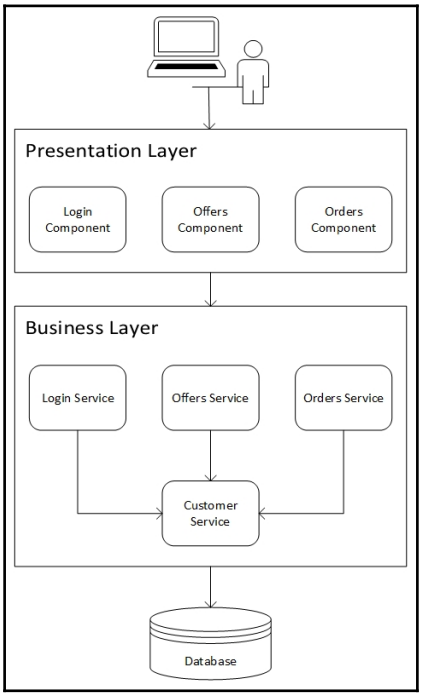
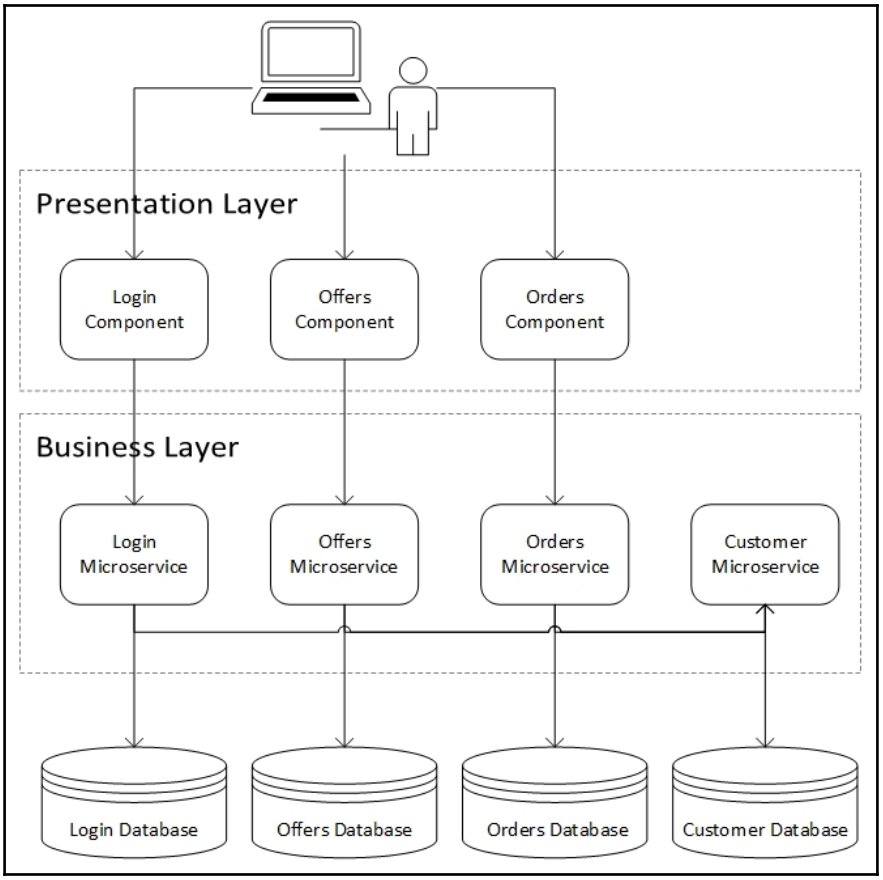
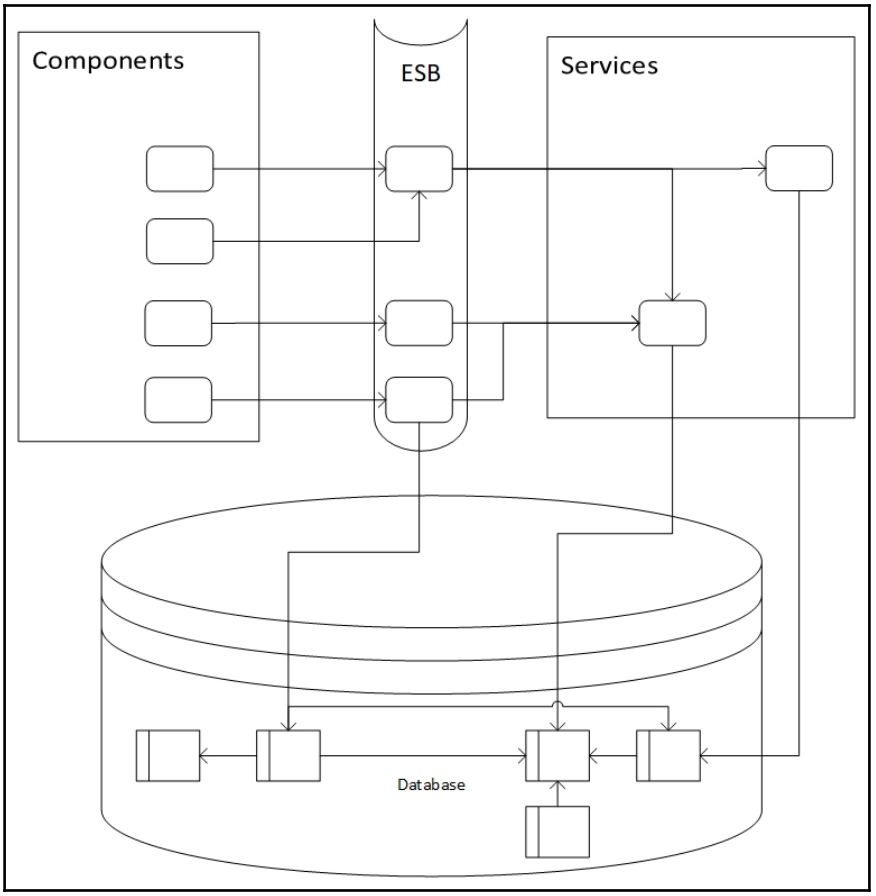
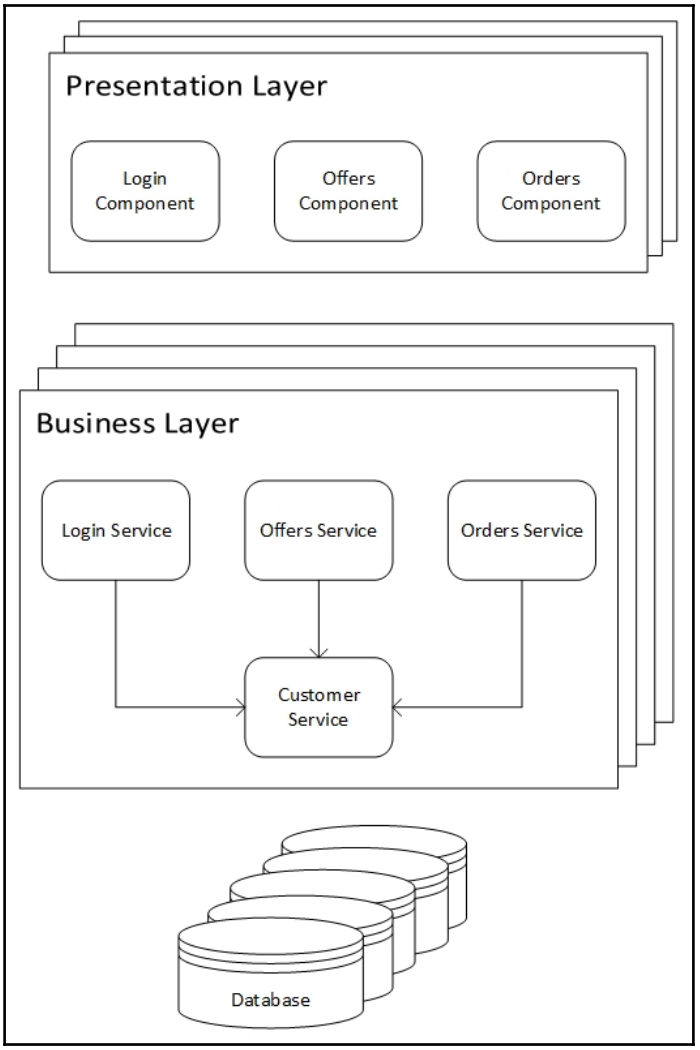
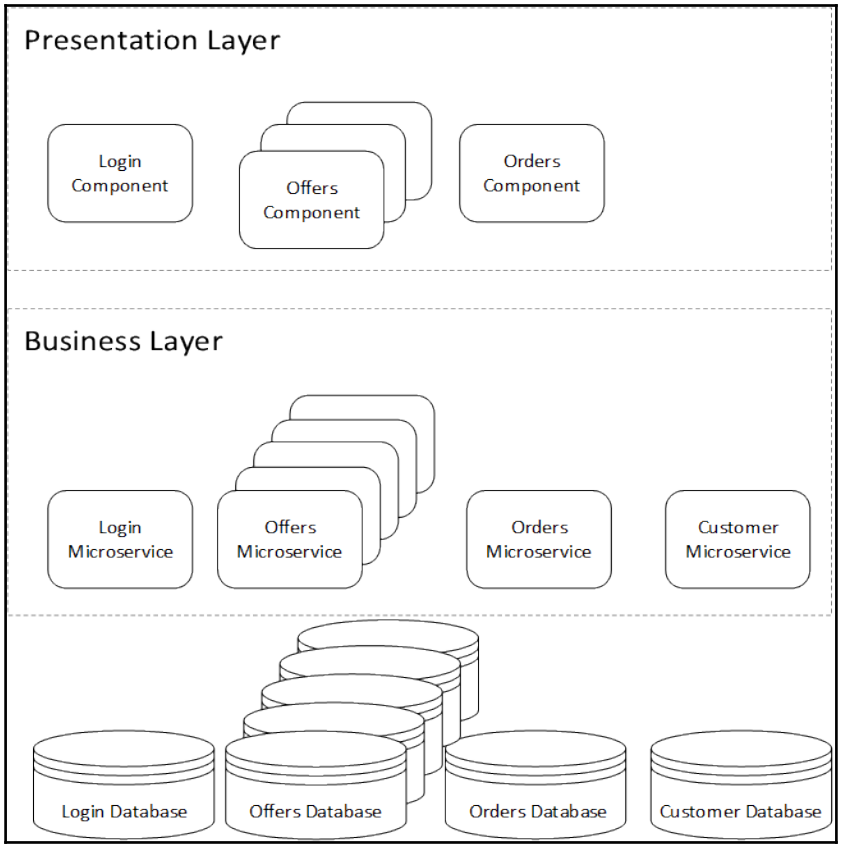
Chapter 1: Understanding Microservices

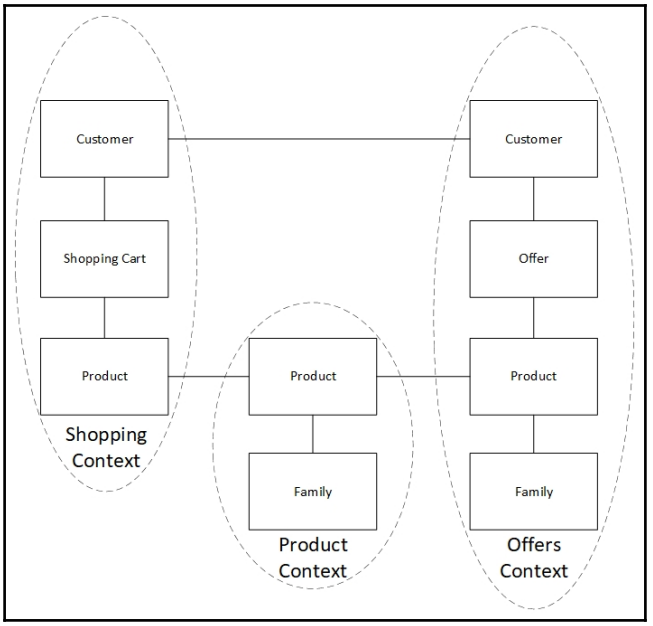


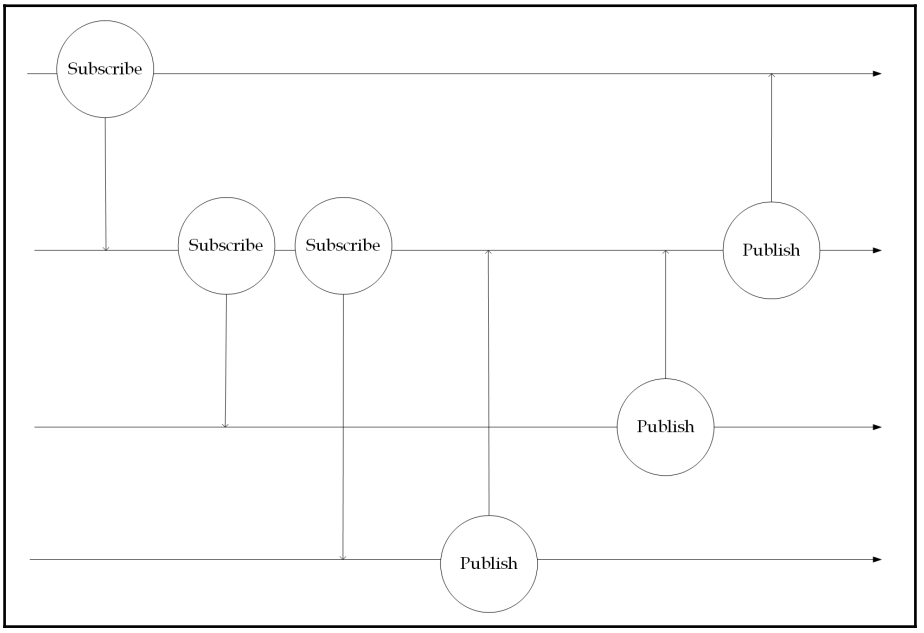

Presentation Layer
Login Component
Offers Component
Orders Component
Business Layer
Login Microservice
Offers Microservice
Orders Microservice
Customer Microservice
Login Database
Offers Database
Orders Database
Customer Database


Components
ESB
Services
Database

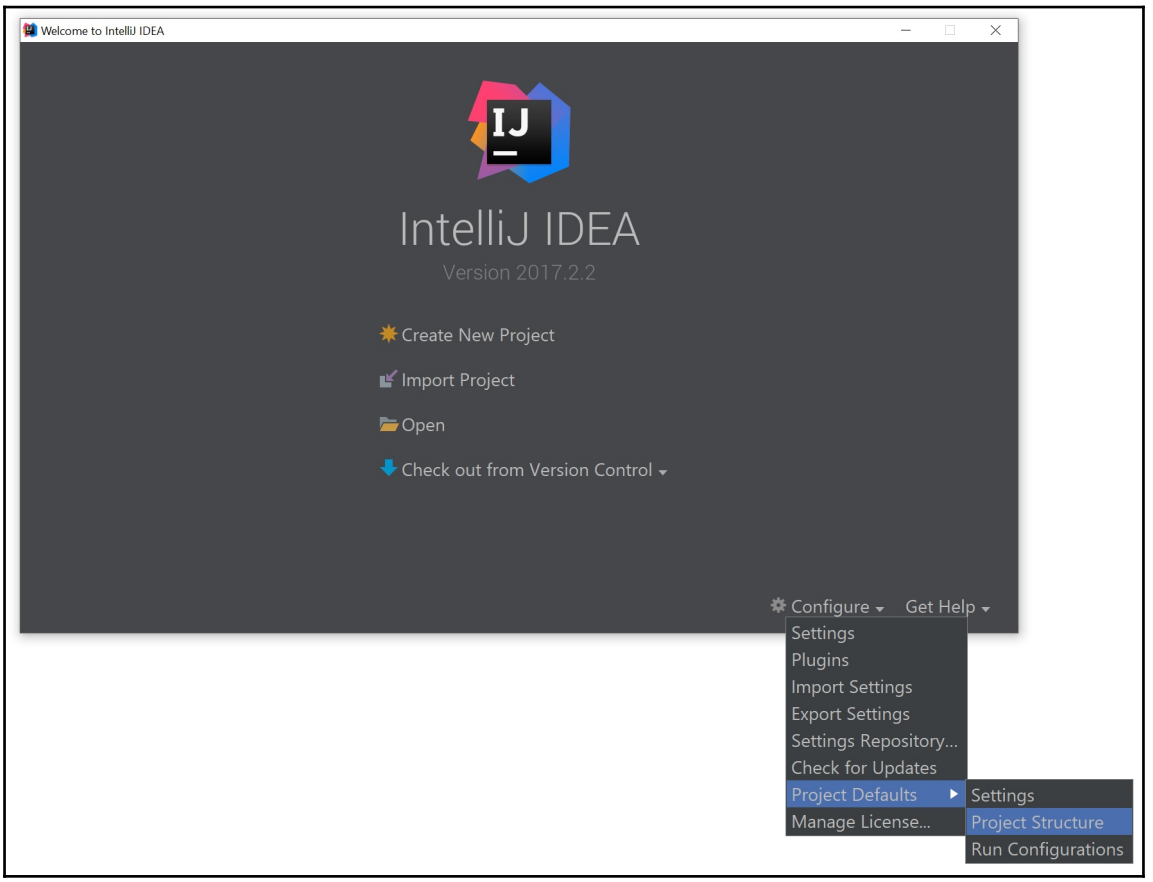

Presentation Layer
Login Component
Offers Component
Orders Component
Business Layer
Login Service
Offers Service
Orders Service
Customer Service
Database

