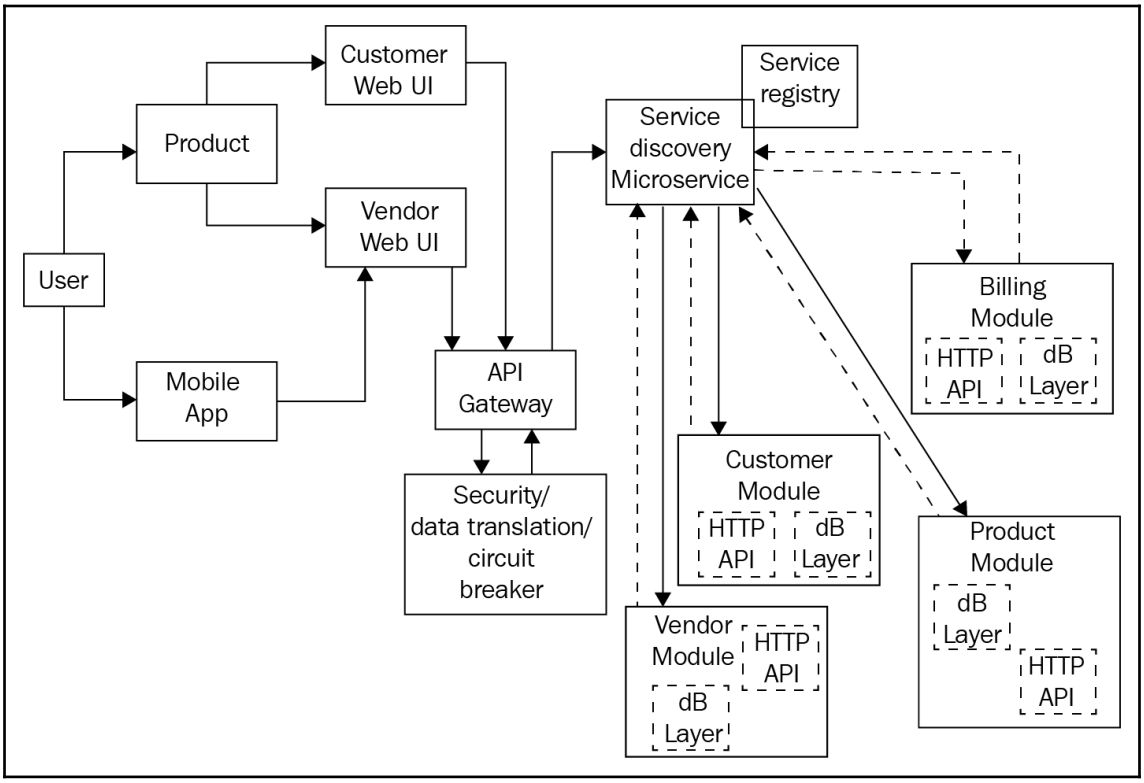
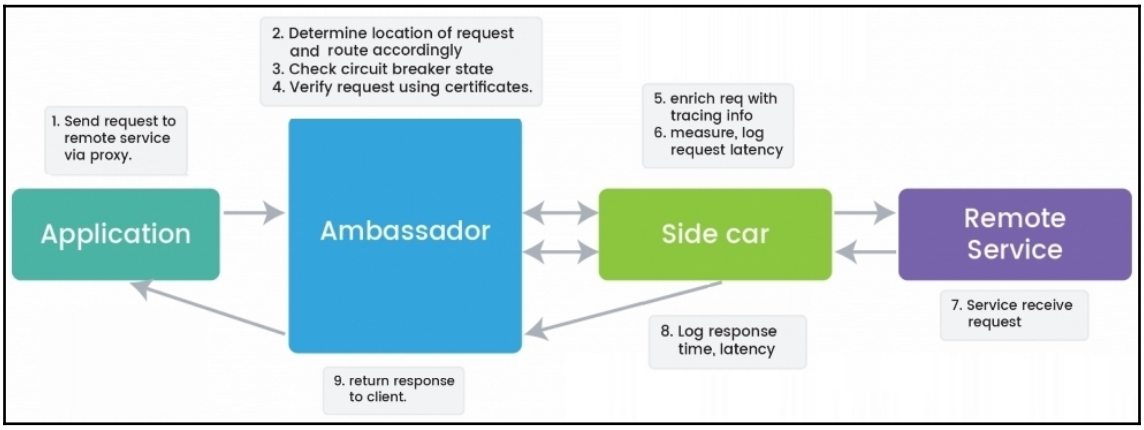
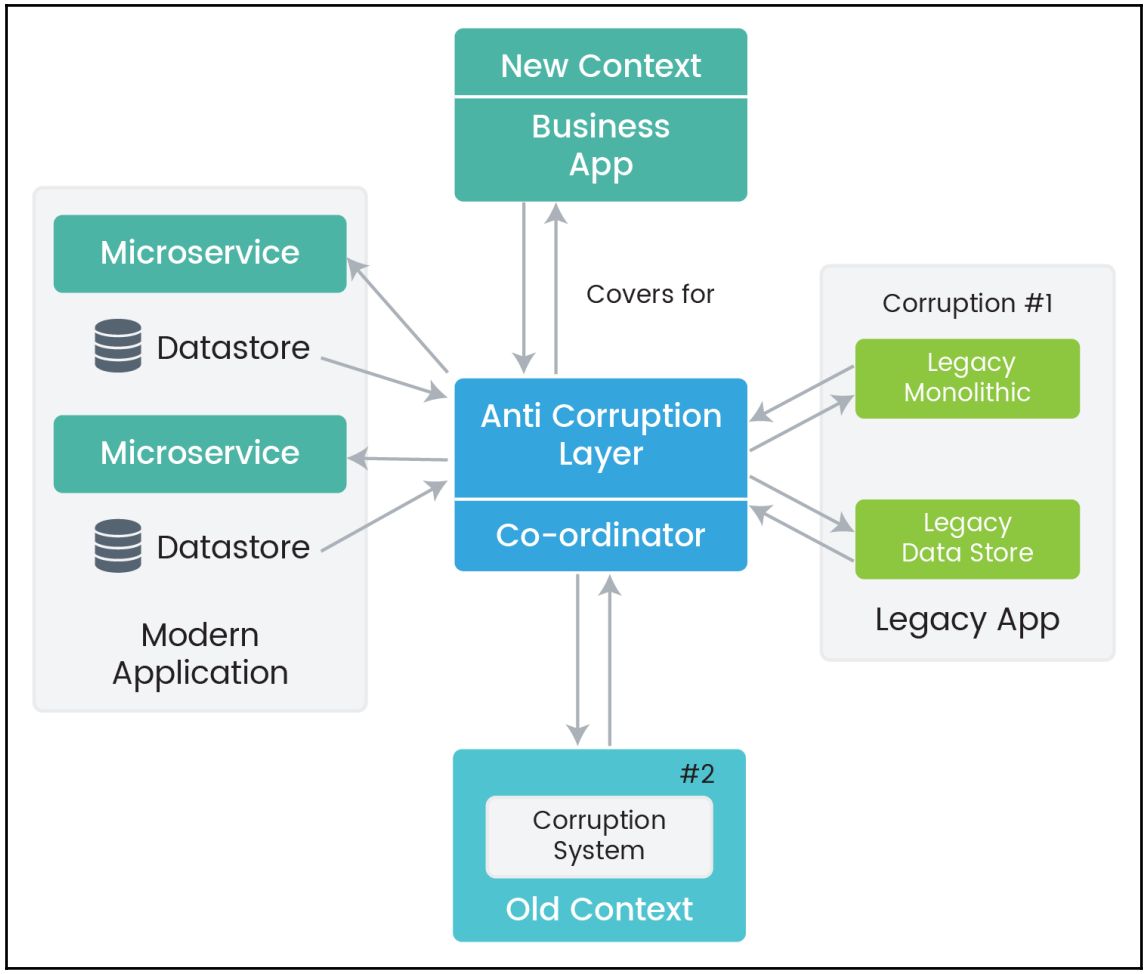
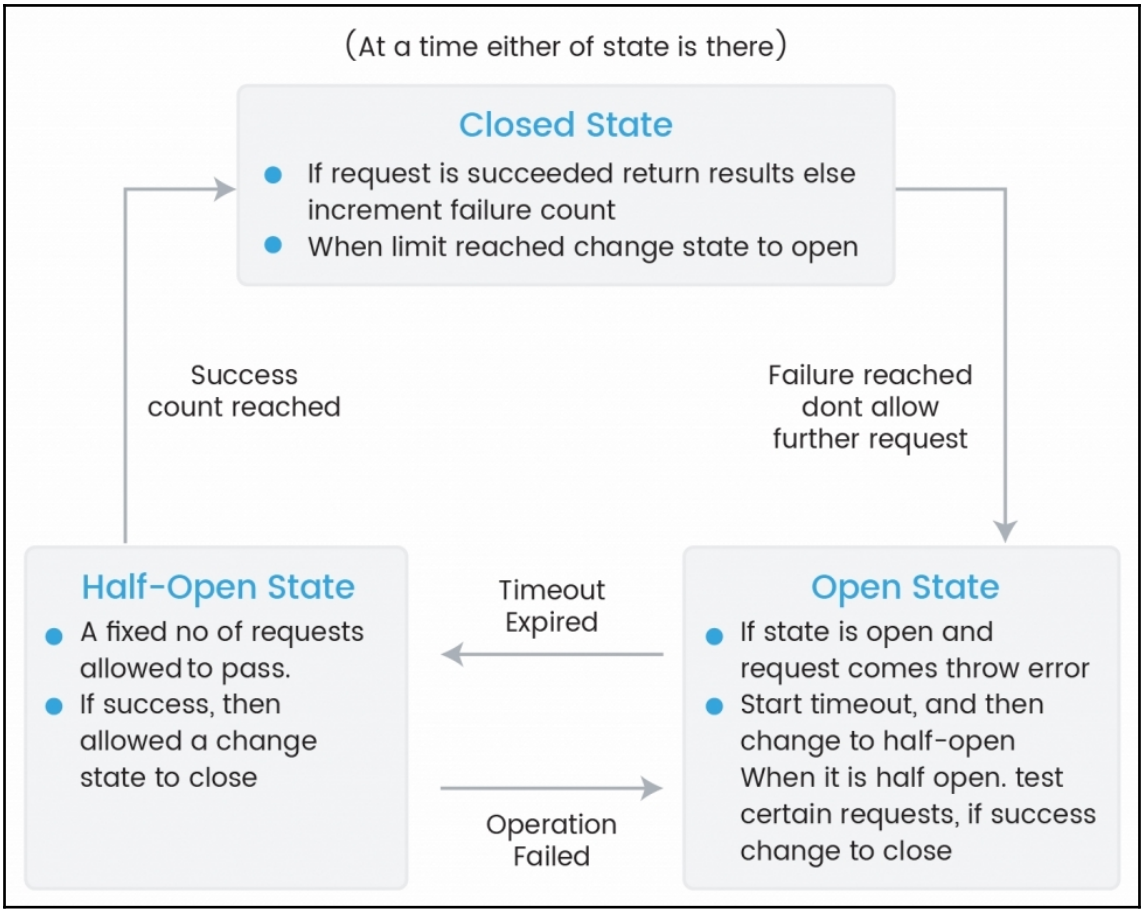
Chapter 1: Debunking Microservices

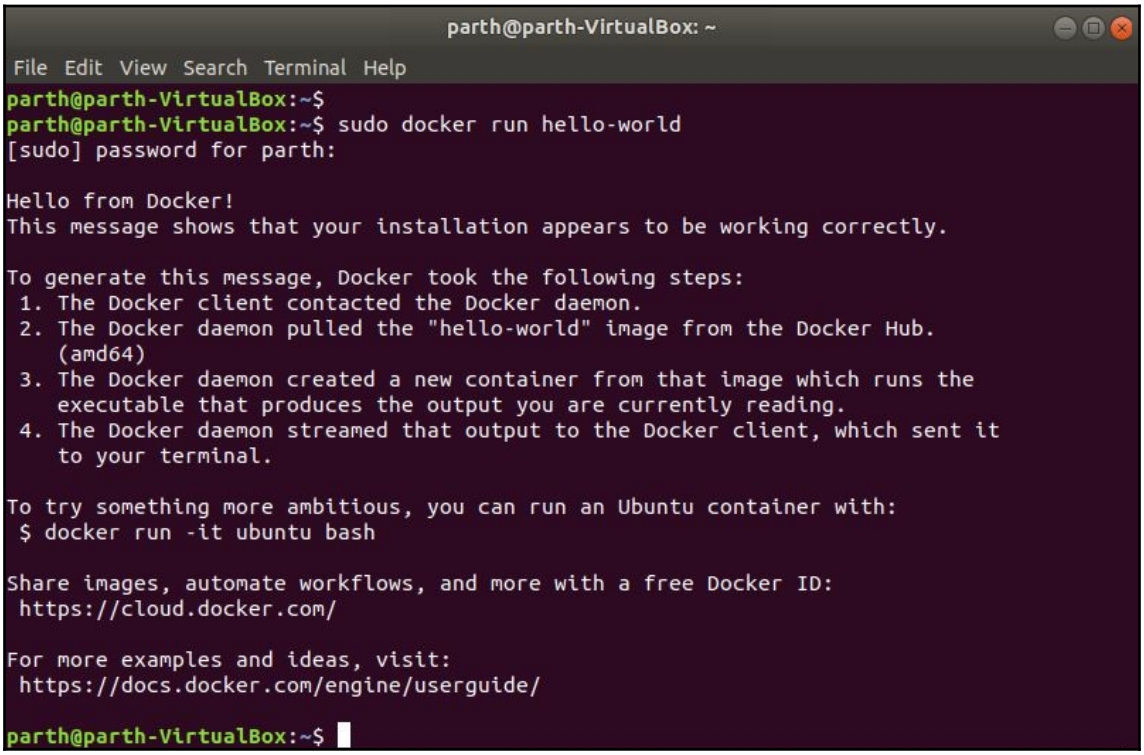


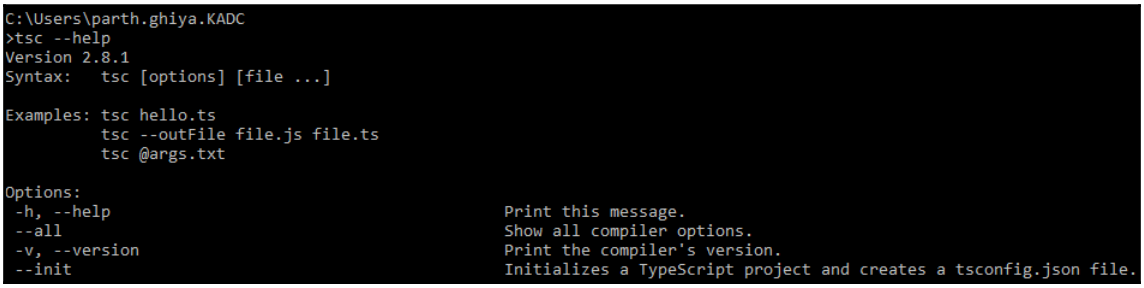


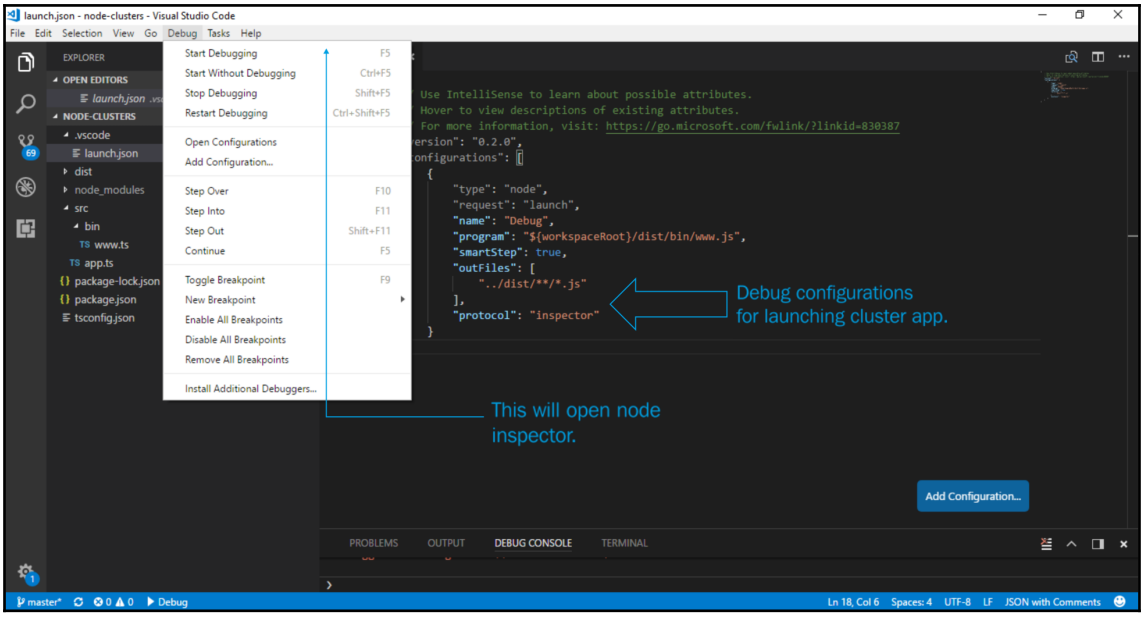

New Context
Business App
Covers for
Microservice
Datastore
Microservice
Datastore
Modern Application
Anti Corruption Layer
Co-ordinator
Corruption #1
Legacy Monolithic
Legacy Data Store
Legacy App
#2
Corruption System
Old Context

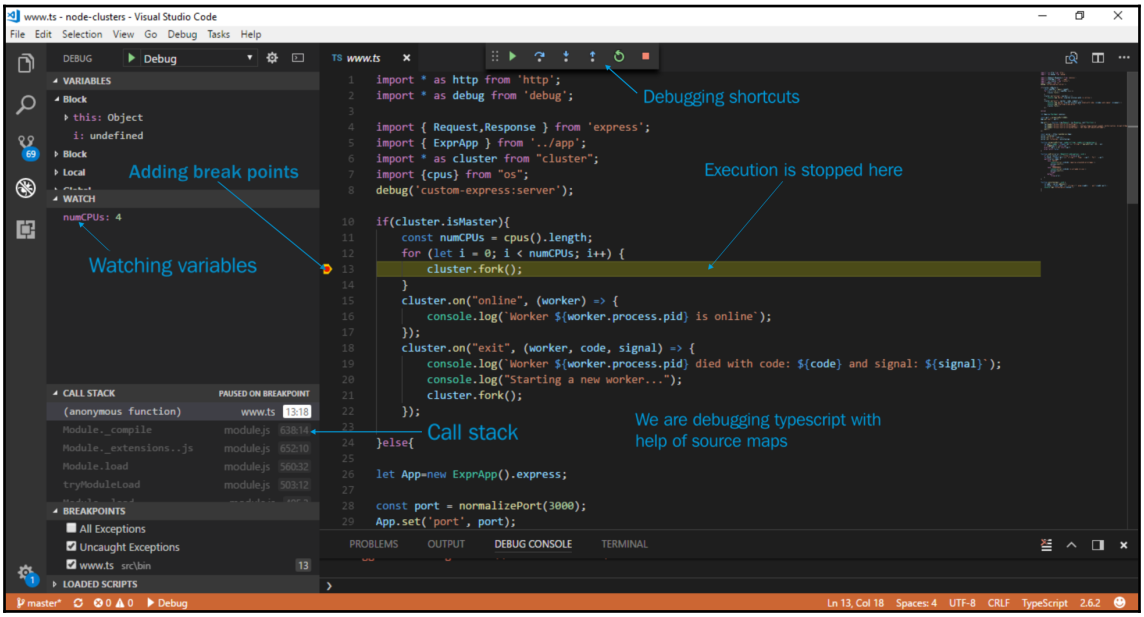

(At a time either of state is there)
Closed State
If request is succeeded return results else increment failure count
When limit reached change state to open
Success count reached
Failure reached dont allow further request
Half-Open State
A fixed no of requests allowed to pass.
If success, then allowed a change state to close
Timeout Expired
Operation Failed
Open State
If state is open and request comes throw error
Start timeout, and then change to half-open When it is half open. test certain requests, if success change to close

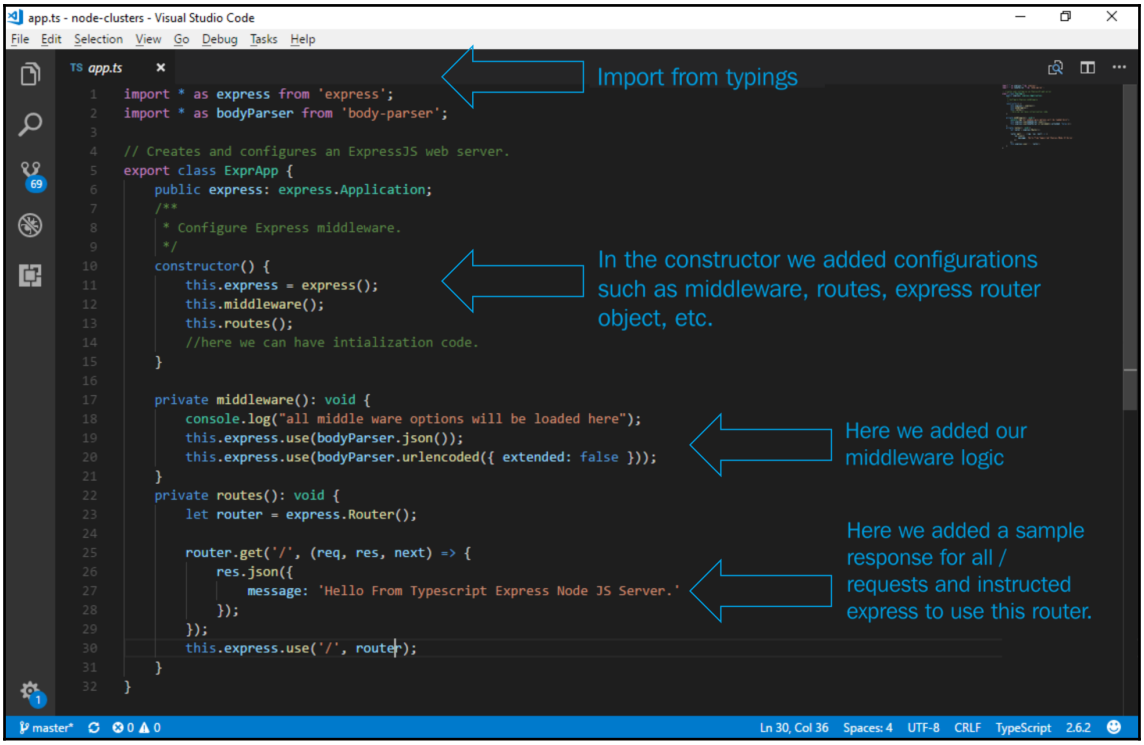
Chapter 2: Gearing up for the Journey





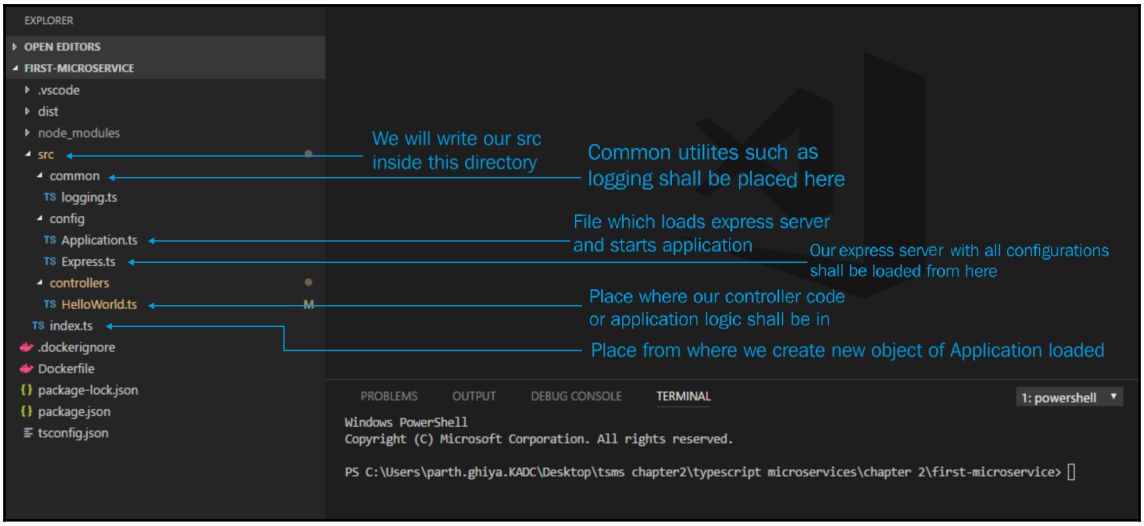

launch.json - node-clusters - Visual Studio Code
File Edit Selection View Go Debug Tasks Help
Start Debugging F5
Start Without Debugging Ctrl+F5
Stop Debugging Shift+F5
Restart Debugging Ctrl+Shift+F5
Open Configurations
Add Configuration...
Step Over F10
Step Into F11
Step Out Shift+F11
Continue F5
Toggle Breakpoint F9
New Breakpoint
Enable All Breakpoints
Disable All Breakpoints
Remove All Breakpoints
Install Additional Debuggers...
Use IntelliSense to learn about possible attributes.
Hover to view descriptions of existing attributes.
For more information, visit: https://go.microsoft.com/fwlink/?linkid=830387
"version": "0.2.0",
"configurations": [
"type": "node",
"request": "launch",
"name": "Debug",
"program": "${workspaceRoot}/dist/bin/www.js",
"smartStep": true,
"outFiles": [
"../dist/**/*.js"
],
"protocol": "inspector"
Debug configurations for launching cluster app.
This will open node inspector.
Add Configuration...
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
master* Debug
Ln 18, Col 6 Spaces: 4 UTF-8 LF JSON with Comments


