# Business Process Automation Lab Demonstrator 2

(Guided Project)

# A quick guide to install and start the project

in Winter 2023/24

**TH Köln - Campus Gummersbach**

Faculty of Computer Science and Engineering Science (F10)

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**Project Supervisor:** Prof. Dr. Matthias Zapp

**Date:** 1st of February, 2024

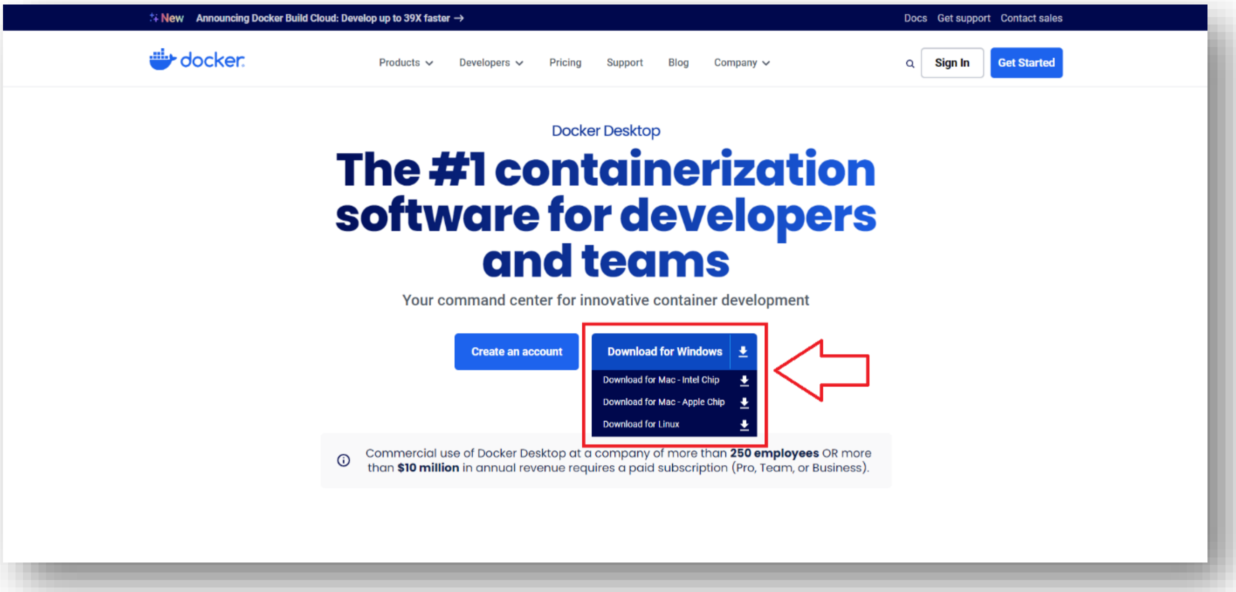
Technology
Arts Sciences
TH Köln

# Welcome to the quick start guide for the BPA Lab Bicycle Factory Demonstrator

***STEP 1:***

*Download the Docker desktop application based on your system preference.*

*Link to download Docker desktop:* [https://www.docker.com/products/docker-desktop/](https://www.docker.com/products/docker-desktop/)



The #1 containerization software for developers and teams

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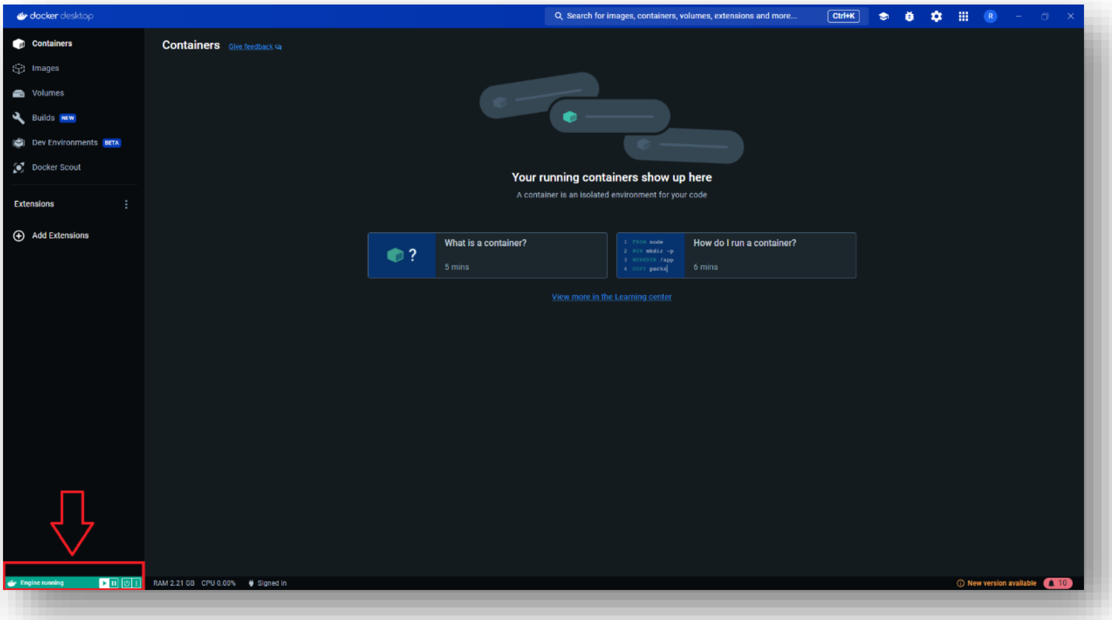
Commercial use of Docker Desktop at a company of more than **250 employees** OR more than **$10 million** in annual revenue requires a paid subscription (Pro, Team, or Business).