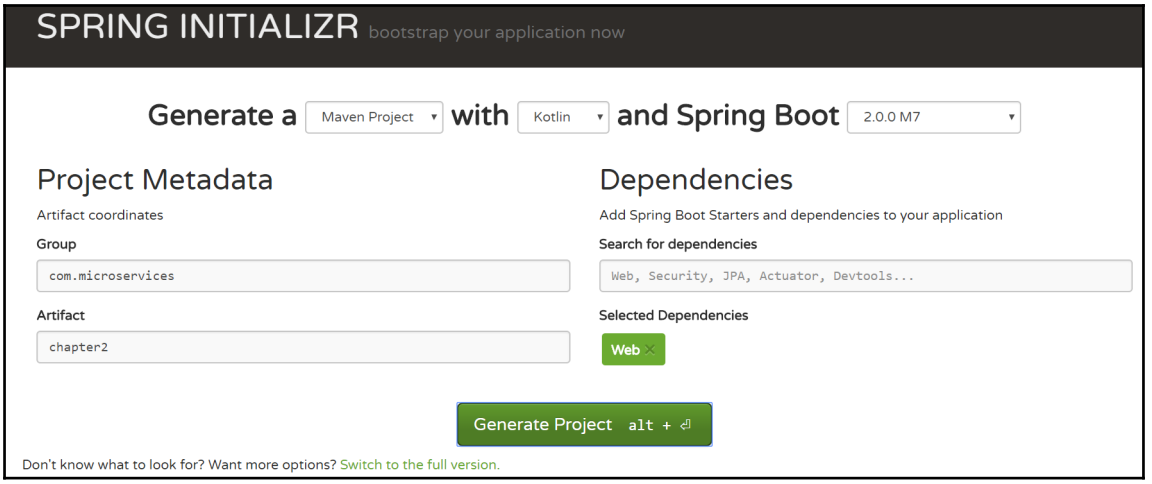

Presentation Layer
Login Component
Offers Component
Orders Component
Business Layer
Login Microservice
Offers Microservice
Orders Microservice
Customer Microservice
Login Database
Offers Database
Orders Database
Customer Database

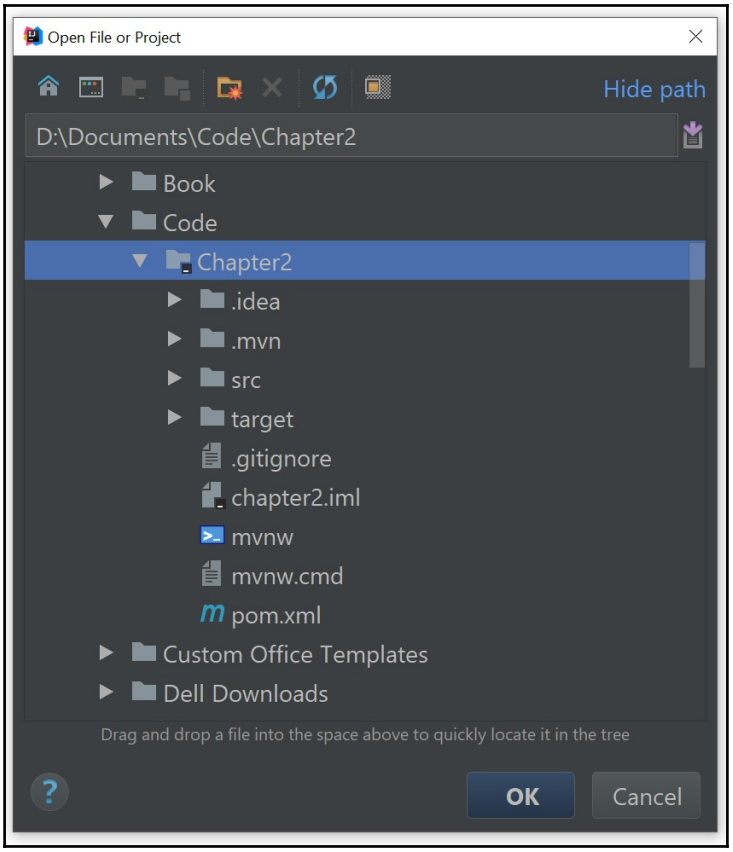

Customer
Shopping Cart
Product
Shopping Context
Product
Family
Product Context
Customer
Offer
Product
Family
Offers Context

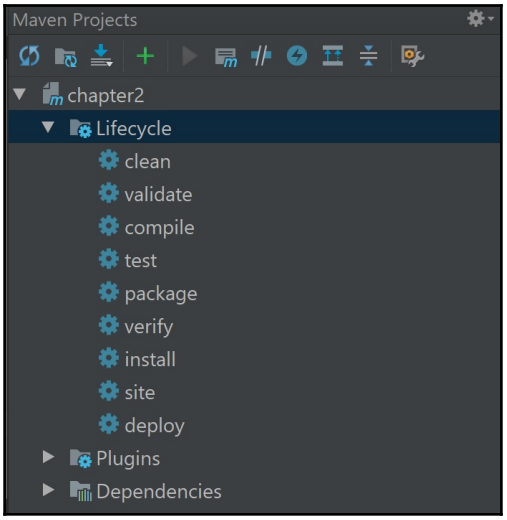

Subscribe
Subscribe
Subscribe
Publish
Publish
Publish

Chapter 2:
Getting Started with Spring Boot 2.0

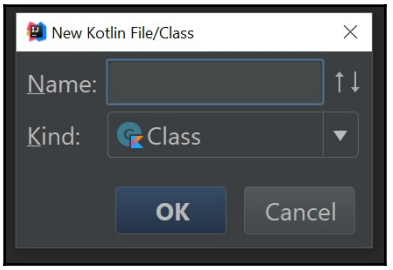


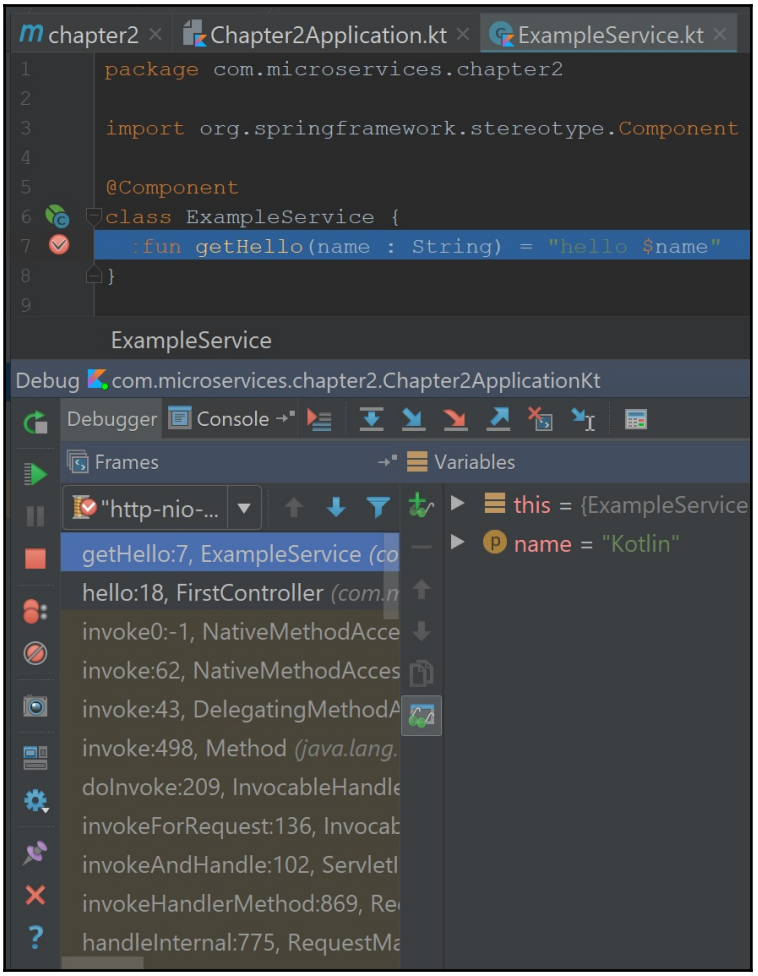

SPRING INITIALIZR
bootstrap your application now
Generate a
Maven Project
with
Kotlin
and Spring Boot
2.0.0 M7
Project Metadata
Artifact coordinates
Group
com.microservices
Artifact
chapter2
Dependencies
Add Spring Boot Starters and dependencies to your application
Search for dependencies
Web, Security, JPA, Actuator, Devtools...
Selected Dependencies
Web
Generate Project alt + ⏎
Don't know what to look for? Want more options? Switch to the full version.

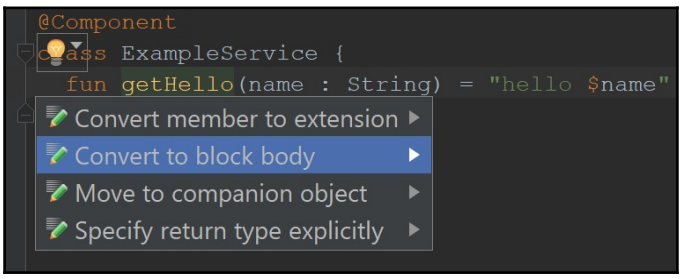

Open File or Project
Hide path
D:\Documents\Code\Chapter2
Book
Code
Chapter2
.idea
.mvn
src
target
.gitignore
chapter2.iml
mvnw
mvnw.cmd
pom.xml
Custom Office Templates
Dell Downloads
Drag and drop a file into the space above to quickly locate it in the tree
OK
Cancel


Maven Projects
chapter2
Lifecycle
clean
validate
compile
test
package
verify
install
site
deploy
Plugins
Dependencies

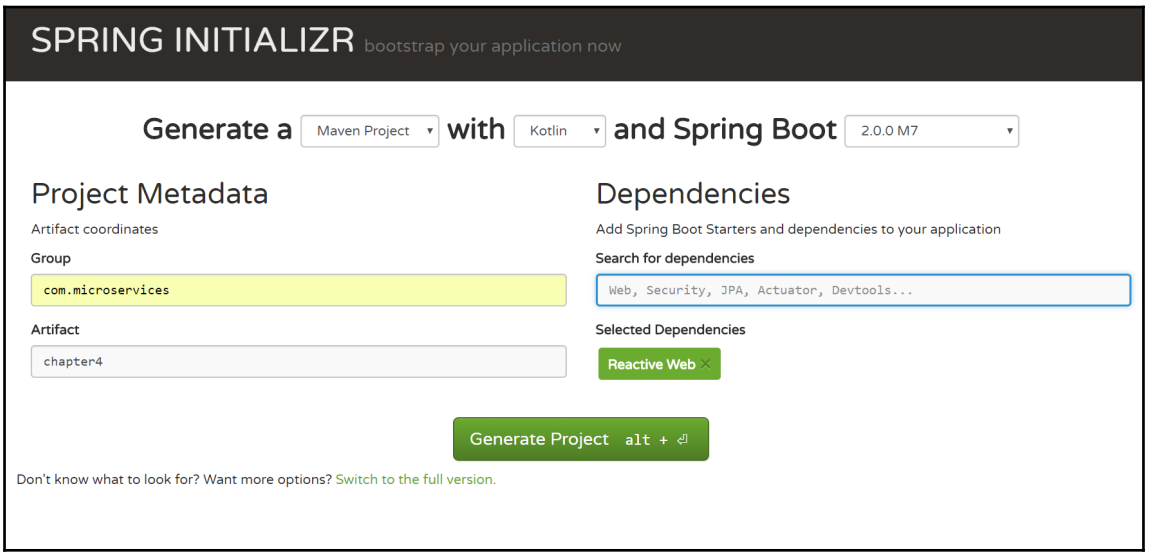
com.microservices.chapter2
AdvanceService
Chapter2Application.kt
New
Cut
Ctrl+X
Java Class
Kotlin File/Class


New Kotlin File/Class
Name:
Kind:
Class
OK
Cancel

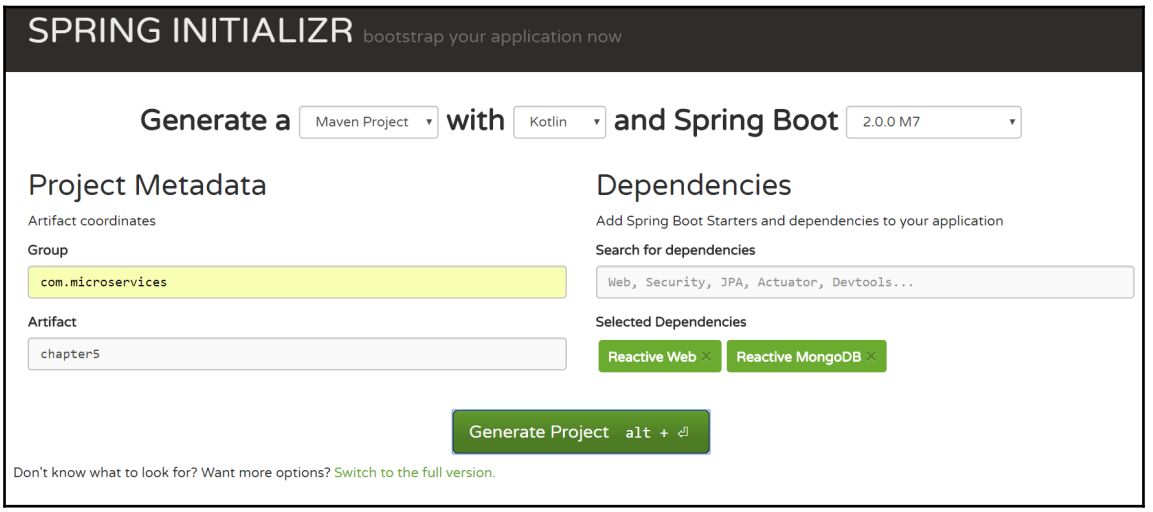

chapter2
Chapter2Application.kt
ExampleService.kt
package com.microservices.chapter2
import org.springframework.stereotype.Component
@Component
class ExampleService {
:fun getHello(name : String) = "hello $name"
}
ExampleService
Debug com.microservices.chapter2.Chapter2ApplicationKt
Debugger
Console
Frames
Variables
"http-nio-...
getHello:7, ExampleService (co
hello:18, FirstController (com.m
invoke0:-1, NativeMethodAcce
invoke:62, NativeMethodAcces
invoke:43, DelegatingMethodA
invoke:498, Method (java.lang.
doInvoke:209, InvocableHandle
invokeForRequest:136, Invocab
invokeAndHandle:102, ServletI
invokeHandlerMethod:869, Re
handleInternal:775, RequestMa
this = {ExampleService
name = "Kotlin"


@Component
class ExampleService {
fun getHello(name : String) = "hello $name"
Convert member to extension
Convert to block body
Move to companion object
Specify return type explicitly

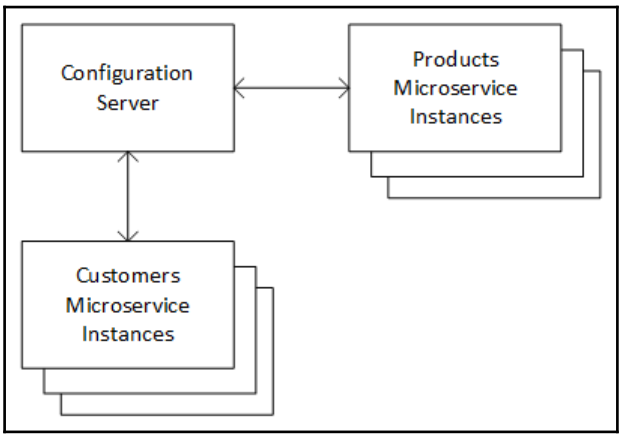
Chapter 4: Creating Reactive Microservices

