

# Spring Cloud Task Lab

## Setting up the environment

1. Install RabbitMQ following the instructions in the document <FOLDER>/DNDataflow/labs/00\_InstallRabbitMQ.pdf.
2. Now let's setup the lab environment:
  - a. Using git
    - i. From a your local terminal or command prompt change directory to a clean working directory.
    - ii. Now execute: git clone <https://github.com/cppwfs/DNDataflow.git>
    - iii. Now cd DNDataflow
  - b. Using Thumbdrive
    - i. Copy the DNDataflow directory from the thumbdrive to a location on your laptop hard drive
    - ii. Now from a terminal or command prompt cd to the DNDataflow directory you just created on your hard drive.

## Let's Get Started!

1. 1) First let's goto lab 2 by going to our lab directory i.e. cd <.>/DNDataflow/labs/lab2 directory
2. Now let's build the project and run it
  - a. mvnw clean package
  - b. java -jar target/tasklab-0.0.1-SNAPSHOT.jar
3. Following the execution we will see the our "Hello World" show up along with the typical logging information from a basic boot app. Something like...

```
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=====|_|=====|_|/_/_/_/_/
:: Spring Boot ::          (v2.1.3.RELEASE)

2019-03-06 16:41:11.735 INFO 15819 --- [           main]
io.spring.TasklabApplication : Starting TasklabApplication on
wlundsmcpro2018.nv.charter.com with PID 15819
```

```
(/Users/wlund/Dropbox/git-workspace/wxlund/DNDataflow/labs/lab2/target/classes
started by wlund in
/Users/wlund/Dropbox/git-workspace/wxlund/DNDataflow/labs/lab2)
2019-03-06 16:41:11.737 INFO 15819 --- [           main]
io.spring.TasklabApplication      : No active profile set, falling
back to default profiles: default
2019-03-06 16:41:12.174 INFO 15819 --- [           main]
io.spring.TasklabApplication      : Started TasklabApplication in
0.688 seconds (JVM running for 1.206)
Hello World
```

## Now Let's Taskify our Boot App!

1. First lets add our dependencies to the pom.xml
2. Using your favorite editor or IDE open the pom.xml
3. We want to add the starter-task dependency along with H2 DataSource dependency.
  - a. Copy the dependencies below and paste them on Line 34 of your pom.xml .
4. Now let's enable the task
  - a.

```
<dependency>
  <groupId>org.springframework.cloud</groupId>
  <artifactId>spring-cloud-starter-task</artifactId>
</dependency>
<dependency>
  <groupId>com.h2database</groupId>
  <artifactId>h2</artifactId>
</dependency>
<dependency>
  <groupId>org.springframework.boot</groupId>
  <artifactId>spring-boot-starter-jdbc</artifactId>
</dependency>
```

- b. Open the
 

```
<..>/DNDataflow/labs/lab2/src/main/java/io/spring/TasklabApplication.java
```
  - c. On Line 13 add the `@EnableTask` annotation .
  - d. If you're not using an IDE uncomment lines 6-9, so it can be imported.
5. From your shell rebuild the application and rerun the app

- a. mvnw clean package
  - b. java -jar target/tasklab-0.0.1-SNAPSHOT.jar
6. Hmm... It looks the same, the log messages you demoed are not present. Well let's update our configuration so that we can see the log messages.
  - a. Open the <.>/DNDataflow/labs/lab2/src/main/resources/application.properties
  - b. Now let's add the following properties:

```
logging.level.org.springframework.cloud.task=DEBUG
spring.application.name=lab2-task
```