***STEP 2:***

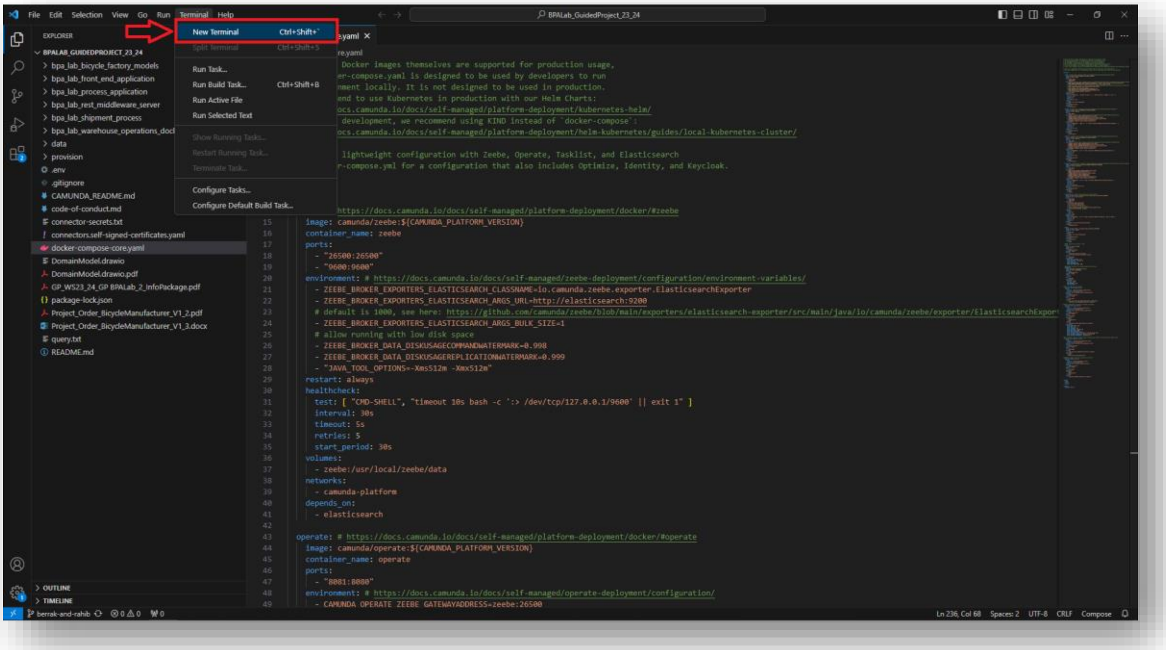
*Start the Docker desktop application on your system and wait till the Docker engine is up and running inside the application.*



Your running containers show up here

A container is an isolated environment for your code

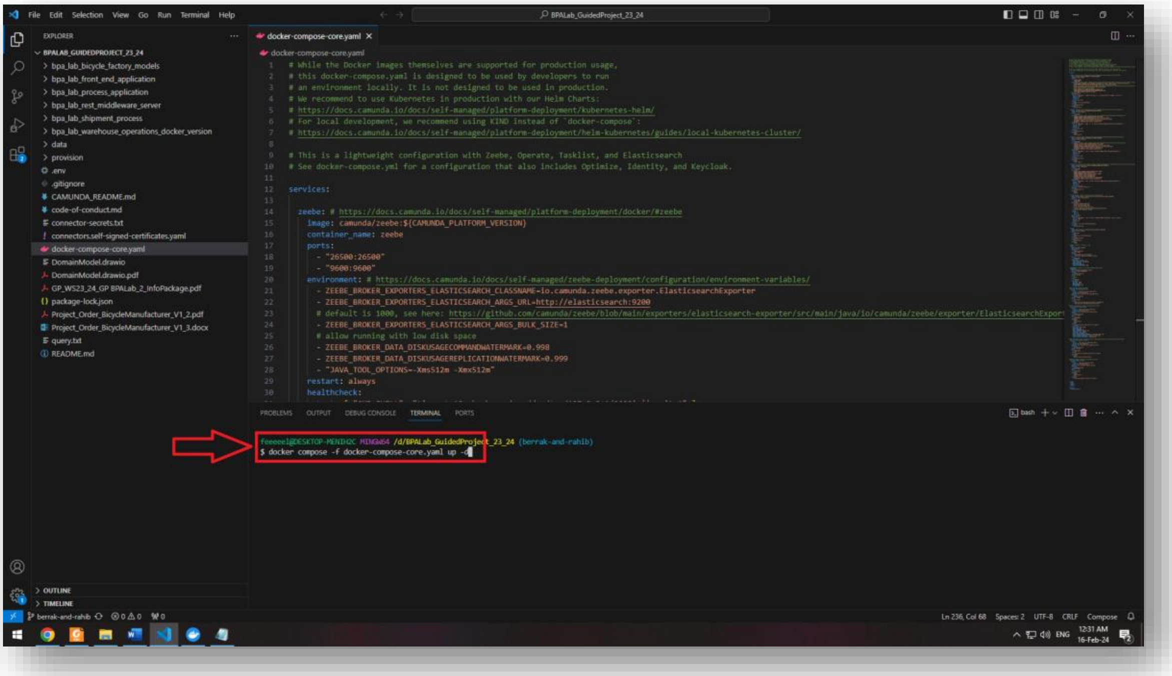
***STEP 3:***
*Open the project in any code editor as per your choice for example Visual Studio Code and open a new terminal.*