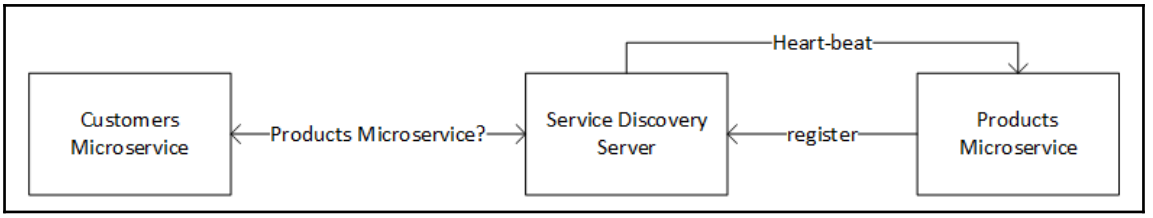


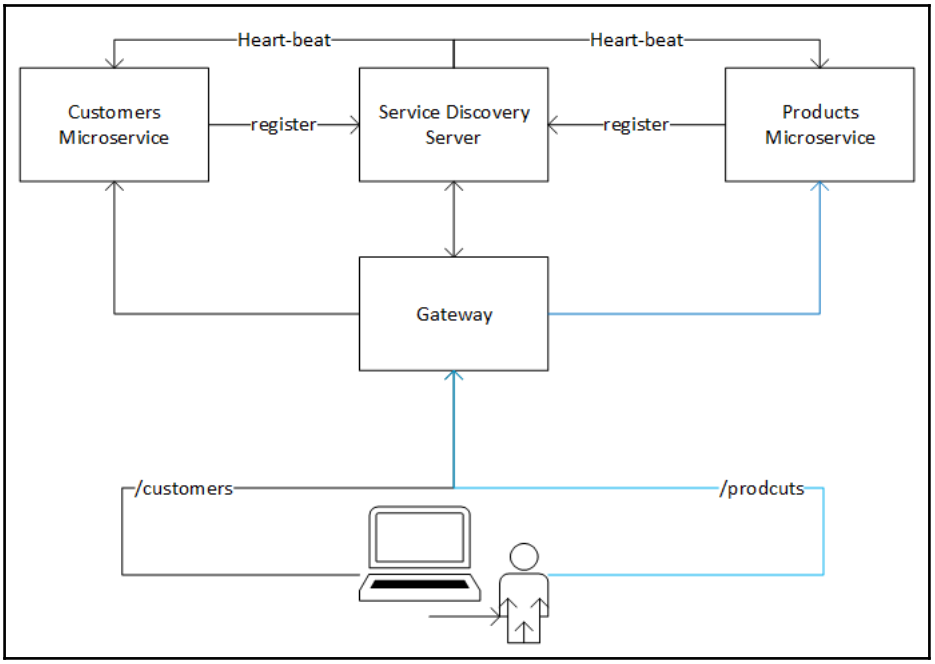
Chapter 5: Reactive Spring Data



Chapter 6: Creating Cloud-Native Microservices







SPRING INITIALIZR bootstrap your application now

Generate a Maven Project with Kotlin and Spring Boot 2.0.0 M7

Project Metadata

Artifact coordinates

Group

com.microservices

Artifact

chapter06-microservice

Dependencies

Add Spring Boot Starters and dependencies to your application

Search for dependencies

Web, Security, JPA, Actuator, Devtools...

Selected Dependencies

Config Client Web

Generate Project alt + ⏎

Don't know what to look for? Want more options? Switch to the full version.

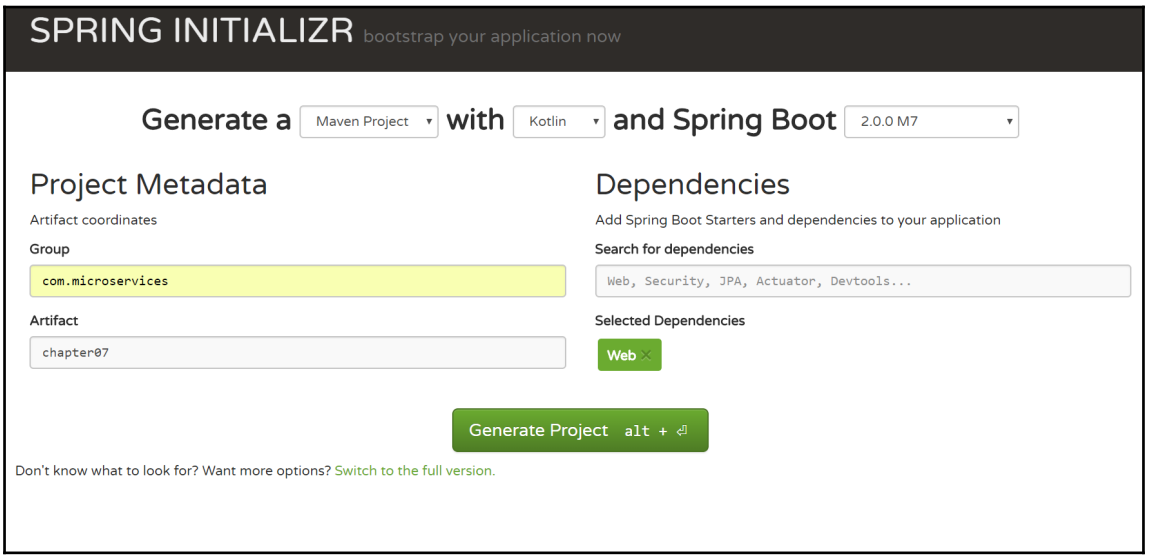
Instances currently registered with Eureka

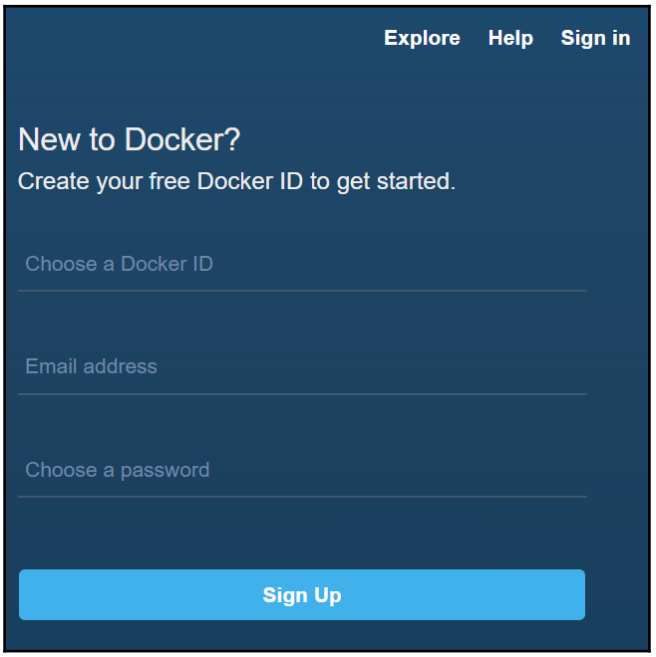
Application	AMIs	Availability Zones	Status
DISCOVERY-SERVER	n/a (1)	(1)	UP (1) - DESKTOP-2407SAG.home:discovery-server:8761
GREETINGS	n/a (1)	(1)	UP (1) - DESKTOP-2407SAG.home:greetings

Instances currently registered with Eureka

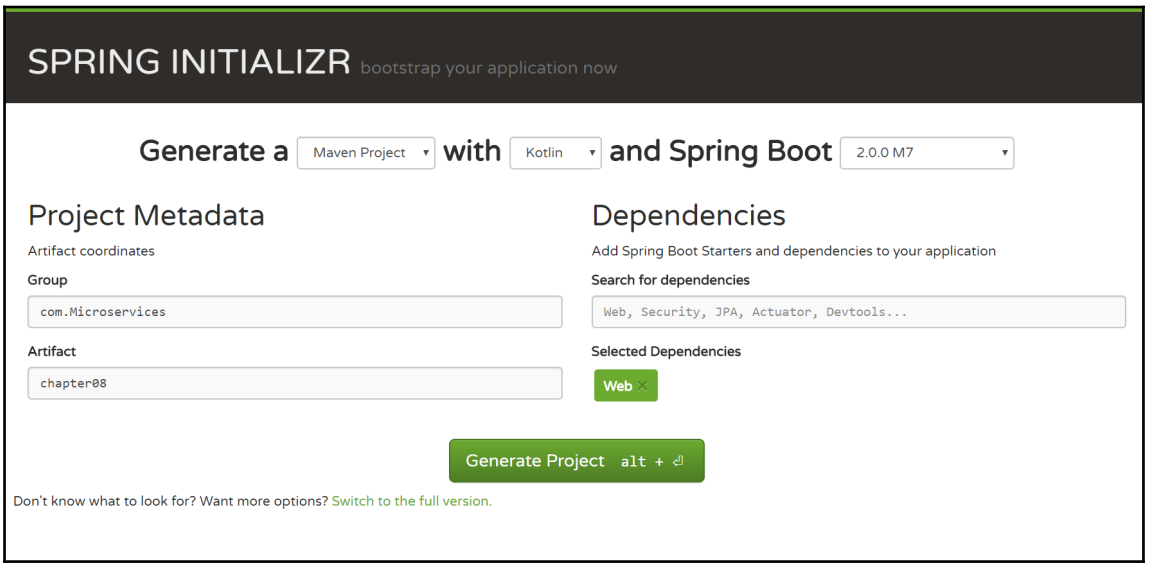
Application	AMIs	Availability Zones	Status
DISCOVERY-SERVER	n/a (1)	(1)	UP (1) - DESKTOP-2407SAG.home:discovery-server:8761
GATEWAY	n/a (1)	(1)	UP (1) - DESKTOP-2407SAG.home:gateway
GREETINGS	n/a (1)	(1)	UP (1) - DESKTOP-2407SAG.home:greetings:0