- c. We just set the log level for spring cloud task so that our log messages will now show up.
  - d. Notice that we also set the name of the application so that when it is stored in the database, the task\_name entry in the TASK\_EXECUTION table has something meaningful.
7. From your shell rebuild the application and rerun the app:
  - a. mvnw clean package
  - b. java -jar target/tasklab-0.0.1-SNAPSHOT.jar
8. Now we see our log messages, like what is shown below:

```
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\ \ / _ _ | | _ | | | | | | ( _ | ) ) )
' | _ _ | . _ | | _ | | _ | | \ _ | / / / /
=====|_|=====|_|_/ _ / _ / _ /
:: Spring Boot ::      (v2.1.3.RELEASE)
```

```
2019-03-06 17:23:49.757 INFO 16094 --- [          main]
io.spring.TasklabApplication      : Starting TasklabApplication
v0.0.1-SNAPSHOT on wlundsmcpro2018.nv.charter.com with PID 16094
(/Users/wlund/Dropbox/git-workspace/wxlund/DNDataflow/labs/lab2/target/task
lab-0.0.1-SNAPSHOT.jar started by wlund in
/Users/wlund/Dropbox/git-workspace/wxlund/DNDataflow/labs/lab2)
2019-03-06 17:23:49.760 INFO 16094 --- [          main]
io.spring.TasklabApplication      : No active profile set, falling
back to default profiles: default
2019-03-06 17:23:50.439 INFO 16094 --- [          main]
com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...
2019-03-06 17:23:50.617 INFO 16094 --- [          main]
```

```

com.zaxxer.hikari.HikariDataSource      : HikariPool-1 - Start completed.
2019-03-06 17:23:50.631 DEBUG 16094 --- [          main]
o.s.c.t.c.SimpleTaskConfiguration      : Using
org.springframework.cloud.task.configuration.DefaultTaskConfigurer
TaskConfigurer
2019-03-06 17:23:50.632 DEBUG 16094 --- [          main]
o.s.c.t.c.DefaultTaskConfigurer        : No EntityManager was found,
using DataSourceTransactionManager
2019-03-06 17:23:50.744 DEBUG 16094 --- [          main]
o.s.c.t.r.s.TaskRepositoryInitializer   : Initializing task schema for h2
database
2019-03-06 17:23:50.975 DEBUG 16094 --- [          main]
o.s.c.t.r.support.SimpleTaskRepository : Creating:
TaskExecution{executionId=0, parentExecutionId=null, exitCode=null,
taskName='lab2-task', startTime=Wed Mar 06 17:23:50 PST 2019, endTime=null,
exitMessage='null', externalExecutionId='null', errorMessage='null',
arguments=[]}
2019-03-06 17:23:50.984 INFO 16094 --- [          main]
io.spring.TasklabApplication           : Started TasklabApplication in
1.595 seconds (JVM running for 1.984)
Hello World
2019-03-06 17:23:50.994 DEBUG 16094 --- [          main]
o.s.c.t.r.support.SimpleTaskRepository : Updating: TaskExecution with
executionId=1 with the following {exitCode=0, endTime=Wed Mar 06 17:23:50
PST 2019, exitMessage='null', errorMessage='null'}
2019-03-06 17:23:51.001 INFO 16094 --- [          main]
com.zaxxer.hikari.HikariDataSource     : HikariPool-1 - Shutdown
initiated...
2019-03-06 17:23:51.006 INFO 16094 --- [          main]
com.zaxxer.hikari.HikariDataSource     : HikariPool-1 - Shutdown
completed.

```

## Now Let's Fail our Task to see if it records the error!

1. Now let's force an exception to be thrown to test how Task handles Exceptions
  - a. Open the

```
<..>/DNDDataflow/labs/lab2/src/main/java/io/spring/TasklabApplication.java
```
  - b. Copy the code below and paste it on line 26 add the following Exception:

```
throw new IllegalStateException("No Task For You!!");
```