File Edit Selection View Go Run Terminal Help
BPALab_GuidedProject_23_24
EXPLORER
BPALAB_GUIDEDPROJECT_23_24
bpa_lab_bicycle_factory_models
bpa_lab_front_end_application
bpa_lab_process_application
bpa_lab_rest_middleware_server
bpa_lab_shipment_process
bpa_lab_warehouse_operations_docl
data
provision
.env
.gitignore
CAMUNDA_README.md
code-of-conduct.md
connector-secrets.txt
connectors.self-signed-certificates.yaml
docker-compose-core.yaml
DomainModel.drawio
DomainModel.drawio.pdf
GP_WS23_24_GP BPALab_2_InfoPackage.pdf
package-lock.json
Project_Order_BicycleManufacturer_V1_2.pdf
Project_Order_BicycleManufacturer_V1_3.docx
query.txt
README.md
New Terminal Ctrl+Shift+`
Split Terminal Ctrl+Shift+5
Run Task...
Run Build Task... Ctrl+Shift+B
Run Active File
Run Selected Text
Show Running Tasks...
Restart Running Task...
Terminate Task...
Configure Tasks...
Configure Default Build Task...
OUTLINE
TIMELINE
berrak-and-rahib
Ln 236, Col 68 Spaces: 2 UTF-8 CRLF Compose

```
re.yaml
 Docker images themselves are supported for production usage,
er-compose.yaml is designed to be used by developers to run
nment locally. It is not designed to be used in production.
end to use Kubernetes in production with our Helm Charts:
ocs.camunda.io/docs/self-managed/platform-deployment/kubernetes-helm/
 development, we recommend using KIND instead of `docker-compose`:
ocs.camunda.io/docs/self-managed/platform-deployment/helm-kubernetes/guides/local-kubernetes-cluster/

 lightweight configuration with Zeebe, Operate, Tasklist, and Elasticsearch
r-compose.yml for a configuration that also includes Optimize, Identity, and Keycloak.



https://docs.camunda.io/docs/self-managed/platform-deployment/docker/#zeebe
    image: camunda/zeebe:${CAMUNDA_PLATFORM_VERSION}
    container_name: zeebe
    ports:
      - "26500:26500"
      - "9600:9600"
    environment: # https://docs.camunda.io/docs/self-managed/zeebe-deployment/configuration/environment-variables/
      - ZEEBE_BROKER_EXPORTERS_ELASTICSEARCH_CLASSNAME=io.camunda.zeebe.exporter.ElasticsearchExporter
      - ZEEBE_BROKER_EXPORTERS_ELASTICSEARCH_ARGS_URL=http://elasticsearch:9200
      # default is 1000, see here: https://github.com/camunda/zeebe/blob/main/exporters/elasticsearch-exporter/src/main/java/io/camunda/zeebe/exporter/ElasticsearchExport
      - ZEEBE_BROKER_EXPORTERS_ELASTICSEARCH_ARGS_BULK_SIZE=1
      # allow running with low disk space
      - ZEEBE_BROKER_DATA_DISKUSAGECOMMANDWATERMARK=0.998
      - ZEEBE_BROKER_DATA_DISKUSAGEREPLICATIONWATERMARK=0.999
      - "JAVA_TOOL_OPTIONS=-Xms512m -Xmx512m"
    restart: always
    healthcheck:
      test: [ "CMD-SHELL", "timeout 10s bash -c ':> /dev/tcp/127.0.0.1/9600' || exit 1" ]
      interval: 30s
      timeout: 5s
      retries: 5
      start_period: 30s
    volumes:
      - zeebe:/usr/local/zeebe/data
    networks:
      - camunda-platform
    depends_on:
      - elasticsearch

  operate: # https://docs.camunda.io/docs/self-managed/platform-deployment/docker/#operate
    image: camunda/operate:${CAMUNDA_PLATFORM_VERSION}
    container_name: operate
    ports:
      - "8081:8080"
    environment: # https://docs.camunda.io/docs/self-managed/operate-deployment/configuration/
      - CAMUNDA_OPERATE_ZEEBE_GATEWAYADDRESS=zeebe:26500
```

***STEP 4:***
*Copy the following command and run the docker-compose-core.yaml from the root directory of the project. Wait for the command to be executed completely. It will automatically pull all the required images, create the containers and start them inside your Docker desktop.*

*Command:* ***docker compose -f docker-compose-core.yaml up -d***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docker-compose-core.yaml
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
bash
OUTLINE
TIMELINE
berrak-and-rahib
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ENG
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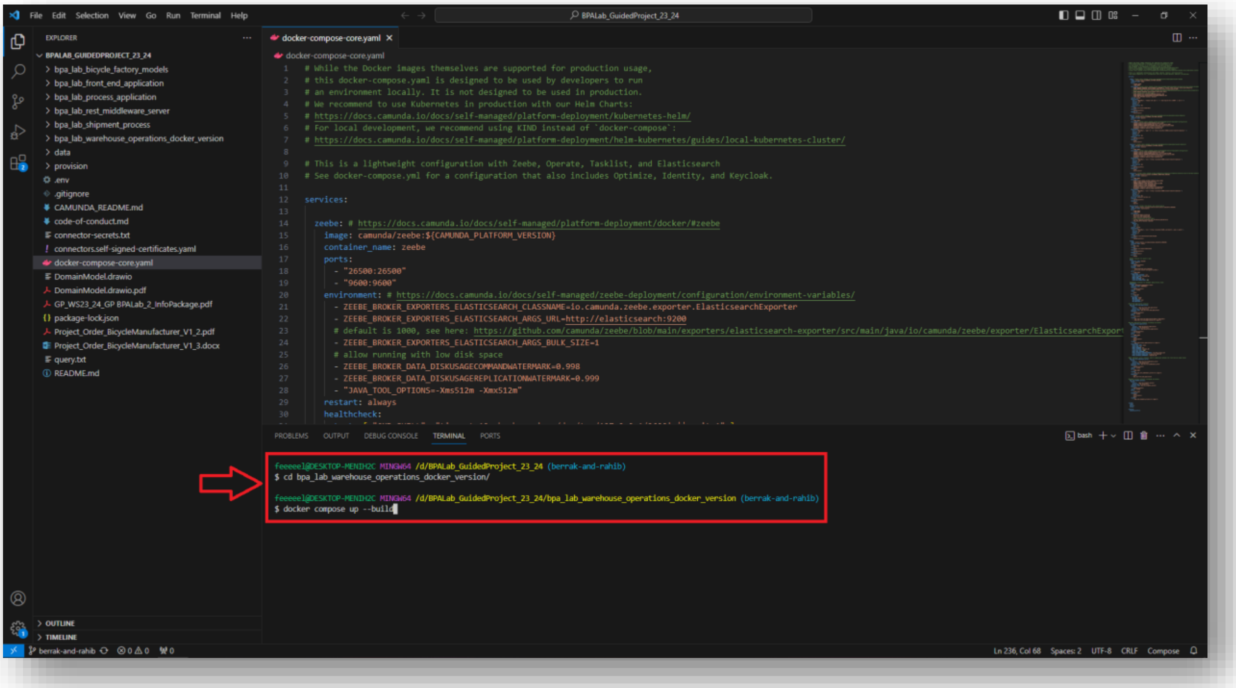
```
# While the Docker images themselves are supported for production usage,
# this docker-compose.yaml is designed to be used by developers to run
# an environment locally. It is not designed to be used in production.
# We recommend to use Kubernetes in production with our Helm Charts:
# https://docs.camunda.io/docs/self-managed/platform-deployment/kubernetes-helm/
# For local development, we recommend using KIND instead of `docker-compose`:
# https://docs.camunda.io/docs/self-managed/platform-deployment/helm-kubernetes/guides/local-kubernetes-cluster/

# This is a lightweight configuration with Zeebe, Operate, Tasklist, and Elasticsearch
# See docker-compose.yml for a configuration that also includes Optimize, Identity, and Keycloak.

services:

  zeebe: # https://docs.camunda.io/docs/self-managed/platform-deployment/docker/#zeebe
    image: camunda/zeebe:${CAMUNDA_PLATFORM_VERSION}
    container_name: zeebe
    ports:
      - "26500:26500"
      - "9600:9600"
    environment: # https://docs.camunda.io/docs/self-managed/zeebe-deployment/configuration/environment-variables/
      - ZEEBE_BROKER_EXPORTERS_ELASTICSEARCH_CLASSNAME=io.camunda.zeebe.exporter.ElasticsearchExporter
      - ZEEBE_BROKER_EXPORTERS_ELASTICSEARCH_ARGS_URL=http://elasticsearch:9200
      # default is 1000, see here: https://github.com/camunda/zeebe/blob/main/exporters/elasticsearch-exporter/src/main/java/io/camunda/zeebe/exporter/ElasticsearchExport
      - ZEEBE_BROKER_EXPORTERS_ELASTICSEARCH_ARGS_BULK_SIZE=1
      # allow running with low disk space
      - ZEEBE_BROKER_DATA_DISKUSAGECOMMANDWATERMARK=0.998
      - ZEEBE_BROKER_DATA_DISKUSAGEREPLICATIONWATERMARK=0.999
      - "JAVA_TOOL_OPTIONS=-Xms512m -Xmx512m"
    restart: always
    healthcheck:
```

```
feeeeel@DESKTOP-MENIH2C MINGW64 /d/BPALab_GuidedProject_23_24 (berrak-and-rahib)
$ docker compose -f docker-compose-core.yaml up -d
```