Chapter 7: Creating Dockers

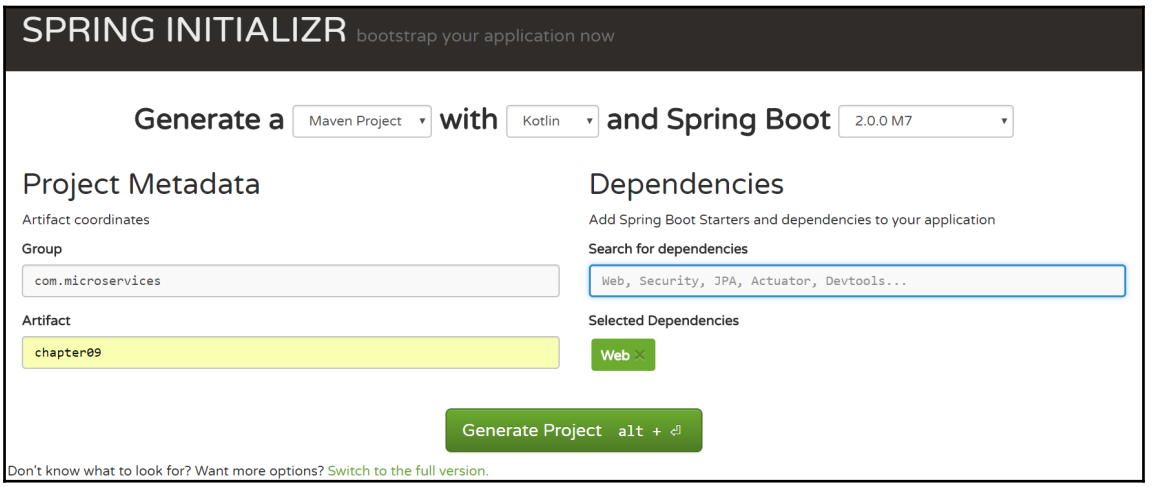


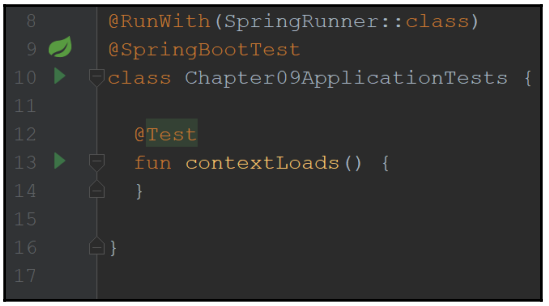


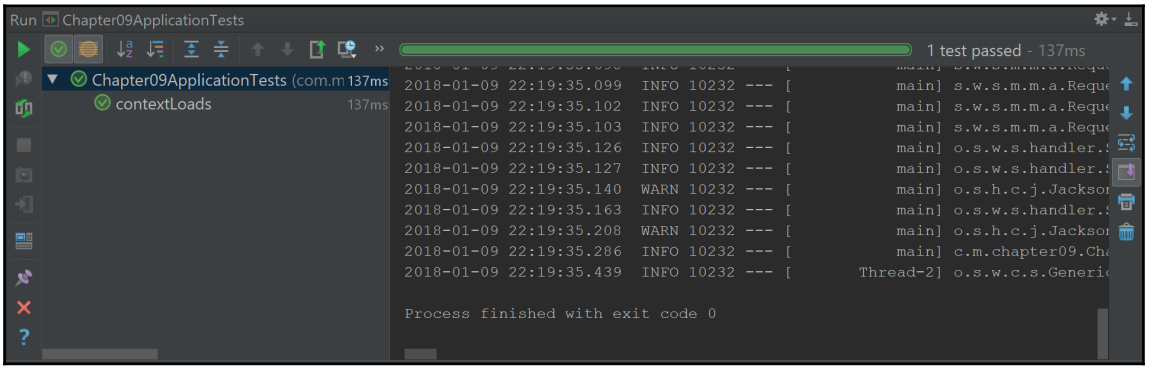
Chapter 8: Scaling Microservices

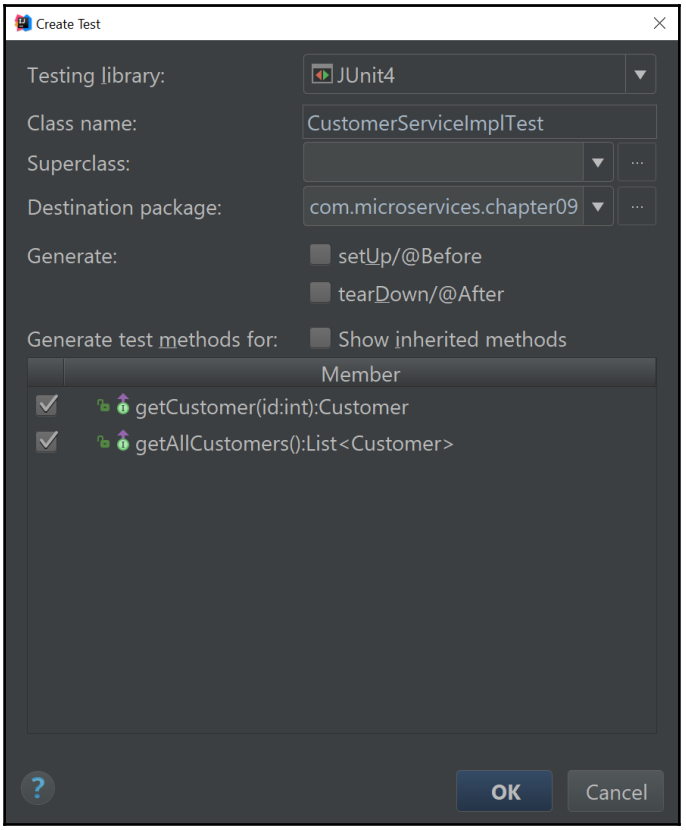


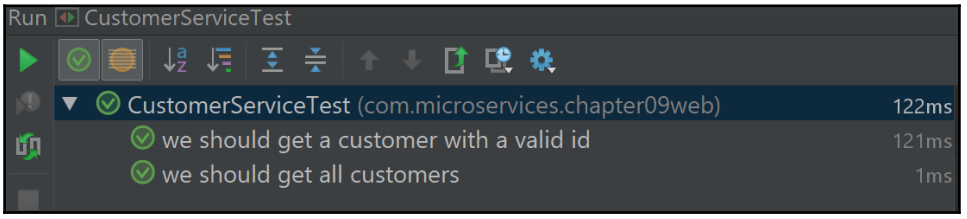
Chapter 9: Testing Spring Microservices

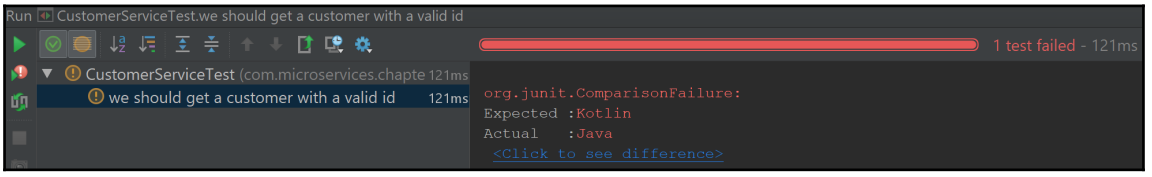




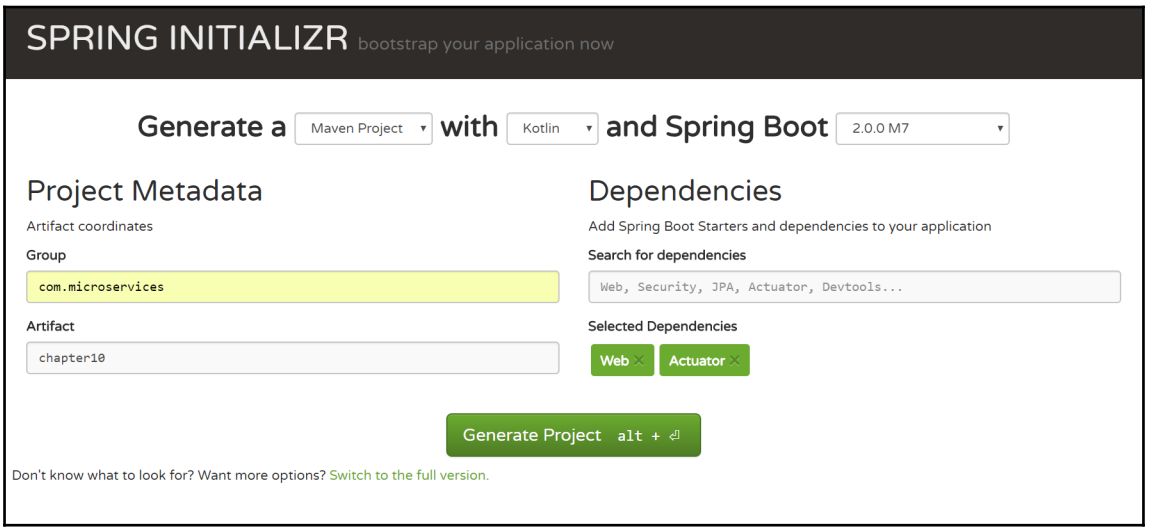


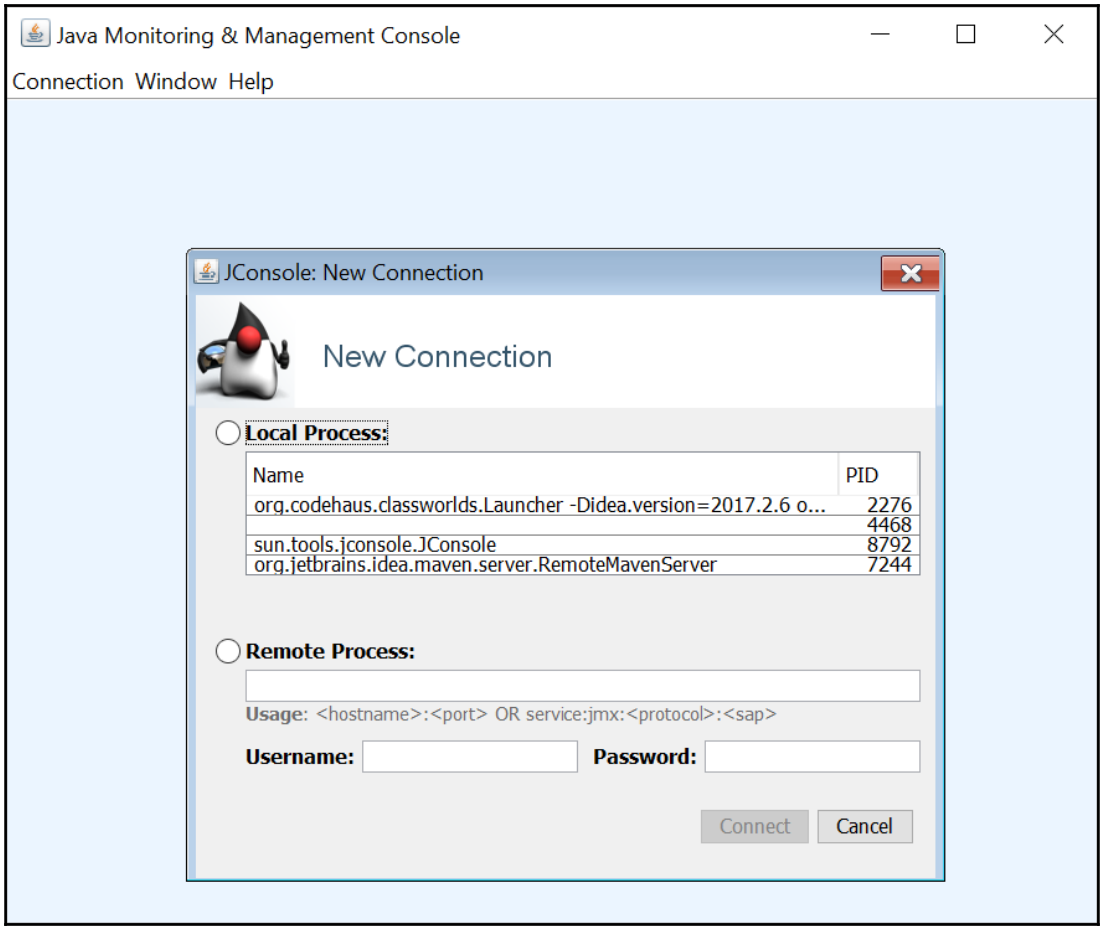

Create Test
Testing library:
JUnit4
Class name:
CustomerServiceImplTest
Superclass:
Destination package:
com.microservices.chapter09
Generate:
setUp/@Before
tearDown/@After
Generate test methods for:
Show inherited methods
Member
getCustomer(id:int):Customer
getAllCustomers():List<Customer>
OK
Cancel

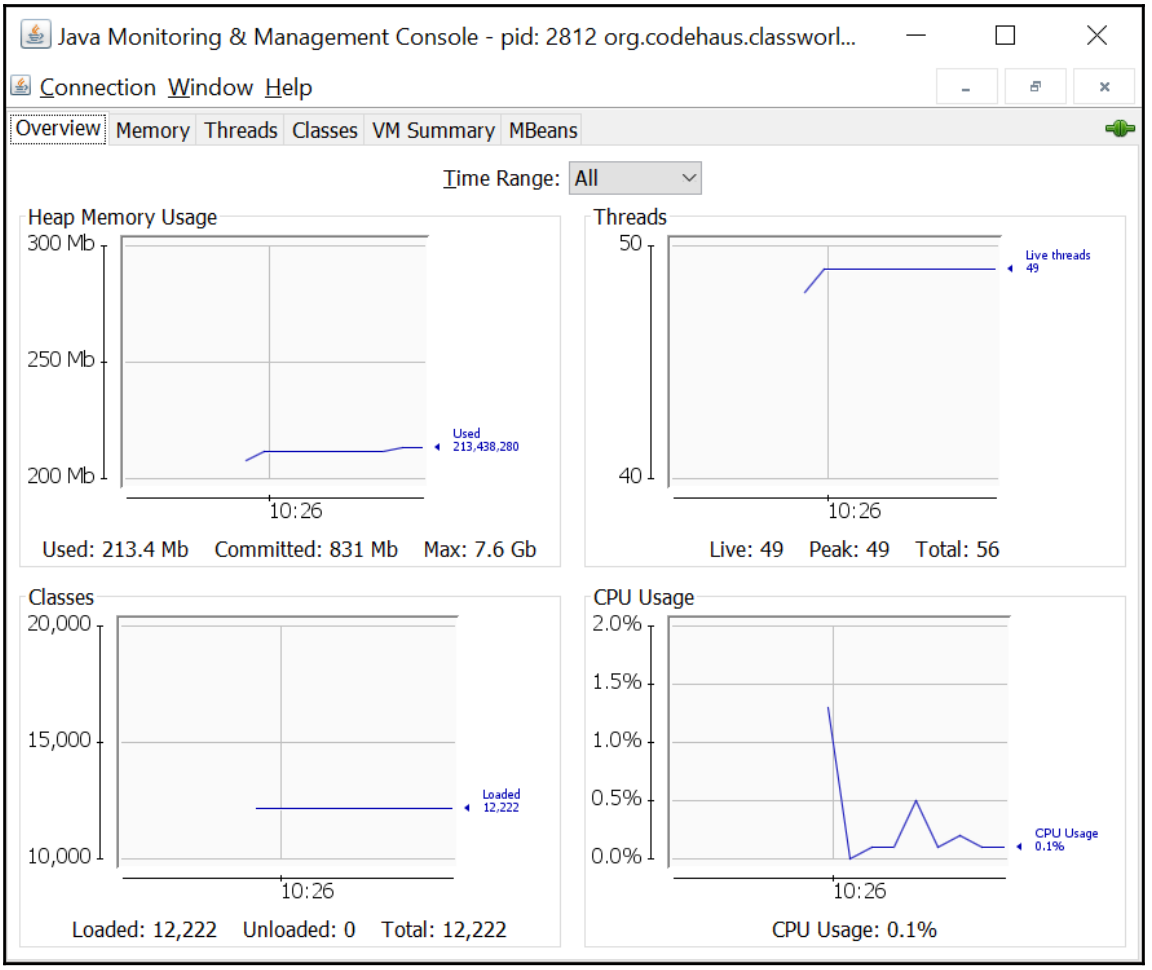

Run
CustomerServiceTest
CustomerServiceTest (com.microservices.chapter09web)
122ms
we should get a customer with a valid id
121ms
we should get all customers
1ms

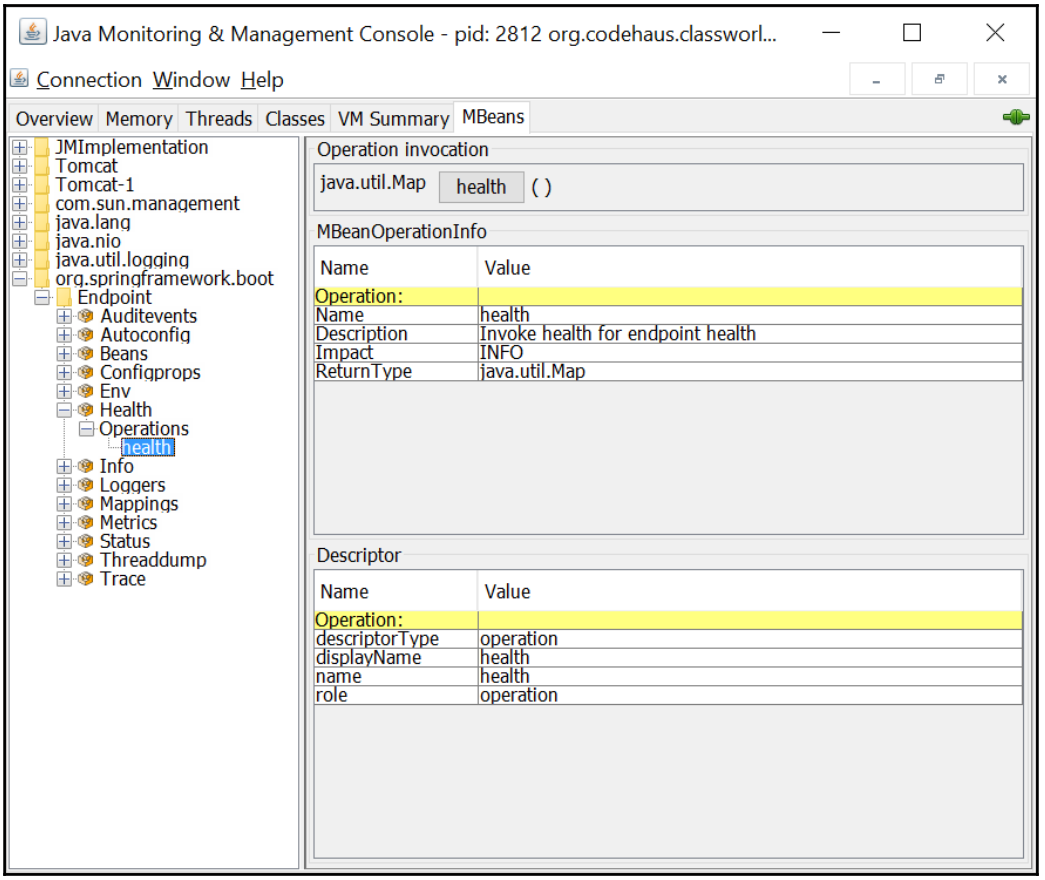

Run
CustomerServiceTest.we should get a customer with a valid id
1 test failed - 121ms
CustomerServiceTest (com.microservices.chapte
121ms
we should get a customer with a valid id
121ms
org.junit.ComparisonFailure:
Expected :Kotlin
Actual :Java
<Click to see difference>

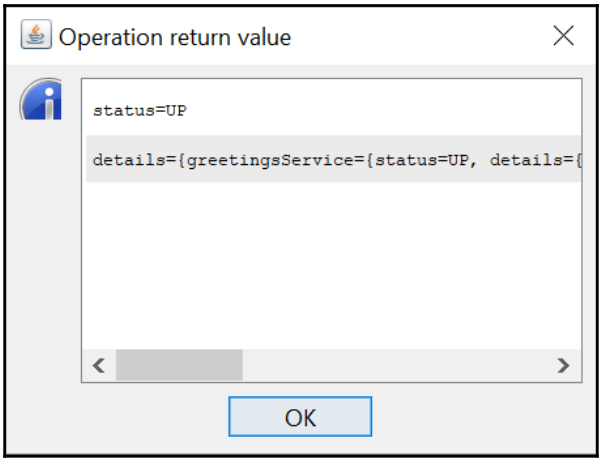
Chapter 10: Monitoring Microservices

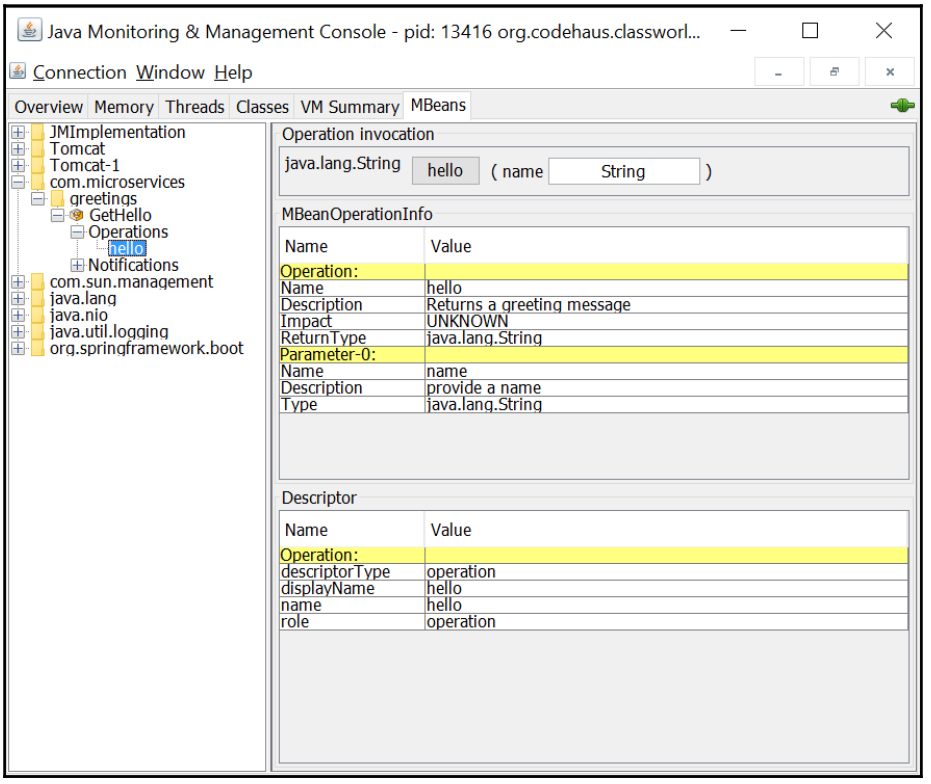


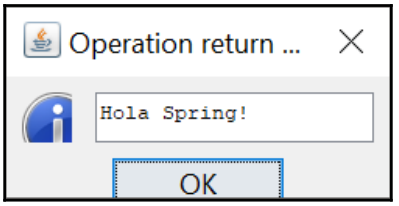

Java Monitoring & Management Console
Connection Window Help
JConsole: New Connection
New Connection
Local Process:
Name
PID
org.codehaus.classworlds.Launcher -Didea.version=2017.2.6 o...
2276
4468
sun.tools.jconsole.JConsole
8792
org.jetbrains.idea.maven.server.RemoteMavenServer
7244
Remote Process:
Usage: <hostname>:<port> OR service:jmx:<protocol>:<sap>
Username:
Password:
Connect
Cancel

