
$
```

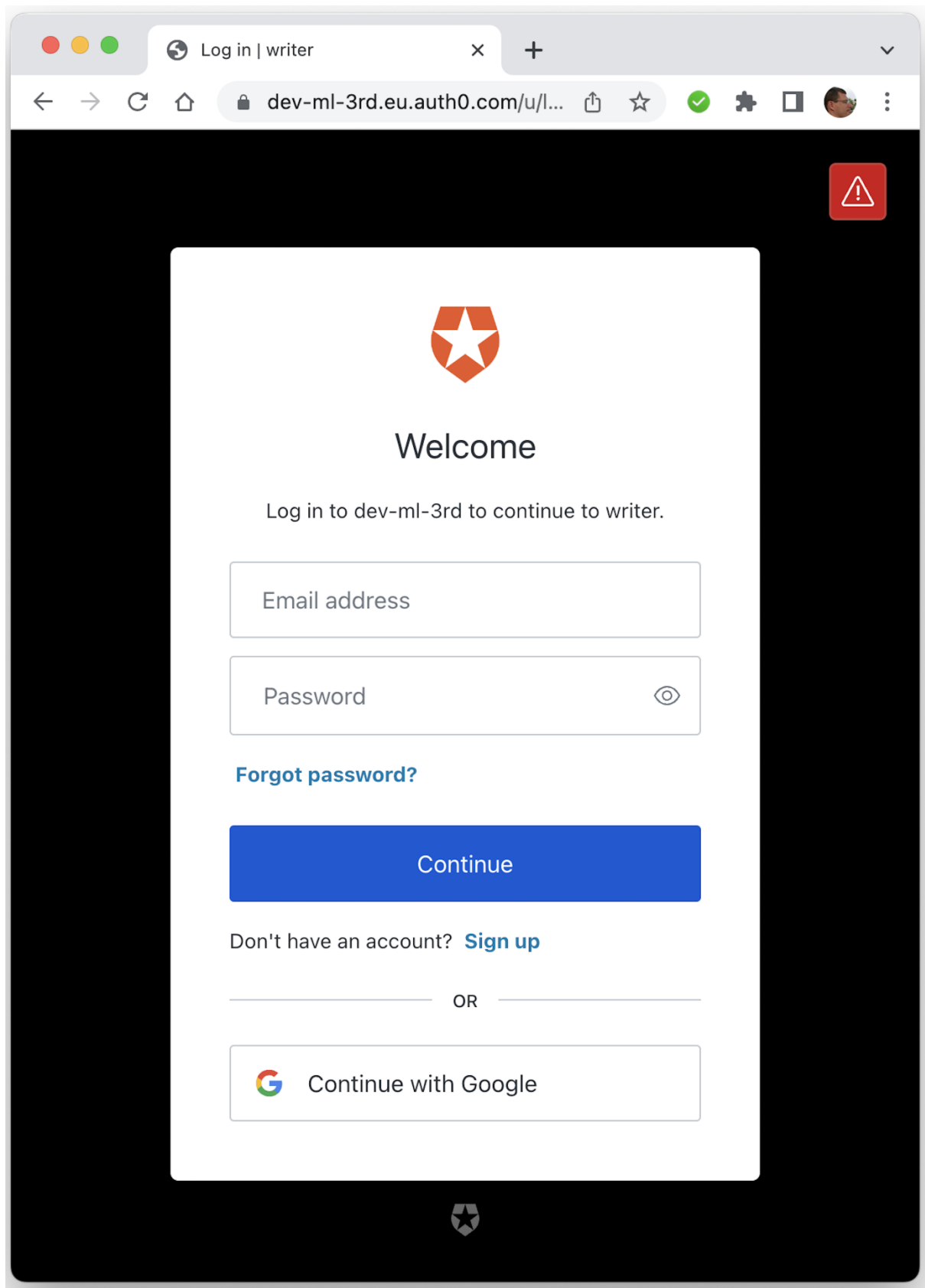
```
bash
Update the tenant, set its default connection to a user dictionary...
"Username-Password-Authentication"
Reader client app already exists
Writer client app already exists
API product-composite (https://localhost:8443/product-composite) already exists
User with email NNN already exists
Client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

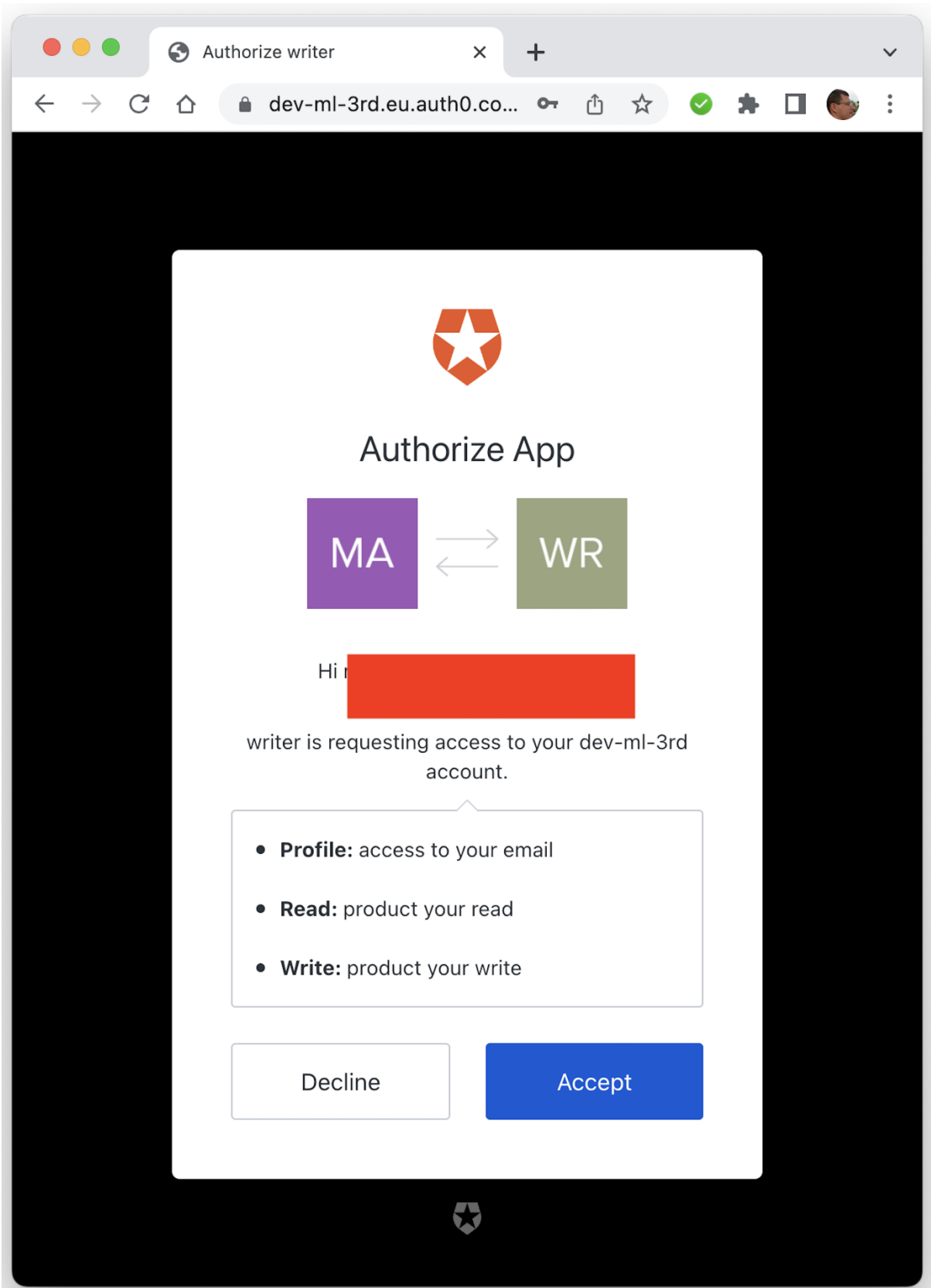
Auth0 - OAuth2 settings:

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

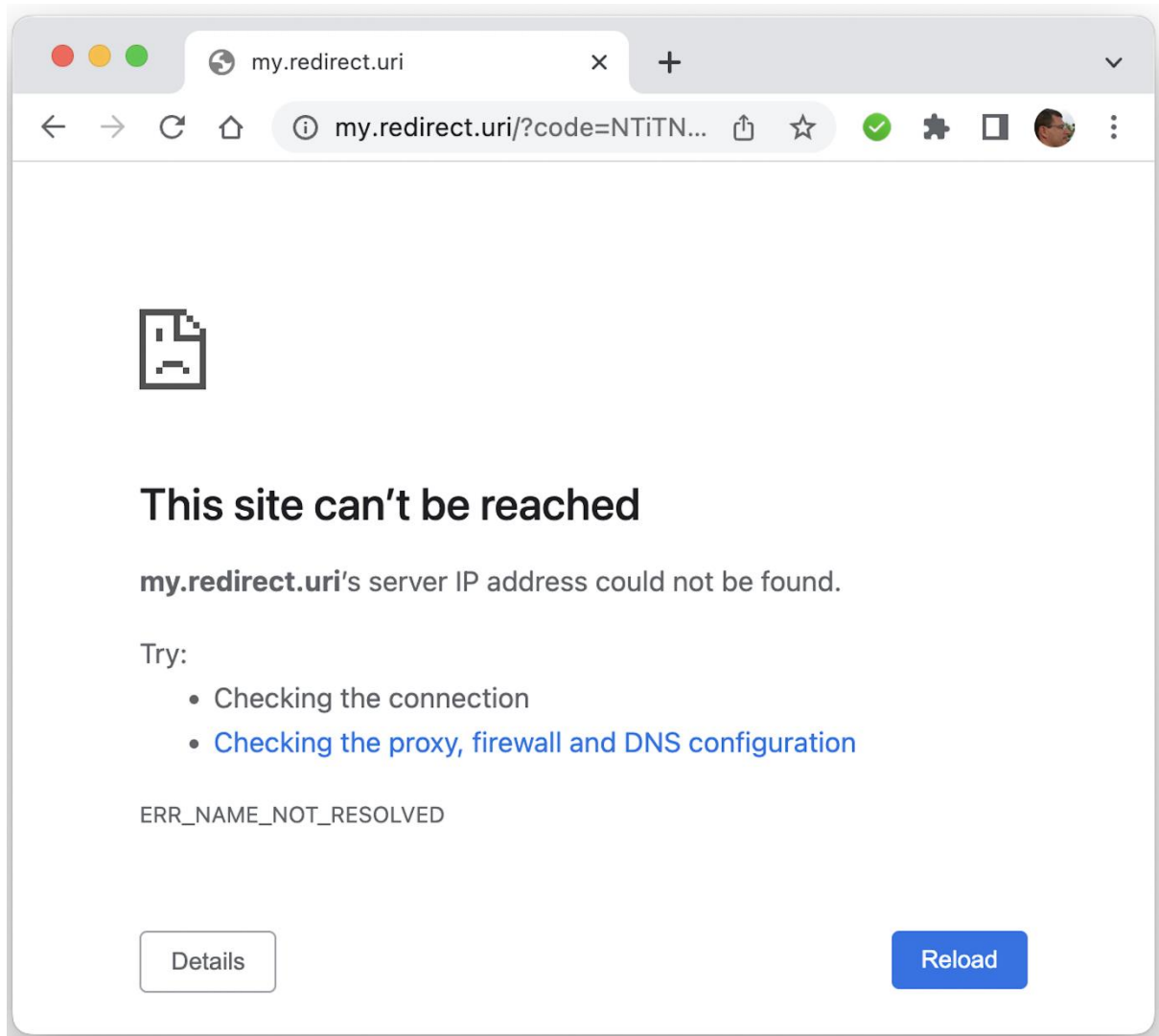
```
chapter11-product-composite-1 | ... Authorization info:  
Subject: ...@clients,  
scopes: product:read product:write,  
expires 2023-04-08T06:09:45Z:  
issuer: https://dev-ml-3rd.eu.auth0.com/,  
audience: [https://localhost:8443/product-composite]  
$
```

```
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]  
$
```

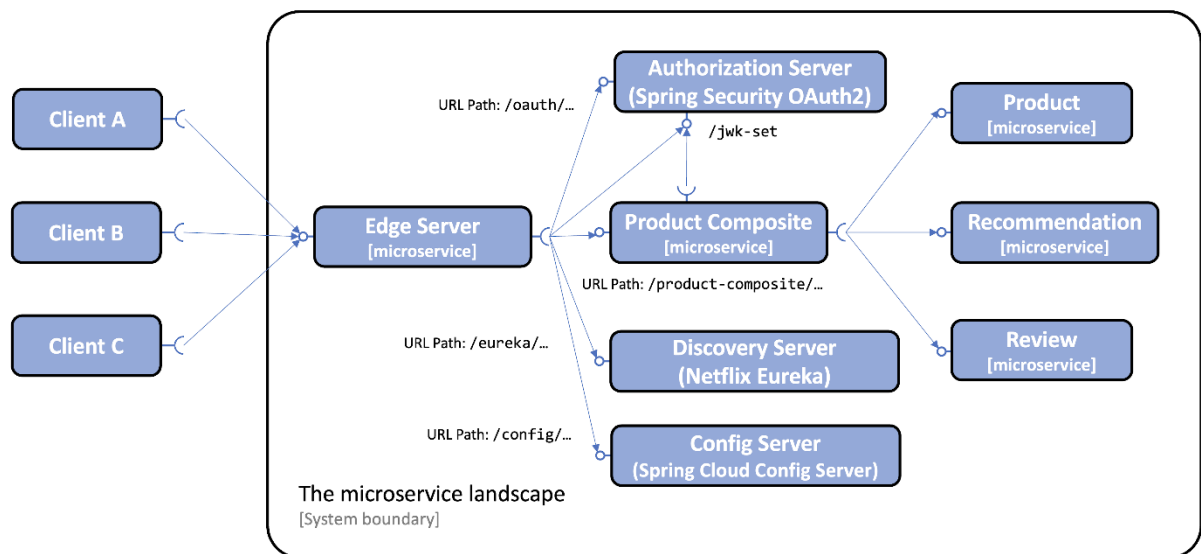








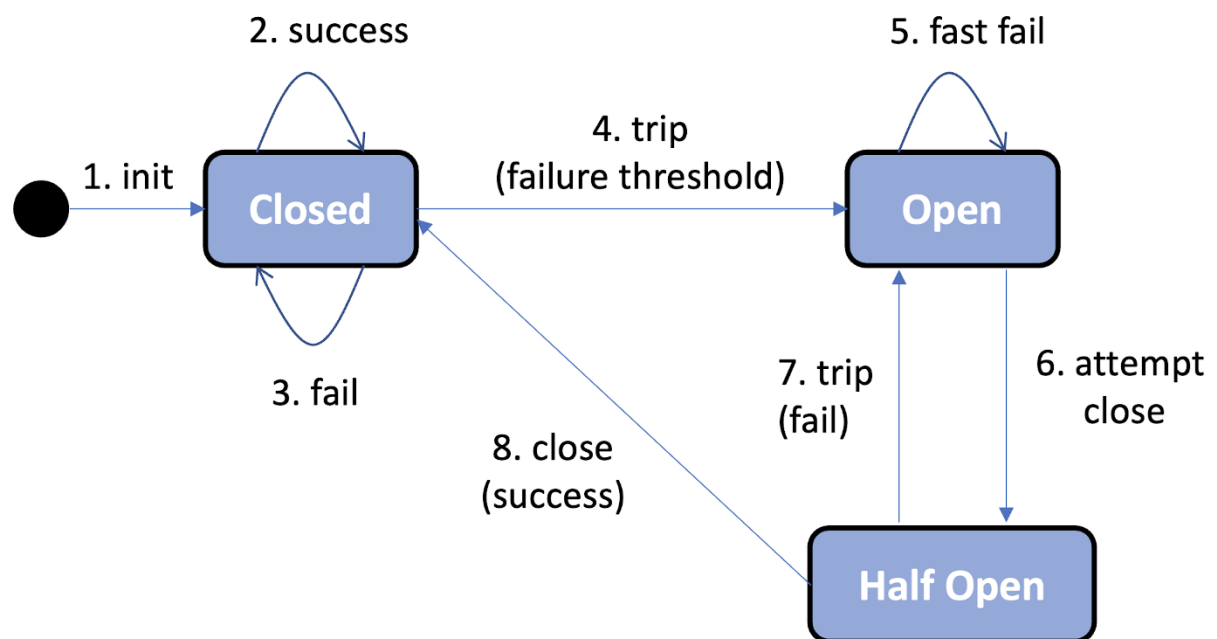
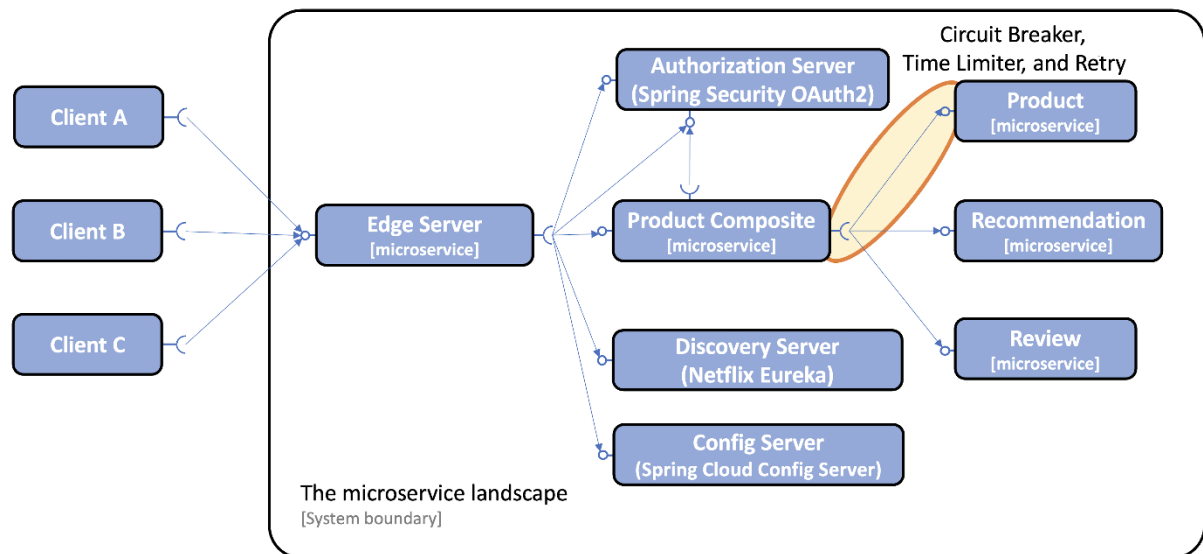
## Chapter 12: Centralized Configuration



```
bash
d91001603dcdf3eb1392ccbd40ff201cdcf7b9af2fcaab3da39e37919033b206$
$
```

```
bash
hello world$
$
```


## Chapter 13: 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"
}
$
```

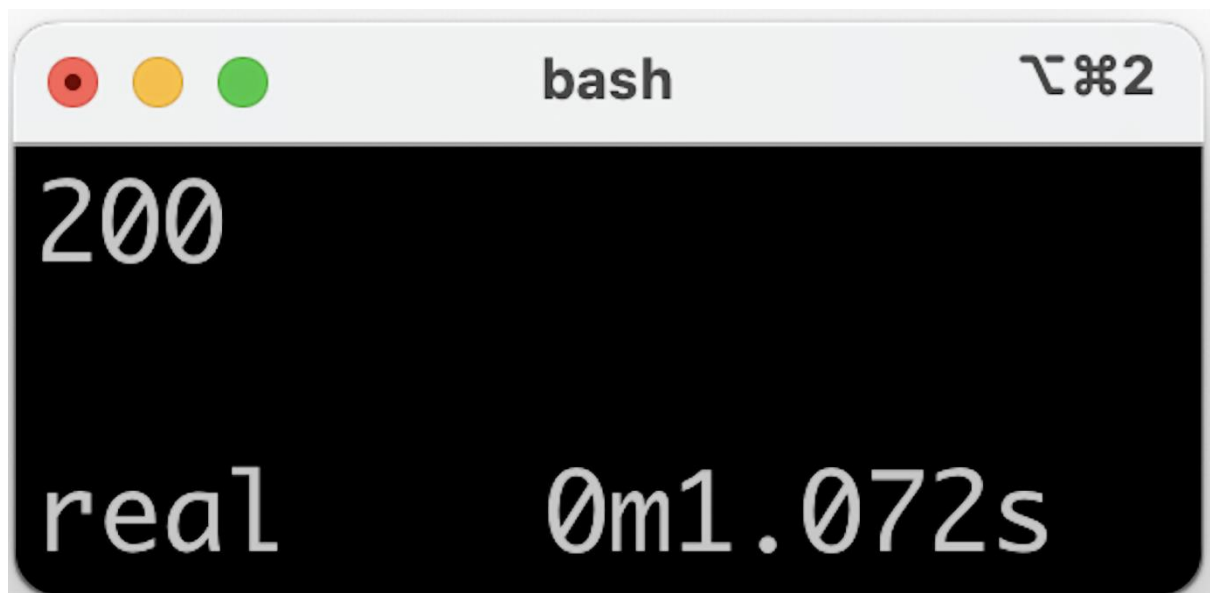
```
bash
{
  "productId": 1,
  "name": "Fallback product1",
  "weight": 1,
}
```

```
bash
CLOSED_TO_OPEN
OPEN_TO_HALF_OPEN
HALF_OPEN_TO_CLOSED
$
```



A terminal window with a light gray title bar containing three colored window control buttons (red, yellow, green) on the left, the text "bash" in the center, and a prompt symbol followed by "2" on the right. The terminal area has a black background with white text. It displays the number "200" on the first line and "real 0m0.066s" on the second line.

```
200  
real 0m0.066s
```

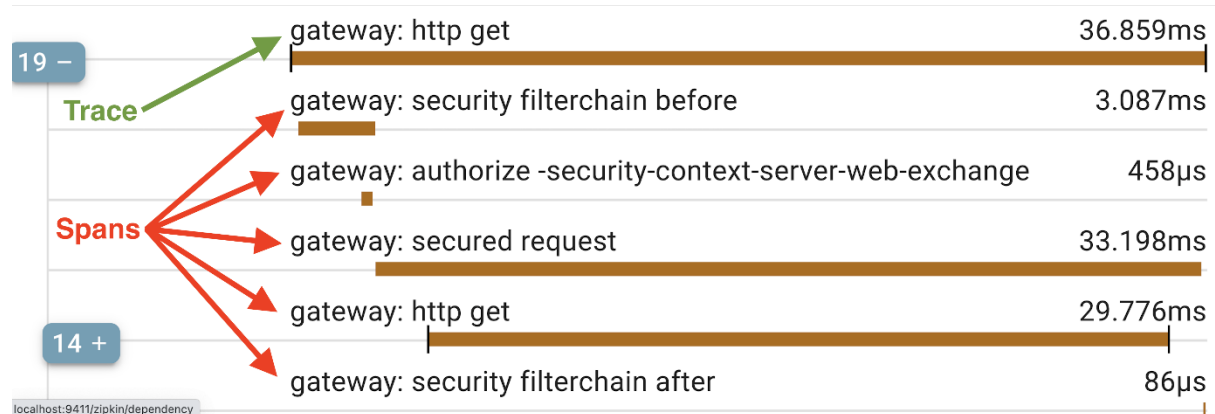


A terminal window with a light gray title bar containing three colored window control buttons (red, yellow, green) on the left, the text "bash" in the center, and a prompt symbol followed by "2" on the right. The terminal area has a black background with white text. It displays the number "200" on the first line and "real 0m1.072s" on the second line.