***STEP 5:***

*Once all the containers are up and running, now change the directory to bpa_lab_warehouse_operations_docker_version and run the docker-compose.yml using the following command. This will automatically pull all the required images, create the containers and start them inside your Docker desktop application. This is for the Warehouse Operations.*

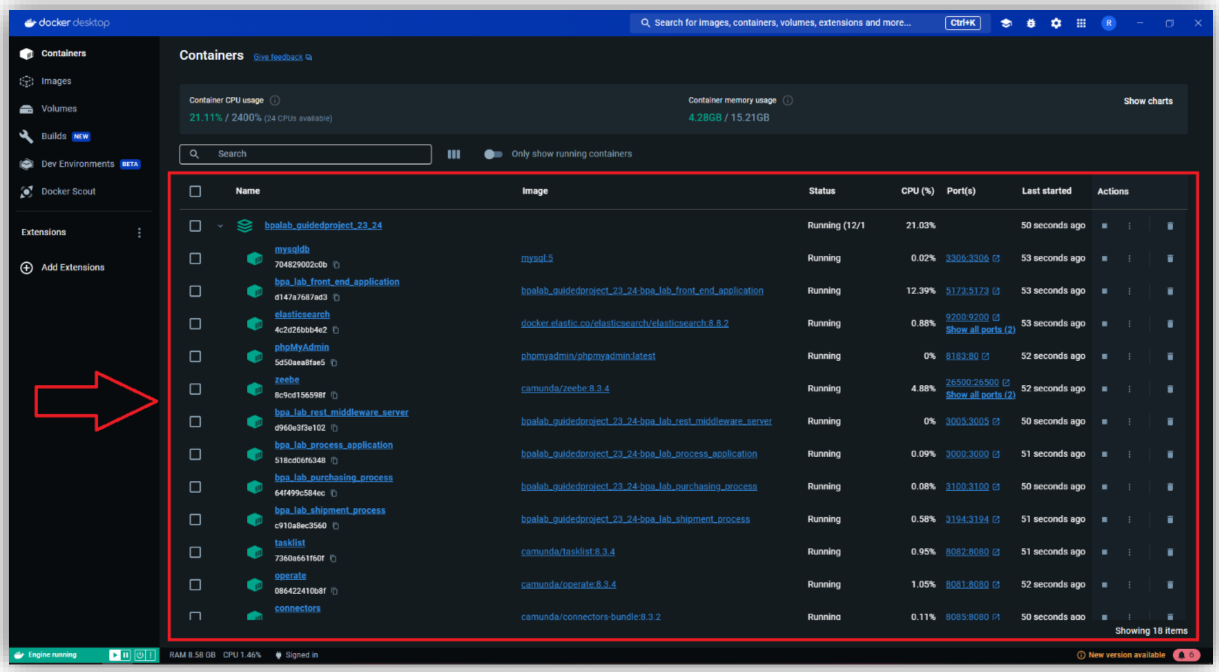
*Command:* ***docker compose up --build***



```
# While the Docker images themselves are supported for production usage,
# this docker-compose.yaml is designed to be used by developers to run
# an environment locally. It is not designed to be used in production.
# We recommend to use Kubernetes in production with our Helm Charts:
# https://docs.camunda.io/docs/self-managed/platform-deployment/kubernetes-helm/
# For local development, we recommend using KIND instead of `docker-compose`:
# https://docs.camunda.io/docs/self-managed/platform-deployment/helm-kubernetes/guides/local-kubernetes-cluster/

# This is a lightweight configuration with Zeebe, Operate, Tasklist, and Elasticsearch
# See docker-compose.yml for a configuration that also includes Optimize, Identity, and Keycloak.

services:

  zeebe: # https://docs.camunda.io/docs/self-managed/platform-deployment/docker/#zeebe
    image: camunda/zeebe:${CAMUNDA_PLATFORM_VERSION}
    container_name: zeebe
    ports:
      - "26500:26500"
      - "9600:9600"
    environment: # https://docs.camunda.io/docs/self-managed/zeebe-deployment/configuration/environment-variables/
      - ZEEBE_BROKER_EXPORTERS_ELASTICSEARCH_CLASSNAME=io.camunda.zeebe.exporter.ElasticsearchExporter
      - ZEEBE_BROKER_EXPORTERS_ELASTICSEARCH_ARGS_URL=http://elasticsearch:9200
      # default is 1000, see here: https://github.com/camunda/zeebe/blob/main/exporters/elasticsearch-exporter/src/main/java/io/camunda/zeebe/exporter/ElasticsearchExport
      - ZEEBE_BROKER_EXPORTERS_ELASTICSEARCH_ARGS_BULK_SIZE=1
      # allow running with low disk space
      - ZEEBE_BROKER_DATA_DISKUSAGECOMMANDWATERMARK=0.998
      - ZEEBE_BROKER_DATA_DISKUSAGEREPLICATIONWATERMARK=0.999
      - "JAVA_TOOL_OPTIONS=-Xms512m -Xmx512m"
    restart: always
    healthcheck:
```

```
feeeeel@DESKTOP-MENIH2C MINGW64 /d/BPALab_GuidedProject_23_24 (berrak-and-rahib)
$ cd bpa_lab_warehouse_operations_docker_version/

feeeeel@DESKTOP-MENIH2C MINGW64 /d/BPALab_GuidedProject_23_24/bpa_lab_warehouse_operations_docker_version (berrak-and-rahib)
$ docker compose up --build
```

