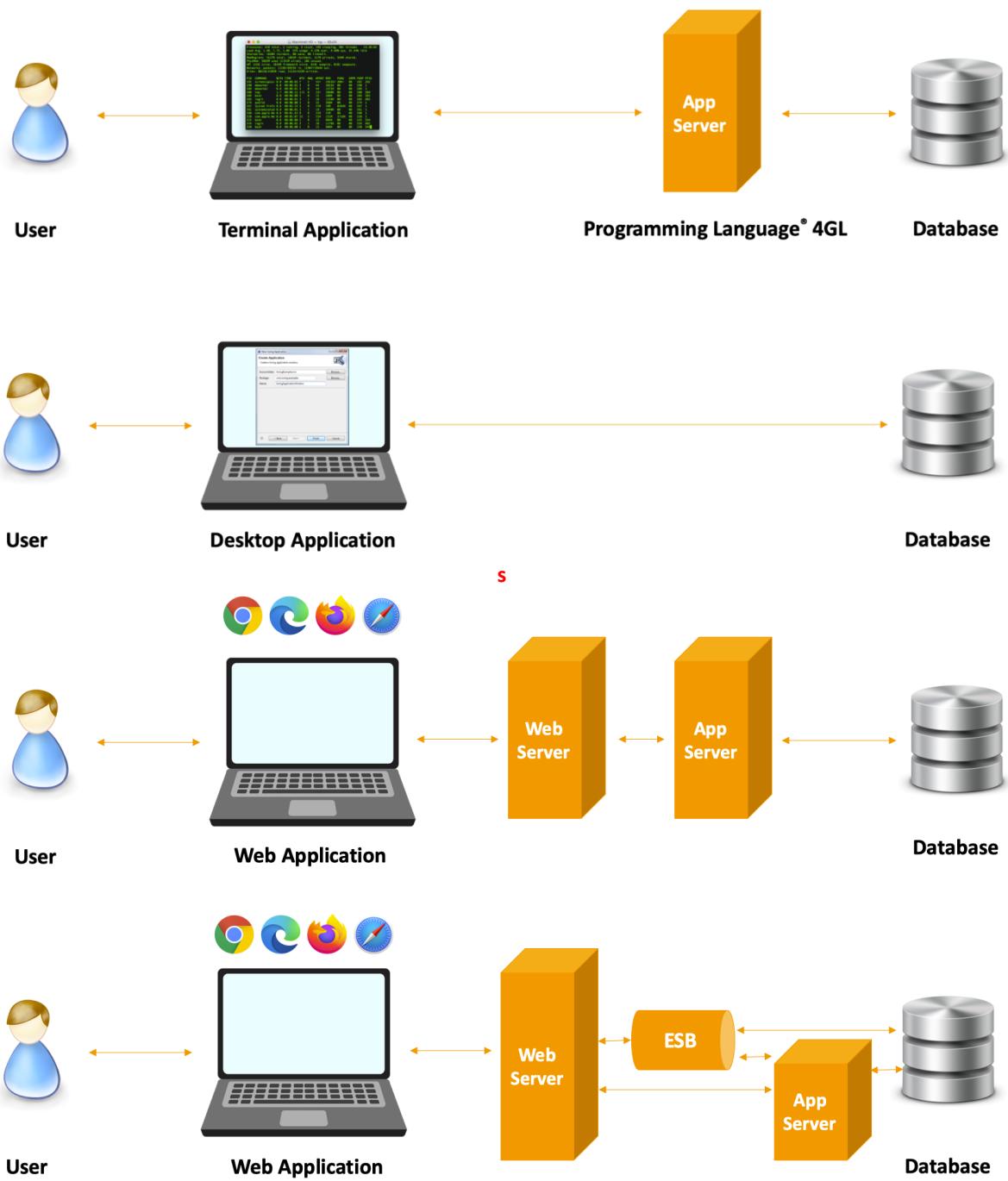


Chapter 1: Getting Started with Microservices Using the Micronaut Framework





```
[● ● ●] zackdawood@zacks-mbp ~ % source "$HOME/.sdkman/bin/sdkman-init.sh"
[● ● ●] zackdawood@zacks-mbp ~ % sdk install micronaut
===== BROADCAST =====
* 2020-08-18: Jbang 0.38.0 released on SDKMAN! Checkout https://github.com/jbang
dev/jbang/releases/tag/v0.38.0. Follow @jbangdev #jbang
* 2020-08-17: Jbang 0.37.0 released on SDKMAN! Checkout https://github.com/jbang
dev/jbang/releases/tag/v0.37.0. Follow @jbangdev #jbang
* 2020-08-17: Kotlin 1.4.0 released on SDKMAN! #kotlin
=====
```

Downloading: micronaut 2.0.1

In progress...

```
#####
##### 100.0%
#####
##### 100.0%
```

Installing: micronaut 2.0.1
Done installing!

Setting micronaut 2.0.1 as default.

```
[● ● ●] zackdawood — curl -sSf https://repo1.maven.org/maven2/com/micronaut/micronaut-core/2.0.1/micronaut-core-2.0.1.pom | grep -oP '(?=<url>\K[^<]*</url>)' | xargs -I{} curl -sSf {} -O
[zackdawood@zacks-mbp ~ % brew install micronaut
==> Downloading https://homebrew.bintray.com/bottles/openjdk-14.0.1.catalina.bot
==> Downloading from https://d29vzk4ow07wi7.cloudfront.net/d44db8c5b212a36d73f11
##### 21.1%
```

```
[zackdawood@zacks-mbp ~ % sudo port install micronaut
Warning: No value for java JAVA_HOME was automatically discovered
---> Fetching archive for micronaut
---> Attempting to fetch micronaut-2.0.1_0.darwin_19.x86_64.tbz2 from https://pek.cn.packages.macports.org/macports/packages/micronaut
---> Attempting to fetch micronaut-2.0.1_0.darwin_19.x86_64.tbz2.rmd160 from https://pek.cn.packages.macports.org/macports/packages/micronaut
---> Installing micronaut @2.0.1_0
---> Activating micronaut @2.0.1_0
---> Cleaning micronaut
---> Scanning binaries for linking errors
---> No broken files found.
---> No broken ports found.
zackdawood@zacks-mbp ~ %
```

Windows Command Prompt

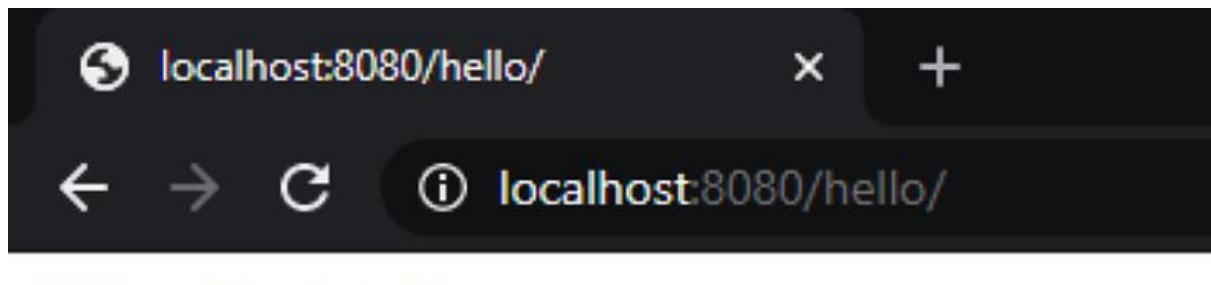
```
Microsoft Windows [Version 10.0.17763.1457]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\nirm.singh>mn -h
Usage: mn [-hvVx] [COMMAND]
Micronaut CLI command line interface for generating projects and services.
Application generation commands are:

* create-app NAME
* create-cli-app NAME
* create-function-app NAME
* create-grpc-app NAME
* create-messaging-app NAME

Options:
-h, --help      Show this help message and exit.
-v, --verbose   Create verbose output.
-V, --version   Print version information and exit.
-x, --stacktrace Show full stack trace when exceptions occur.

Commands:
create-app      Creates an application
create-cli-app   Creates a CLI application
create-function-app Creates a Cloud Function
create-grpc-app  Creates a gRPC application
create-messaging-app Creates a messaging application
C:\Users\nirm.singh>
```

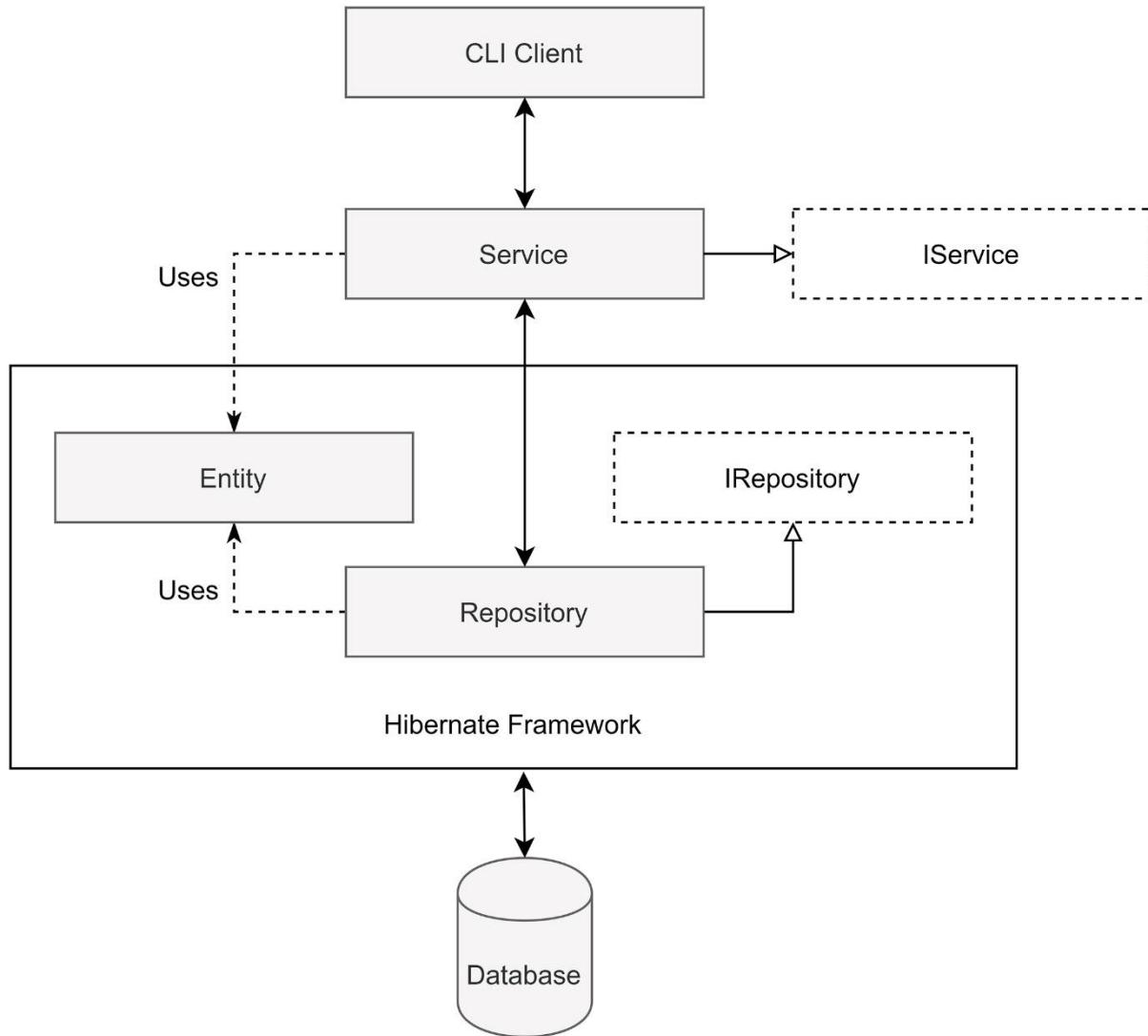
A screenshot of the Micronaut Launch interface at micronaut.io/launch/. The page has a header with the Micronaut logo and social sharing icons. It contains several configuration fields:

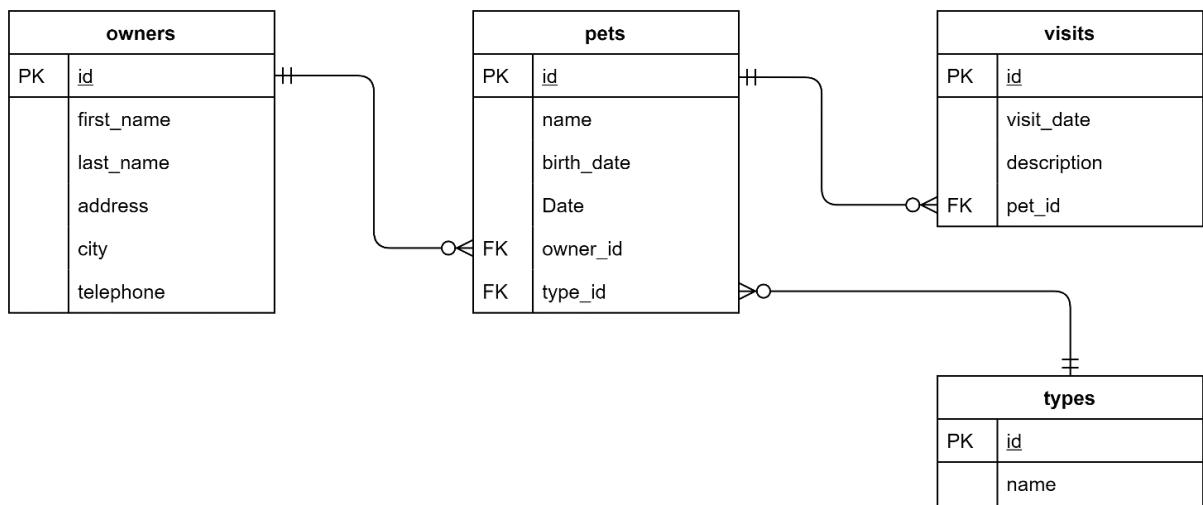
- Application Type: Application (selected), Java Version: 14, Base Package: com.packtpub.micronaut, Name: hello-world-gradle
- Micronaut Version: 2.0.1 (selected), 2.0.2.BUILD-SNAPSHOT
- Language: Java (selected), Kotlin, Groovy
- Build: Gradle (selected), Maven
- Test Framework: JUnit (selected), Spock, Kotlintest

At the bottom are buttons for '+ FEATURES', 'DIFF', 'PREVIEW', and 'GENERATE PROJECT'.

Chapter 2: Working on Data Access

Microservice name	Database type	Persistence framework
pet-owner	Relational (PostgreSQL)	Hibernate
pet-clinic	Relational (PostgreSQL)	MyBatis
pet-clinic-reviews	MongoDB	MongoDB Sync





Micronaut Launch

<https://micronaut.io/launch/>

MICRONAUT™ LAUNCH

Application Type: Application

Java Version: 14

Base Package: com.packtpub.micronaut

Name: pet-owner

Micronaut Version: 2.0.1

Language: Java

Build: Maven

Test Framework: JUnit

FEATURES: data-jpa, hibernate-jpa, jdbc-hikari, logback, postgres

DIFF

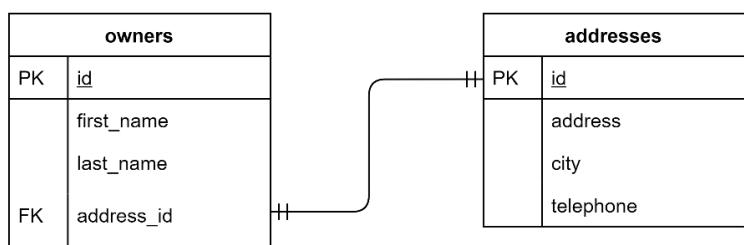
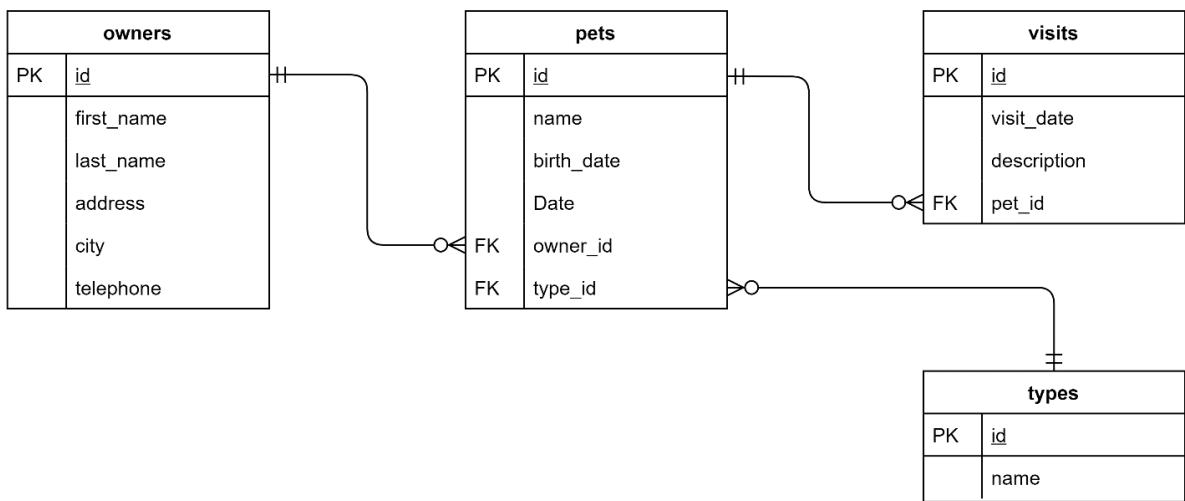
PREVIEW

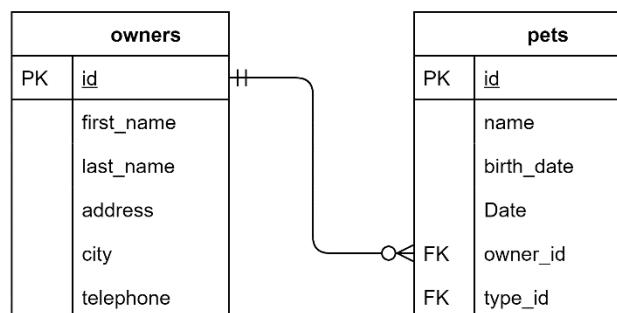
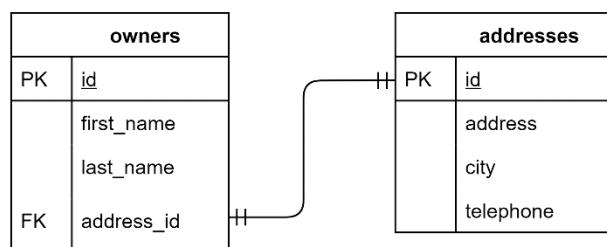
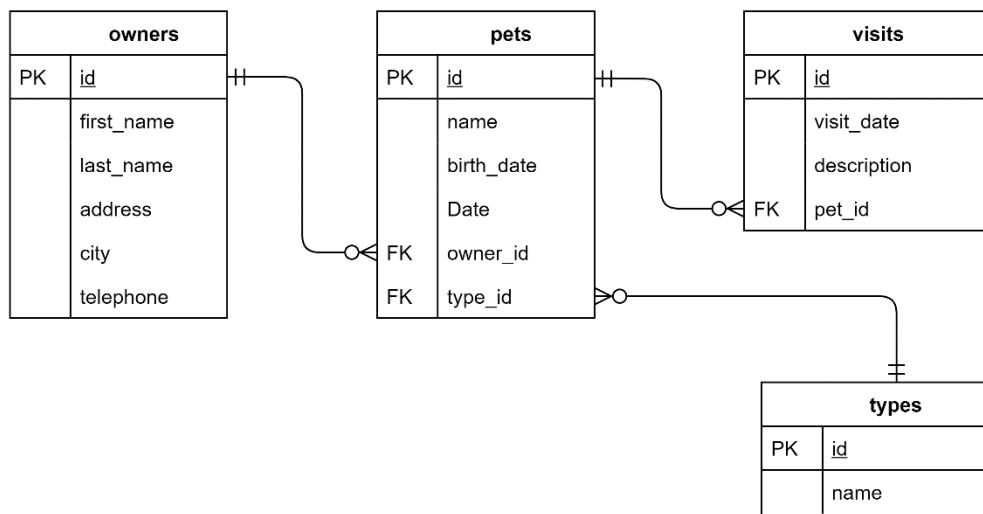
GENERATE PROJECT