```
200  
real 0m1.072s
```

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

## Chapter 14: Understanding Distributed Tracing



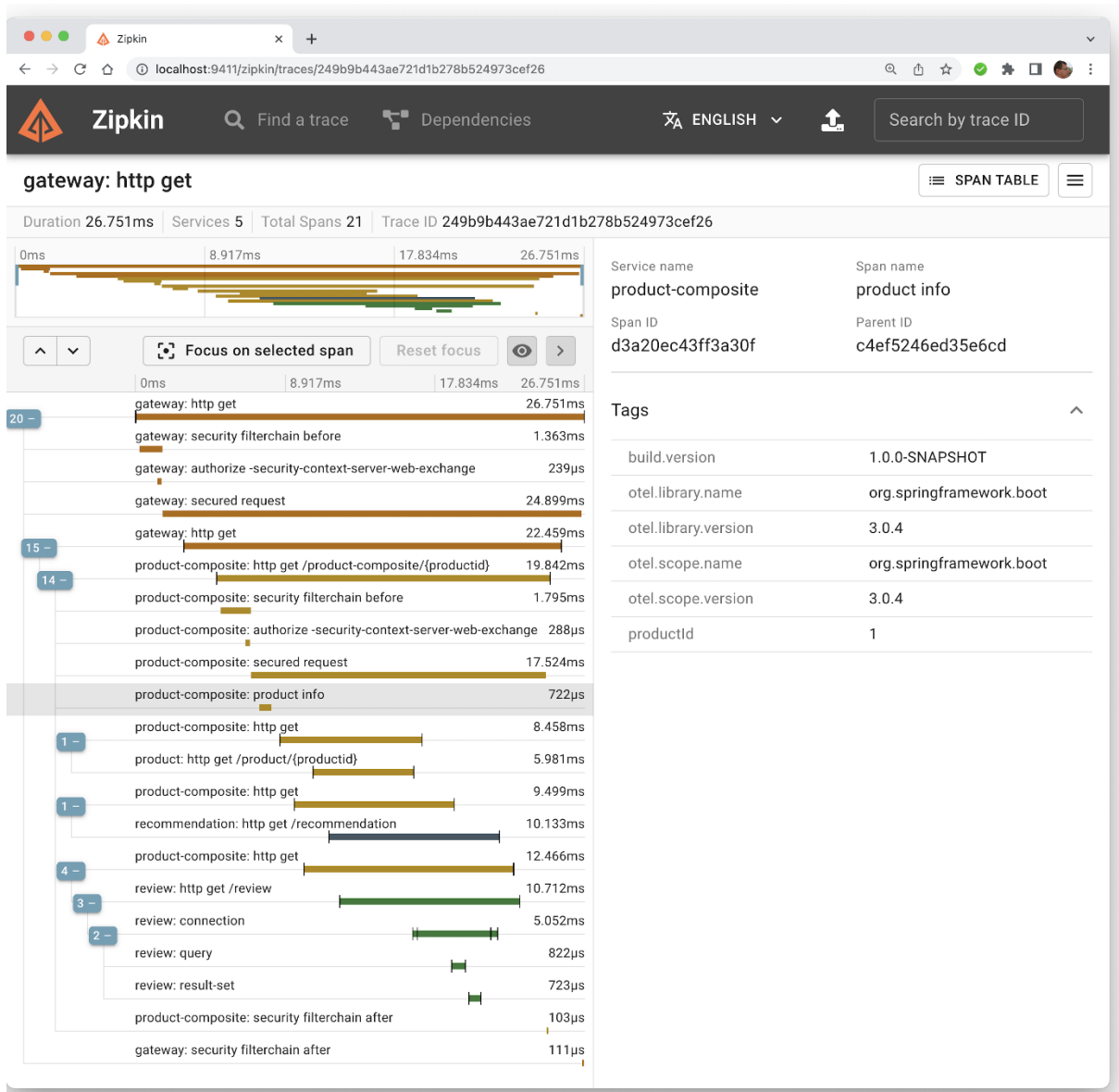
Zipkin

Find a trace Dependencies ENGLISH Search by trace ID

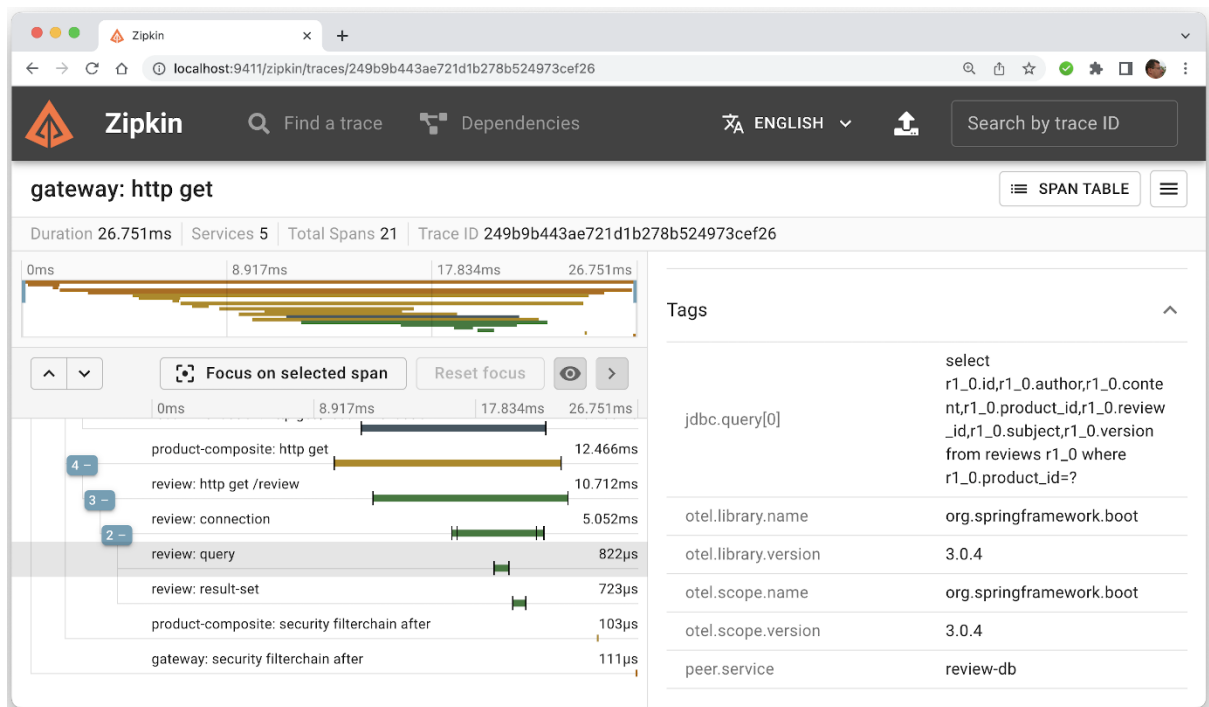
serviceName gateway + a b RUN QUERY

10 Results EXPAND ALL COLLAPSE ALL Service filters

Root	c ↓ Start Time	Spans	Duration
gateway: http get	a minute ago (04/23 11:13:30:849)	21	26.751ms SHOW
gateway: http post	a minute ago (04/23 11:13:20:613)	12	22.687ms SHOW
gateway: http get	2 minutes ago (04/23 11:12:17:377)	20	37.461ms SHOW







Zipkin

Find a trace Dependencies

ENGLISH

Search by trace ID

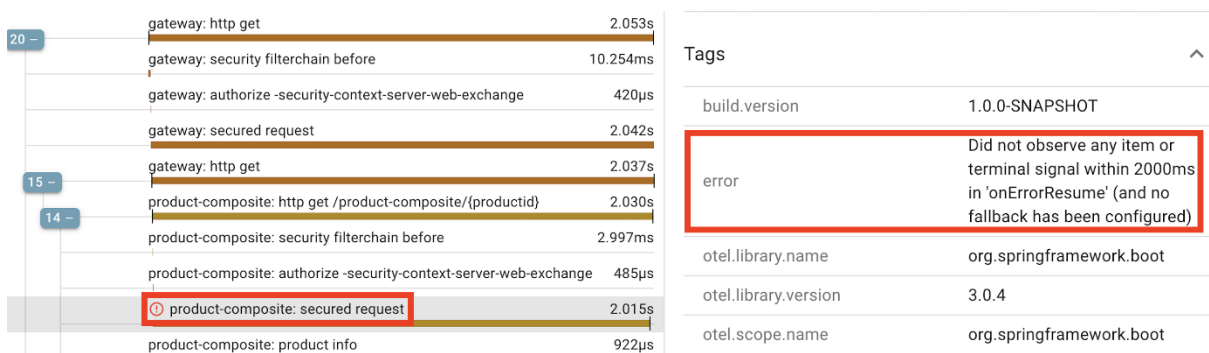
serviceName gateway

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
gateway: http get	11 minutes ago (04/23 11:30:25:735)	19	32.853ms



Zipkin

Find a trace

Dependencies

ENGLISH

Search by trace ID

serviceName gateway

RUN QUERY

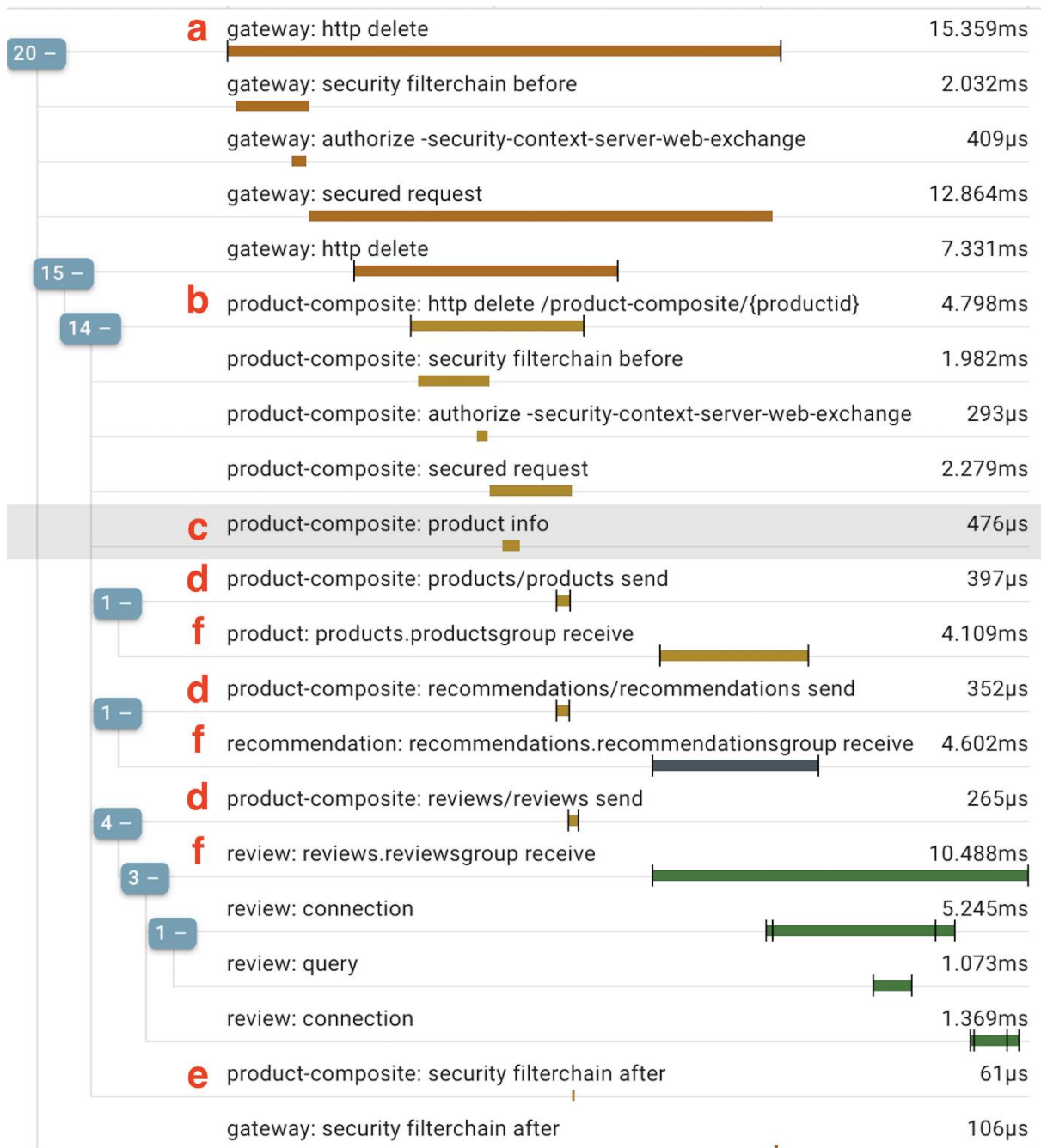
10 Results

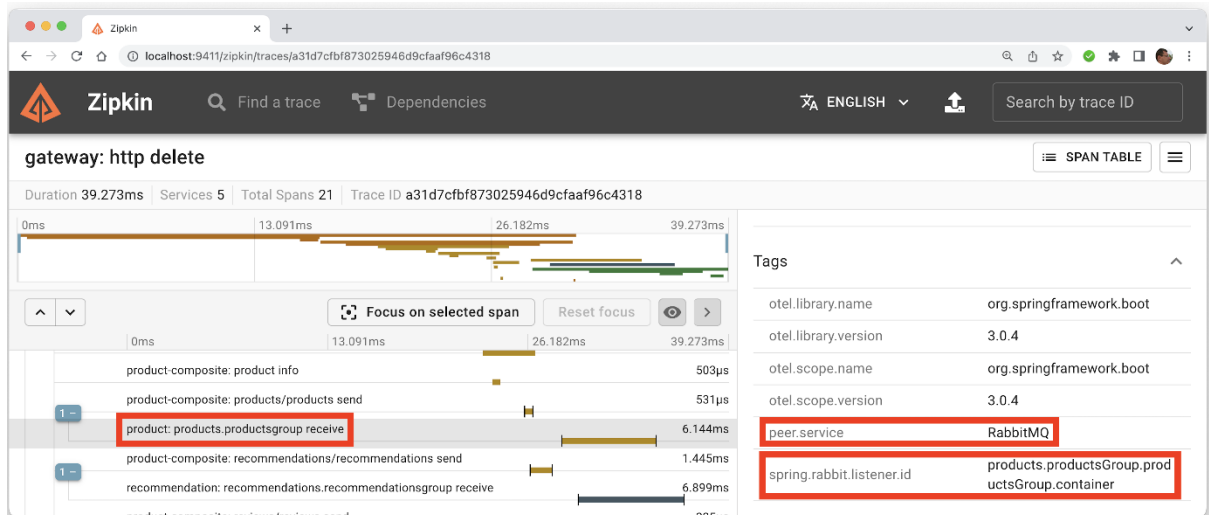
EXPAND ALL

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





RabbitMQ Management

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

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

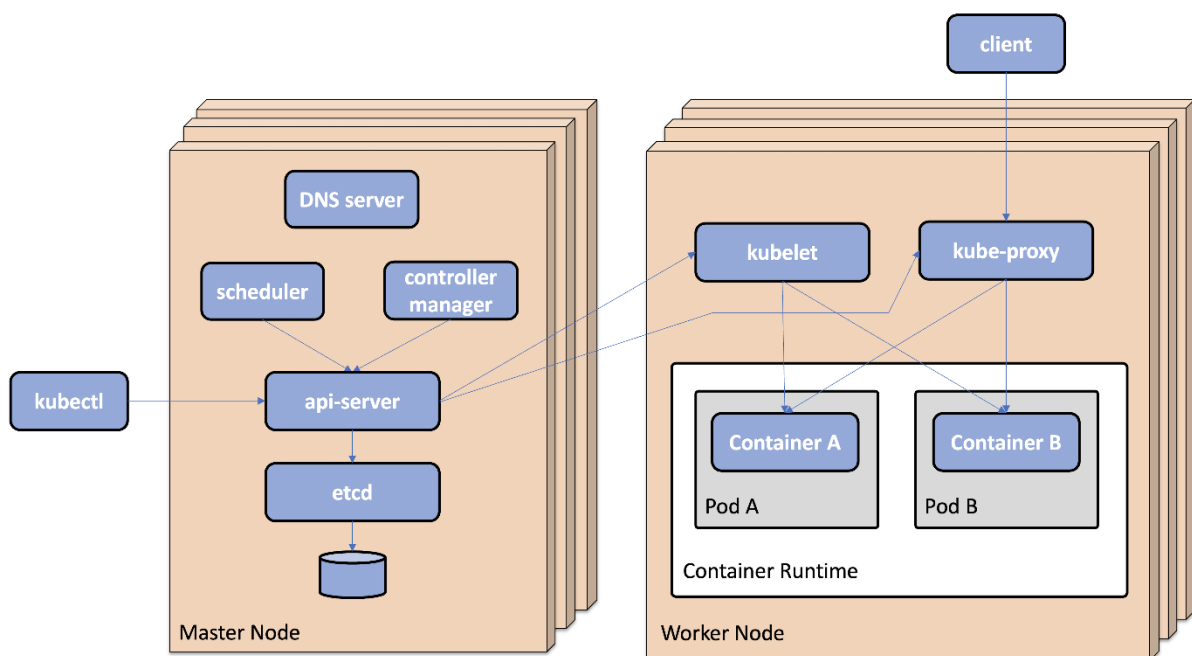
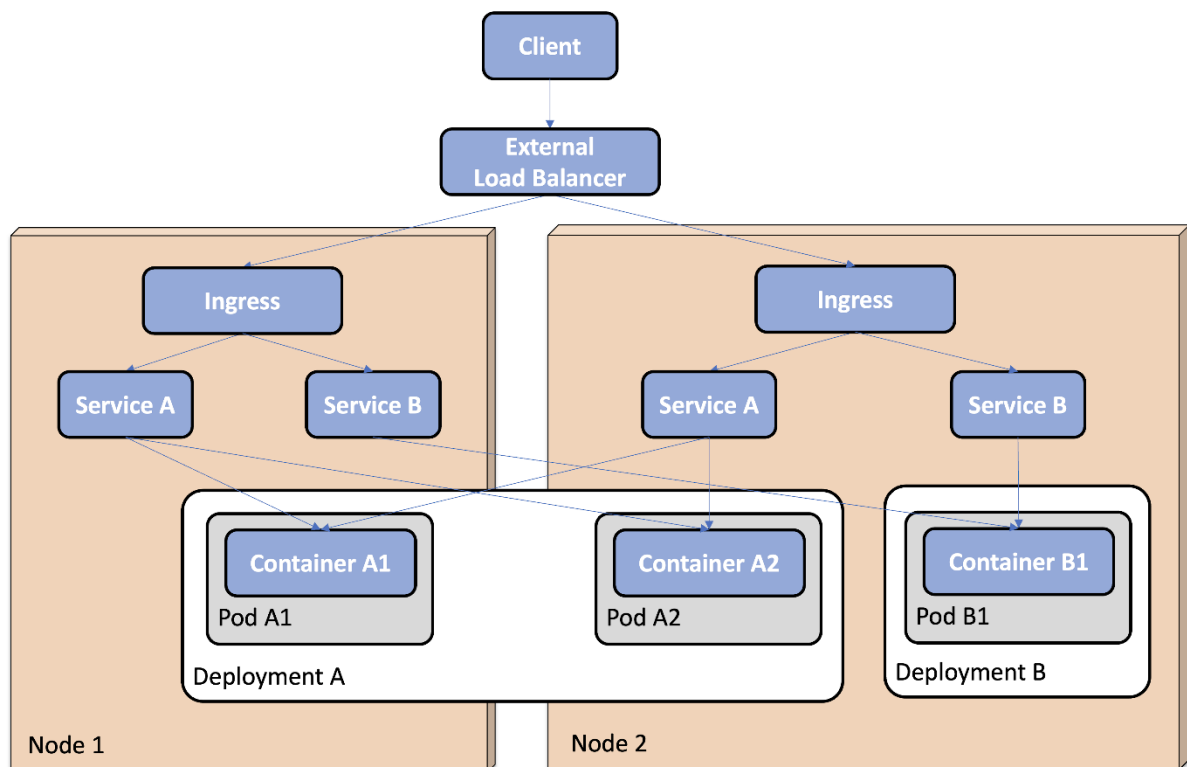
Get Message(s)

Message 1

The server reported 12 messages remaining.

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

## Chapter 15: Introduction to Kubernetes



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

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

```
bash
$ 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
$
```

```
bash
$ 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

```
kubectl get all
```

NAME	READY	STATUS	RESTARTS	AGE
pod/nginx-deploy-58bfb487f9-g9zg7	1/1	Running	0	9s
pod/nginx-deploy-58bfb487f9-knhfp	1/1	Running	0	3m8s
pod/nginx-deploy-58bfb487f9-w9lgs	1/1	Running	0	9s

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
deployment.apps/nginx-deploy	3/3	3	3	5m34s

NAME	DESIRED	CURRENT	READY	AGE
replicaset.apps/nginx-deploy-58bfb487f9	3	3	3	5m34s

```
kubectl get svc
```

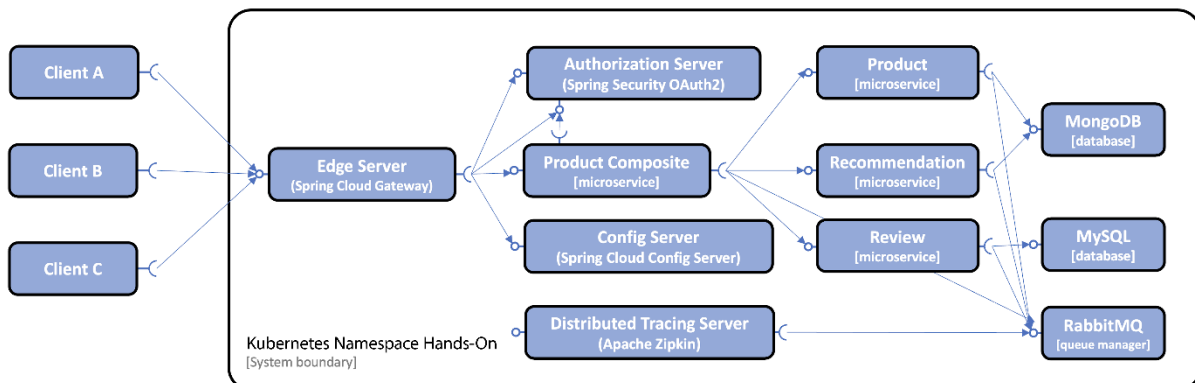
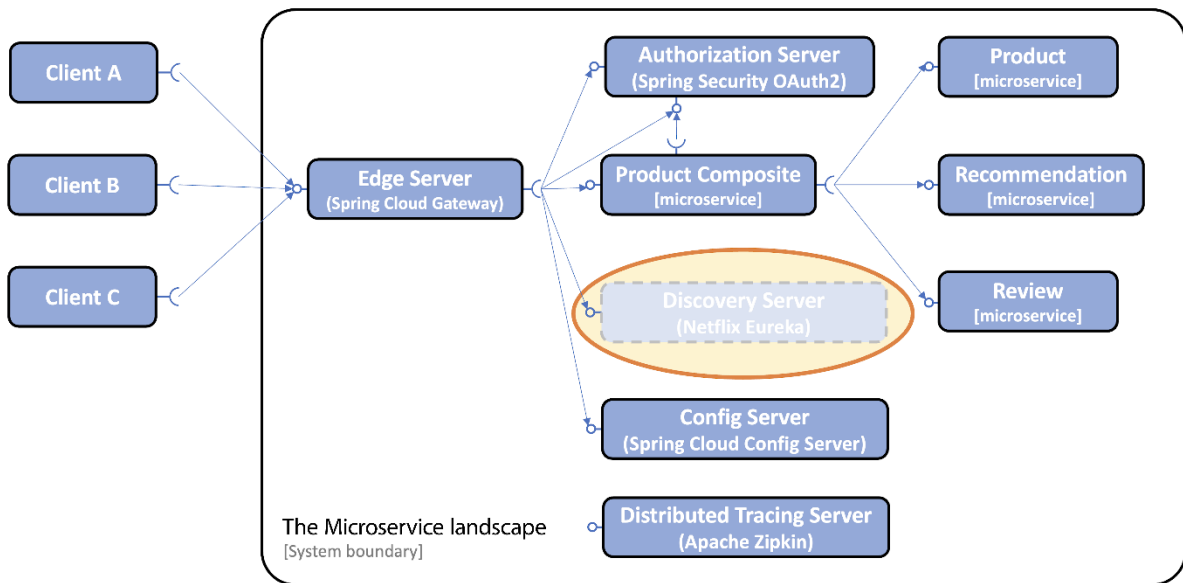
NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
nginx-service	NodePort	10.100.230.194	<none>	80:30080/TCP	30s



```
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



```
root@81676feda95e: /application
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
$
```

root@81676feda95e: /application					
rabbitmq-6c7b9bf547-vrjkn	0/1	Running	0	5s	
product-composite-f45fccdf5-gjd6z	0/1	ContainerCreating	0	5s	
zipkin-server-586bccd96-btcg4	0/1	Running	0	5s	
config-server-6b9f6c6988-zbkzg	0/1	Running	0	6s	
recommendation-7b6cbdc67-l2zq2	0/1	ContainerCreating	0	5s	
mongodb-d466986f-6fgxp	1/1	Running	0	7s	
gateway-7bdcf586df-tn4gv	0/1	Running	0	7s	
product-composite-f45fccdf5-gjd6z	0/1	Running	0	8s	
mysql-5846f7fb7c-zlbxq	1/1	Running	0	8s	
review-777ff7d5b4-ccdn7	0/1	Running	0	8s	
auth-server-5c58bbcb9b-h2st7	0/1	Running	0	9s	
recommendation-7b6cbdc67-l2zq2	0/1	Running	0	8s	
zipkin-server-586bccd96-btcg4	1/1	Running	0	11s	
config-server-6b9f6c6988-zbkzg	1/1	Running	0	11s	