*If all the containers are created successfully (green), you should be able to see something like this in your Docker desktop application:*



Containers

Container CPU usage: 21.11% / 2400% (24 CPUs available)

Container memory usage: 4.28GB / 15.21GB

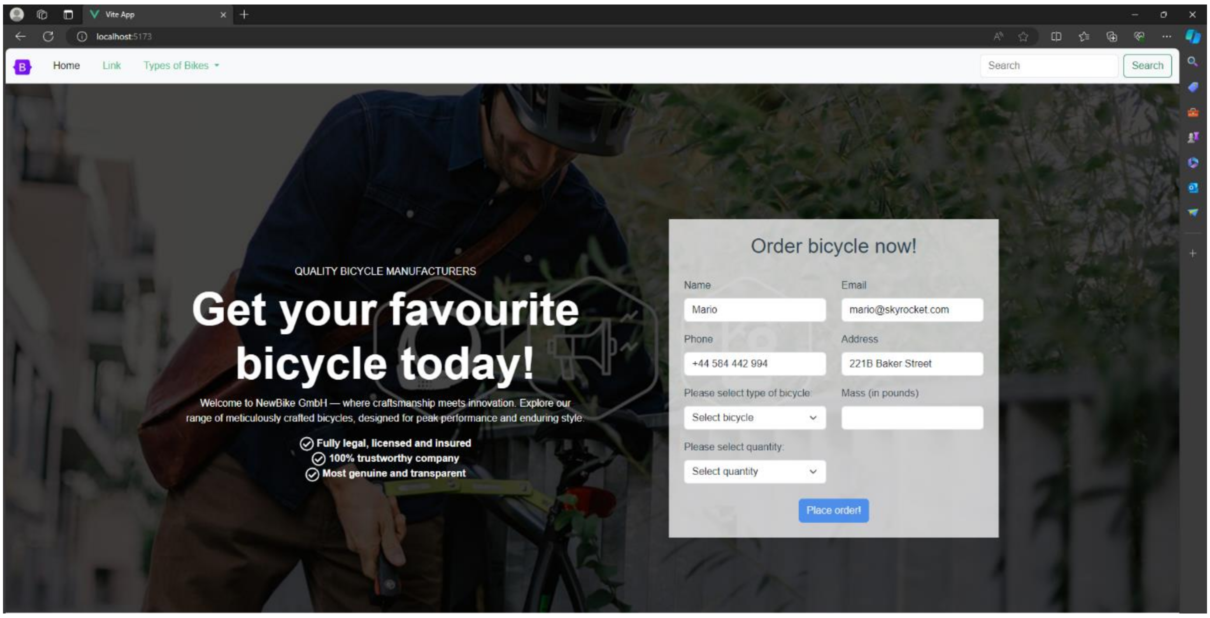
| Name | Image | Status | CPU (%) | Port(s) | Last started |
|---|---|---|---|---|---|
| bpalab_guidedproject_23_24 | | Running (12/1 | 21.03% | | 50 seconds ago |
| mysqldb<br>704829002c0b | mysql:5 | Running | 0.02% | 3306:3306 | 53 seconds ago |
| bpa_lab_front_end_application<br>d147a7687ad3 | bpalab_guidedproject_23_24-bpa_lab_front_end_application | Running | 12.39% | 5173:5173 | 53 seconds ago |
| elasticsearch<br>4c2d26bbb4e2 | docker.elastic.co/elasticsearch/elasticsearch:8.8.2 | Running | 0.88% | 9200:9200<br>Show all ports (2) | 53 seconds ago |
| phpMyAdmin<br>5d50aea8fae5 | phpmyadmin/phpmyadmin:latest | Running | 0% | 8183:80 | 52 seconds ago |
| zeebe<br>8c9cd156598f | camunda/zeebe:8.3.4 | Running | 4.88% | 26500:26500<br>Show all ports (2) | 52 seconds ago |
| bpa_lab_rest_middleware_server<br>d960e3f3e102 | bpalab_guidedproject_23_24-bpa_lab_rest_middleware_server | Running | 0% | 3005:3005 | 50 seconds ago |
| bpa_lab_process_application<br>518cd06f6348 | bpalab_guidedproject_23_24-bpa_lab_process_application | Running | 0.09% | 3000:3000 | 51 seconds ago |
| bpa_lab_purchasing_process<br>64f499c584ec | bpalab_guidedproject_23_24-bpa_lab_purchasing_process | Running | 0.08% | 3100:3100 | 50 seconds ago |
| bpa_lab_shipment_process<br>c910a8ec3560 | bpalab_guidedproject_23_24-bpa_lab_shipment_process | Running | 0.58% | 3194:3194 | 51 seconds ago |
| tasklist<br>7360a661f60f | camunda/tasklist:8.3.4 | Running | 0.95% | 8082:8080 | 51 seconds ago |
| operate<br>086422410b8f | camunda/operate:8.3.4 | Running | 1.05% | 8081:8080 | 52 seconds ago |
| connectors | camunda/connectors-bundle:8.3.2 | Running | 0.11% | 8085:8080 | 50 seconds ago |