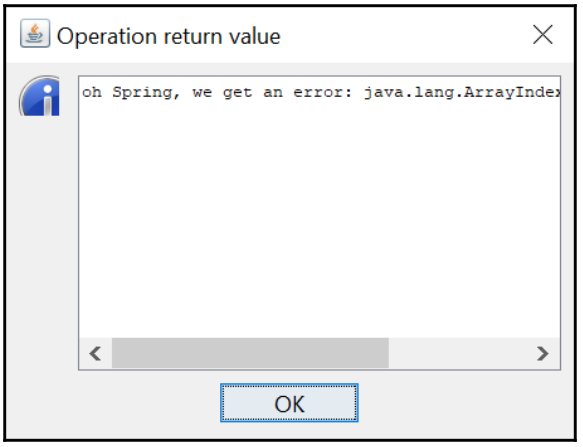

Java Monitoring & Management Console - pid: 2812 org.codehaus.classworl...
Connection Window Help
Overview
Memory
Threads
Classes
VM Summary
MBeans
Time Range: All
Heap Memory Usage
300 Mb
250 Mb
200 Mb
Used
213,438,280
10:26
Used: 213.4 Mb
Committed: 831 Mb
Max: 7.6 Gb
Threads
50
40
Live threads
49
10:26
Live: 49
Peak: 49
Total: 56
Classes
20,000
15,000
10,000
Loaded
12,222
10:26
Loaded: 12,222
Unloaded: 0
Total: 12,222
CPU Usage
2.0%
1.5%
1.0%
0.5%
0.0%
CPU Usage
0.1%
10:26
CPU Usage: 0.1%


Java Monitoring & Management Console - pid: 2812 org.codehaus.classworl...
Connection Window Help
Overview Memory Threads Classes VM Summary MBeans
JMImplementation
Tomcat
Tomcat-1
com.sun.management
java.lang
java.nio
java.util.logging
org.springframework.boot
Endpoint
Auditevents
Autoconfig
Beans
Configprops
Env
Health
Operations
health
Info
Loggers
Mappings
Metrics
Status
Threaddump
Trace
Operation invocation
java.util.Map
health
( )
MBeanOperationInfo
Name
Value
Operation:
Name
health
Description
Invoke health for endpoint health
Impact
INFO
ReturnType
java.util.Map
Descriptor
Name
Value
Operation:
descriptorType
operation
displayName
health
name
health
role
operation

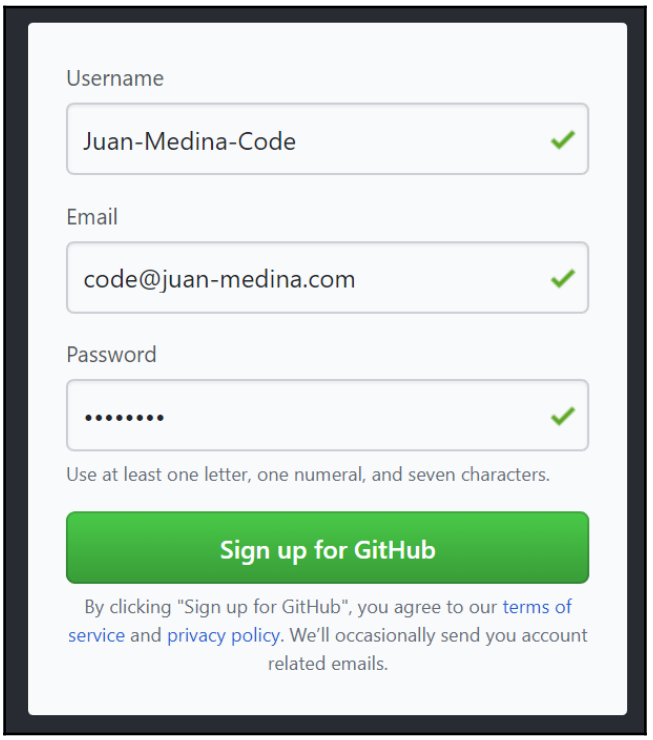

Operation return value
status=UP
details={greetingsService={status=UP, details={
OK


Java Monitoring & Management Console - pid: 13416 org.codehaus.classworl...
Connection Window Help
Overview Memory Threads Classes VM Summary MBeans
JMImplementation
Tomcat
Tomcat-1
com.microservices
greetings
GetHello
Operations
hello
Notifications
com.sun.management
java.lang
java.nio
java.util.logging
org.springframework.boot
Operation invocation
java.lang.String
hello
(name
String
)
MBeanOperationInfo
Name
Value
Operation:
Name
hello
Description
Returns a greeting message
Impact
UNKNOWN
ReturnType
java.lang.String
Parameter-0:
Name
name
Description
provide a name
Type
java.lang.String
Descriptor
Name
Value
Operation:
descriptorType
operation
displayName
hello
name
hello
role
operation


Operation return ...
Hola Spring!
OK


Operation return value
oh Spring, we get an error: java.lang.ArrayIndex
OK

Chapter 11: Deploying Microservices



Welcome to GitHub

You've taken your first step into a larger world, **@Juan-Medina-Code**.

Completed	Step 2:	Step 3:
Set up a personal account	Choose your plan	Tailor your experience

Choose your personal plan

- (•) Unlimited public repositories for free.
- ( ) **Unlimited private repositories** for $7/month.

Don't worry, you can cancel or upgrade at any time.

Both plans include:

- ✓ Collaborative code review
- ✓ Issue tracking
- ✓ Open source community
- ✓ Unlimited public repositories
- ✓ Join any organization

- [ ] **Help me set up an organization next**
  Organizations are separate from personal accounts and are best suited for businesses who need to manage permissions for many employees.
  Learn more about organizations

- [ ] **Send me updates on GitHub news, offers, and events**
  Unsubscribe anytime in your email preferences. Learn more

Continue

Welcome to GitHub

You'll find endless opportunities to learn, code, and create, **@Juan-Medina-Code**.

Completed	Step 2:	Step 3:
Set up a personal account	Choose your plan	Tailor your experience

How would you describe your level of programming experience?

- ( ) Very experienced
- ( ) Somewhat experienced
- ( ) Totally new to programming

What do you plan to use GitHub for? (check all that apply)

- [ ] Research
- [ ] School projects
- [ ] Project Management
- [ ] Development
- [ ] Design
- [ ] Other (please specify)

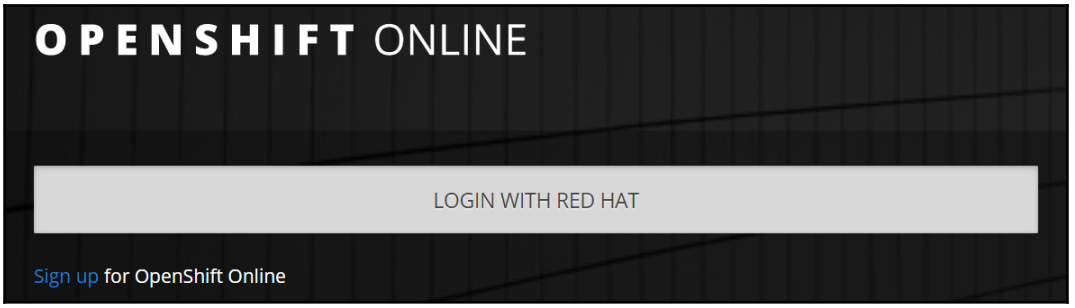
Which is closest to how you would describe yourself?

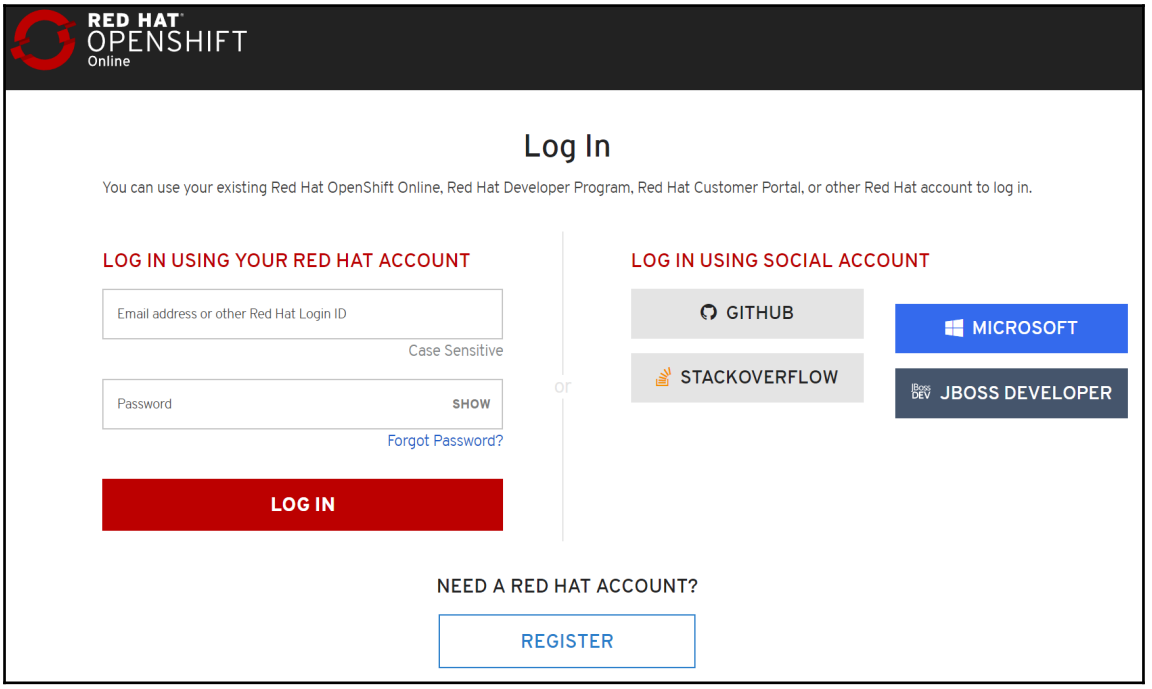
- ( ) I'm a professional
- ( ) I'm a student
- ( ) I'm a hobbyist
- ( ) Other (please specify)

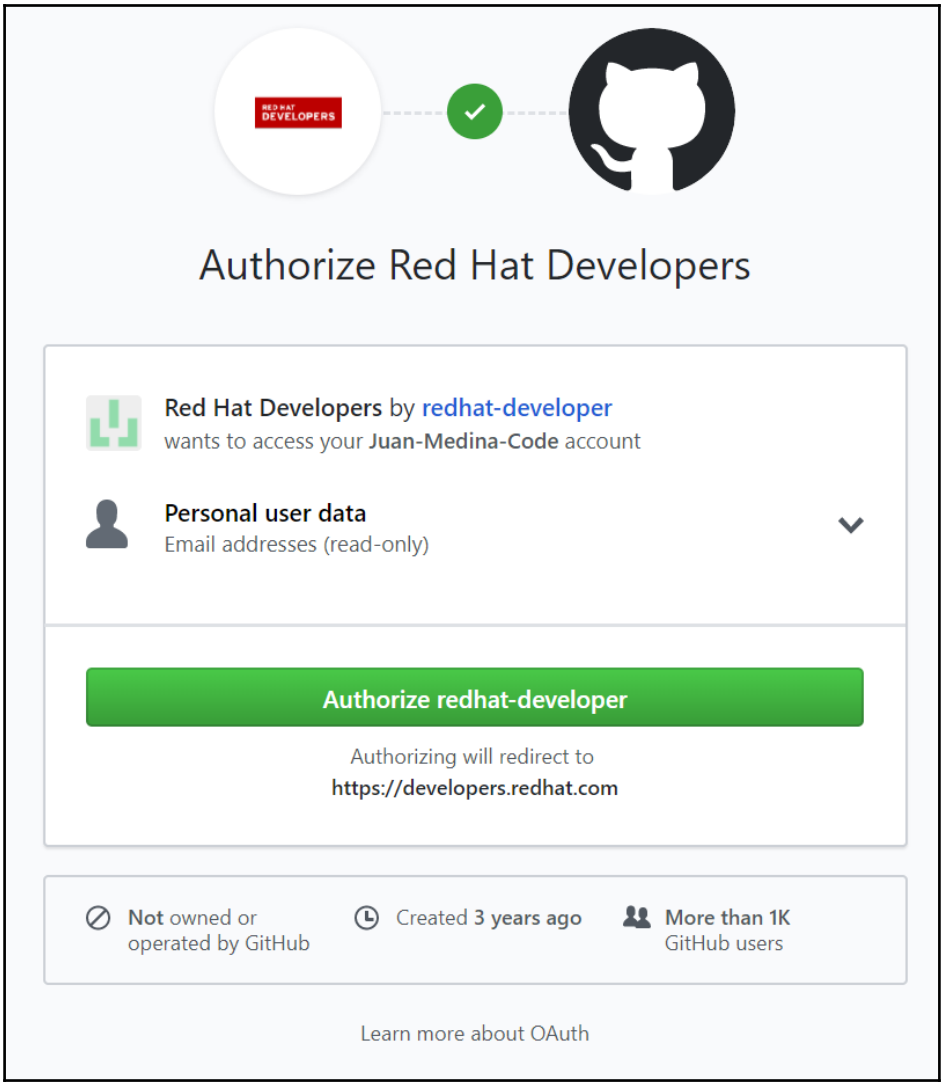
What are you interested in?

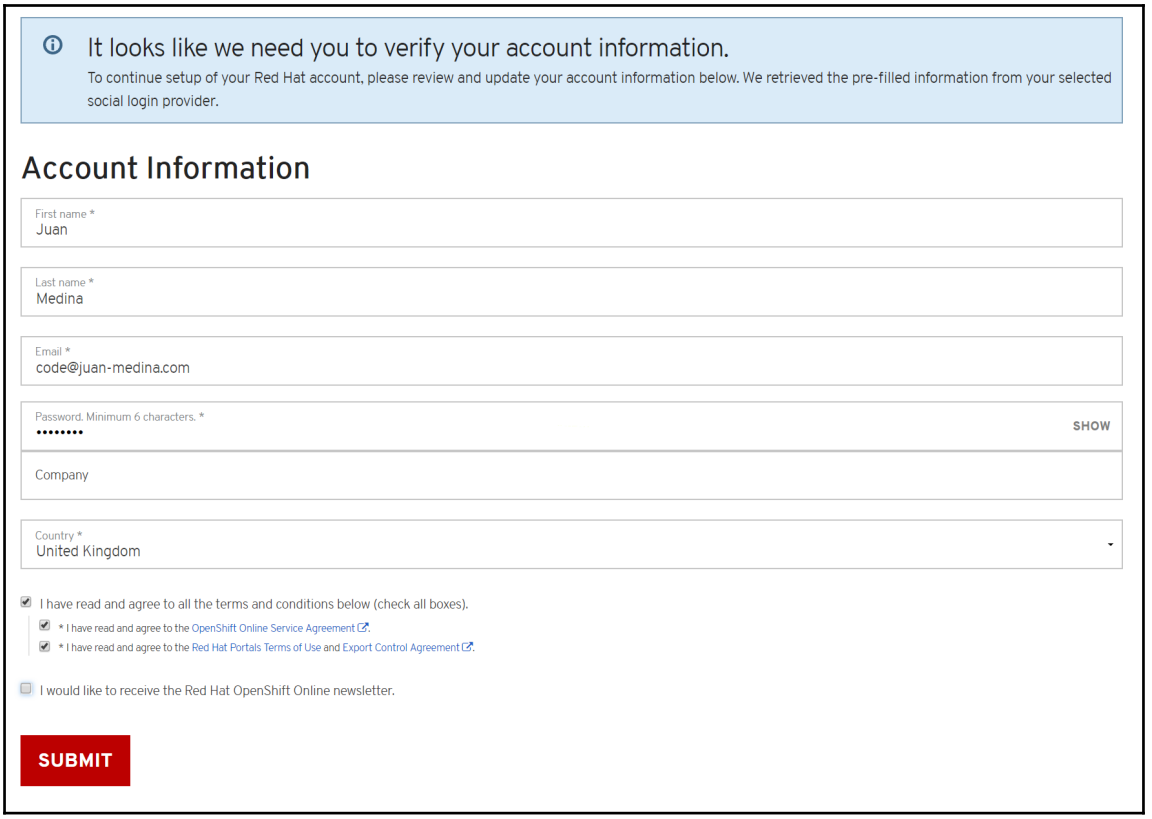
e.g. tutorials, android, ruby, web-development, machine-learning, open-source