```
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
$
```

```
bash
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
```

```
bash
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
```

```
bash
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
```

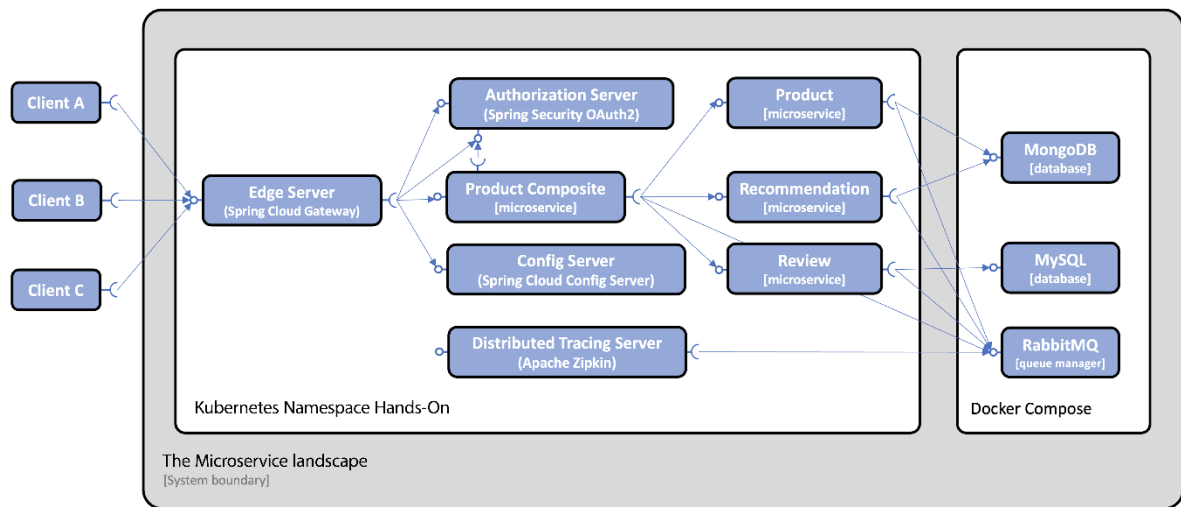
```
bash
{
  "status": "UP"
}
$
```



bash

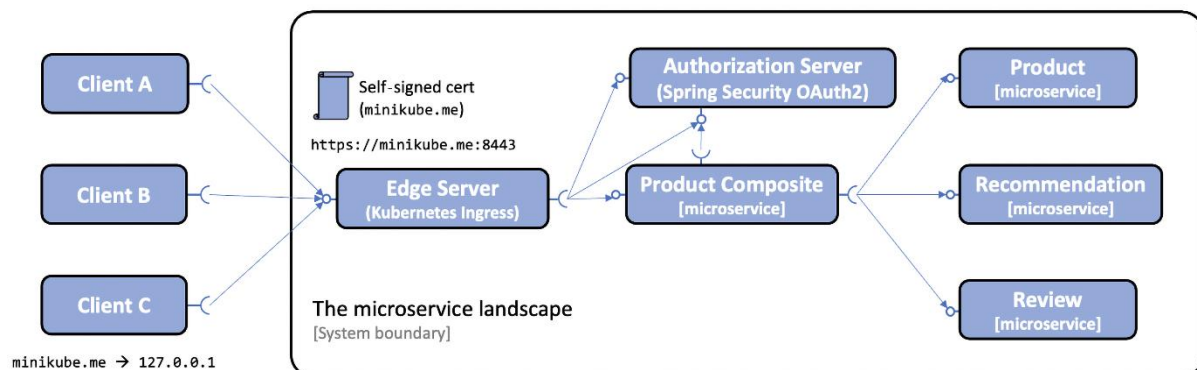
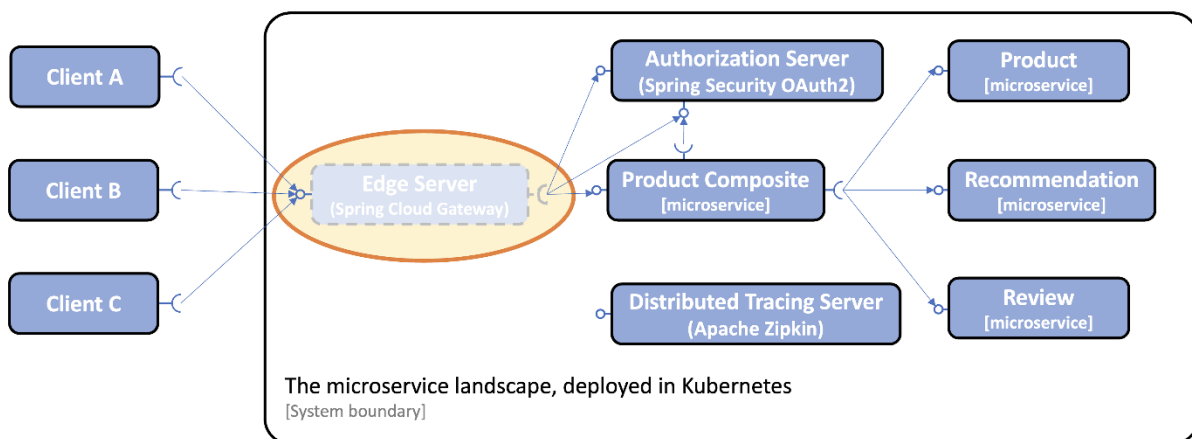
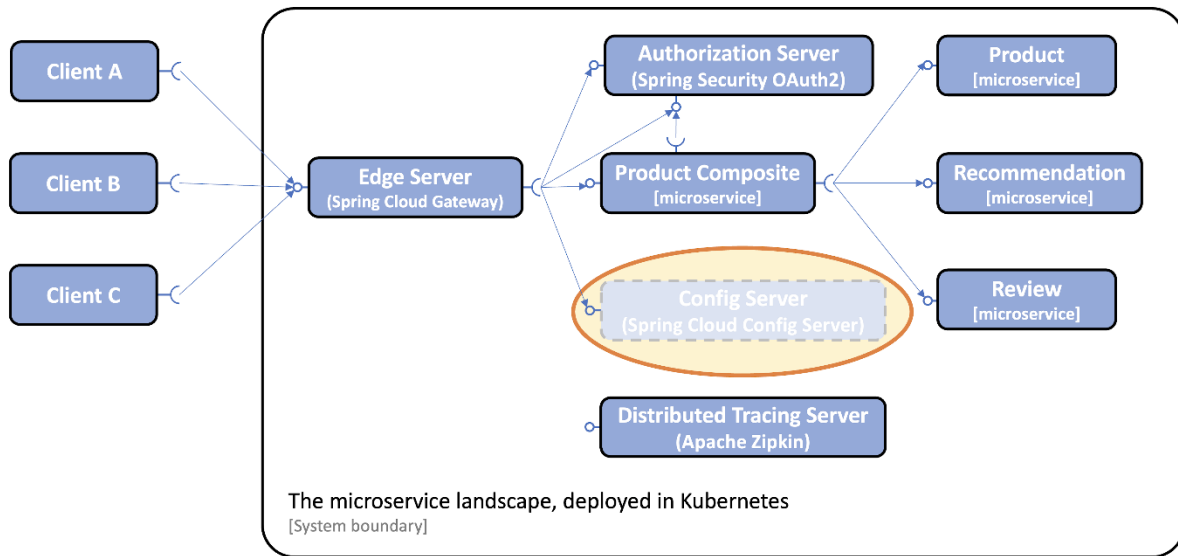
~ 1

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



```
bash
"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



```

NAME                                READY   STATUS    RESTARTS   AGE
cert-manager-64f9f45d6f-2dmlld      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      True    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

```

```

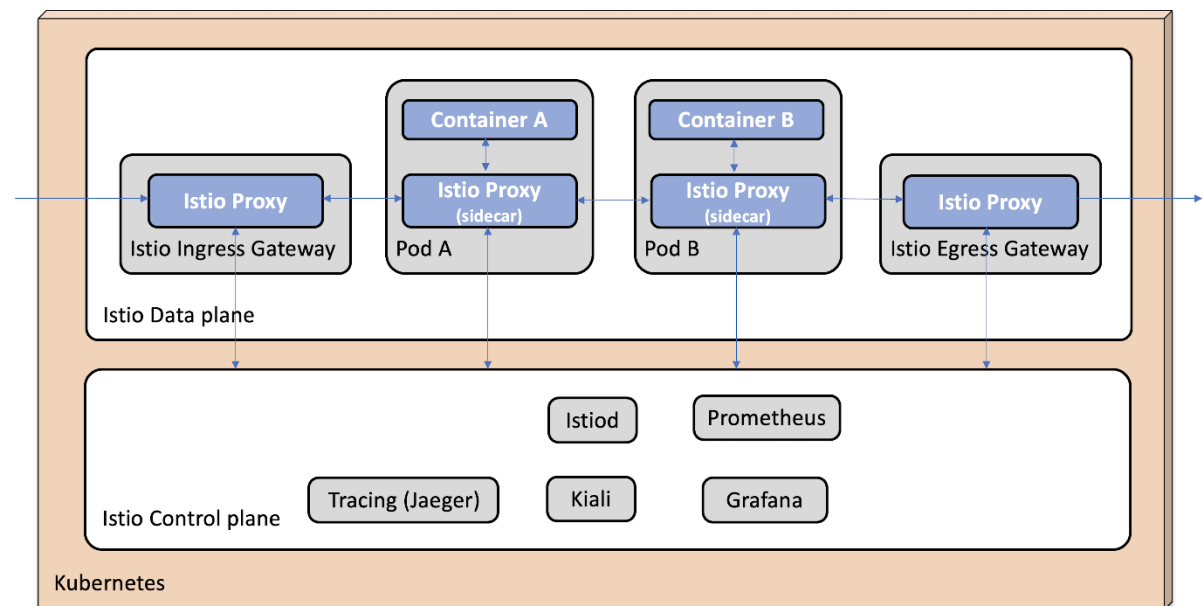
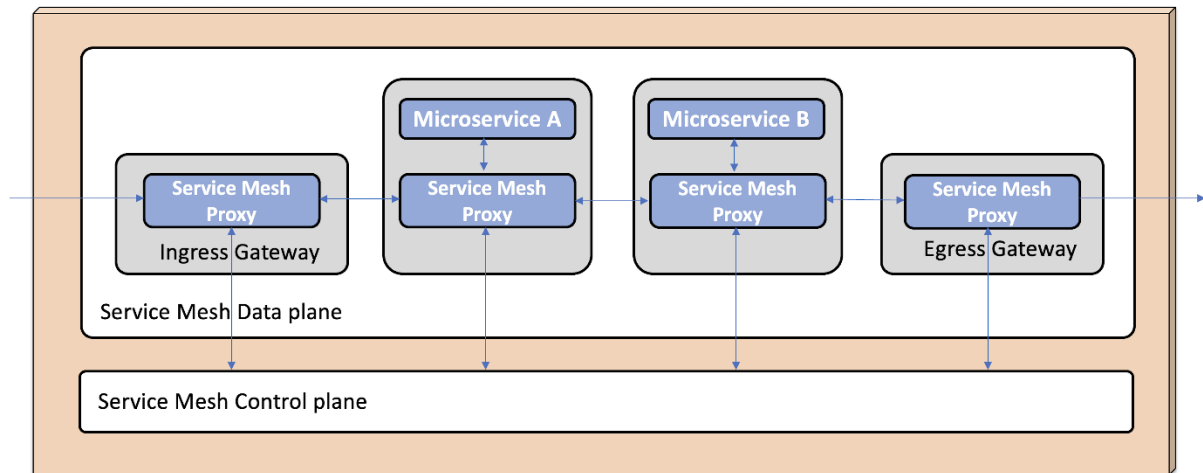
0s      Normal    Issuing    certificate/tls-certificate
Renewing certificate as renewal was scheduled at 2023-05-07 05:55:40 +0000 UTC
...
0s      Normal    Issuing    certificate/tls-certificate
The certificate has been successfully issued

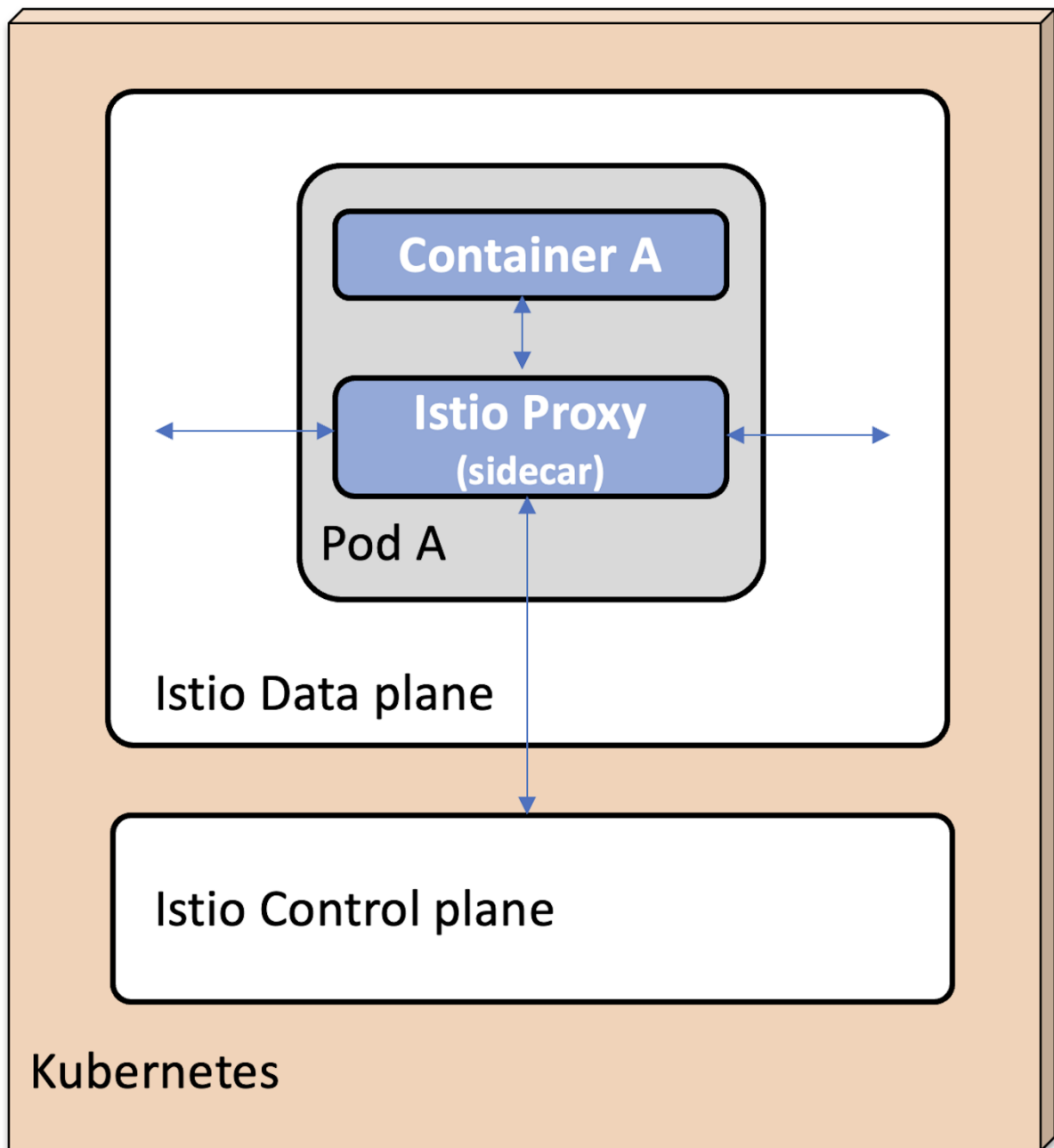
```



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

$
```

```
bash
✓ 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/

$
```

```
bash
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

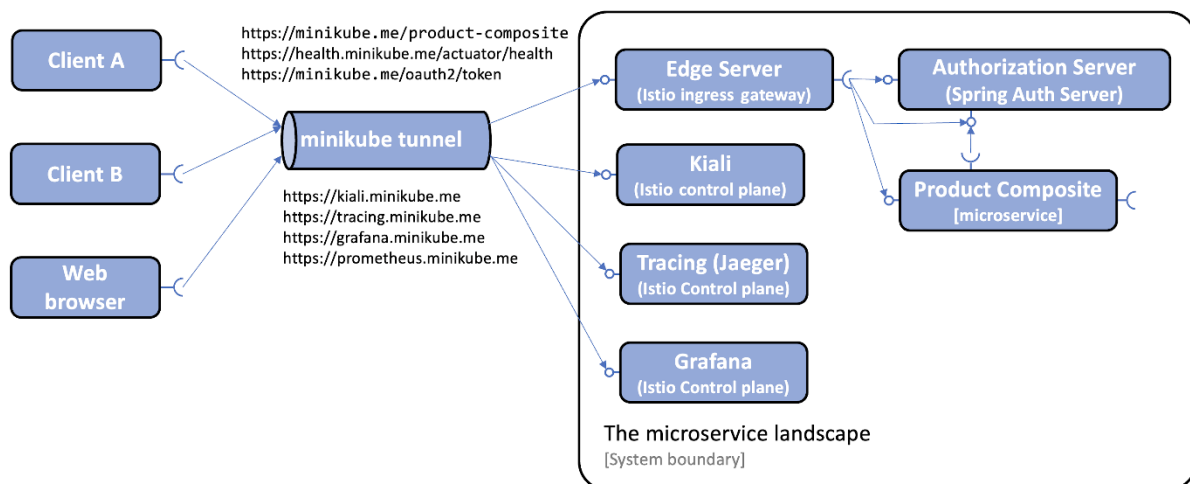
$
```

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
$

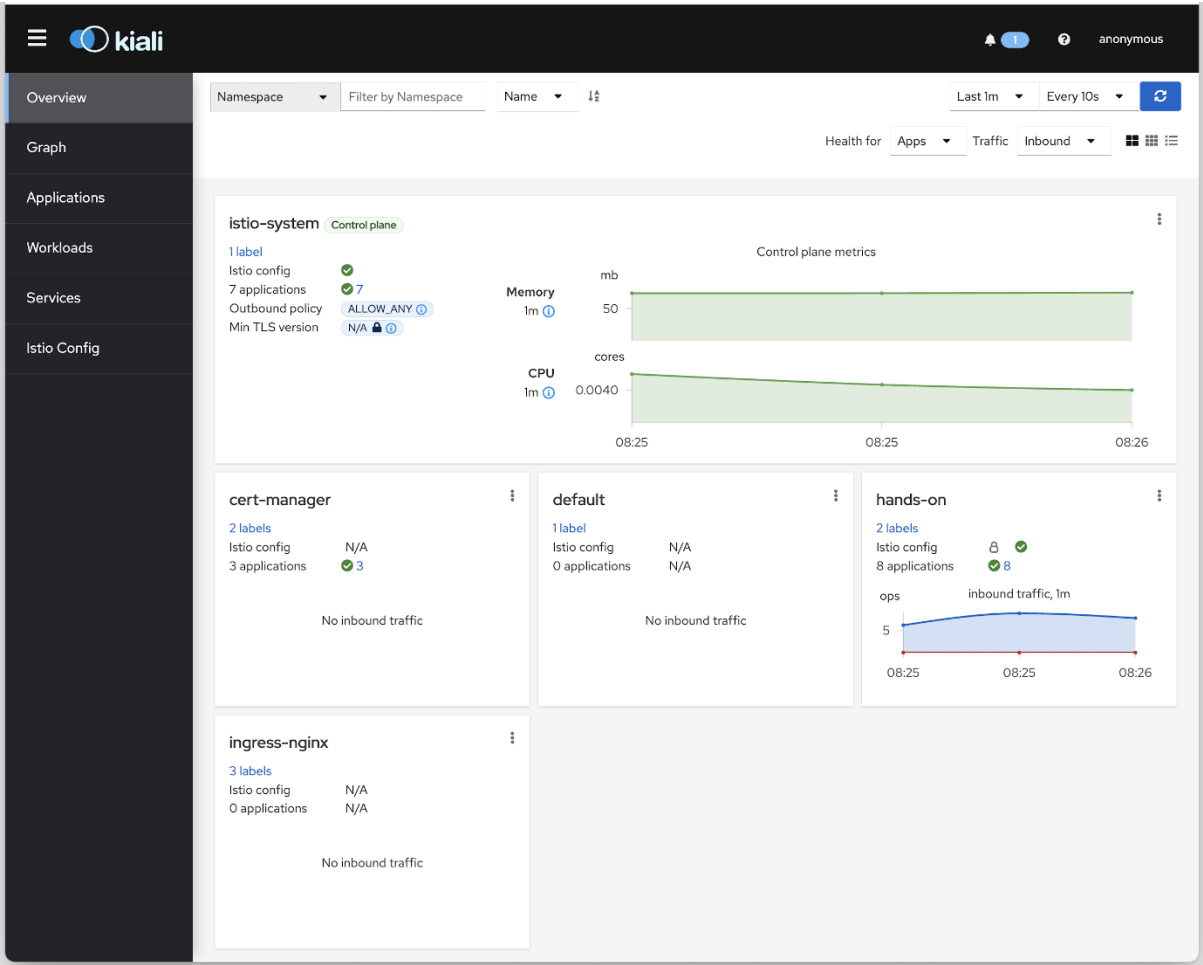
```

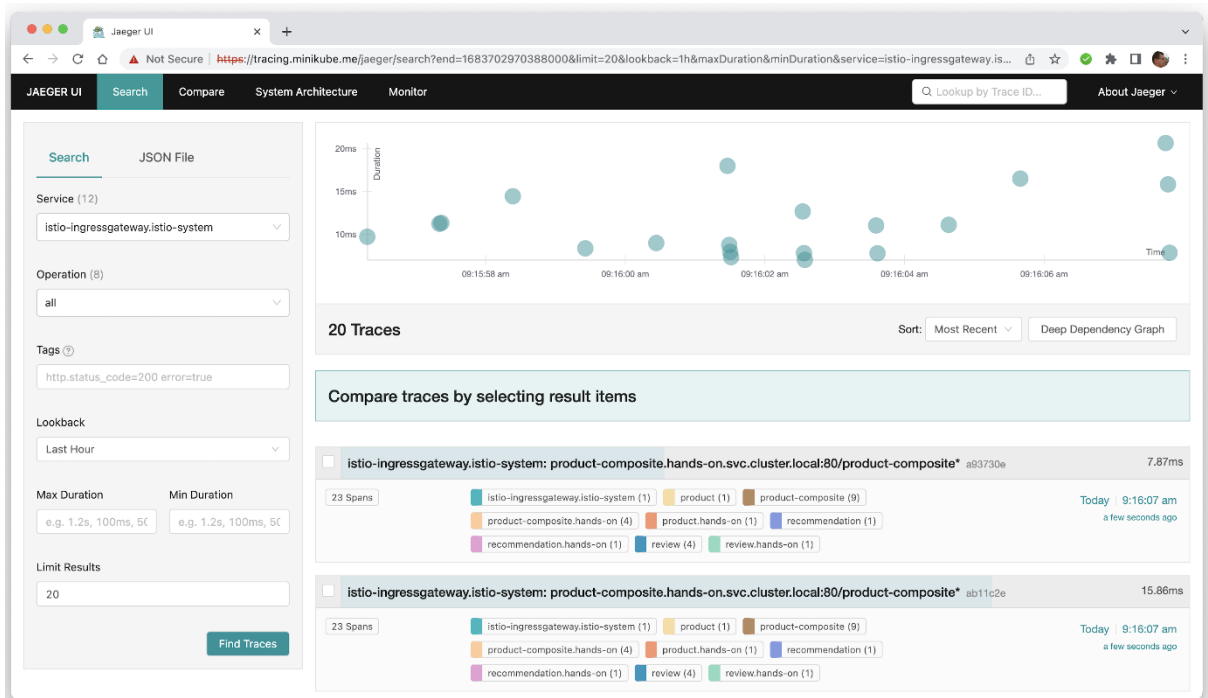
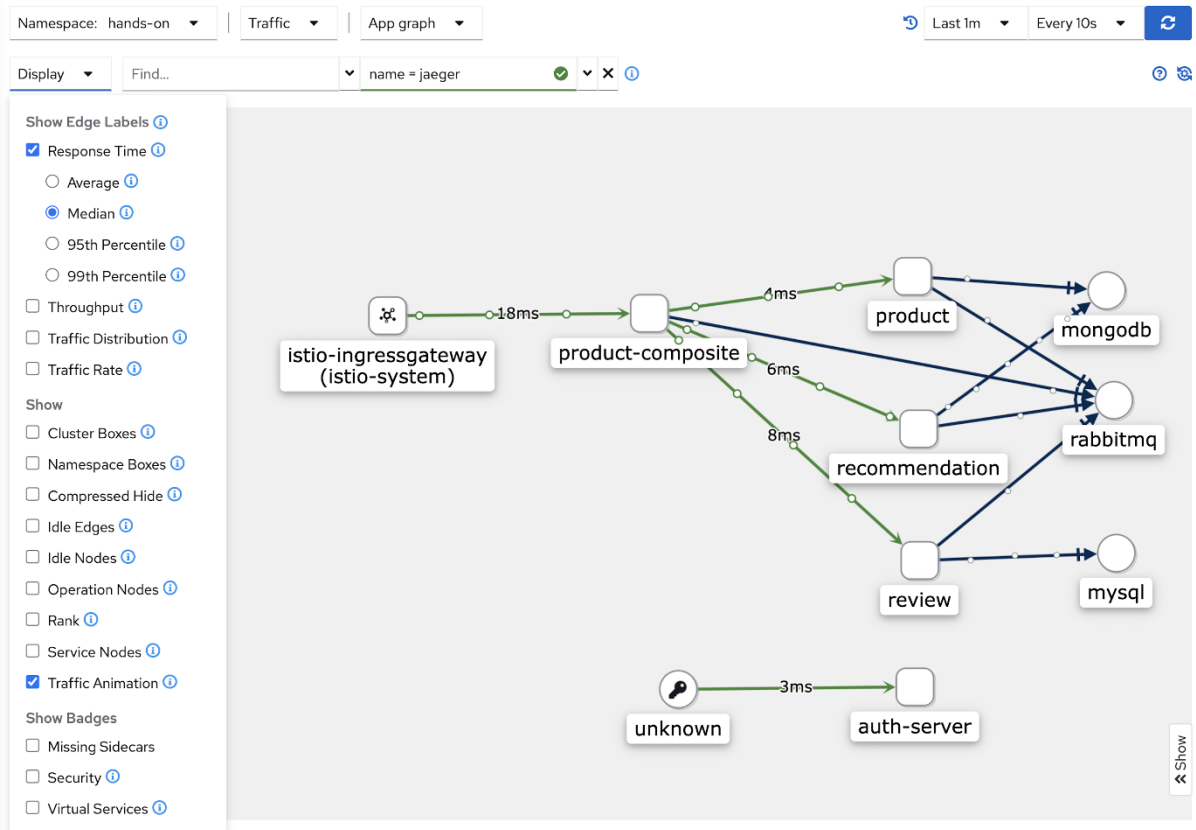
NAME	READY	STATUS	RESTARTS	AGE
auth-server-cf57b9bff-l2wnf	2/2	Running	0	39s
mongodb-6f4b595bbf-kvwnm	1/1	Running	0	39s
mysql-5dd488c7d-l7lvz	1/1	Running	0	39s
product-5454d77458-dvrtz	2/2	Running	0	39s
product-composite-59fb54568c-t8czm	2/2	Running	0	39s
rabbitmq-9cbbbb894-wlkgv	1/1	Running	0	39s
recommendation-96984995d-mpvq9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