www.ts - node-clusters - Visual Studio Code
File Edit Selection View Go Debug Tasks Help
Debugging shortcuts
Adding break points
Execution is stopped here
Watching variables
Call stack
We are debugging typescript with help of source maps
import * as http from 'http';
import * as debug from 'debug';
import { Request,Response } from 'express';
import { ExprApp } from '../app';
import * as cluster from "cluster";
import {cpus} from "os";
debug('custom-express:server');
if(cluster.isMaster){
const numCPUs = cpus().length;
for (let i = 0; i < numCPUs; i++) {
cluster.fork();
}
cluster.on("online", (worker) => {
console.log(`Worker ${worker.process.pid} is online`);
});
cluster.on("exit", (worker, code, signal) => {
console.log(`Worker ${worker.process.pid} died with code: ${code} and signal: ${signal}`);
console.log("Starting a new worker...");
cluster.fork();
});
}else{
let App=new ExprApp().express;
const port = normalizePort(3000);
App.set('port', port);
numCPUs: 4
(anonymous function) www.ts 13:18
Module._compile module.js 638:14
Module._extensions..js module.js 652:10
Module.load module.js 560:32
tryModuleLoad module.js 503:12
All Exceptions
Uncaught Exceptions
www.ts src\bin 13
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
master* Debug
Ln 13, Col 18 Spaces: 4 UTF-8 CRLF TypeScript 2.6.2




```
import * as express from 'express';
import * as bodyParser from 'body-parser';

// Creates and configures an ExpressJS web server.
export class ExprApp {
    public express: express.Application;
    /**
     * Configure Express middleware.
     */
    constructor() {
        this.express = express();
        this.middleware();
        this.routes();
        //here we can have intialization code.
    }

    private middleware(): void {
        console.log("all middle ware options will be loaded here");
        this.express.use(bodyParser.json());
        this.express.use(bodyParser.urlencoded({ extended: false }));
    }
    private routes(): void {
        let router = express.Router();

        router.get('/', (req, res, next) => {
            res.json({
                message: 'Hello From Typescript Express Node JS Server.'
            });
        });
        this.express.use('/', router);
    }
}
```

```
PS C:\Users\parth.ghiya.KADC\Desktop\tsms chapter2\handing-asynchronous-nature> node .\dist\retry_failed_req.js
Waiting 1 ms
Retrying connect ECONNREFUSED 127.0.0.1:8081 0
Waiting 2 ms
Retrying connect ECONNREFUSED 127.0.0.1:8081 1
Waiting 4 ms
Retrying connect ECONNREFUSED 127.0.0.1:8081 2
Waiting 8 ms
Retrying connect ECONNREFUSED 127.0.0.1:8081 3
Waiting 16 ms
Retrying connect ECONNREFUSED 127.0.0.1:8081 4
Waiting 32 ms
Retrying connect ECONNREFUSED 127.0.0.1:8081 5
Waiting 64 ms
Retrying connect ECONNREFUSED 127.0.0.1:8081 6
```

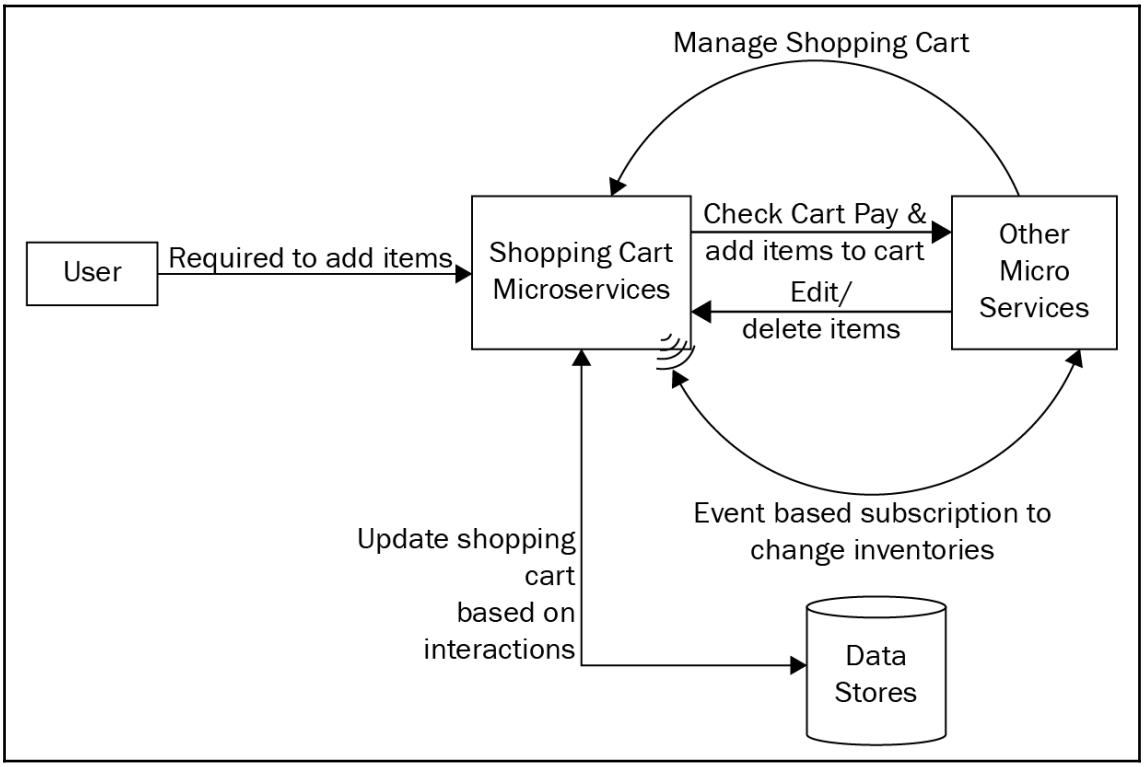


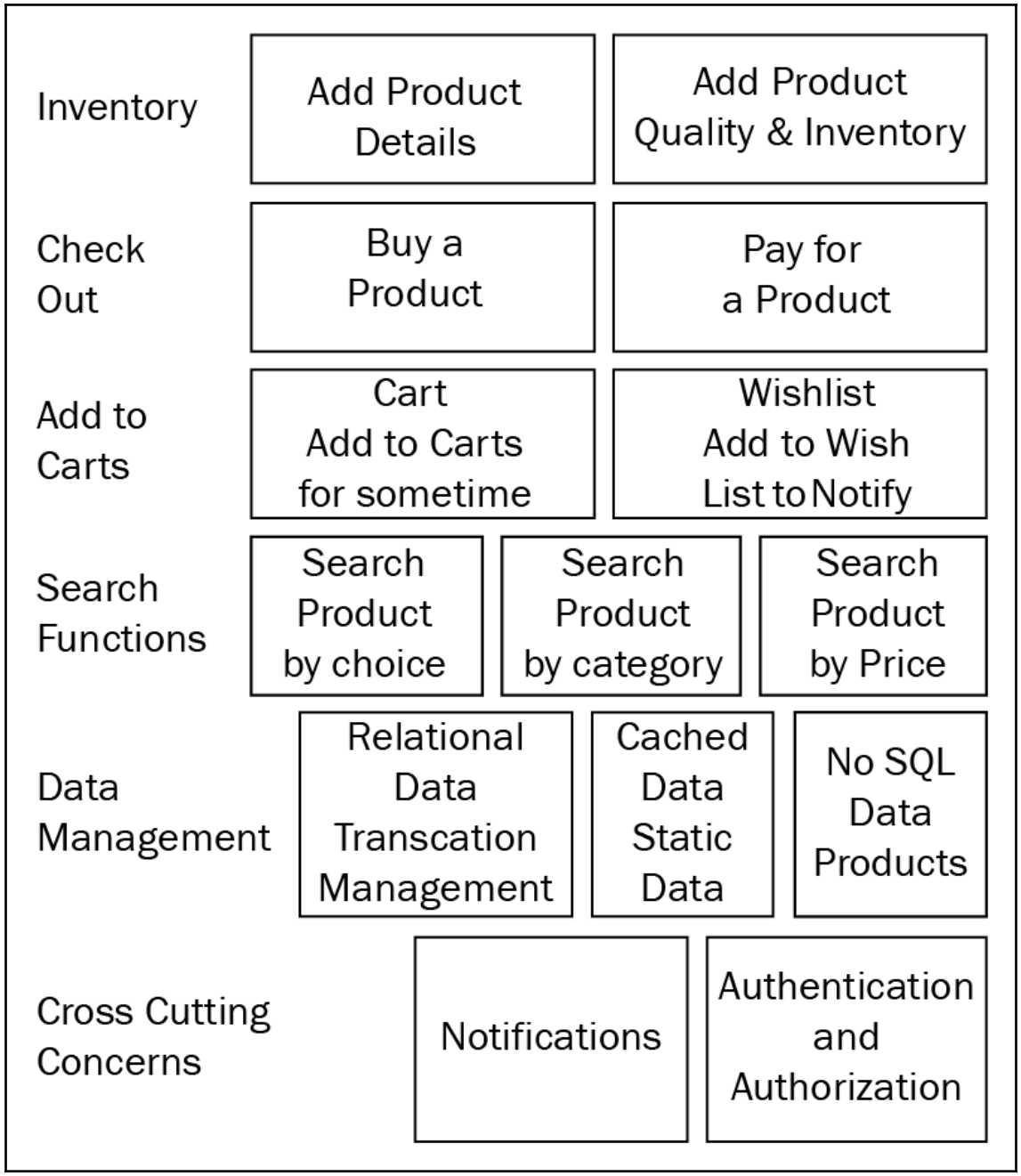

```
parth@parth-VirtualBox:~/Desktop/typescript-microservices/chapter 2/first-microservice$ sudo docker build -t firstypescriptms .
Sending build context to Docker daemon  58.88kB
Step 1/7 : FROM node:9.2.0
9.2.0: Pulling from library/node
85b1f47fba49: Pull complete
ba6bd283713a: Pull complete
817c8cd48a09: Pull complete
47cc0ed96dc3: Pull complete
8888adcbd08b: Pull complete
6f2de60646b9: Pull complete
9dd205971dc0: Pull complete
5859715a4691: Pull complete
Digest: sha256:7c9099e0f68242387d7755eaa54c287e16cedd3cca423444ca773794f5f1e423
Status: Downloaded newer image for node:9.2.0
 ---> c1d02ac1d9b4
Step 2/7 : RUN mkdir -p /usr/src/app
 ---> Running in 8f83b0563ceb
 ---> fa3bffe08b51
Removing intermediate container 8f83b0563ceb
Step 3/7 : WORKDIR /usr/src/app
 ---> d17282a4ca91
Removing intermediate container f0bf27df96ad
Step 4/7 : COPY package.json /usr/src/app
 ---> ff984e30dbaf
Step 5/7 : RUN npm install
 ---> Running in 284c3be59ee7
npm notice created a lockfile as package-lock.json. You should commit this file.
added 96 packages in 58.729s
npm WARN clusters@1.0.0 No repository field.

 ---> 065af12205c4
Removing intermediate container 284c3be59ee7
Step 6/7 : COPY . /usr/src/app
 ---> 2caaf9e51845
Step 7/7 : CMD npm start
 ---> Running in 5231188dff05
 ---> 2d08409ff56c
Removing intermediate container 5231188dff05
Successfully built 2d08409ff56c
Successfully tagged firstypescriptms:latest
parth@parth-VirtualBox:~/Desktop/typescript-microservices/chapter 2/first-microservice$
```

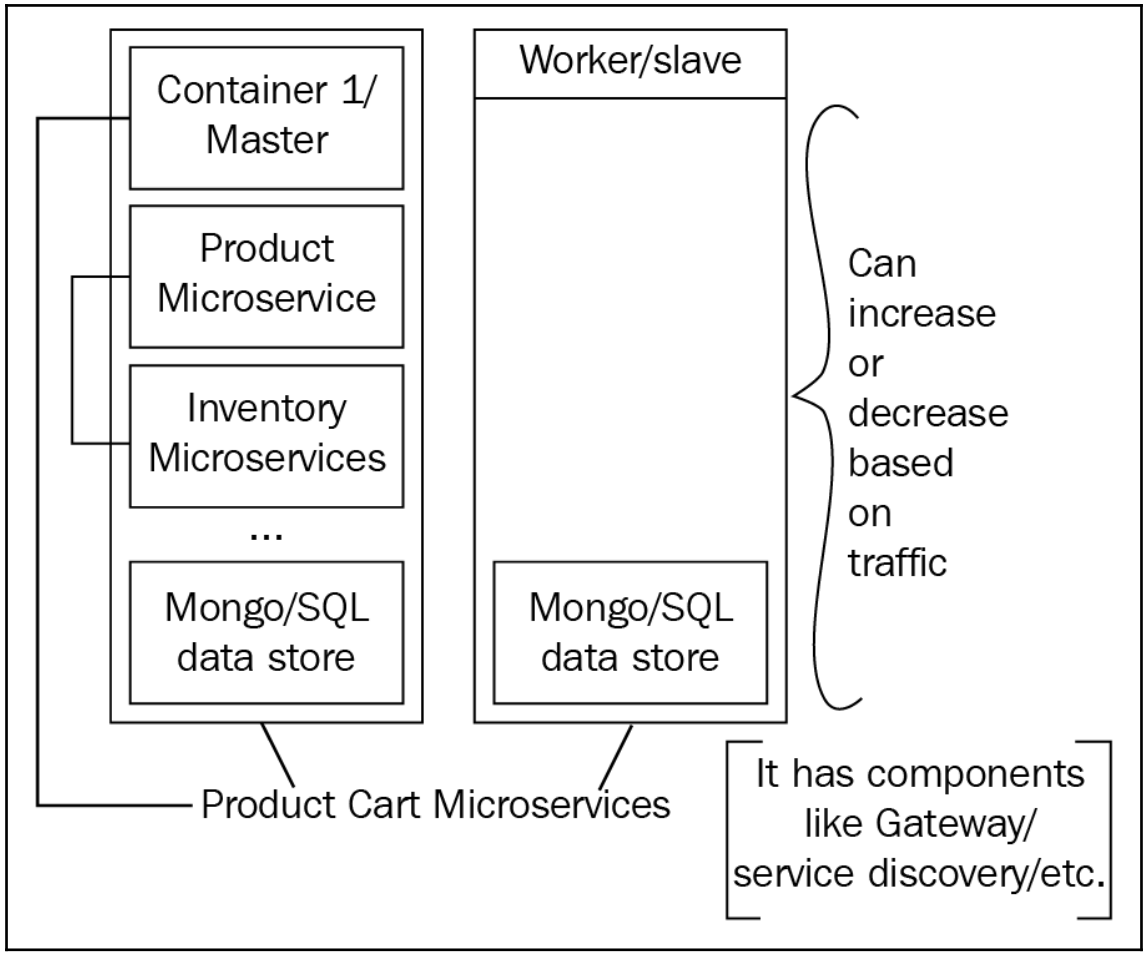
Chapter 3: Exploring Reactive Programming

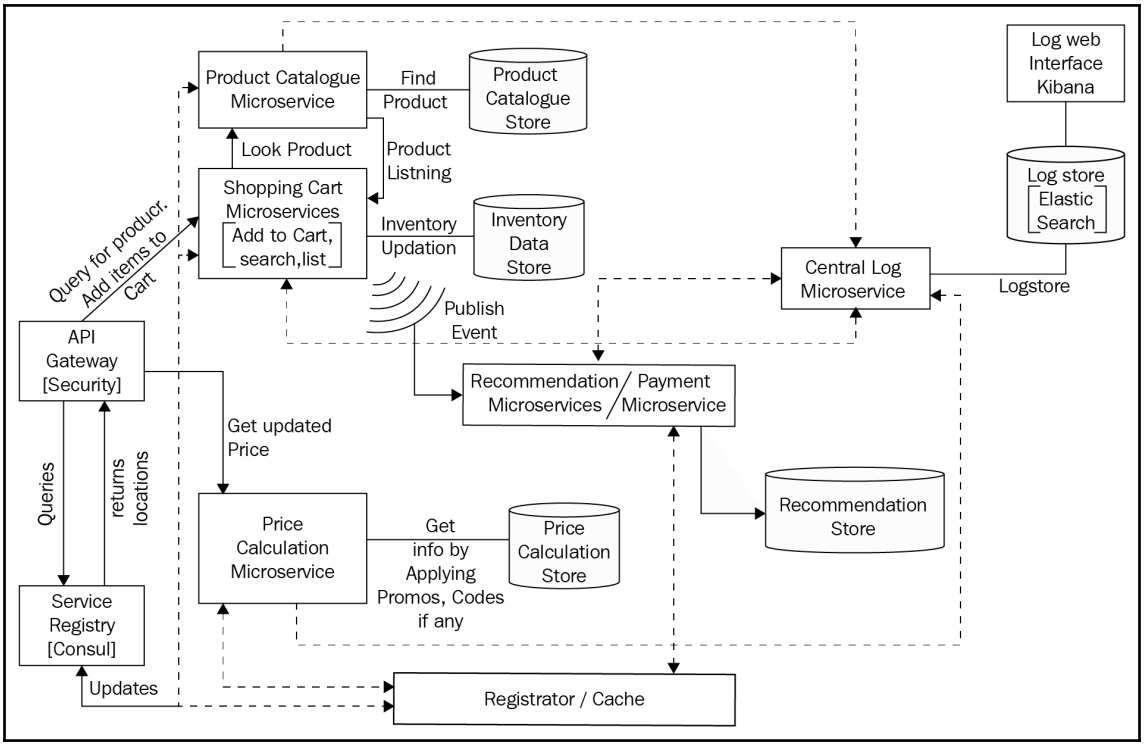
No images

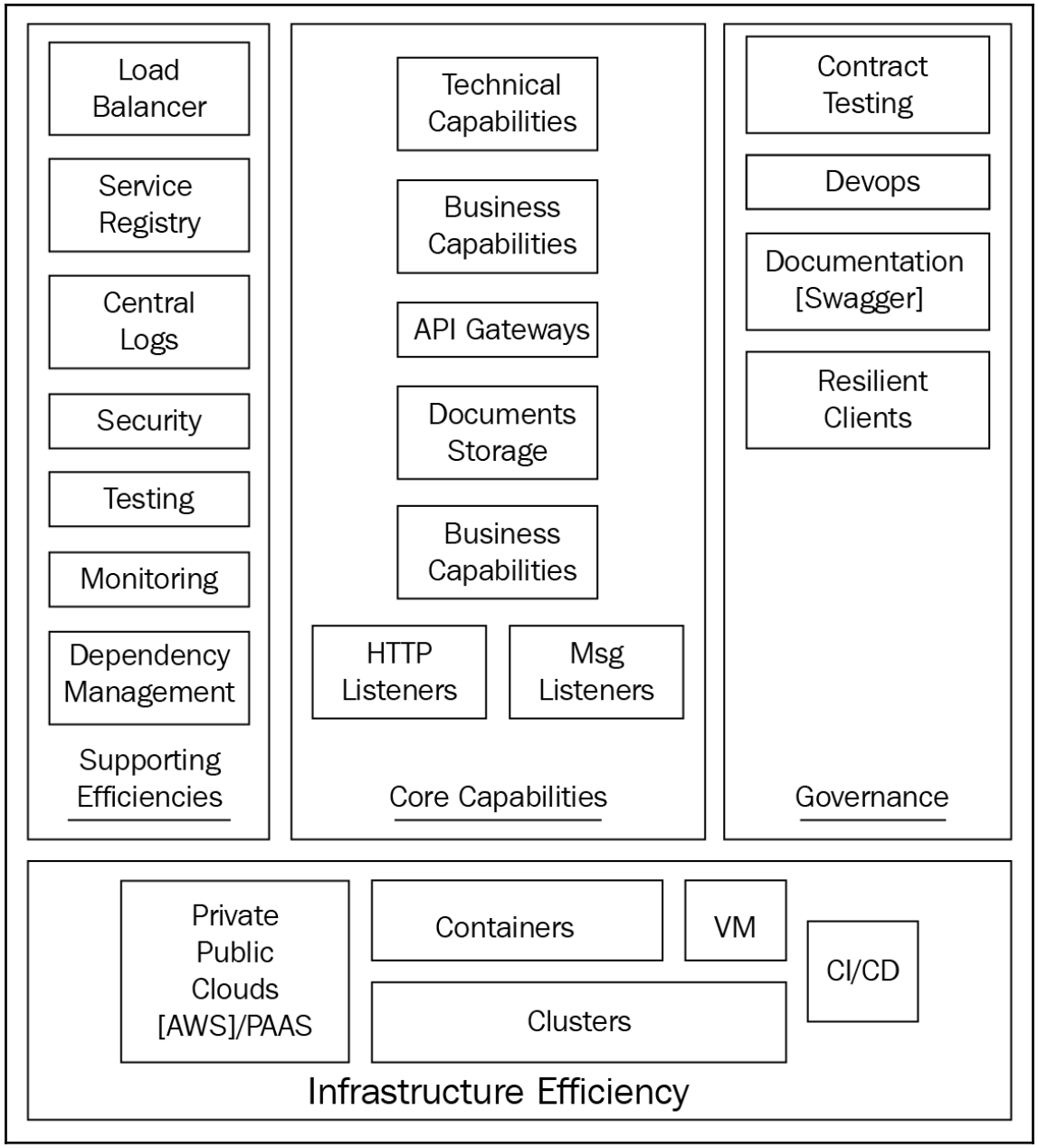
Chapter 4: Beginning Your Microservice Journey

