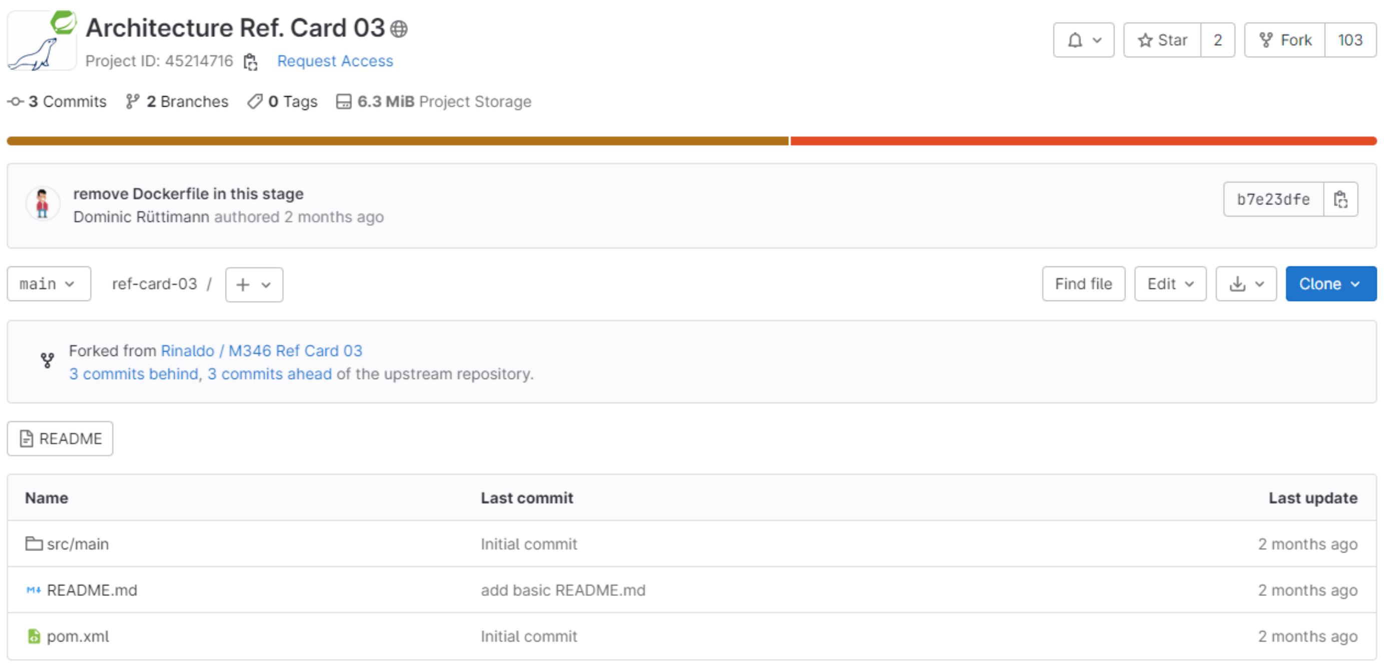
Capture The Flag vorbereitung

Dockerfile

Als ersten Schritt forken wir das Repository, das uns als Aufgabe gestellt wurde:



Architecture Ref. Card 03

Project ID: 45214716 Request Access

3 Commits 2 Branches 0 Tags 6.3 MiB Project Storage

remove Dockerfile in this stage
Dominic Rüttimann authored 2 months ago

b7e23dfe

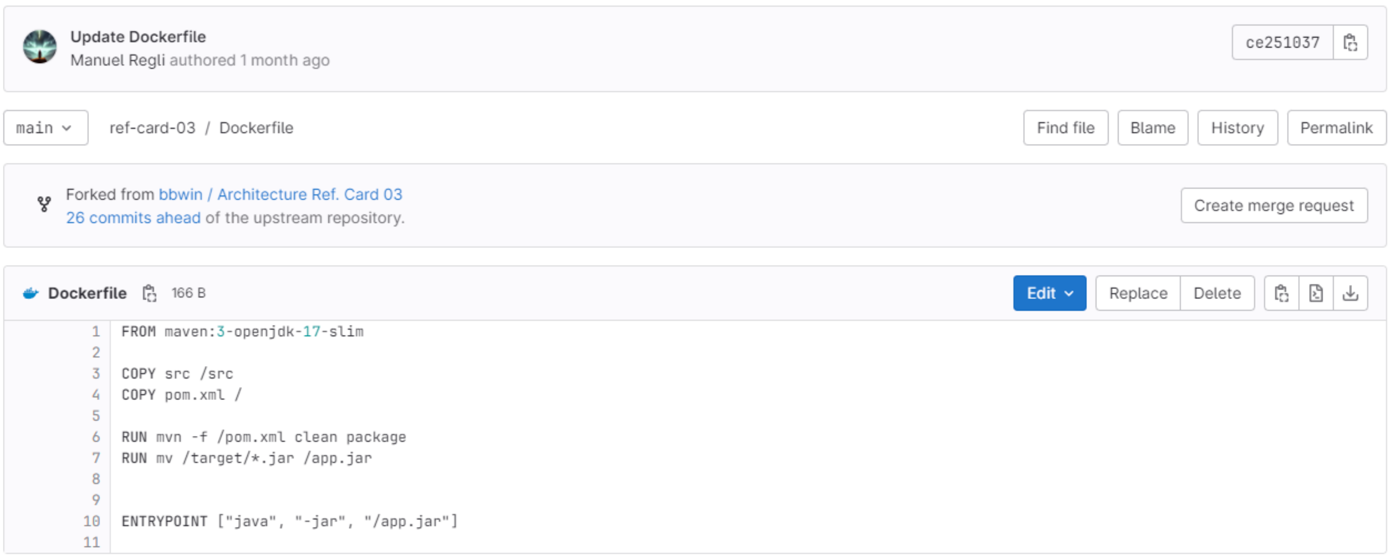
main ref-card-03 /

Forked from Rinaldo / M346 Ref Card 03
3 commits behind, 3 commits ahead of the upstream repository.

README

Name	Last commit	Last update
src/main	Initial commit	2 months ago
README.md	add basic README.md	2 months ago
pom.xml	Initial commit	2 months ago

Anschließend erstellen wir ein Dockerfile, welches einen ausführbaren Docker-Container generiert (Testen in einer VM oder im WSL, wenn auf Sicherheit geachtet werden soll). Nachfolgend sehen Sie ein beispielhaften Code:



```
FROM maven:3-openjdk-17-slim

COPY src /src
COPY pom.xml /

RUN mvn -f /pom.xml clean package
RUN mv /target/*.jar /app.jar


ENTRYPOINT ["java", "-jar", "/app.jar"]

```

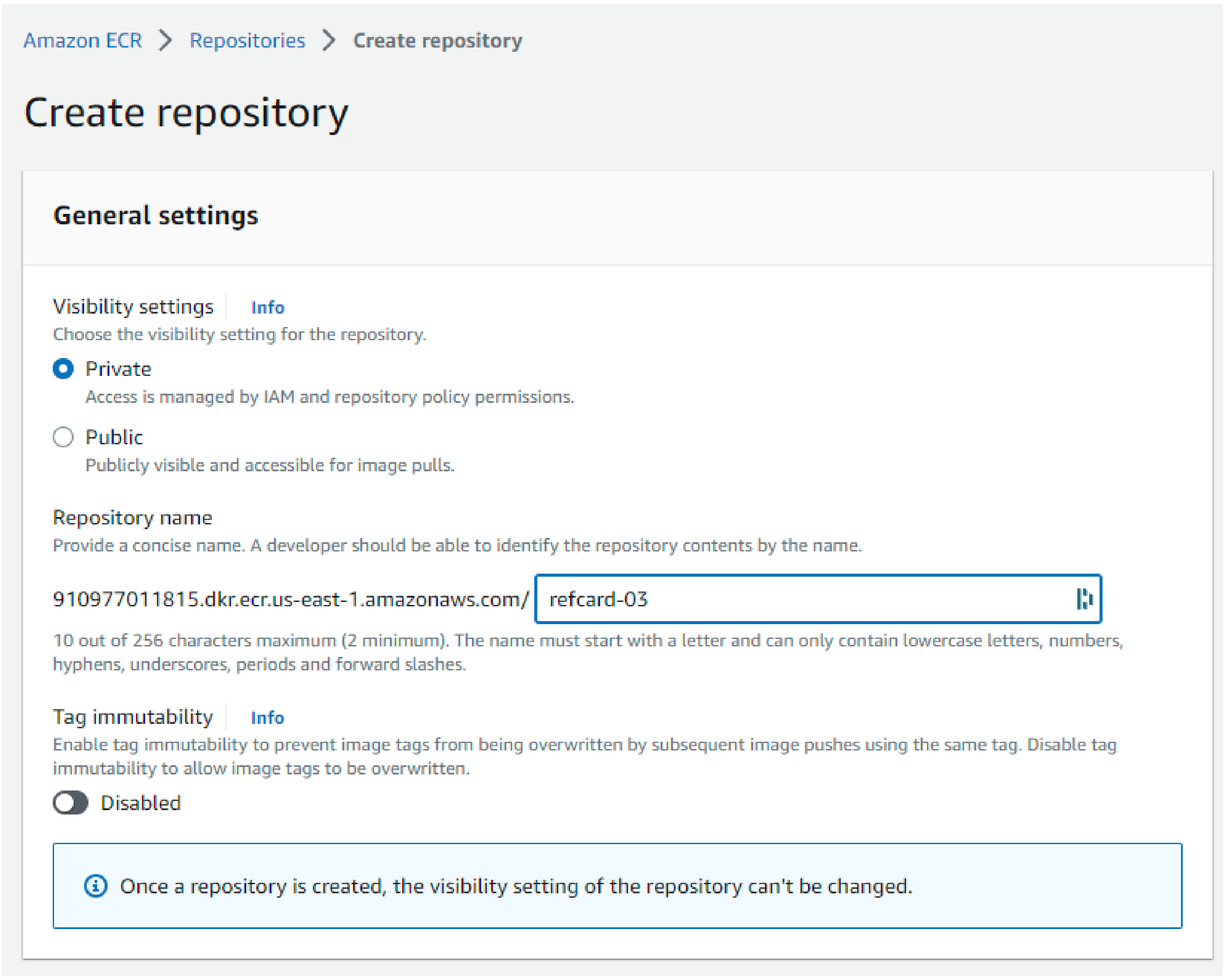
```
FROM maven:3-openjdk-11-slim as builder
COPY src /src
COPY pom.xml /
RUN mvn -f pom.xml clean package
FROM adoptopenjdk/openjdk11:alpine-jre
COPY --from=builder /target/*.jar app.jar
ENTRYPOINT ["java","-jar","/app.jar"]
```

```
FROM maven:3.6.1-jdk-13-alpine as builder
COPY src /src
COPY pom.xml /
RUN mvn -f pom.xml clean package
FROM adoptopenjdk/openjdk13:alpine-jre
COPY --from=builder /target/*.jar app.jar
ENTRYPOINT ["java","-jar","/app.jar"]
```

```
FROM maven:3.8.5-openjdk-17-slim as builder
COPY src /src
COPY pom.xml /
RUN mvn -f pom.xml clean package
FROM eclipse-temurin:17-jre-alpine
COPY --from=builder /target/*.jar app.jar
ENTRYPOINT ["java","-jar","/app.jar"]
```