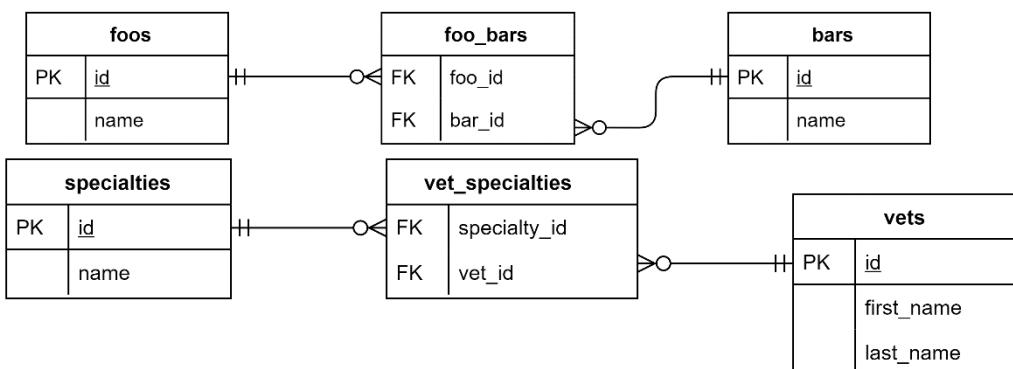
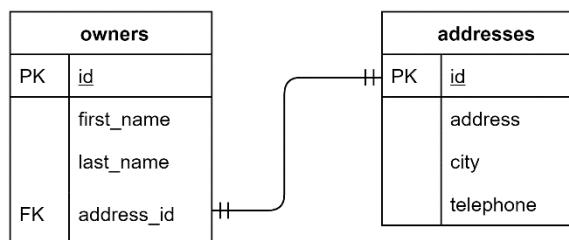
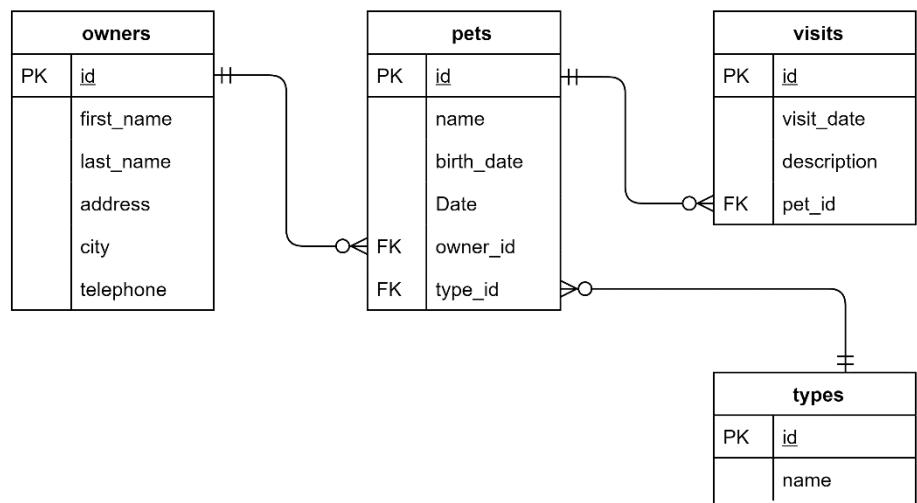
Included Features (5)

data-jpa, hibernate-jpa, jdbc-hikari, logback, postgres

OBJECT COMPUTING
HOME TO MICRONAUT







Micronaut Launch

<https://micronaut.io/launch/>

MICRONAUT™ LAUNCH

Application Type Application Java Version 14 Base Package com.packtpub.micronaut Name pet-clinic

Micronaut Version 2.0.1 Language Java Build Gradle Test Framework JUnit
2.0.2.BUILD-SNAPSHOT Kotlin Maven Spock
Groovy Kotlintest

+ FEATURES DIFF PREVIEW GENERATE PROJECT

Included Features (3)
jdbc-hikari X logback X postgres X

 OBJECT COMPUTING
HOME TO MICRONAUT

Micronaut Launch

<https://micronaut.io/launch/>

MICRONAUT™ LAUNCH

Application Type Application Java Version 14 Base Package com.packtpub.micronaut Name pet-clinic-reviews

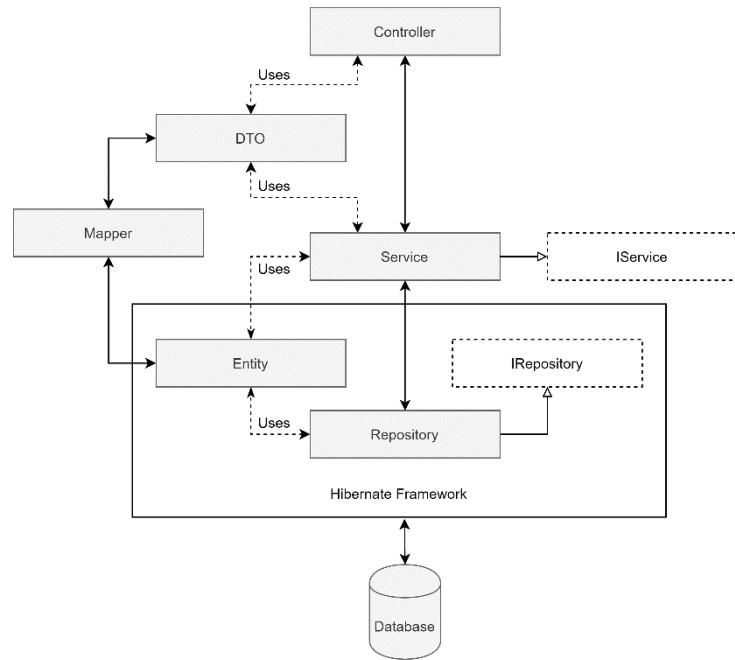
Micronaut Version 2.0.1 Language Java Build Gradle Test Framework JUnit
2.0.2.BUILD-SNAPSHOT Kotlin Maven Spock
Groovy Kotlintest

+ FEATURES DIFF PREVIEW GENERATE PROJECT

Included Features (2)
logback X mongo-sync X

 OBJECT COMPUTING
HOME TO MICRONAUT

Chapter 3: Working on the RESTful Web Services



☰ Request

Method Request URL
GET http://localhost:8080/api/owners

SEND



Parameters Show panel

200 OK 12808.14 ms

DETAILS ▾



```
[Array[10]
-0: {
  "id": 1,
  "firstName": "George",
  "lastName": "Franklin",
  "address": "110 W. Liberty St.",
  "city": "Madison",
  "telephone": "6085551023",
  - "pets": [Array[1]
    -0: {
      "id": 1,
      "name": "Leo",
      - "birthDate": [Array[3]
        0: 2010,
        1: 9,
        2: 7
      ],
      - "type": {
        "id": 1,
        "name": "cat"
      }
    }
  ],
  -1: {
    "id": 2,
    "firstName": "Betty",
    "lastName": "Davis",
    "address": "638 Cardinal Ave.",
    "city": "Sun Prairie",
    "telephone": "6085551749",
    - "pets": [Array[1]
      -0: {
        "id": 2,
        "name": "Basil",
        - "birthDate": [Array[3]
          0: 2012,
          1: 8,
```

≡ Request

Method

GET

Request URL

http://localhost:8080/api/owners/1

SEND



Parameters ▾

200 OK

58.17 ms

DETAILS ▾



```
{  
  "id": 1,  
  "firstName": "George",  
  "lastName": "Franklin",  
  "address": "110 W. Liberty St.",  
  "city": "Madison",  
  "telephone": "6085551023",  
  - "pets": [Array[1]  
    - 0: {  
      "id": 1,  
      "name": "Leo",  
      - "birthDate": [Array[3]  
        0: 2010,  
        1: 9,  
        2: 7  
      ],  
      - "type": {  
        "id": 1,  
        "name": "cat"  
      }  
    }  
  ],  
}
```

≡ Request

Method Request URL
GET <http://localhost:8080/api/owners/123789> ▼ SEND ⋮

Parameters ▼

404 Not Found

25.27 ms

DETAILS ▼



```
{  
    "message": "Page Not Found",  
    "_links": {  
        "self": {  
            "href": "/api/owners/123789",  
            "templated": false  
        }  
    }  
}
```

≡ Request

Method Request URL
POST

Parameters ^

Headers	Body	Variables
Body content type <input type="text" value="application/json"/>	Editor view <input type="text" value="Raw input"/>	

FORMAT JSON MINIFY JSON

```
{  
  "firstName": "Sam",  
  "lastName": "Potterman",  
  "address": "110 King St.",  
  "city": "Toronto",  
  "telephone": "6085551023"  
}
```

201 Created 166.66 ms

DETAILS ▾



```
{  
  "id": 39,  
  "firstName": "Sam",  
  "lastName": "Potterman",  
  "address": "110 King St.",  
  "city": "Toronto",  
  "telephone": "6085551023"  
}
```

≡ Request

Method Request URL
POST http://localhost:8080/api/owners

SEND



Parameters ^

Headers

Body

Variables

Body content type
application/json

Editor view

Raw input

FORMAT JSON MINIFY JSON

```
{  
  "id": 39,  
  "firstName": "Sam",  
  "lastName": "Potterman",  
  "address": "110 King St.",  
  "city": "Toronto",  
  "telephone": "6085551023"  
}
```

500 Internal Server Error 53.85 ms

DETAILS ▾



```
{  
  "message": "Internal Server Error: A new owner cannot already have an ID"  
}
```

≡ Request

Method Request URL
PUT http://localhost:8080/api/owners

SEND



Parameters ^

Headers

Body

Variables

Body content type Editor view
application/json Raw input

FORMAT JSON MINIFY JSON

```
{  
  "id": 39,  
  "firstName": "Sam",  
  "lastName": "Potterman",  
  "address": "120 King St.",  
  "city": "New York",  
  "telephone": "6085551023"  
}
```

200 OK 65.45 ms

DETAILS ▾



```
{  
  "id": 39,  
  "firstName": "Sam",  
  "lastName": "Potterman",  
  "address": "120 King St.",  
  "city": "New York",  
  "telephone": "6085551023"  
}
```

≡ Request

Method Request URL
PUT http://localhost:8080/api/owners

SEND



Parameters ^

Headers

Body

Variables

Body content type
application/json

Editor view

Raw input

FORMAT JSON MINIFY JSON

```
{  
  "firstName": "Sam",  
  "lastName": "Potterman",  
  "address": "120 King St.",  
  "city": "New York",  
  "telephone": "6085551023"  
}
```

500 Internal Server Error

40.73 ms

DETAILS ▾



```
{  
  "message": "Internal Server Error: Invalid id"  
}
```

≡ Request

Method Request URL
DELETE http://localhost:8080/api/owners/39

SEND



Parameters ▾

204 No Content

62.34 ms

DETAILS ▾



≡ Request

Method Request URL
PUT http://localhost:8080/api/owners

SEND



Parameters ^

Headers	Body	Variables
Body content type application/json	Editor view Raw input	

FORMAT JSON MINIFY JSON

```
{  
    "firstName": "Sam",  
    "lastName": "Potterman",  
    "address": "120 King St.",  
    "city": "New York",  
    "telephone": "6085551023"  
}
```

500 Internal Server Error

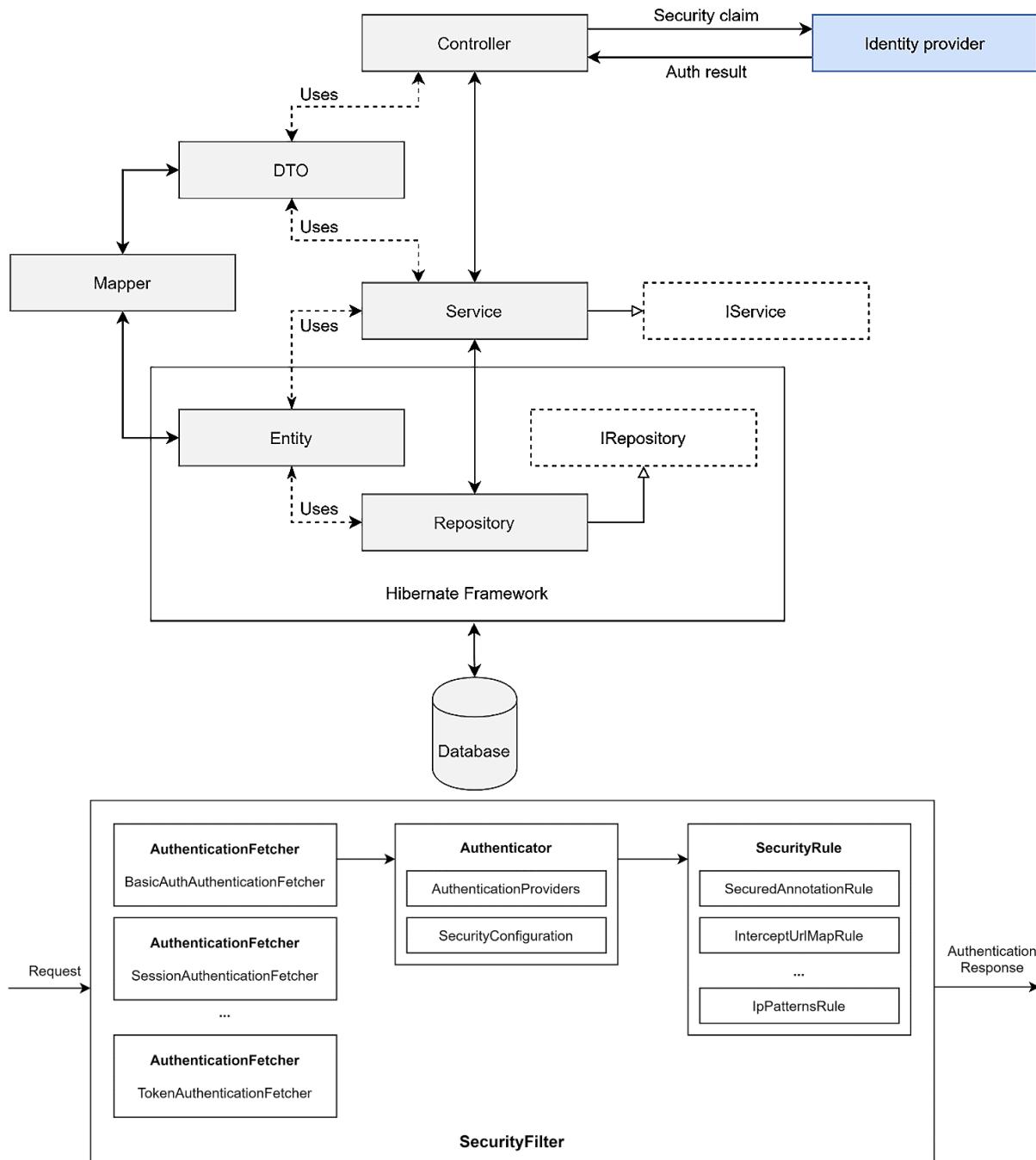
40.73 ms

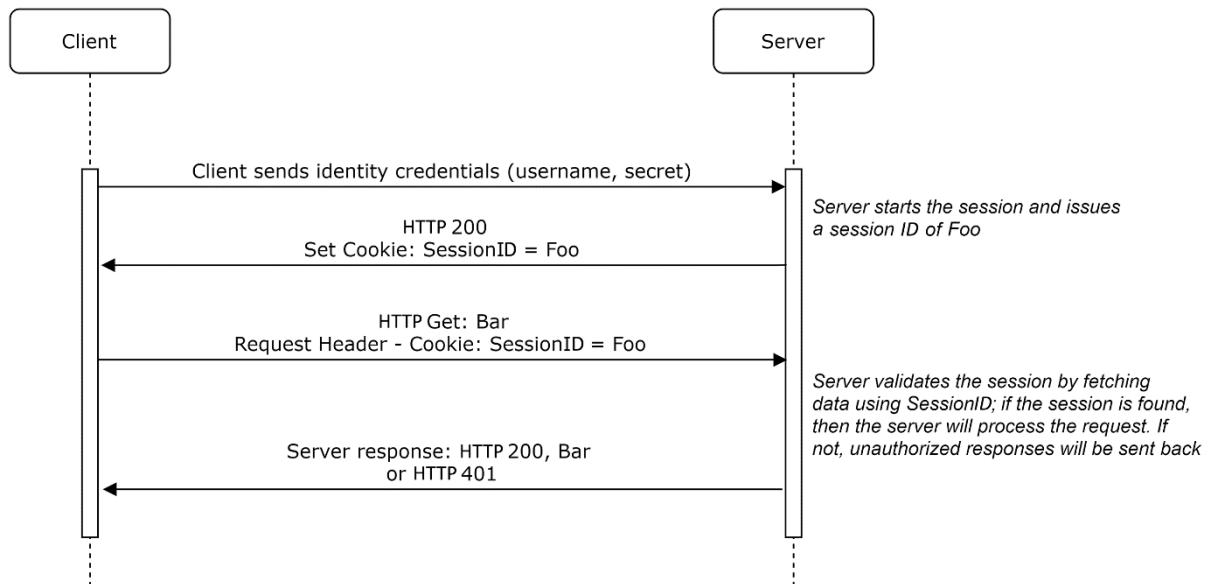
DETAILS ▾



```
{  
    "message": "Internal Server Error: Invalid id"  
}
```

Chapter 4: Securing the Microservices





≡ Request

Method Request URL
GET ▾ http://localhost:8081/api/pets

SEND



Parameters ▾ Show panel

200 OK 2211.73 ms

DETAILS ▾



```
[Array[13]
-0: {
  "id": 1,
  "name": "Leo",
  - "birthDate": [Array[3]
    0: 2010,
    1: 9,
    2: 7
  ],
  - "type": {
    "id": 1,
    "name": "cat"
  }
},
-1: {
  "id": 2,
  "name": "Basil",
  - "birthDate": [Array[3]
    0: 2012,
    1: 8,
    2: 6
  ],
  - "type": {
    "id": 6,
    "name": "hamster"
  }
},
-2: {
  "id": 3,
  "name": "Rosy",
  - "birthDate": [Array[3]
    0: 2011,
    1: 4,
    2: 17
  ],
}
```

≡ Request

Method **GET** Request URL <http://localhost:8081/api/visits> **SEND** :

Parameters ▾

200 OK 158.92 ms

DETAILS ▾



```
[Array[4]
-0: {
  "id": 1,
  "visitDate": [Array[3]
    0: 2013,
    1: 1,
    2: 1
  ],
  "description": "rabies shot",
  "petId": 7
},
-1: {
  "id": 2,
  "visitDate": [Array[3]
    0: 2013,
    1: 1,
    2: 2
  ],
  "description": "rabies shot",
  "petId": 8
},
-2: {
  "id": 3,
  "visitDate": [Array[3]
    0: 2013,
    1: 1,
    2: 3
  ],
  "description": "neutered",
  "petId": 8
},]
```