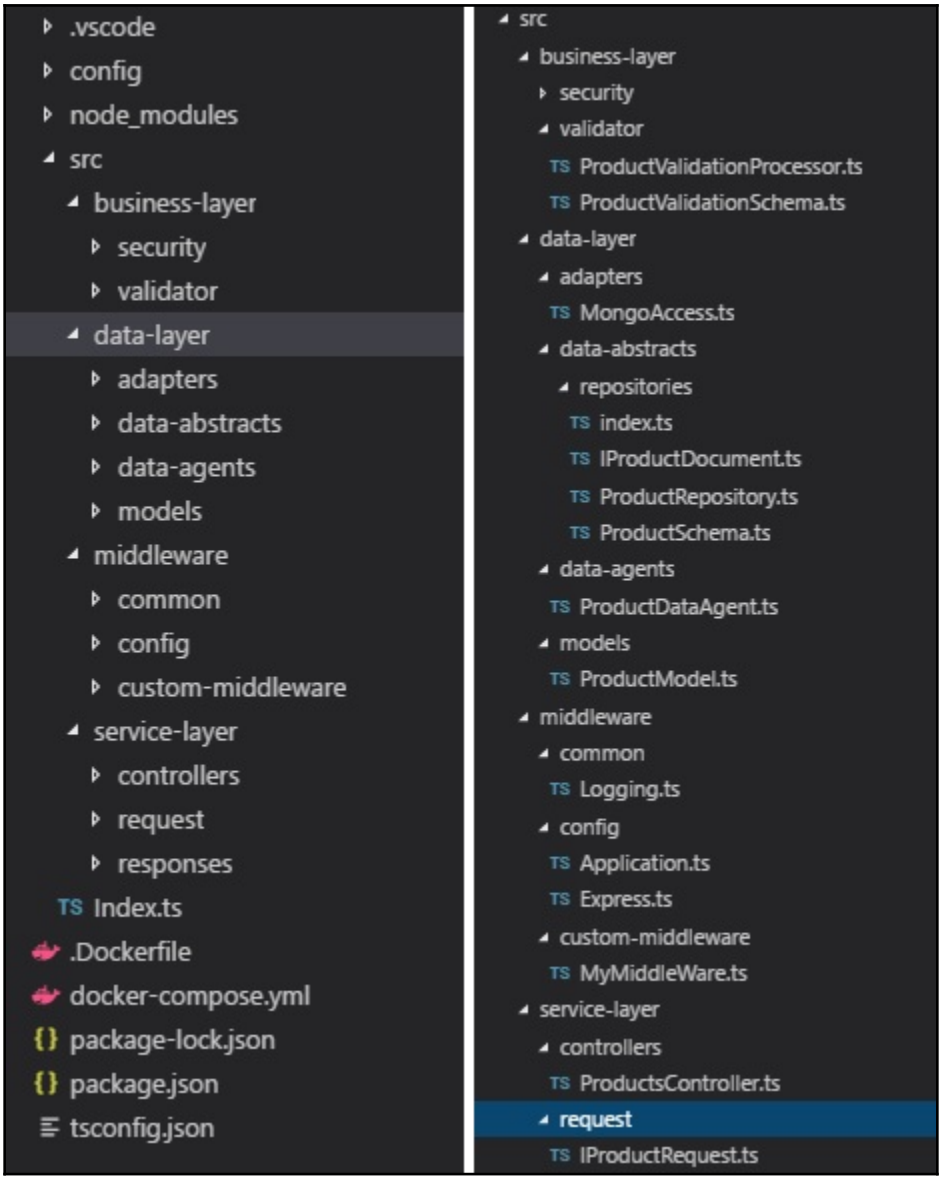


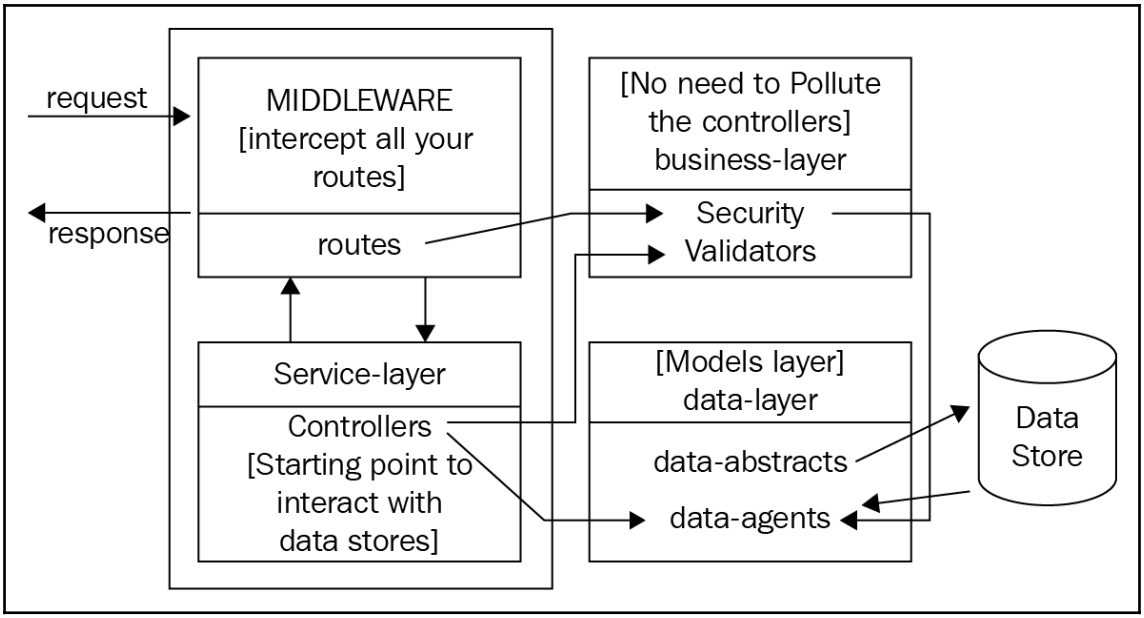

Inventory
Add Product Details
Add Product Quality & Inventory
Check Out
Buy a Product
Pay for a Product
Add to Carts
Cart Add to Carts for sometime
Wishlist Add to Wish List to Notify
Search Functions
Search Product by choice
Search Product by category
Search Product by Price
Data Management
Relational Data Transcation Management
Cached Data Static Data
No SQL Data Products
Cross Cutting Concerns
Notifications
Authentication and Authorization


Container 1/
Master
Product
Microservice
Inventory
Microservices
...
Mongo/SQL
data store
Worker/slave
Mongo/SQL
data store
Can
increase
or
decrease
based
on
traffic
Product Cart Microservices
It has components
like Gateway/
service discovery/etc.

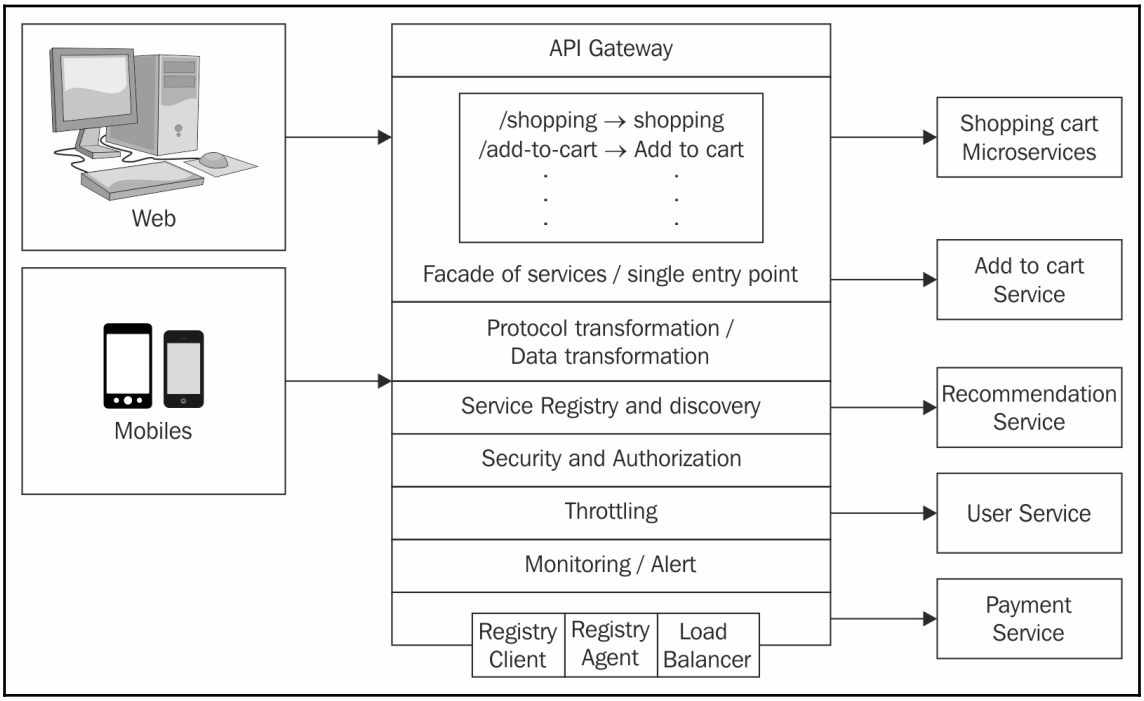

Product Catalogue Microservice
Find Product
Product Catalogue Store
Look Product
Product Listning
Shopping Cart Microservices
Add to Cart, search,list
Inventory Updation
Inventory Data Store
Query for product. Add items to Cart
Publish Event
API Gateway [Security]
Recommendation / Payment Microservices
Get updated Price
Queries
returns locations
Price Calculation Microservice
Get info by Applying Promos, Codes if any
Price Calculation Store
Recommendation Store
Service Registry [Consul]
Updates
Registrator / Cache
Central Log Microservice
Logstore
Log web Interface Kibana
Log store
Elastic Search

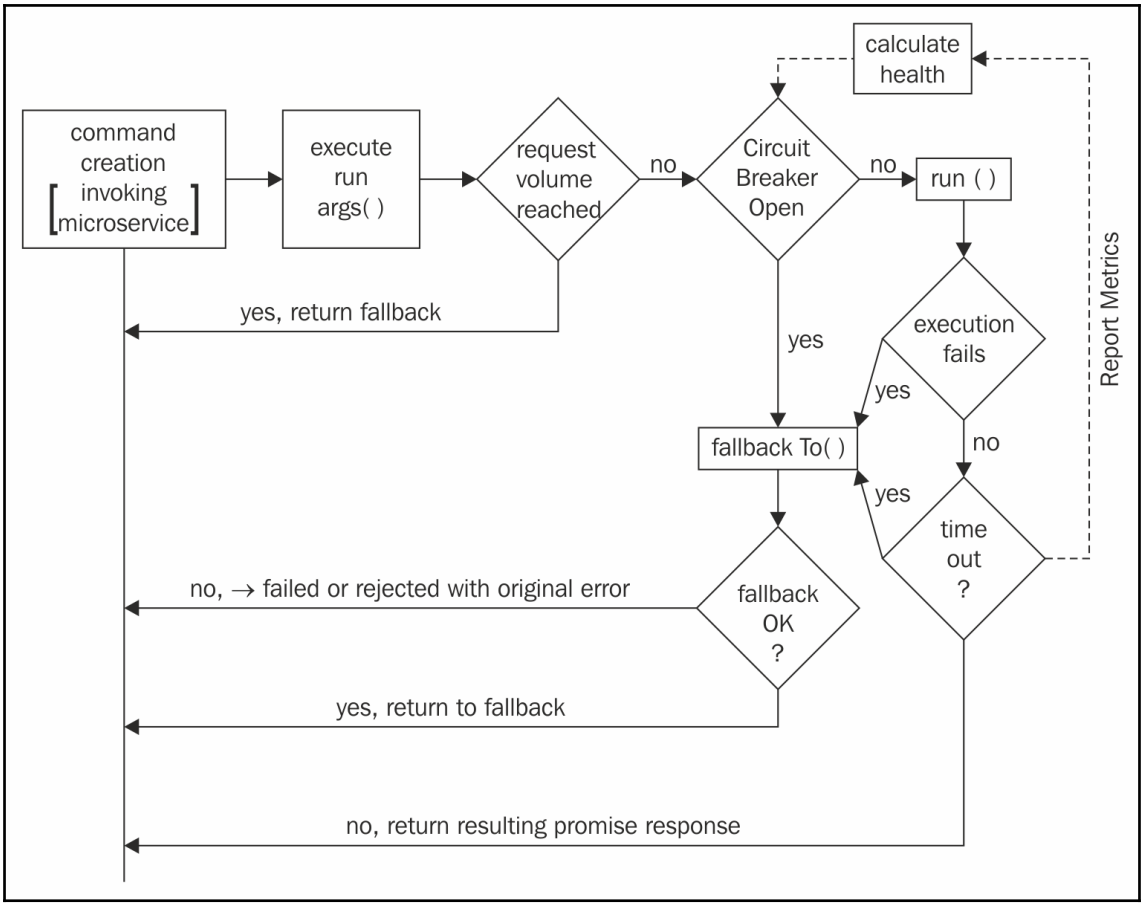

Load Balancer
Service Registry
Central Logs
Security
Testing
Monitoring
Dependency Management
Supporting Efficiencies
Technical Capabilities
Business Capabilities
API Gateways
Documents Storage
Business Capabilities
HTTP Listeners
Msg Listeners
Core Capabilities
Contract Testing
Devops
Documentation [Swagger]
Resilient Clients
Governance
Private Public Clouds [AWS]/PAAS
Containers
VM
CI/CD
Clusters
Infrastructure Efficiency


.vscode
config
node_modules
src
business-layer
security
validator
data-layer
adapters
data-abstracts
data-agents
models
middleware
common
config
custom-middleware
service-layer
controllers
request
responses
Index.ts
.Dockerfile
docker-compose.yml
package-lock.json
package.json
tsconfig.json
src
business-layer
security
validator
ProductValidationProcessor.ts
ProductValidationSchema.ts
data-layer
adapters
MongoAccess.ts
data-abstracts
repositories
index.ts
IProductDocument.ts
ProductRepository.ts
ProductSchema.ts
data-agents
ProductDataAgent.ts
models
ProductModel.ts
middleware
common
Logging.ts
config
Application.ts
Express.ts
custom-middleware
MyMiddleWare.ts
service-layer
controllers
ProductsController.ts
request
IProductRequest.ts

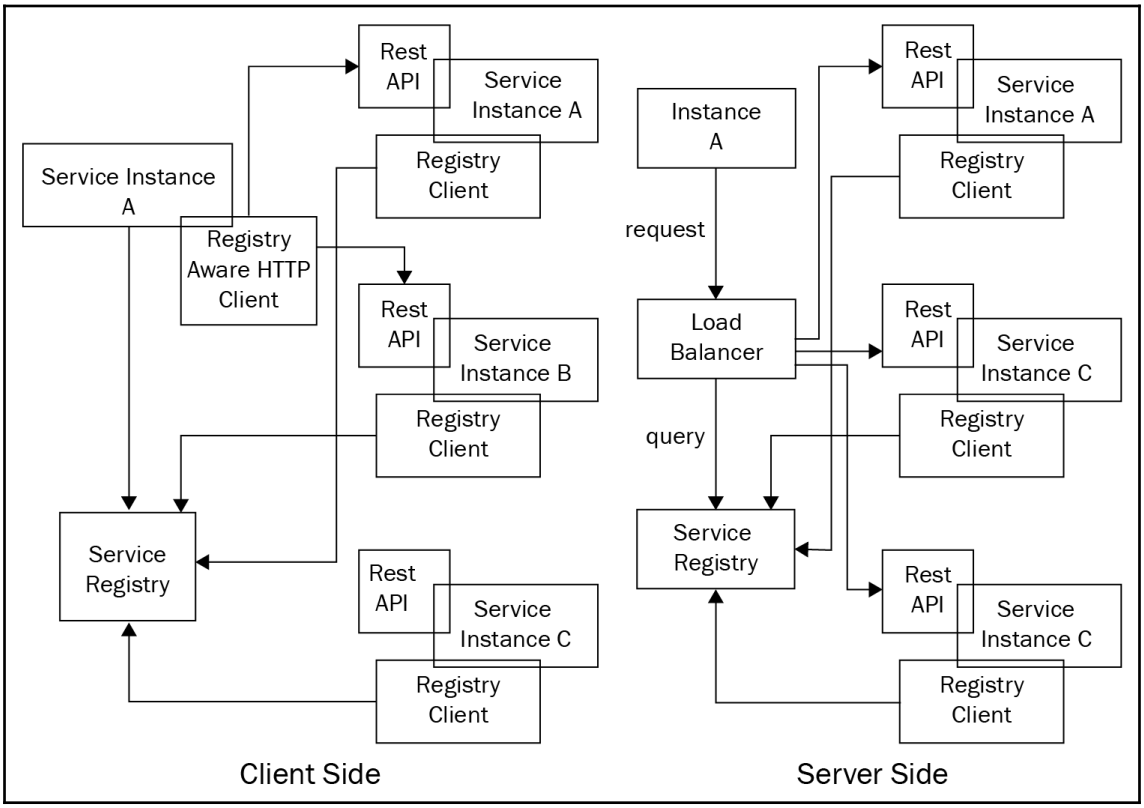

request
response
MIDDLEWARE
[intercept all your
routes]
routes
[No need to Pollute
the controllers]
business-layer
Security
Validators
Service-layer
Controllers
[Starting point to
interact with
data stores]
[Models layer]
data-layer
data-abstracts
data-agents
Data
Store

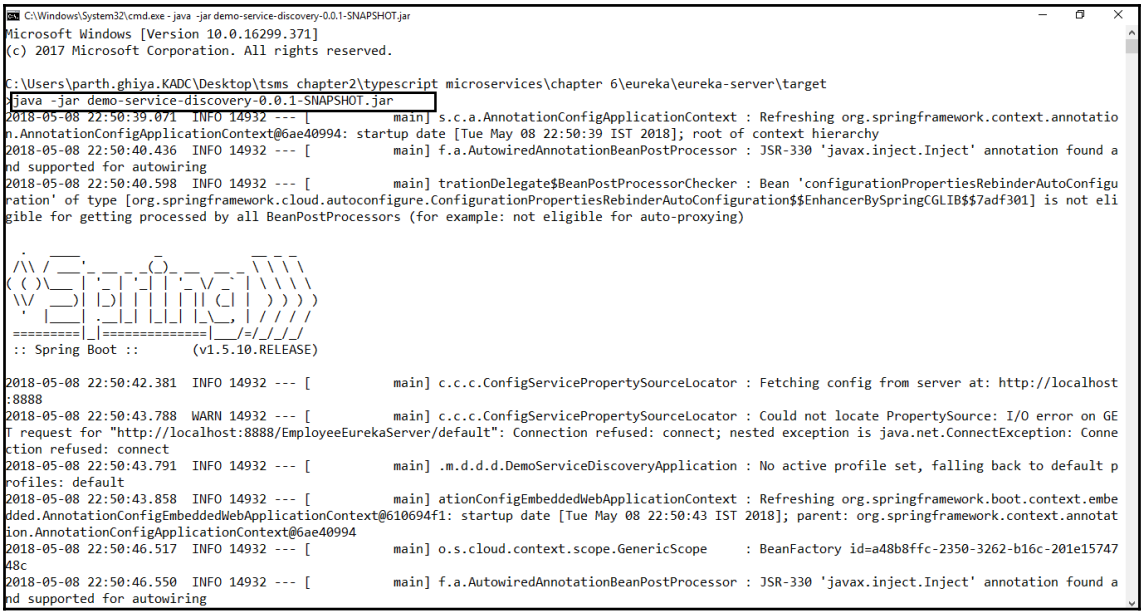
Chapter 5: Understanding API Gateway

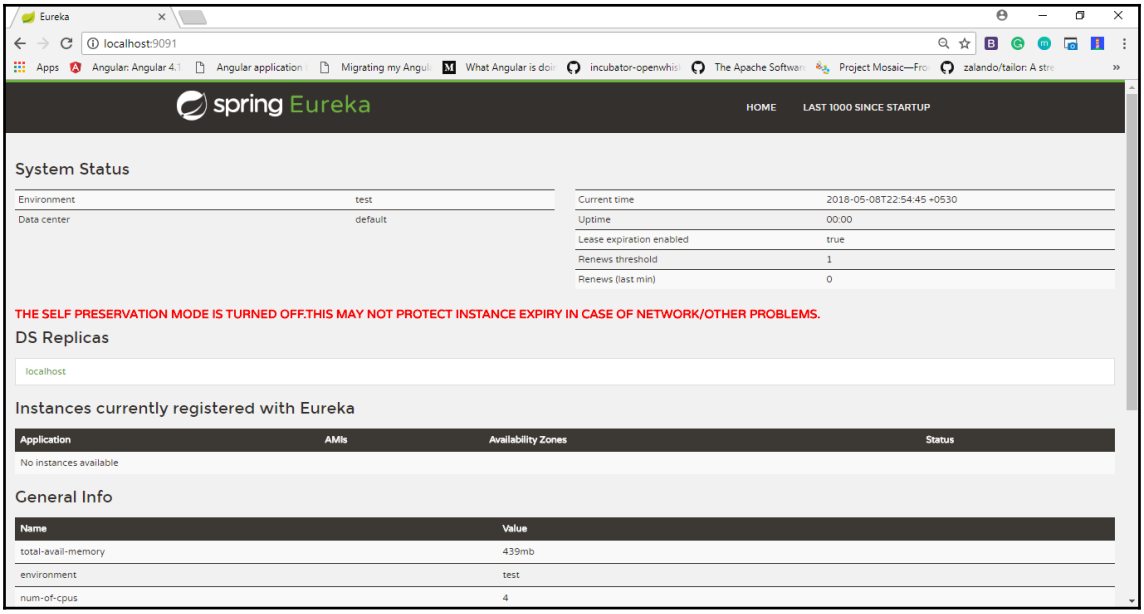


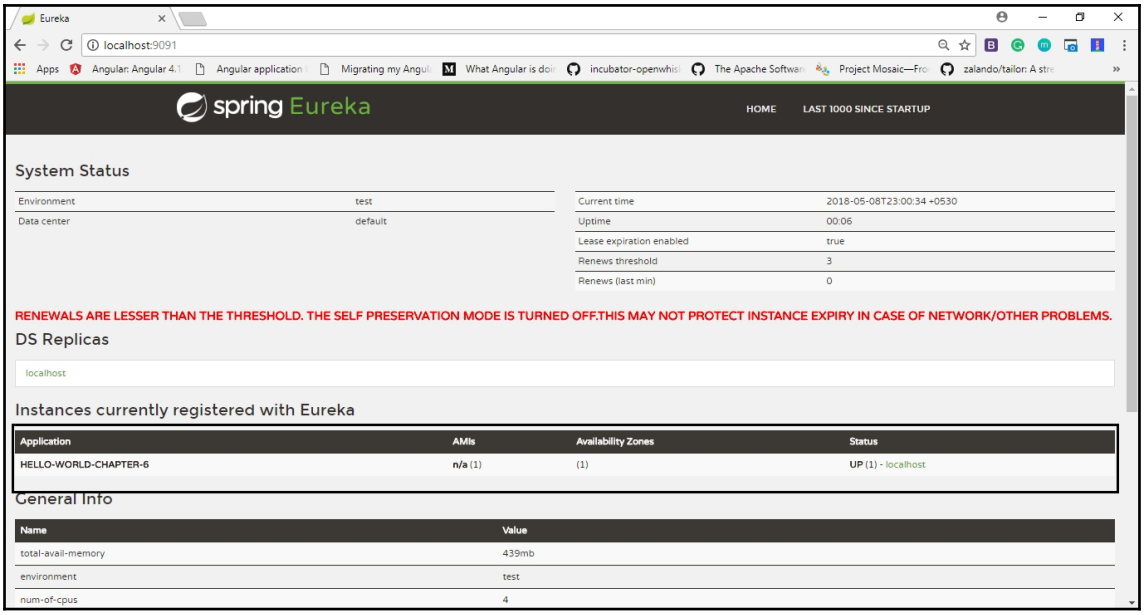

calculate health
command creation invoking microservice
execute run args( )
request volume reached
no
Circuit Breaker Open
no
run ( )
Report Metrics
yes, return fallback
yes
execution fails
yes
no
fallback To( )
yes
time out ?
fallback OK ?
no, → failed or rejected with original error
yes, return to fallback
no, return resulting promise response