Repository erstellen

Nachdem das Dockerfile erstellt wurde, starten wir das Learner-Lab, navigieren zum Service ECR und erstellen ein neues privates Repository.



Create repository

General settings

Visibility settings Info
Choose the visibility setting for the repository.

[✓ Private] Access is managed by IAM and repository policy permissions.

Public Publicly visible and accessible for image pulls.

Repository name
Provide a concise name. A developer should be able to identify the repository contents by the name.

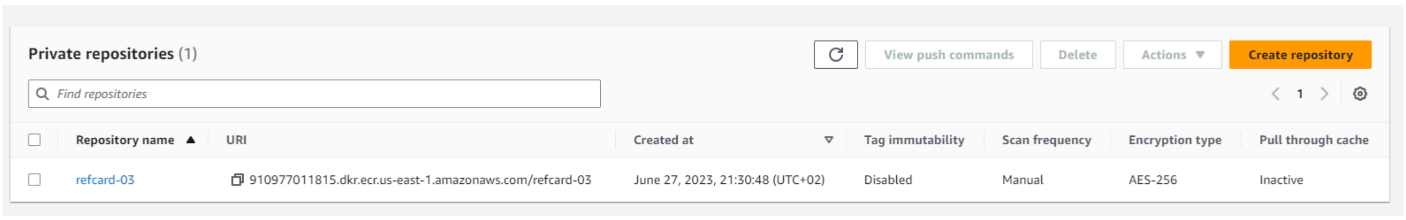
910977011815.dkr.ecr.us-east-1.amazonaws.com/ refcard-03

10 out of 256 characters maximum (2 minimum). The name must start with a letter and can only contain lowercase letters, numbers, hyphens, underscores, periods and forward slashes.

Tag immutability Info
Enable tag immutability to prevent image tags from being overwritten by subsequent image pushes using the same tag. Disable tag immutability to allow image tags to be overwritten.

Disabled

Once a repository is created, the visibility setting of the repository can't be changed.

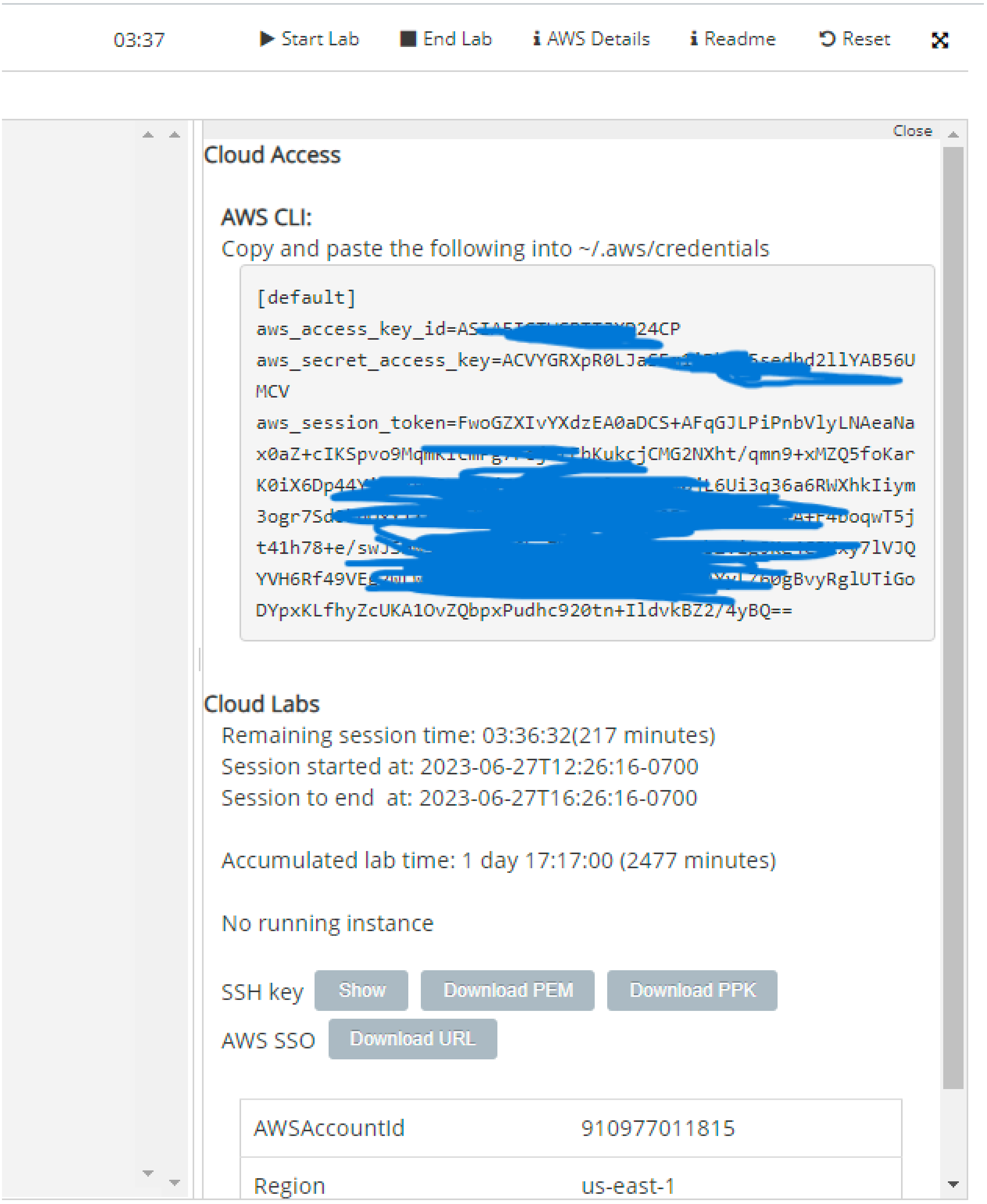


Private repositories (1)

Repository name	URI	Created at	Tag immutability	Scan frequency	Encryption type	Pull through cache
refcard-03	910977011815.dkr.ecr.us-east-1.amazonaws.com/refcard-03	June 27, 2023, 21:30:48 (UTC+02)	Disabled	Manual	AES-256	Inactive

GitLab-Variablen

Um geheime Informationen für CI/CD nicht für jeden zugänglich zu machen, müssen wir Secret Variables erstellen. Die ersten drei finden wir im Learner Lab, wenn wir auf AWS-Details und dann auf AWS CLI klicken. Die Variablen heißen: "AWS_ACCESS_KEY_ID", "AWS_SECRET_ACCESS_KEY" und "AWS_SESSION_TOKEN".