- c. From your shell rebuild the application and rerun the app:
  - i. NOTE: that we are skipping tests for now so we can include the exception
  - ii. `mvnw clean package -DskipTests`
  - iii. `java -jar target/tasklab-0.0.1-SNAPSHOT.jar`
- d. Notice below that the “Updating” log message is a bit different. The `exitCode` for the application is 1 instead of 0 (because it failed) and also that the `errorMessage` is not empty but rather contains the stack trace.

```
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\ \ _ _)| |_)| | | | | | | | (| | ) ) )  
 ' | _ _| . _|_| |_|_| |_ \ , | / / / /  
=====|_|=====|__/_=/_/_/_/_/  
:: Spring Boot ::          (v2.1.3.RELEASE)
```

```
2019-03-06 17:30:41.592 INFO 16127 --- [main]
io.spring.TasklabApplication : Starting TasklabApplication on
wlundsmcpro2018.nv.charter.com with PID 16127
(/Users/wlund/Dropbox/git-workspace/wxlund/DNDataflow/labs/lab2/target/classes
started by wlund in
/Users/wlund/Dropbox/git-workspace/wxlund/DNDataflow/labs/lab2)
2019-03-06 17:30:41.594 INFO 16127 --- [main]
io.spring.TasklabApplication : No active profile set, falling
back to default profiles: default
2019-03-06 17:30:42.051 INFO 16127 --- [main]
com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...
2019-03-06 17:30:42.118 INFO 16127 --- [main]
com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Start completed.
2019-03-06 17:30:42.128 DEBUG 16127 --- [main]
o.s.c.t.c.SimpleTaskConfiguration : Using
org.springframework.cloud.task.configuration.DefaultTaskConfigurer
TaskConfigurer
2019-03-06 17:30:42.129 DEBUG 16127 --- [main]
o.s.c.t.c.DefaultTaskConfigurer : No EntityManager was found,
using DataSourceTransactionManager
2019-03-06 17:30:42.192 DEBUG 16127 --- [main]
o.s.c.t.r.s.TaskRepositoryInitializer : Initializing task schema for h2
database
2019-03-06 17:30:42.358 DEBUG 16127 --- [main]
o.s.c.t.r.support.SimpleTaskRepository : Creating:
```

```

TaskExecution{executionId=0, parentExecutionId=null, exitCode=null,
taskName='lab2-task', startTime=Wed Mar 06 17:30:42 PST 2019, endTime=null,
exitMessage='null', externalExecutionId='null', errorMessage='null',
arguments=[--spring.output.ansi.enabled=always]}
2019-03-06 17:30:42.364 INFO 16127 --- [          main]
io.spring.TasklabApplication      : Started TasklabApplication in
0.984 seconds (JVM running for 1.387)
2019-03-06 17:30:42.366 INFO 16127 --- [          main]
ConditionEvaluationReportLoggingListener :

Error starting ApplicationContext. To display the conditions report re-run
your application with 'debug' enabled.
2019-03-06 17:30:42.372 DEBUG 16127 --- [          main]
o.s.c.t.r.support.SimpleTaskRepository : Updating: TaskExecution with
executionId=1 with the following {exitCode=1, endTime=Wed Mar 06 17:30:42
PST 2019, exitMessage='null',
errorMessage='java.lang.IllegalStateException: Failed to execute
CommandLineRunner
    at
org.springframework.boot.SpringApplication.callRunner(SpringApplication.jav
a:816)
    at
org.springframework.boot.SpringApplication.callRunners(SpringApplication.ja
va:797)
    at
org.springframework.boot.SpringApplication.run(SpringApplication.java:324)
    at
org.springframework.boot.SpringApplication.run(SpringApplication.java:1260)
    at
org.springframework.boot.SpringApplication.run(SpringApplication.java:1248)
    at io.spring.TasklabApplication.main(TasklabApplication.java:18)
Caused by: java.lang.IllegalStateException: No Task For You!!
    at io.spring.TasklabApplication$1.run(TasklabApplication.java:26)
    at
org.springframework.boot.SpringApplication.callRunner(SpringApplication.jav
a:813)
    ... 5 more
'}
2019-03-06 17:30:42.376 INFO 16127 --- [          main]
com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Shutdown
initiated...
2019-03-06 17:30:42.377 INFO 16127 --- [          main]

```

```

com.zaxxer.hikari.HikariDataSource      : HikariPool-1 - Shutdown
completed.
2019-03-06 17:30:42.385 ERROR 16127 --- [          main]
o.s.boot.SpringApplication              : Application run failed

java.lang.IllegalStateException: Failed to execute CommandLineRunner
    at
    org.springframework.boot.SpringApplication.callRunner(SpringApplication.jav
a:816) [spring-boot-2.1.3.RELEASE.jar:2.1.3.RELEASE]
    at
    org.springframework.boot.SpringApplication.callRunners(SpringApplication.ja
va:797) [spring-boot-2.1.3.RELEASE.jar:2.1.3.RELEASE]
    at
    org.springframework.boot.SpringApplication.run(SpringApplication.java:324)
    [spring-boot-2.1.3.RELEASE.jar:2.1.3.RELEASE]
    at
    org.springframework.boot.SpringApplication.run(SpringApplication.java:1260)
    [spring-boot-2.1.3.RELEASE.jar:2.1.3.RELEASE]
    at
    org.springframework.boot.SpringApplication.run(SpringApplication.java:1248)
    [spring-boot-2.1.3.RELEASE.jar:2.1.3.RELEASE]
    at io.spring.TasklabApplication.main(TasklabApplication.java:18)
    [classes/:na]
Caused by: java.lang.IllegalStateException: No Task For You!!
    at io.spring.TasklabApplication$1.run(TasklabApplication.java:26)
    ~[classes/:na]
    at
    org.springframework.boot.SpringApplication.callRunner(SpringApplication.jav
a:813) [spring-boot-2.1.3.RELEASE.jar:2.1.3.RELEASE]
    ... 5 common frames omitted