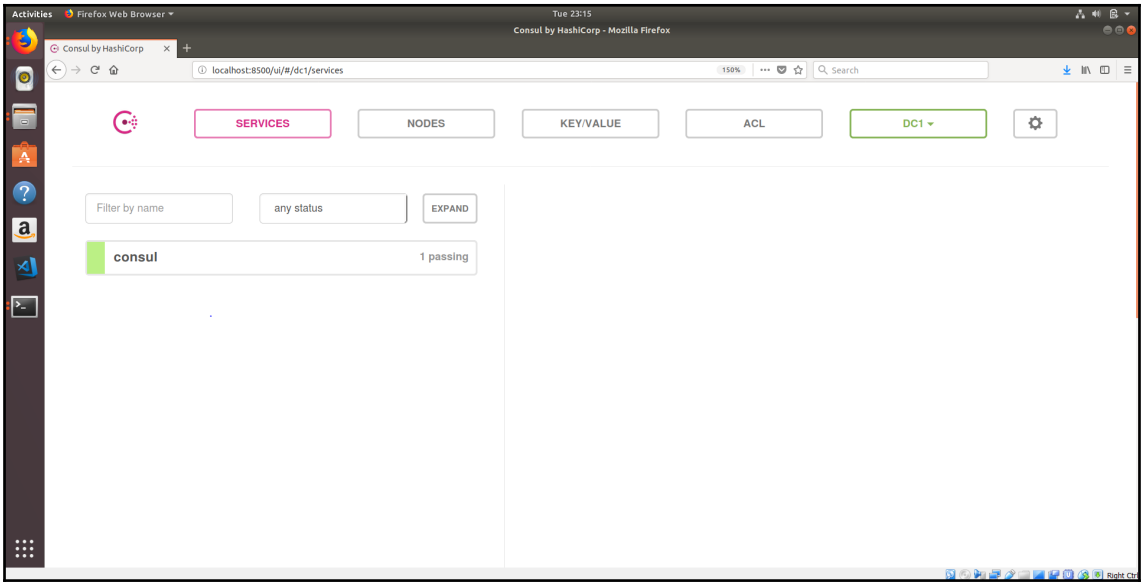
Chapter 6: Service Registry and Discovery

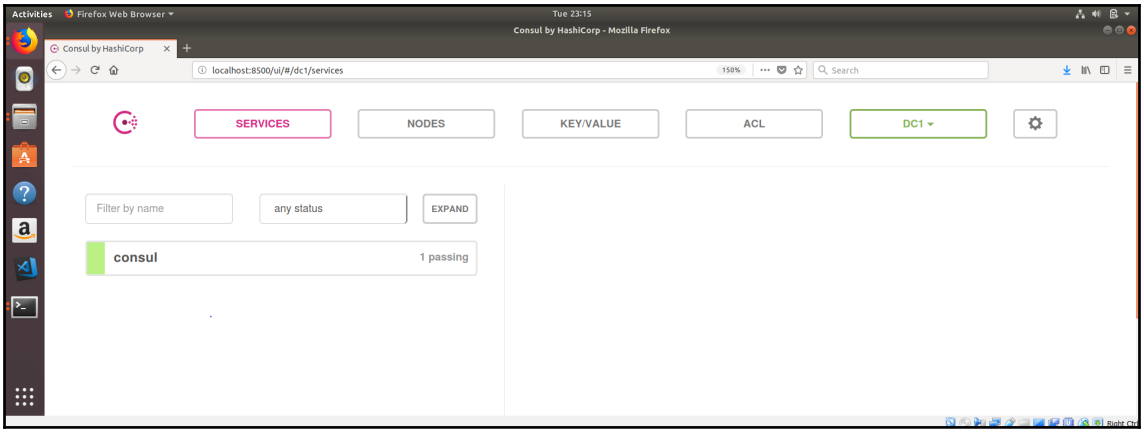



C:\Windows\System32\cmd.exe - java -jar demo-service-discovery-0.0.1-SNAPSHOT.jar
Microsoft Windows [Version 10.0.16299.371]
(c) 2017 Microsoft Corporation. All rights reserved.
C:\Users\parth.ghiya.KADC\Desktop\tsms chapter2\typescript microservices\chapter 6\eureka\eureka-server\target
>java -jar demo-service-discovery-0.0.1-SNAPSHOT.jar
2018-05-08 22:50:39.071 INFO 14932 --- [main] s.c.a.AnnotationConfigApplicationContext : Refreshing org.springframework.context.annotation.AnnotationConfigApplicationContext@6ae40994: startup date [Tue May 08 22:50:39 IST 2018]; root of context hierarchy
2018-05-08 22:50:40.436 INFO 14932 --- [main] f.a.AutowiredAnnotationBeanPostProcessor : JSR-330 'javax.inject.Inject' annotation found and supported for autowiring
2018-05-08 22:50:40.598 INFO 14932 --- [main] trationDelegate$BeanPostProcessorChecker : Bean 'configurationPropertiesRebinderAutoConfiguration' of type [org.springframework.cloud.autoconfigure.ConfigurationPropertiesRebinderAutoConfiguration$$EnhancerBySpringCGLIB$$7adf301] is not eligible for getting processed by all BeanPostProcessors (for example: not eligible for auto-proxying)
:: Spring Boot :: (v1.5.10.RELEASE)
2018-05-08 22:50:42.381 INFO 14932 --- [main] c.c.c.ConfigServicePropertySourceLocator : Fetching config from server at: http://localhost:8888
2018-05-08 22:50:43.788 WARN 14932 --- [main] c.c.c.ConfigServicePropertySourceLocator : Could not locate PropertySource: I/O error on GET request for "http://localhost:8888/EmployeeEurekaServer/default": Connection refused: connect; nested exception is java.net.ConnectException: Connection refused: connect
2018-05-08 22:50:43.791 INFO 14932 --- [main] .m.d.d.d.DemoServiceDiscoveryApplication : No active profile set, falling back to default profiles: default
2018-05-08 22:50:43.858 INFO 14932 --- [main] ationConfigEmbeddedWebApplicationContext : Refreshing org.springframework.boot.context.embedded.AnnotationConfigEmbeddedWebApplicationContext@610694f1: startup date [Tue May 08 22:50:43 IST 2018]; parent: org.springframework.context.annotation.AnnotationConfigApplicationContext@6ae40994
2018-05-08 22:50:46.517 INFO 14932 --- [main] o.s.cloud.context.scope.GenericScope : BeanFactory id=a48b8ffc-2350-3262-b16c-201e1574748c
2018-05-08 22:50:46.550 INFO 14932 --- [main] f.a.AutowiredAnnotationBeanPostProcessor : JSR-330 'javax.inject.Inject' annotation found and supported for autowiring

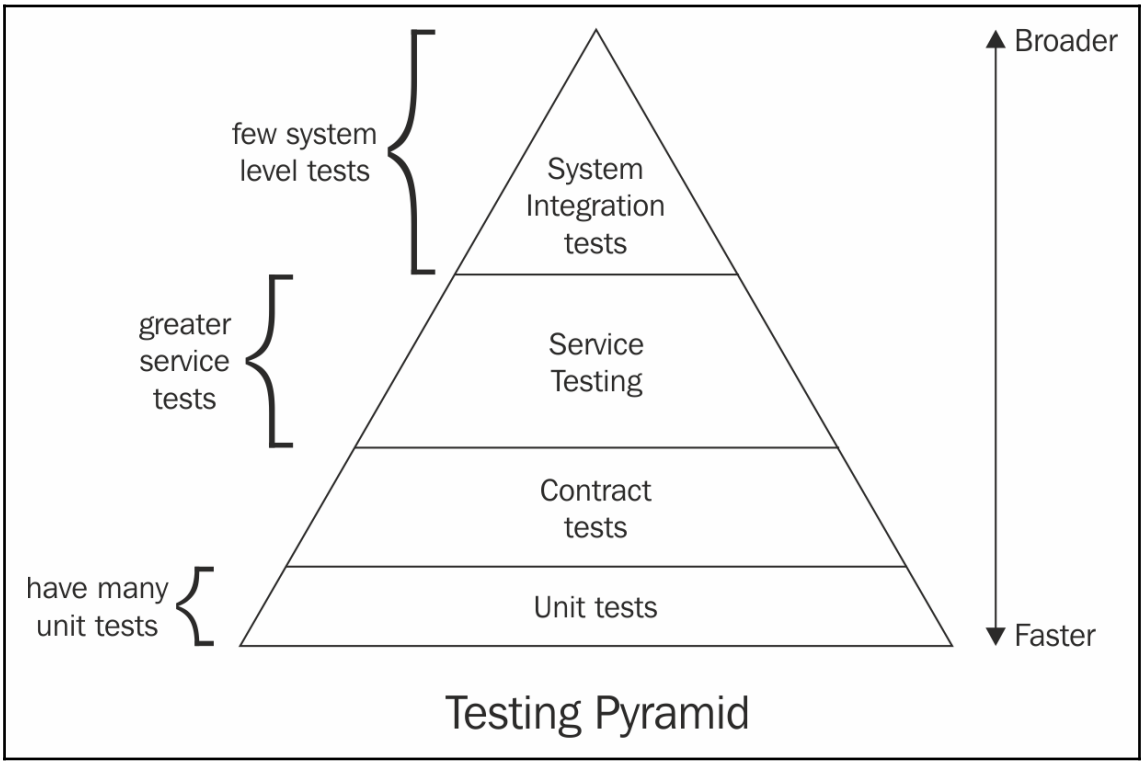

Eureka
localhost:9091
spring Eureka
HOME
LAST 1000 SINCE STARTUP
System Status
Environment test
Data center default
Current time 2018-05-08T22:54:45 +0530
Uptime 00:00
Lease expiration enabled true
Renews threshold 1
Renews (last min) 0
THE SELF PRESERVATION MODE IS TURNED OFF.THIS MAY NOT PROTECT INSTANCE EXPIRY IN CASE OF NETWORK/OTHER PROBLEMS.
DS Replicas
localhost
Instances currently registered with Eureka
Application AMIs Availability Zones Status
No instances available
General Info
Name Value
total-avail-memory 439mb
environment test
num-of-cpus 4

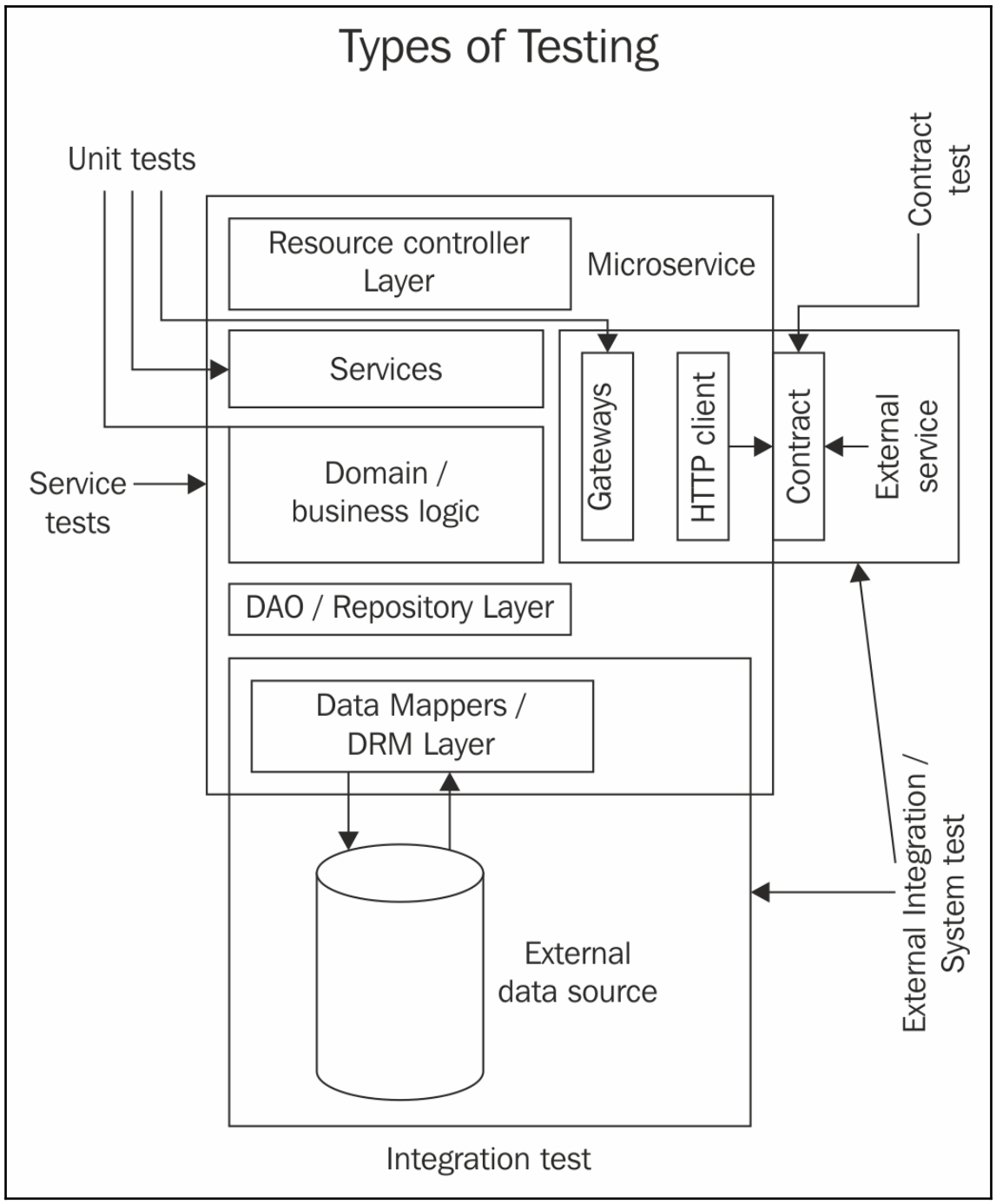

Eureka
localhost:9091
spring Eureka
HOME
LAST 1000 SINCE STARTUP
System Status
Environment test
Data center default
Current time 2018-05-08T23:00:34 +0530
Uptime 00:06
Lease expiration enabled true
Renews threshold 3
Renews (last min) 0
RENEWALS ARE LESSER THAN THE THRESHOLD. THE SELF PRESERVATION MODE IS TURNED OFF.THIS MAY NOT PROTECT INSTANCE EXPIRY IN CASE OF NETWORK/OTHER PROBLEMS.
DS Replicas
localhost
Instances currently registered with Eureka
Application AMIs Availability Zones Status
HELLO-WORLD-CHAPTER-6 n/a (1) (1) UP (1) - localhost
General Info
Name Value
total-avail-memory 439mb
environment test
num-of-cpus 4

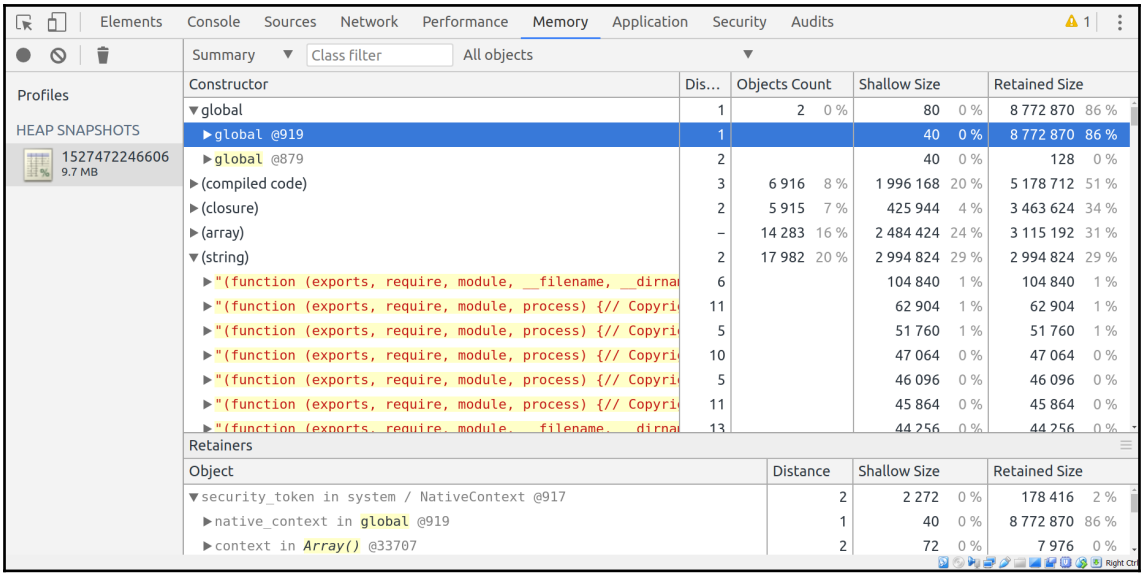

Activities
Firefox Web Browser
Tue 23:15
Consul by HashiCorp - Mozilla Firefox
Consul by HashiCorp
localhost:8500/ui/#/dc1/services
SERVICES
NODES
KEY/VALUE
ACL
DC1
Filter by name
any status
EXPAND
consul
1 passing

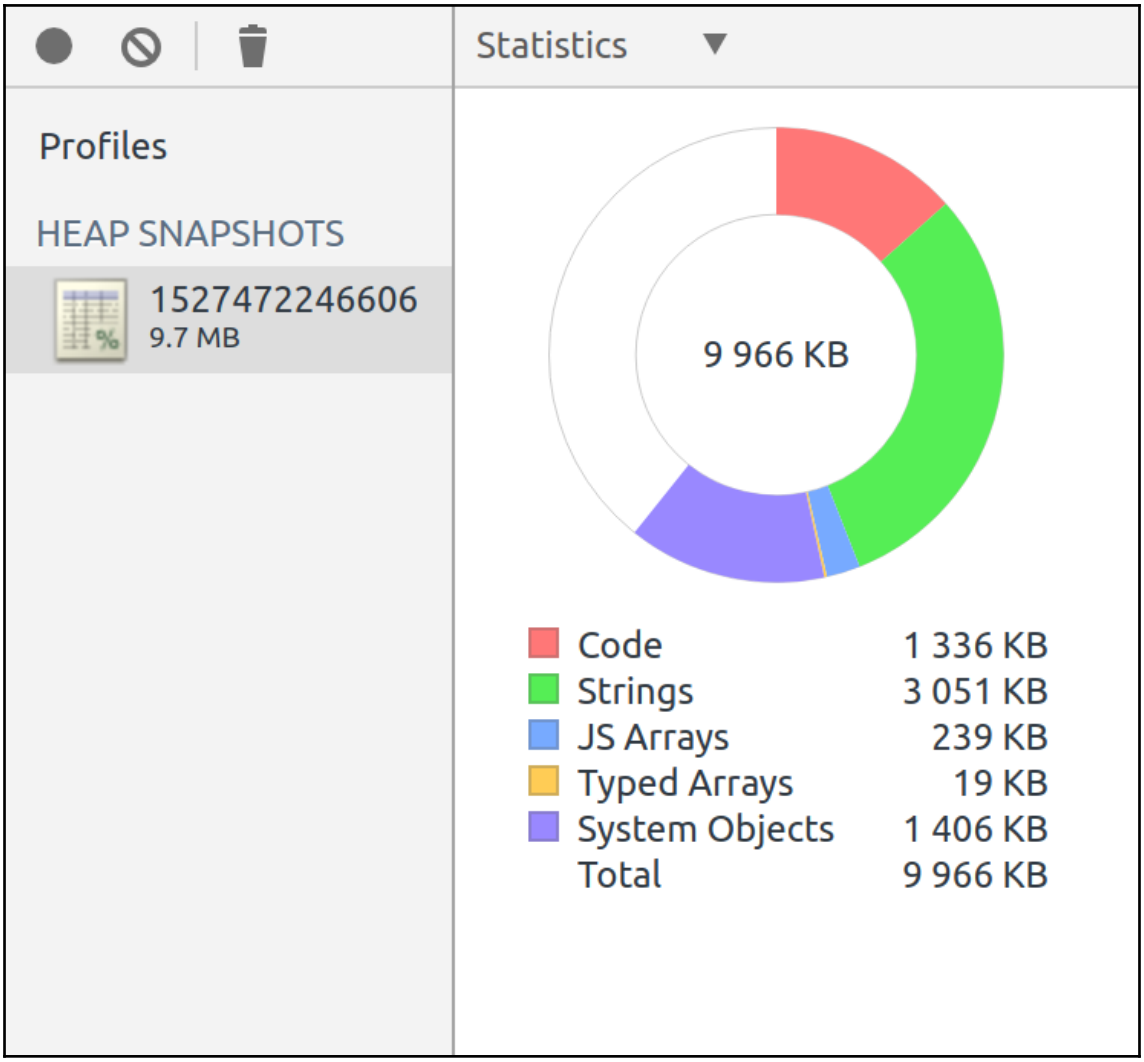

Activities
Firefox Web Browser
Tue 23:15
Consul by HashiCorp - Mozilla Firefox
Consul by HashiCorp
localhost:8500/ui/#/dc1/services
150%
Search
SERVICES
NODES
KEY/VALUE
ACL
DC1
Filter by name
any status
EXPAND
consul
1 passing

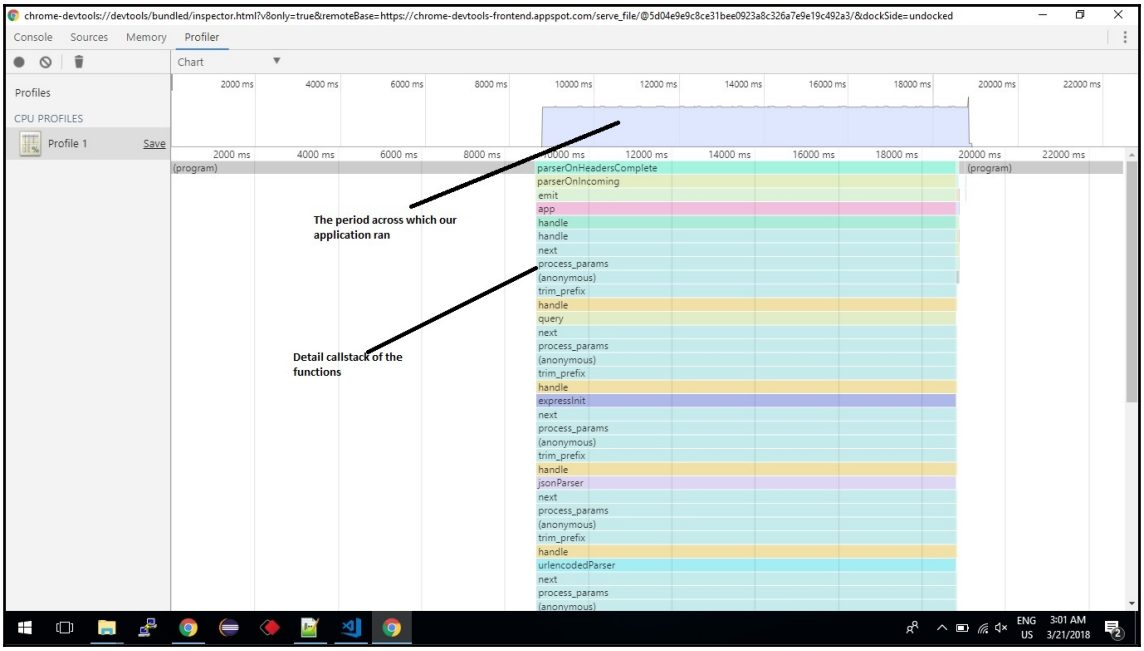
Chapter 7: Service State and Interservice Communication

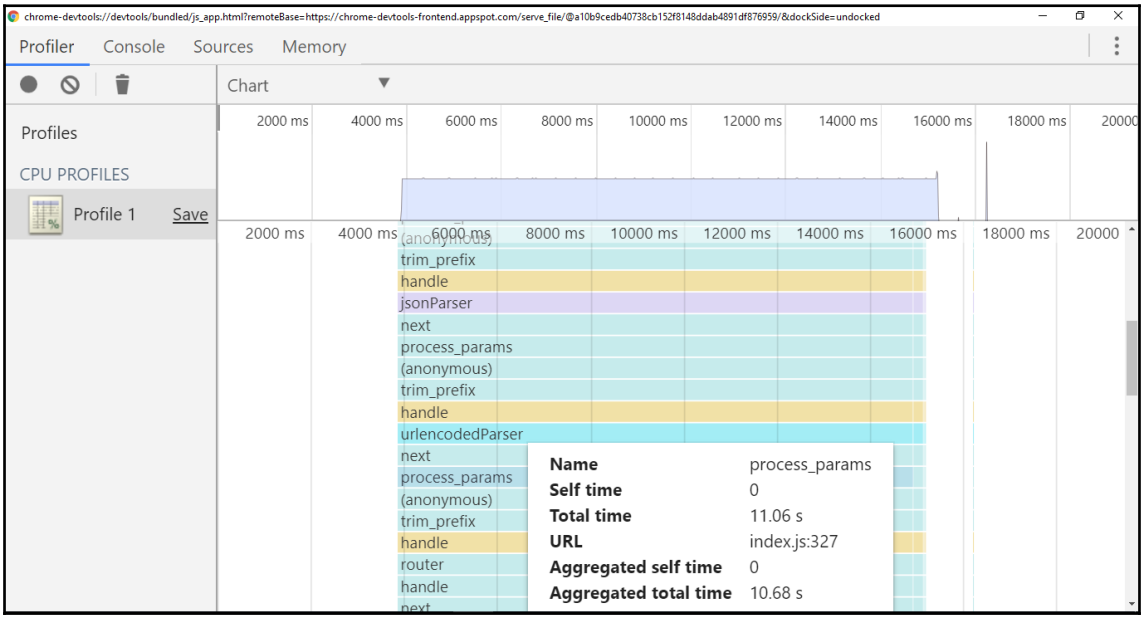



Types of Testing
Unit tests
Contract test
Resource controller Layer
Microservice
Services
Gateways
HTTP client
Contract
External service
Service tests
Domain / business logic
DAO / Repository Layer
Data Mappers / DRM Layer
External data source
External Integration / System test
Integration test