Cloud Access

AWS CLI:

Copy and paste the following into ~/.aws/credentials

```
[default]
aws_access_key_id=AS[redacted]24CP
aws_secret_access_key=ACVYGRXpR0LJa[redacted]5sedhd2llYAB56U
MCV
aws_session_token=FwoGZXIvYXdzEA0aDCS+AFqGJLPiPnbVlyLNAeaNa
x0aZ+cIKSpvo9Mq[redacted]bKukcjCMG2NXht/qmn9+xMZQ5foKar
K0iX6Dp44Y[redacted]
3ogr7Sd[redacted]
t41h78+e/swJ[redacted]
YVH6Rf49VE[redacted]
DYpxKLfhyZcUKA1OvZQbpxPudhc920tn+IldvkBZ2/4yBQ==
```

Cloud Labs

Remaining session time: 03:36:32(217 minutes)
Session started at: 2023-06-27T12:26:16-0700
Session to end at: 2023-06-27T16:26:16-0700

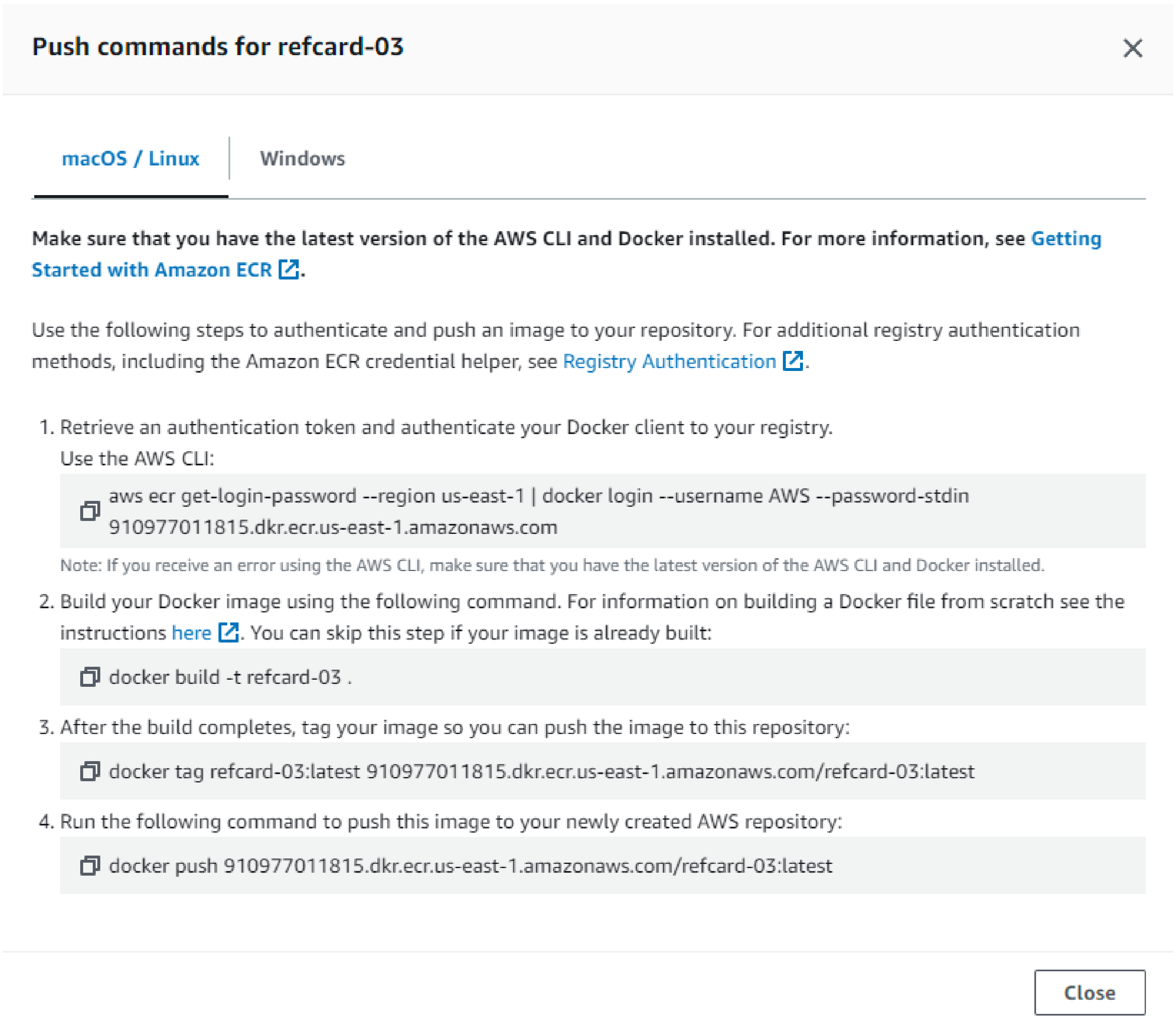
Accumulated lab time: 1 day 17:17:00 (2477 minutes)

No running instance

AWSAccountId	910977011815
Region	us-east-1

Die weiteren drei Variablen finden wir im neu erstellten Repository. Die Variablen und ihre Werte sind: "AWS_DEFAULT_REGION" = "us-east-1", "CI_AWS_ECR_REGISTRY" =

"910977011815.dkr.ecr.us-east-1.amazonaws.com" und "CI_AWS_ECR_REPOSITORY_NAME" = "refcard-03".



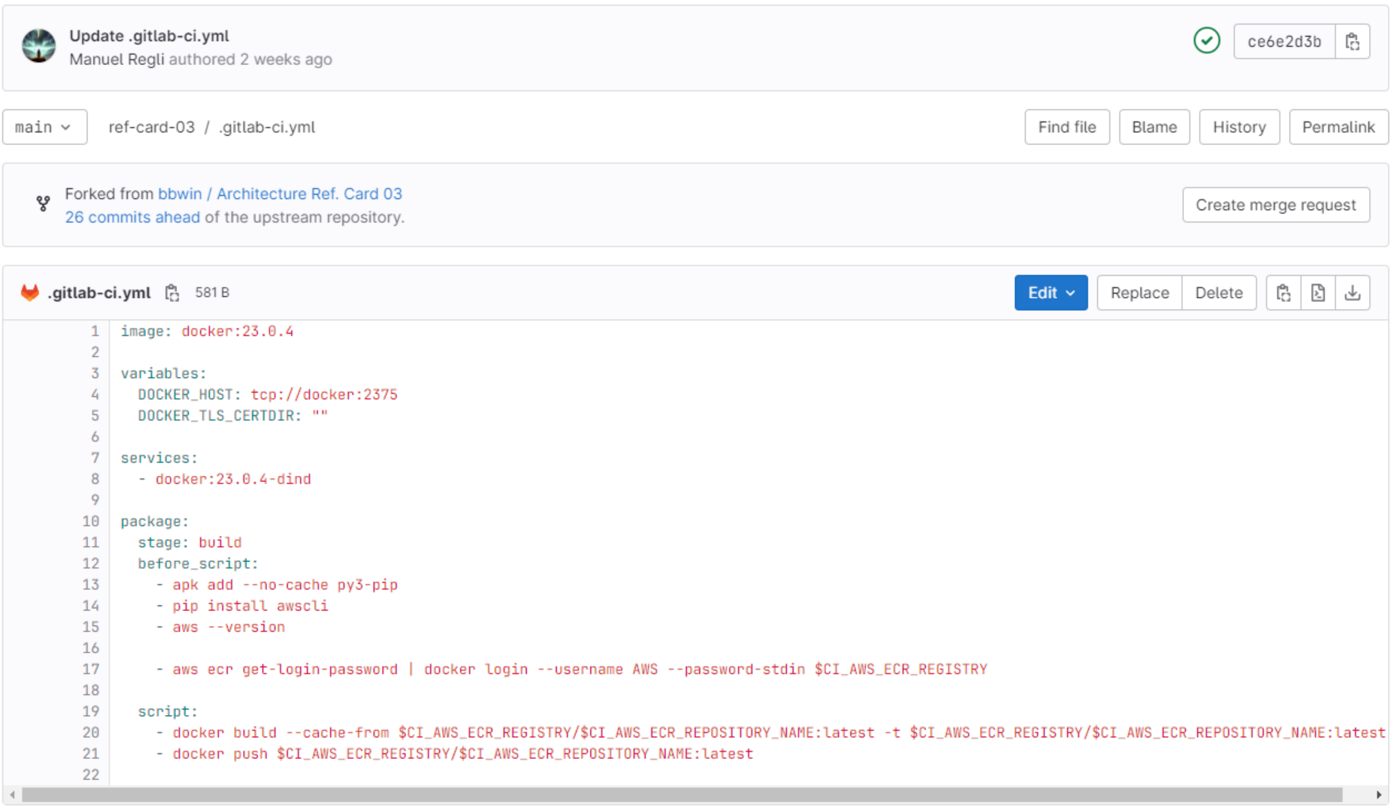
Make sure that you have the latest version of the AWS CLI and Docker installed. For more information, see Getting Started with Amazon ECR.

Use the following steps to authenticate and push an image to your repository. For additional registry authentication methods, including the Amazon ECR credential helper, see Registry Authentication.

1. Retrieve an authentication token and authenticate your Docker client to your registry.
   Use the AWS CLI:
   ```
   aws ecr get-login-password --region us-east-1 | docker login --username AWS --password-stdin
   910977011815.dkr.ecr.us-east-1.amazonaws.com
   ```
   Note: If you receive an error using the AWS CLI, make sure that you have the latest version of the AWS CLI and Docker installed.
2. Build your Docker image using the following command. For information on building a Docker file from scratch see the instructions here. You can skip this step if your image is already built:
   ```
   docker build -t refcard-03 .
   ```
3. After the build completes, tag your image so you can push the image to this repository:
   ```
   docker tag refcard-03:latest 910977011815.dkr.ecr.us-east-1.amazonaws.com/refcard-03:latest
   ```
4. Run the following command to push this image to your newly created AWS repository:
   ```
   docker push 910977011815.dkr.ecr.us-east-1.amazonaws.com/refcard-03:latest
   ```

.gitlab-ci.yml erstellen

Im Folgenden wird ein .gitlab-ci.yml vorgestellt, das dazu dient, ein Docker-Image zu generieren und es in ein AWS-Repository hochzuladen.