≡ Request

Method Request URL
GET http://localhost:8081/api/owners [SEND](#) [⋮](#)

Parameters ▾

401 Unauthorized 67.67 ms [DETAILS](#) ▾

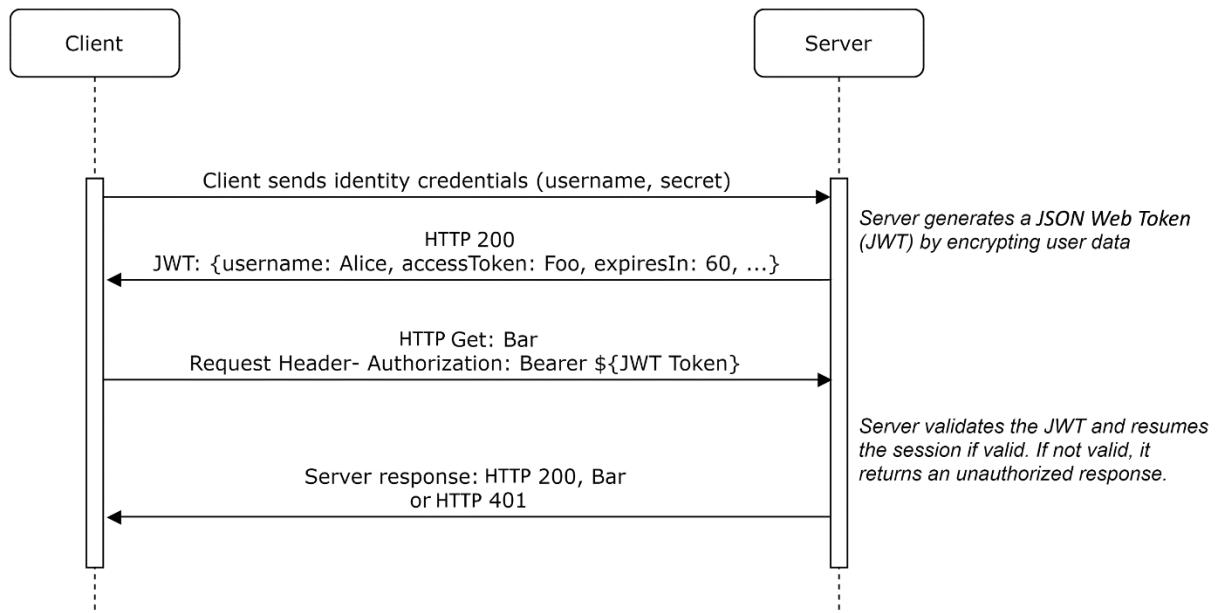


```
MINGW64:/c/Users/nirm.singh/workspace/micronaut/Building-Microservices-with-Micronaut/Chapter04
nirm.singh@CA-L2WT60G2 MINGW64 ~/workspace/micronaut/Building-Microservices-with-Micronaut/Chapter04 (master)
$ curl -v "POST" "http://localhost:8081/login" -H "Content-Type: application/json; charset=utf-8" -d '{"username":"alice", "password":"alice@1"}'
% Total    % Received % Xferd  Average Speed   Time   Time  Current
          Dload  Upload   Total Spent  Left  Speed
0       0     0      0  0     0      0 --:--:-- 0:00:06 --:--:-- 0* Could not resolve host: POST
curl: (6) Could not resolve host: POST
*   Trying ::1:8081...
* TCP_NODELAY set
* Connected to localhost (::1) port 8081 (#1)
> POST /login HTTP/1.1
> Host: localhost:8081
> User-Agent: curl/7.65.1
> Accept: */*
> Content-Type: application/json; charset=utf-8
> Content-Length: 42
>
} [42 bytes data]
* upload completely sent off: 42 out of 42 bytes
* Mark bundle as not supporting multiuse
< HTTP/1.1 303 See Other
< Location: /
< Authorization-Info: 88f1aaaf8-6f72-4c4e-a701-8bb59cc5e5a8
< set-cookie: SESSION=ODhmMwFhzigtNmY3Mi00YzR1LWE3MDetOGJiNTljYzV1NwE4; Path=/; HTTPOnly
< Date: Thu, 24 Jun 2021 17:28:59 GMT
< connection: keep-alive
< transfer-encoding: chunked
<
{ [5 bytes data]
100  42  0     0 100  42  0     44 --:--:-- --:--:-- --:--:--  0
* Connection #1 to host localhost left intact
```

The screenshot shows the Request app interface. At the top, it displays the method (GET), request URL (http://localhost:8081/api/owners), and a large blue 'SEND' button. Below this is a 'Parameters' section with three icons: copy, download, and share. The main content area shows a red box around the status '200 OK' and response time '803.00 ms'. Underneath, a JSON array of owner objects is displayed:

```
[{"id": 1, "firstName": "George", "lastName": "Franklin", "address": "110 W. Liberty St.", "city": "Madison", "telephone": "6085551023", "pets": [{"id": 1, "name": "Leo", "birthdate": "2010-01-09", "type": "cat"}]}
```

At the bottom, there's a note 'Selected environment: Default'.



The screenshot shows the Keycloak administration interface under the 'Clients' section for a client named 'pet-clinic'. The 'Settings' tab is selected. Several configuration parameters are highlighted with red boxes:

- Access Type:** Set to 'confidential'.
- Implicit Flow Enabled:** Set to 'OFF'.
- Direct Access Grants Enabled:** Set to 'ON'.

The rest of the configuration includes:

- Client ID:** pet-clinic
- Name:** (empty)
- Description:** (empty)
- Enabled:** ON
- Always Display in Console:** OFF
- Consent Required:** OFF
- Login Theme:** (dropdown menu)
- Client Protocol:** openid-connect
- Standard Flow Enabled:** ON
- Service Accounts Enabled:** ON
- Authorization Enabled:** ON
- Root URL:** (empty)
- Valid Redirect URIs:** / (with '+' and '-' buttons)
- Base URL:** (empty)
- Admin URL:** (empty)
- Web Origins:** (with '+' button)

Screenshot of the Keycloak Admin Console showing the configuration of a realm role named "realm roles". The "Token Claim" field is highlighted with a red border.

Realm Roles

Protocol: openid-connect
ID: 8e9fa1e1-7bd9-4ce3-8843-5f8ea2e03d15
Name: realm roles
Mapper Type: User Realm Role
Realm Role prefix:
Multivalued: ON
Token Claim: roles
Claim JSON Type: String
Add to ID token: OFF
Add to access: ON

Request

Method: GET Request URL: http://localhost:8082/api/vets

Parameters

401 Unauthorized 1244.30 ms DETAILS

```
curl -v "http://localhost:8082/api/vets" -H "Authorization: Bearer eyJra..."
```

Terminal Output

```
curl: (6) Could not resolve host: POST
* TCP_NODELAY set
Connected to localhost (::1) port 8082 (#1)
> POST /api/vets HTTP/1.1
> Host: localhost:8082
> User-Agent: curl/7.65.1
> Accept: */*
> Content-Type: application/json
> Content-Length: 39
[39 bytes data]
* Mark bundle as not supporting multiuse
* Mark bundle as not supporting multiuse
* Connection #0 to host localhost left intact
```

≡ Request

Method: GET Request URL: http://localhost:8082/api/vets

Parameters:

Headers	Variables
Header name: cookie Header value: JWT=eyJhbGciOiJSUzI1NlIsInR5cClgOiAiSldeIiwiia2lkliA6ICJzSE5hMUk1bkR5bWp3dXRocI9NTG5QZ0ZybklmTEVxR0	X edit

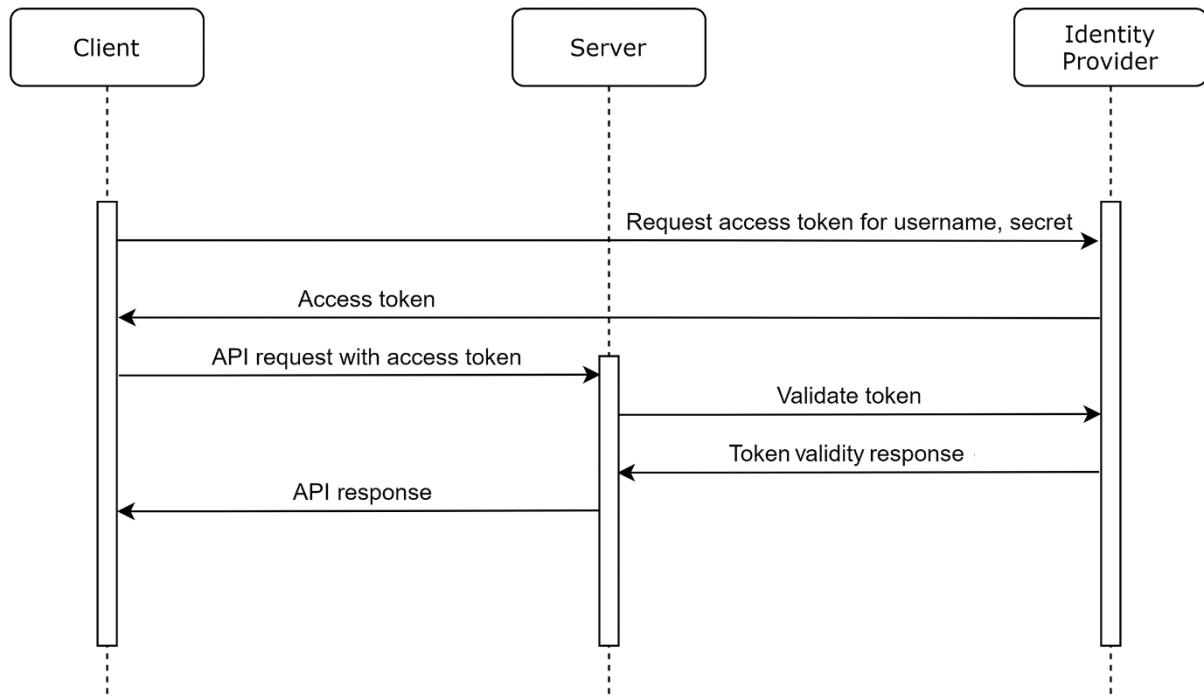
ADD HEADER

A Headers size: 1254 bytes

200 OK 380.58 ms

DETAILS

```
[Array[6]
  -0: {
    "id": 1,
    "firstName": "James",
    "lastName": "Carter"
  },
  -1: {
    "id": 2,
    "firstName": "Helen",
    "lastName": "Leary",
    "specialties": [Array[1]
      -0: {
        "id": 1,
        "name": "radiology"
      }
    ],
  },
  -2: {
    "id": 3,
    "firstName": "Linda",
    "lastName": "Douglas",
    "specialties": [Array[2]
      -0: {
        "id": 2,
        "name": "surgery"
      },
    ],
  },
]
```



Welcome to the Okta developer platform!

Activate your Okta account by clicking the button below (expires in 7 days):

ACTIVATE MY ACCOUNT

Your Okta domain: dev-496 [REDACTED].okta.com

Get started with our SDKs, documentation, and sample apps at developer.okta.com/docs. If you have any questions, simply reply to this email.

APPLICATION SETTINGS

Name

pet-clinic-reviews

Login redirect URIs

com.okta.dev-4962048/callback

+ Add URI

Okta sends an OAuth authorization response to these URIs. Add your application's callback endpoint. [Docs](#)

Logout redirect URIs

com.okta.dev-4962048:/

+ Add URI

When a user signs out, your application can specify a URI where the browser is redirected. Okta only allows redirects for URIs that are listed here. [Docs](#)

Group assignments

Optional

Everyone

Users can only sign in to apps that they are assigned to. Group assignments are easier to manage than individual users.

Grant type allowed

Client acting on behalf of a user

Authorization Code

Refresh Token

Resource Owner Password

Implicit (Hybrid)

Okta can authorize your app's requests with these OAuth 2.0 grant types. Limit the allowed grant types to minimize security risks. [Docs](#)

Add Person

User type 

User



First name

Alice

Last name

Alice

Username

alice@email.com

Primary email

alice@email.com

Groups (optional)

You haven't added any groups

Password 

Set by admin



.....

User must change password on first login

Save

Save and Add Another

Cancel

```

nirm.singh@CA-L2WT60G2 MINGW64 ~/workspace/micronaut/chapter-04/micronaut-petclinic/pet-clinic-reviews
$ curl -k -v GET "https://localhost:8443/api/vet-reviews"
  % Total    % Received % Xferd  Average Speed   Time   Time  Current
               Dload  Upload Total Spent   Left  Speed
0     0     0     0     0     0     0 --:--:--  0:00:01 --:--:-- 0* Could not resolve host: GET
curl: (6) Could not resolve host: GET
*   Trying ::1:8443...
* TCP_NODELAY set
* Connected to localhost (::1) port 8443 (#1)
* ALPN, offering h2
* ALPN, offering http/1.1
* successfully set certificate verify locations:
*   CAfile: C:/Program Files/Git/mingw64/ssl/certs/ca-bundle.crt
*   Capath: none
} [5 bytes data]
* TLSv1.3 (OUT), TLS handshake, Client hello (1):
} [512 bytes data]
* TLSv1.3 (IN), TLS handshake, Server hello (2):
{ [85 bytes data]
* TLSv1.2 (IN), TLS handshake, Certificate (11):
{ [1053 bytes data]
* TLSv1.2 (IN), TLS handshake, Server key exchange (12):
{ [300 bytes data]
* TLSv1.2 (IN), TLS handshake, Server finished (14):
{ [4 bytes data]
* TLSv1.2 (OUT), TLS handshake, Client key exchange (16):
{ [37 bytes data]
* TLSv1.2 (OUT), TLS change cipher, Change cipher spec (1):
{ [1 bytes data]
* TLSv1.2 (OUT), TLS handshake, Finished (20):
{ [16 bytes data]
0     0     0     0     0     0     0 --:--:-- --:--:-- --:--:-- 0* TLSv1.2 (IN), TLS handshake, Finished (20):
{ [16 bytes data]
* SSL connection using TLSv1.2 / ECDHE-RSA-AES128-GCM-SHA256
* ALPN, server did not agree to a protocol
* Server certificate:
*   subject: C=CA; ST=Ontario; L=Toronto; O=Packtpub; OU=Packtpub; CN=Nirmal Singh; emailAddress=singhnirma190@gmail.com
*   start date: Dec 30 20:43:16 2020 GMT
*   expire date: Dec 30 20:43:16 2021 GMT
*   issuer: C=CA; ST=Ontario; L=Toronto; O=Packtpub; OU=Packtpub; CN=Nirmal Singh; emailAddress=singhnirma190@gmail.com
*   SSL certificate verify result: self signed certificate (18), continuing anyway.
} [5 bytes data]
> GET /api/vet-reviews HTTP/1.1
> Host: localhost:8443
> User-Agent: curl/7.65.1
> Accept: */*
>
{ [5 bytes data]
* Mark bundle as not supporting multiuse
< HTTP/1.1 401 Unauthorized
< connection: keep-alive
< transfer-encoding: chunked
<
{ [5 bytes data]
0     0     0     0     0     0     0 --:--:-- --:--:-- --:--:-- 0
* Connection #1 to host localhost left intact

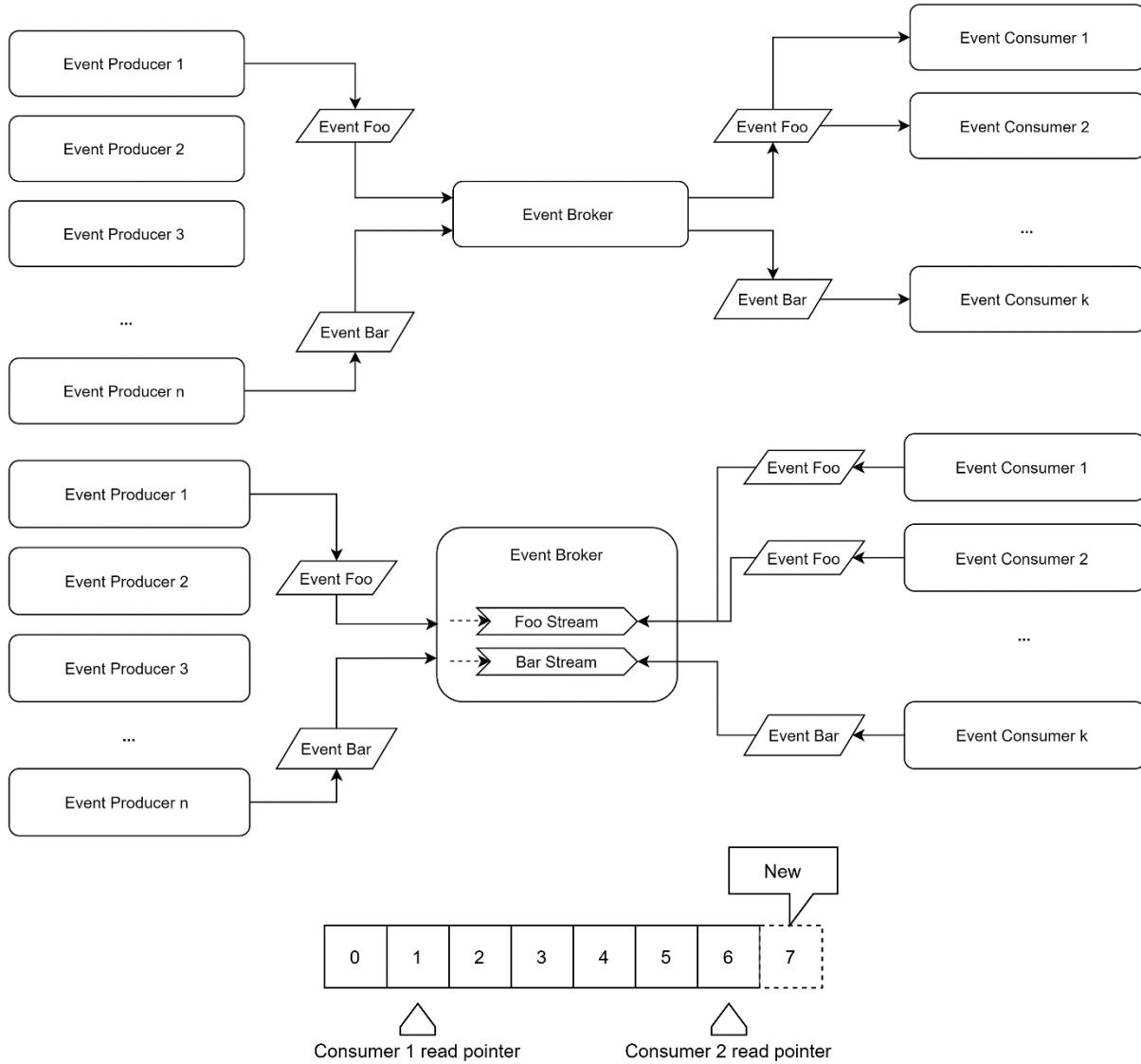
nirm.singh@CA-L2WT60G2 MINGW64 ~/workspace/micronaut/chapter-04/micronaut-petclinic/pet-clinic-reviews
$ |

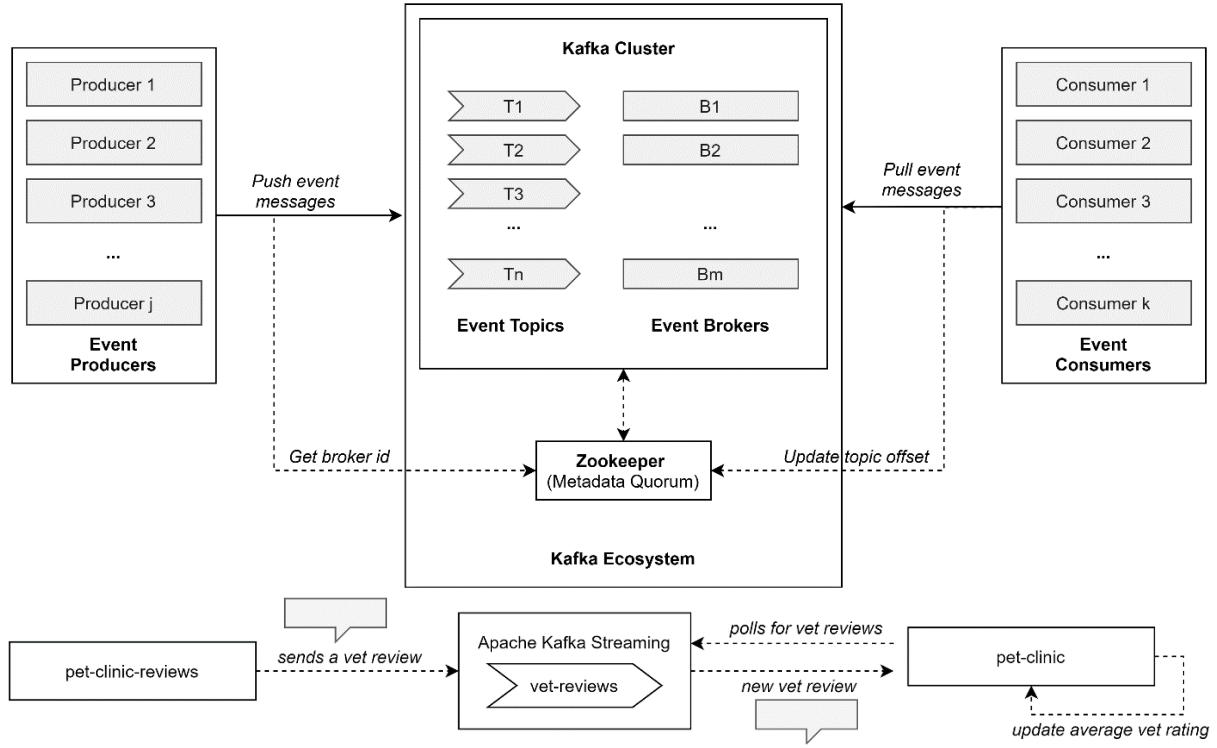
nirm.singh@CA-L2WT60G2 MINGW64 ~/workspace/micronaut/chapter-04/micronaut-petclinic/pet-clinic-reviews
$ curl -k GET "https://localhost:8443/api/vet-reviews" -H 'Cookie: JWT=eyJraioiJwR0JhwXeyWdwZ0xrWUpCn1EtbDlxbm1mY3ctcVRsbV80dm5Zw1EZkt3IwiYWx1000TYMDQ4Lm9rdGeUy29tL29hdXRm19KzWzhdxO1wiYXXvkIjotYXbpo18VGWvYXvsdIsIm1hdC16MTYwOTQyNjcyMCwvZkhvIjoxNjA5NDMwMzIwLCJjaWoiIwb2EzG5taXgbhlpssyOt000g81Jrk96AnpHjQj0RvvEHka6RTVs0zHjy165AKS89AF3_7v8pRuiGvjSeiwEqf1qjx85fbu9dXlFm07o-3LnQciW2yr6ExspB6nnXt3bpXACsKjTOYWoZn7rbq1htulE4PRoOURZ'Gw-fuDAAql5jl14kfWOhTy5WY7bKK23uhJmGkShtjjUr0a9mRwmPPA'
  % Total    % Received % Xferd  Average Speed   Time   Time  Current
               Dload  Upload Total Spent   Left  Speed
0     0     0     0     0     0     0 --:--:--  0:00:01 --:--:-- 0curl: (6) Could not resolve host: GET
100 1308 100 1308 0     0     13080 0 --:--:-- --:--:-- 13080 [{"reviewId": "0ee19b1c-ec8e-11ea-adc1-0242ac120002", "rating": 4.0, "comment": "Very good vet", "vetId": 2, "dateAdded": "2020-08-28"}, {"reviewId": "0ee19b1c-ec8e-11ea-adc1-0242ac120004", "rating": 2.5, "comment": "Bad experience with this vet", "vetId": 2, "dateAdded": "2020-08-31"}, {"reviewId": "0ee19b1c-ec8e-11ea-adc1-0242ac120006", "rating": 2.5, "comment": "Very good vet", "vetId": 2, "dateAdded": "2020-12-30"}, {"reviewId": "bb6ab48c-6dd5-4801-a1d0-0405cd782066", "rating": 4.5, "comment": "Very good vet", "vetId": 2, "dateAdded": "2020-12-30"}, {"reviewId": "9af49842-93a2-4db9-831a-745f4bc610d1", "rating": 4.5, "comment": "Very good vet", "vetId": 2, "dateAdded": "2020-12-30"}]

nirm.singh@CA-L2WT60G2 MINGW64 ~/workspace/micronaut/chapter-04/micronaut-petclinic/pet-clinic-reviews
$ |