Showing 18 items

***STEP 6:***
*Now lets go through the ports and access the required containers:*

## ***Required containers***

***Front-end application:*** *[http://localhost:5173](http://localhost:5173)*



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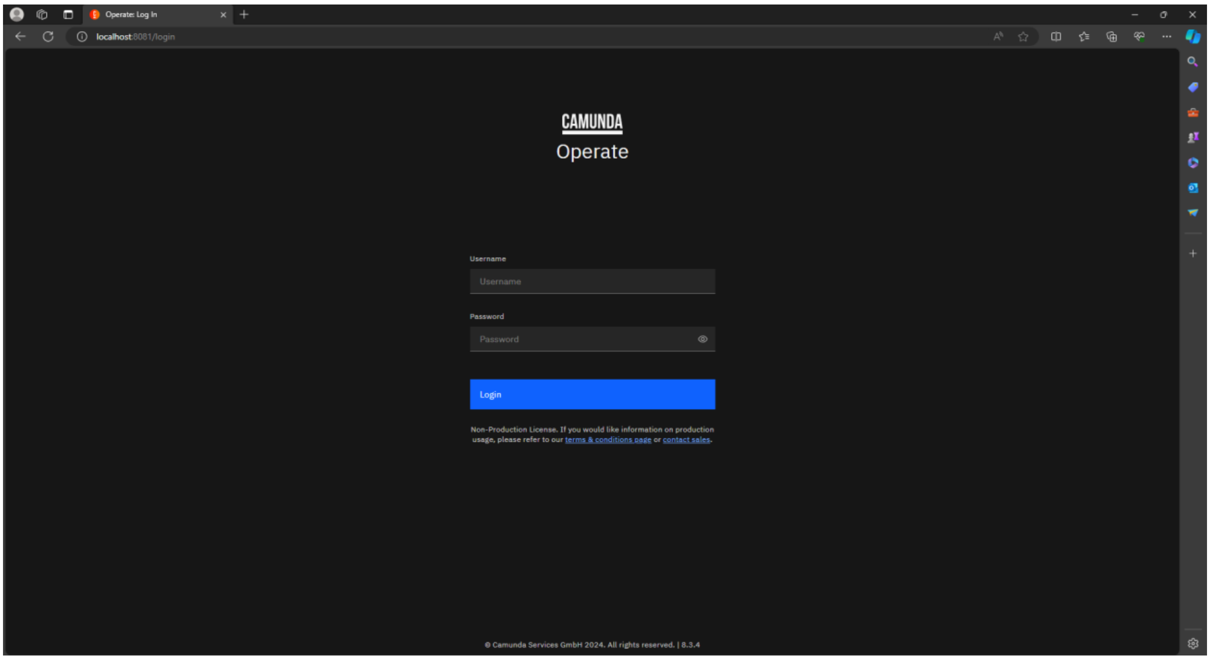
Order bicycle now!

Name: Mario
Email: mario@skyrocket.com
Phone: +44 584 442 994
Address: 221B Baker Street
Please select type of bicycle: Select bicycle
Mass (in pounds):
Please select quantity: Select quantity

Place order!

***Camunda Operate:*** *[http://localhost:8081](http://localhost:8081)*

***Username:*** *demo*
***Password:*** *demo*



Operate

Username
Username

Password
Password

Login

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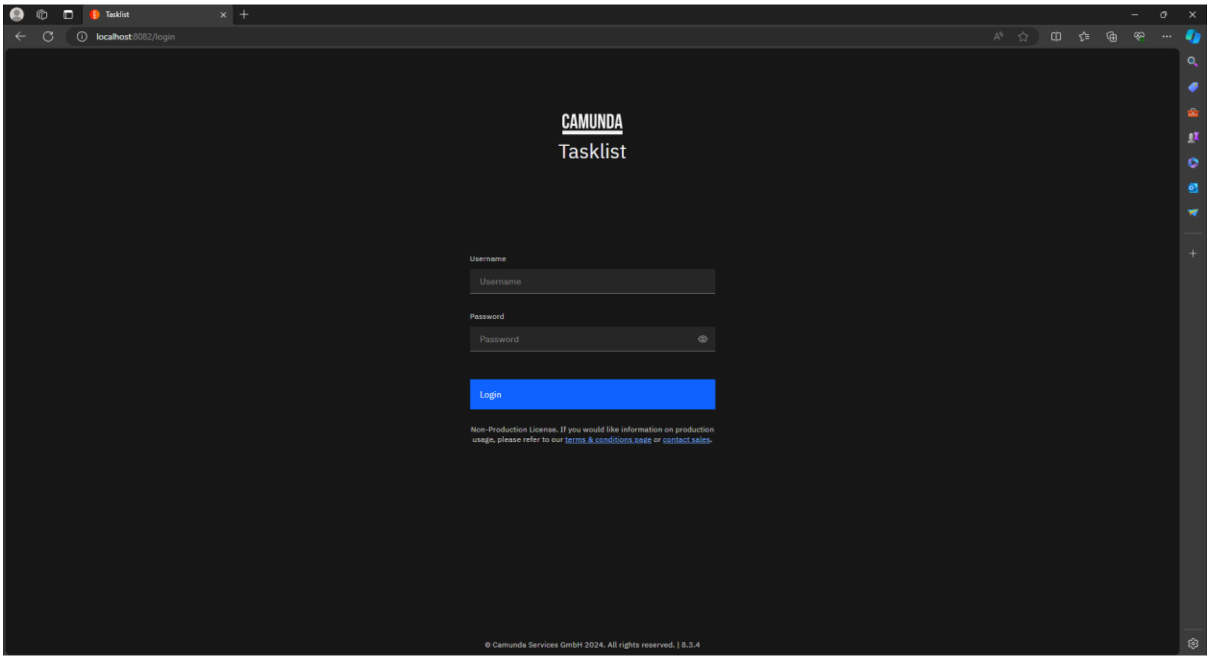
***Camunda Tasklist:*** *[http://localhost:8082](http://localhost:8082)*