Update .gitlab-ci.yml
Manuel Regli authored 2 weeks ago

ce6e2d3b

main · ref-card-03 / .gitlab-ci.yml

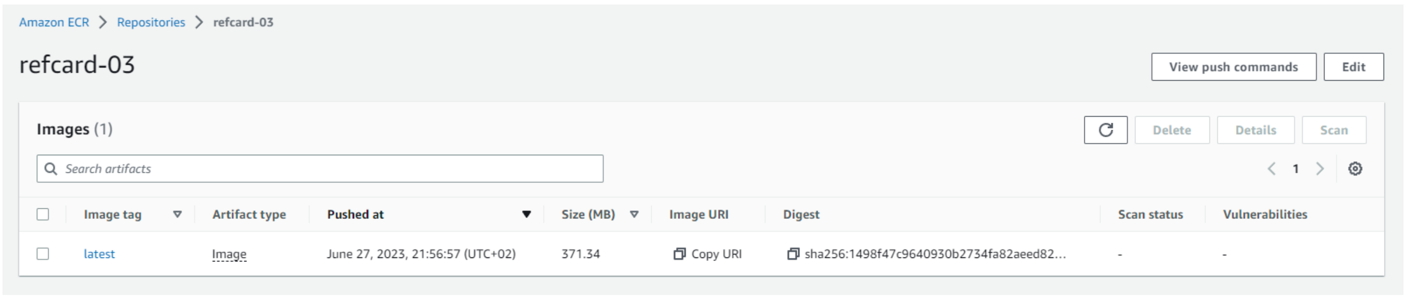
Forked from bbwin / Architecture Ref. Card 03
26 commits ahead of the upstream repository.

.gitlab-ci.yml 581 B

```yaml
image: docker:23.0.4

variables:
  DOCKER_HOST: tcp://docker:2375
  DOCKER_TLS_CERTDIR: ""

services:
  - docker:23.0.4-dind

package:
  stage: build
  before_script:
    - apk add --no-cache py3-pip
    - pip install awscli
    - aws --version

    - aws ecr get-login-password | docker login --username AWS --password-stdin $CI_AWS_ECR_REGISTRY

  script:
    - docker build --cache-from $CI_AWS_ECR_REGISTRY/$CI_AWS_ECR_REPOSITORY_NAME:latest -t $CI_AWS_ECR_REGISTRY/$CI_AWS_ECR_REPOSITORY_NAME:latest
    - docker push $CI_AWS_ECR_REGISTRY/$CI_AWS_ECR_REPOSITORY_NAME:latest

```

```yaml
image: docker:23.0.4

variables:
  DOCKER_HOST: tcp://docker:2375
  DOCKER_TLS_CERTDIR: ""

services:
  - docker:23.0.4-dind

package:
  stage: build
  before_script:
    - apk add --no-cache py3-pip
    - pip install awscli
    - aws --version

    - aws ecr get-login-password | docker login --username AWS --password-stdin $CI_AWS_ECR_REGISTRY

  script:
    - docker build --cache-from $CI_AWS_ECR_REGISTRY/$CI_AWS_ECR_REPOSITORY_NAME:latest -t $CI_AWS_ECR_REGISTRY/$CI_AWS_ECR_REPOSITORY_NAME:latest .
    - docker push $CI_AWS_ECR_REGISTRY/$CI_AWS_ECR_REPOSITORY_NAME:latest
```

Sobald diese Datei erstellt wurde, sollte automatisch ein Runner gestartet werden, vorausgesetzt ein solcher ist konfiguriert. Dies kann man unter Settings - CI/CD - Runners überprüfen.



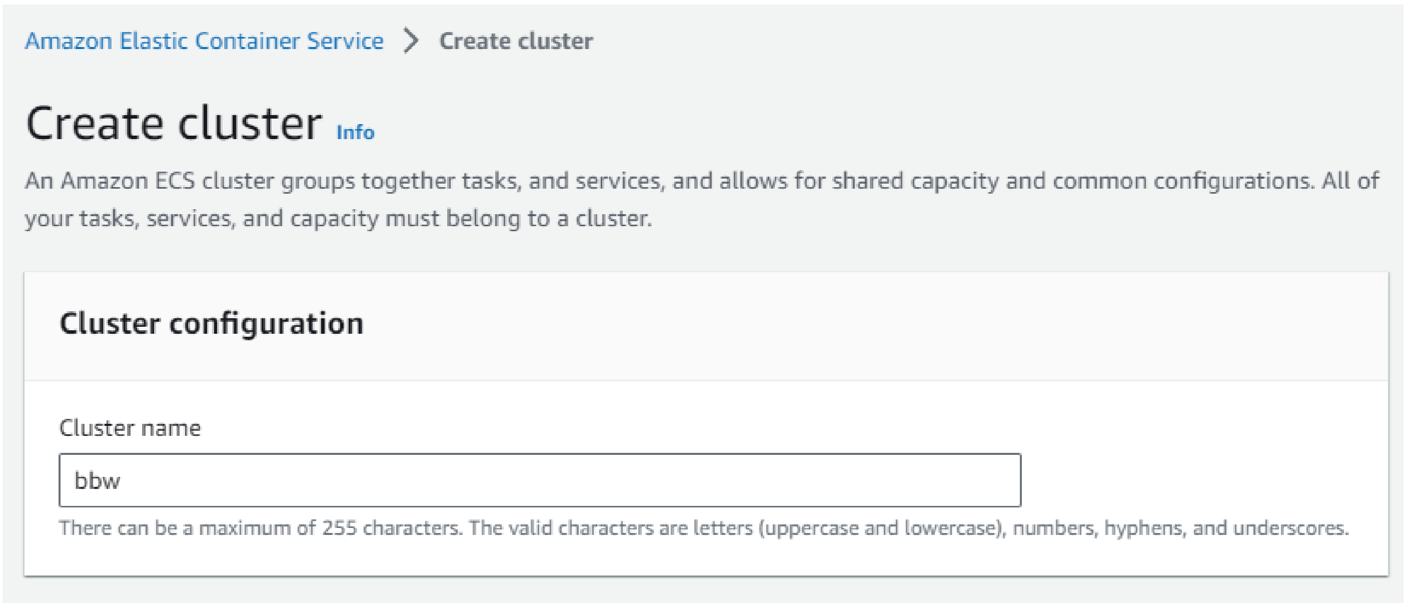
refcard-03

Images (1)

	Image tag	Artifact type	Pushed at	Size (MB)	Image URI	Digest	Scan status	Vulnerabilities
☐	latest	Image	June 27, 2023, 21:56:57 (UTC+02)	371.34	Copy URI	sha256:1498f47c9640930b2734fa82aeed82...	-	-

Erstellen eines ECS Clusters

Anschließend beginnen wir mit der Erstellung eines ECS Clusters. Der Name spielt hierbei keine Rolle, wichtig ist nur, den Namespace zu entfernen, damit das Cluster im Learner Lab erstellt werden kann.



Create cluster

An Amazon ECS cluster groups together tasks, and services, and allows for shared capacity and common configurations. All of your tasks, services, and capacity must belong to a cluster.

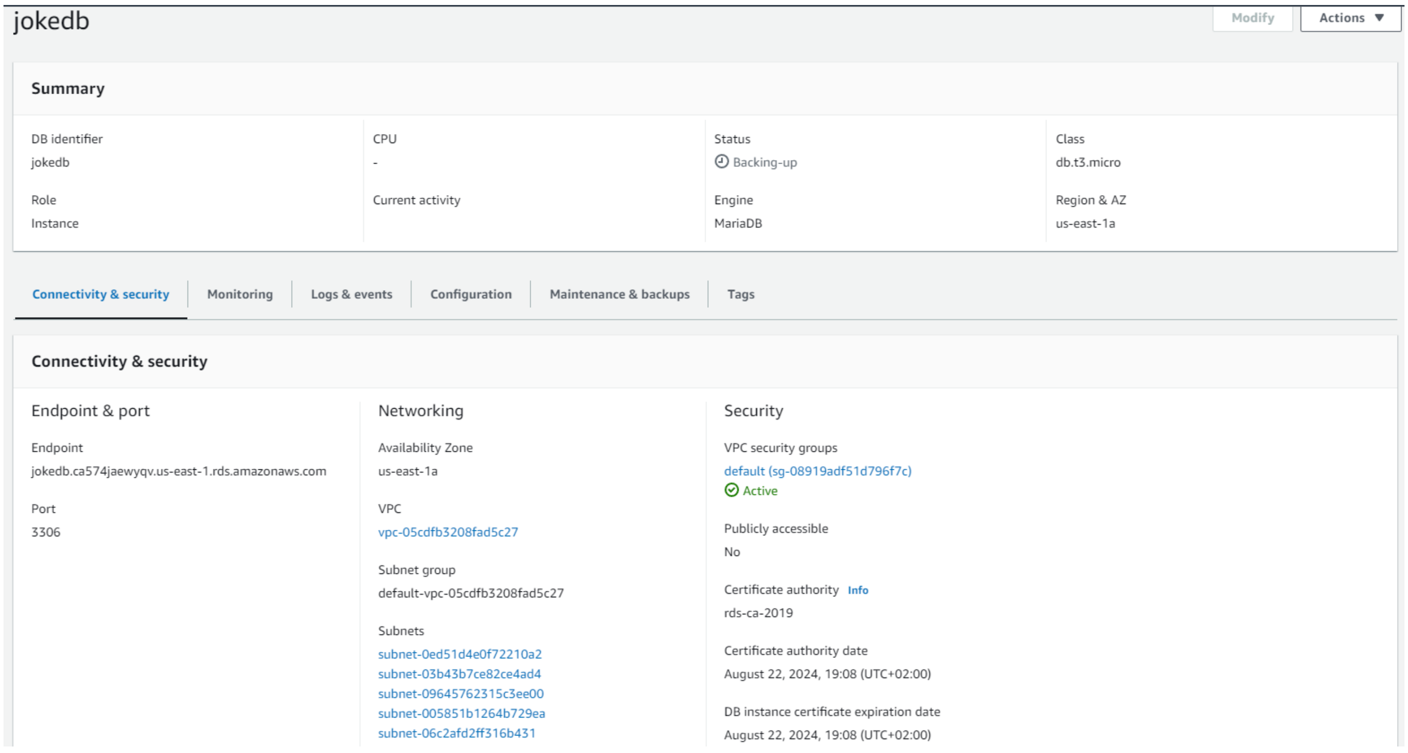
Cluster configuration

Cluster name: bbw

There can be a maximum of 255 characters. The valid characters are letters (uppercase and lowercase), numbers, hyphens, and underscores.