\$

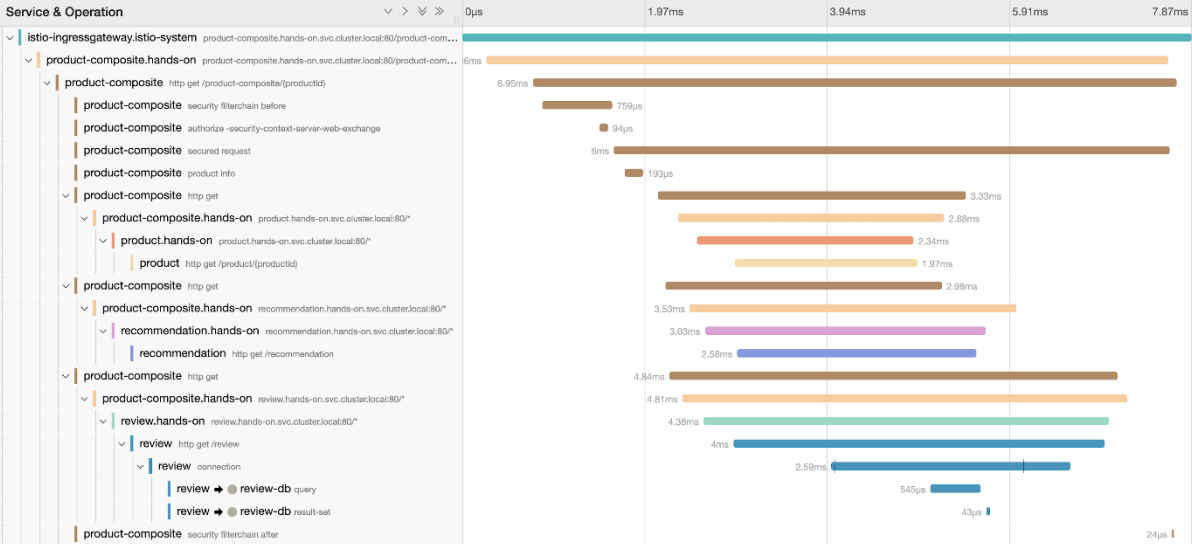
```
Start Tests: Tue May 9 18:12:07 CEST 2023
...
Wait for: curl -k https://health.minikube.me/actuator/health...
DONE, continues...
...
Test OK (HTTP Code: 200)
...
End, all tests OK: Tue May 9 18:12:33 CEST 2023
$
```

```
** 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
```

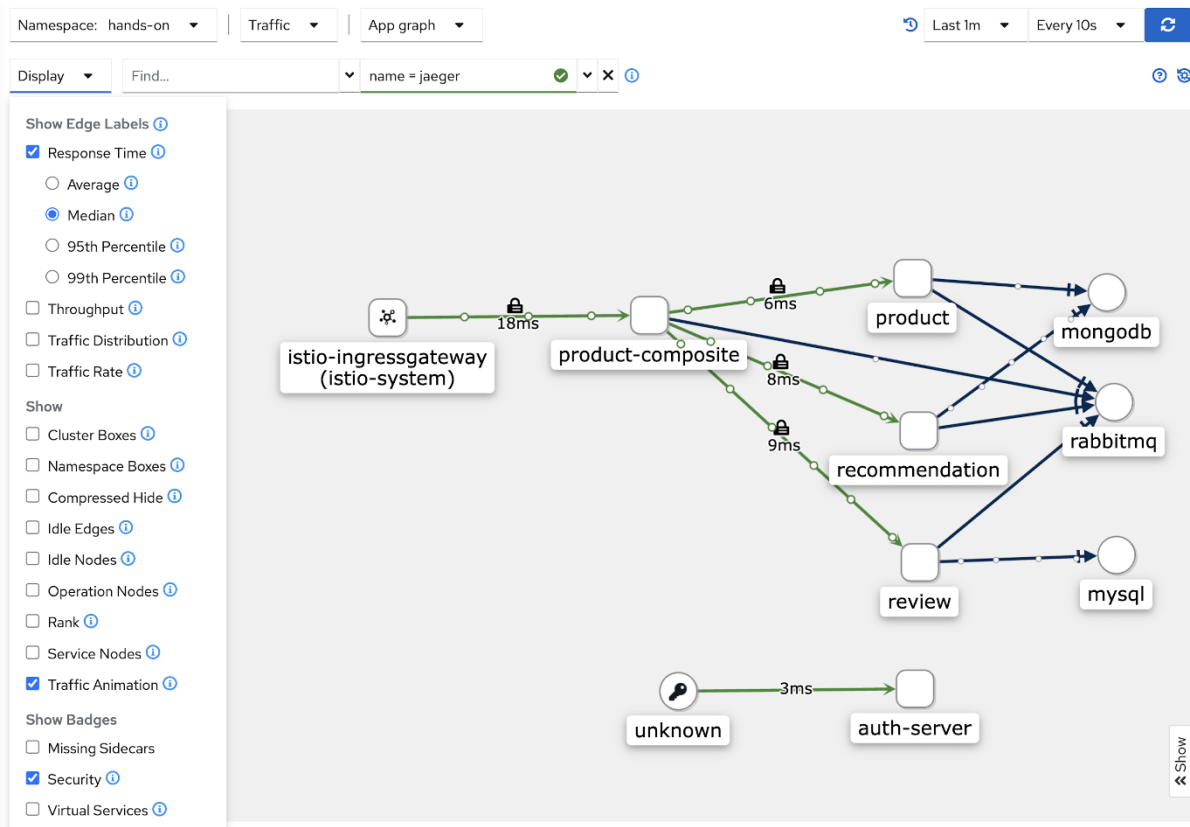








```
Owner: SERIALNUMBER=my-sn, CN=minikube.me, OU=my-ou, O=my-org, OID.2.5.4.15
=my-pc, STREET=my-address, L=my-locality, ST=my-province, C=my-country
Issuer: CN=hands-on-ca
$
```



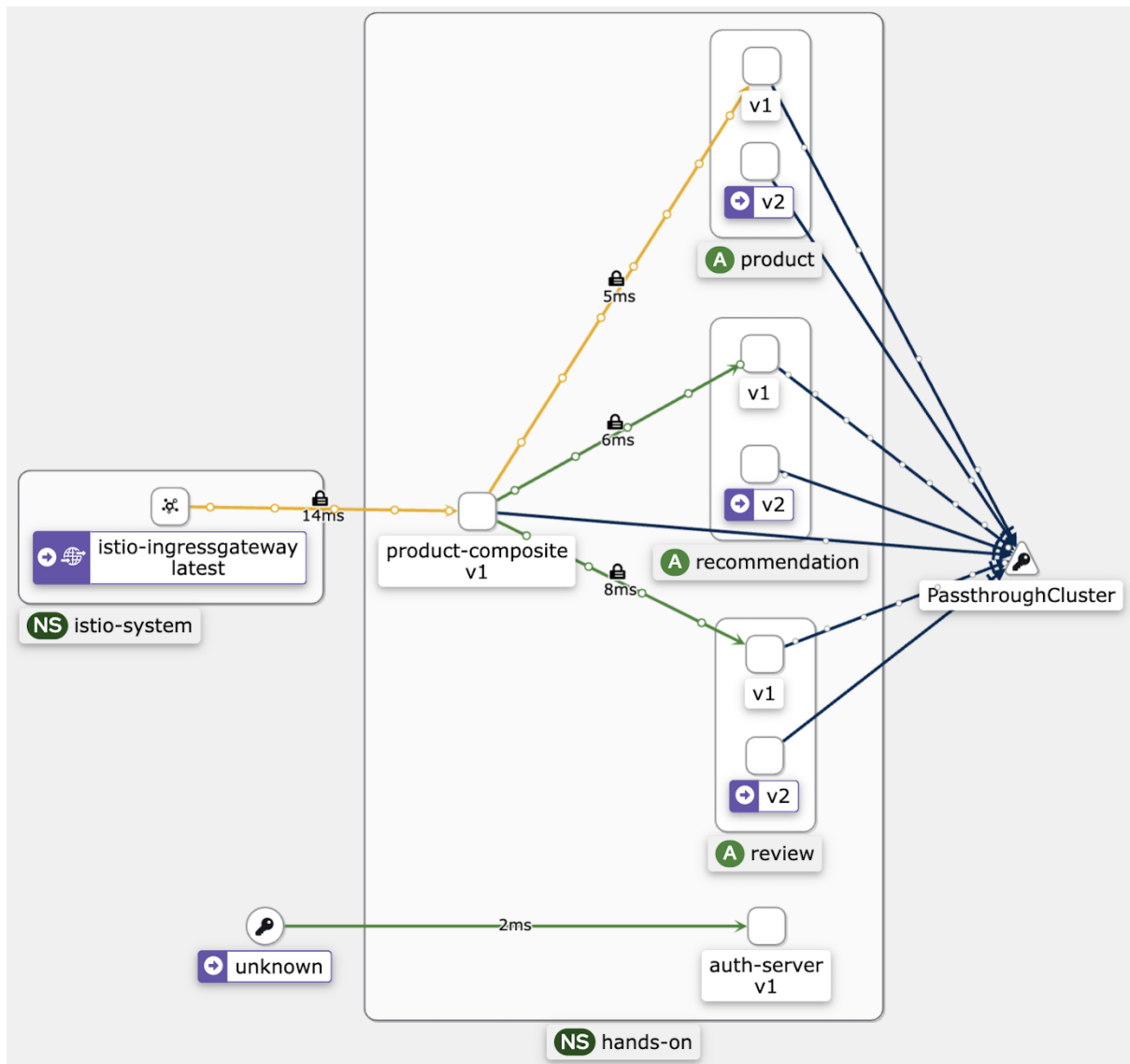
```
bash
HTTP/1.1 200 0.03 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 1.02 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 0.03 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 1.05 secs: 771 bytes ==> GET /product-composite/1
HTTP/1.1 200 0.02 secs: 771 bytes ==> GET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

```
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
$
```

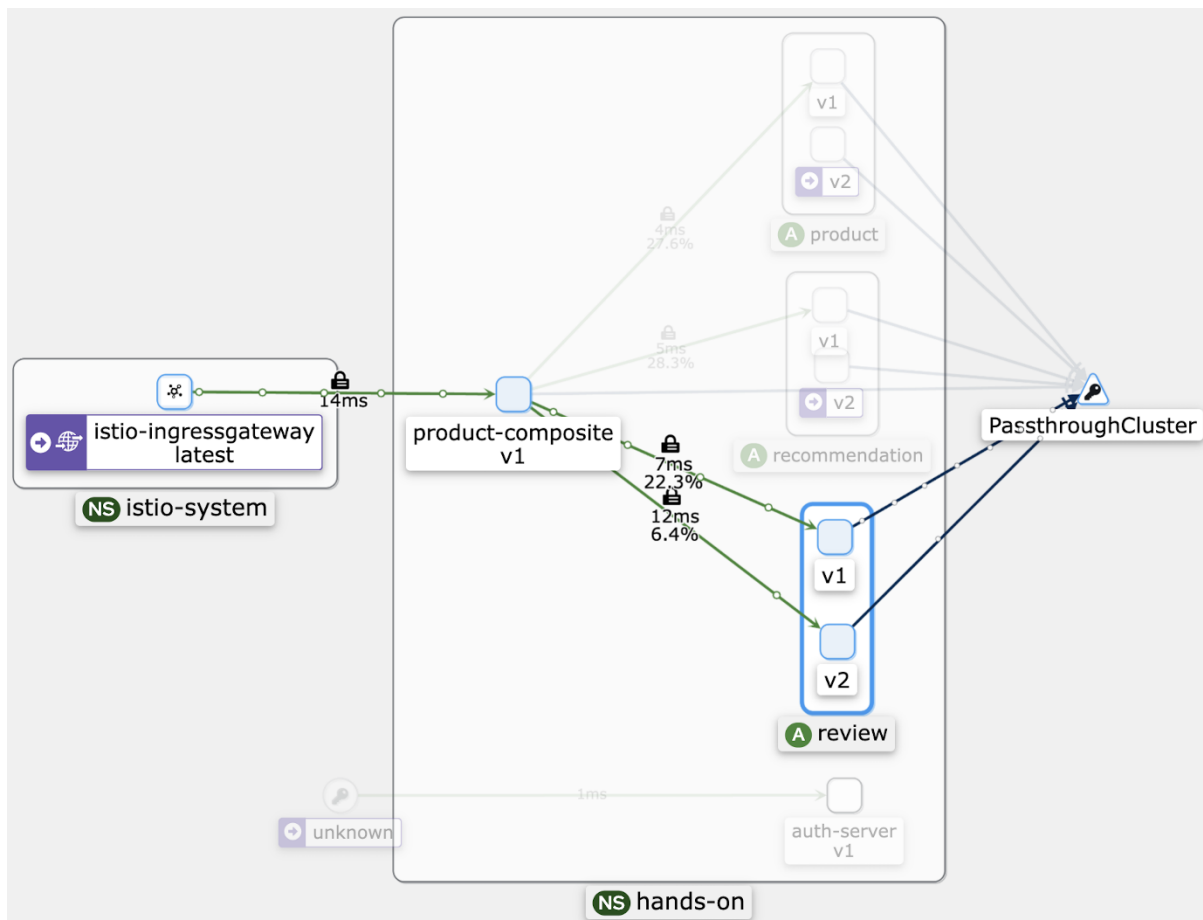
```
bash
NAME                                READY   STATUS    RESTARTS   AGE
auth-server-78c4d44b55-ml2rg        2/2     Running   0           47s
product-composite-546597978c-j2cdc  2/2     Running   0           47s
product-v1-76dd48574-hlfgt          2/2     Running   0           47s
product-v2-5ff8575567-s6j2b         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
$
```

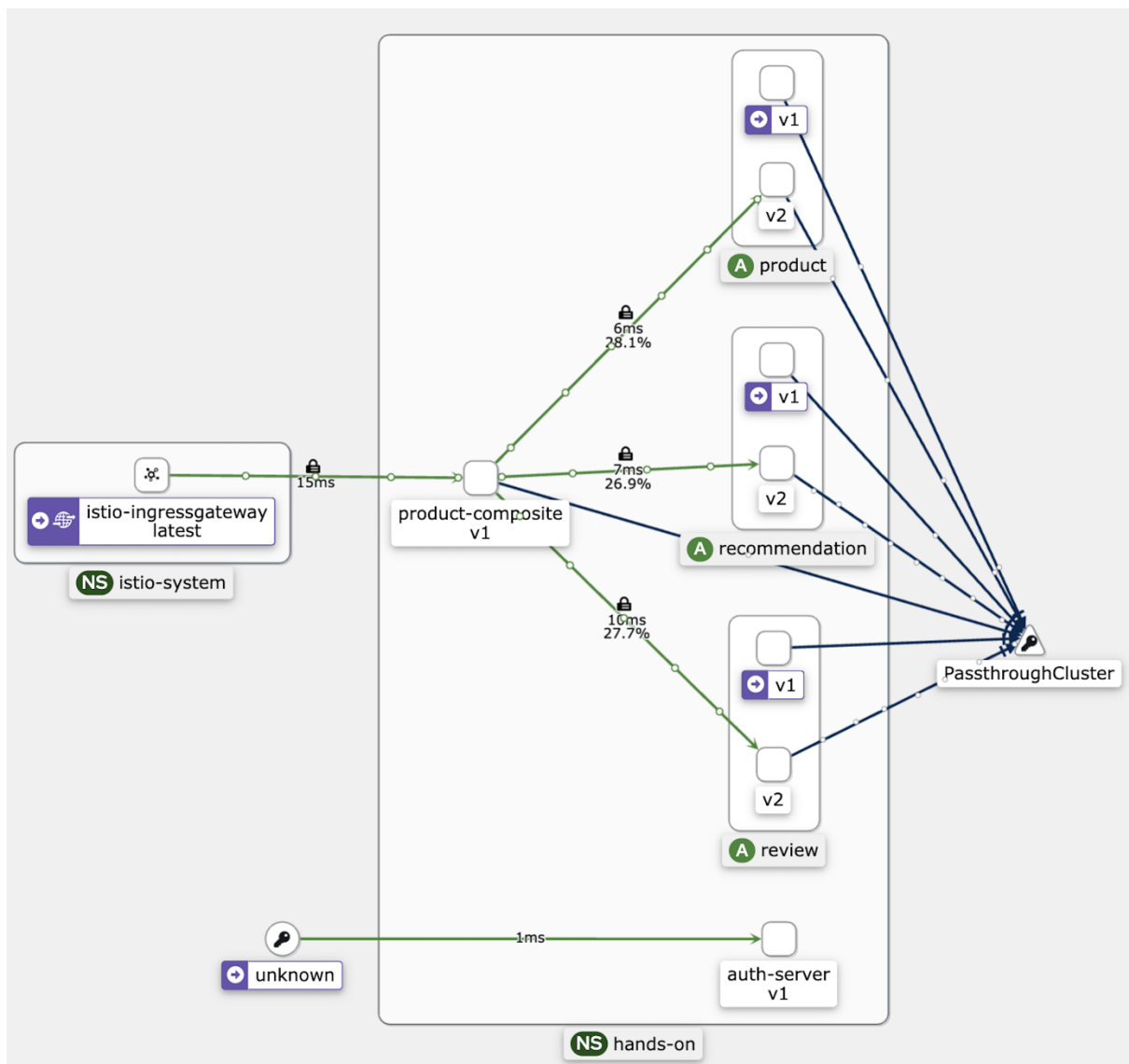
```
bash
Start Tests: Wed May 10 10:07:21 CEST 2023
...
Wait for: curl -k https://health.minikube.me/actuator/health...
DONE, continues...
...
Test OK (HTTP Code: 200)
...
End, all tests OK: Wed May 10 10:07:48 CEST 2023
$
```



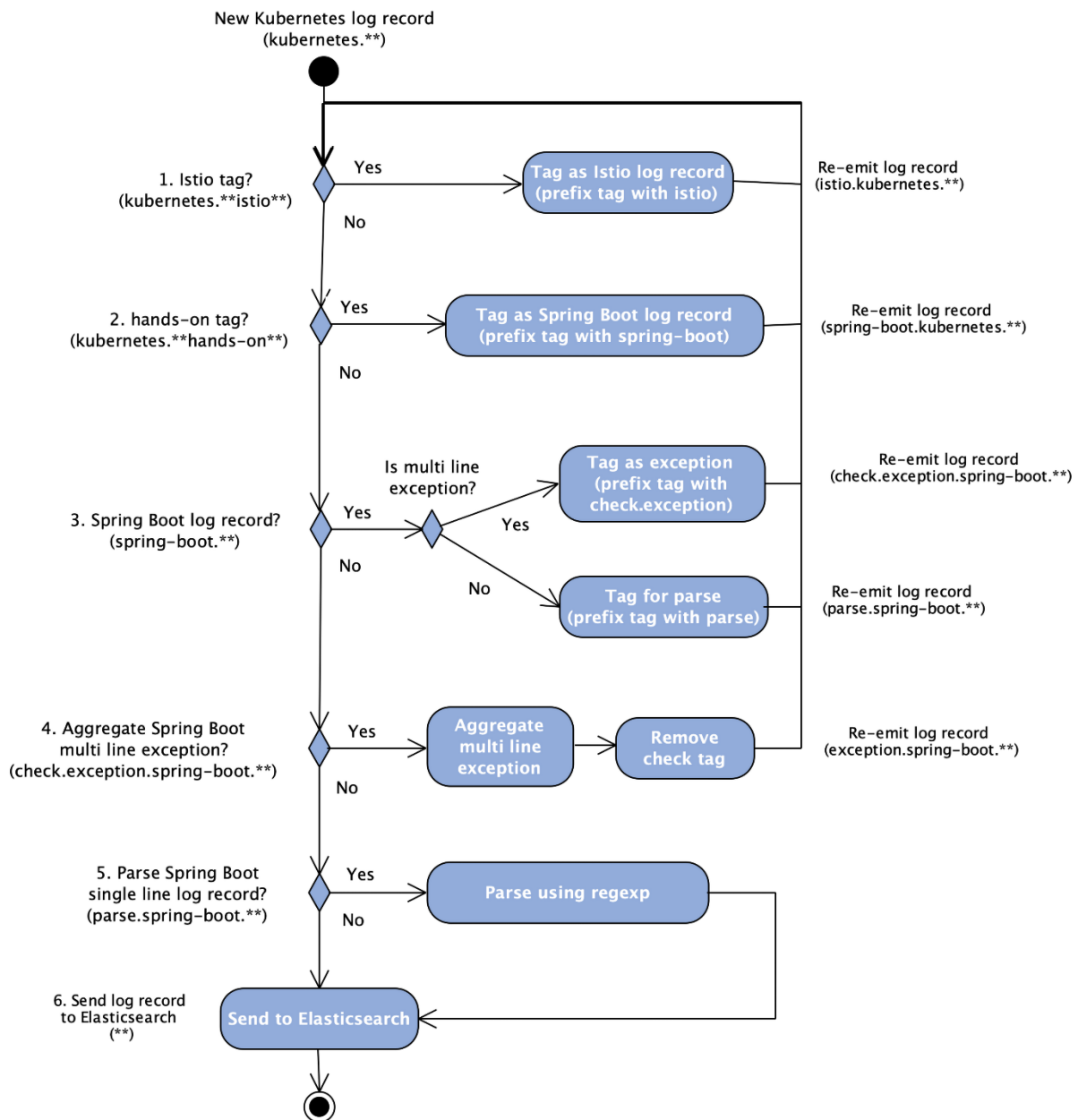
```
bash
{
  "cmp": "product-composite-546597978c-j2cdc/10.244.0.26:80",
  "pro": "product-v1-76dd48574-hlfgt/10.244.0.28:80",
  "rev": "review-v1-5f5f74b49d-bpprh/10.244.0.29:80",
  "rec": "recommendation-v1-8fc6456fd-dv92b/10.244.0.30:80"
}
```