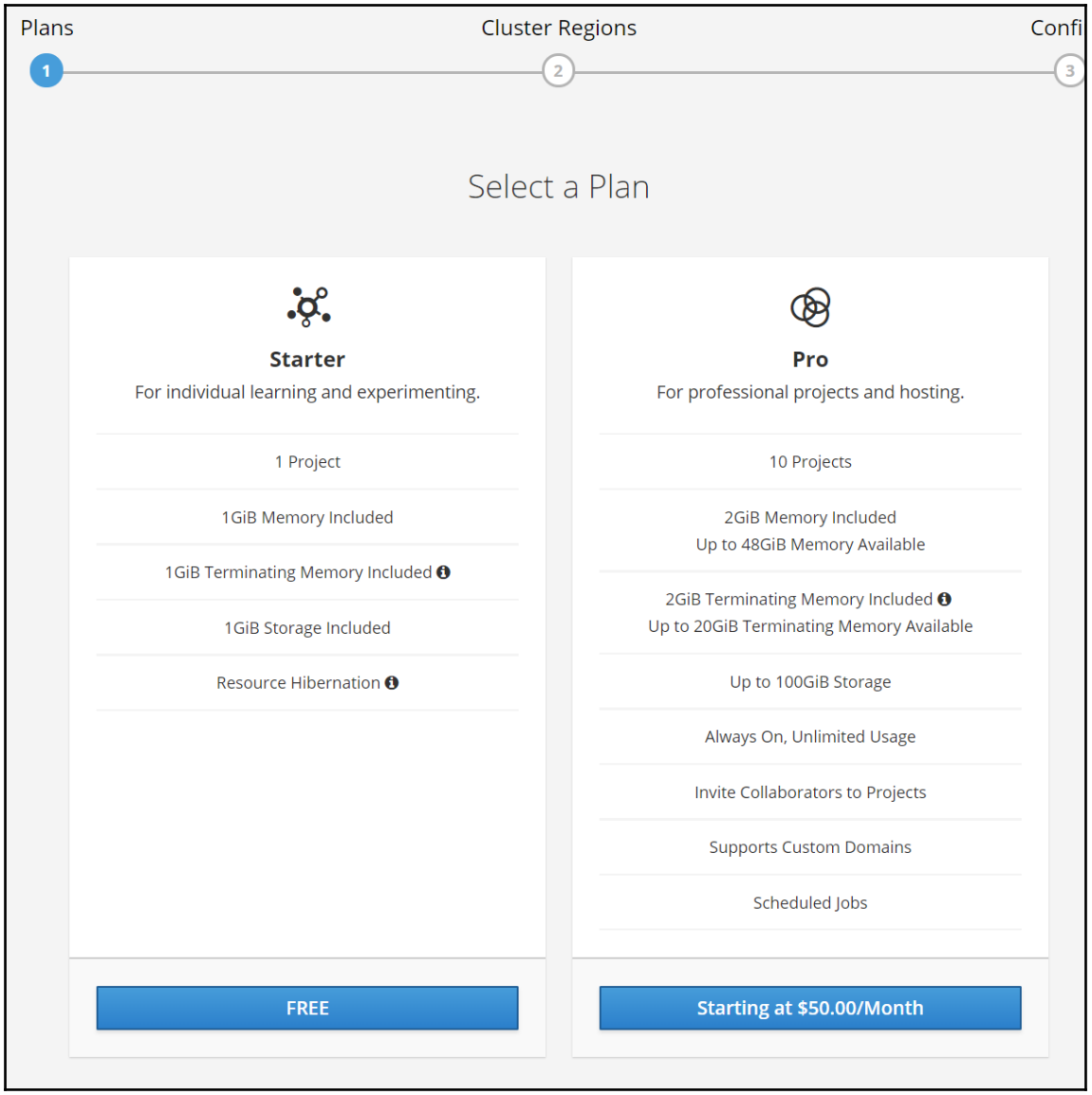
Submit skip this step

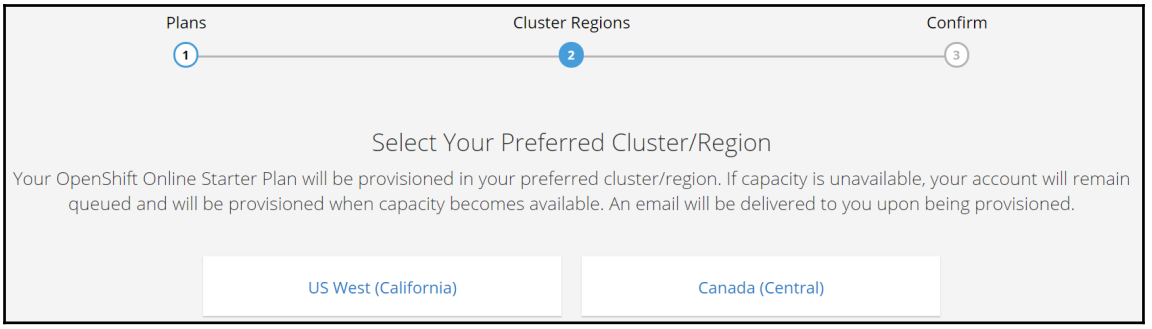

OPENSHIFT ONLINE
LOGIN WITH RED HAT
Sign up for OpenShift Online

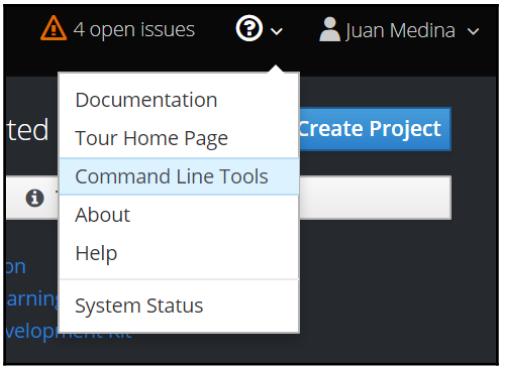

RED HAT
OPENSHIFT
Online
Log In
You can use your existing Red Hat OpenShift Online, Red Hat Developer Program, Red Hat Customer Portal, or other Red Hat account to log in.
LOG IN USING YOUR RED HAT ACCOUNT
Email address or other Red Hat Login ID
Case Sensitive
Password
SHOW
Forgot Password?
LOG IN
or
LOG IN USING SOCIAL ACCOUNT
GITHUB
MICROSOFT
STACKOVERFLOW
JBOSS DEVELOPER
NEED A RED HAT ACCOUNT?
REGISTER

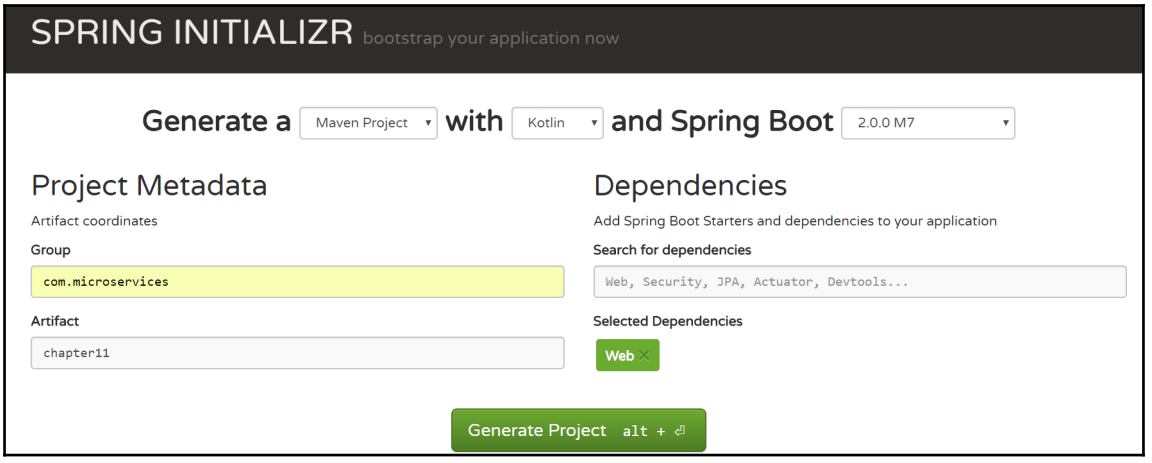

Authorize Red Hat Developers
Red Hat Developers by redhat-developer
wants to access your Juan-Medina-Code account
Personal user data
Email addresses (read-only)
Authorize redhat-developer
Authorizing will redirect to
https://developers.redhat.com
Not owned or operated by GitHub
Created 3 years ago
More than 1K GitHub users
Learn more about OAuth

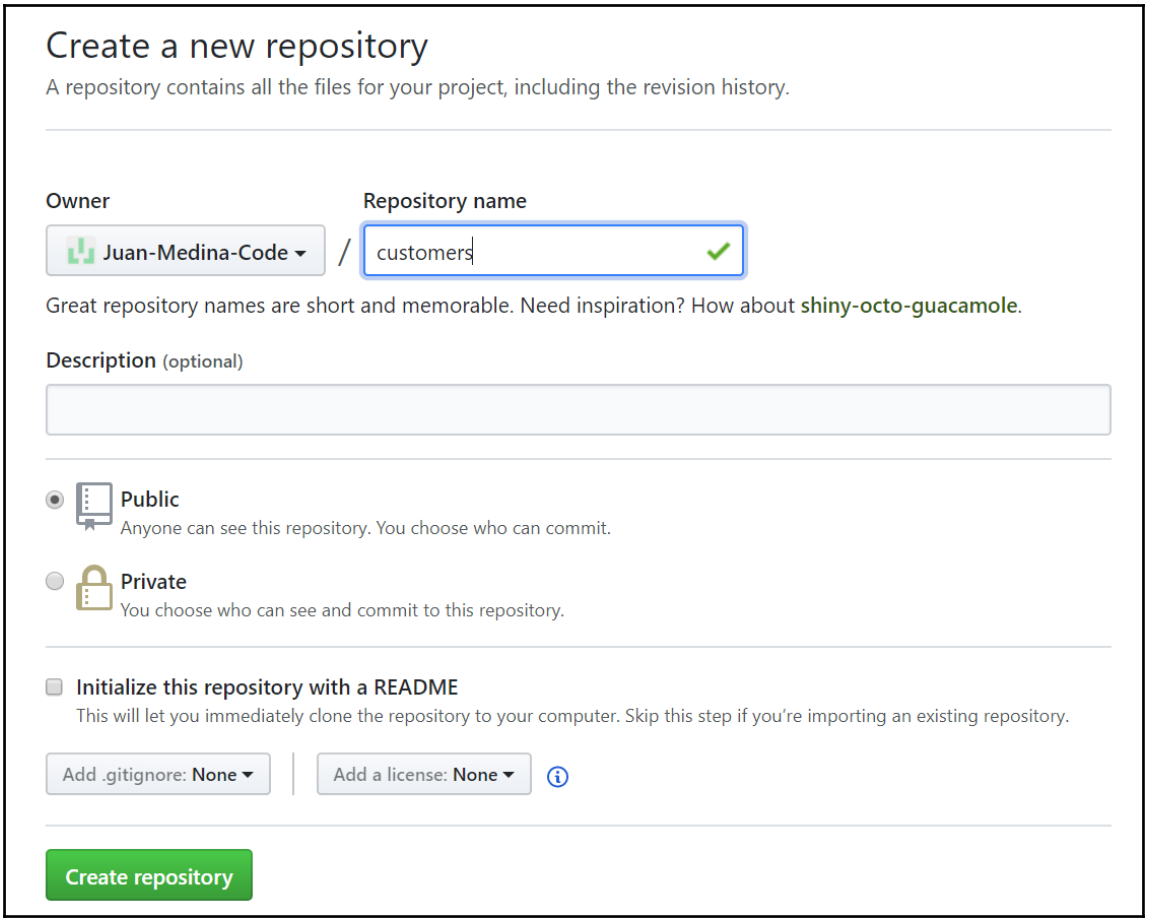

It looks like we need you to verify your account information.
To continue setup of your Red Hat account, please review and update your account information below. We retrieved the pre-filled information from your selected social login provider.
Account Information
First name *
Juan
Last name *
Medina
Email *
code@juan-medina.com
Password. Minimum 6 characters. *
SHOW
Company
Country *
United Kingdom
I have read and agree to all the terms and conditions below (check all boxes).
* I have read and agree to the OpenShift Online Service Agreement.
* I have read and agree to the Red Hat Portals Terms of Use and Export Control Agreement.
I would like to receive the Red Hat OpenShift Online newsletter.
SUBMIT


Plans
Cluster Regions
Confi
1
2
3
Select a Plan
Starter
For individual learning and experimenting.
1 Project
1GiB Memory Included
1GiB Terminating Memory Included
1GiB Storage Included
Resource Hibernation
FREE
Pro
For professional projects and hosting.
10 Projects
2GiB Memory Included
Up to 48GiB Memory Available
2GiB Terminating Memory Included
Up to 20GiB Terminating Memory Available
Up to 100GiB Storage
Always On, Unlimited Usage
Invite Collaborators to Projects
Supports Custom Domains
Scheduled Jobs
Starting at $50.00/Month

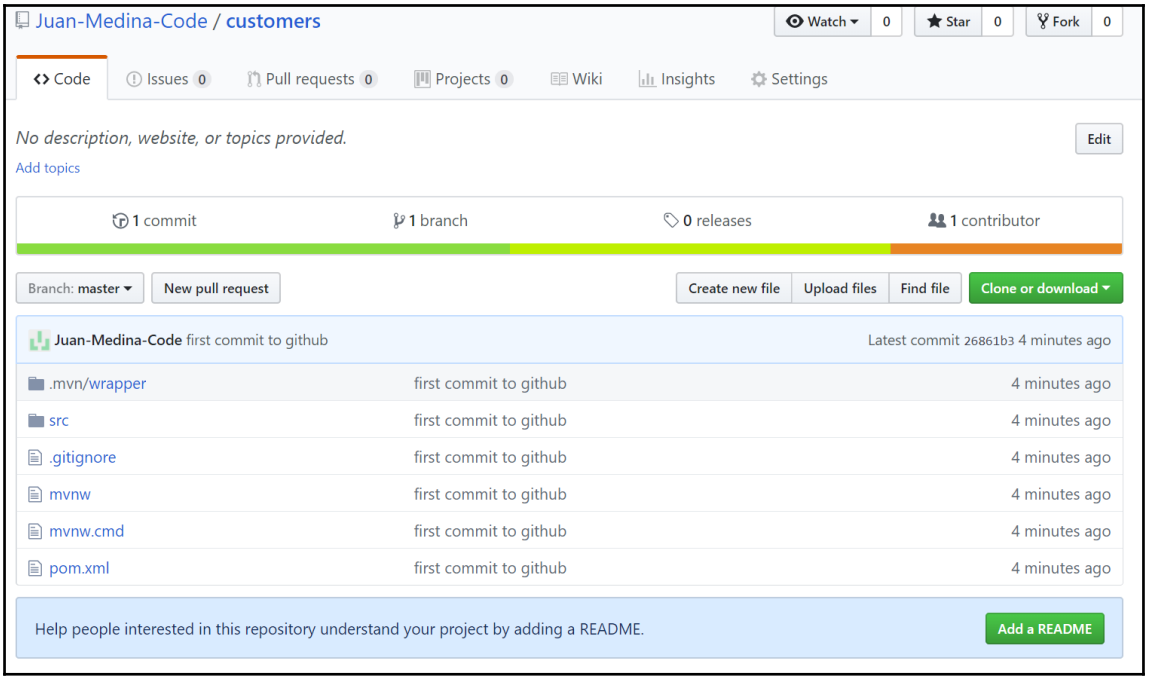

Plans
Cluster Regions
Confirm
1
2
3
Select Your Preferred Cluster/Region
Your OpenShift Online Starter Plan will be provisioned in your preferred cluster/region. If capacity is unavailable, your account will remain queued and will be provisioned when capacity becomes available. An email will be delivered to you upon being provisioned.
US West (California)
Canada (Central)

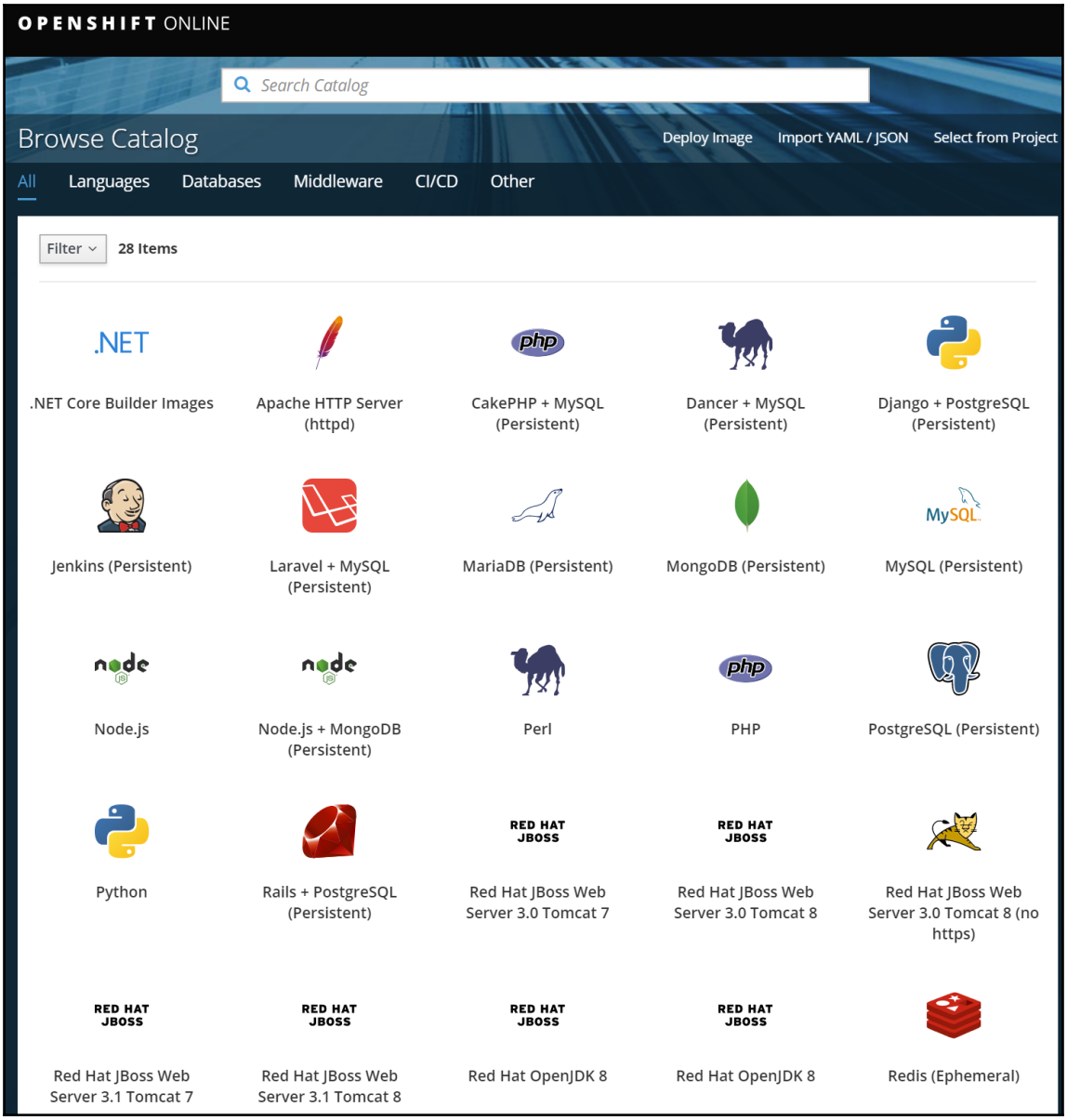

4 open issues
Juan Medina
Documentation
Tour Home Page
Command Line Tools
About
Help
System Status
Create Project