Datenbank erstellen (optional)

Für refcard03 war es notwendig, eine Datenbank zu verbinden, daher habe ich ein RDS erstellt. Für die Capture The Flag Aufgabe ist dies jedoch nicht erforderlich.



Summary

DB identifier	CPU	Status	Class
jokedb	-	Backing-up	db.t3.micro
Role	Current activity	Engine	Region & AZ
Instance		MariaDB	us-east-1a

Connectivity & security

Endpoint & port

Endpoint
jokedb.ca574jaewyqv.us-east-1.rds.amazonaws.com

Port
3306

Networking

Availability Zone
us-east-1a

VPC
vpc-05cdfb3208fad5c27

Subnet group
default-vpc-05cdfb3208fad5c27

Subnets
subnet-0ed51d4e0f72210a2
subnet-03b43b7ce82ce4ad4
subnet-09645762315c3ee00
subnet-005851b1264b729ea
subnet-06c2afd2ff316b431

Security

VPC security groups
default (sg-08919adf51d796f7c)
Active

Publicly accessible
No

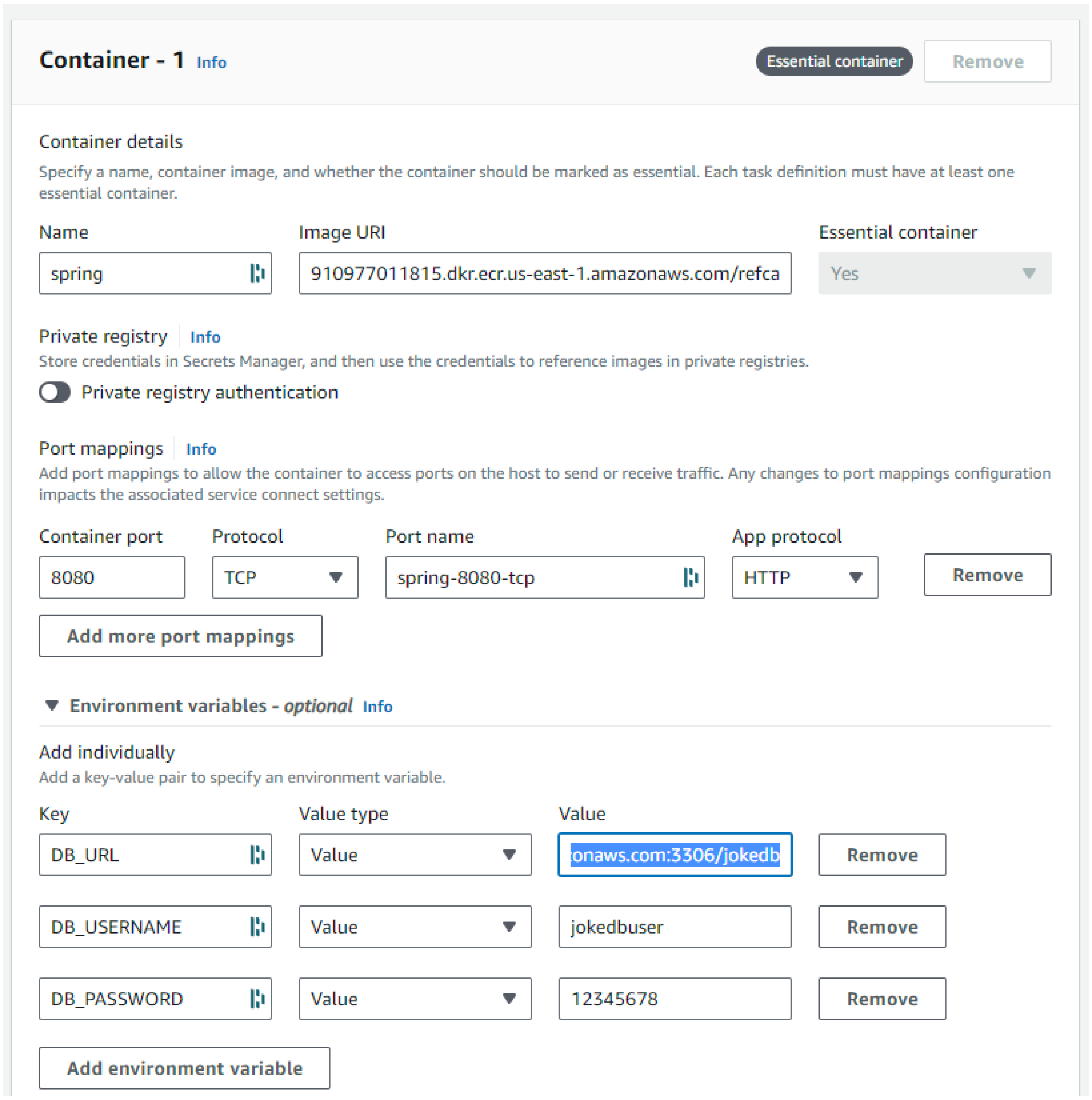
Certificate authority Info
rds-ca-2019

Certificate authority date
August 22, 2024, 19:08 (UTC+02:00)

DB instance certificate expiration date
August 22, 2024, 19:08 (UTC+02:00)

Erstellung einer Task Definition

Nun erstellen wir eine Taskdefinition mit der Image-URL des Repositories (am Ende sollte :latest stehen). Der Port ist vom Image abhängig und die Environment-Variablen werden nur mit der RDS-Datenbank benötigt.



Container - 1 Info

Essential container | Remove

Container details

Specify a name, container image, and whether the container should be marked as essential. Each task definition must have at least one essential container.

Name	Image URI	Essential container
spring	910977011815.dkr.ecr.us-east-1.amazonaws.com/refca	Yes

Private registry Info

Store credentials in Secrets Manager, and then use the credentials to reference images in private registries.

Private registry authentication

Port mappings Info

Add port mappings to allow the container to access ports on the host to send or receive traffic. Any changes to port mappings configuration impacts the associated service connect settings.

Container port	Protocol	Port name	App protocol	
8080	TCP	spring-8080-tcp	HTTP	Remove

Add more port mappings

Environment variables - *optional* Info

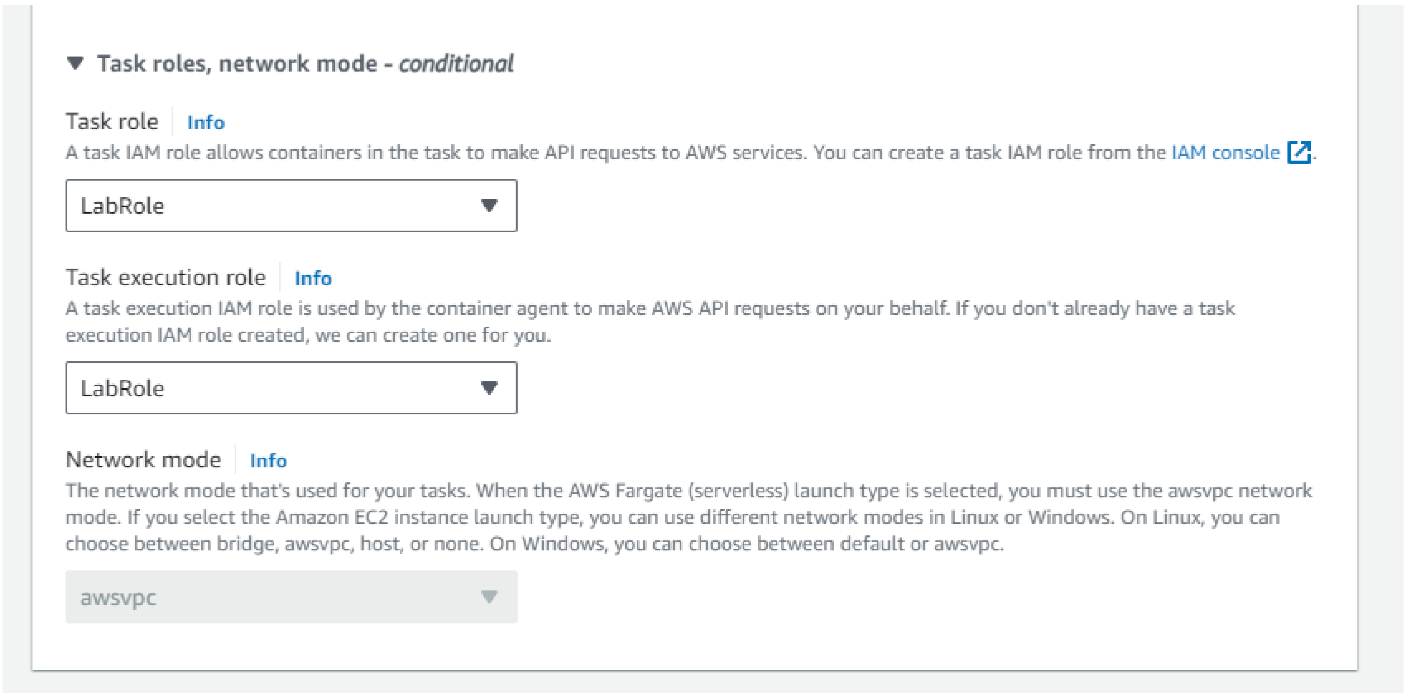
Add individually

Add a key-value pair to specify an environment variable.