```
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"
}
```

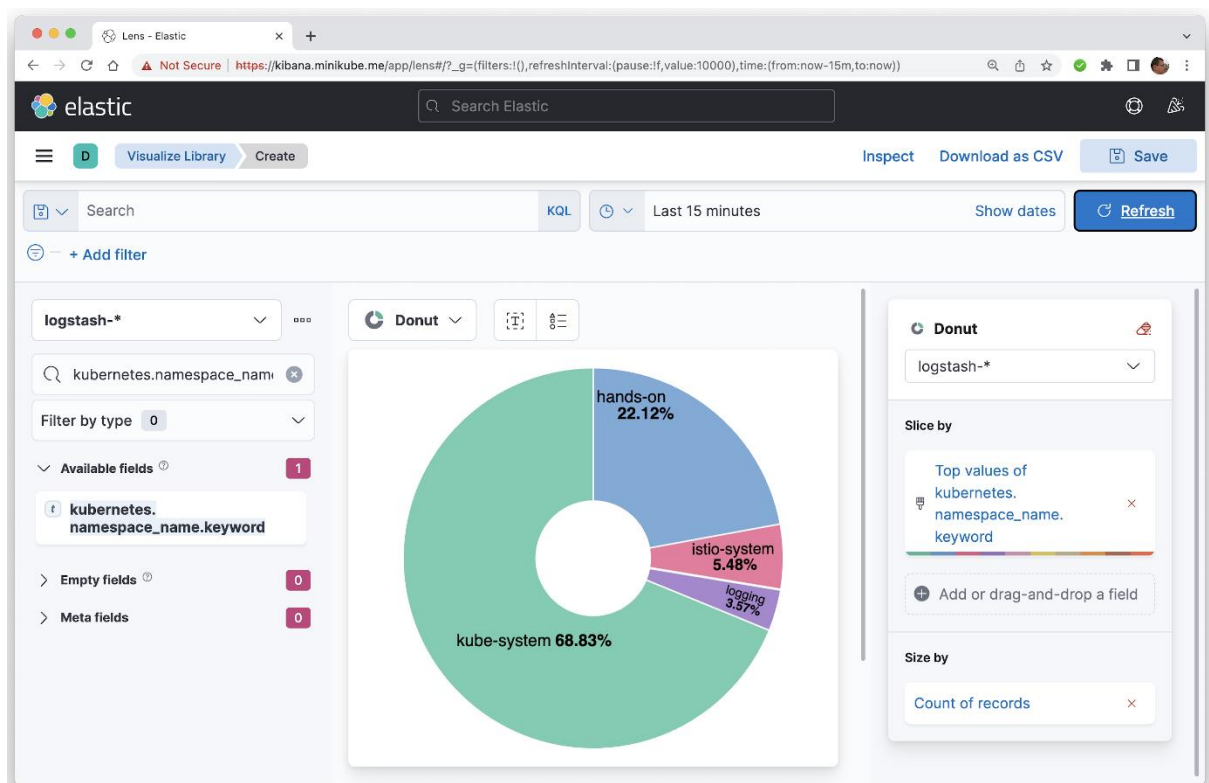
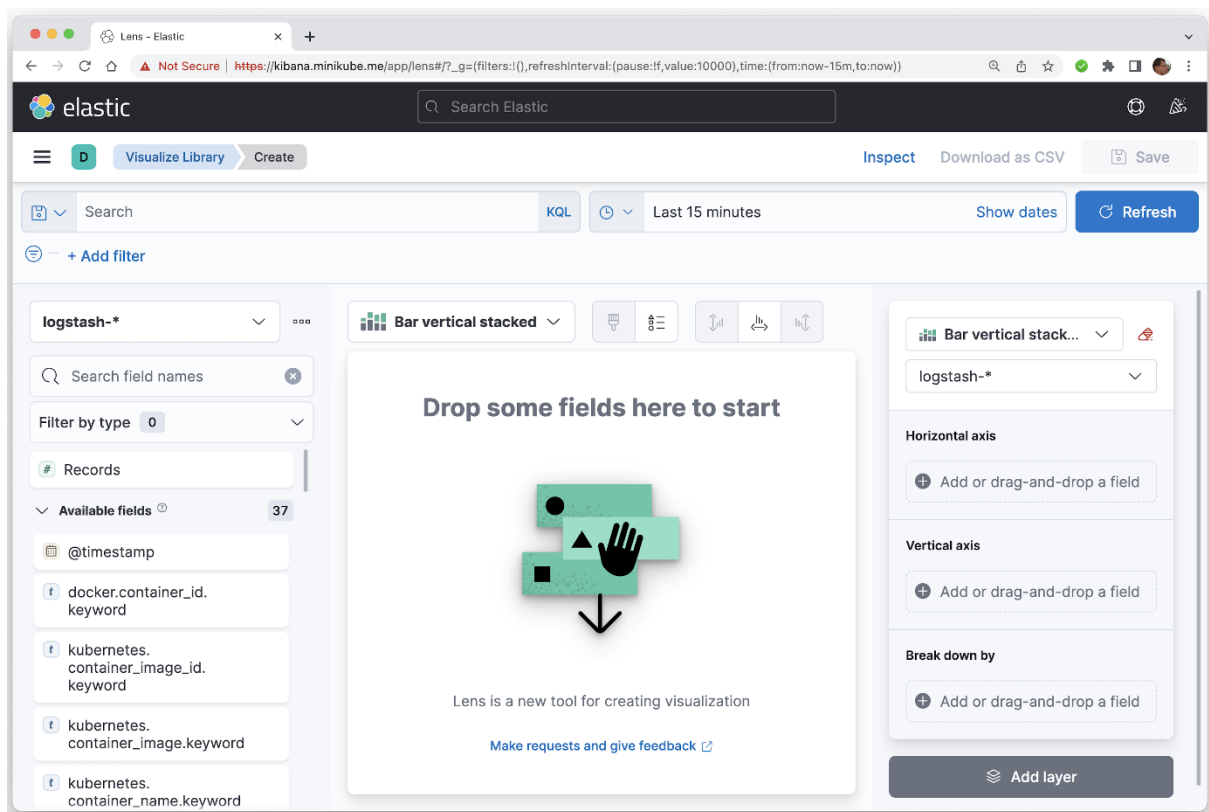




## Chapter 19: Centralized Logging with the EFK Stack

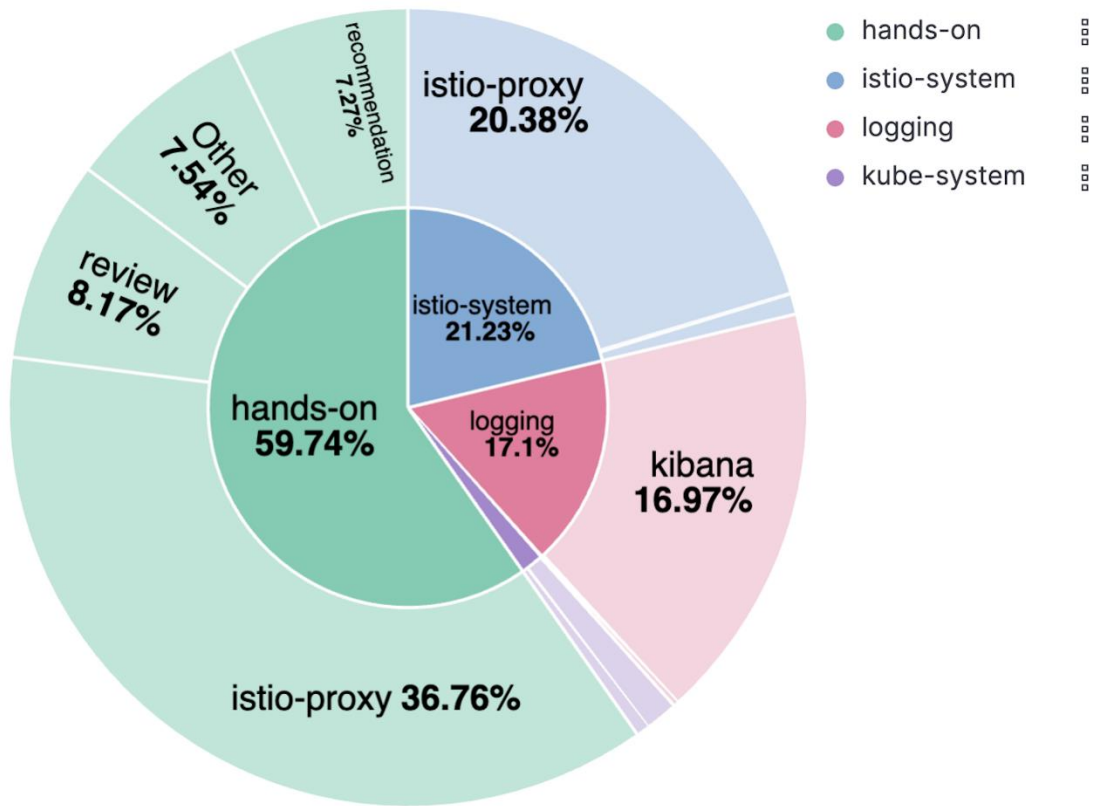


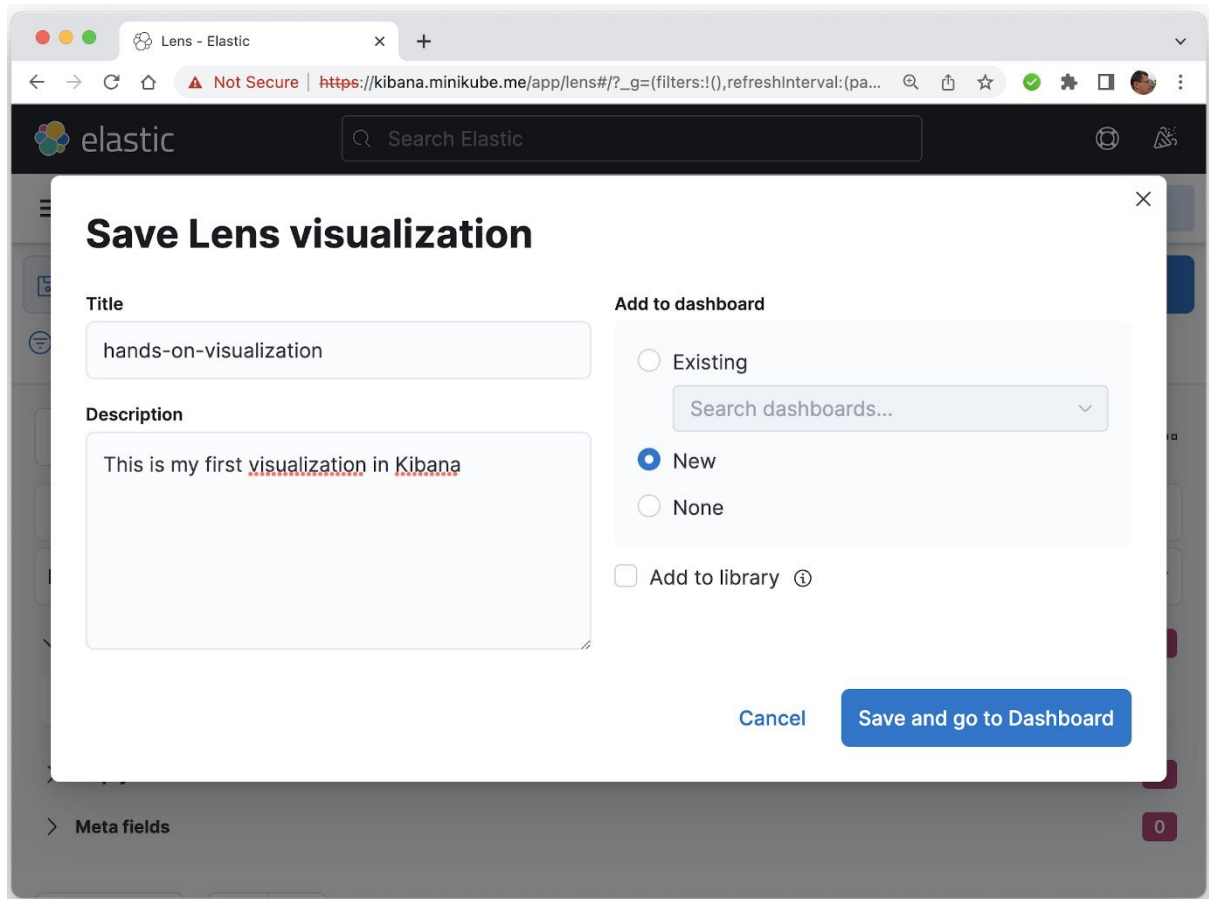
```
bash
Start Tests: Thu May 18 09:27:34 CEST 2023
...
Wait for: curl -k https://health.minikube.me/actuator/health...
DONE, continues...
...
Test OK (HTTP Code: 200)
...
End, all tests OK: Thu May 18 09:28:01 CEST 2023
$
```

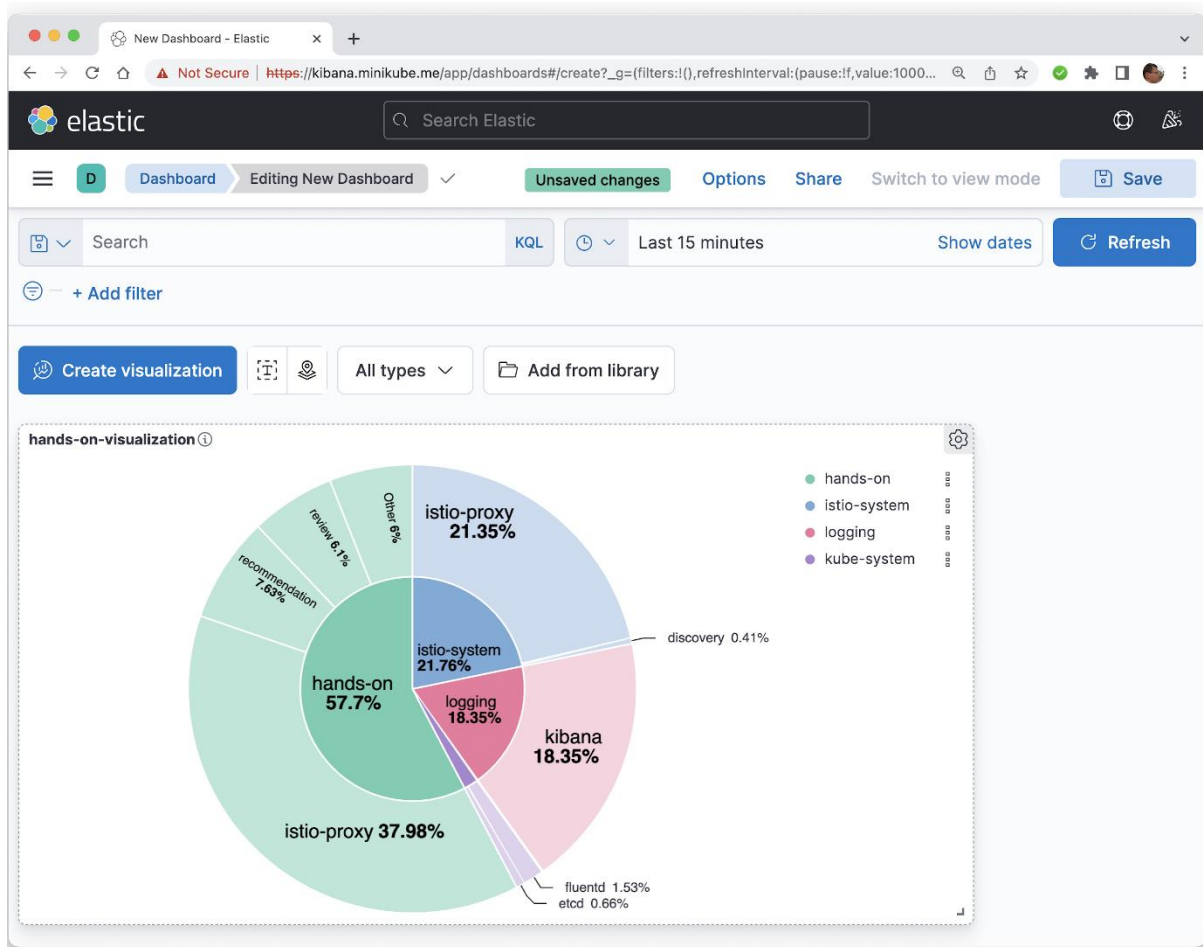




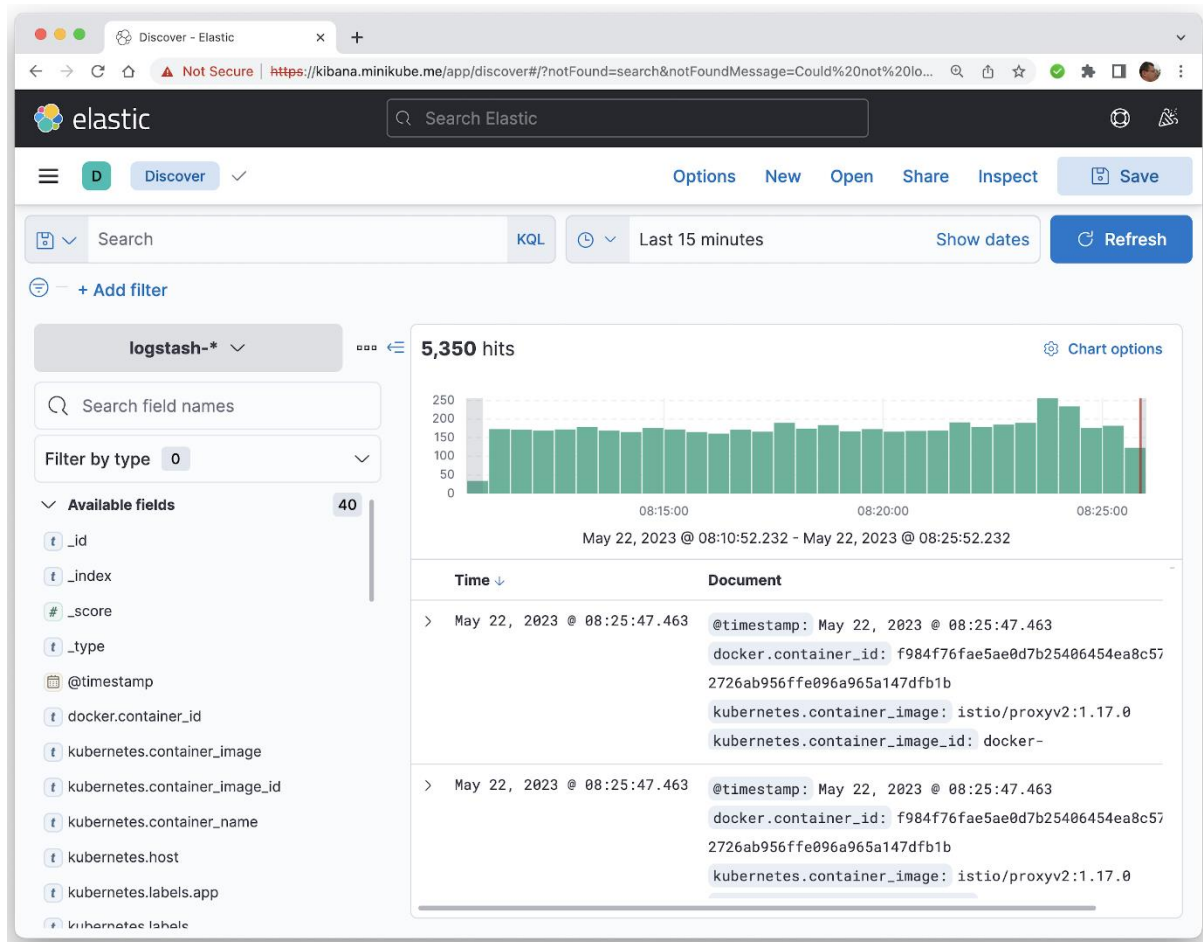
Pie

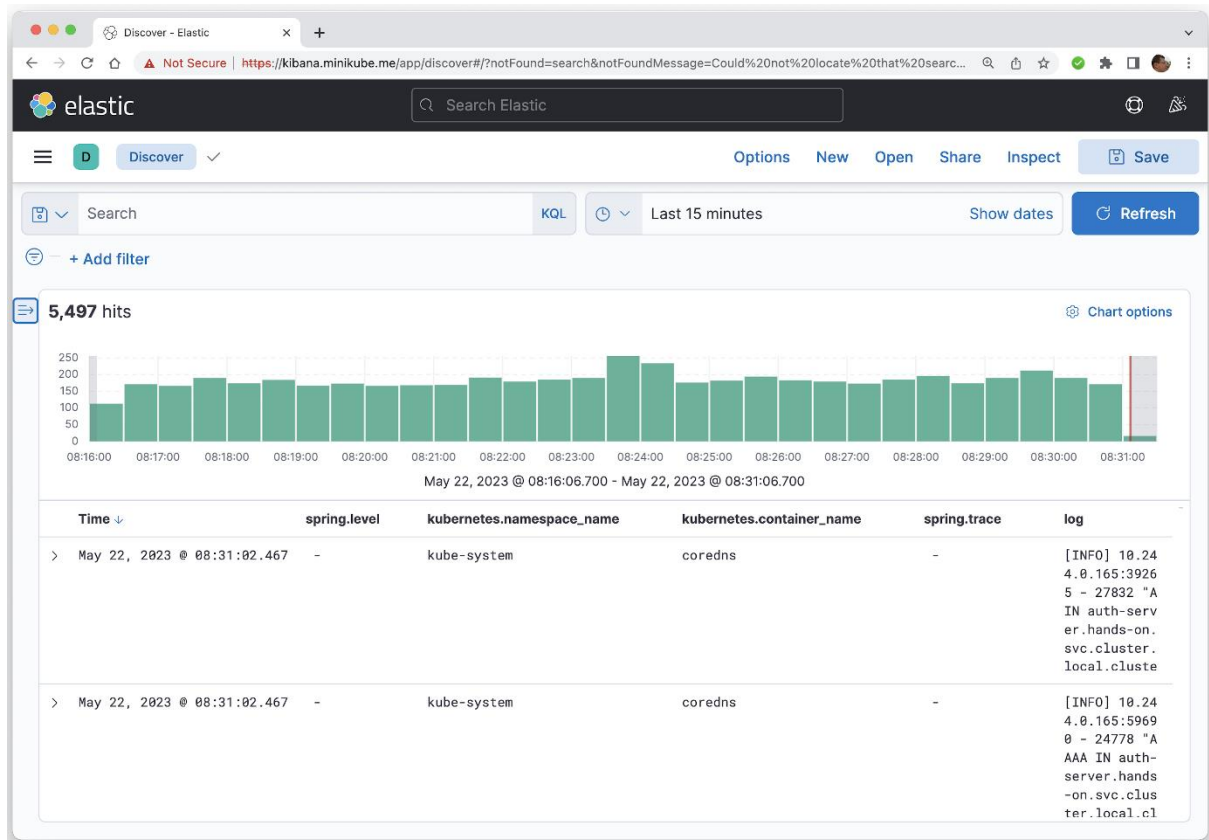






```
bash
{
  "productId": 1234,
  "name": "product name 1234",
  "weight": 1234,
  "recommendations": [],
  "reviews": [],
  "serviceAddresses": {
    "cmp": "product-composite-59fb54568c-p8kzd/10.244.0.166:80",
    "pro": "product-5454d77458-9b565/10.244.0.156:80",
    "rev": "",
    "rec": ""
  }
}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



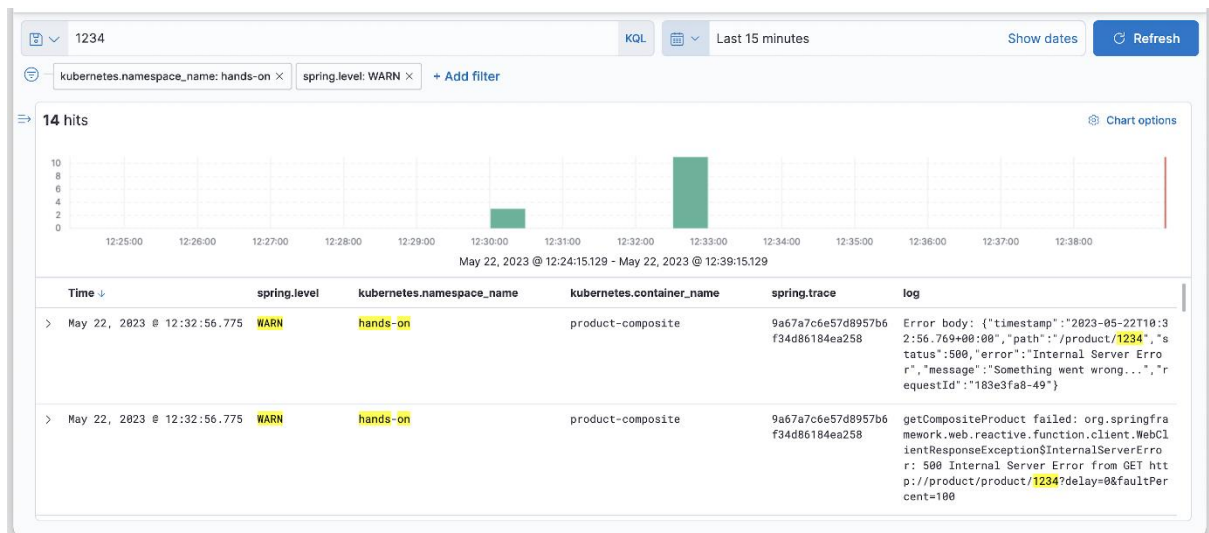


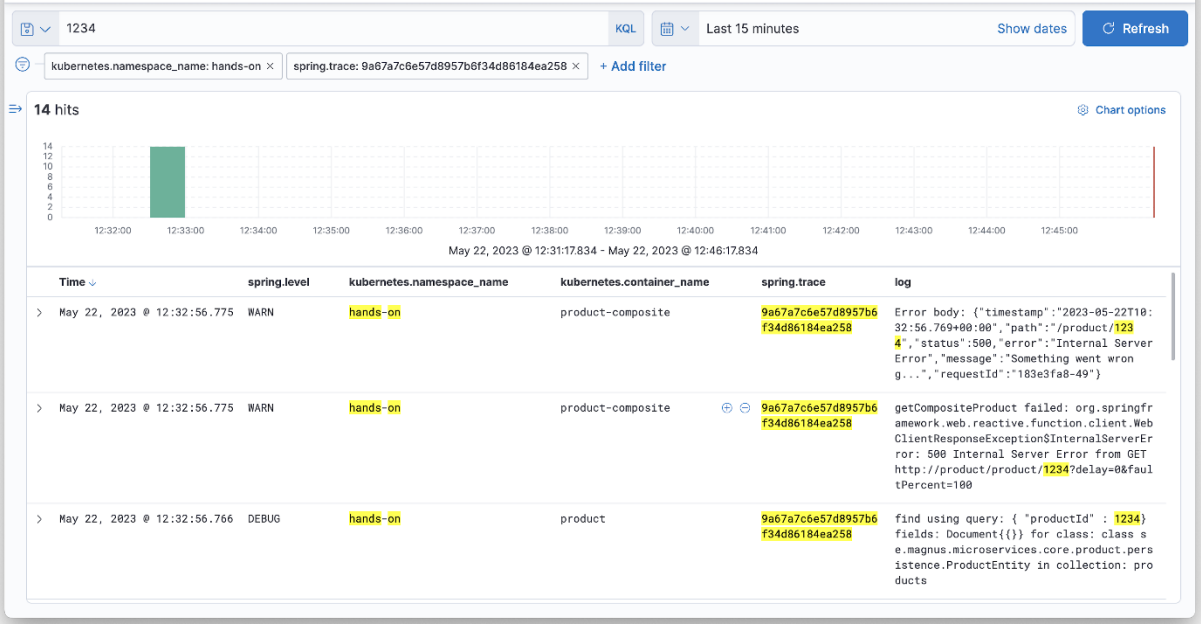
Time	spring.level	kubernetes.namespace_name	kubernetes.container_name	spring.trace	log
May 22, 2023 @ 08:24:01.041	INFO	hands-on	product-composite	bb3f5c15756af1f5bee6bb01b862684	Will get composite product info for product.id=1234

Time	spring.level	kubernetes.namespace_name	kubernetes.container_name	spring.trace	log
May 22, 2023 @ 08:24:01.048	DEBUG	hands-on	review	bb3f5c15756af1f5bee6bb01b862684	select r1._id,r1._id.author,r1._id.content,r1._id.product_id,r1._id.review_id,r1._id.subject,r1._id.version from reviews r1 where r1._id.product_id=?
May 22, 2023 @ 08:24:01.045	DEBUG	hands-on	product	bb3f5c15756af1f5bee6bb01b862684	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	bb3f5c15756af1f5bee6bb01b862684	find using query: { "productId": 1234 } fields: Document({}) for class: class se.magnus.microservices.core.recommendation.persistence.RecommendationEntity in collection: recommendations

Time	spring.level	kubernetes.namespace_name	kubernetes.container_name	spring.trace	log
May 22, 2023 @ 08:24:01.044	INFO	hands-on	product	bb3f5c15756af1f5bee6bb01b862684	Will get product info for id=1234
May 22, 2023 @ 08:24:01.044	INFO	hands-on	recommendation	bb3f5c15756af1f5bee6bb01b862684	Will get recommendations for product with id=1234
May 22, 2023 @ 08:24:01.044	INFO	hands-on	review	bb3f5c15756af1f5bee6bb01b862684	Will get reviews for product with id=1234
May 22, 2023 @ 08:24:01.041	INFO	hands-on	product-composite	bb3f5c15756af1f5bee6bb01b862684	Will get composite product info for product.id=1234

```
bash
{"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"
}
```





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

Table

JSON

Actions	Field	Value
	_id	xpsEQ4gB_j4ptToB_nsF
	_index	logstash-2023.05.22
	_score	-

View surrounding documents

View single document

					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.service.s.ProductServiceImpl.throwErrorIfBadLuck(ProductServiceImpl.java:104) ~[classes/:1.0.0-SNAPSHOT] at se.magnus.microservices.core.product.service.s.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

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.