```

2. Now let's comment out our throw new IllegalStateException.

## Now Let's do some pre and post processing!

3. 1. Let's test the before and after task processing capabilities for Task.
  - a. Open the
 

```
<..>/DNDDataflow/labs/lab2/src/main/java/io/spring/TasklabApplication.java
```
  - b. Copy the code below and paste it on line 30 add the following lifecycle methods:

```
@BeforeTask
public void beforeTask(TaskExecution taskExecution) {
    System.out.println("Before TASK");
}
@AfterTask
public void afterTask(TaskExecution taskExecution) {
    System.out.println("After TASK");
}
```

- c. From your shell rebuild the application and rerun the app:

```
mvnw clean package
```

```
java -jar target/tasklab-0.0.1-SNAPSHOT.jar
```

- d. Notice below that the after the “Creating:” log message we see that the method annotated with `@BeforeTask` fired printing “Before TASK”. And before the “Updating:” log message we see that the method annotated with `@AfterTask` fired printing “After TASK”.





```

After TASK
2019-03-07 09:50:21.587 DEBUG 24354 --- [           main]
o.s.c.t.r.support.SimpleTaskRepository : Updating: TaskExecution with
executionId=1 with the following {exitCode=0, endTime=Thu Mar 07 09:50:21
PST 2019, exitMessage='null', errorMessage='null'}
2019-03-07 09:50:21.591 INFO 24354 --- [           main]
com.zaxxer.hikari.HikariDataSource      : HikariPool-1 - Shutdown
initiated...
2019-03-07 09:50:21.593 INFO 24354 --- [           main]
com.zaxxer.hikari.HikariDataSource      : HikariPool-1 - Shutdown
completed.

```

## Deploying to Cloud Foundry

Its as simple as:

```
cf push --health-check-type none -p target/tasklab-0.0.1-SNAPSHOT.jar runner
```

```
cf logs runner
```

And the output should be something like:

```

2019-03-07T10:47:12.63-0800 [APP/PROC/WEB/0] OUT . ____ _
_ _ _
2019-03-07T10:47:12.63-0800 [APP/PROC/WEB/0] OUT /\ / __' _ _ _(_)_
_ _ _ \ \ \ \
2019-03-07T10:47:12.63-0800 [APP/PROC/WEB/0] OUT ( ( )\__ | ' _ | '_ | |
'_ \/_ ` | \ \ \ \
2019-03-07T10:47:12.63-0800 [APP/PROC/WEB/0] OUT \ \ / ___) | |_) | | | |
| | | (_ | | ) ) ) )
2019-03-07T10:47:12.63-0800 [APP/PROC/WEB/0] OUT ' |__| ._|_|
|_|_| |_\_, | / / / /
2019-03-07T10:47:12.63-0800 [APP/PROC/WEB/0] OUT
=====|_|=====|___/=/_/_/_/_/
2019-03-07T10:47:12.63-0800 [APP/PROC/WEB/0] OUT :: Spring Boot ::
(v2.1.3.RELEASE)