```

Chapter 5: Integrating Microservices using the Event-Driven Architecture





The screenshot shows the Kafdrop interface for the topic **foo-stream**:

- Topic Messages: foo-stream**
- Filter options: First Offset: 0 | Last Offset: 1 | Size: 1
- Message details: Partition: 0 | Offset: 0 | # messages: 100 | Key format: DEFAULT | Message format: DEFAULT
- View Messages button
- Message content: Offset: 0 | Key: empty | Timestamp: 2020-12-31 21:20:52.492 | Headers: empty
Hello-world!

≡ Request

Method POST Request URL <http://localhost:8083/api/vet-reviews> SEND ⋮

Parameters ^

Headers	Body	Variables
Body content type application/json	Editor view Raw input	

FORMAT JSON MINIFY JSON

```
{  
  "rating": 4.5,  
  "comment": "Very good vet in the area",  
  "vetId": 3,  
  "dateAdded": [  
    2020,  
    12,  
    31  
  ]  
}
```

201 Created

5267.50 ms

DETAILS ▾



```
{  
  "reviewId": "51992654-4d78-4913-83c4-a3b1e9de47dd",  
  "rating": 4.5,  
  "comment": "Very good vet in the area",  
  "vetId": 3,  
  "dateAdded": [Array[3]  
    0: 2020,  
    1: 12,  
    2: 31  
  ],  
}
```

The screenshot shows the Kafdrop web application interface. At the top left is the Kafdrop logo, which consists of a stylized blue and purple 'K' shape followed by the word 'Kafdrop'. In the top right corner, there is a small circular icon with a question mark and the word 'Star'. Below the logo, the title 'Topic Messages: vet-reviews' is displayed in a large, bold, black font. Underneath the title, there is a search bar with the placeholder text 'First Offset: 0 Last Offset: 1 Size: 1'. Below the search bar are several dropdown menus and input fields: 'Partition' set to 0, 'Offset' set to 0, '# messages' set to 100, 'Key format' set to DEFAULT, and 'Message format' set to DEFAULT. A prominent blue button labeled 'View Messages' is located below these controls. At the bottom of the interface, a message card displays the following details: 'Offset: 0', 'Key: empty', 'Timestamp: 2020-12-31 21:54:07.133', and 'Headers: empty'. The message content is shown as a JSON object: { "reviewId": "51992654-4d78-4913-83c4-a3b1e9de47dd", "rating": 4.5, "comment": "Very good vet in the area", "vetId": 3, "dateAdded": [2020, 12, 31] }.

≡ Request

Method

POST

Request URL

http://localhost:8083/api/vet-reviews

SEND



Parameters ^

Headers

Body

Variables

Body content type

application/json

Editor view

Raw input

FORMAT JSON MINIFY JSON

```
{  
  "rating": 2.5,  
  "comment": "We didn't like the services",  
  "vetId": 3,  
  "dateAdded": [  
    2021,  
    1,  
    3  
  ]  
}
```

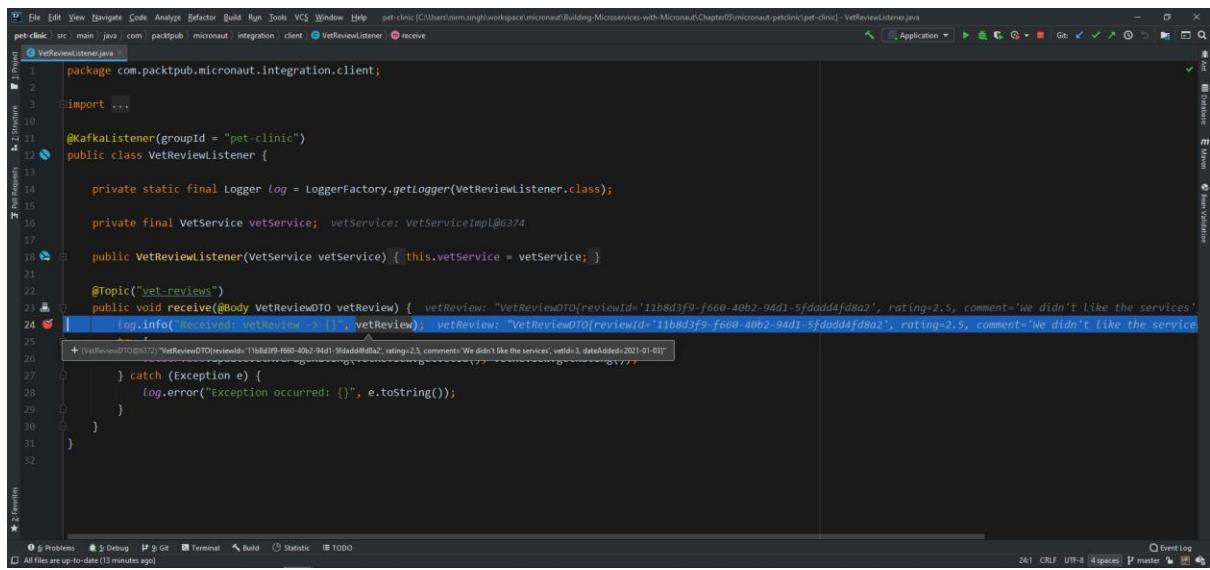
201 Created

99.64 ms

DETAILS ▾

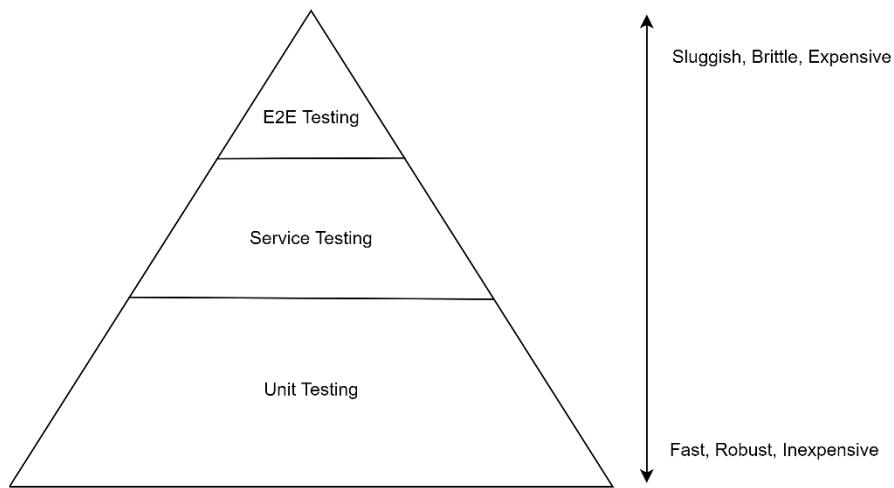


```
{  
  "reviewId": "93d67c54-d69c-4136-9278-cf21fda5de91",  
  "rating": 2.5,  
  "comment": "We didn't like the services",  
  "vetId": 3,  
  - "dateAdded": [Array[3]  
    0: 2021,  
    1: 1,  
    2: 3  
  ],  
}
```



```
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help pet-clinic [C:\Users\nimrung\workspace\micronaut\Building-Microservices-with-Micronaut\Chapter05\micronaut-petclinic] - VetReviewListener.java
pet-clinic src main java com packtpub micronaut integration client VetReviewListener receive
1 package com.packtpub.micronaut.integration.client;
2
3 import ...
4
5 @KafkaListener(groupId = "pet-clinic")
6 public class VetReviewListener {
7
8     private static final Logger log = LoggerFactory.getLogger(VetReviewListener.class);
9
10    private final VetService vetService; vetService: VetServiceImpl@6374
11
12    public VetReviewListener(VetService vetService) { this.vetService = vetService; }
13
14    @Topic("vet-reviews")
15    public void receive(@Body VetReviewDTO vetReview) { vetReview: "VetReviewDTO(reviewId='11b8d3f9-f660-40b2-94d1-5fdadd4fd8a2', rating=2.5, comment='We didn't like the services'
16        | log.info("Received: " + vetReview); vetReview: "VetReviewDTO(reviewId='11b8d3f9-f660-40b2-94d1-5fdadd4fd8a2', rating=2.5, comment='We didn't like the services'
17        | + (VetReviewDTO@11b8d3f9-f660-40b2-94d1-5fdadd4fd8a2, rating=2.5, comment='We didn't like the services', vetId=3, dateAdded=2021-01-01T00:00:00.000Z)
18        | } catch (Exception e) {
19            | log.error("Exception occurred: {}", e.toString());
20        | }
21    }
22
23    }
24
25
26
27
28
29
30
31
32
```

Chapter 6: Testing the Microservices



Chapter 7: Handling Microservice Concerns

The screenshot shows a web-based interface for managing microservices. At the top, there's a navigation bar with icons for cluster, datacenter (dc1), services, nodes, key/value (which is selected and highlighted in dark blue), ACL, and intentions. Below the navigation, a breadcrumb trail indicates the current path: Key / Values / config / pet-owner. The main content area has a title "application.yml". On the left, there's a "Value" tab and a "Code" toggle switch (which is turned on). The code editor displays the following YAML configuration:

```
1 micronaut:
2   application:
3     name: pet-owner
4   router:
5     static-resources:
6       swagger:
7         paths: classpath:META-INF/swagger
8         mapping: /swagger/**

9
10 datasources:
11   default:
12     url: "jdbc:postgresql://localhost:5432/postgres"
13     username: postgres
14     password: postgres
15     driverClassName: org.postgresql.Driver
16
17 jpa:
18   default:
19     entity-scan:
20       packages:
21         - com.packtpub.micronaut.domain
22     properties:
23       hibernate:
24         show_sql: false
25         dialect: org.hibernate.dialect.PostgreSQL95Dialect
26         enable_lazy_load_no_trans: true
27
```

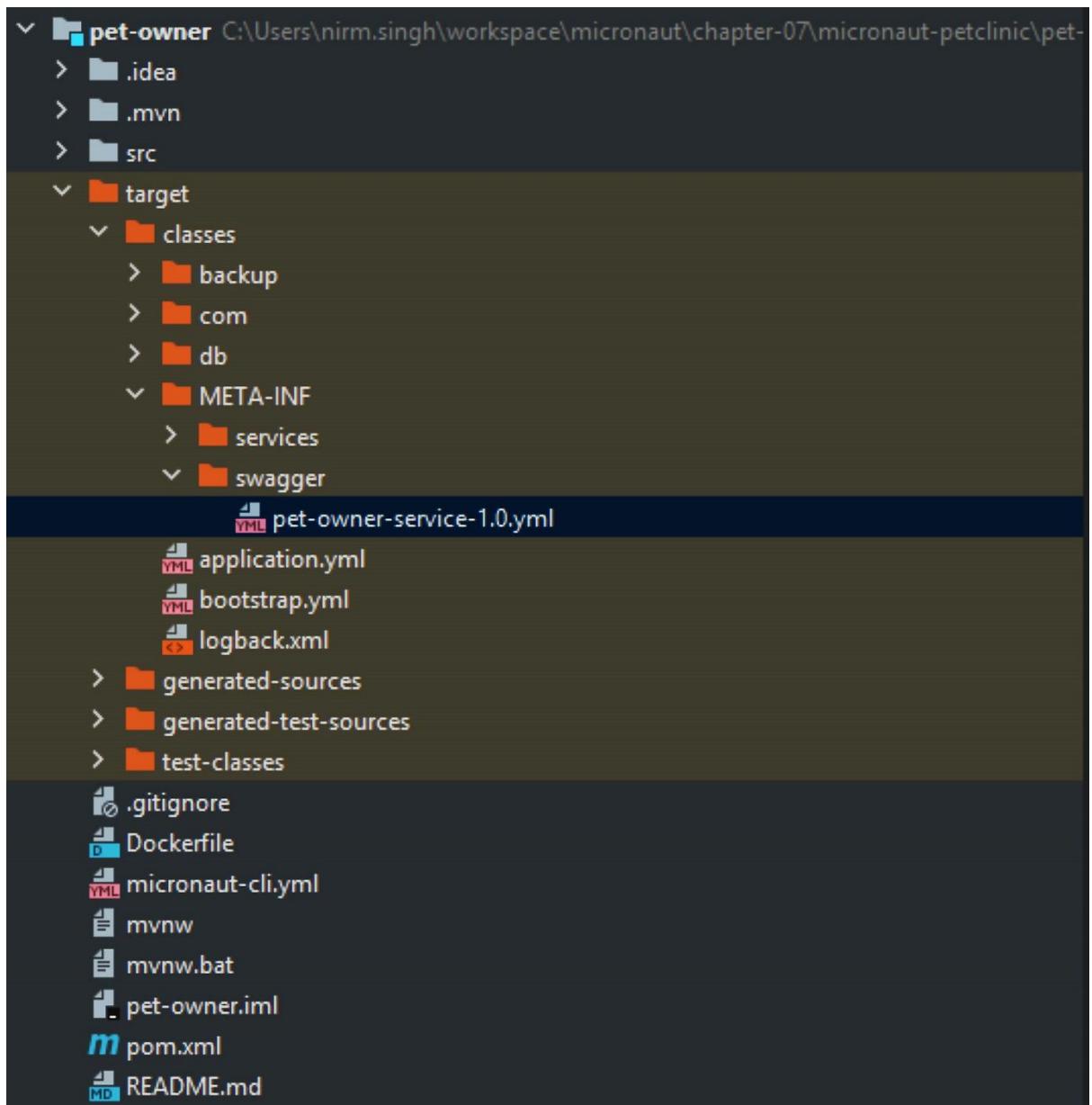
At the bottom right of the code editor, there's a "YAML" button with a dropdown arrow. Below the code editor, there are three buttons: "Save" (blue background), "Cancel" (gray background), and "Delete" (red border).