Key	Value type	Value	
DB_URL	Value	onaws.com:3306/jokedb	Remove
DB_USERNAME	Value	jokedbuser	Remove
DB_PASSWORD	Value	12345678	Remove

Add environment variable

Für Task-Rolle und Task-Ausführungsrolle sollten wir "LabRole" auswählen.



▼ Task roles, network mode - *conditional*

Task role | Info

A task IAM role allows containers in the task to make API requests to AWS services. You can create a task IAM role from the IAM console.

LabRole ▼

Task execution role | Info

A task execution IAM role is used by the container agent to make AWS API requests on your behalf. If you don't already have a task execution IAM role created, we can create one for you.

LabRole ▼

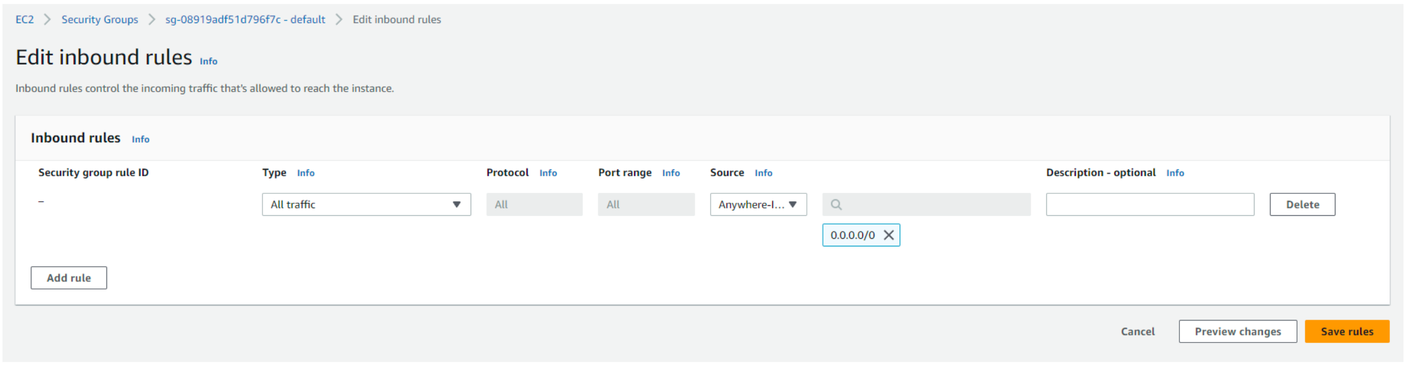
Network mode | Info

The network mode that's used for your tasks. When the AWS Fargate (serverless) launch type is selected, you must use the awsvpc network mode. If you select the Amazon EC2 instance launch type, you can use different network modes in Linux or Windows. On Linux, you can choose between bridge, awsvpc, host, or none. On Windows, you can choose between default or awsvpc.

awsvpc ▼

Änderung der Security Group

Aus Gründen der Schnelligkeit kann man in der Default Security Group festlegen, dass jeder eingehende Traffic zugelassen wird.



EC2 > Security Groups > sg-08919adf51d796f7c - default > Edit inbound rules

Edit inbound rules Info

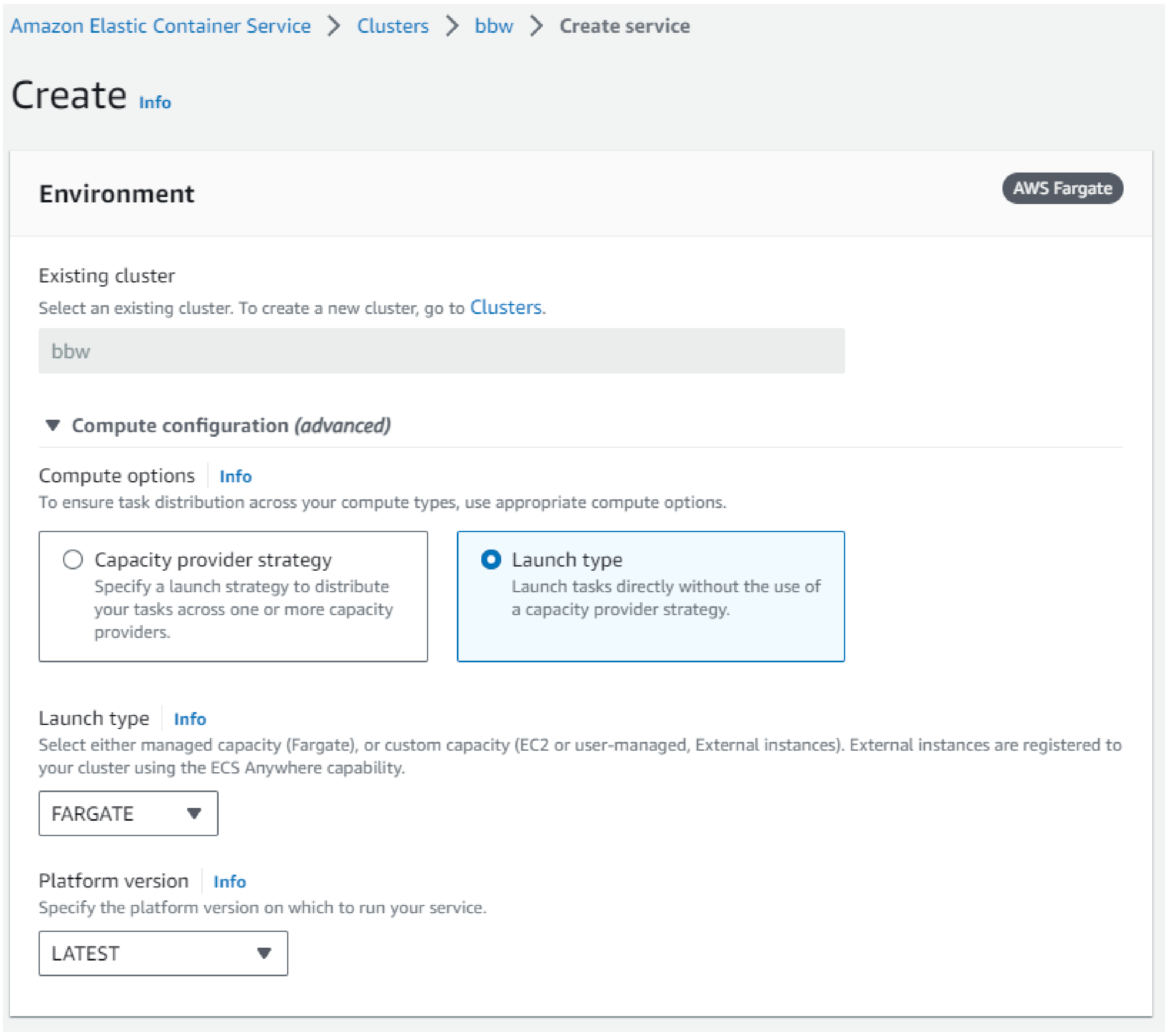
Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules Info

Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info		Description - optional Info
–	All traffic	All	All	Anywhere-I...	0.0.0.0/0	

Erstellung eines Services im ECS Cluster

Folgen Sie den untenstehenden Konfigurationen (je nach Docker-Image können Änderungen erforderlich sein).