```

```
2019-03-07T10:47:12.82-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:12.823
INFO 15 --- [          main] pertySourceApplicationContextInitializer :
'cloud' property source added
2019-03-07T10:47:12.82-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:12.828
INFO 15 --- [          main] nfigurationApplicationContextInitializer :
Reconfiguration enabled
2019-03-07T10:47:12.83-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:12.836
INFO 15 --- [          main] io.spring.TasklabApplication          :
Starting TasklabApplication on 173c1c8c-1113-4215-685b-1242 with PID 15
(/home/vcap/app/BOOT-INF/classes started by vcap in /home/vcap/app)
2019-03-07T10:47:12.83-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:12.836
INFO 15 --- [          main] io.spring.TasklabApplication          :
The following profiles are active: cloud
2019-03-07T10:47:13.70-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:13.708
INFO 15 --- [          main] com.zaxxer.hikari.HikariDataSource   :
HikariPool-1 - Starting...
2019-03-07T10:47:13.90-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:13.900
INFO 15 --- [          main] com.zaxxer.hikari.HikariDataSource   :
HikariPool-1 - Start completed.
2019-03-07T10:47:13.91-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:13.913
DEBUG 15 --- [          main] o.s.c.t.c.SimpleTaskConfiguration    :
Using org.springframework.cloud.task.configuration.DefaultTaskConfigurer
TaskConfigurer
2019-03-07T10:47:13.91-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:13.914
DEBUG 15 --- [          main] o.s.c.t.c.DefaultTaskConfigurer      :
No EntityManager was found, using DataSourceTransactionManager
2019-03-07T10:47:14.03-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:14.038
DEBUG 15 --- [          main] o.s.c.t.r.s.TaskRepositoryInitializer :
Initializing task schema for h2 database
2019-03-07T10:47:14.25-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:14.252
DEBUG 15 --- [          main] o.s.c.t.r.support.SimpleTaskRepository :
Creating: TaskExecution{executionId=0, parentExecutionId=null,
exitCode=null, taskName='lab2-task', startTime=Thu Mar 07 18:47:14 UTC
2019, endTime=null, exitMessage='null', externalExecutionId='null',
errorMessage='null', arguments=[]}
2019-03-07T10:47:14.25-0800 [APP/PROC/WEB/0] OUT Before TASK
2019-03-07T10:47:14.26-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:14.261
INFO 15 --- [          main] io.spring.TasklabApplication          :
Started TasklabApplication in 2.068 seconds (JVM running for 2.849)
2019-03-07T10:47:14.26-0800 [APP/PROC/WEB/0] OUT Hello World
2019-03-07T10:47:14.26-0800 [APP/PROC/WEB/0] OUT After TASK
2019-03-07T10:47:14.27-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:14.272
```

```

DEBUG 15 --- [           main] o.s.c.t.r.support.SimpleTaskRepository :
Updating: TaskExecution with executionId=1 with the following {exitCode=0,
endTime=Thu Mar 07 18:47:14 UTC 2019, exitMessage='null',
errorMessage='null'}
    2019-03-07T10:47:14.27-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:14.277
INFO 15 --- [           main] com.zaxxer.hikari.HikariDataSource :
HikariPool-1 - Shutdown initiated...
    2019-03-07T10:47:14.27-0800 [APP/PROC/WEB/0] OUT 2019-03-07 18:47:14.279
INFO 15 --- [           main] com.zaxxer.hikari.HikariDataSource :
HikariPool-1 - Shutdown completed.
    2019-03-07T10:47:14.28-0800 [APP/PROC/WEB/0] OUT Exit status 0

```

## (Optional) Extra Credit!

If you are running MySQL or other database on your laptop locally, we can test Tasks ability to create its tables in that repository and update with a Task Execution.

1. Using your favorite editor or IDE open the pom.xml
2. In this example we are going to add the MySQL (mariadb) DataSource dependency.
  - a. Note: if you are using another database you can use that database dependencies.
  - b. Copy the dependencies below and paste them on Line 46 of your pom.xml.

```

<dependency>
  <groupId>org.mariadb.jdbc</groupId>
  <artifactId>mariadb-java-client</artifactId>
</dependency>

```

3. Now let's rebuild your project

```
mvnw clean package
```

4. And now let's setup the environment variables for example:

```

export spring_datasource_url=jdbc:mariadb://localhost:3306/<your database>
export spring_datasource_username=<your username >
export spring_datasource_password=<your password >
export spring_datasource_driverClassName=org.mariadb.jdbc.Driver

```

5. Now rerun the app

- a. `java -jar target/tasklab-0.0.1-SNAPSHOT.jar`