Discover - Elastic

Not Secure | [https://kibana.minikube.me/app/discover/#/?\\_g=\(filters:!\(\),refreshInterval:\(pause:!t,...](https://kibana.minikube.me/app/discover/#/?_g=(filters:!(),refreshInterval:(pause:!t,...)

elastic Search Elastic

Discover

Options New Open Share Inspect Save

Search KQL Last 2 hours Show dates Refresh

kubernetes.namespace\_name: hands-on x spring.level: INFO x + Add filter

17 hits Chart options

log	Will get composite product info for product.id=-1
spring.class	s.m.m.c.p.s.ProductCompositeServiceImpl
spring.level	INFO
spring.pid	1
spring.service	product-composite
spring.span	9ef3ccc4844e8ba8
spring.thread	parallel-5
spring.trace	f4861c653b9238b39dff9b78a0ff69f9

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.ma gnus.api.exceptions.InvalidInputE xception: Invalid productId: -1

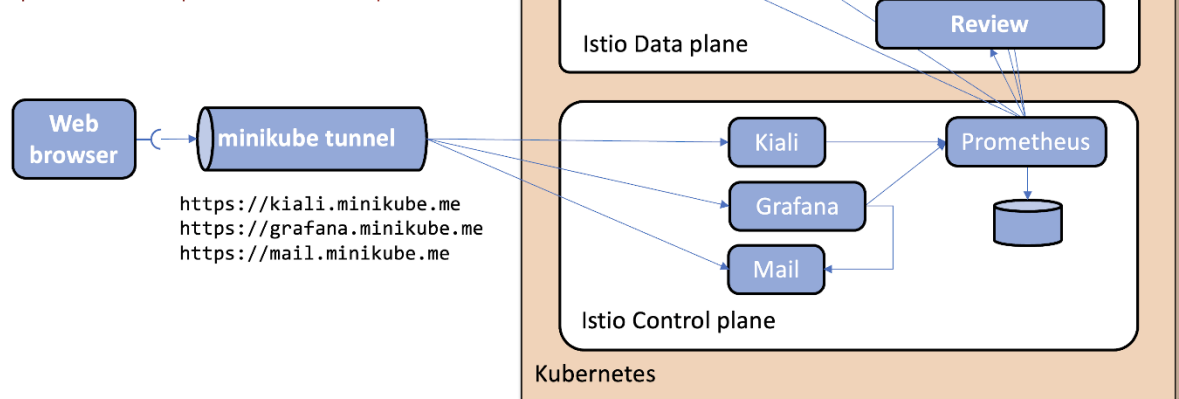
Expanded document

[View surrounding documents](#) [View single document](#)

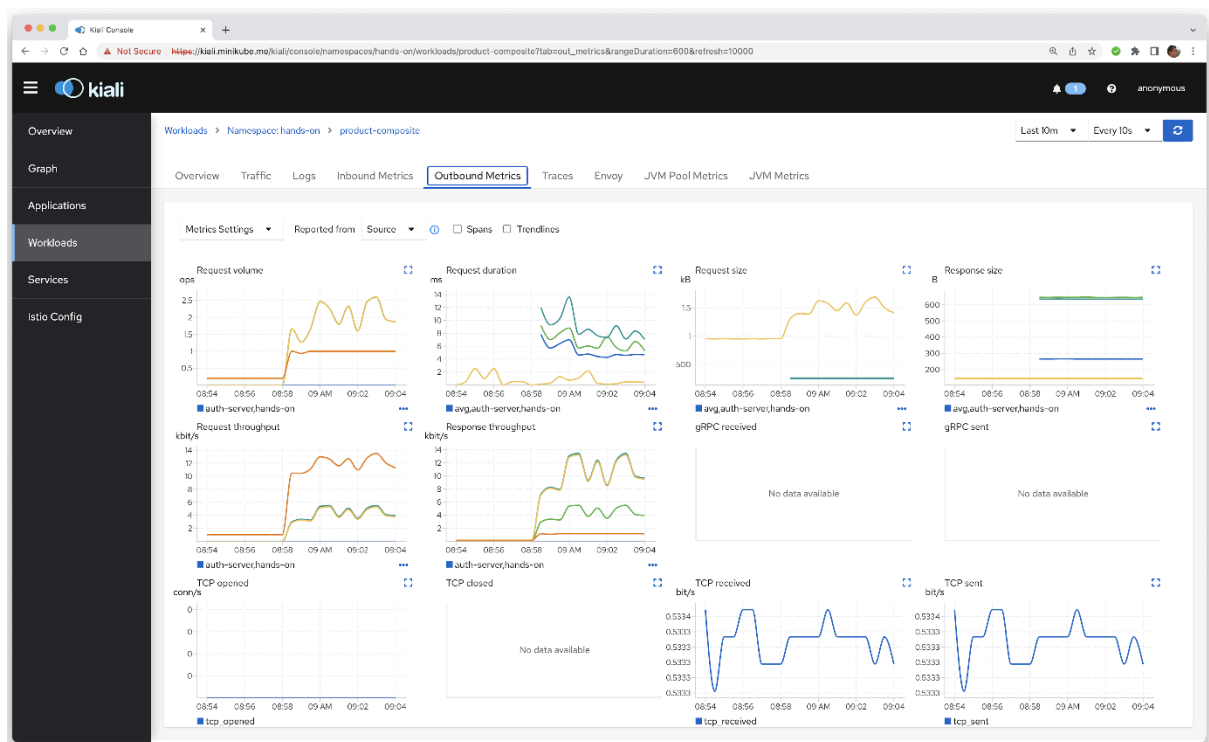
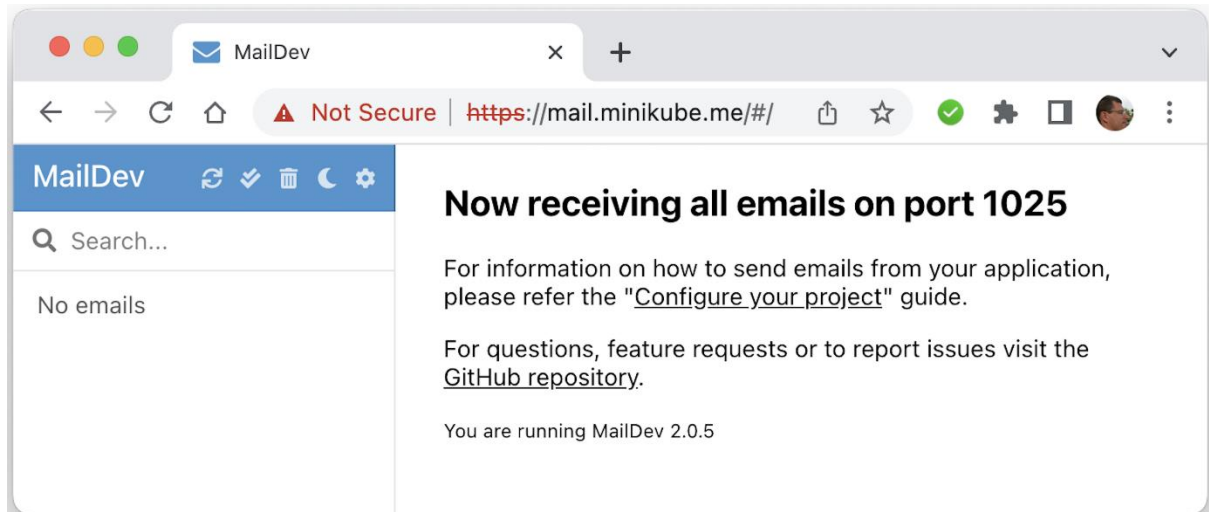
## Chapter 20: Monitoring Microservices

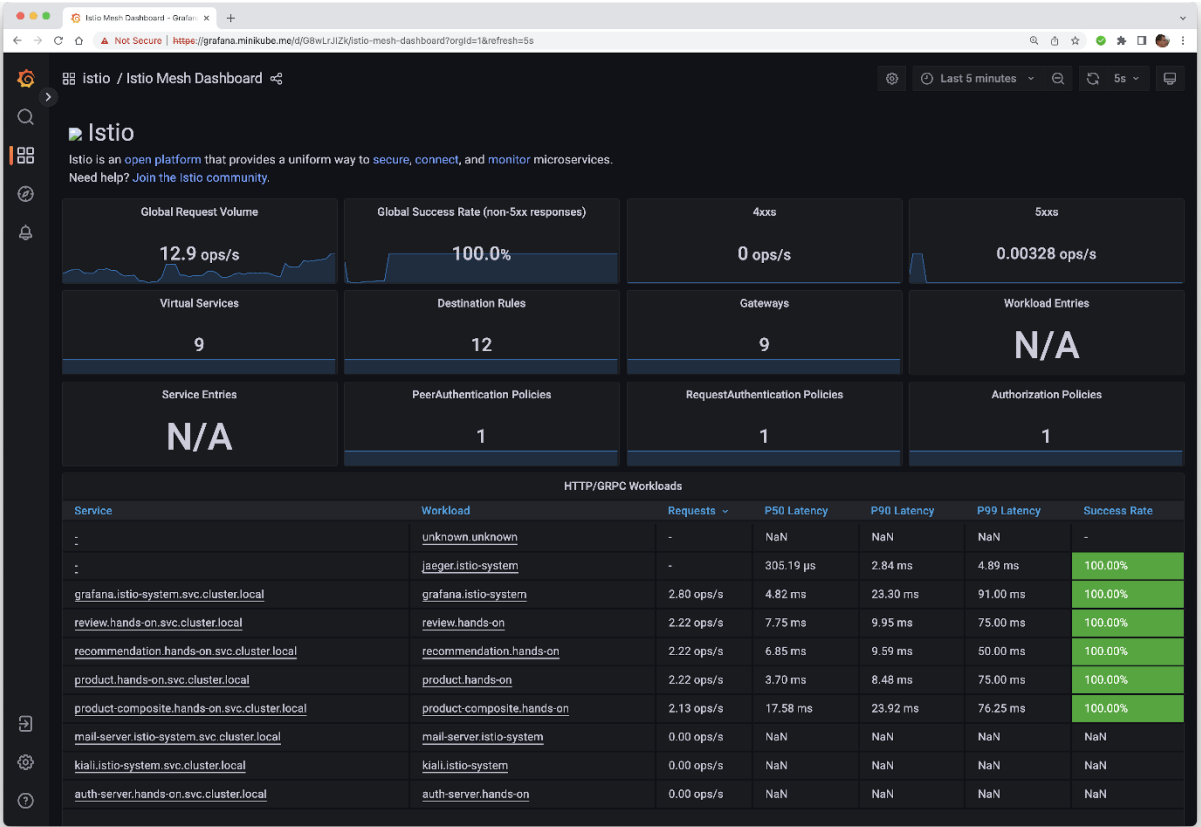
Kubernetes annotations on the microservice pods:

```
annotations:  
  prometheus.io/scrape: "true"  
  prometheus.io/port: "4004"  
  prometheus.io/scheme: http  
  prometheus.io/path: "/actuator/prometheus"
```



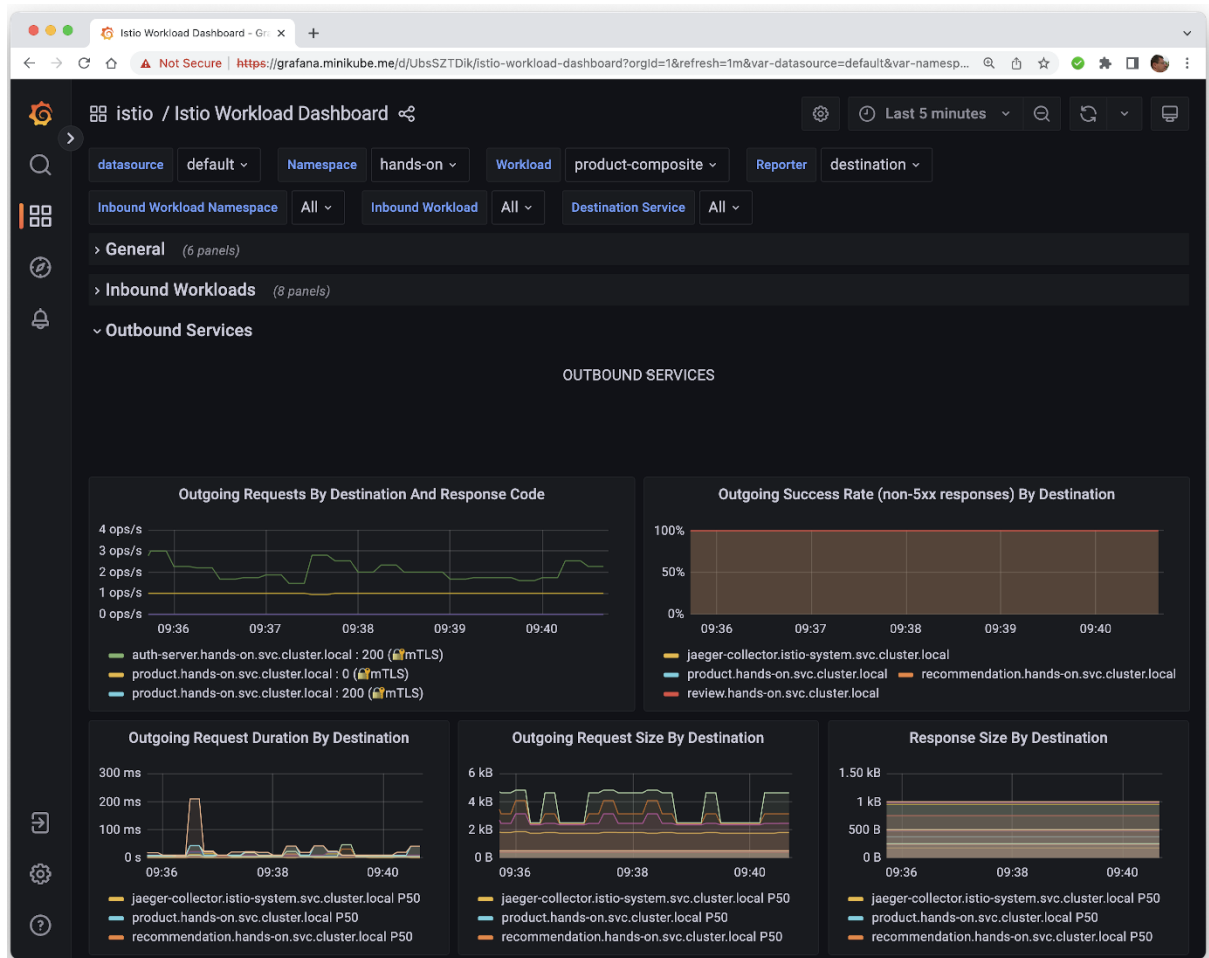
```
bash
Start Tests: Sat May 27 17:02:59 CEST 2023
...
Wait for: curl -k https://health.minikube.me/actuator/health...
DONE, continues...
...
Test OK (HTTP Code: 200)
...
End, all tests OK: Sat May 27 17:03:26 CEST 2023
$
```

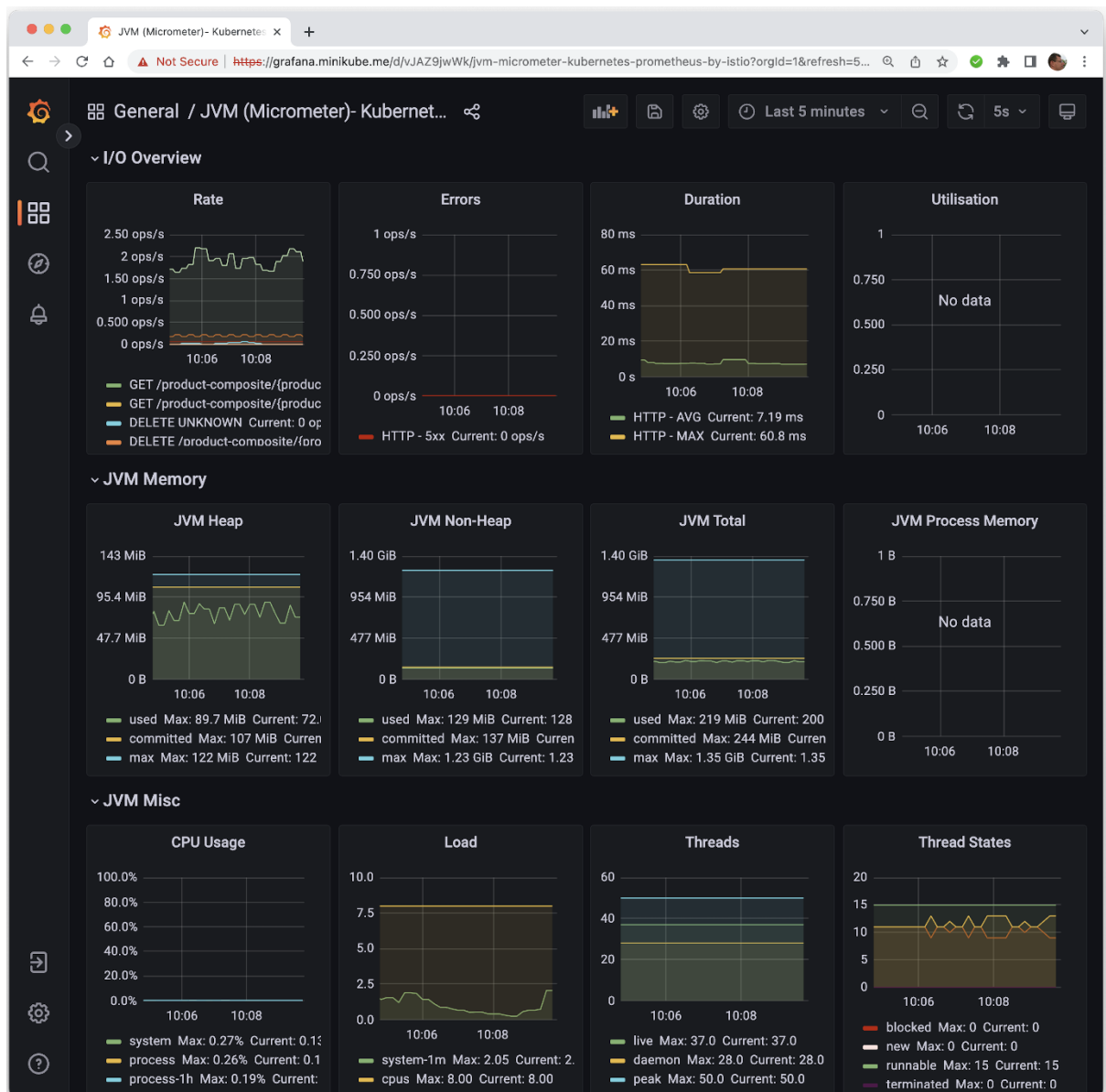




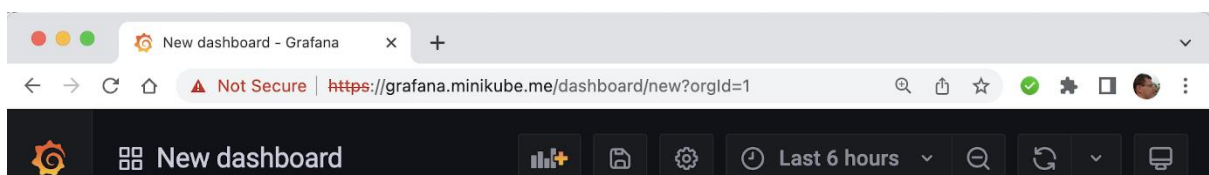
HTTP/GRPC Workloads

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
kiail.istio-system.svc.cluster.local	kiail.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





```
...
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
$
```



A

(Prometheus)

?