Amazon Elastic Container Service > Clusters > bbw > Create service

Create Info

Environment AWS Fargate

Existing cluster
Select an existing cluster. To create a new cluster, go to Clusters.
bbw

▼ Compute configuration *(advanced)*

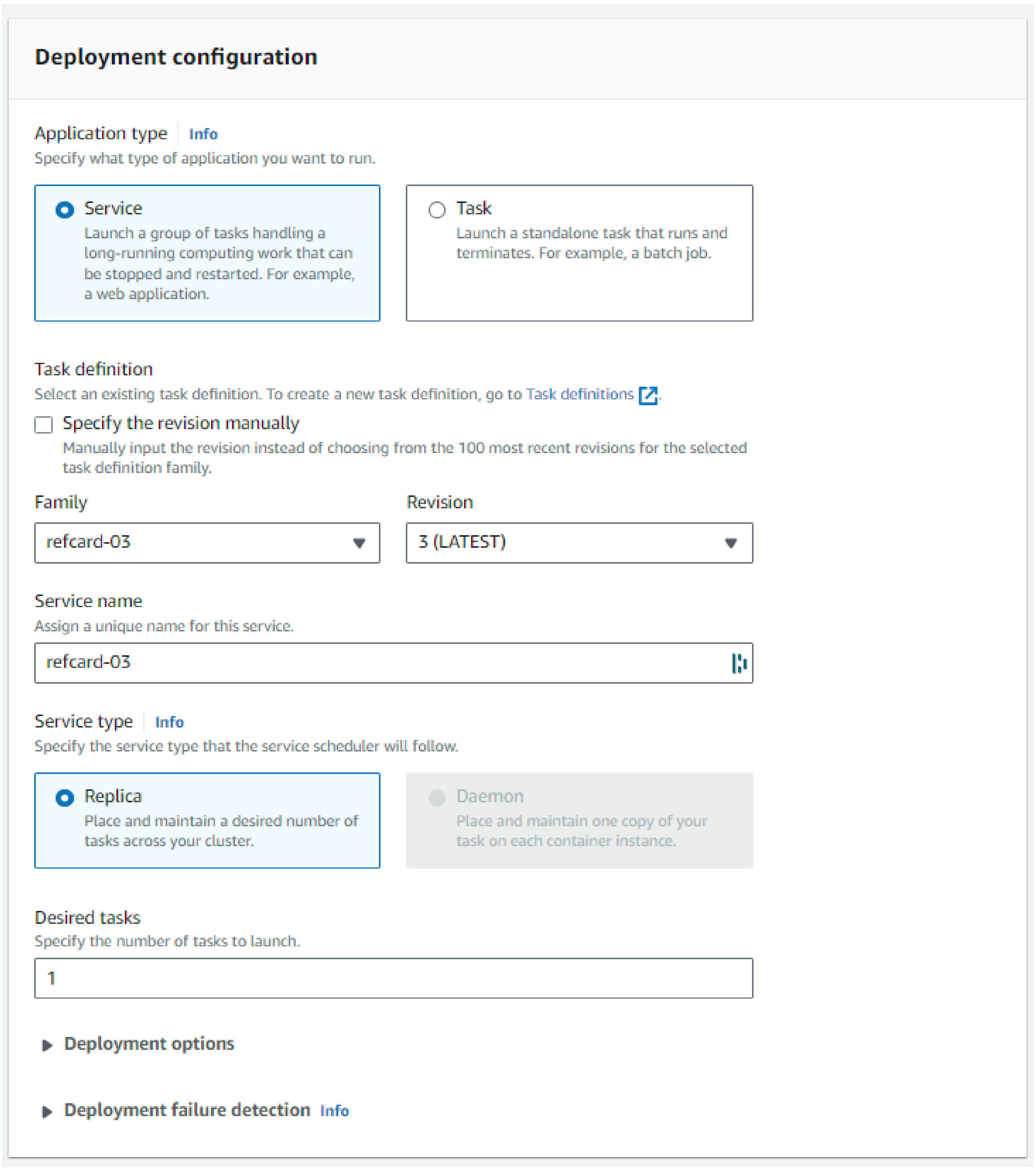
Compute options | Info
To ensure task distribution across your compute types, use appropriate compute options.

○ Capacity provider strategy
Specify a launch strategy to distribute your tasks across one or more capacity providers.

● Launch type
Launch tasks directly without the use of a capacity provider strategy.

Launch type | Info
Select either managed capacity (Fargate), or custom capacity (EC2 or user-managed, External instances). External instances are registered to your cluster using the ECS Anywhere capability.
FARGATE ▼

Platform version | Info
Specify the platform version on which to run your service.
LATEST ▼



Deployment configuration

Application type Info

Specify what type of application you want to run.

[✓ Service] Launch a group of tasks handling a long-running computing work that can be stopped and restarted. For example, a web application.

Task — Launch a standalone task that runs and terminates. For example, a batch job.

Task definition

Select an existing task definition. To create a new task definition, go to Task definitions.

☐ Specify the revision manually

Manually input the revision instead of choosing from the 100 most recent revisions for the selected task definition family.

Family	Revision
refcard-03	3 (LATEST)

Service name

Assign a unique name for this service.

refcard-03

Service type Info

Specify the service type that the service scheduler will follow.

[✓ Replica] Place and maintain a desired number of tasks across your cluster.

Daemon — Place and maintain one copy of your task on each container instance.

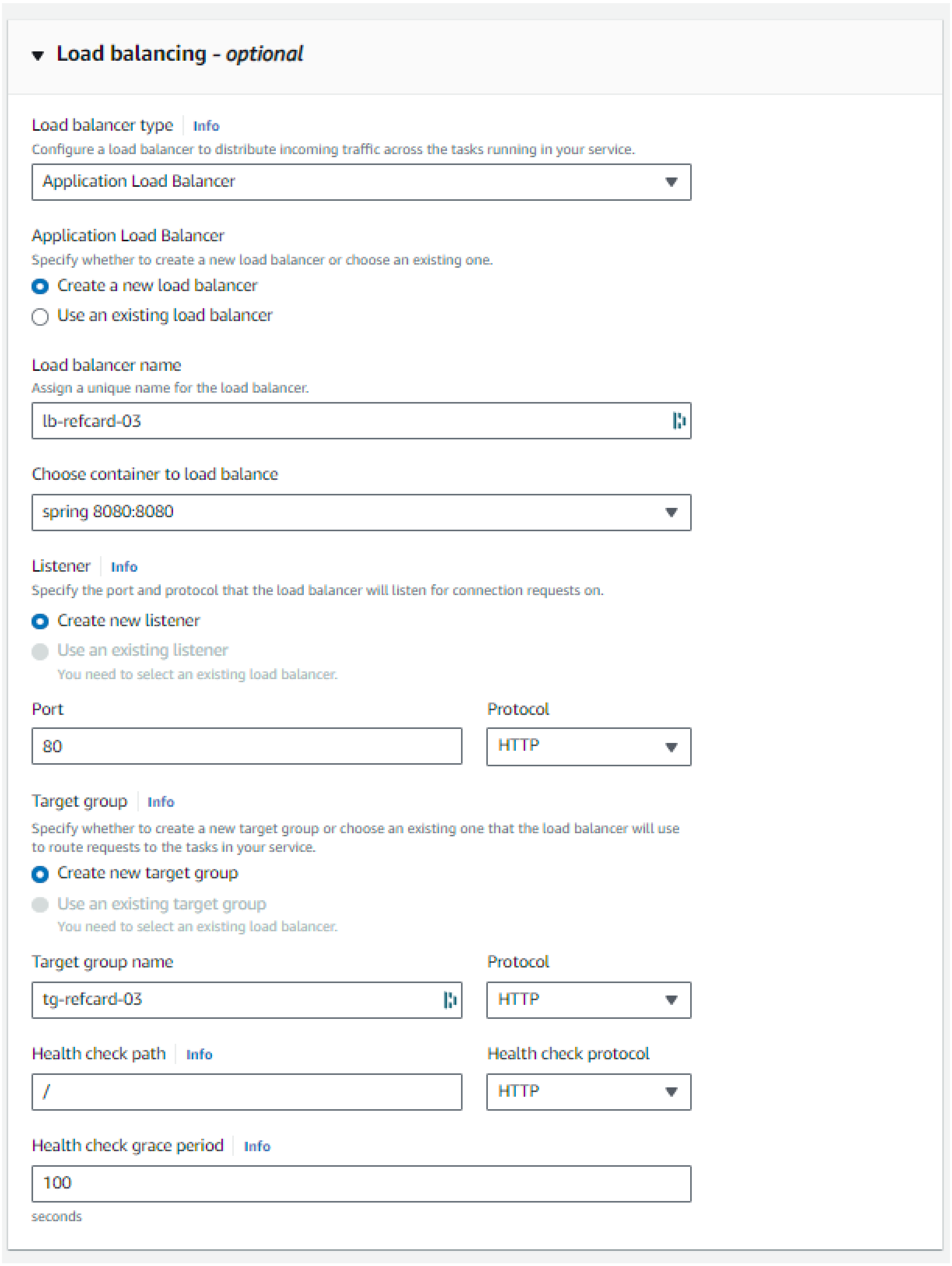
Desired tasks

Specify the number of tasks to launch.

1

▶ Deployment options

▶ Deployment failure detection Info


Load balancing - *optional*

Load balancer type | Info
Configure a load balancer to distribute incoming traffic across the tasks running in your service.
Application Load Balancer

Application Load Balancer
Specify whether to create a new load balancer or choose an existing one.
[✓ Create a new load balancer]
Use an existing load balancer

Load balancer name
Assign a unique name for the load balancer.
lb-refcard-03

Choose container to load balance
spring 8080:8080

Listener | Info
Specify the port and protocol that the load balancer will listen for connection requests on.
[✓ Create new listener]
Use an existing listener
You need to select an existing load balancer.