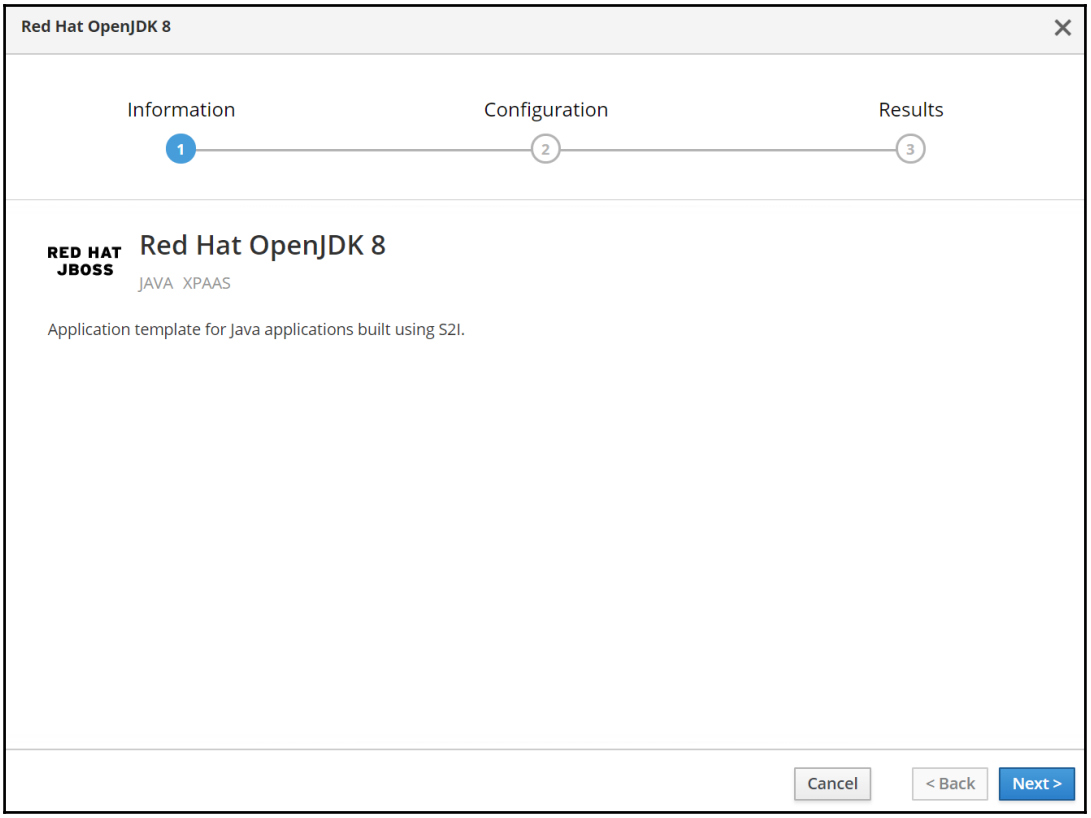

SPRING INITIALIZR
bootstrap your application now
Generate a
Maven Project
with
Kotlin
and Spring Boot
2.0.0 M7
Project Metadata
Artifact coordinates
Group
com.microservices
Artifact
chapter11
Dependencies
Add Spring Boot Starters and dependencies to your application
Search for dependencies
Web, Security, JPA, Actuator, Devtools...
Selected Dependencies
Web
Generate Project alt + ⏎

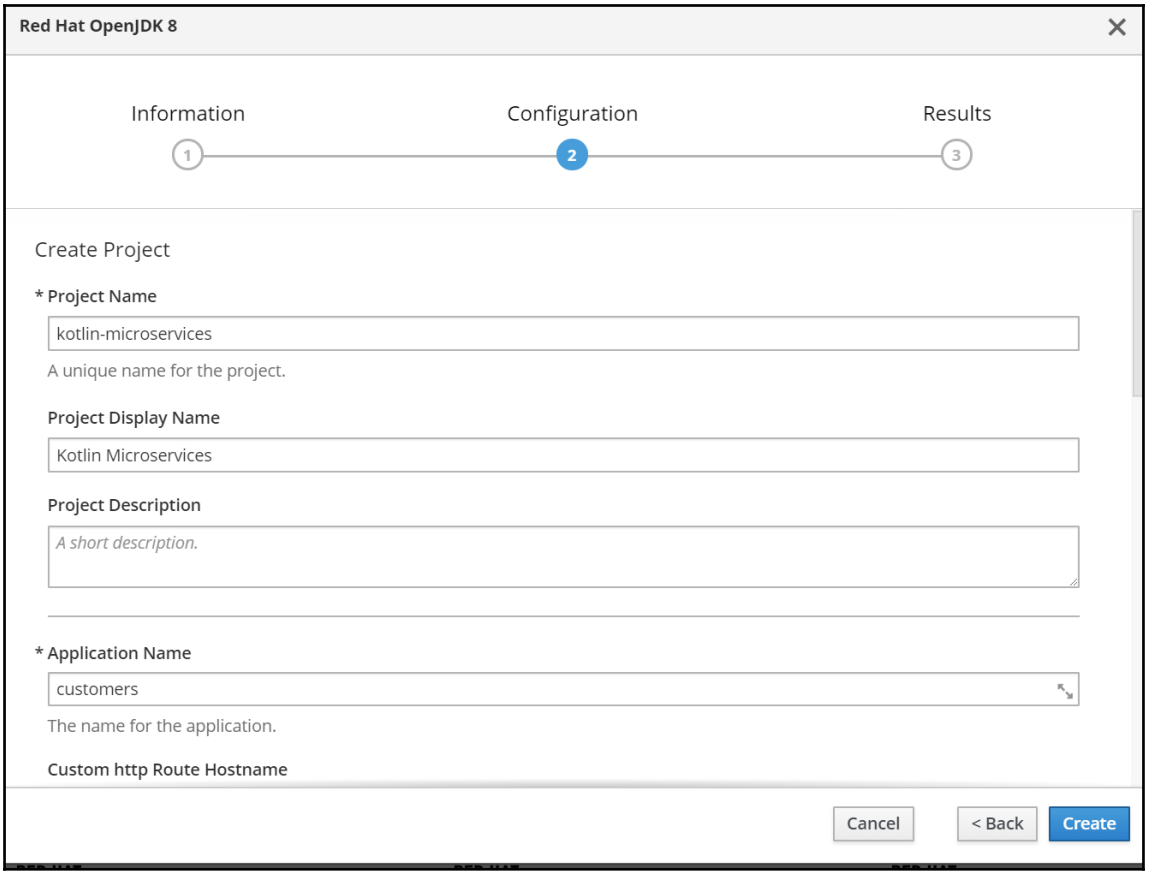

Create a new repository
A repository contains all the files for your project, including the revision history.
Owner
Repository name
Juan-Medina-Code
/
customers
Great repository names are short and memorable. Need inspiration? How about shiny-octo-guacamole.
Description (optional)
Public
Anyone can see this repository. You choose who can commit.
Private
You choose who can see and commit to this repository.
Initialize this repository with a README
This will let you immediately clone the repository to your computer. Skip this step if you're importing an existing repository.
Add .gitignore: None
Add a license: None
Create repository

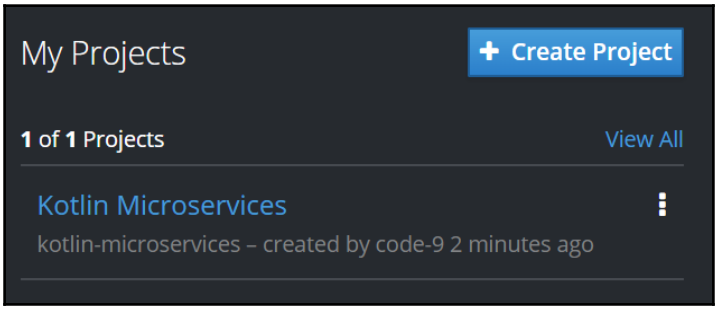
Juan-Medina-Code / customers
Watch 0
Star 0
Fork 0
Code
Issues 0
Pull requests 0
Projects 0
Wiki
Insights
Settings
Quick setup — if you've done this kind of thing before
Set up in Desktop
or
HTTPS
SSH
https://github.com/Juan-Medina-Code/customers.git
We recommend every repository include a README, LICENSE, and .gitignore.

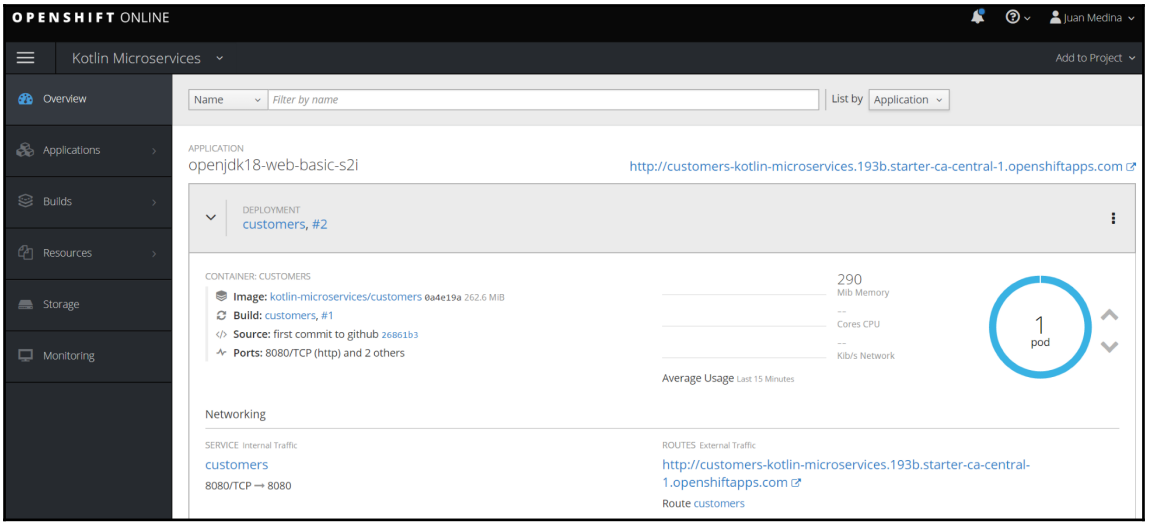

Juan-Medina-Code / customers
Watch 0
Star 0
Fork 0
Code
Issues 0
Pull requests 0
Projects 0
Wiki
Insights
Settings
No description, website, or topics provided.
Edit
Add topics
1 commit
1 branch
0 releases
1 contributor
Branch: master
New pull request
Create new file
Upload files
Find file
Clone or download
Juan-Medina-Code first commit to github
Latest commit 26861b3 4 minutes ago
.mvn/wrapper first commit to github 4 minutes ago
src first commit to github 4 minutes ago
.gitignore first commit to github 4 minutes ago
mvnw first commit to github 4 minutes ago
mvnw.cmd first commit to github 4 minutes ago
pom.xml first commit to github 4 minutes ago
Help people interested in this repository understand your project by adding a README.
Add a README

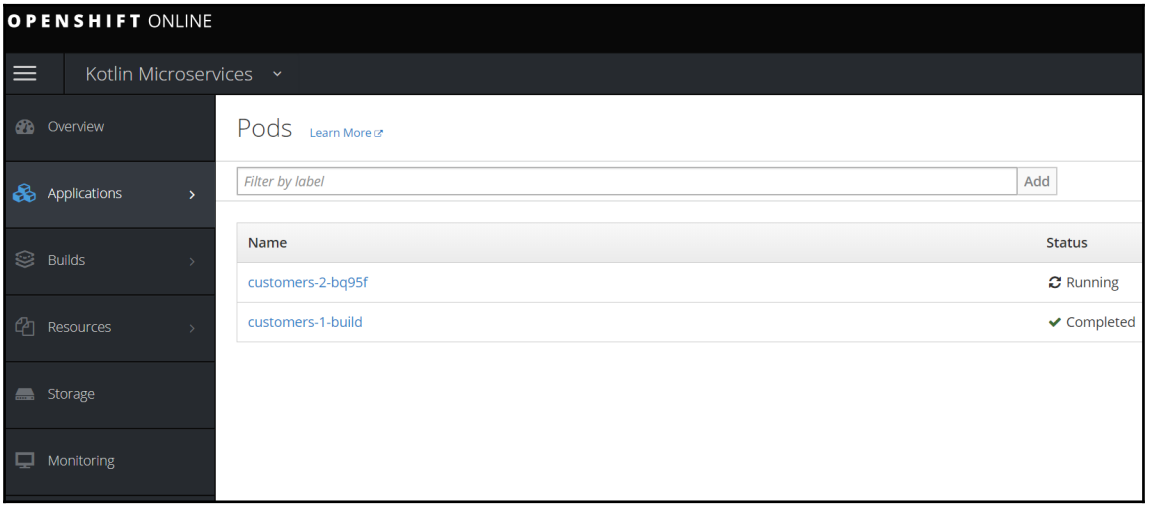

OPENSHIFT ONLINE
Search Catalog
Browse Catalog
Deploy Image
Import YAML / JSON
Select from Project
All
Languages
Databases
Middleware
CI/CD
Other
Filter
28 Items
.NET Core Builder Images
Apache HTTP Server (httpd)
CakePHP + MySQL (Persistent)
Dancer + MySQL (Persistent)
Django + PostgreSQL (Persistent)
Jenkins (Persistent)
Laravel + MySQL (Persistent)
MariaDB (Persistent)
MongoDB (Persistent)
MySQL (Persistent)
Node.js
Node.js + MongoDB (Persistent)
Perl
PHP
PostgreSQL (Persistent)
Python
Rails + PostgreSQL (Persistent)
Red Hat JBoss Web Server 3.0 Tomcat 7
Red Hat JBoss Web Server 3.0 Tomcat 8
Red Hat JBoss Web Server 3.0 Tomcat 8 (no https)
Red Hat JBoss Web Server 3.1 Tomcat 7
Red Hat JBoss Web Server 3.1 Tomcat 8
Red Hat OpenJDK 8
Red Hat OpenJDK 8
Redis (Ephemeral)

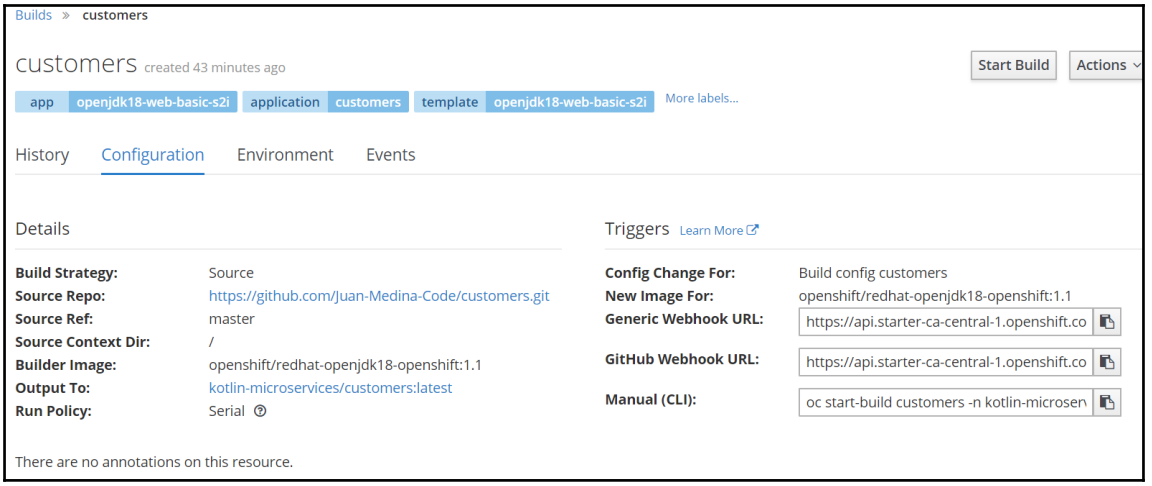

Red Hat OpenJDK 8
Information
Configuration
Results
1
2
3
RED HAT JBOSS
Red Hat OpenJDK 8
JAVA XPAAS
Application template for Java applications built using S2I.
Cancel
< Back
Next >