The screenshot shows an IDE interface with a project named "pet-owner". The central window displays the "Application.java" file. Below the code editor, the terminal output shows the application's startup logs. A red box highlights a specific section of the log where Micronaut is reading configuration from a bootstrap file and connecting to Consul.

```
18:16:16.502 [main] INFO i.m.context.DefaultBeanContext - Reading Startup environment from bootstrap.yml
18:16:22.202 [main] INFO i.m.d.c.c.DistributedPropertySourceLocator - Resolved 1 configuration sources from client:
  compositeConfigurationClient(consul)
18:16:22.826 [main] INFO com.zaxxer.hikari.HikariDataSource - HikariPool-1 - Starting...
18:16:23.540 [main] INFO com.zaxxer.hikari.HikariDataSource - HikariPool-1 - Start completed.
18:16:23.595 [main] INFO org.hibernate.Version - HHH000412: Hibernate ORM core version 5.4.24.Final
18:16:23.912 [main] INFO o.h.annotations.common.Version - HCANN000001: Hibernate Commons Annotations {5.1.2.Final}
18:16:24.227 [main] INFO org.hibernate.dialect.Dialect - HHH000400: Using dialect: org.hibernate.dialect.PostgreSQL95Dialect
18:16:27.069 [main] INFO io.micronaut.runtime.Micronaut - Startup completed in 11669ms. Server Running: http://localhost:10731
18:16:27.073 [main] INFO com.packtpub.micronaut.Application - 

-----
Application 'pet-owner' is running! Access URLs:
Local: http://localhost:10731
External: http://localhost:10731

18:16:27.196 [default-nioEventLoopGroup-3-2] INFO i.m.d.registration.AutoRegistration - Registered service [pet-owner] with Consul
```



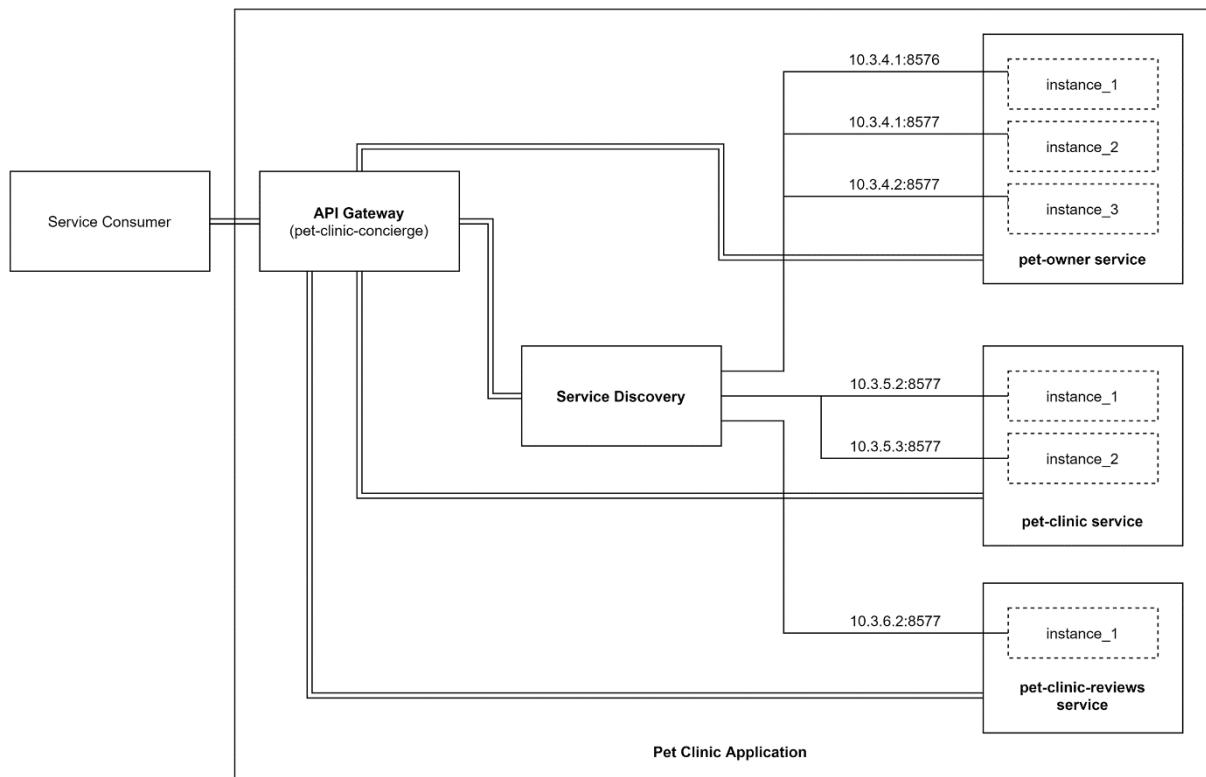
The screenshot shows the Swagger Editor interface with the URL <https://editor.swagger.io>. On the left, the code editor displays the OpenAPI specification for the 'pet-owner-service'. On the right, the API documentation is presented in a clean, modern design. The top right corner features a green 'OAS3' badge. Below it, the title 'pet-owner-service' is displayed with a '1.0' version indicator. A sub-header 'Pet Owner APIs' follows. The main content area is titled 'default' and lists various API endpoints with their methods, URLs, and descriptions. The endpoints include:

- GET /api/owners**: GET /owners : get all the owners.
- PUT /api/owners**: PUT /owners : Updates an existing owner.
- POST /api/owners**: POST /owners : Create a new owner.
- GET /api/owners/{id}**: GET /owners/{id} : get the "id" owner.
- DELETE /api/owners/{id}**: DELETE /owners/{id} : delete the "id" owner.
- GET /api/pet-types**: GET /pet-types : get all the petTypes.
- PUT /api/pet-types**: PUT /pet-types : Updates an existing petType.
- POST /api/pet-types**: POST /pet-types : Create a new petType.
- GET /api/pet-types/{id}**: GET /pet-types/{id} : get the "id" petType.
- DELETE /api/pet-types/{id}**: DELETE /pet-types/{id} : delete the "id" petType.
- GET /api/pets**: GET /pets : get all the pets.

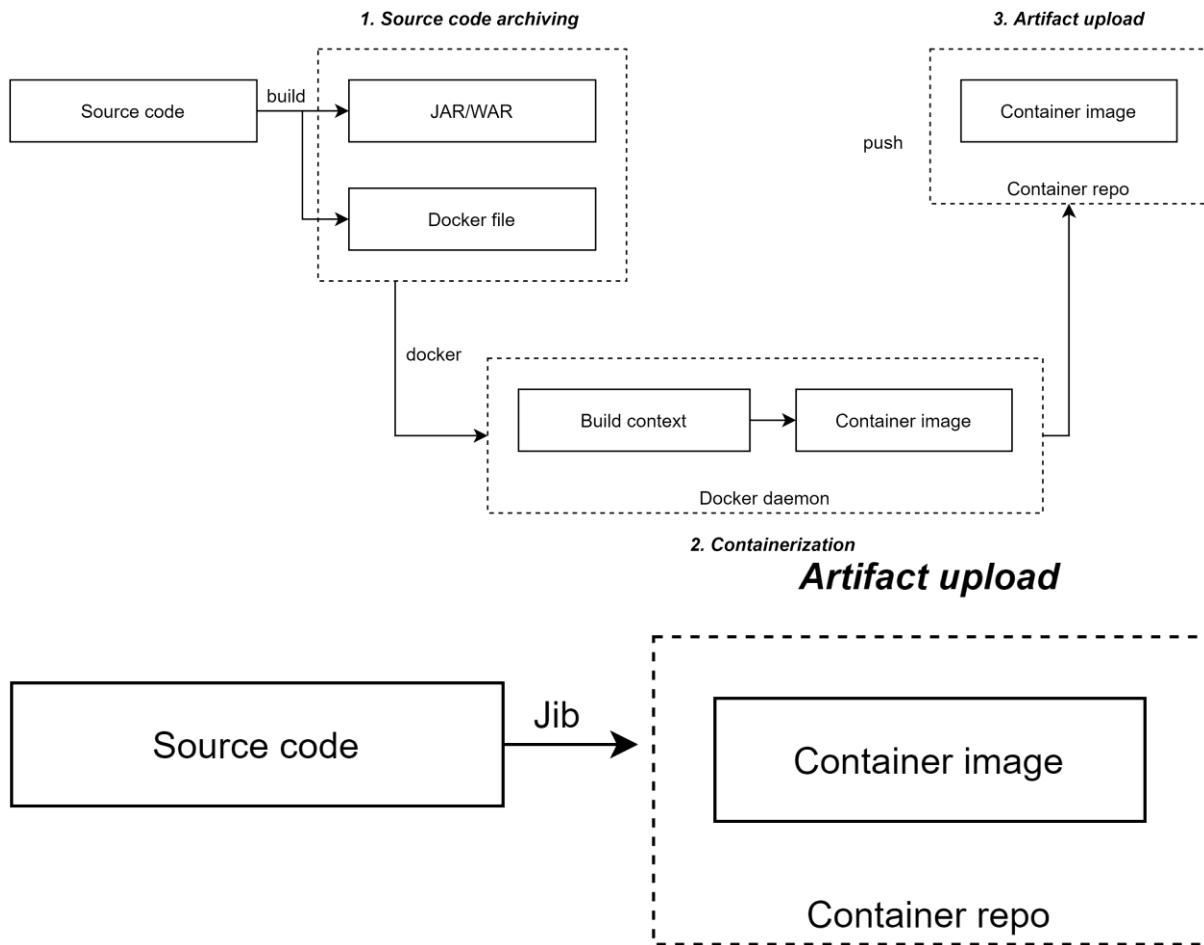
At the bottom of the interface, there is a navigation bar with tabs: Services (which is active), Nodes, Key/Value, ACL, and Intentions. To the left of the tabs, there is a small icon representing a cluster or data center.

Services 4 total

	Search	Search Across	Health Status	Service Type
✓ consul				
1 Instance				
✓ pet-clinic				
1 Instance				
✓ pet-clinic-reviews				
1 Instance				
✓ pet-owner				
1 Instance				



Chapter 8: Deploying Microservices



```
nirm.singh@CA-L2WT60G2 MINGW64 ~/workspace/micronaut/Chapter-08/micronaut-petclinic
$ docker images | grep pet-owner
pet-owner-0.1-image      latest          a65b932fde5a   24 hours ago  441MB
```

TAG	IMAGE ID	CREATED	SIZE	
pet-clinic-concierge-0.1-im...	latest	8c774af05d2c	about 22 hours ago	431.33 MB
pet-clinic-reviews-0.1-image	latest	61cec8549f8b	about 22 hours ago	436.88 MB
pet-clinic-0.1-image	latest	92eee28f7da3	about 22 hours ago	437.53 MB
pet-owner-0.1-image	latest	a65b932fde5a	about 22 hours ago	441.38 MB

The screenshot shows the Docker desktop application interface. The top navigation bar includes the Docker logo, Upgrade, Settings, and a user account for singhnirmal90. The main left sidebar lists 'Containers / Apps' and 'Images'. The central pane displays a search bar and a list of running containers under the 'micronaut-petclinic' service. The list includes:

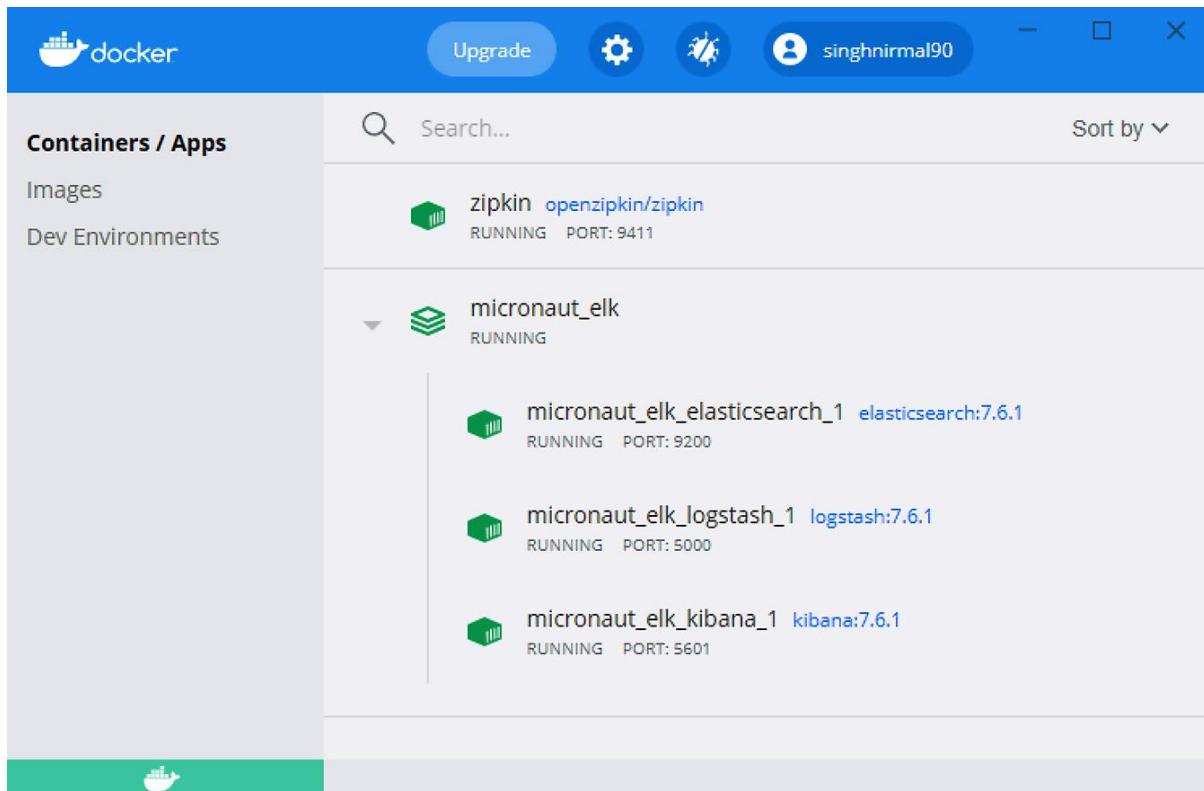
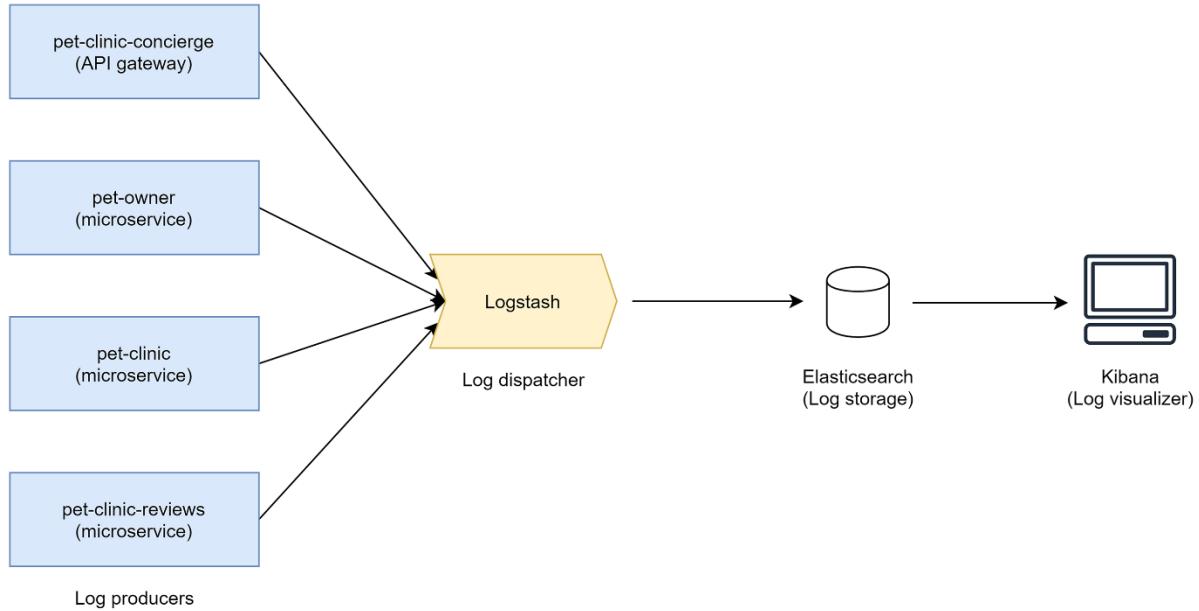
- micronaut-petclinic_zookeeper_1 bitnami/zookeeper:3-debian-10
RUNNING PORT: 2181
- micronaut-petclinic_consul_1 bitnami/consul:latest
RUNNING PORT: 8500
- micronaut-petclinic_pet-owner_1 pet-owner-0.1-image
RUNNING PORT: 32581
- micronaut-petclinic_kafka_1 bitnami/kafka:2-debian-10
RUNNING PORT: 9094
- micronaut-petclinic_pet-clinic-reviews_1 pet-clinic-reviews-0.1-image
RUNNING PORT: 32583
- micronaut-petclinic_pet-clinic_1 pet-clinic-0.1-image
RUNNING PORT: 32582
- micronaut-petclinic_kafdrop_1 obsidiandynamics/kafdrop
RUNNING PORT: 9100
- micronaut-petclinic_pet-clinic-concierge_1 pet-clinic-concierge-0.1-image
RUNNING PORT: 32584

The bottom navigation bar includes icons for Home, Services (which is selected), Nodes, Key/Value, ACL, and Intentions.

Services 5 total

Search	Search Across	Health Status	Service Type
consul		Green	External
pet-clinic		Green	External
pet-clinic-concierge		Green	External
pet-clinic-reviews		Green	External
pet-owner		Green	External

Chapter 9: Distributed logging, tracing and monitoring



Home

The Home page features two main sections: **Observability** and **Security**.

Observability:

- APM:** APM automatically collects in-depth performance metrics and errors from inside your applications. Buttons: **Add APM**.
- Logs:** Ingest logs from popular data sources and easily visualize in preconfigured dashboards. Buttons: **Add log data**.
- Metrics:** Collect metrics from the operating system and services running on your servers. Buttons: **Add metric data**.

Security:

- SIEM:** Centralize security events for interactive investigation in ready-to-go visualizations. Buttons: **Add events**.

Data Sources:

- Add sample data:** Load a data set and a Kibana dashboard.
- Upload data from log file:** Import a CSV, NDJSON, or log file.
- Use Elasticsearch data:** Connect to your Elasticsearch index (button highlighted with a red border).

Visualize and Explore Data:

- APM:** Automatically collect in-depth performance metrics and errors from inside your applications.
- Canvas:** Showcase your data in a pixel-perfect way.

Manage and Administer the Elastic Stack:

- Console:** Skip cURL and use this JSON interface to work with your data directly.
- Index Patterns:** Manage the index patterns that help retrieve your data from Elasticsearch.

Discover

The Discover page displays search results for the **logstash*** index.

Search Controls:

- New, Save, Open, Share, Inspect.
- Search bar: **logstash***.
- Time range: Last 15 minutes.
- Show dates button.
- Refresh button.

Filtering:

- Search field names: **_source**.
- Filter by type: **_source**.

Selected fields:

- @timestamp** (highlighted with a red border).
- t app_name** (highlighted with a red border).