Query patterns

Raw query

Give feedback

Run queries

Explain

Builder

Beta

Code

Metric

resilience4j\_circuitbreaker\_state

Labels

state

=

closed

×

+

+ Operations

Raw query

resilience4j\_circuitbreaker\_state{state="closed"}

Options

Legend

Min step

Format

Type

Exemplars

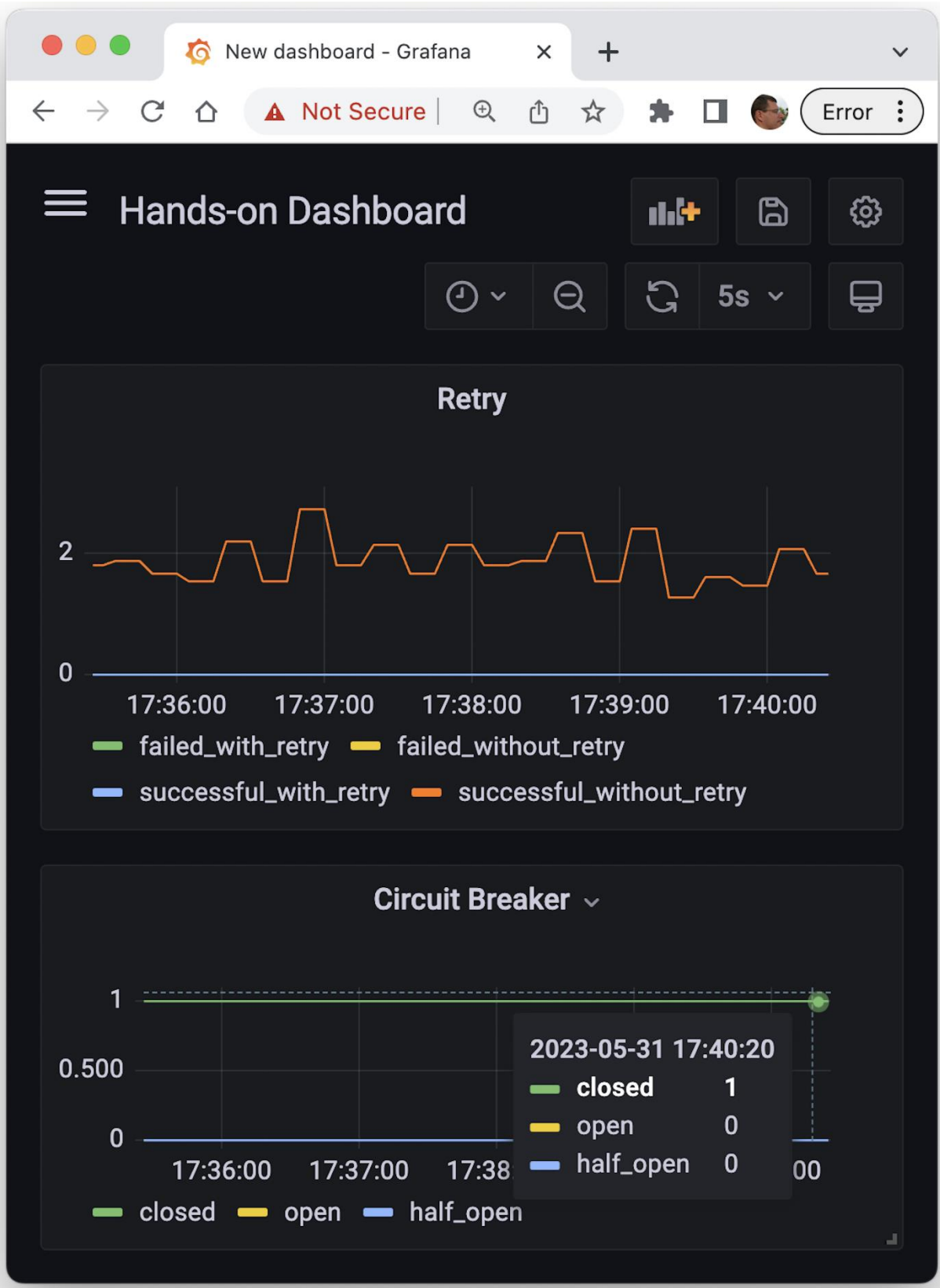
{{state}}

auto

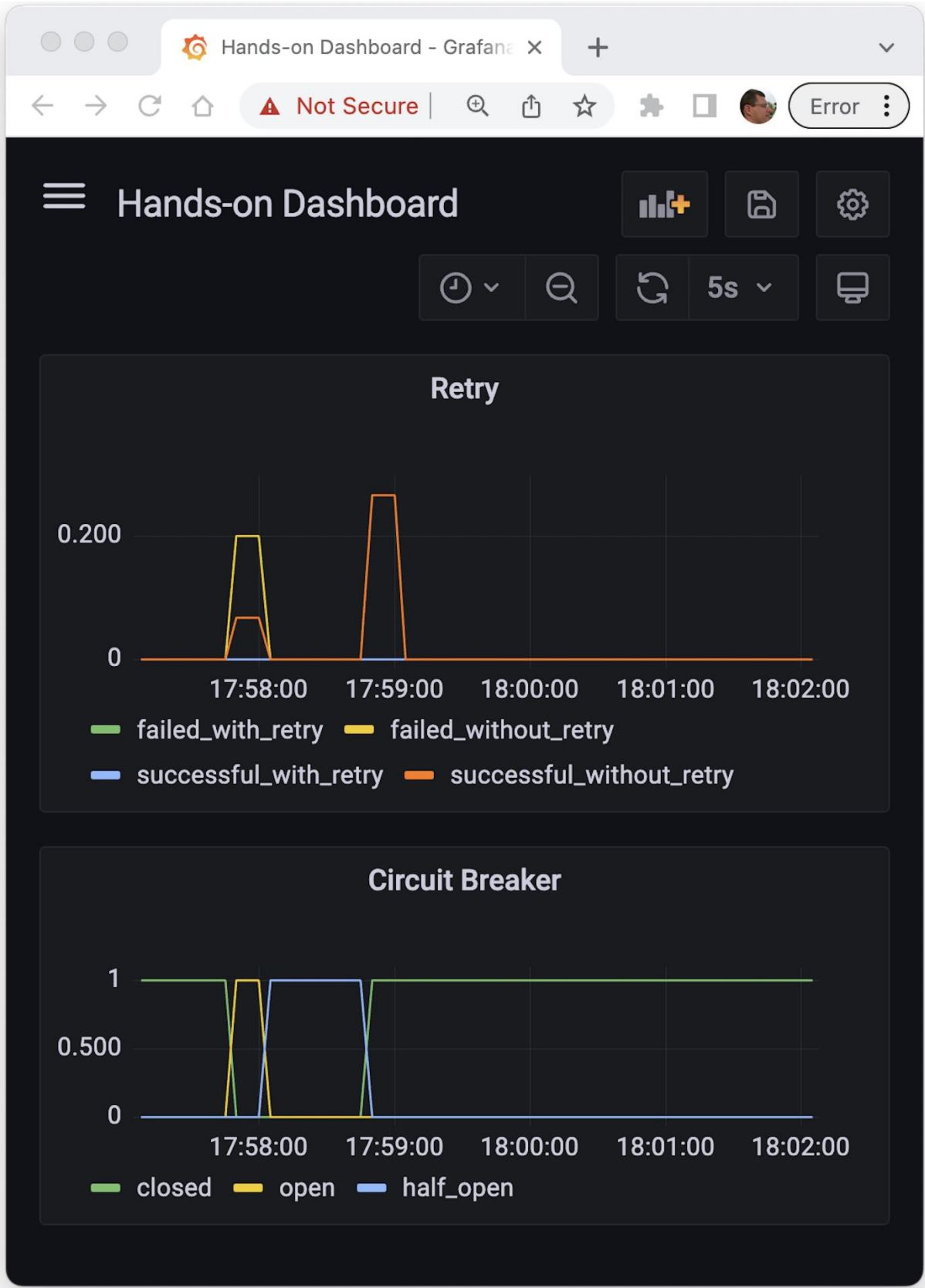
Time series

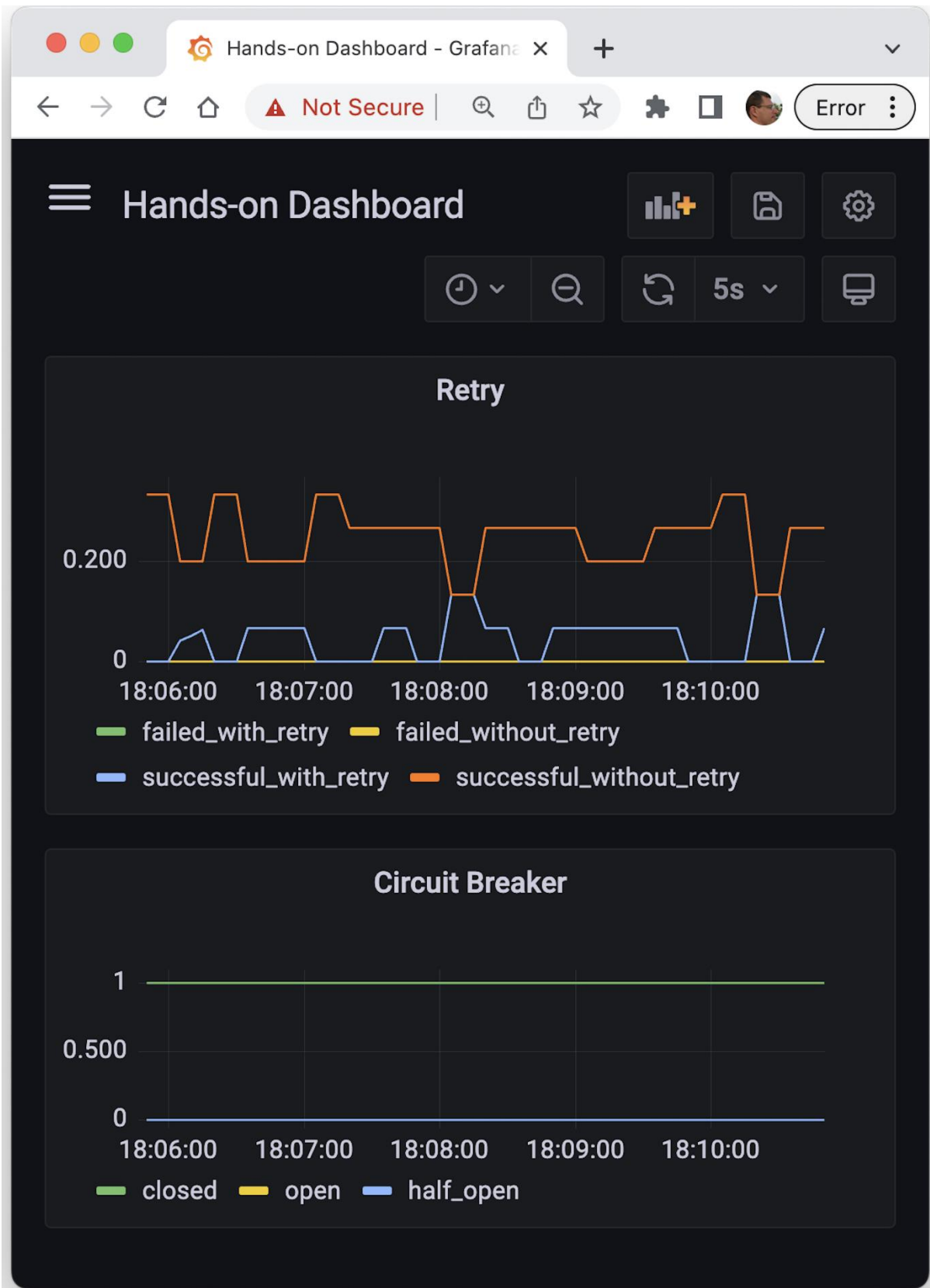
Range

Instant















Alerting: Notification channels x

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

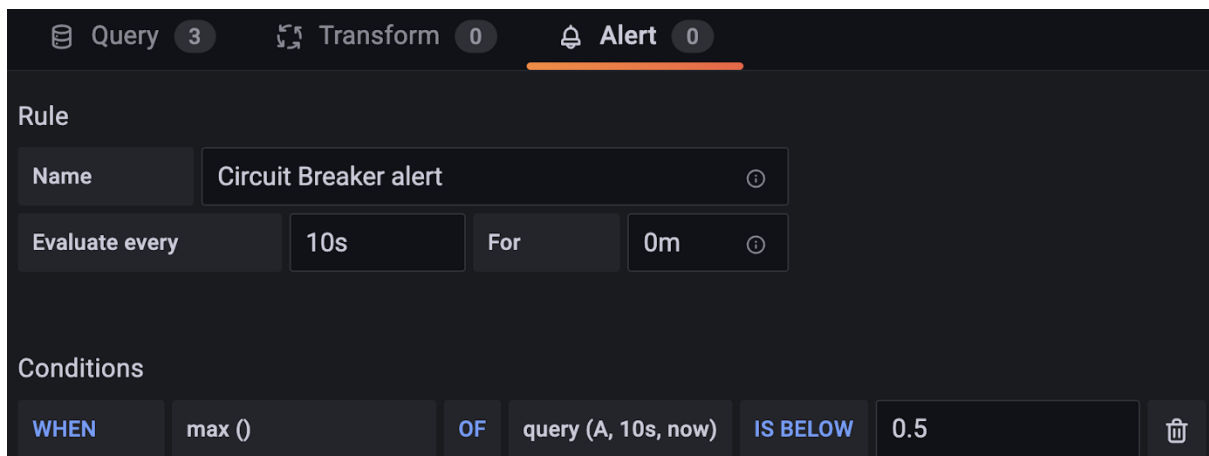
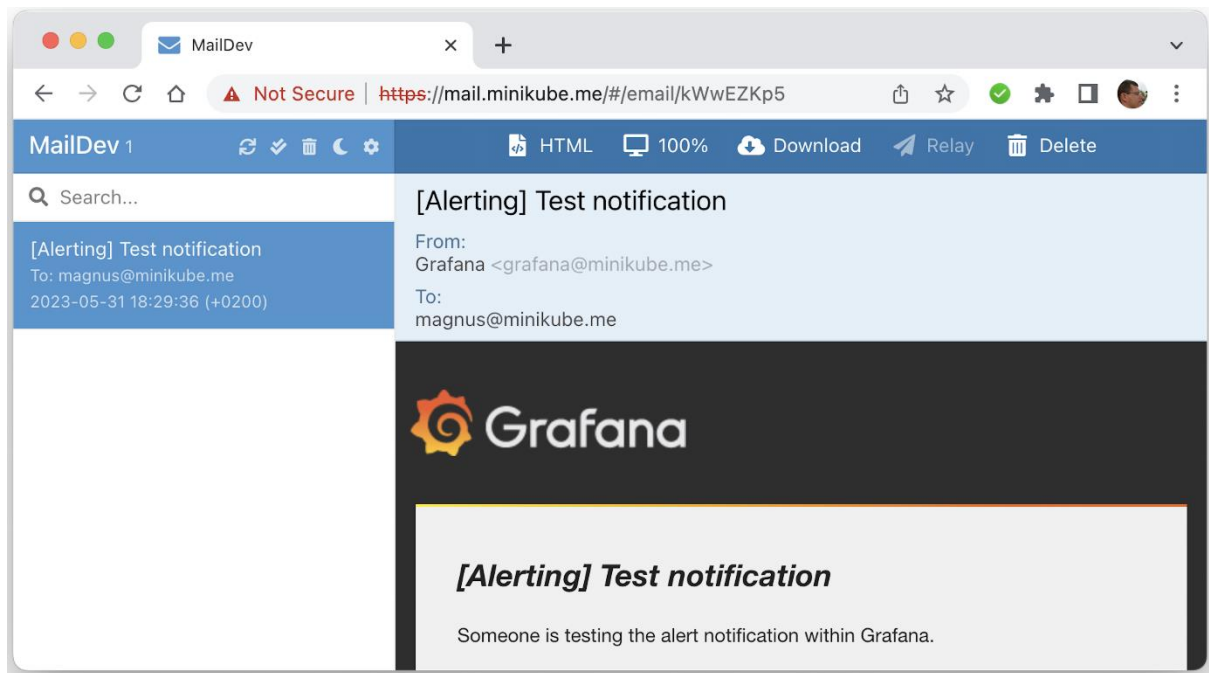
☐ Send reminders

Send additional notifications for triggered alerts

Save

Test

Back





## Alert list



Q 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

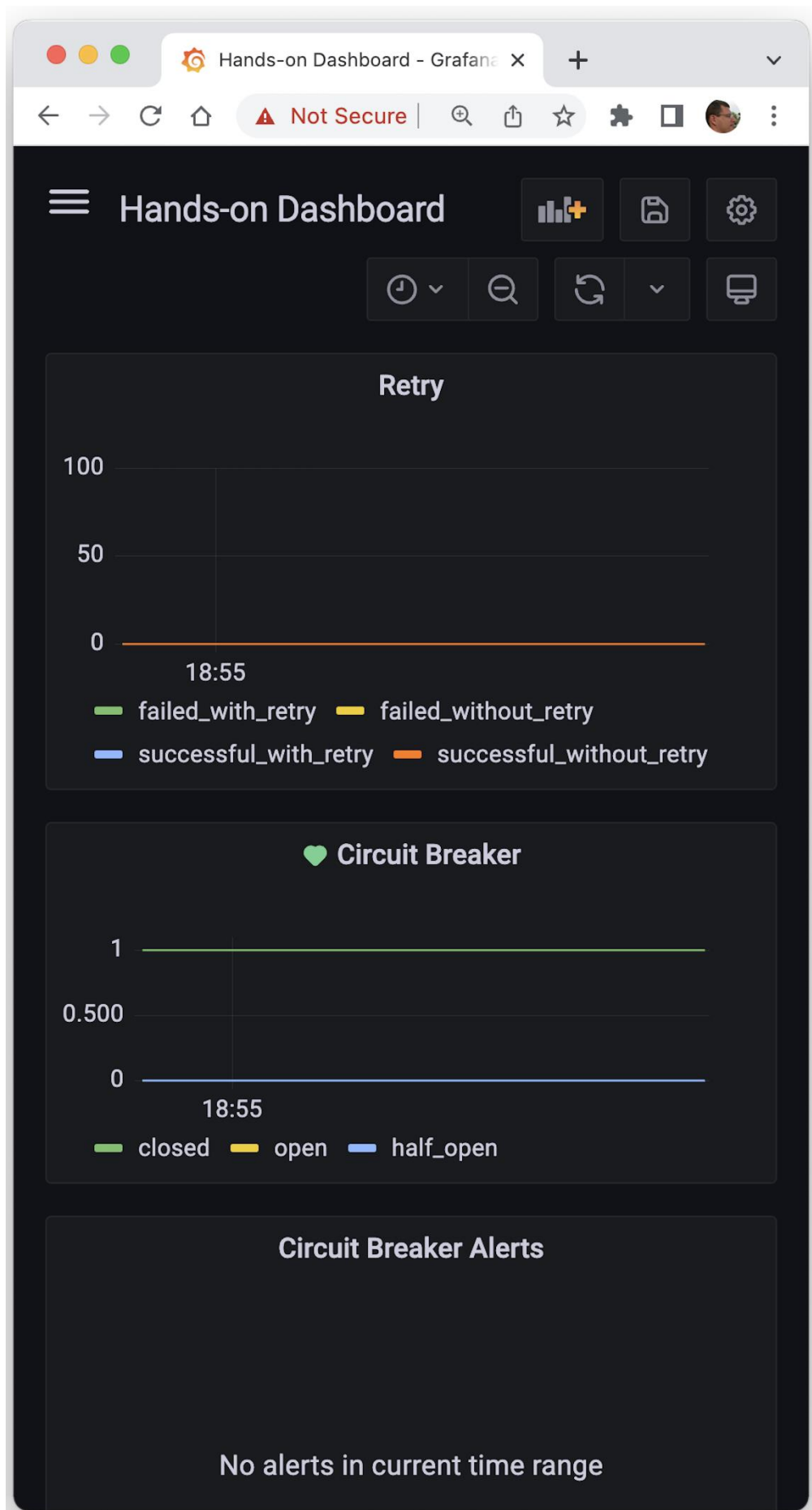
Alphabetical (asc)