Elements
Console
Sources
Network
Performance
Memory
Application
Security
Audits
1
Summary
Class filter
All objects
Profiles
HEAP SNAPSHOTS
1527472246606
9.7 MB
Constructor
Dis…
Objects Count
Shallow Size
Retained Size
global 1 2 0 % 80 0 % 8 772 870 86 %
global @919 1 40 0 % 8 772 870 86 %
global @879 2 40 0 % 128 0 %
(compiled code) 3 6 916 8 % 1 996 168 20 % 5 178 712 51 %
(closure) 2 5 915 7 % 425 944 4 % 3 463 624 34 %
(array) – 14 283 16 % 2 484 424 24 % 3 115 192 31 %
(string) 2 17 982 20 % 2 994 824 29 % 2 994 824 29 %
"(function (exports, require, module, __filename, __dirna 6 104 840 1 % 104 840 1 %
"(function (exports, require, module, process) {// Copyri 11 62 904 1 % 62 904 1 %
"(function (exports, require, module, process) {// Copyri 5 51 760 1 % 51 760 1 %
"(function (exports, require, module, process) {// Copyri 10 47 064 0 % 47 064 0 %
"(function (exports, require, module, process) {// Copyri 5 46 096 0 % 46 096 0 %
"(function (exports, require, module, process) {// Copyri 11 45 864 0 % 45 864 0 %
"(function (exports, require, module, __filename, __dirna 13 44 256 0 % 44 256 0 %
Retainers
Object
Distance
Shallow Size
Retained Size
security_token in system / NativeContext @917 2 2 272 0 % 178 416 2 %
native_context in global @919 1 40 0 % 8 772 870 86 %
context in Array() @33707 2 72 0 % 7 976 0 %

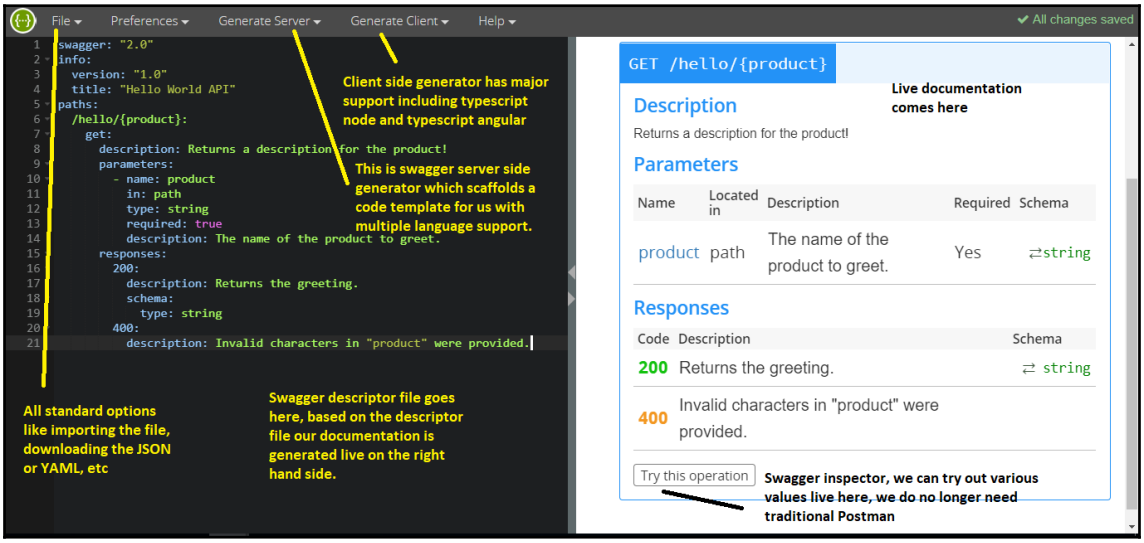

Statistics
Profiles
HEAP SNAPSHOTS
1527472246606
9.7 MB
9 966 KB
Code 1 336 KB
Strings 3 051 KB
JS Arrays 239 KB
Typed Arrays 19 KB
System Objects 1 406 KB
Total 9 966 KB

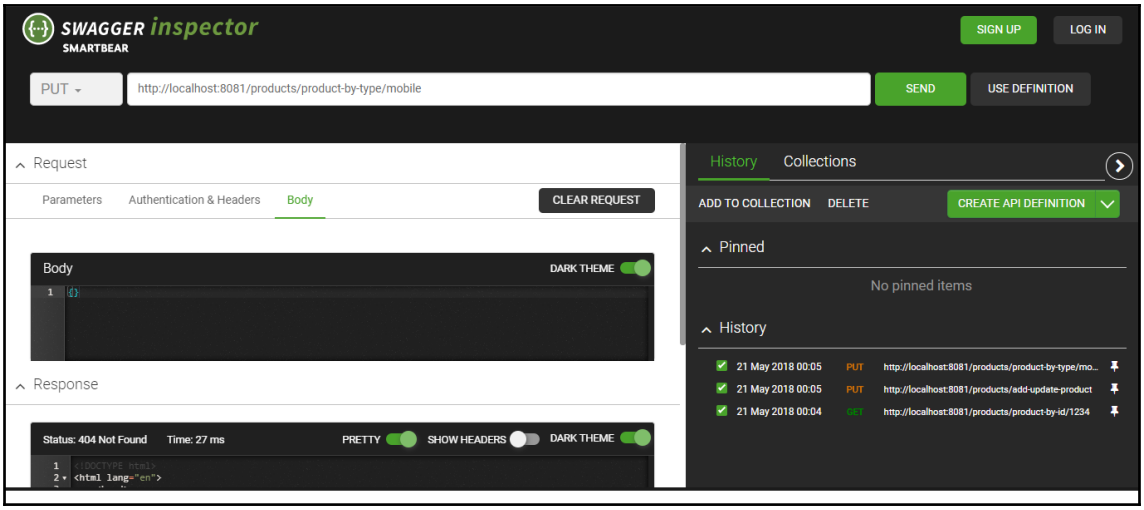

chrome-devtools://devtools/bundled/inspector.html?v8only=true&remoteBase=https://chrome-devtools-frontend.appspot.com/serve_file/@5d04e9e9c8ce31bee0923a8c326a7e9e19c492a3/&dockSide=undocked
Console
Sources
Memory
Profiler
Chart
Profiles
CPU PROFILES
Profile 1
Save
2000 ms
4000 ms
6000 ms
8000 ms
10000 ms
12000 ms
14000 ms
16000 ms
18000 ms
20000 ms
22000 ms
(program)
parserOnHeadersComplete
parserOnIncoming
emit
app
handle
handle
next
process_params
(anonymous)
trim_prefix
handle
query
next
process_params
(anonymous)
trim_prefix
handle
expressInit
next
process_params
(anonymous)
trim_prefix
handle
jsonParser
next
process_params
(anonymous)
trim_prefix
handle
urlencodedParser
next
process_params
(anonymous)
The period across which our application ran
Detail callstack of the functions
ENG
US
3:01 AM
3/21/2018


chrome-devtools://devtools/bundled/js_app.html?remoteBase=https://chrome-devtools-frontend.appspot.com/serve_file/@a10b9cedb40738cb152f8148ddab4891df876959/&dockSide=undocked
Profiler
Console
Sources
Memory
Chart
Profiles
CPU PROFILES
Profile 1
Save
2000 ms
4000 ms
6000 ms
8000 ms
10000 ms
12000 ms
14000 ms
16000 ms
18000 ms
20000 ms
trim_prefix
handle
jsonParser
next
process_params
(anonymous)
trim_prefix
handle
urlencodedParser
next
process_params
(anonymous)
trim_prefix
handle
router
handle
next
Name process_params
Self time 0
Total time 11.06 s
URL index.js:327
Aggregated self time 0
Aggregated total time 10.68 s

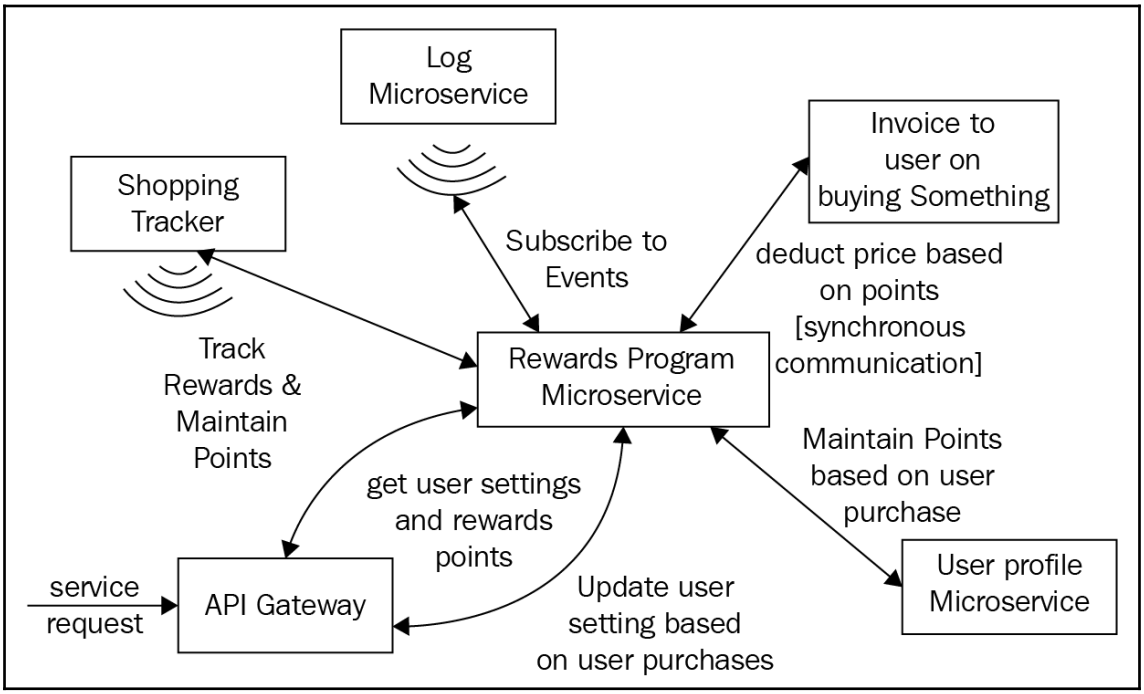
Swagger WorkFlow

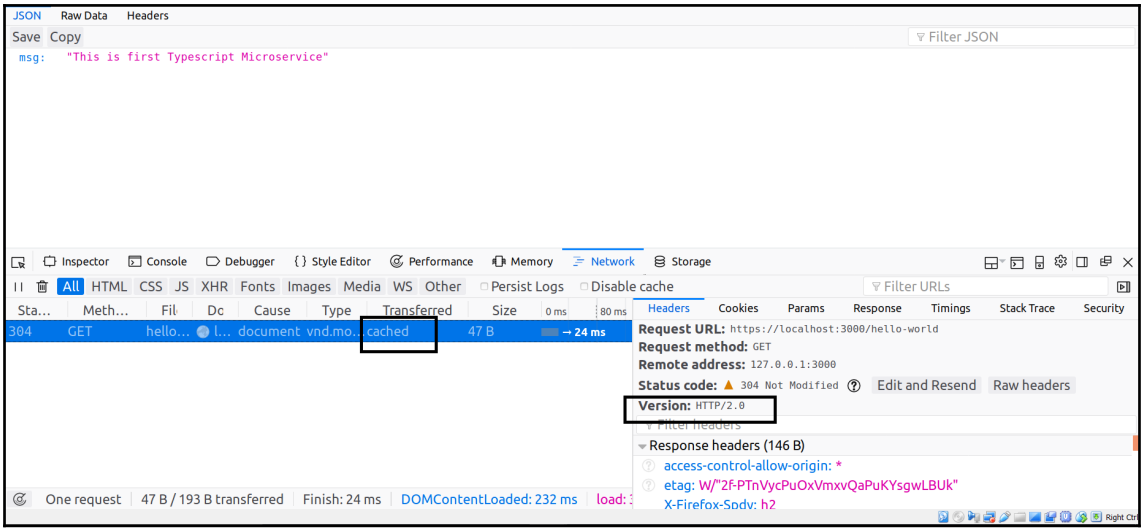
Design	Build	Document	Test
[Swagger Editor]	[Swagger code Gen]	[Swagger UI]	[Swagger inspector]
Design New API's or edit existing one's which can visually render your swagger definition with feedback and error handling	Build API's by turning your swagger definition into code. It has support for 40 different languages	Visualizing your APIs and generating documentation that can be hosted into environment	API testing tool for calling validating REST graph QL and SOAP based services

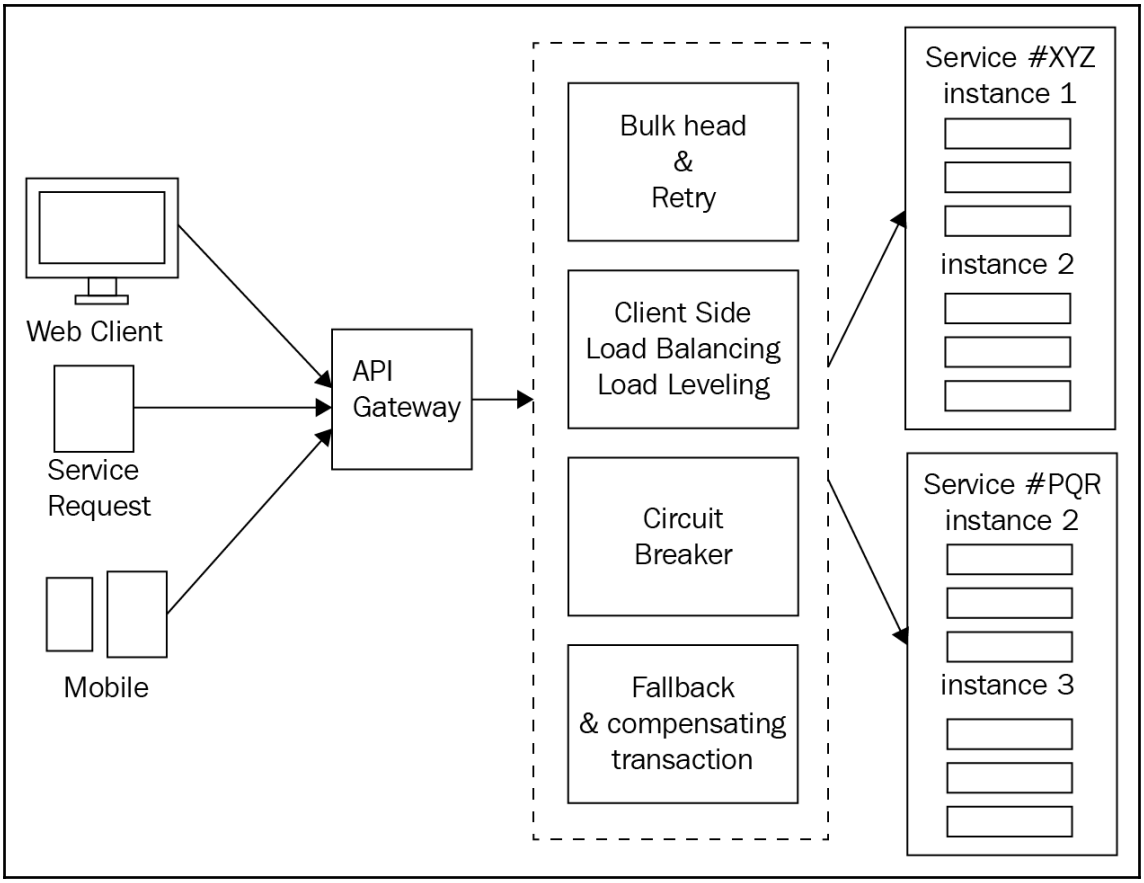



SWAGGER inspector
SMARTBEAR
SIGN UP
LOG IN
PUT
http://localhost:8081/products/product-by-type/mobile
SEND
USE DEFINITION
Request
Parameters
Authentication & Headers
Body
CLEAR REQUEST
Body
DARK THEME
1 {}
Response
Status: 404 Not Found
Time: 27 ms
PRETTY
SHOW HEADERS
DARK THEME
1 <!DOCTYPE html>
2 <html lang="en">
History
Collections
ADD TO COLLECTION
DELETE
CREATE API DEFINITION
Pinned
No pinned items
History
21 May 2018 00:05 PUT http://localhost:8081/products/product-by-type/mo...
21 May 2018 00:05 PUT http://localhost:8081/products/add-update-product
21 May 2018 00:04 GET http://localhost:8081/products/product-by-id/1234

Chapter 8: Testing, Debugging, and Documenting




JSON
Raw Data
Headers
Save
Copy
Filter JSON
msg: "This is first Typescript Microservice"
Inspector
Console
Debugger
Style Editor
Performance
Memory
Network
Storage
All
HTML
CSS
JS
XHR
Fonts
Images
Media
WS
Other
Persist Logs
Disable cache
Filter URLs
Sta…
Meth…
Fil
Do
Cause
Type
Transferred
Size
0 ms
80 ms
304
GET
hello…
l…
document
vnd.mo…
cached
47 B
→ 24 ms
Headers
Cookies
Params
Response
Timings
Stack Trace
Security
Request URL: https://localhost:3000/hello-world
Request method: GET
Remote address: 127.0.0.1:3000
Status code: 304 Not Modified
Edit and Resend
Raw headers
Version: HTTP/2.0
Filter headers
Response headers (146 B)
access-control-allow-origin: *
etag: W/"2f-PTnVycPuOxVmxvQaPuKYsgwLBUk"
X-Firefox-Spdy: h2
One request
47 B / 193 B transferred
Finish: 24 ms
DOMContentLoaded: 232 ms
load:


Web Client
Service
Request
Mobile
API
Gateway
Bulk head
&
Retry
Client Side
Load Balancing
Load Leveling
Circuit
Breaker
Fallback
& compensating
transaction
Service #XYZ
instance 1
instance 2
Service #PQR
instance 2
instance 3

Hystrix Dashboard

Eureka URL: http://hostname:8080/eureka/v2/apps
Eureka Application: Choose here ▼ Stream Type: Hystrix ○ Turbine ◉

http://hostname:port/turbine/turbine.stream

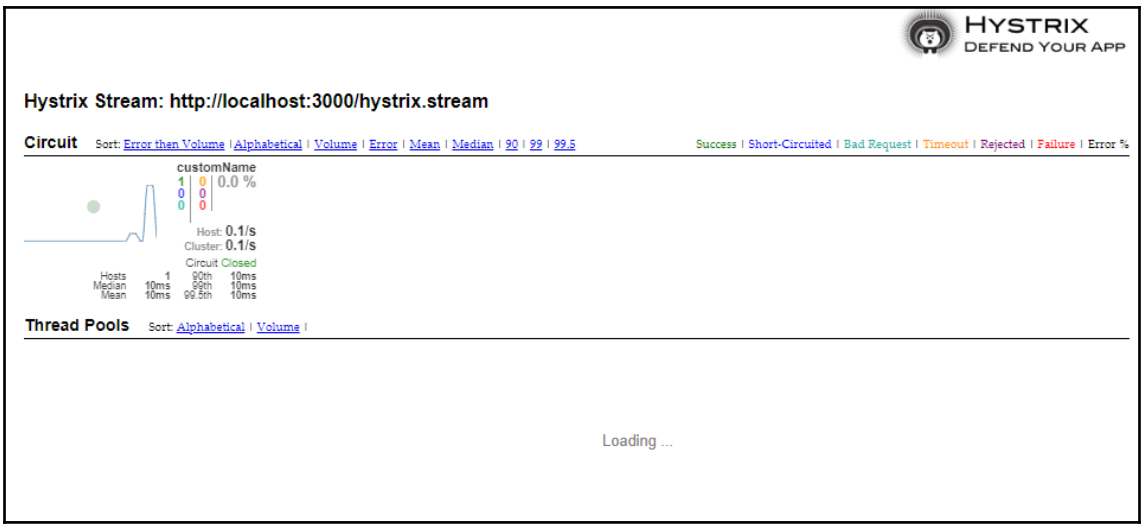
Cluster via Turbine (default cluster): http://turbine-hostname:port/turbine.stream
Cluster via Turbine (custom cluster): http://turbine-hostname:port/turbine.stream?cluster=[clusterName]
Single Hystrix App: http://hystrix-app:port/hystrix.stream

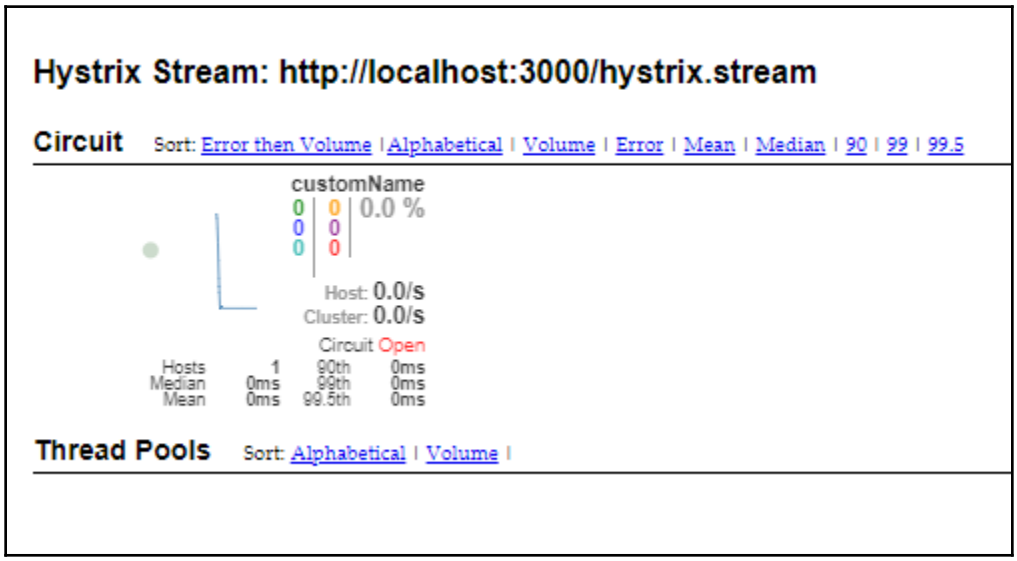
Delay: 2000 ms Title: Example Hystrix App