***Username:*** *demo*
***Password:*** *demo*



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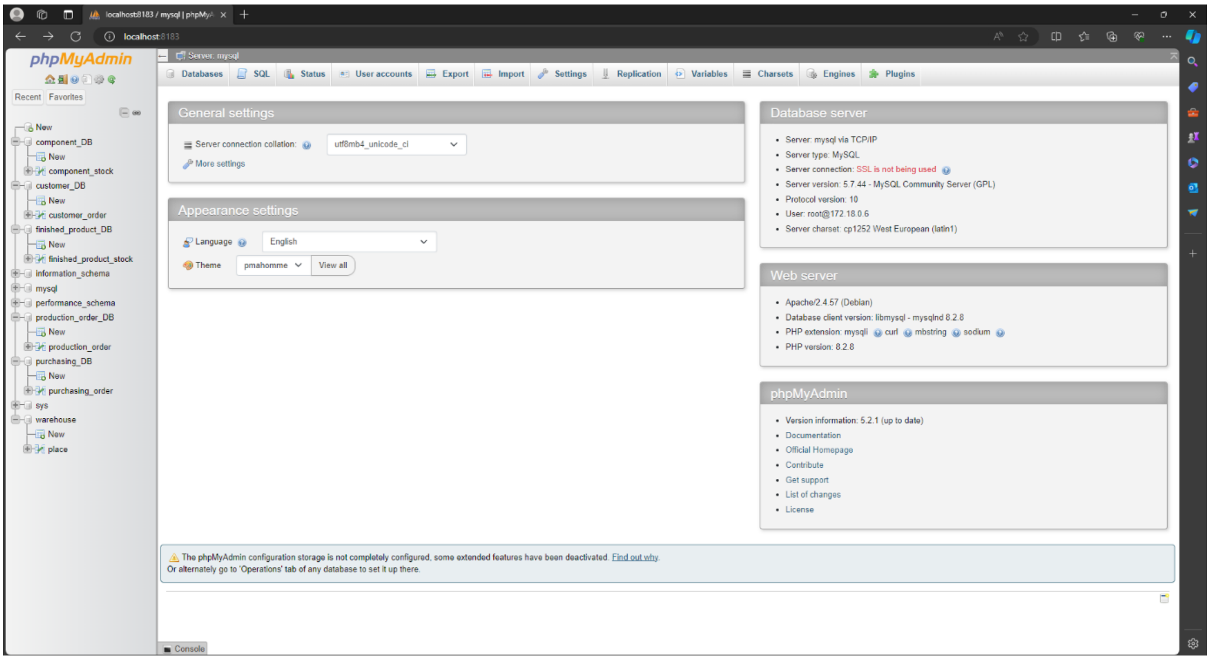
***phpMyAdmin MySQL:*** *[http://localhost:8183](http://localhost:8183)*



Server connection collation: utf8mb4_unicode_ci

Language: English

Theme: pmahomme

Database server

- Server: mysql via TCP/IP
- Server type: MySQL
- Server connection: SSL is not being used
- Server version: 5.7.44 - MySQL Community Server (GPL)
- Protocol version: 10
- User: root@172.18.0.6
- Server charset: cp1252 West European (latin1)

Web server

- Apache/2.4.57 (Debian)
- Database client version: libmysql - mysqlnd 8.2.8
- PHP extension: mysqli curl mbstring sodium
- PHP version: 8.2.8

phpMyAdmin

- Version information: 5.2.1 (up to date)

⚠ The phpMyAdmin configuration storage is not completely configured, some extended features have been deactivated. Find out why.
Or alternately go to 'Operations' tab of any database to set it up there.