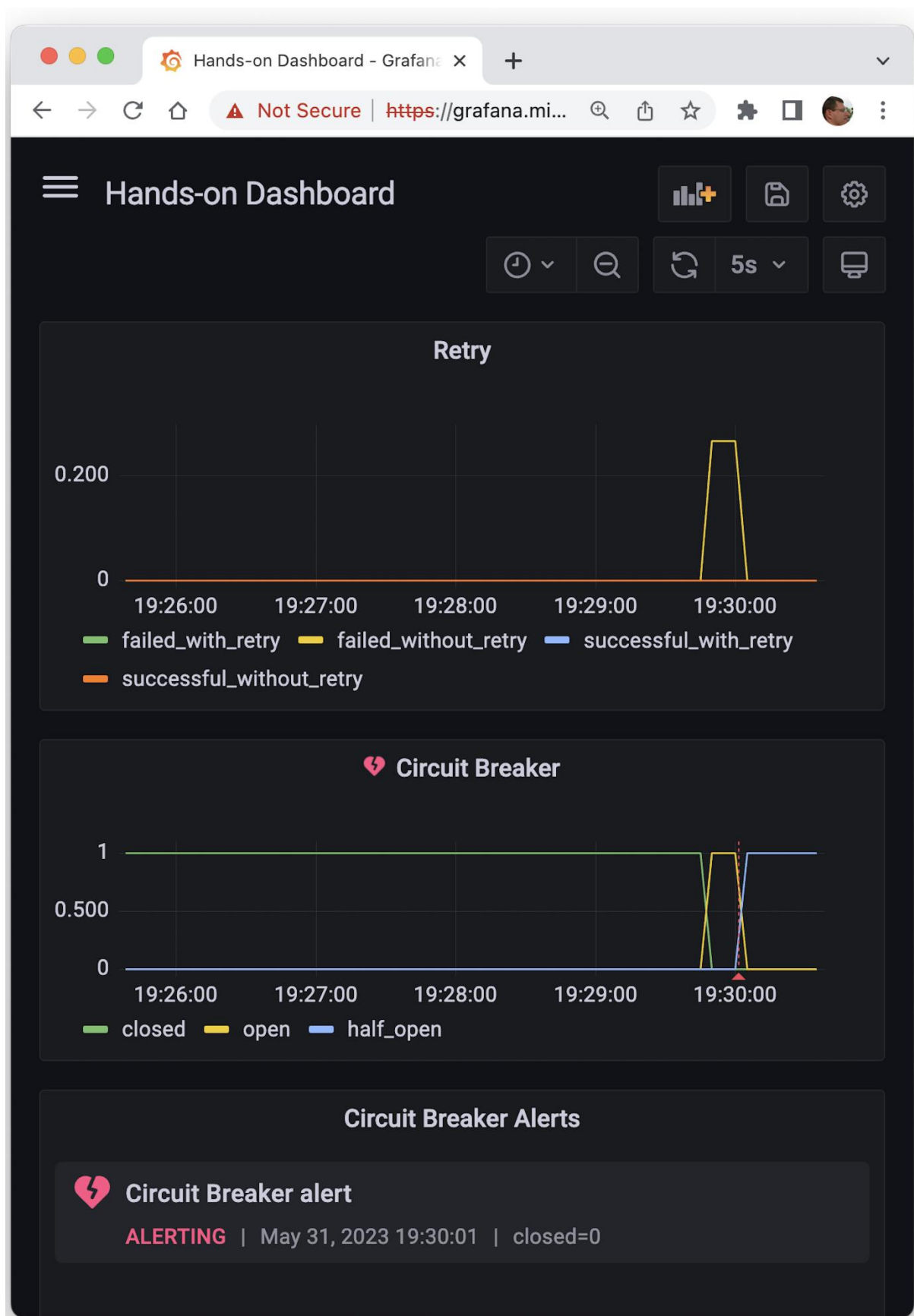


Alerts from this dashboard

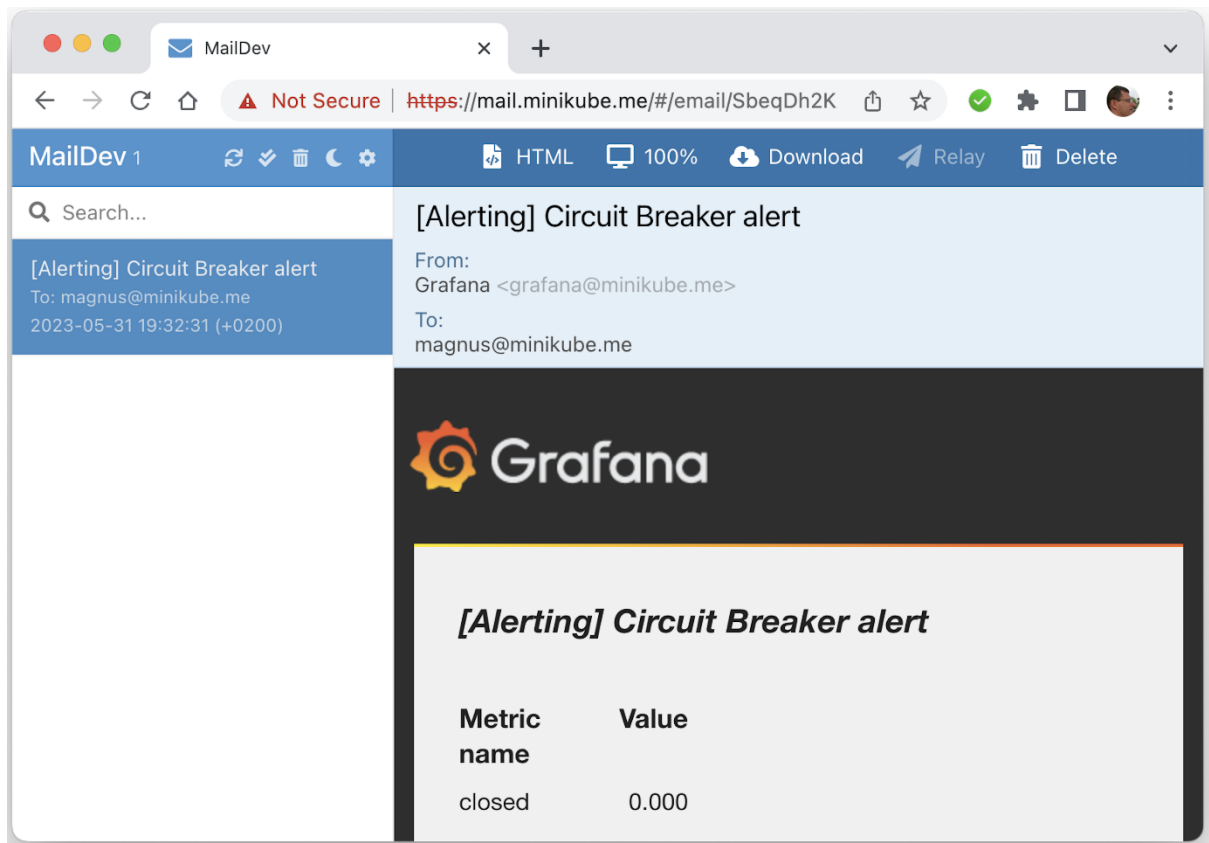


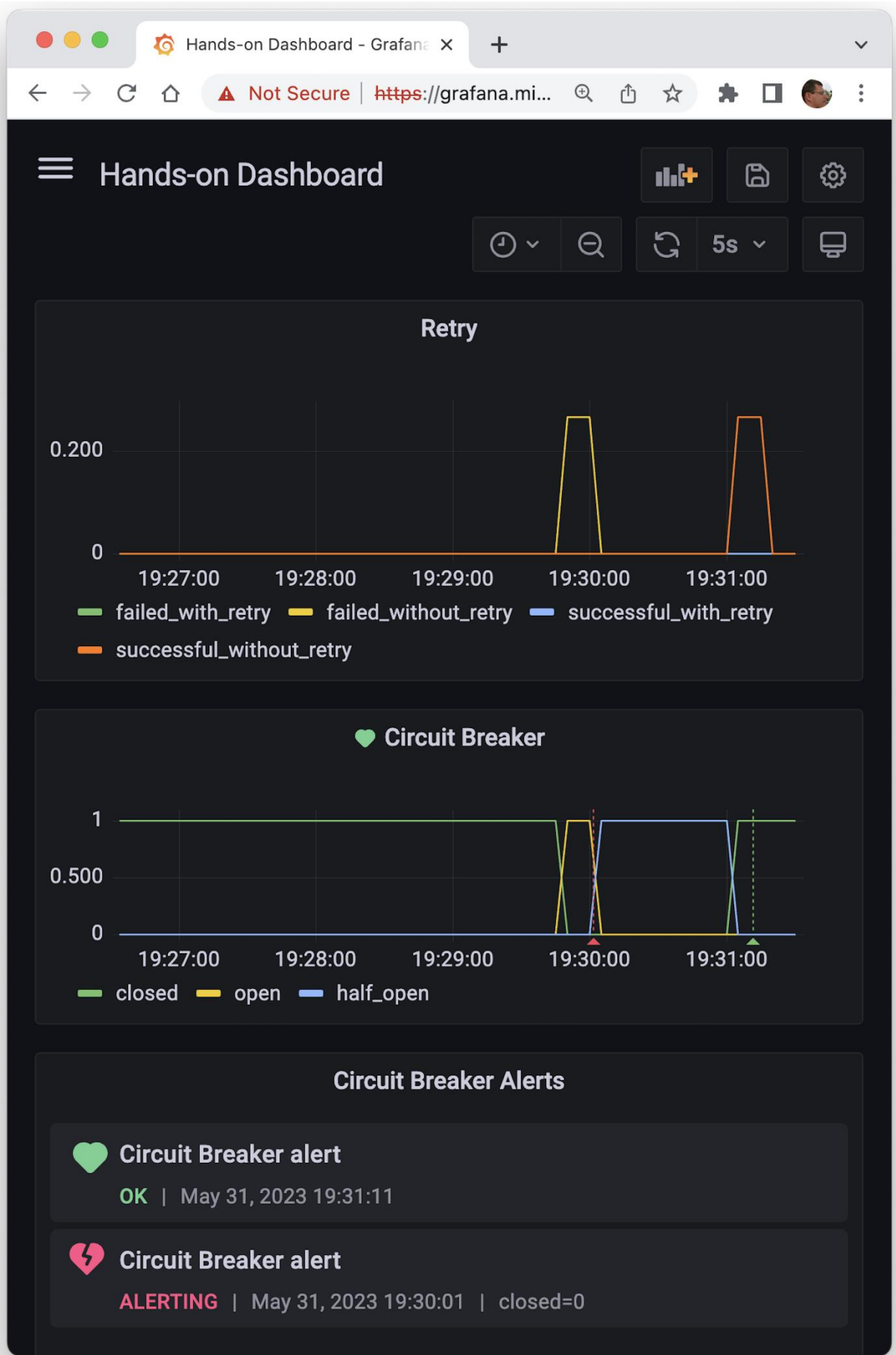


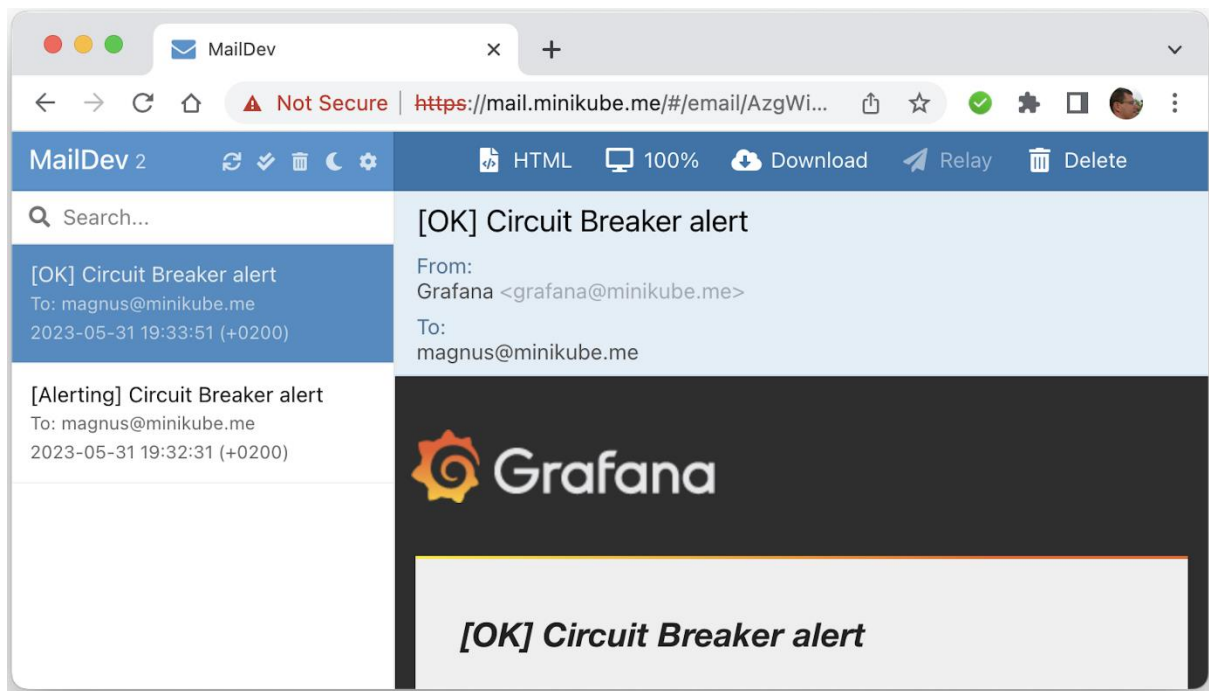


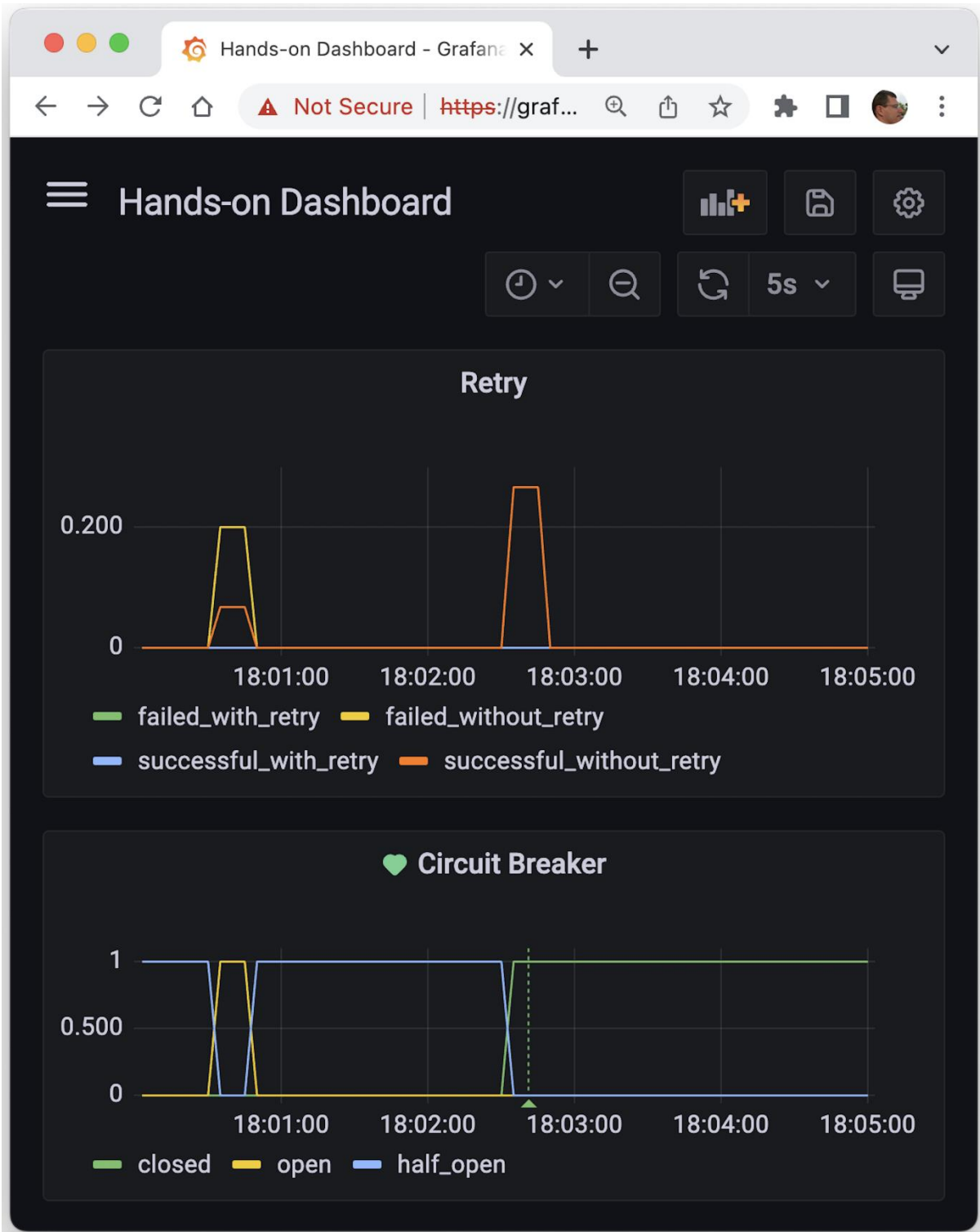




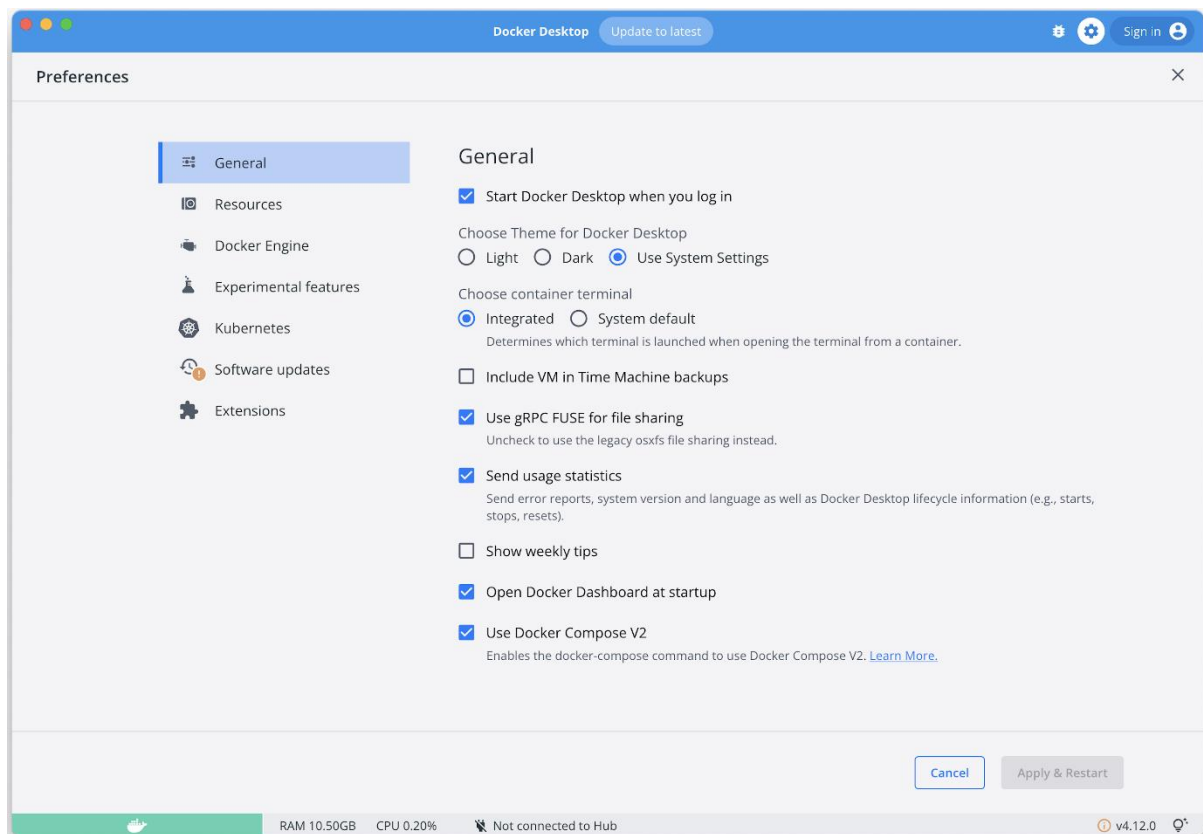
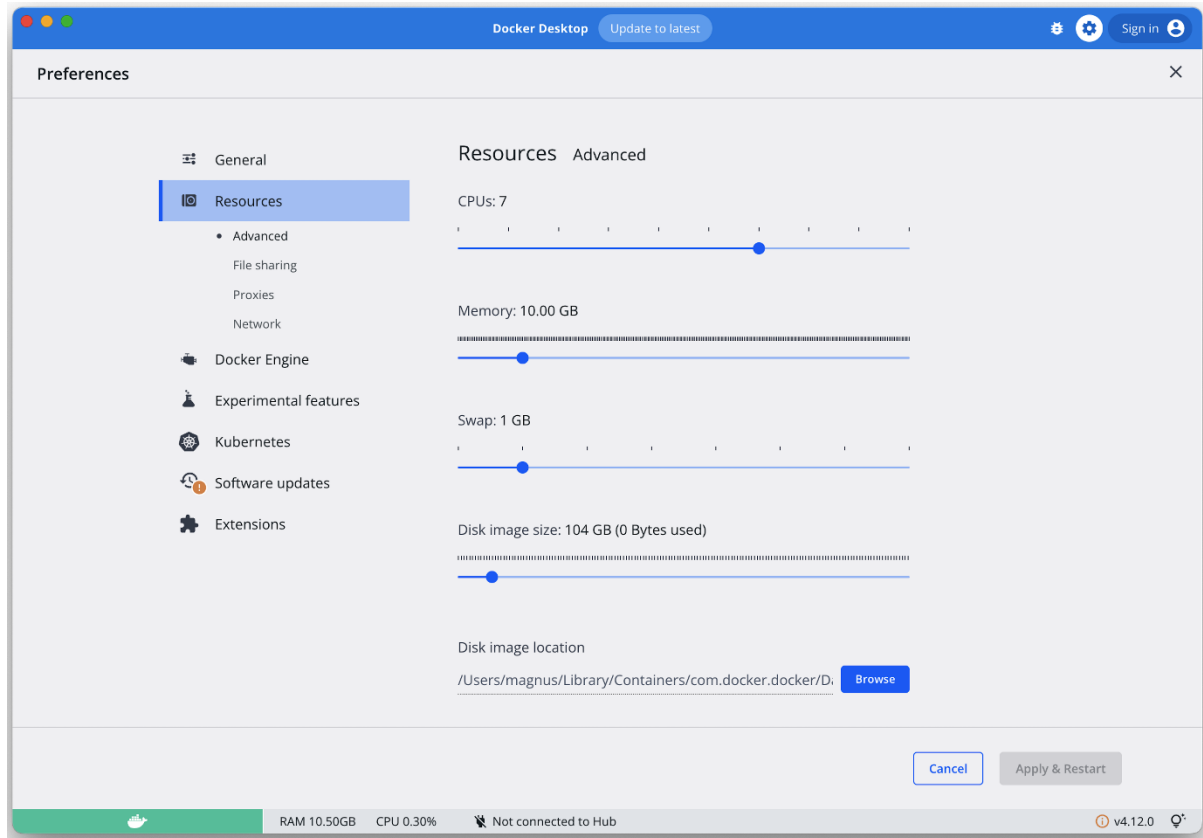


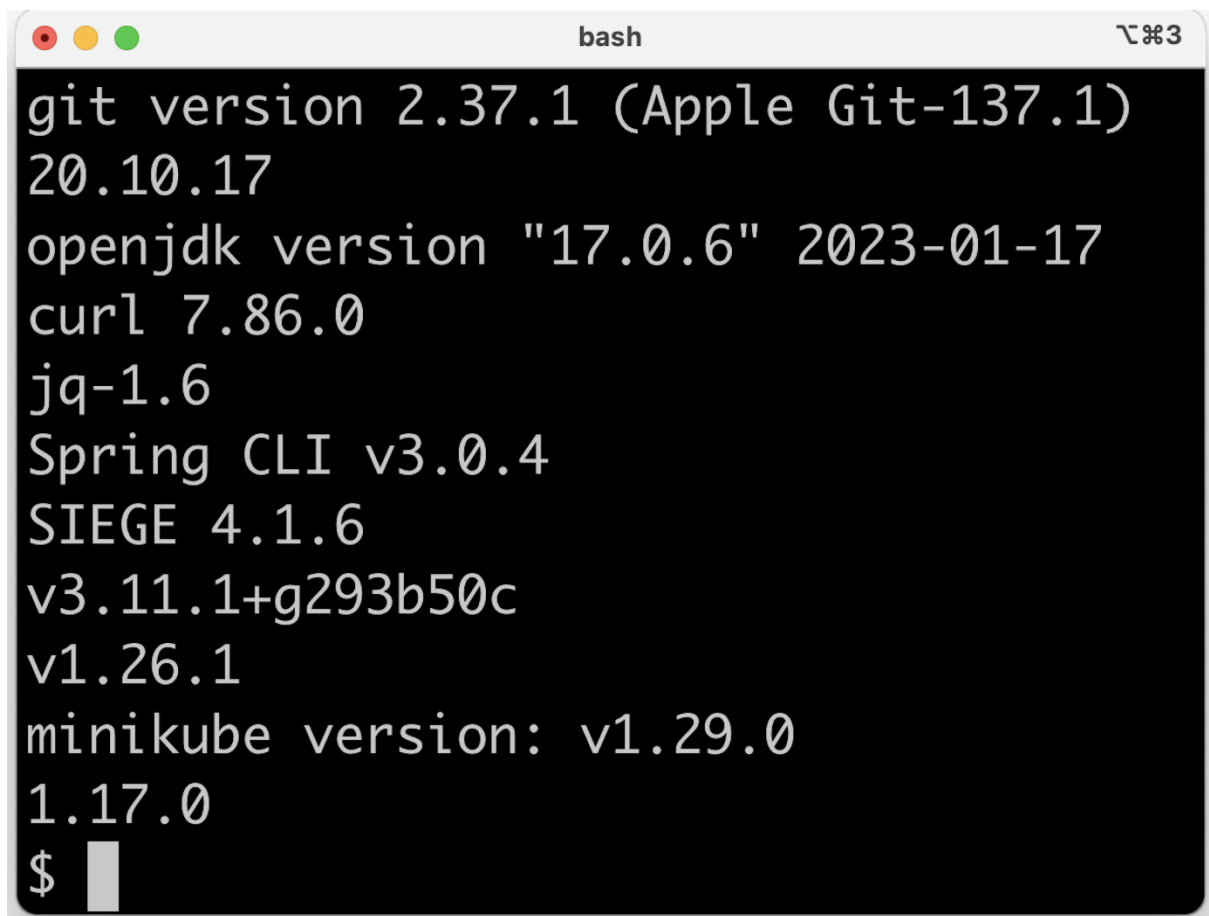






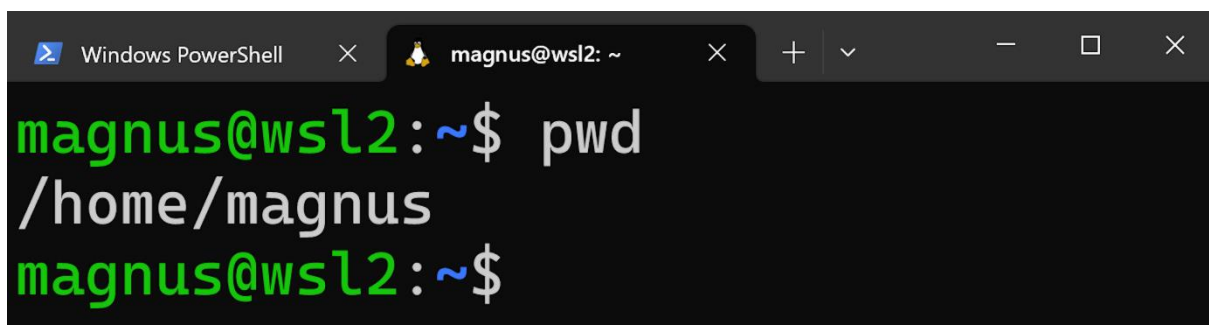
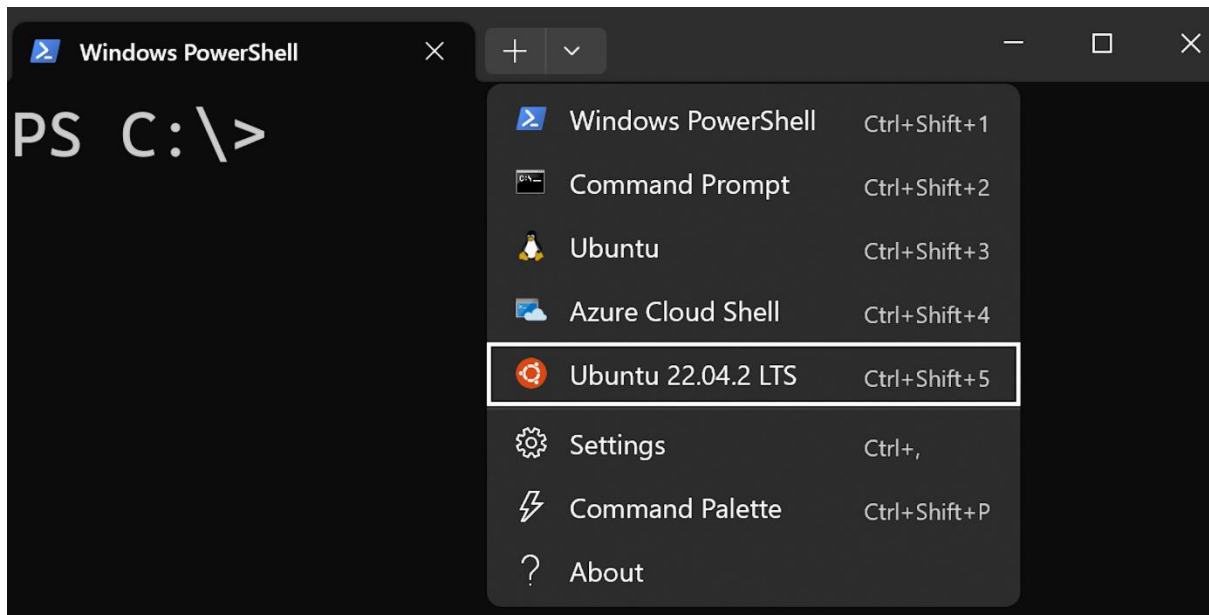
# Chapter 21: Installation Instructions for macOS



A terminal window with a light gray title bar containing three colored window control buttons (red, yellow, green) on the left, the text "bash" in the center, and a keyboard shortcut icon (⌘+3) on the right. The terminal area has a black background with white text. It displays the output of several version commands: "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 v3.0.4", "SIEGE 4.1.6", "v3.11.1+g293b50c", "v1.26.1", "minikube version: v1.29.0", and "1.17.0". The prompt "\$" is followed by a white cursor bar.

```
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 v3.0.4
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



Docker Desktop

Update to latest

SearchCtrl+K

Sign in

Settings

General

Resources

Docker Engine

Beta features

Kubernetes

Software updates

Extensions

General

☒ Start Docker Desktop when you log in

Choose Theme for Docker Desktop

☐ Light☐ Dark☒ Use System Settings

Choose container terminal

☒ Integrated☐ System default

Determines which terminal is launched when opening the terminal from a container.

☐ Expose daemon on tcp://localhost:2375 without TLS

Exposing daemon on TCP without TLS helps legacy clients connect to the daemon. It also makes yourself vulnerable to remote code execution attacks. Use with caution.

☒ Use the WSL 2 based engine

WSL 2 provides better performance than the legacy Hyper-V backend. [Learn more.](#)

☒ Send usage statistics

Send error reports, system version and language as well as Docker Desktop lifecycle information (e.g., starts, stops, resets).

☐ Show weekly tips

☒ Open Docker Dashboard at startup

☒ Use Docker Compose V2

Enables the docker-compose command to use Docker Compose V2. [Learn More.](#)

Cancel

Apply & restart

RAM 8.43GB

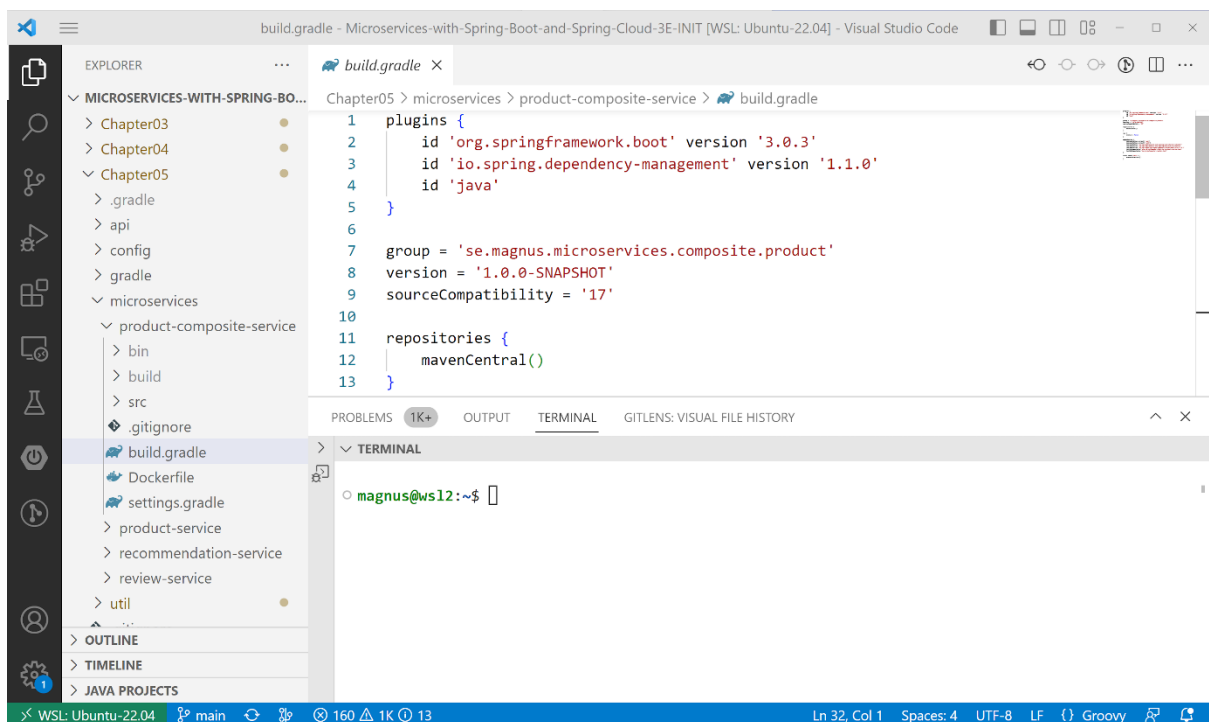
CPU 0.00%

Not connected to Hub

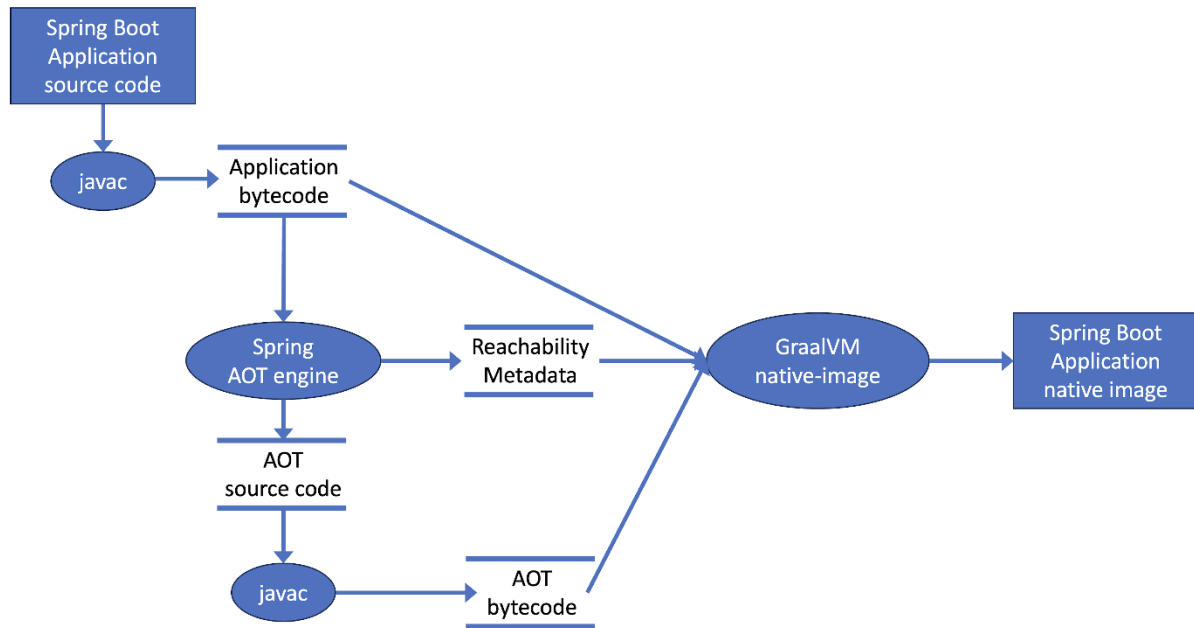
v4.14.0



```
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 v3.0.4  
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-review-service latest ...
hands-on/native-product-service latest ...
hands-on/native-recommendation-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
$
```

```
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
$
```

```
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 ...
$
```

```
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 ...
$
```

```
bash 1
2023-06-17T08:20:50.759Z ... Started ProductCompositeServiceApplication in 0.442 seconds
$
```

```
bash 1
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
$
```