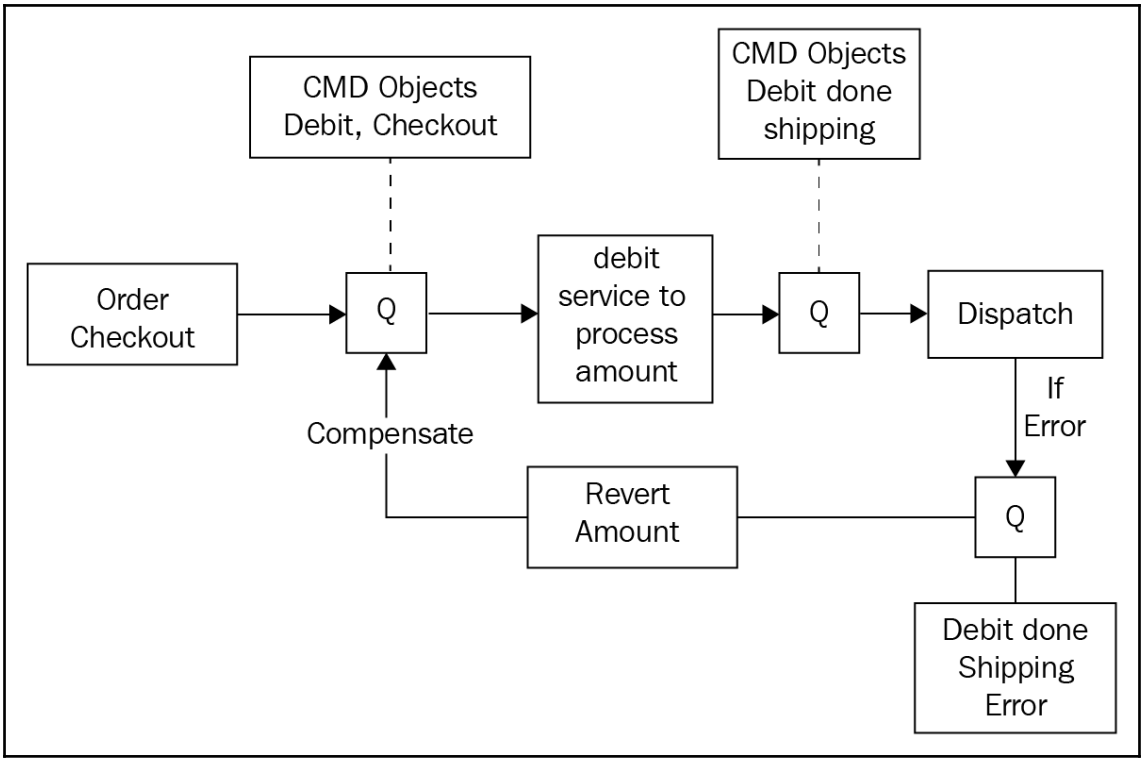
Authorization: Basic Zm9vOmJhcg==

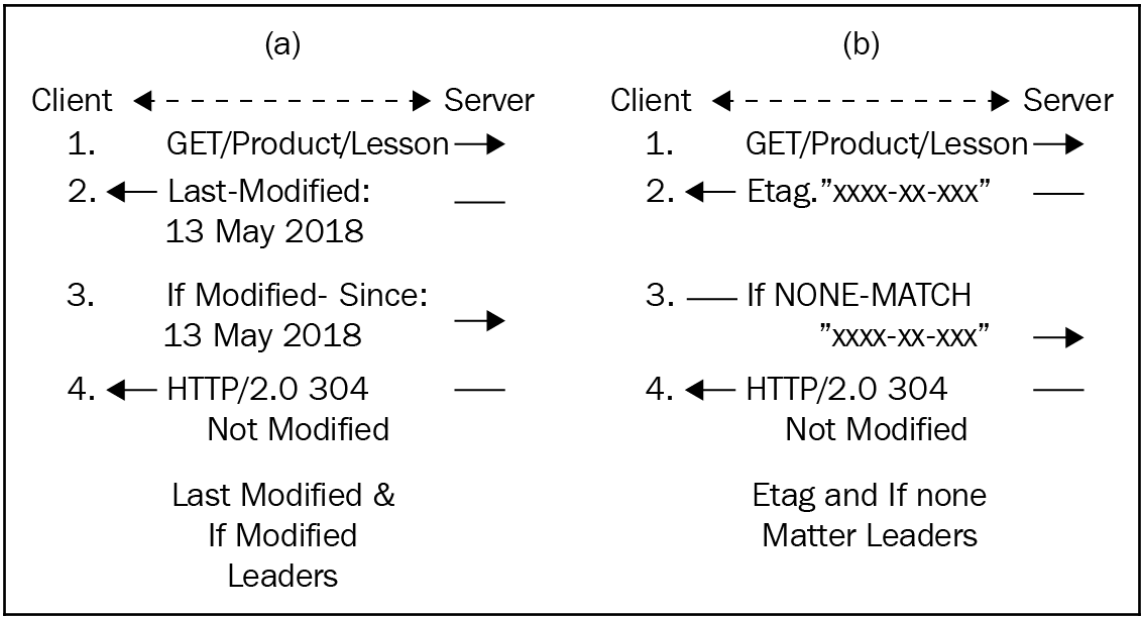
Add Stream

Monitor Streams

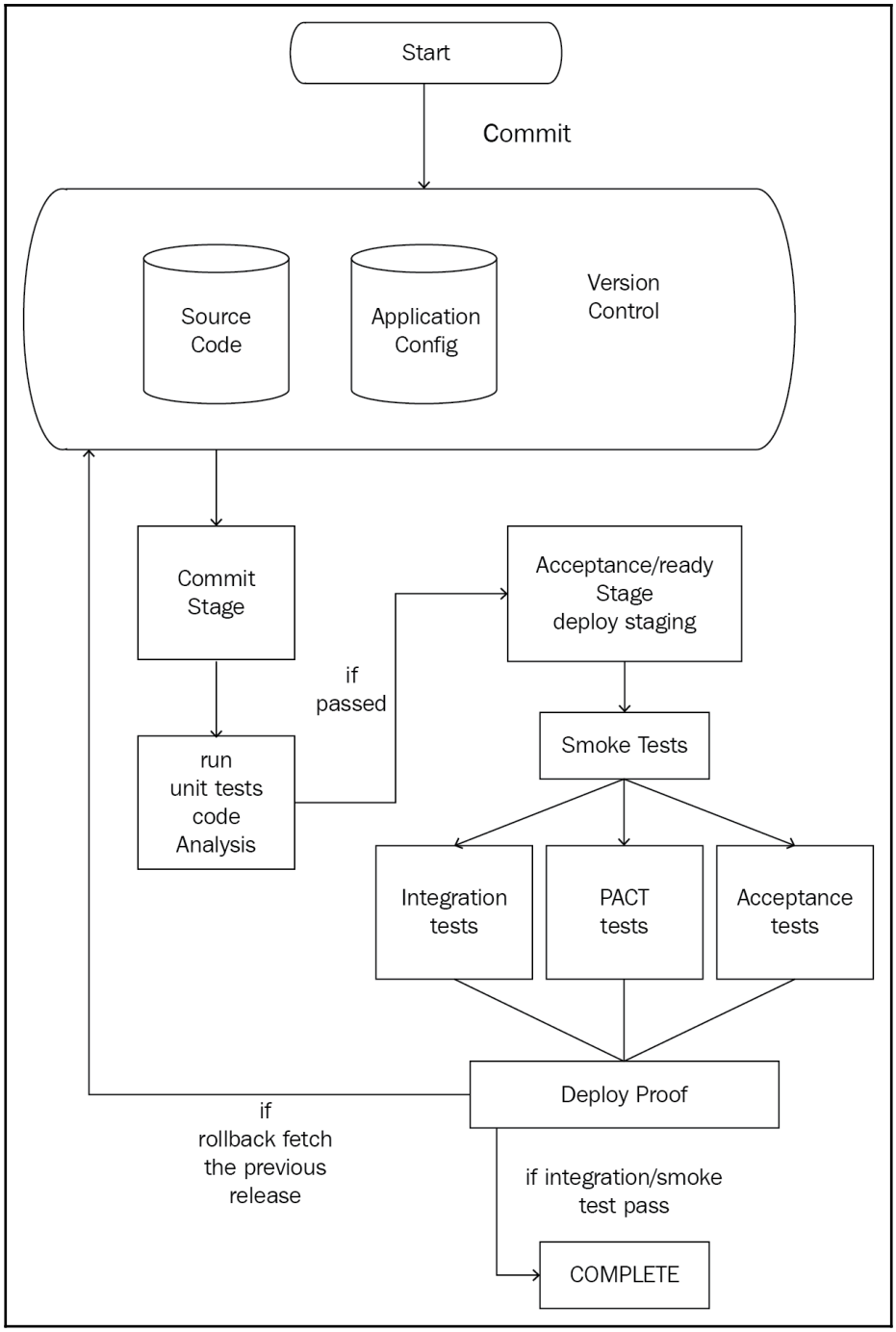

HYSTRIX
DEFEND YOUR APP
Hystrix Stream: http://localhost:3000/hystrix.stream
Circuit
Sort: Error then Volume | Alphabetical | Volume | Error | Mean | Median | 90 | 99 | 99.5
Success | Short-Circuited | Bad Request | Timeout | Rejected | Failure | Error %
customName
1 | 0 | 0.0 %
0 | 0 |
0 | 0 |
Host: 0.1/s
Cluster: 0.1/s
Circuit Closed
Hosts 1 90th 10ms
Median 10ms 99th 10ms
Mean 10ms 99.5th 10ms
Thread Pools
Sort: Alphabetical | Volume |
Loading ...

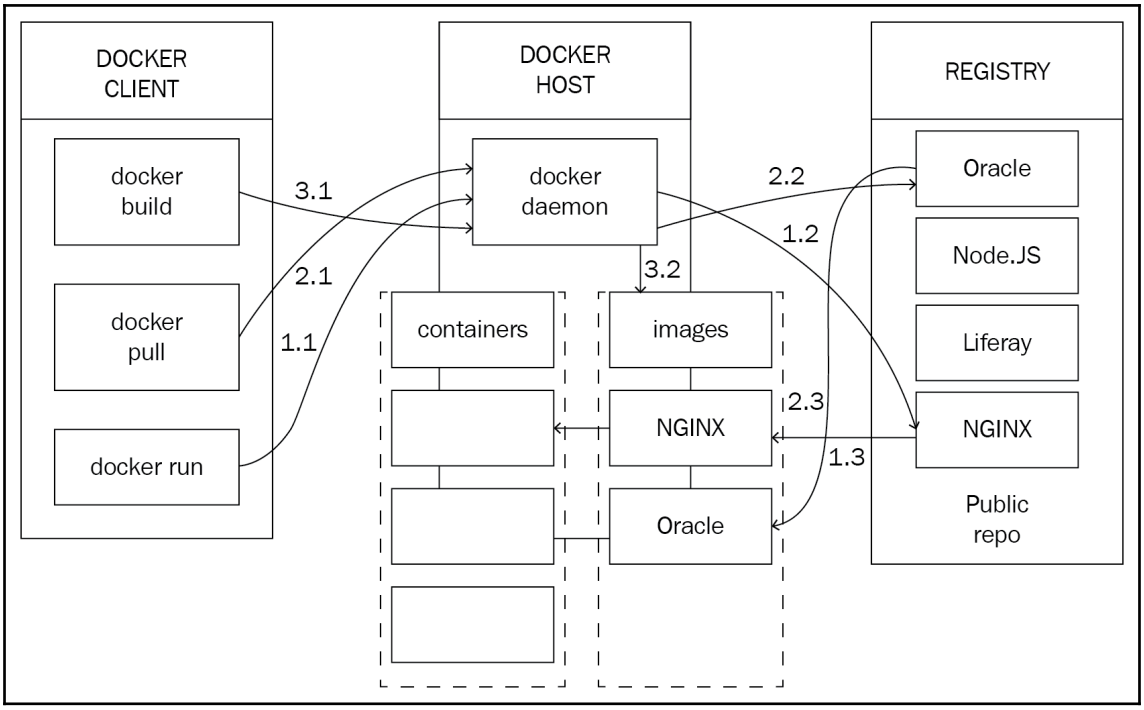

Hystrix Stream: http://localhost:3000/hystrix.stream
Circuit
Sort: Error then Volume | Alphabetical | Volume | Error | Mean | Median | 90 | 99 | 99.5
customName
0 | 0 | 0.0 %
0 | 0 |
0 | 0 |
Host: 0.0/s
Cluster: 0.0/s
Circuit Open
Hosts 1 90th 0ms
Median 0ms 99th 0ms
Mean 0ms 99.5th 0ms
Thread Pools
Sort: Alphabetical | Volume |

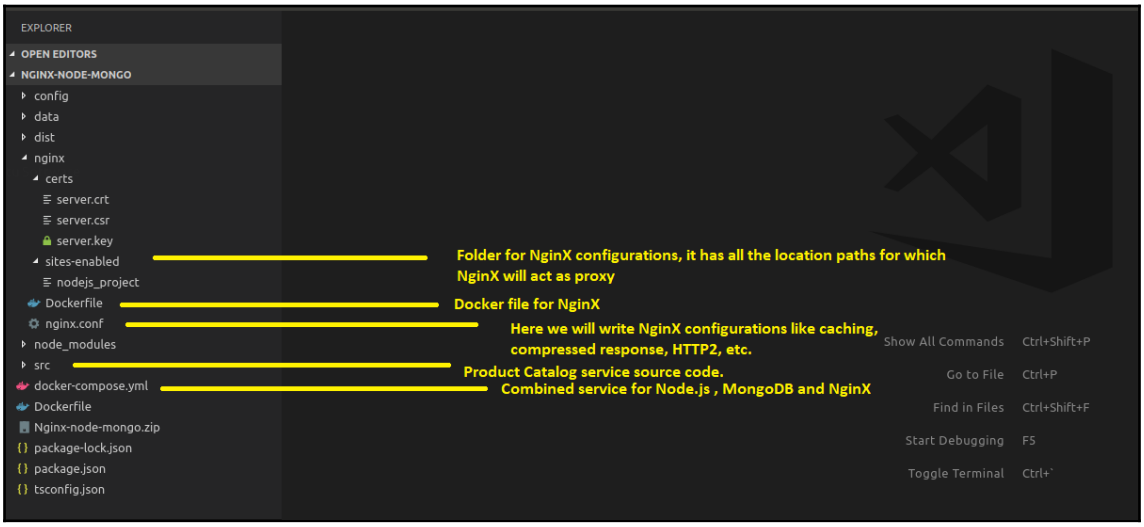

CMD Objects
Debit, Checkout
CMD Objects
Debit done
shipping
Order
Checkout
Q
debit
service to
process
amount
Q
Dispatch
If
Error
Compensate
Revert
Amount
Q
Debit done
Shipping
Error

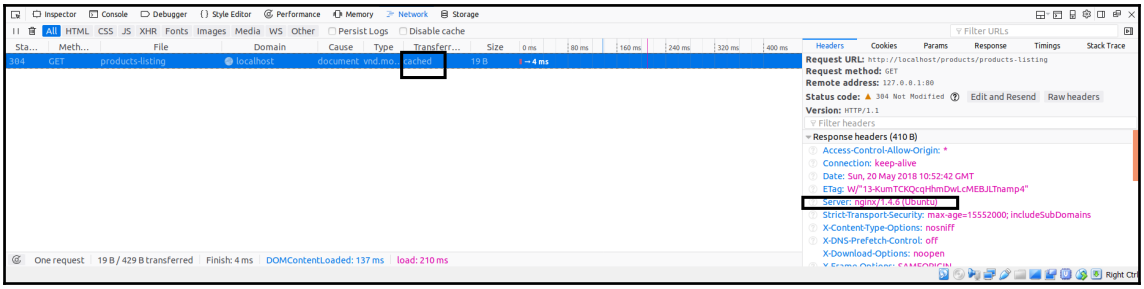

(a)
Client
Server
1. GET/Product/Lesson
2. Last-Modified: 13 May 2018
3. If Modified- Since: 13 May 2018
4. HTTP/2.0 304 Not Modified
Last Modified & If Modified Leaders
(b)
Client
Server
1. GET/Product/Lesson
2. Etag."xxxx-xx-xxx"
3. If NONE-MATCH "xxxx-xx-xxx"
4. HTTP/2.0 304 Not Modified
Etag and If none Matter Leaders

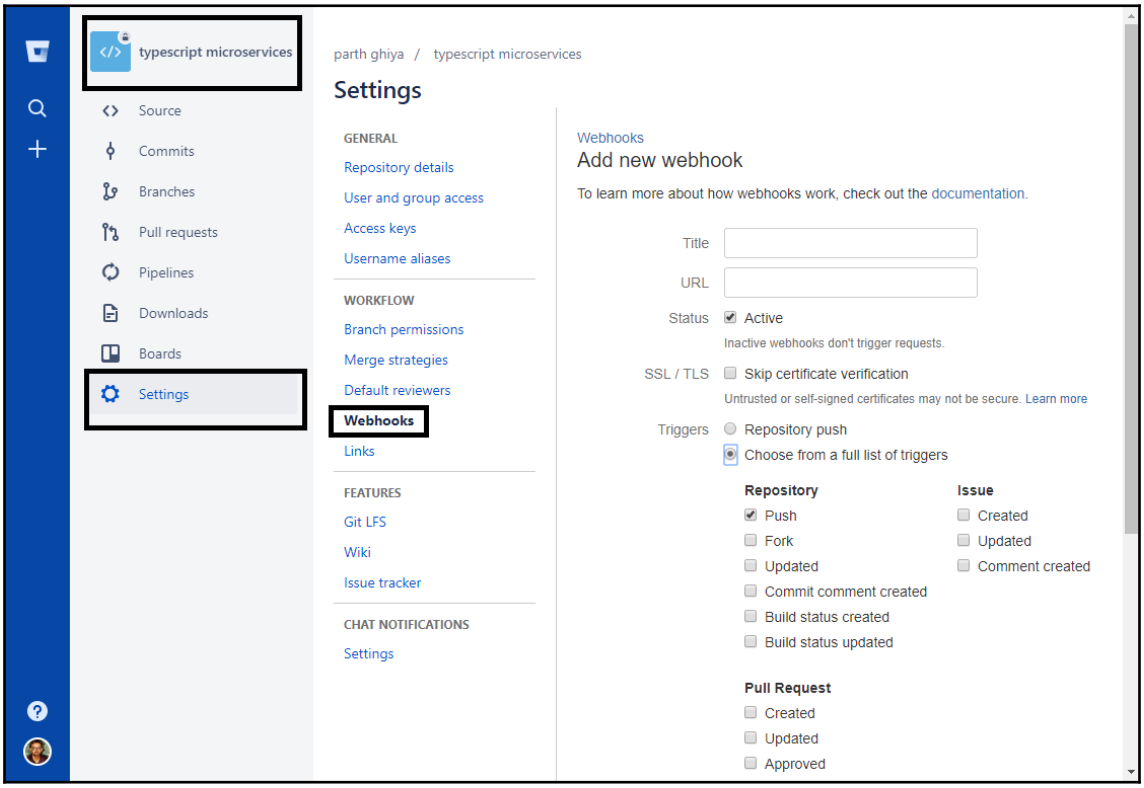
Chapter 9: Deployment, Logging, and Monitoring

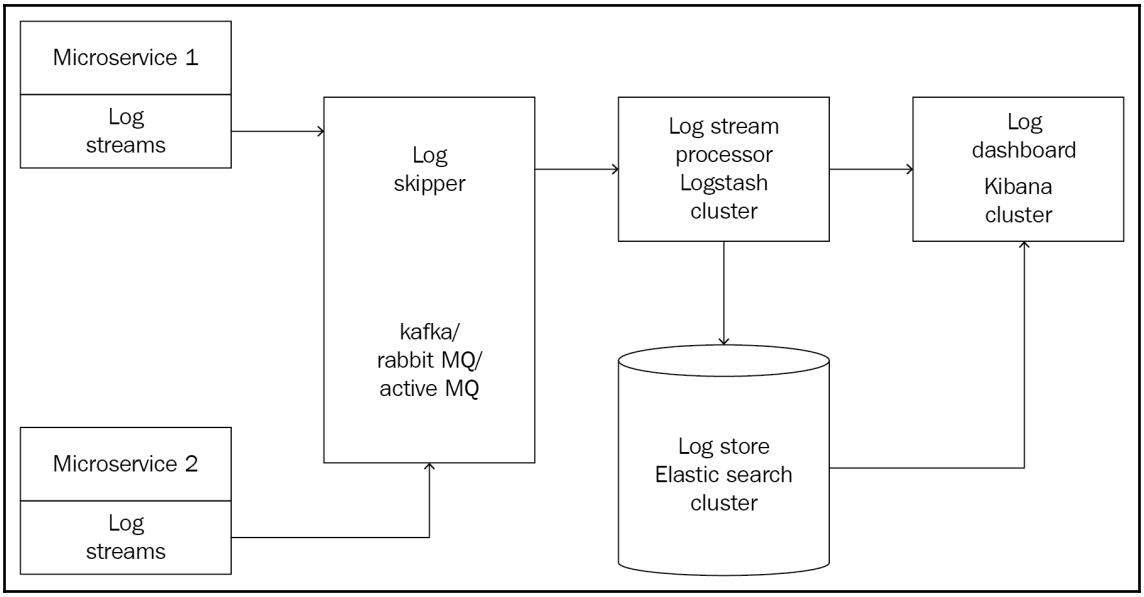

Start
Commit
Source Code
Application Config
Version Control
Commit Stage
run unit tests code Analysis
if passed
Acceptance/ready Stage deploy staging
Smoke Tests
Integration tests
PACT tests
Acceptance tests
Deploy Proof
if rollback fetch the previous release
if integration/smoke test pass
COMPLETE

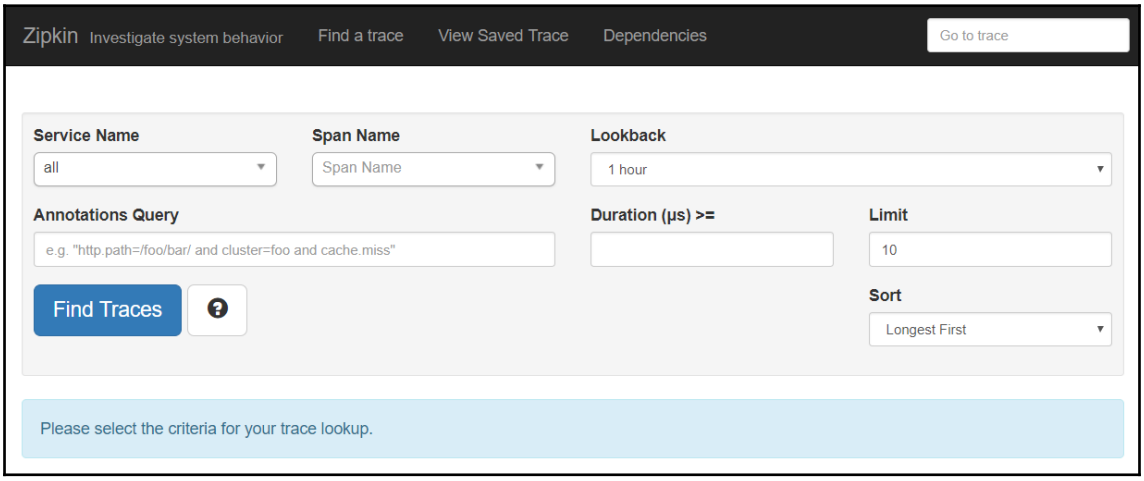

DOCKER CLIENT
DOCKER HOST
REGISTRY
docker build
docker pull
docker run
docker daemon
containers
images
NGINX
Oracle
Oracle
Node.JS
Liferay
NGINX
Public repo
3.1
2.1
1.1
2.2
1.2
3.2
2.3
1.3

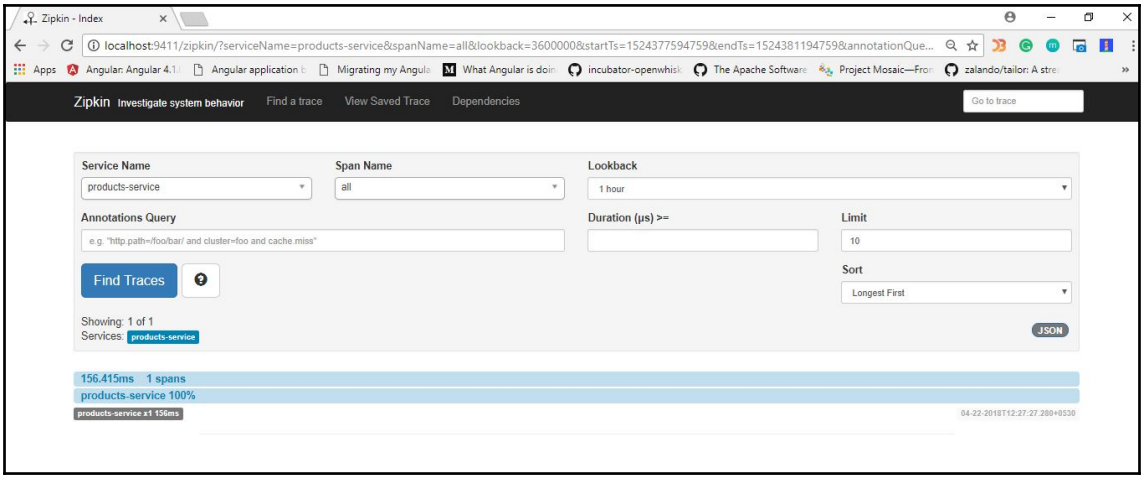

EXPLORER
OPEN EDITORS
NGINX-NODE-MONGO
config
data
dist
nginx
certs
server.crt
server.csr
server.key
sites-enabled
nodejs_project
Dockerfile
nginx.conf
node_modules
src
docker-compose.yml
Dockerfile
Nginx-node-mongo.zip
package-lock.json
package.json
tsconfig.json
Folder for NginX configurations, it has all the location paths for which NginX will act as proxy
Docker file for NginX
Here we will write NginX configurations like caching, compressed response, HTTP2, etc.
Product Catalog service source code.
Combined service for Node.js , MongoDB and NginX
Show All Commands Ctrl+Shift+P
Go to File Ctrl+P
Find in Files Ctrl+Shift+F
Start Debugging F5
Toggle Terminal Ctrl+`