## ***Other containers***

***Camunda Zeebe:*** *Running on port: 26500*

***Camunda Elasticsearch:*** *Running on port: 9200*

***Camunda Connectors:*** *Running on port: 8085*

***MySql Database:*** *Running on port: 3306*

***BPA Lab REST Middleware Server:*** *Running on port: 3005*

***BPA Lab Process Application:*** *Running on port: 3000*

***BPA Lab Purchasing Process:*** *Running on port: 3100*

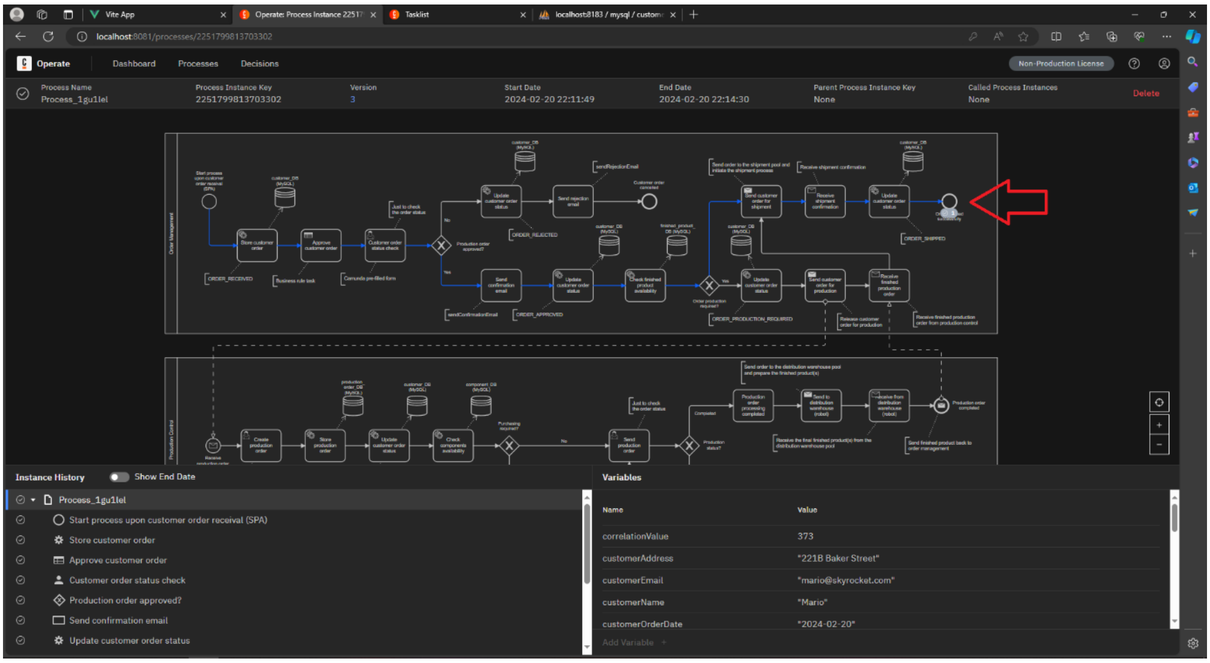
***BPA Lab Shipment Process:*** *Running on port: 3194*

***MQTT Broker:*** *Running on port: 2020*

***MySql Database (Warehouse Operations):*** *Running on port: 3333*

### ***STEP 7:***

*Place an order from the front-end application in order to start the process instance and track the process inside Operate:*



| Process Name | Process Instance Key | Version | Start Date | End Date | Parent Process Instance Key | Called Process Instances |
|---|---|---|---|---|---|---|
| Process_1gu1lel | 2251799813703302 | 3 | 2024-02-20 22:11:49 | 2024-02-20 22:14:30 | None | None |

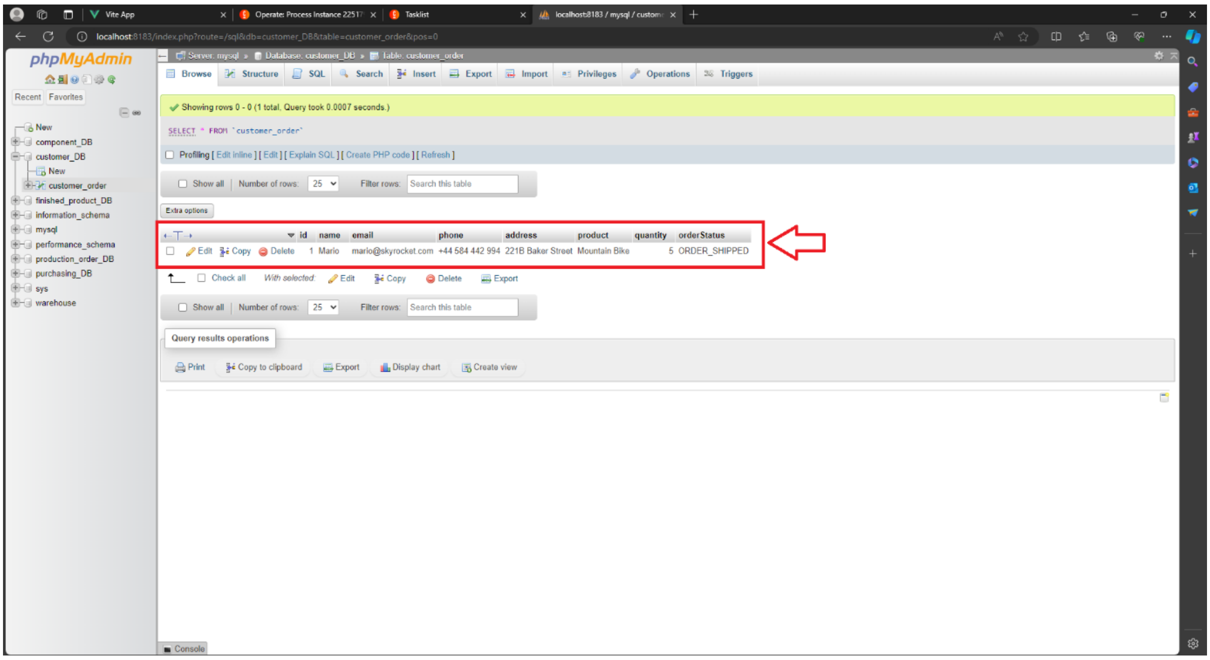
Instance History

- Process_1gu1lel
  - Start process upon customer order receival (SPA)
  - Store customer order
  - Approve customer order
  - Customer order status check
  - Production order approved?
  - Send confirmation email
  - Update customer order status

Variables

| Name | Value |
|---|---|
| correlationValue | 373 |
| customerAddress | "221B Baker Street" |
| customerEmail | "mario@skyrocket.com" |
| customerName | "Mario" |
| customerOrderDate | "2024-02-20" |

*The customer order is being stored inside the database and its state changes as the process instance progresses forward:*



✓ Showing rows 0 - 0 (1 total, Query took 0.0007 seconds.)

```
SELECT * FROM `customer_order`
```

□ Profiling [ Edit inline ] [ Edit ] [ Explain SQL ] [ Create PHP code ] [ Refresh ]

□ Show all | Number of rows: 25 Filter rows: Search this table

| | id | name | email | phone | address | product | quantity | orderStatus |
|---|---|---|---|---|---|---|---|---|
| □ Edit Copy Delete | 1 | Mario | mario@skyrocket.com | +44 584 442 994 | 221B Baker Street | Mountain Bike | 5 | ORDER_SHIPPED |

----------THE END----------