Available fields:

- Popular:**
 - @timestamp**
 - t app_name** (highlighted with a red border)
 - Top 5 values in 500 / 500 records:**
 - pet-clinic**: 60.8%
 - pet-clinic-reviews**: 28.2%
 - pet-clinic-concierge**: 6.4%
 - pet-owner**: 4.6%
 - @version**
 - t X-B3-SpanId**
 - t X-B3-TracedId**
 - t X-Span-Export**
 - t _id**
 - t _index**

Results:

- Count:** 9,344 hits. Date range: May 1, 2021 @ 19:08:13.055 - May 1, 2021 @ 19:23:13.055.
- Histogram:** @timestamp per 30 seconds.
- Log Entries:**
 - May 1, 2021 @ 19:23:12.358: instance_name: pet-clinic-gateway:32582 @version: 1 message: [Consumer clientId=pet-clinic-vet-review-listener, groupId=pet-clinic] Added READ_UNCOMMITTED fetch request for partition vet-reviews-0 at position FetchPosition(offset=0, offsetEpoch=Optional.empty, currentLeader=leaderAndEpoch.leader=Optional.of(kafka:9092 (id: 1 rack: null)), epoch=0) to node kafka:9092 (id: 1 rack: null) level_value: 10,000 app_name: pet-clinic type: syslog
 - May 1, 2021 @ 19:23:12.358: instance_name: pet-clinic-gateway:32582 @version: 1 message: [Consumer clientId=pet-clinic-vet-review-listener, groupId=pet-clinic] Built incremental fetch (sessionId=1494760228, epoch=76) for node 1. Added 0 partition(s), altered 0 partition(s), removed 0 partition(s) out of 1 partition(s) level_value: 10,000 app_name: pet-clinic type: syslog @timestamp: May 1, 2021 @ 19:23:12.358 logger_name: org.apache.kafka.clients.FetchSessionHandler level: DEBUG host: gateway port: 58,858
 - May 1, 2021 @ 19:23:12.358: instance_name: pet-clinic-gateway:32582 @version: 1 message: [Consumer clientId=pet-clinic-vet-review-listener, groupId=pet-clinic] Sending READ_UNCOMMITTED IncrementalFetchRequest(toSend=(), toForget=(), implied=(vet-reviews-0)) to broker kafka:9092 (id: 1 rack: null) level_value: 10,000 app_name: pet-clinic type: syslog @timestamp: May 1, 2021 @ 19:23:12.358 logger_name: org.apache.kafka.clients.consumer.internals.Fetcher level: DEBUG host: gateway



Zipkin Find a trace Dependencies ENGLISH Search by trace ID

PET-CLINIC-CONCIERGE: get /api/owners

Duration: 947.366ms Services: 2 Depth: 3 Total Spans: 3 Trace ID: cb2e89f5770f0e1e DOWNLOAD JSON

CLINIC-CONCIE get /api/owners [947.366ms]

CLINIC-CONCIE getallowners [929.448ms]

PET-OWNER get /api/owners [905.269ms]

PET-CLINIC-CONCIERGE
get /api/owners
Span ID: cb2e89f5770f0e1e Parent ID: None

Annotations

Server Start

Start Time	05/01 20:55:09.334_095
Relative Time	
Address	pet-clinic-concierge

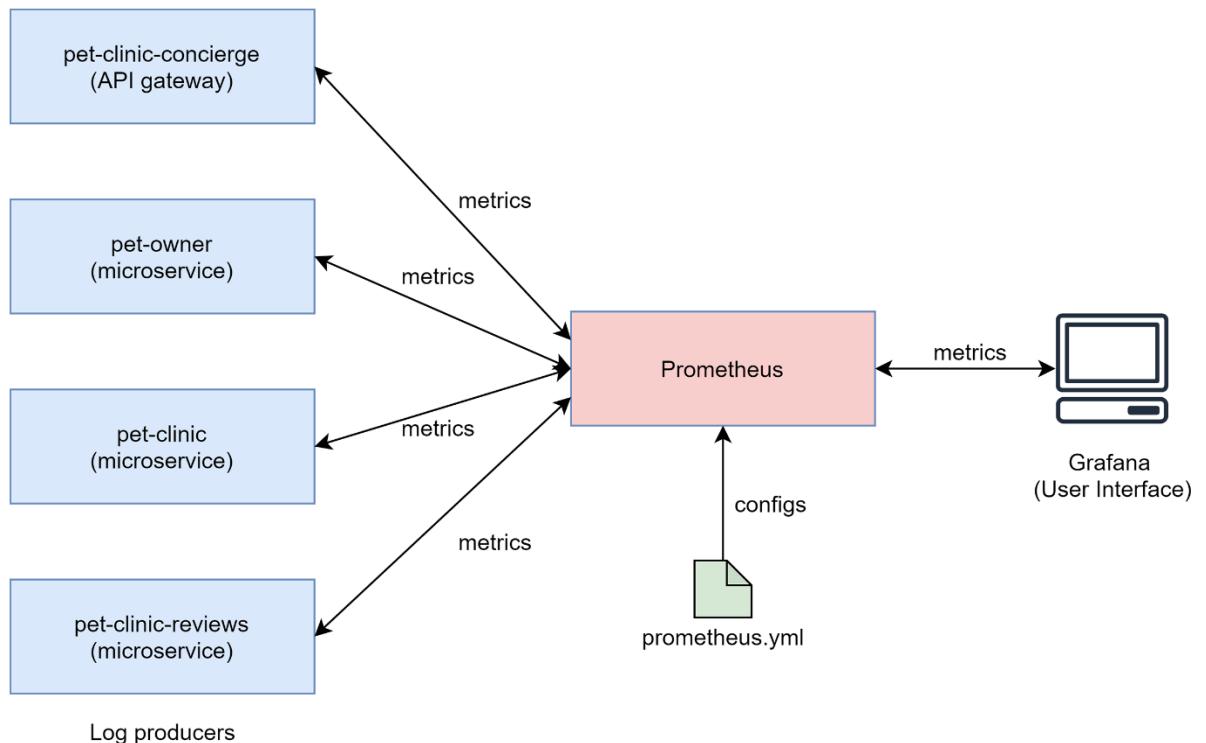
Server Finish

Start Time	05/01 20:55:10.281_461
Relative Time	947.366ms
Address	pet-clinic-concierge

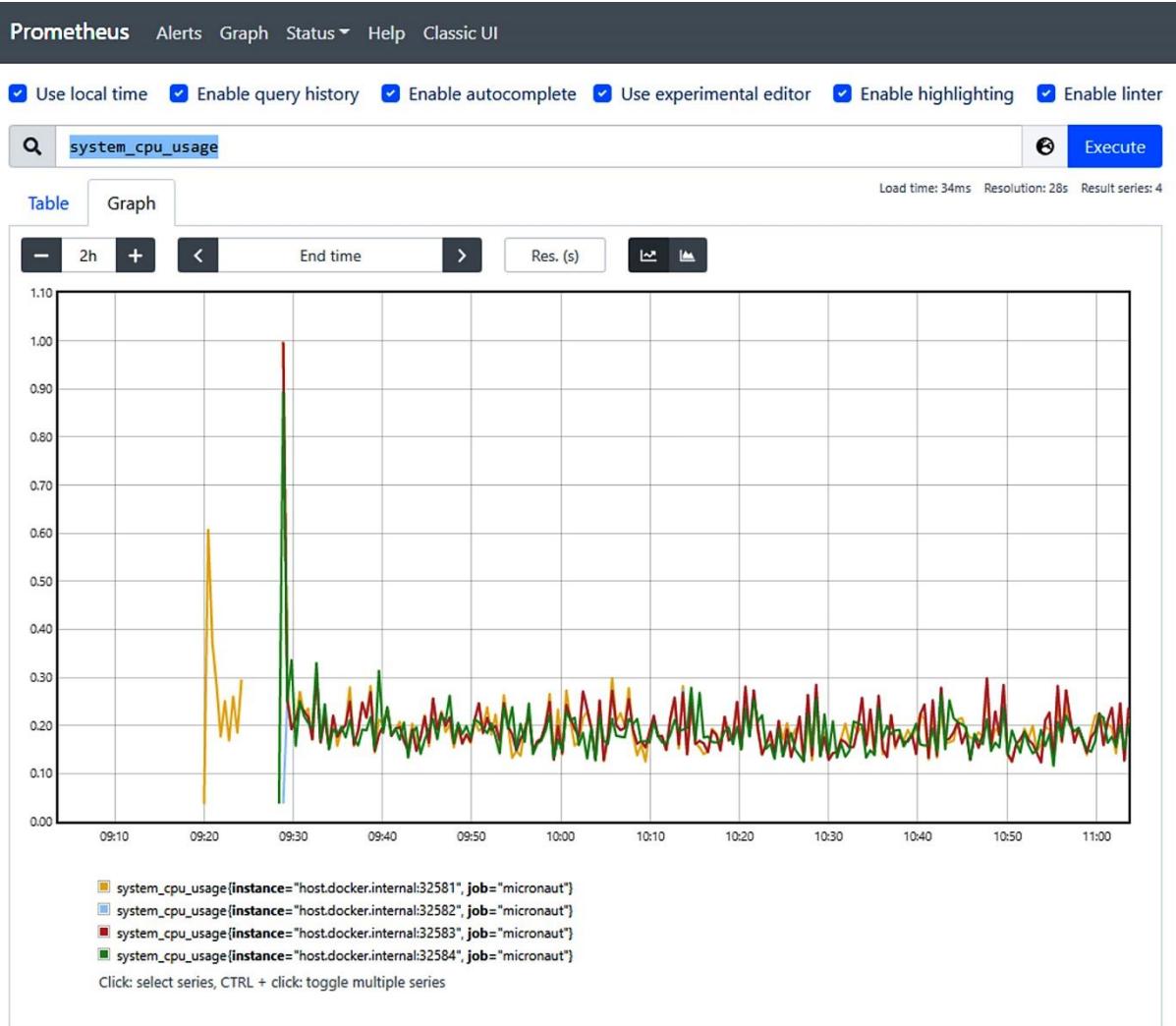
HIDE ANNOTATIONS

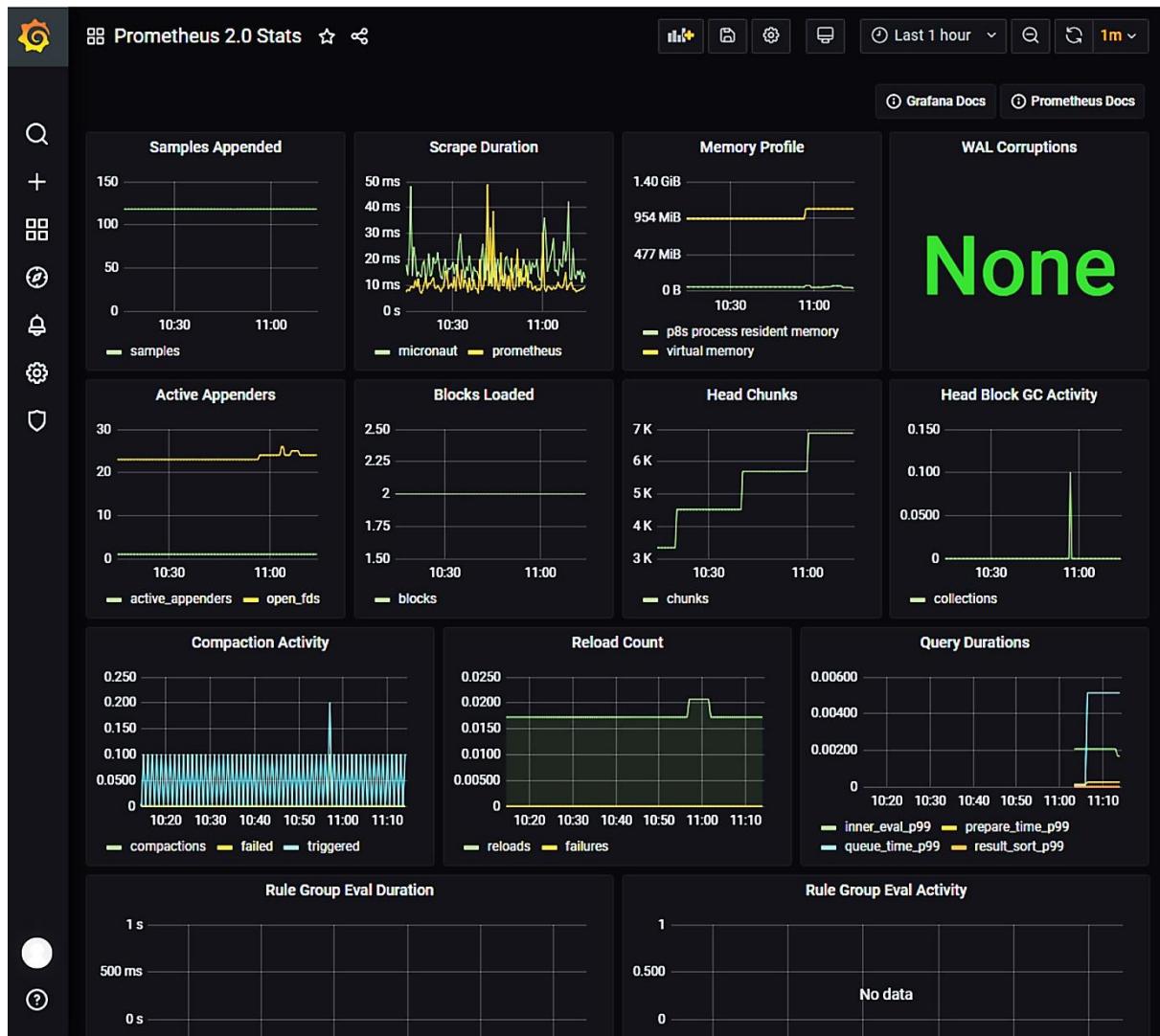
Tags

http.method	GET
http.path	/api/owners

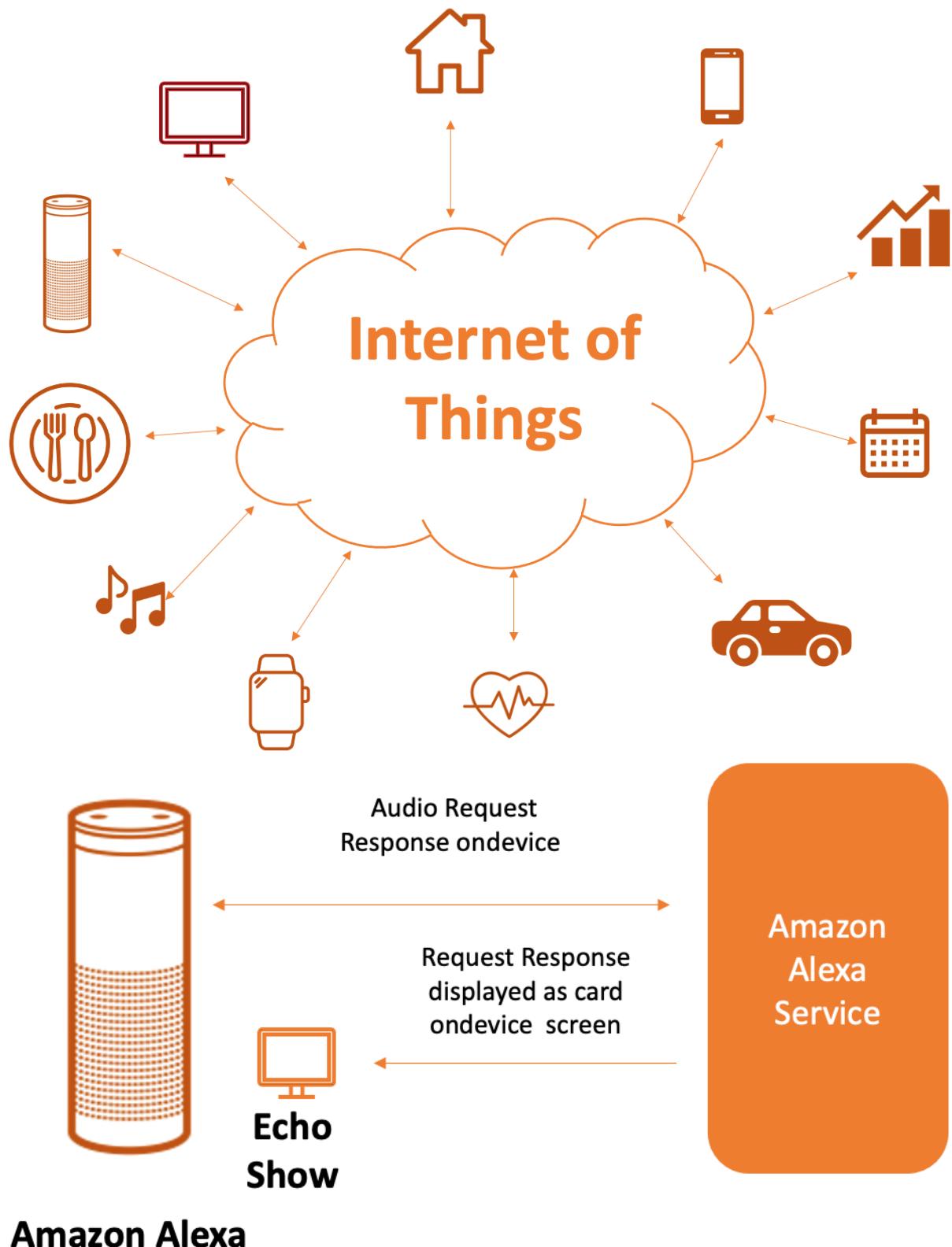


Log producers





Chapter 10: IoT with Micronaut



Opening a Skill

Alexa, ask space facts for a fact

Wake word

launch

space facts

Invocation name

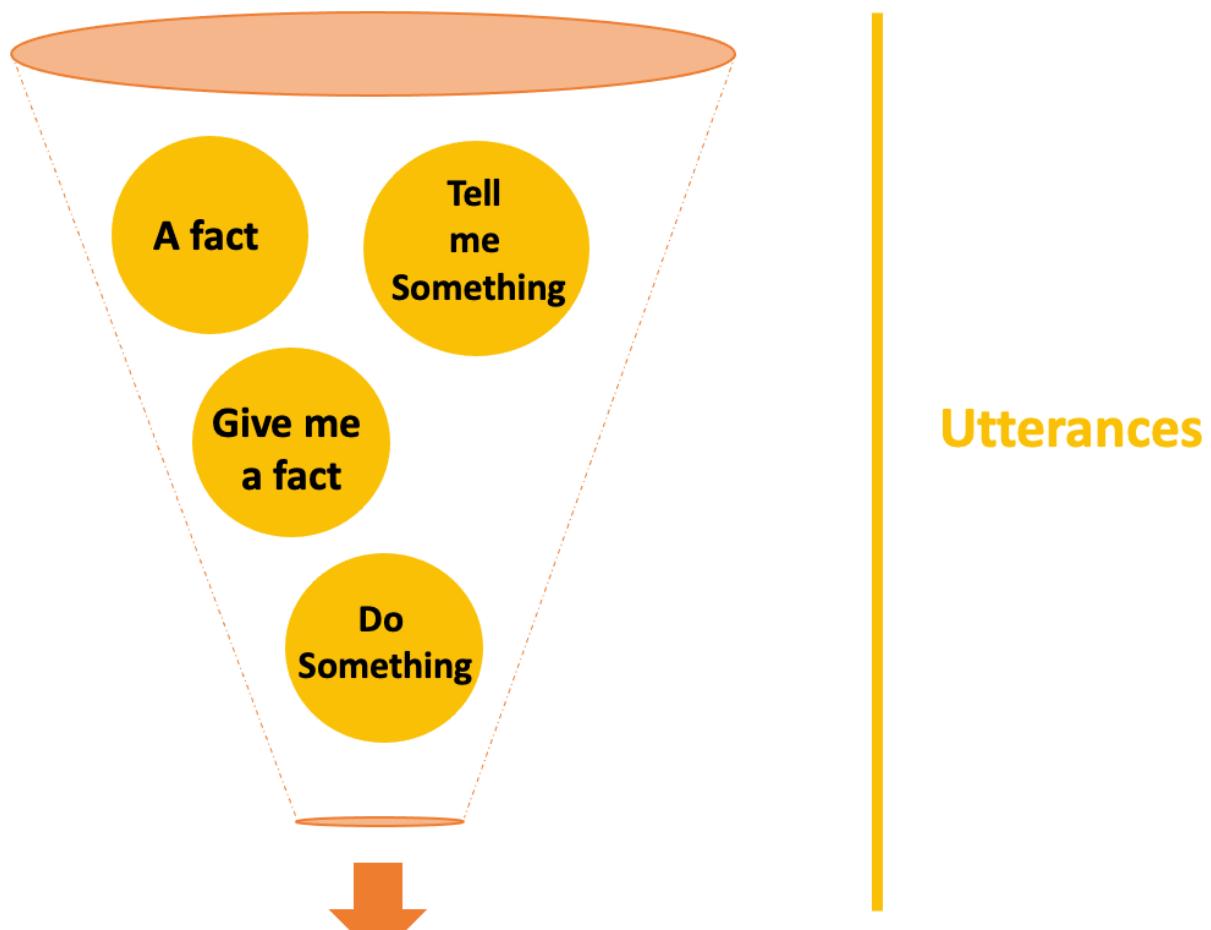
for a fact

utterance

Start
Ask
Tell
Play
Open
Find

Pet Clinic

Give me a fact
A fact
Tell me something
Do something



GetNewFactIntent

Intent

Opening a Skill

Alexa, ask space facts for a fact

Wake word	launch	Invocation name	utterance
Alexa	Open	Pet Clinic	Do something

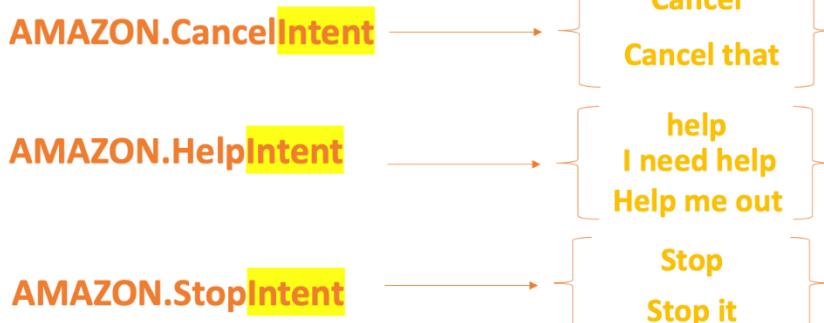
GetFactByPetClinicIntent

Intent

The screenshot shows the Alexa developer console interface. The top navigation bar includes links for 'Your Skills', 'Pet Clinic', 'Build', and 'Code'. The main content area has a sidebar on the left with sections for 'Invocation' and 'Intents (6)'. Under 'Intents (6)', there is a list titled 'Built-In Intents (5)' containing: 'AMAZON.CancelIntent', 'AMAZON.HelpIntent', 'AMAZON.StopIntent', 'AMAZON.NavigateHomeIntent', and 'AMAZON.FallbackIntent'. The right side of the screen displays the 'Intent' configuration for the skill.