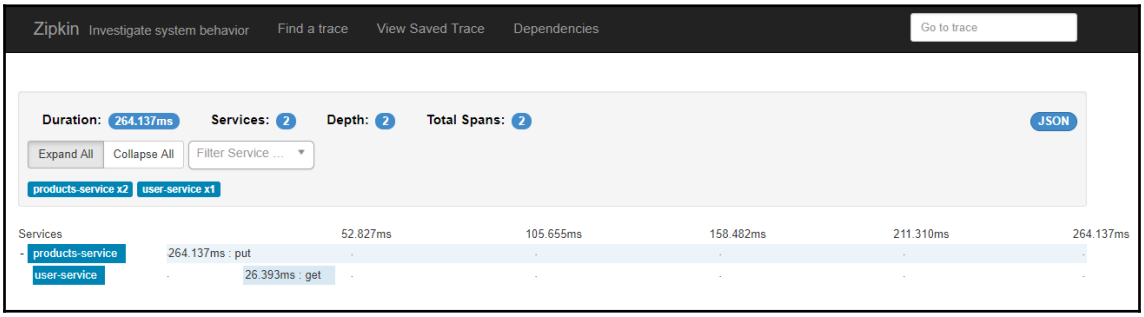

Inspector
Console
Debugger
Style Editor
Performance
Memory
Network
Storage
Sta...
Meth...
File
Domain
Cause
Type
Transferr...
Size
304
GET
products-listing
localhost
document
vnd.mo...
cached
19 B
4 ms
Headers
Cookies
Params
Response
Timings
Stack Trace
Request URL: http://localhost/products/products-listing
Request method: GET
Remote address: 127.0.0.1:80
Status code: 304 Not Modified
Edit and Resend
Raw headers
Version: HTTP/1.1
Response headers (410 B)
Access-Control-Allow-Origin: *
Connection: keep-alive
Date: Sun, 20 May 2018 10:52:42 GMT
ETag: W/"13-KumTCKQcqHhmDwLcMEBJLTnamp4"
Server: nginx/1.4.6 (Ubuntu)
Strict-Transport-Security: max-age=15552000; includeSubDomains
X-Content-Type-Options: nosniff
X-DNS-Prefetch-Control: off
X-Download-Options: noopen
One request
19 B / 429 B transferred
Finish: 4 ms
DOMContentLoaded: 137 ms
load: 210 ms

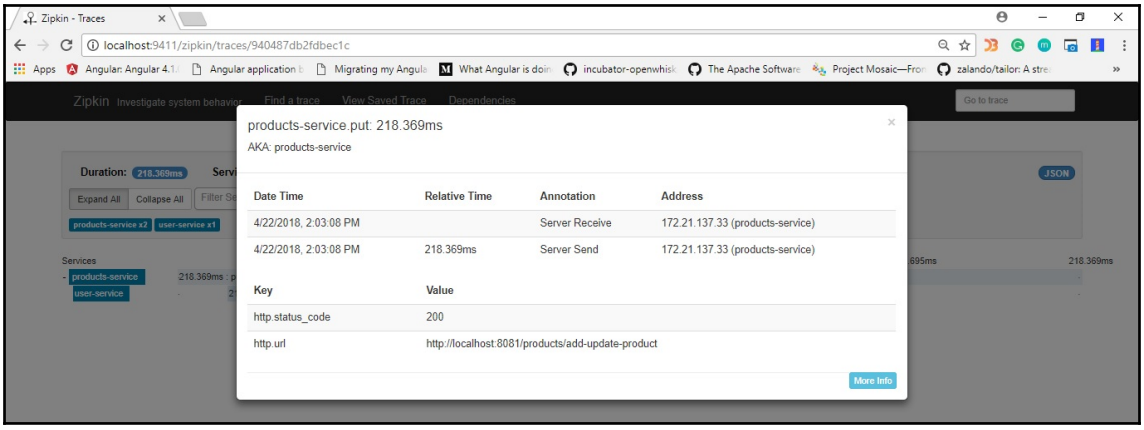

typescript microservices
Source
Commits
Branches
Pull requests
Pipelines
Downloads
Boards
Settings
parth ghiya / typescript microservices
Settings
GENERAL
Repository details
User and group access
Access keys
Username aliases
WORKFLOW
Branch permissions
Merge strategies
Default reviewers
Webhooks
Links
FEATURES
Git LFS
Wiki
Issue tracker
CHAT NOTIFICATIONS
Settings
Webhooks
Add new webhook
To learn more about how webhooks work, check out the documentation.
Title
URL
Status
Active
Inactive webhooks don't trigger requests.
SSL / TLS
Skip certificate verification
Untrusted or self-signed certificates may not be secure. Learn more
Triggers
Repository push
Choose from a full list of triggers
Repository
Push
Fork
Updated
Commit comment created
Build status created
Build status updated
Issue
Created
Updated
Comment created
Pull Request
Created
Updated
Approved

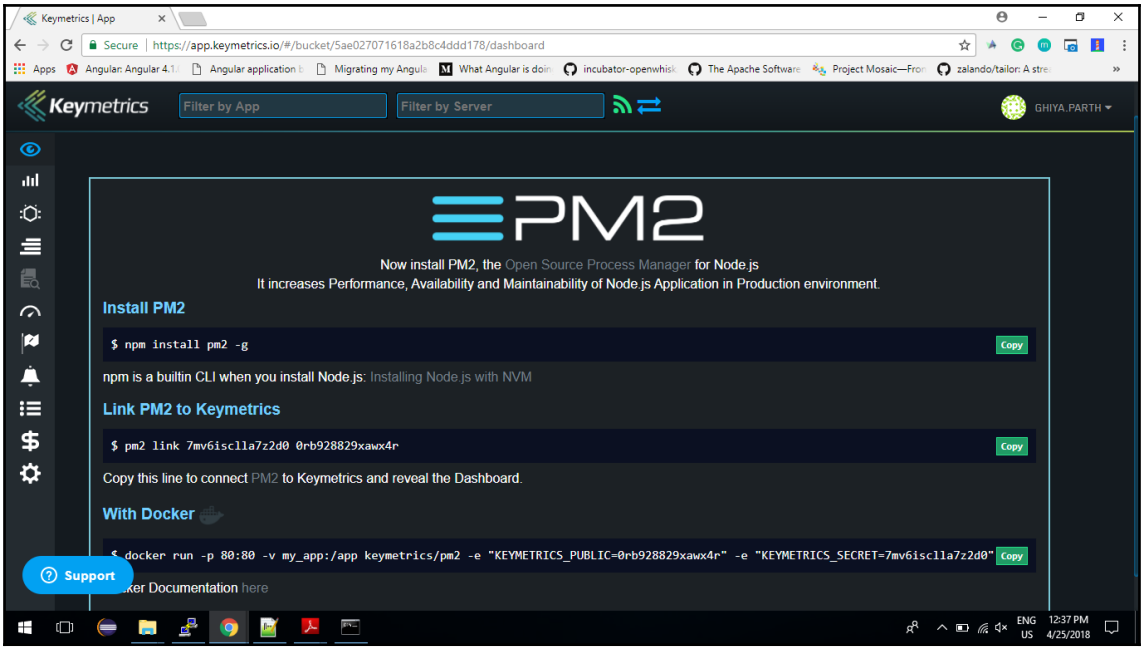

Microservice 1
Log
streams
Log
skipper
kafka/
rabbit MQ/
active MQ
Log stream
processor
Logstash
cluster
Log
dashboard
Kibana
cluster
Log store
Elastic search
cluster
Microservice 2
Log
streams


Zipkin
Investigate system behavior
Find a trace
View Saved Trace
Dependencies
Go to trace
Service Name
all
Span Name
Span Name
Lookback
1 hour
Annotations Query
e.g. "http.path=/foo/bar/ and cluster=foo and cache.miss"
Duration (μs) >=
Limit
10
Find Traces
Sort
Longest First
Please select the criteria for your trace lookup.


Zipkin - Index
localhost:9411/zipkin/?serviceName=products-service&spanName=all&lookback=3600000&startTs=1524377594759&endTs=1524381194759&annotationQue...
Zipkin Investigate system behavior
Find a trace
View Saved Trace
Dependencies
Go to trace
Service Name
products-service
Span Name
all
Lookback
1 hour
Annotations Query
e.g. "http.path=/foo/bar/ and cluster=foo and cache.miss"
Duration (µs) >=
Limit
10
Sort
Longest First
Find Traces
Showing 1 of 1
Services: products-service
JSON
156.415ms 1 spans
products-service 100%
products-service x1 156ms


Zipkin Investigate system behavior
Find a trace
View Saved Trace
Dependencies
Go to trace
Duration: 264.137ms
Services: 2
Depth: 2
Total Spans: 2
JSON
Expand All
Collapse All
Filter Service ...
products-service x2
user-service x1
Services
52.827ms
105.655ms
158.482ms
211.310ms
264.137ms
products-service
264.137ms : put
user-service
26.393ms : get

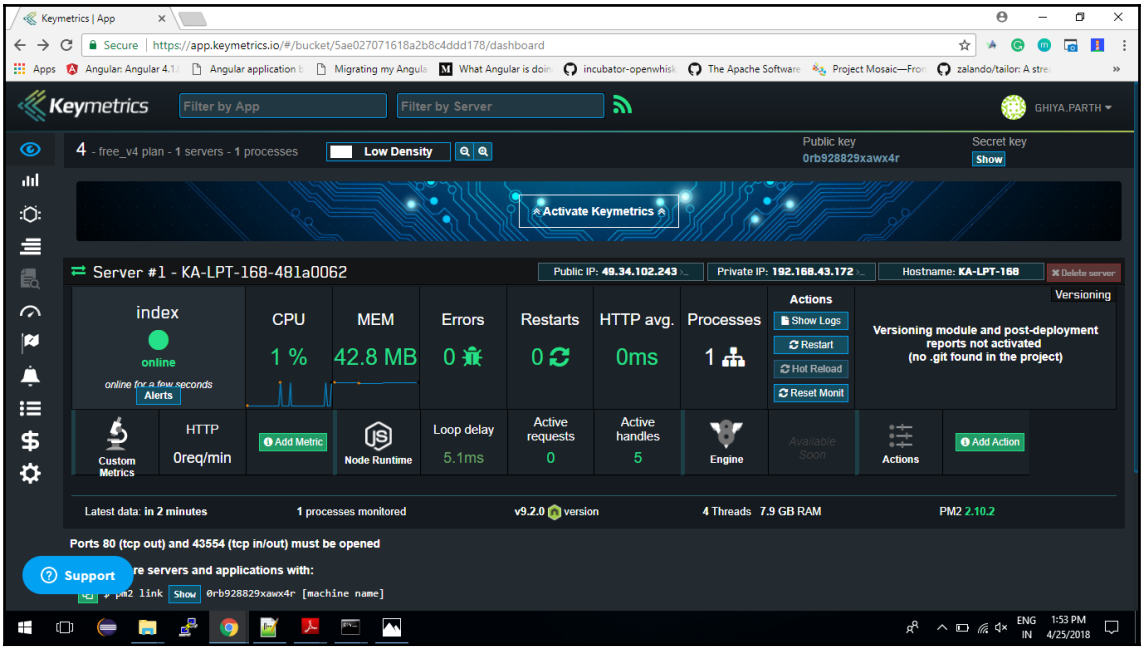

Zipkin - Traces
localhost:9411/zipkin/traces/940487db2fdbec1c
products-service.put: 218.369ms
AKA: products-service
Date Time
Relative Time
Annotation
Address
4/22/2018, 2:03:08 PM
Server Receive
172.21.137.33 (products-service)
4/22/2018, 2:03:08 PM
218.369ms
Server Send
172.21.137.33 (products-service)
Key
Value
http.status_code
200
http.url
http://localhost:8081/products/add-update-product
More Info



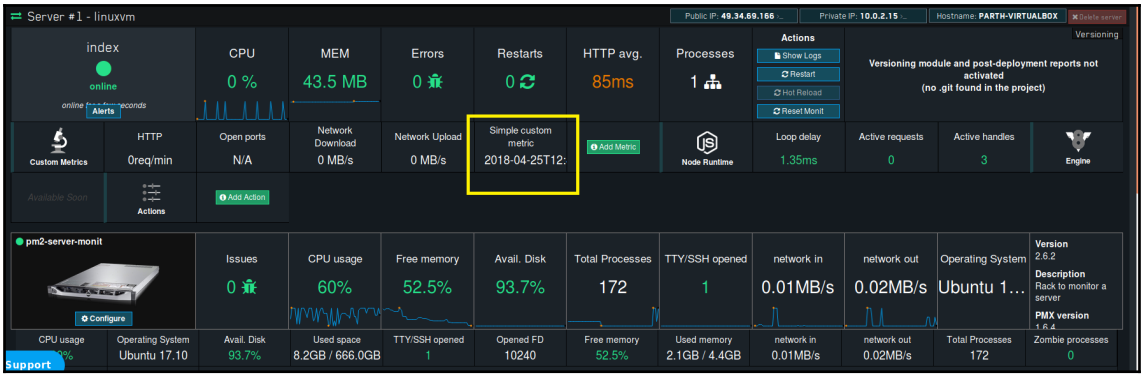

```
[PM2] Starting C:\Users\parth.ghiya.KADC\Desktop\tsms chapter2\shopping cart microservices\products-catalog\dist\index.js in fork_mode (1 instance)
[PM2] Done.
┌ Agent Online | Dashboard Access: https://app.keymetrics.io/#/r/0rb928829xawx4r | Server name: KA-LPT-168-481a0062
```

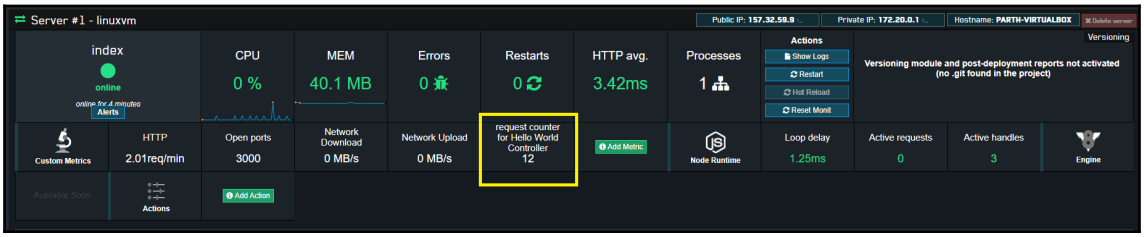
App name	id	mode	pid	status	restart	uptime	cpu	mem	user	watching
index	0	fork	2832	online	0	0s	0%	3.9 MB	parth.ghiya	disabled

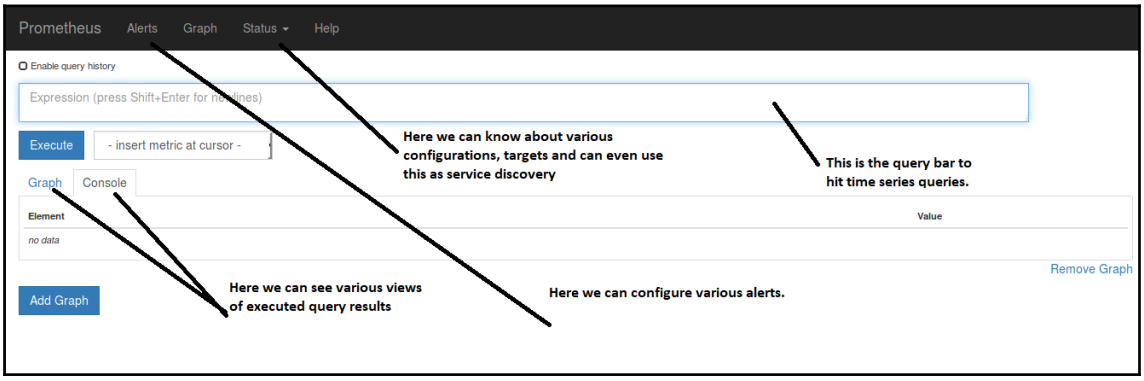
```
Use `pm2 show <id|name>` to get more details about an app
```

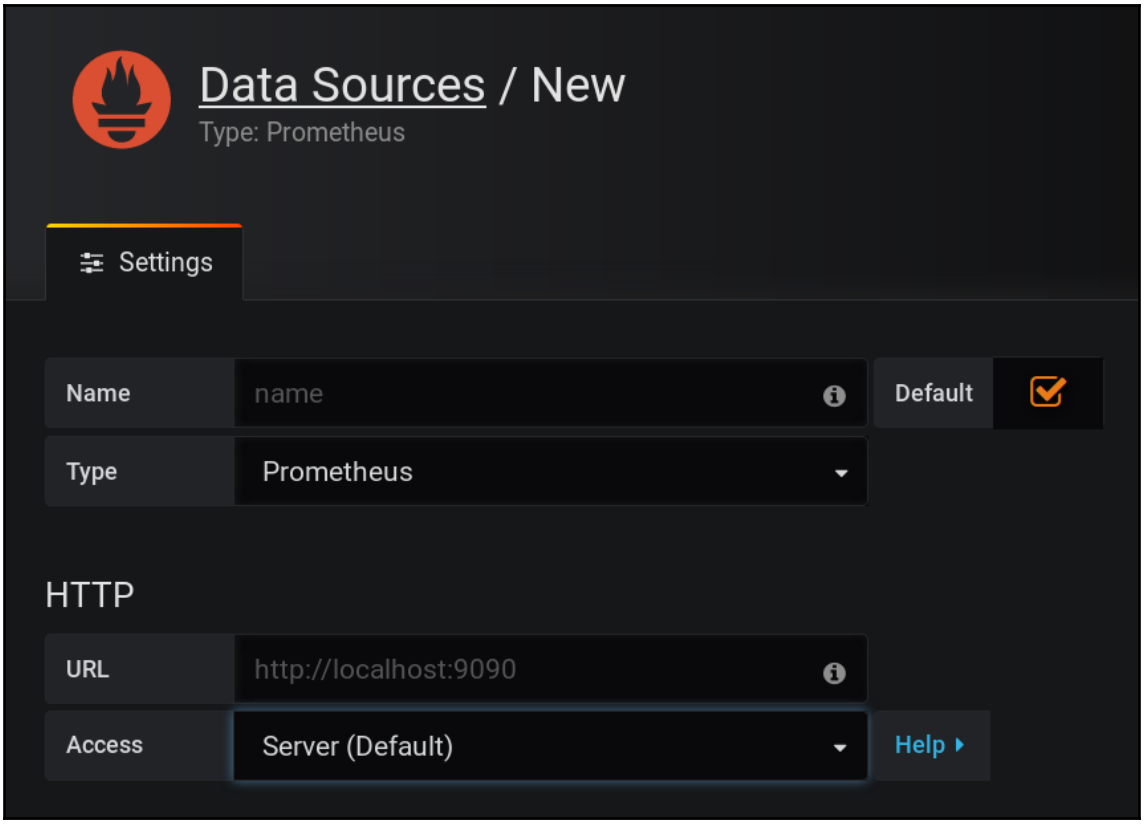

Keymetrics | App
Secure https://app.keymetrics.io/#/bucket/5ae027071618a2b8c4ddd178/dashboard
Keymetrics
Filter by App
Filter by Server
GHIYA.PARTH
4 - free_v4 plan - 1 servers - 1 processes
Low Density
Public key
0rb928829xawx4r
Secret key
Show
Activate Keymetrics
Server #1 - KA-LPT-168-481a0062
Public IP: 49.34.102.243
Private IP: 192.168.43.172
Hostname: KA-LPT-168
Delete server
index
online
online for a few seconds
Alerts
CPU
1 %
MEM
42.8 MB
Errors
0
Restarts
0
HTTP avg.
0ms
Processes
1
Actions
Show Logs
Restart
Hot Reload
Reset Monit
Versioning
Versioning module and post-deployment reports not activated
(no .git found in the project)
Custom Metrics
HTTP
0req/min
Add Metric
Node Runtime
Loop delay
5.1ms
Active requests
0
Active handles
5
Engine
Available Soon
Actions
Add Action
Latest data: in 2 minutes
1 processes monitored
v9.2.0 version
4 Threads 7.9 GB RAM
PM2 2.10.2
Ports 80 (tcp out) and 43554 (tcp in/out) must be opened
Support
pm2 link Show 0rb928829xawx4r [machine name]
ENG
IN
1:53 PM
4/25/2018

4 - free_v4 plan - 1 servers - 2 processes
Low Density
Public key
0rb928829xawx4r
Secret key
Show
Activate Keymetrics
Server #1 - linuxvm
Public IP: 49.34.69.166
Private IP: 10.0.2.15
Hostname: PARTH-VIRTUALBOX
index
online
Alerts
CPU
0 %
MEM
44.5 MB
Errors
2
Restarts
0
HTTP avg.
0.36ms
Processes
1
Actions
Show Logs
Restart
Hot Reload
Reset Monit
Versioning
Versioning module and post-deployment reports not activated
(no .git found in the project)
Custom Metrics
HTTP
1411.72req/min
Add Metric
Node Runtime
Loop delay
1.05ms
Active requests
0
Active handles
3
Engine
Available Soon
Actions
Add Action
pm2-server-monit
Configure
Issues
0
CPU usage
77.78%
Free memory
44.5%
Avail. Disk
93.4%
Total Processes
172
TTY/SSH opened
1
network in
0.01MB/s
network out
0.02MB/s
Operating System
Ubuntu 1...
Version
2.6.2
Description
Rack to monitor a server
PMX version
CPU usage
77.78%
Operating System
Ubuntu 17.10
Avail. Disk
93.4%
Used space
10.3GB / 666.0...
TTY/SSH opened
1
Opened FD
9824
Free memory
44.5%
Used memory
2.5GB / 4.4GB
network in
0.01MB/s
network out
0.02MB/s
Total Processes
172
Zombie processes
0
Support


Server #1 - linuxvm
Public IP: 49.34.69.166
Private IP: 10.0.2.15
Hostname: PARTH-VIRTUALBOX
index
online
Alerts
CPU
0 %
MEM
43.5 MB
Errors
0
Restarts
0
HTTP avg.
85ms
Processes
1
Actions
Show Logs
Restart
Hot Reload
Reset Monit
Versioning
Versioning module and post-deployment reports not activated
(no .git found in the project)
Custom Metrics
HTTP
0req/min
Open ports
N/A
Network Download
0 MB/s
Network Upload
0 MB/s
Simple custom metric
2018-04-25T12:
Add Metric
Node Runtime
Loop delay
1.35ms
Active requests
0
Active handles
3
Engine
Actions
Add Action
pm2-server-monit
Configure
Issues
0
CPU usage
60%
Free memory
52.5%
Avail. Disk
93.7%
Total Processes
172
TTY/SSH opened
1
network in
0.01MB/s
network out
0.02MB/s
Operating System
Ubuntu 1...
Version
2.6.2
Description
Rack to monitor a server
PMX version
CPU usage
Operating System
Ubuntu 17.10
Avail. Disk
93.7%
Used space
8.2GB / 666.0GB
TTY/SSH opened
1
Opened FD
10240
Free memory
52.5%
Used memory
2.1GB / 4.4GB
network in
0.01MB/s
network out
0.02MB/s
Total Processes
172
Zombie processes
0
Support