Port	Protocol
80	HTTP

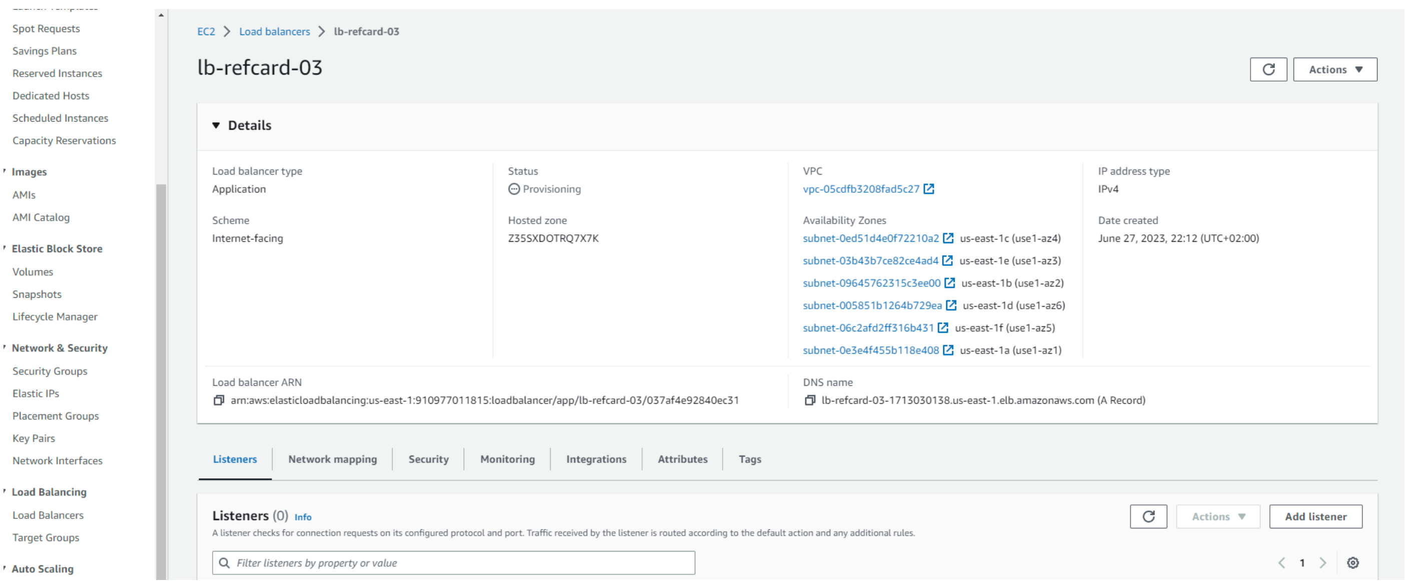
Target group | Info
Specify whether to create a new target group or choose an existing one that the load balancer will use to route requests to the tasks in your service.
[✓ Create new target group]
Use an existing target group
You need to select an existing load balancer.

Target group name	Protocol
tg-refcard-03	HTTP
Health check path	Health check protocol
/	HTTP

Health check grace period | Info
100
seconds

Testen des Loadbalancers

Um den Loadbalancer zu testen, können wir zu EC2 gehen und dort auf Loadbalancer klicken. Anschließend kopieren wir den DNS-Namen.



EC2 > Load balancers > lb-refcard-03

lb-refcard-03

Details

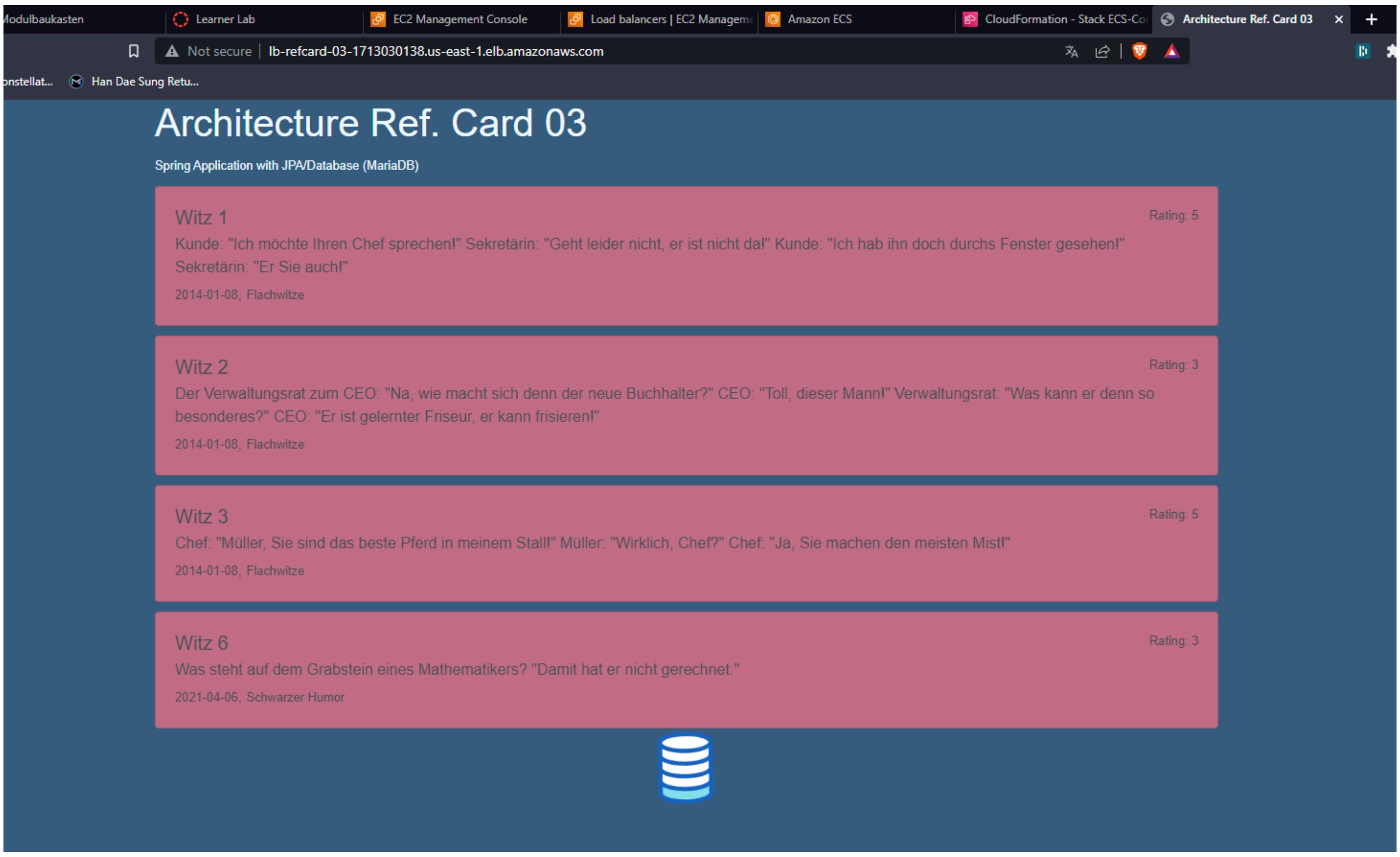
Load balancer type Application	Status Provisioning	VPC vpc-05cdfb3208fad5c27	IP address type IPv4
Scheme Internet-facing	Hosted zone Z35SXDOTRQ7X7K	Availability Zones subnet-0ed51d4e0f72210a2 us-east-1c (use1-az4) subnet-03b43b7ce82ce4ad4 us-east-1e (use1-az3) subnet-09645762315c3ee00 us-east-1b (use1-az2) subnet-005851b1264b729ea us-east-1d (use1-az6) subnet-06c2afd2ff316b431 us-east-1f (use1-az5) subnet-0e3e4f455b118e408 us-east-1a (use1-az1)	Date created June 27, 2023, 22:12 (UTC+02:00)

Load balancer ARN
arn:aws:elasticloadbalancing:us-east-1:910977011815:loadbalancer/app/lb-refcard-03/037af4e92840ec31

DNS name
lb-refcard-03-1713030138.us-east-1.elb.amazonaws.com (A Record)

Listeners (0) Info
A listener checks for connection requests on its configured protocol and port. Traffic received by the listener is routed according to the default action and any additional rules.

Diesen Loadbalancer-Namen geben wir dann in den Browser ein und nach einiger Zeit sollten wir die Webanwendung sehen.



Not secure | lb-refcard-03-1713030138.us-east-1.elb.amazonaws.com

Architecture Ref. Card 03

Spring Application with JPA/Database (MariaDB)

Witz 1 — Rating: 5
Kunde: "Ich möchte Ihren Chef sprechen!" Sekretärin: "Geht leider nicht, er ist nicht da!" Kunde: "Ich hab ihn doch durchs Fenster gesehen!" Sekretärin: "Er Sie auch!"
2014-01-08, Flachwitze

Witz 2 — Rating: 3
Der Verwaltungsrat zum CEO: "Na, wie macht sich denn der neue Buchhalter?" CEO: "Toll, dieser Mann!" Verwaltungsrat: "Was kann er denn so besonderes?" CEO: "Er ist gelernter Friseur, er kann frisieren!"
2014-01-08, Flachwitze

Witz 3 — Rating: 5
Chef: "Müller, Sie sind das beste Pferd in meinem Stall!" Müller: "Wirklich, Chef?" Chef: "Ja, Sie machen den meisten Mist!"
2014-01-08, Flachwitze

Witz 6 — Rating: 3
Was steht auf dem Grabstein eines Mathematikers? "Damit hat er nicht gerechnet."
2021-04-06, Schwarzer Humor

Revision #1
Created 15 December 2023 12:28:16 by Manuel Regli
Updated 15 December 2023 12:35:04 by Manuel Regli