Built-in Intents

Utterances



developer.amazon.com/alexa/console/ask

alexa developer console

Alexa Conversations
Alexa Conversations (beta) lets you create Alexa Skills that feel more natural with fewer lines of code.
[Learn More](#)

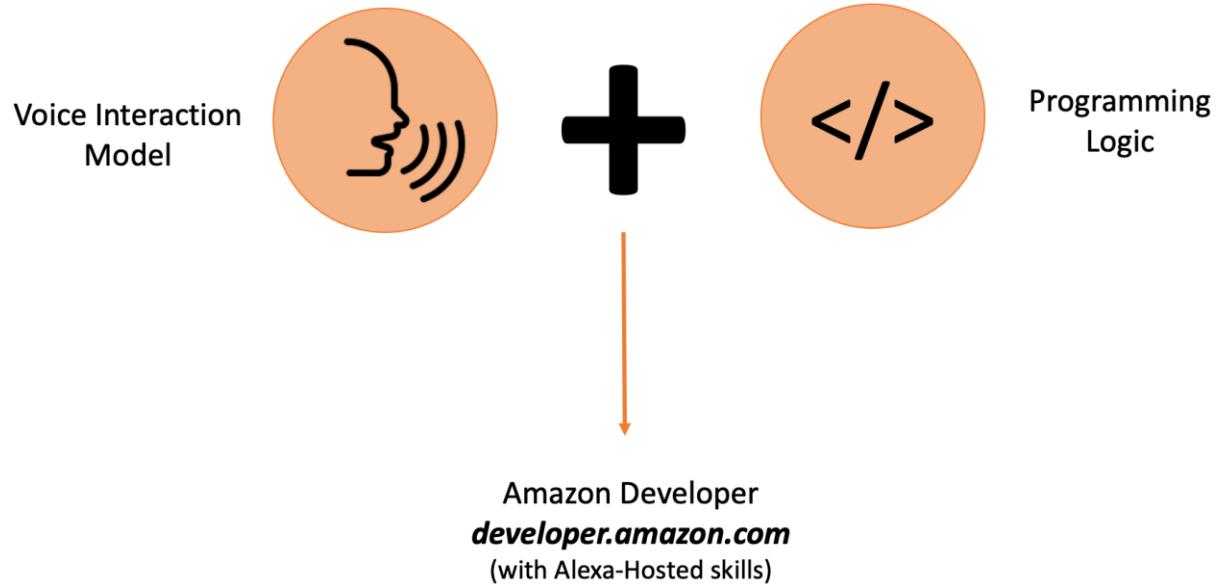
Skills Earnings Payments Hosting Settings

Alexa Skills [Skill examples](#) [Learn More](#)

Search by skill name or skill ID [Create Skill](#)

SKILL NAME	LANGUAGE	MODIFIED	STATUS	ACTIONS
 Alexa Skills Create your first skill or learn more about Alexa Skills Kit Create Skill				

[View all skills](#) 0 – 0 of 0



The screenshot displays three screenshots of the Alexa Developer Console interface, showing the Invocation and Endpoint sections, and a terminal window showing a Maven build success.

Invocation Section:

The Invocation section of the Alexa Developer Console. The skill's invocation name is set to "pet clinic". A note states: "Brand names are only allowed if you provide proof of rights in the testing instructions or if you use the brand name in a reference manner that doesn't imply ownership (examples of terms that can be added to a brand name for referential usage: unofficial, unauthorized, fan, fandom, for, about)." Examples of built-in intents listed include AMAZON.CancelIntent, AMAZON.HelpIntent, and AMAZON.StopIntent.

Endpoint Section:

The Endpoint section of the Alexa Developer Console. Configuration options include:

- AWS Lambda ARN (Recommended): amzn1.ask.skill.de392a0b-0a95-451a-a615-dcba1f9a23c6
- Your Skill ID: amzn1.ask.skill.de392a0b-0a95-451a-a615-dcba1f9a23c6
- Default Region (Required): am:aws:lambda:us-east-1:427979889385:function:lambda_for_petclinic
- North America (Optional): amaws:lambda:us-east-1:<aws_account_id>:function:<lambda_name>
- Europe and India (Optional): amaws:lambda:eu-west-1:<aws_account_id>:function:<lambda_name>

A warning message states: "You must create your own AWS Lambda or HTTPS endpoint for your skill to pass certification and be published. You can refer to instructions for [setting up an endpoint](#) or [choose to convert your skill to an Alexa-hosted Skill](#) to benefit from manager backend resources."

Maven Terminal Output:

```

[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 13.406 s
[INFO] Finished at: 2021-06-08T00:01:06-04:00
[INFO] -----
zackdawood@Zacks-MacBook-Pro petclinic-alexa-maven %

```

The terminal window shows the output of a Maven assembly command, indicating a successful build. The project structure in the background shows Java code for PetClinicStreamHandler and various intent handlers.

Alexa Developer Console Lambda

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

Mohammed Zackria Arshid Dawood Basha N. Virginia Support ▾

Lambda > Functions > Create function

Create function Info

Choose one of the following options to create your function.

Author from scratch Start with a simple Hello World example.

Use a blueprint Build a Lambda application from sample code and configuration presets for common use cases.

Container image Select a container image to deploy for your function.

Browse serverless app repository Deploy a sample Lambda application from the AWS Serverless Application Repository.

Basic information

Function name Enter a name that describes the purpose of your function.

Use only letters, numbers, hyphens, or underscores with no spaces.

Runtime Info Choose the language to use for your function. Note that the console code editor supports only Node.js, Python, and Ruby.

Permissions Info By default, Lambda will create an execution role with permissions to upload logs to Amazon CloudWatch Logs. You can customize this default role later when adding triggers.

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Lambda > Functions > demo

demo

Throttle Actions ▾

Function overview Info

 demo
 Layers (0)

Description
-

Last modified
2 minutes ago

Function ARN

Add trigger

Trigger configuration

Alexa Skills Kit

Skill ID verification

Enable (recommended)

Disable

Skill ID

Lambda will add the necessary permissions for Amazon Alexa to invoke your Lambda function from this trigger. [Learn more](#) about the Lambda permissions model.

[Cancel](#) [Add](#)

Alexa Developer Console

Services Search for services, i [Option+S]

Mohammed Zackria Arshid Dawood Bas N. Virginia Support

lambda_for_petclinic

Function overview

Description

Last modified 1 month ago

Function ARN arn:aws:lambda:us-east-1:427979889385:function:lambda_for_petclinic

Code source

Upload from .zip or jar file

Amazon S3 location

The deployment package of your Lambda function "lambda_for_petclinic" is too large to editing. However, you can still invoke your function.

Feedback English (US) Privacy Policy Terms of Use Cookie preferences

The screenshot shows the Alexa Developer Console interface. At the top, there are tabs for 'Your Skills', 'pet clinic', 'Build', 'Code', 'Test', 'Distribution', 'Certification', and 'Analytics'. The 'Test' tab is selected. The URL in the address bar is developer.amazon.com/alexas/console/test/amzn1.ask.skill.de392a0b-0a96-451a-a165-dcba1f9a23c0/development/en_CA/.

The main area displays the 'Skill Invocations' section. It includes a dropdown for 'Skill testing is enabled in:' set to 'Development', and checkboxes for 'Skill I/O', 'Device Display', and 'Device Log', with 'Skill I/O' and 'Device Display' checked.

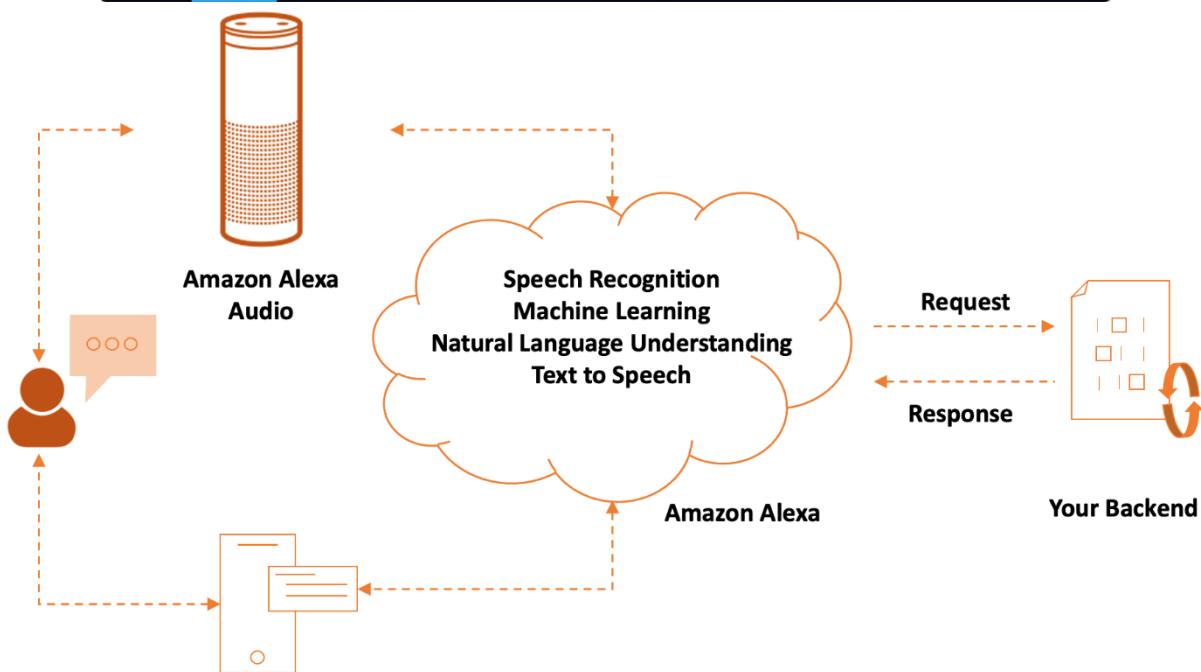
Below this, there are tabs for 'Alexa Simulator', 'Manual JSON', and 'Voice & Tone'. The 'Manual JSON' tab is selected. It shows a JSON input and output example:

```
JSON Input 1
1 - {
2 -   "version": "1.0",
3 -   "session": {
4 -     "new": false,
5 -     "sessionId": "amzn1.echo-api.session"
6 -   },
7 -   "application": {
8 -     "applicationId": "amzn1.ask.skill"
9 -   },
10 -   "user": {
11 -     "userId": "amzn1.ask.account.AEJ"
12 -   }
13 - },
14 - "context": {
15 -   "Viewports": [
16 -     {
17 -       "type": "APL",
18 -       "id": "main",
19 -       "shape": "RECTANGLE",
20 -       "dpt": 213,
21 -       "presentationType": "STANDARD"
22 -     },
23 -     {
24 -       "type": "HUB",
25 -       "video": {
26 -         "codecs": [
27 -           "H_264_42",
28 -           "H_264_41"
29 -         ]
29 -       }
29 -     }
29 -   ]
29 - }
```

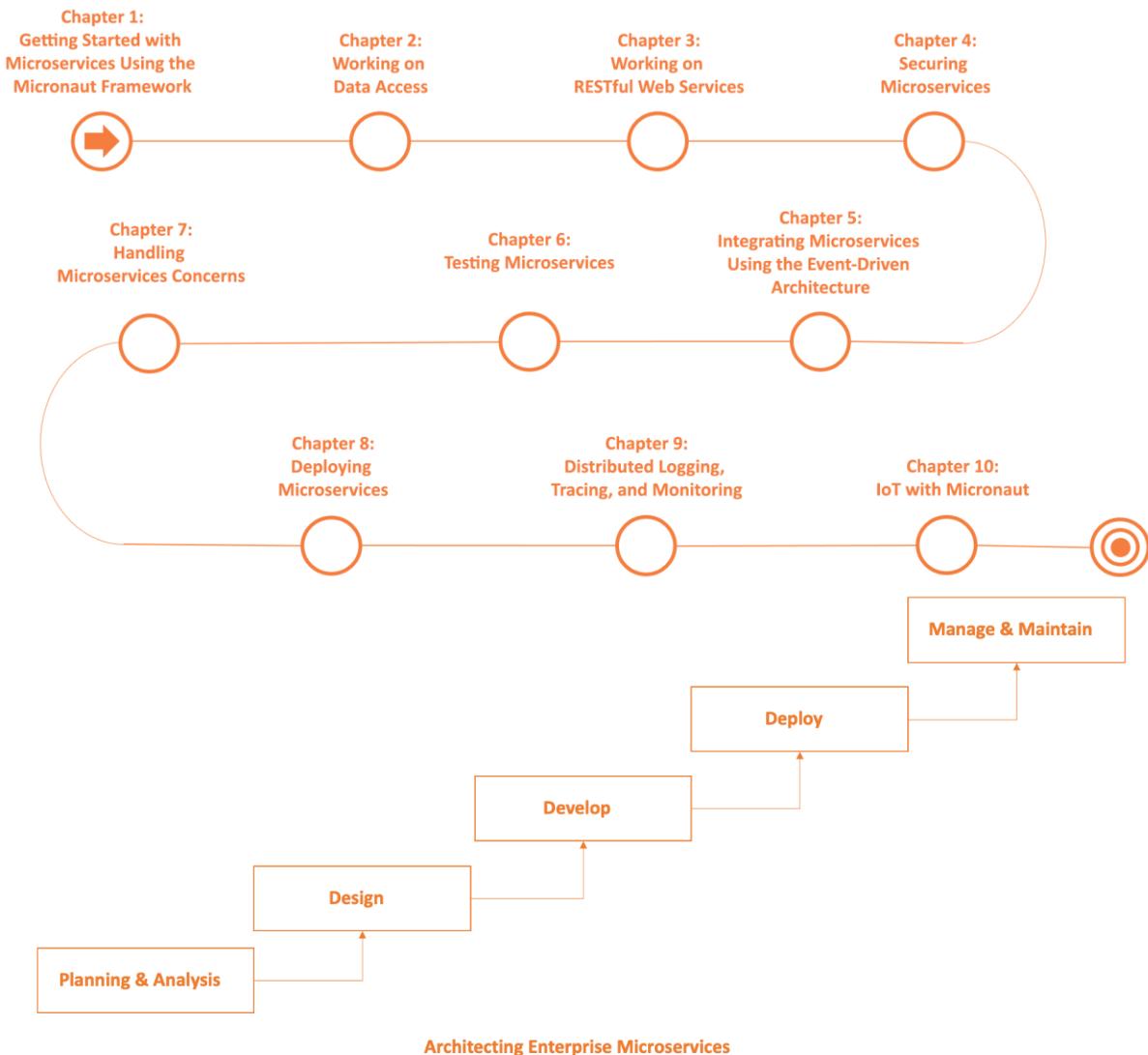
```
JSON Output 1
1 - {
2 -   "body": {
3 -     "version": "1.0",
4 -     "response": {
5 -       "outputSpeech": {
6 -         "type": "SSML",
7 -         "ssml": "<speak>The nearest pet
8 -         clinics are Animal Clinic, 75
9 -         Matheson Blvd East, New York, NY
10 -       }
11 -     }
12 -   }
13 - },
14 - "card": {
15 -   "type": "Simple",
16 -   "title": "PetClinic",
17 -   "content": "The nearest pet
18 -   clinics are Animal Clinic, 75
19 -   Matheson Blvd East, New York, NY
20 - },
21 - "reprompt": {
22 -   "outputSpeech": {
23 -     "type": "SSML",
24 -     "ssml": "<speak>The near
25 -   }
25 - },
26 - "shouldEndSession": false,
27 - "type": "DEFAULT_RESPONSE"
28 - },
29 - "userAgent": "ask-java/2.20.2 Java/1
29 - }
```

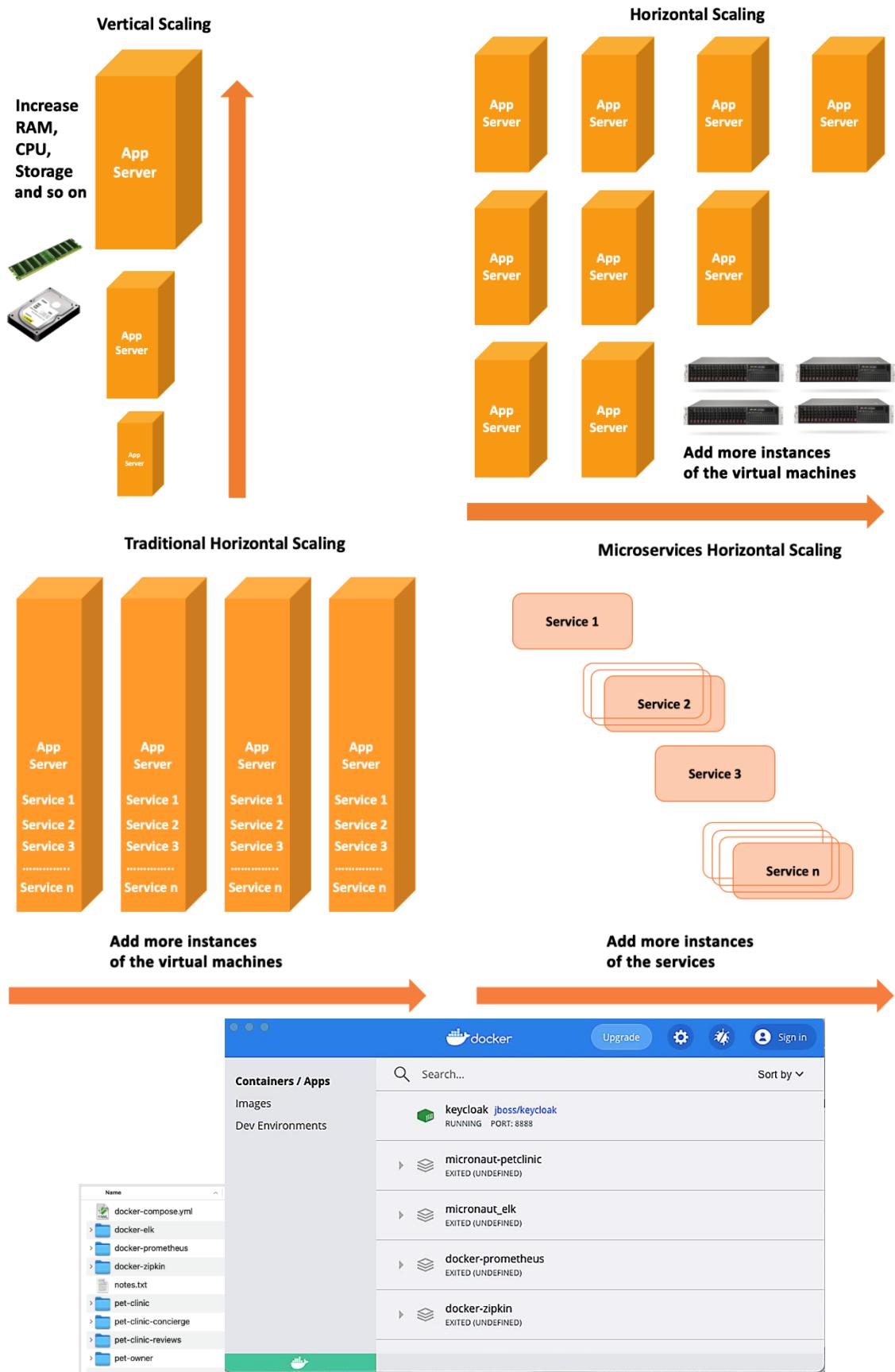
On the left, a sidebar shows a message from the Alexa Simulator: 'Welcome to Pet Clinic, You can say find near by Pet Clinics'. Below it are two buttons: 'open pet clinic' and 'find near by pet clinics'. A blue callout box highlights the message and the second button.