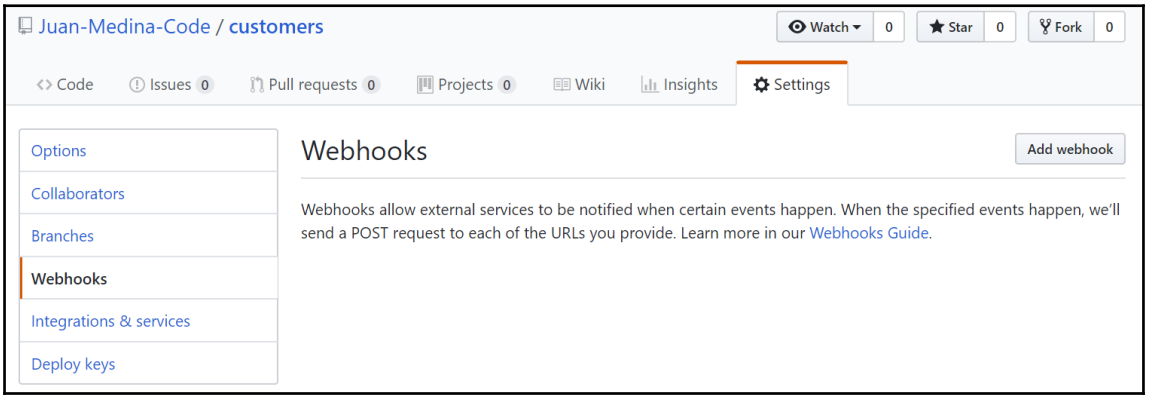

Red Hat OpenJDK 8
Information
Configuration
Results
1
2
3
Create Project
* Project Name
kotlin-microservices
A unique name for the project.
Project Display Name
Kotlin Microservices
Project Description
A short description.
* Application Name
customers
The name for the application.
Custom http Route Hostname
Cancel
< Back
Create

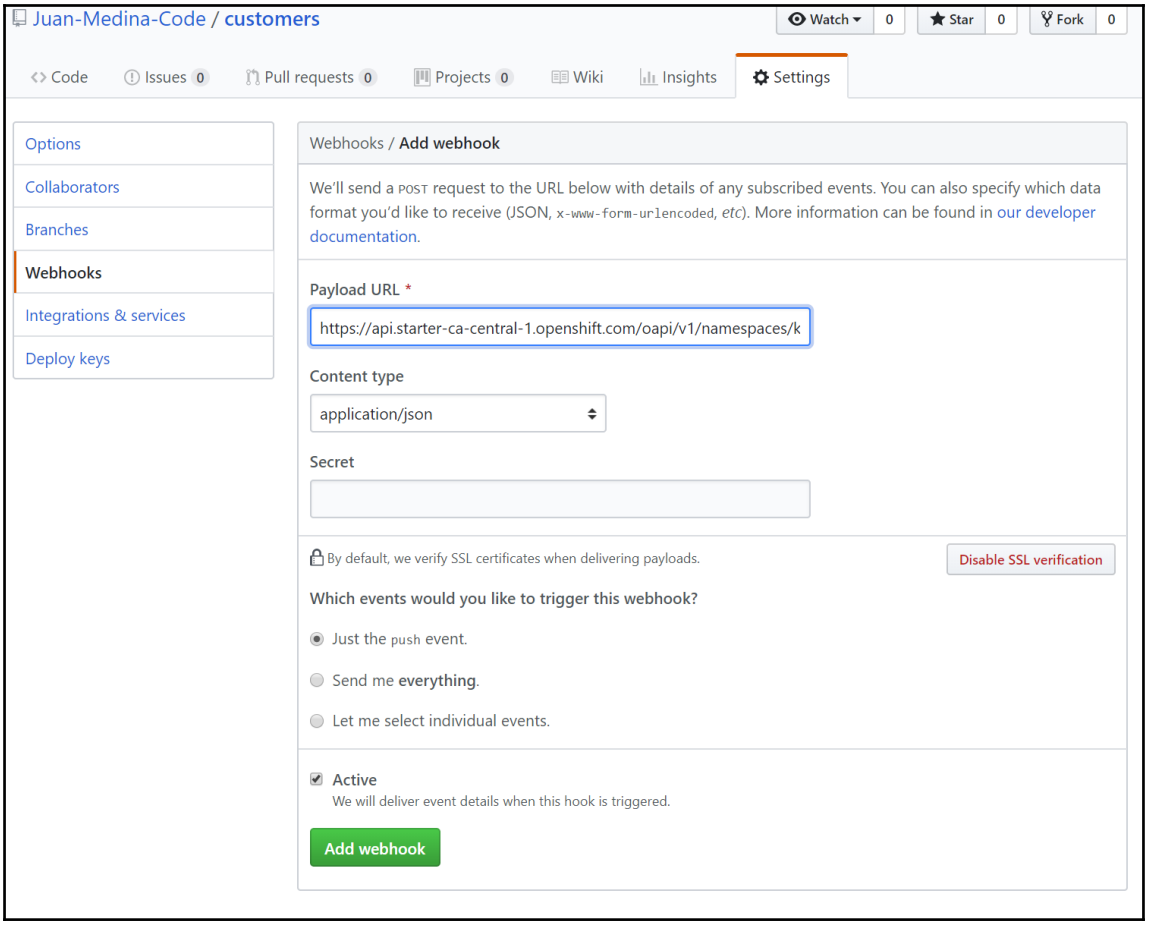

My Projects
+ Create Project
1 of 1 Projects
View All
Kotlin Microservices
kotlin-microservices – created by code-9 2 minutes ago

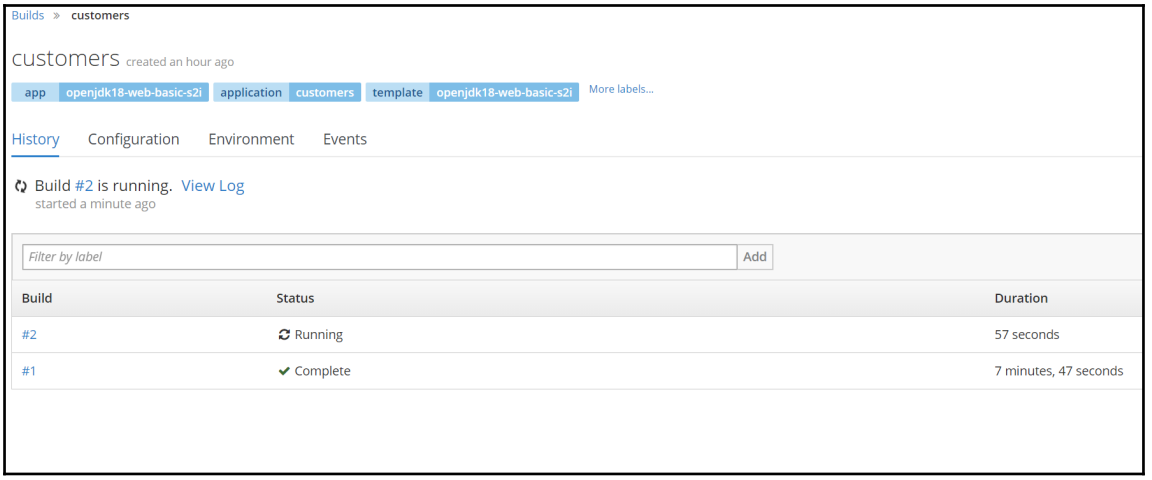

OPENSHIFT ONLINE
Juan Medina
Kotlin Microservices
Add to Project
Overview
Applications
Builds
Resources
Storage
Monitoring
Name
Filter by name
List by
Application
APPLICATION
openjdk18-web-basic-s2i
http://customers-kotlin-microservices.193b.starter-ca-central-1.openshiftapps.com
DEPLOYMENT
customers, #2
CONTAINER: CUSTOMERS
Image: kotlin-microservices/customers 0a4e19a 262.6 MiB
Build: customers, #1
Source: first commit to github 26861b3
Ports: 8080/TCP (http) and 2 others
290
Mib Memory
Cores CPU
Kib/s Network
1
pod
Average Usage Last 15 Minutes
Networking
SERVICE Internal Traffic
customers
8080/TCP → 8080
ROUTES External Traffic
http://customers-kotlin-microservices.193b.starter-ca-central-1.openshiftapps.com
Route customers


OPENSHIFT ONLINE
Kotlin Microservices
Overview
Applications
Builds
Resources
Storage
Monitoring
Pods
Learn More
Filter by label
Add
Name
Status
customers-2-bq95f
Running
customers-1-build
Completed

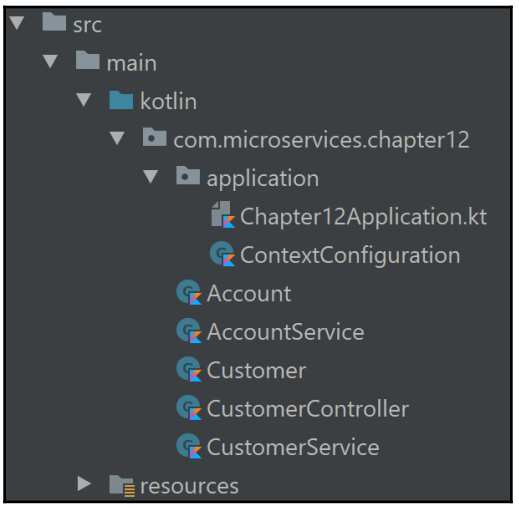

Builds » customers
customers created 43 minutes ago
Start Build
Actions
app openjdk18-web-basic-s2i application customers template openjdk18-web-basic-s2i More labels...
History Configuration Environment Events
Details
Build Strategy: Source
Source Repo: https://github.com/Juan-Medina-Code/customers.git
Source Ref: master
Source Context Dir: /
Builder Image: openshift/redhat-openjdk18-openshift:1.1
Output To: kotlin-microservices/customers:latest
Run Policy: Serial
Triggers Learn More
Config Change For: Build config customers
New Image For: openshift/redhat-openjdk18-openshift:1.1
Generic Webhook URL: https://api.starter-ca-central-1.openshift.co
GitHub Webhook URL: https://api.starter-ca-central-1.openshift.co
Manual (CLI): oc start-build customers -n kotlin-microsen
There are no annotations on this resource.

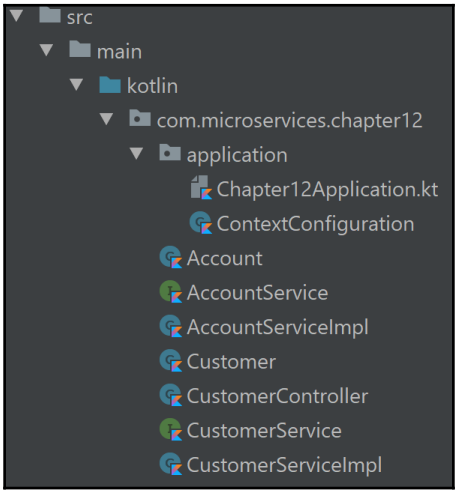

Juan-Medina-Code / customers
Watch 0
Star 0
Fork 0
Code Issues 0 Pull requests 0 Projects 0 Wiki Insights Settings
Options
Collaborators
Branches
Webhooks
Integrations & services
Deploy keys
Webhooks
Add webhook
Webhooks allow external services to be notified when certain events happen. When the specified events happen, we'll send a POST request to each of the URLs you provide. Learn more in our Webhooks Guide.

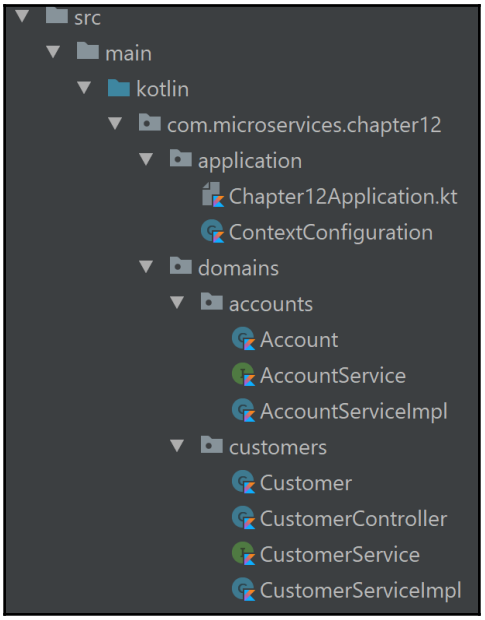

Juan-Medina-Code / customers
Watch 0
Star 0
Fork 0
Code
Issues 0
Pull requests 0
Projects 0
Wiki
Insights
Settings
Options
Collaborators
Branches
Webhooks
Integrations & services
Deploy keys
Webhooks / Add webhook
We'll send a POST request to the URL below with details of any subscribed events. You can also specify which data format you'd like to receive (JSON, x-www-form-urlencoded, etc). More information can be found in our developer documentation.
Payload URL *
https://api.starter-ca-central-1.openshift.com/oapi/v1/namespaces/k
Content type
application/json
Secret
By default, we verify SSL certificates when delivering payloads.
Disable SSL verification
Which events would you like to trigger this webhook?
Just the push event.
Send me everything.
Let me select individual events.
Active
We will deliver event details when this hook is triggered.
Add webhook

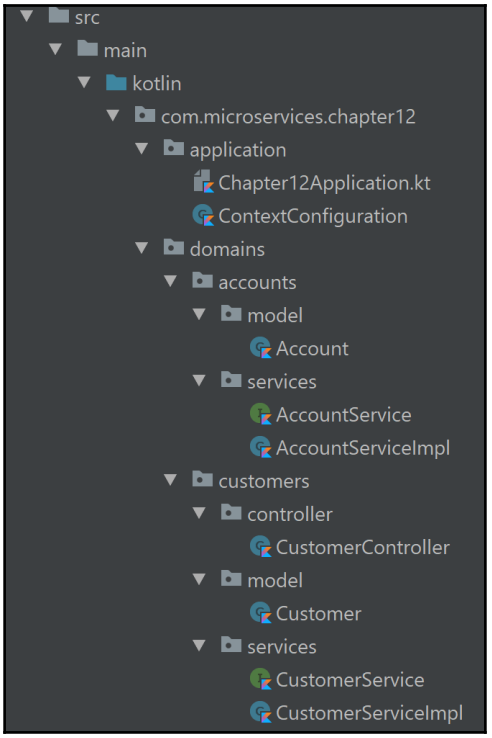

Builds » customers
customers created an hour ago
app openjdk18-web-basic-s2i application customers template openjdk18-web-basic-s2i More labels...
History Configuration Environment Events
Build #2 is running. View Log
started a minute ago
Filter by label
Add
Build
Status
Duration
#2
Running
57 seconds
#1
Complete
7 minutes, 47 seconds

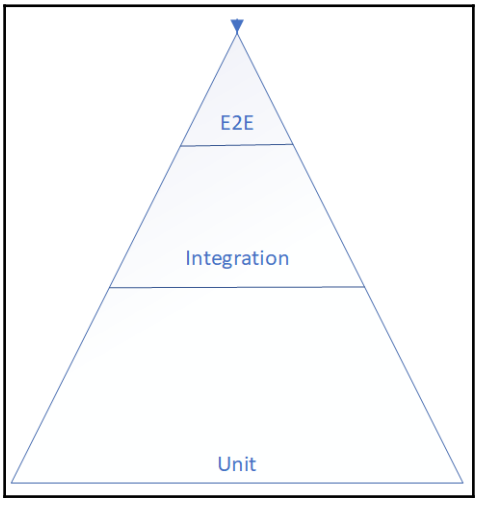
Chapter 12: Best Practices






src
main
kotlin
com.microservices.chapter12
application
Chapter12Application.kt
ContextConfiguration
domains
accounts
Account
AccountService
AccountServiceImpl
customers
Customer
CustomerController
CustomerService
CustomerServiceImpl


src
main
kotlin
com.microservices.chapter12
application
Chapter12Application.kt
ContextConfiguration
domains
accounts
model
Account
services
AccountService
AccountServiceImpl
customers
controller
CustomerController
model
Customer
services
CustomerService
CustomerServiceImpl


E2E
Integration
Unit