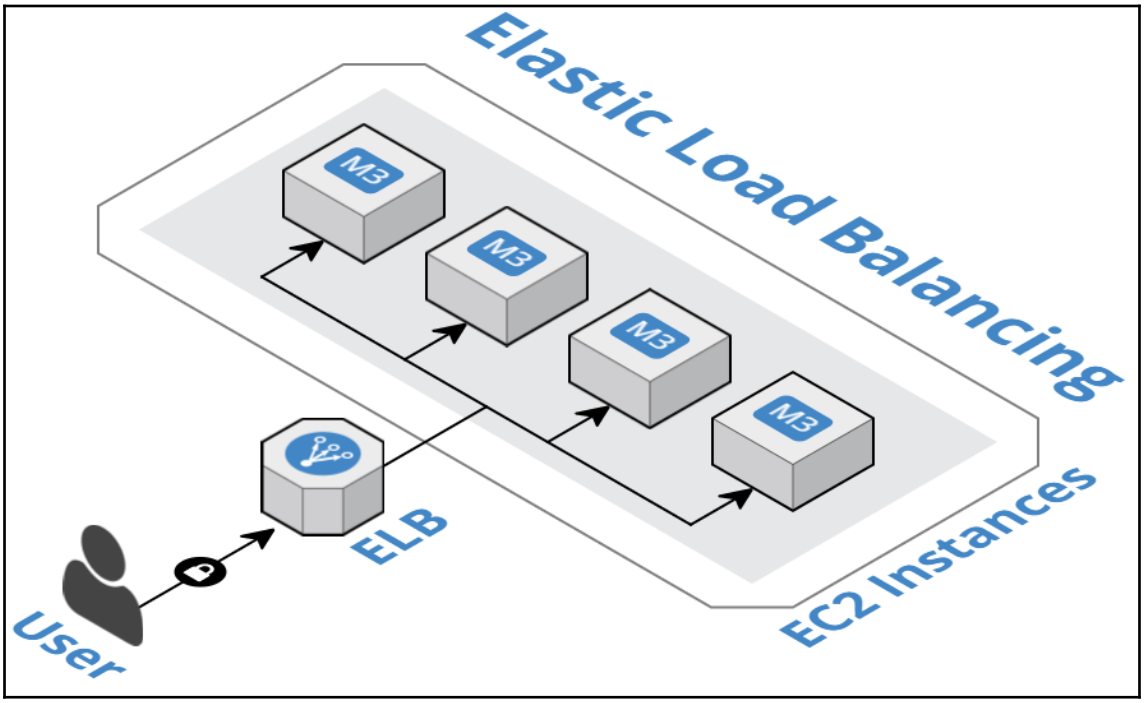

Server #1 - linuxvm
Public IP: 157.32.59.9
Private IP: 172.20.0.1
Hostname: PARTH-VIRTUALBOX
index
online
Alerts
CPU
0 %
MEM
40.1 MB
Errors
0
Restarts
0
HTTP avg.
3.42ms
Processes
1
Actions
Show Logs
Restart
Hot Reload
Reset Monit
Versioning
Versioning module and post-deployment reports not activated
(no .git found in the project)
Custom Metrics
HTTP
2.01req/min
Open ports
3000
Network Download
0 MB/s
Network Upload
0 MB/s
request counter for Hello World Controller
12
Add Metric
Node Runtime
Loop delay
1.25ms
Active requests
0
Active handles
3
Engine
Actions
Add Action

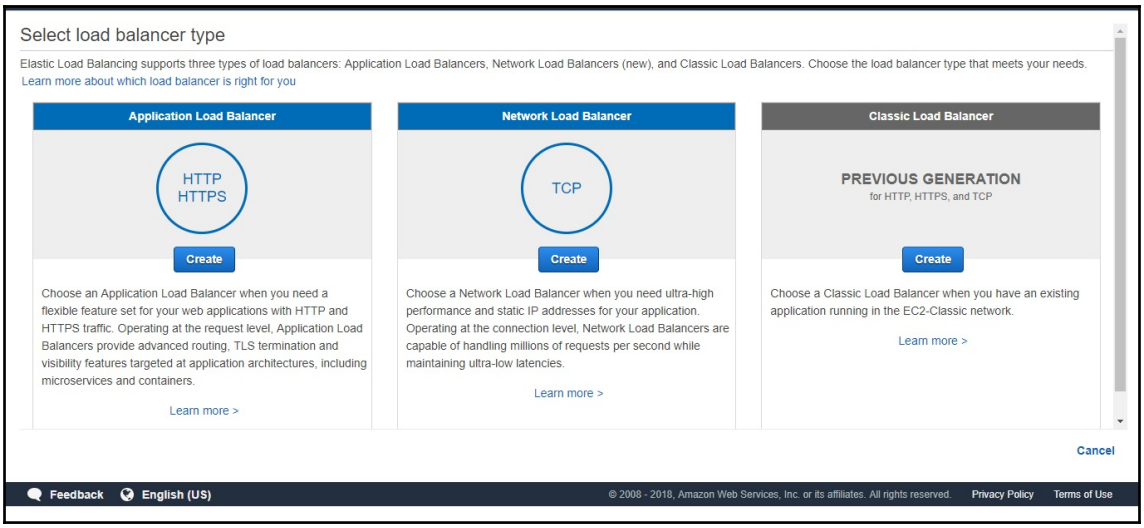

Prometheus
Alerts
Graph
Status
Help
Enable query history
Expression (press Shift+Enter for newlines)
Execute
- insert metric at cursor -
Graph
Console
Element
Value
no data
Remove Graph
Add Graph
Here we can know about various configurations, targets and can even use this as service discovery
This is the query bar to hit time series queries.
Here we can see various views of executed query results
Here we can configure various alerts.

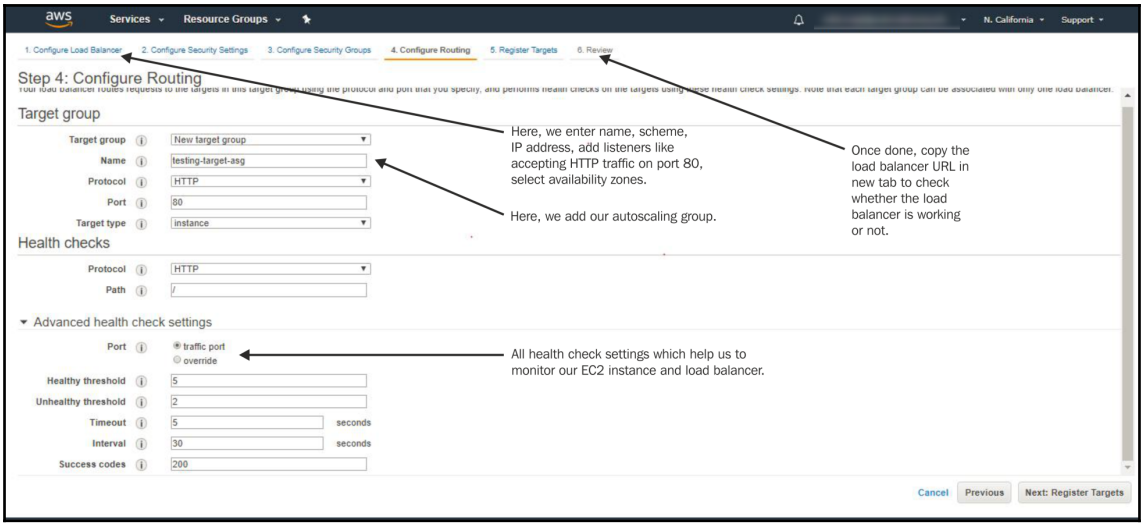

Data Sources / New
Type: Prometheus
Settings
Name
name
Default
Type
Prometheus
HTTP
URL
http://localhost:9090
Access
Server (Default)
Help

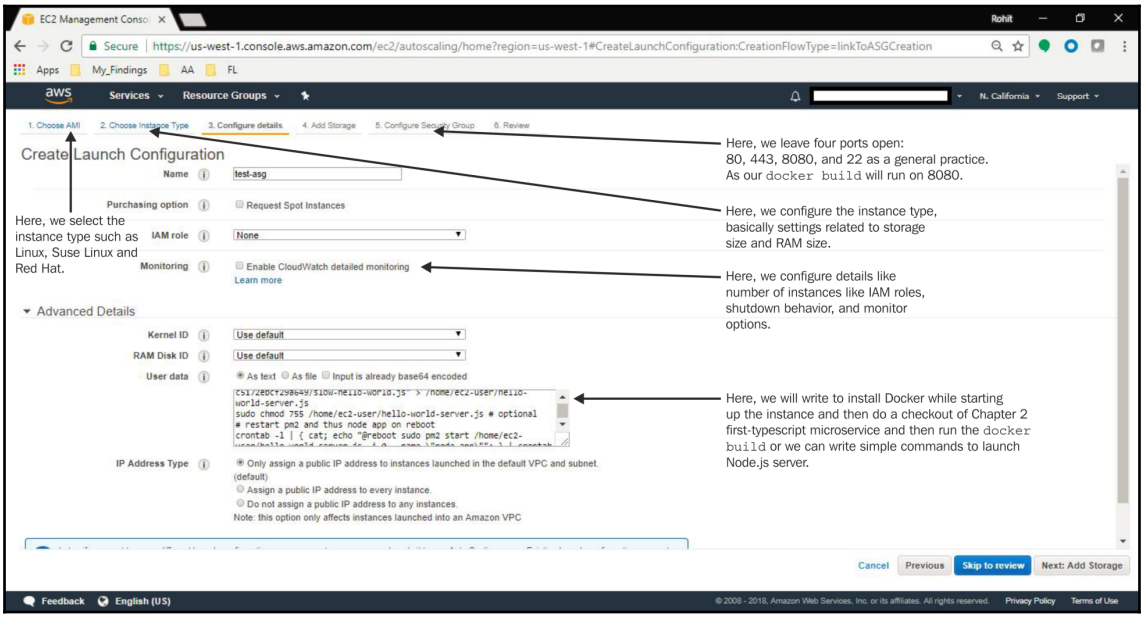
New dashboard
Last 6 hours
Panel Title
70
65
60
55
50
18:30
19:00
19:30
20:00
20:30
21:00
21:30
22:00
22:30
23:00
23:30
00:00
A-series

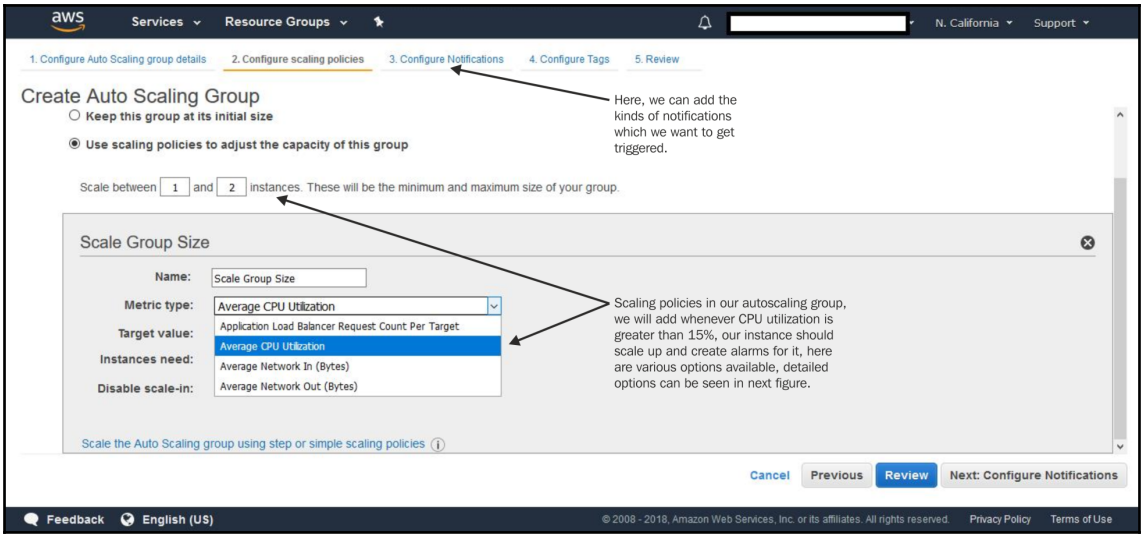
Chapter 10: Hardening Your Application






Here, we enter name, scheme, IP address, add listeners like accepting HTTP traffic on port 80, select availability zones.
Here, we add our autoscaling group.
Once done, copy the load balancer URL in new tab to check whether the load balancer is working or not.
All health check settings which help us to monitor our EC2 instance and load balancer.


Here, we select the instance type such as Linux, Suse Linux and Red Hat.
Here, we leave four ports open: 80, 443, 8080, and 22 as a general practice. As our docker build will run on 8080.
Here, we configure the instance type, basically settings related to storage size and RAM size.
Here, we configure details like number of instances like IAM roles, shutdown behavior, and monitor options.
Here, we will write to install Docker while starting up the instance and then do a checkout of Chapter 2 first-typescript microservice and then run the docker build or we can write simple commands to launch Node.js server.


aws
Services
Resource Groups
N. California
Support
1. Configure Auto Scaling group details
2. Configure scaling policies
3. Configure Notifications
4. Configure Tags
5. Review
Create Auto Scaling Group
Keep this group at its initial size
Use scaling policies to adjust the capacity of this group
Here, we can add the kinds of notifications which we want to get triggered.
Scale between 1 and 2 instances. These will be the minimum and maximum size of your group.
Scale Group Size
Name:
Scale Group Size
Metric type:
Average CPU Utilization
Target value:
Instances need:
Disable scale-in:
Application Load Balancer Request Count Per Target
Average CPU Utilization
Average Network In (Bytes)
Average Network Out (Bytes)
Scaling policies in our autoscaling group, we will add whenever CPU utilization is greater than 15%, our instance should scale up and create alarms for it, here are various options available, detailed options can be seen in next figure.
Scale the Auto Scaling group using step or simple scaling policies
Cancel
Previous
Review
Next: Configure Notifications
Feedback
English (US)
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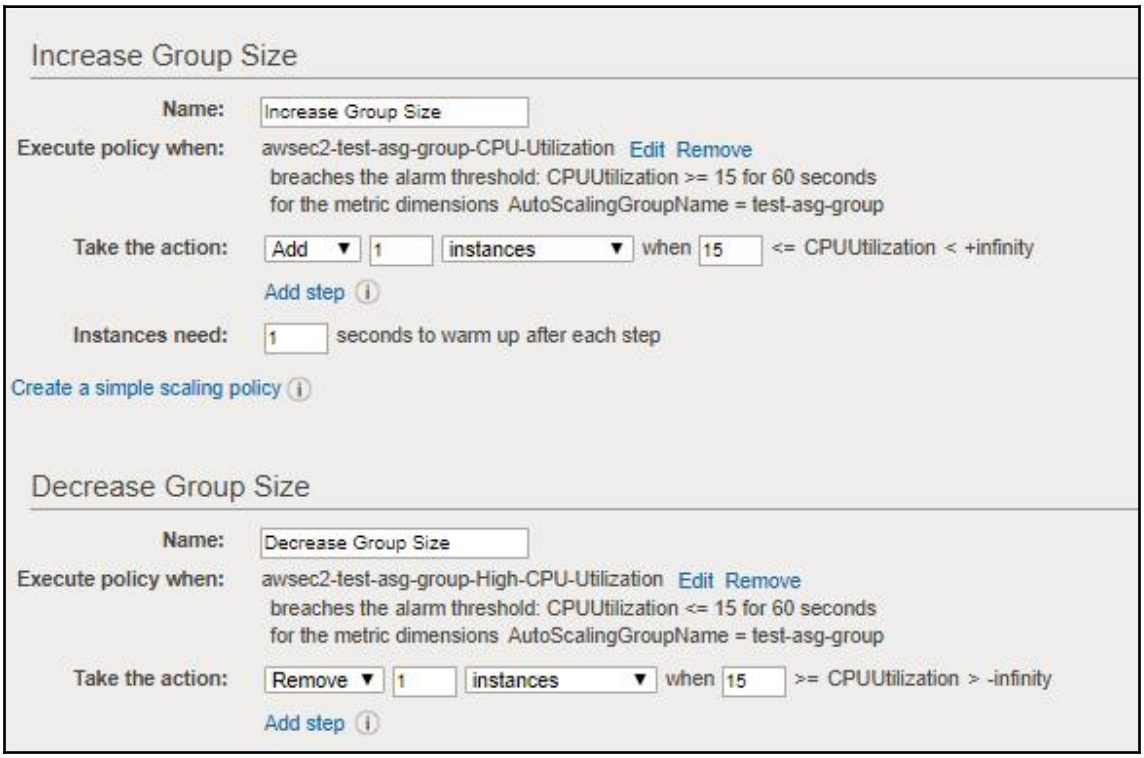
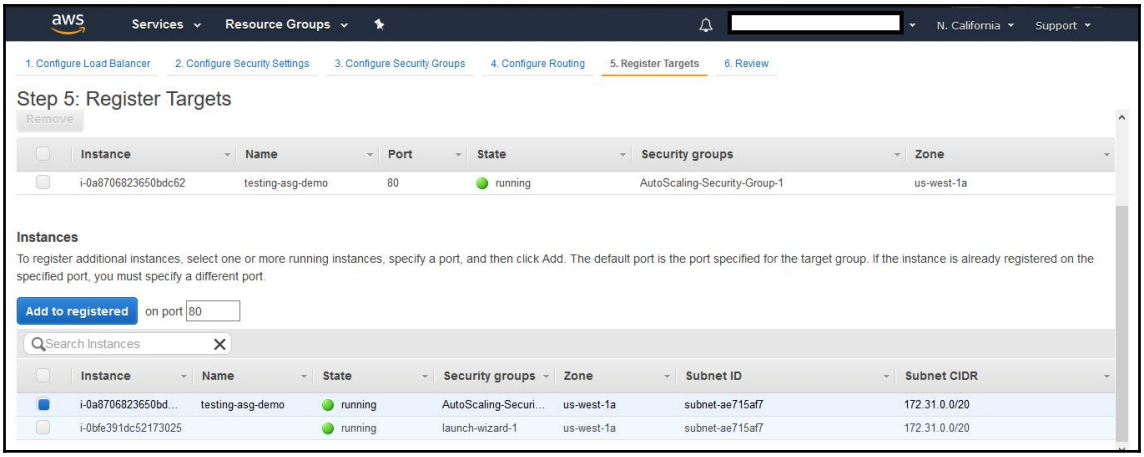
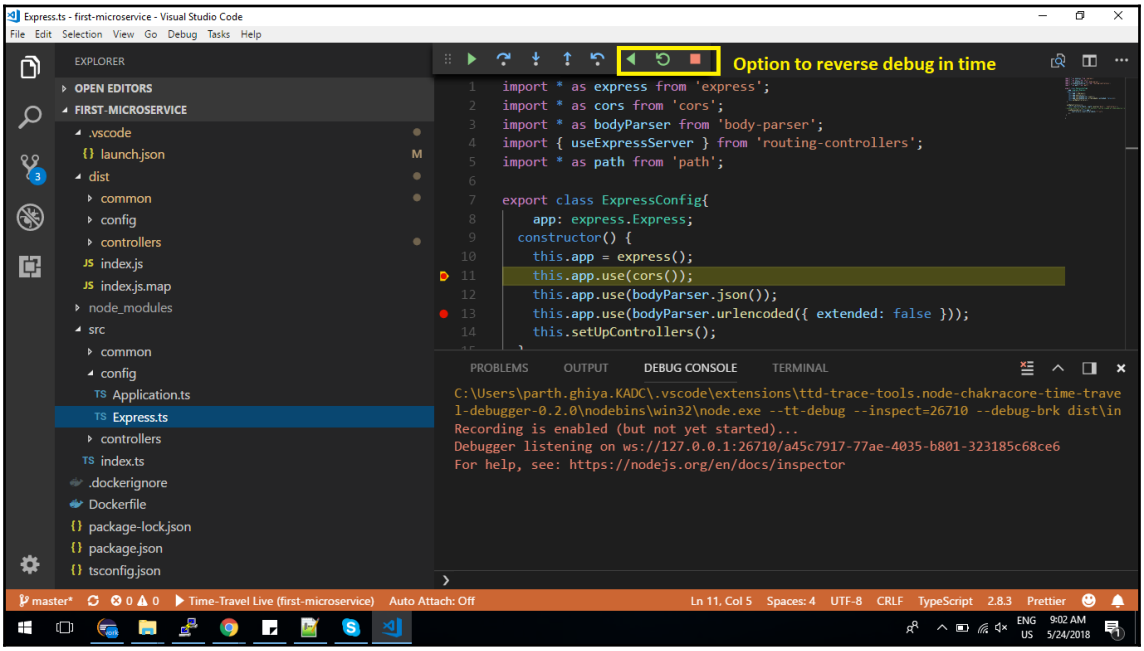
Privacy Policy
Terms of Use


Increase Group Size
Name:
Increase Group Size
Execute policy when:
awsec2-test-asg-group-CPU-Utilization Edit Remove
breaches the alarm threshold: CPUUtilization >= 15 for 60 seconds
for the metric dimensions AutoScalingGroupName = test-asg-group
Take the action:
Add 1 instances when 15 <= CPUUtilization < +infinity
Add step
Instances need:
1 seconds to warm up after each step
Create a simple scaling policy
Decrease Group Size
Name:
Decrease Group Size
Execute policy when:
awsec2-test-asg-group-High-CPU-Utilization Edit Remove
breaches the alarm threshold: CPUUtilization <= 15 for 60 seconds
for the metric dimensions AutoScalingGroupName = test-asg-group
Take the action:
Remove 1 instances when 15 >= CPUUtilization > -infinity
Add step


aws
Services
Resource Groups
N. California
Support
1. Configure Load Balancer
2. Configure Security Settings
3. Configure Security Groups
4. Configure Routing
5. Register Targets
6. Review
Step 5: Register Targets
Remove
Instance
Name
Port
State
Security groups
Zone
i-0a8706823650bdc62
testing-asg-demo
80
running
AutoScaling-Security-Group-1
us-west-1a
Instances
To register additional instances, select one or more running instances, specify a port, and then click Add. The default port is the port specified for the target group. If the instance is already registered on the specified port, you must specify a different port.
Add to registered
on port
80
Search Instances
Instance
Name
State
Security groups
Zone
Subnet ID
Subnet CIDR
i-0a8706823650bd...
testing-asg-demo
running
AutoScaling-Securi...
us-west-1a
subnet-ae715af7
172.31.0.0/20
i-0bfe391dc52173025
running
launch-wizard-1
us-west-1a
subnet-ae715af7
172.31.0.0/20

Appendix: What's New in Node.js 10.x and NPM 6.x?




```
Microsoft Windows [Version 10.0.16299.431]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\parth.ghiya.KADC\Desktop\tsms chapter2\typescript microservices\chapter 9\prometheus-grafana
>npm install
npm WARN prometheus-grafana-board@1.0.0 No repository field.
npm WARN optional SKIPPING OPTIONAL DEPENDENCY: fsevents@1.2.2 (node_modules\fsevents):
npm WARN notsup SKIPPING OPTIONAL DEPENDENCY: Unsupported platform for fsevents@1.2.2: wanted {"os":"darwin","arch":"any"}
 (current: {"os":"win32","arch":"x64"})

added 304 packages from 298 contributors in 62.256s
[!] 1 vulnerability found [1627 packages audited]
    Severity: 1 Low
    Run `npm audit` for more detail
```

Security Alert

```
C:\Users\parth.ghiya.KADC\Desktop\tsms chapter2\typescript microservices\chapter 9\prometheus-grafana
>npm audit

                       === npm audit security report ===

# Run  npm update fsevents --depth 3  to resolve 1 vulnerability

  Low             Prototype Pollution

  Package         deep-extend

  Dependency of   pm2

  Path            pm2 > chokidar > fsevents > node-pre-gyp > rc > deep-extend

  More info       https://nodesecurity.io/advisories/612



[!] 1 vulnerability found - Packages audited: 1627 (32 dev, 98 optional)
    Severity: 1 Low
```