At the bottom, there is a feedback link: 'Feedback X'.



Chapter 11: Building enterprise grade microservices





The image displays three screenshots illustrating the configuration of a Keycloak client and its integration with a Java application.

Keycloak Admin Console - Pet-clinic Client Configuration:

- Credentials Tab:** Shows the 'Client Authenticator' set to 'Client Id and Secret'. The 'Secret' field contains the value: 06211143-c455-484b-b727-b07fa72d633f.
- Advanced Settings Tab:** Shows the 'Access Token Lifespan' set to 15 Minutes, 'Client Session Idle' set to 15 Minutes, and 'Client Offline Session Max' set to 15 Minutes. The 'OAuth 2.0 Mutual TLS Certificate Bound Access Tokens Enabled' option is set to OFF.

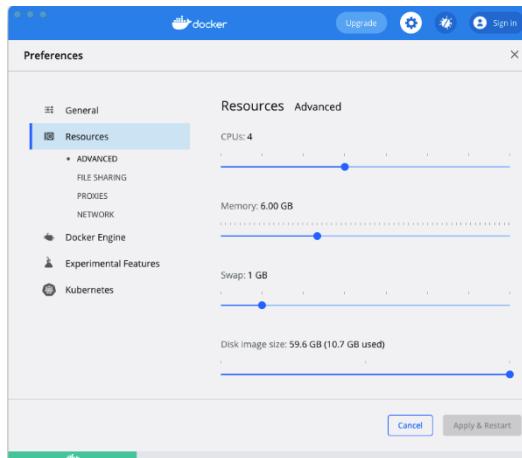
IntelliJ IDEA - pet-owner Application Configuration:

```

pet-owner - application.yml
...
    enabled: true
    signatures.jwks.keycloak:
        url: http://host.docker.internal:8888/auth/realms/master/prov
    oauth2.clients.keycloak:
        grant-type: password
        client-id: pet-clinic
        client-secret: 06211143-c455-484b-b727-b07fa72d633f
        authorization:
            url: http://host.docker.internal:8888/auth/realms/master/protocol
        token:
            url: http://host.docker.internal:8888/auth/realms/master/protocol
            auth-method: client_secret_post

```

The IntelliJ IDEA interface shows the code editor with the application's configuration file, and the terminal below it shows the command: zackdawood@Zacks-MacBook-Pro pet-owner % []



```
zackdawood@Zacks-MacBook-Pro kafka-zookeeper-kafdrop-docker % docker-compose create
WARNING: The create command is deprecated. Use the up command with the --no-start flag instead.
Creating kafka-zookeeper-kafdrop-docker_zookeeper_1 ... done
Creating kafka-zookeeper-kafdrop-docker_kafka_1 ... done
Creating kafka-zookeeper-kafdrop-docker_kafdrop_1 ... done
zackdawood@Zacks-MacBook-Pro kafka-zookeeper-kafdrop-docker %
```

```
... docker-zipkin -- zsh -- 80x24
Last login: Sat Jun  5 23:01:09 on ttys000
zackdawood@Zacks-MacBook-Pro docker-zipkin % docker-compose up -d
Docker Compose is now in the Docker CLI, try `docker compose up`

Creating network "docker-zipkin_default" with the default driver
Creating docker-zipkin_zipkin_1 ... done
zackdawood@Zacks-MacBook-Pro docker-zipkin %
```

```
... docker-prometheus -- zsh -- 80x24
Last login: Sat Jun  5 23:20:53 on ttys004
zackdawood@Zacks-MacBook-Pro docker-prometheus % docker-compose up -d
Docker Compose is now in the Docker CLI, try `docker compose up`

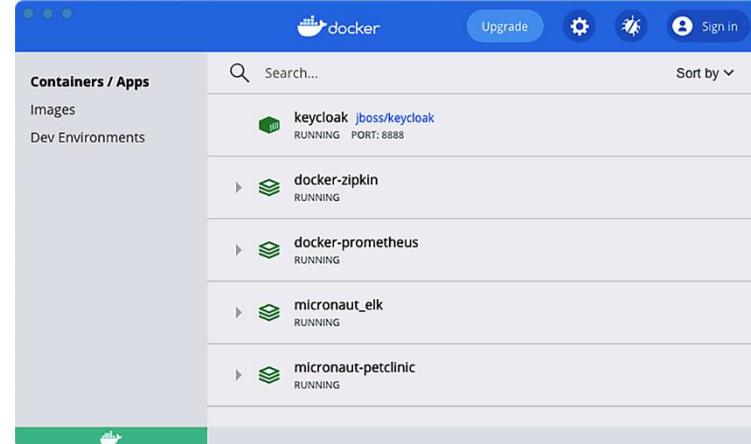
Creating network "docker-prometheus_default" with the default driver
Creating docker-prometheus_node-exporter_1 ... done
Creating docker-prometheus_prometheus_1 ... done
Creating docker-prometheus_grafana_1 ... done
zackdawood@Zacks-MacBook-Pro docker-prometheus %
```

```
... docker-elk -- zsh -- 80x24
Last login: Sat Jun  5 23:23:40 on ttys000
zackdawood@Zacks-MacBook-Pro docker-elk % docker-compose up -d
Docker Compose is now in the Docker CLI, try `docker compose up`

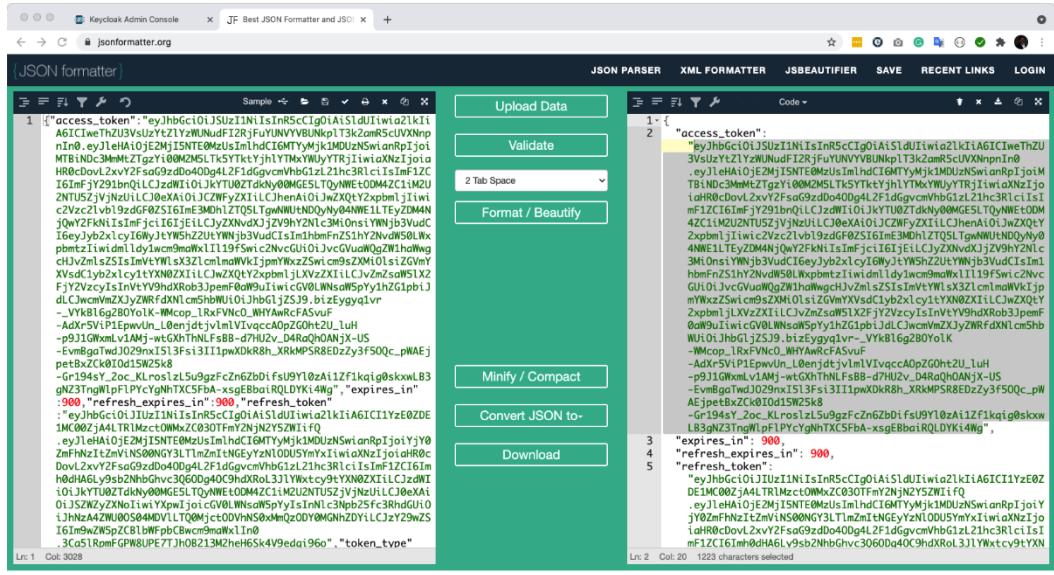
Creating network "micronaut_elk_internal" with the default driver
Creating micronaut_elk_elasticsearch_1 ... done
Creating micronaut_elk_logstash_1 ... done
Creating micronaut_elk_kibana_1 ... done
zackdawood@Zacks-MacBook-Pro docker-elk %
```

```
... micronaut-petclinic -- zsh -- 80x24
Last login: Sat Jun  5 23:26:00 on ttys005
zackdawood@Zacks-MacBook-Pro micronaut-petclinic % docker-compose up -d
Docker Compose is now in the Docker CLI, try `docker compose up`

Creating network "micronaut-petclinic_default" with the default driver
Creating micronaut-petclinic_consul_1 ... done
Creating micronaut-petclinic_zookeeper_1 ... done
Creating micronaut-petclinic_kafka_1 ... done
Creating micronaut-petclinic_pet-owner_1 ... done
Creating micronaut-petclinic_pet-clinic-concierge_1 ... done
Creating micronaut-petclinic_pet-clinic-reviews_1 ... done
Creating micronaut-petclinic_pet-clinic_1 ... done
Creating micronaut-petclinic_kafdrop_1 ... done
zackdawood@Zacks-MacBook-Pro micronaut-petclinic %
```



```
zackdawood@Zacks-MacBook-Pro micronaut-petclinic % curl -L -X POST 'http://localhost:8888/auth/realms/master/protocol/openid-connect/token' \
-H 'Content-Type: application/x-www-form-urlencoded' \
--data-urlencode 'client_id=pet-clinic' \
--data-urlencode 'grant_type=password' \
--data-urlencode 'client_secret=06211143-c455-484b-b727-b07fa72d633f' \
--data-urlencode 'scope=openid' \
--data-urlencode 'username=alice' \
--data-urlencode 'password=alice'
```



ARC

Request

HTTP request

Socket

History

Today

- GET http://localhost:32584/api/vets
- Wednesday, June 2, 2021
- GET http://localhost:32584/api/vets
- GET http://localhost:32582/api/vets
- GET http://localhost:32584/api/owners

Tuesday, June 1, 2021

- GET http://localhost:8080/api/specialties/1
- GET http://localhost:8080/api/specialties
- GET http://localhost:8080/api/owners
- GET http://localhost:8080/api
- GET http://localhost:8080

Saved

Save a request and recall it from here

Install new ARC with new features!

Method: GET Request URL: http://localhost:32584/api/vets Headers Variables

content-type: application/json
cookie: JW7TseyjhGcI0JSUzJ1NlslnR5cCig0AISdJUlwia2ldIA6IClweThZU3VsJzYzIy2WUf

Headers are valid Headers size: 1266 bytes

200 OK 2186.70 ms DETAILS

```
[{"id": 1, "firstName": "James", "lastName": "Carter"}, {"id": 2, "firstName": "Mal", "lastName": "Merry", "specialties": [{"id": 1, "name": "radiology"}]}, {"id": 3, "firstName": "Linda", "lastName": "Peterson"}]
```

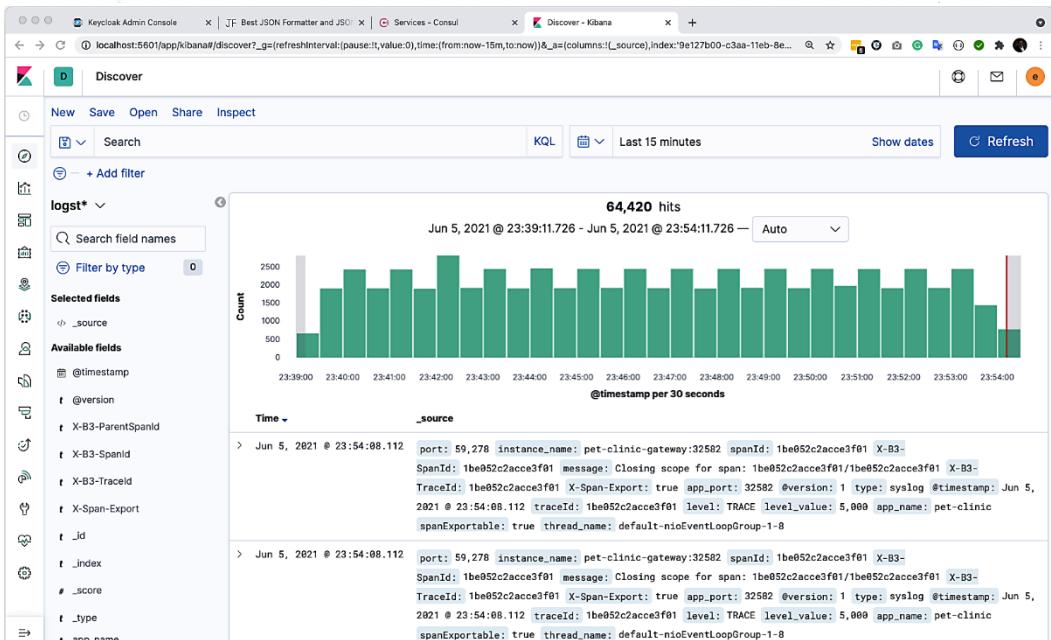
Selected environment: Default

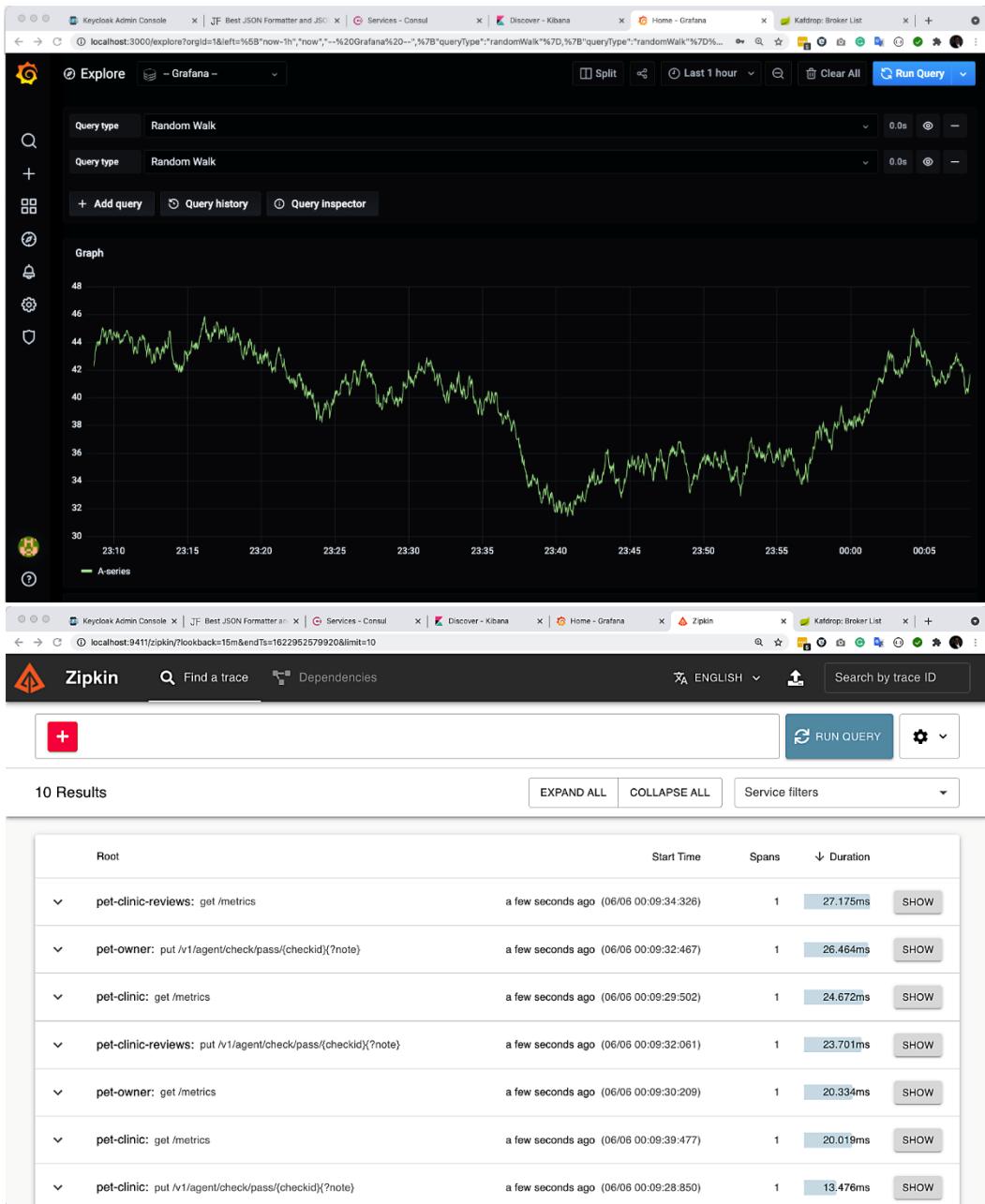
Keycloak Admin Console | JF Best JSON Formatter and JSON Editor | Services - Consul | localhost:8500/ui/dc1/services | Help | Settings

Services 5 total

Search	Search Across	Health Status	Service Type	Unhealthy to Healthy
consul		1 Instance		
pet-clinic		1 Instance		
pet-clinic-conierge		1 Instance		
pet-clinic-reviews		1 Instance		
pet-owner		1 Instance		

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The screenshot shows the Kafdrop Kafka Cluster Overview page. At the top, there's a navigation bar with tabs for Keycloak Admin Console, JF Best JSON Formatter, Services - Consul, Discover - Kibana, Home - Grafana, Zipkin, and Kafdrop: Broker List. The URL is localhost:9101.

The main content area has a dark background with light-colored tables and sections. It includes:

- Kafka Cluster Overview**: A table showing cluster statistics:

Bootstrap servers	kafka:9092
Total topics	2
Total partitions	51
Total preferred partition leader	100%
Total under-replicated partitions	0
- Brokers**: A table listing brokers:

ID	Host	Port	Rack	Controller	Number of partitions [% of total]
1	kafka	9092	-	Yes	51(100%)
- Topics**: A table listing topics:

Name	Partitions	% Preferred	# Under-replicated	Custom Config
_consumer_offsets	50	100%	0	Yes
vet-reviews	1	100%	0	No
- A "New" button at the bottom left of the Topics section.