

CI/CD?????Docker??

“ 构建 CI/CD 部署 Docker 运行 HPC 应用 ”

参考 <https://git.nju.edu.cn/escience/singularity-example>

构建环境

- 构建 root 环境
- 构建环境
- 构建环境

构建环境 Docker 运行环境

Singularity 运行环境

构建 eScience 运行环境 构建环境 构建环境 构建环境 构建环境

构建环境 Conda 运行环境 Python Numpy 运行环境

?? Dockerfile ????????

构建 Dockerfile 运行环境 Docker 运行环境

```
FROM continuumio/miniconda3:22.11.1

# 构建 conda 环境
COPY .condarc /root/.condarc

# 构建环境
RUN conda create -n my-env python=3.10 numpy
```

```
# 容器
SHELL ["/bin/bash", "--login", "-c"]
RUN conda init bash
RUN echo "source activate my-env" > ~/.bashrc
ENV PATH /opt/conda/envs/my-env/bin:$PATH
```

在 .condarc 文件中添加

numpy

并安装 Python 依赖

使用 Docker 构建 docker 镜像

```
docker build -t escience/conda-numpy .
```

“ Docker 镜像 Docker 镜像 docker.nju.edu.cn ”

运行容器

```
docker run -i escience/conda-numpy python < test.py
```

??CI/CD

CI/CD 流程

git.nju.edu.cn 仓库

.gitlab-ci.yml 文件

CI/CD

构建和测试阶段

CI/CD 配置

gcr.nju.edu.cn 镜像

```
# 容器
stages:
  - build
  - test
# 构建
build:
  stage: build
```

```

image:
  name: gcr.nju.edu.cn/kaniko-project/executor:debug # gcr
  entrypoint: [""]
script:
  - /kaniko/executor
  --context "${CI_PROJECT_DIR}"
  --dockerfile "${CI_PROJECT_DIR}/Dockerfile"
  --destination "${CI_REGISTRY_IMAGE}:${CI_COMMIT_TAG}"
rules: #
  - if: $CI_COMMIT_TAG
#
test:
  stage: test
  image:
    name: ${CI_REGISTRY_IMAGE}:${CI_COMMIT_TAG}
  script:
    - python "${CI_PROJECT_DIR}/test.py"
  rules:
    - if: $CI_COMMIT_TAG

```

test

The screenshot shows the GitLab web interface for the 'singularity-example' project. The left sidebar contains navigation links such as '项目信息', '仓库', '文件', '提交', '分支', '标签', '贡献者统计', '分支图', '比较修订版本', '锁定的文件', '议题', '合并请求', 'CI/CD', '安全与合规', '部署', '软件包与镜像库', '基础设施', '监控', '分析', 'Wiki', and '收起侧边栏'. The main content area displays the 'tags' page, with a search bar and a '新建标签' button. A list of tags is shown, with the 'test' tag selected. The 'test' tag has a commit hash '689731fe' and a description '更新.gitlab-ci.yml文件 · 18分钟前'. There are buttons for '创建发布', '下载', and '删除'.

"CI/CD"- " " "

状态

流水线

✔ 已通过

00:03:55

白 1分钟前

更新.gitlab-ci.yml文件

#73419 test 689731fe

最新

[illegible]

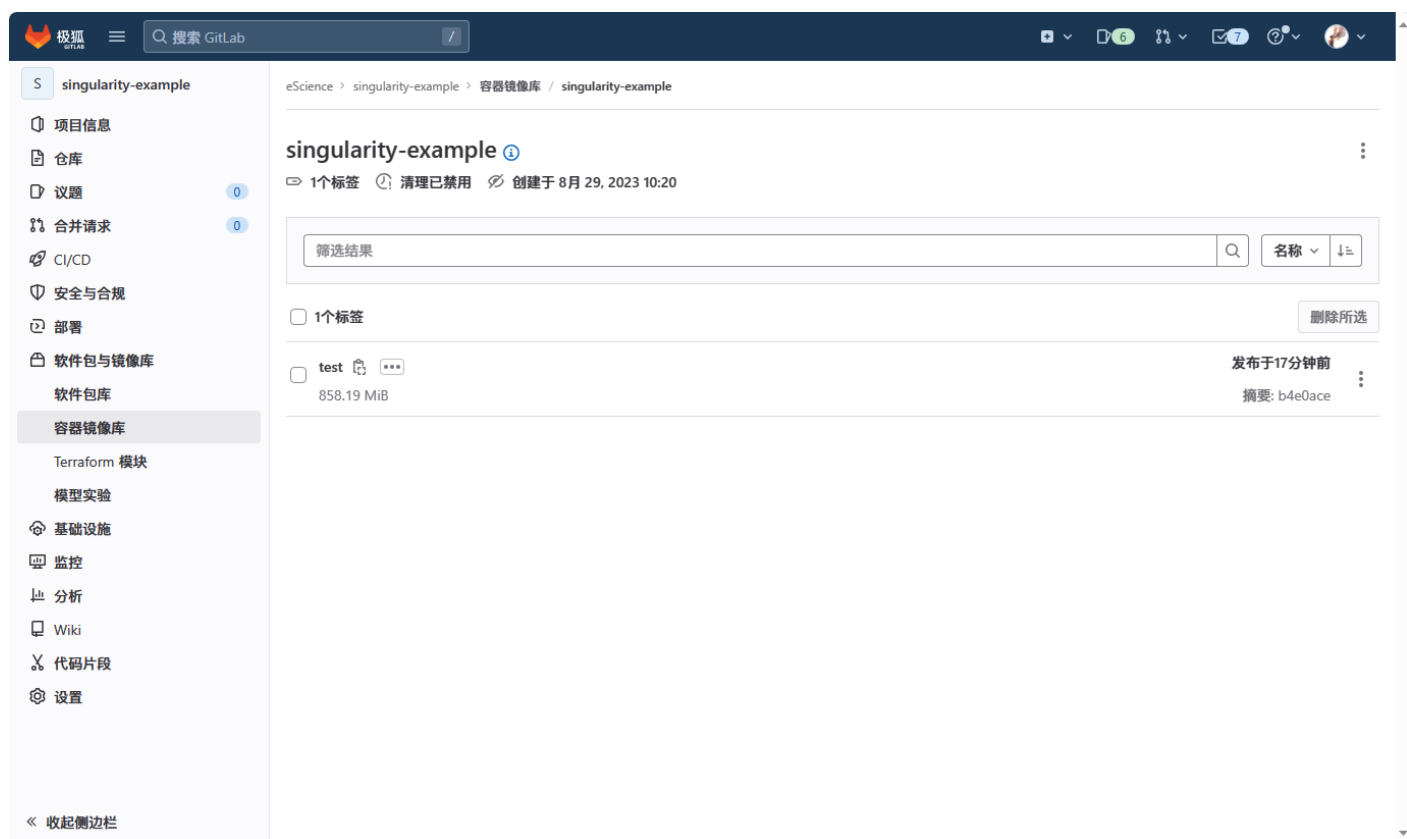
" [] [] [] [] [] []

”-“

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"

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“

Kaniko

[illegible]

```
docker push
```

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reg.nju.edu.cn

Singularity□□□□

Dockerfile

Docker

??????

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Singularities ☐ ☐ ☐

```
INFO: Starting build...
Getting image source signatures
Copying blob 3389e9eb8624 done
Copying blob 3f4ca61aafcd done
Copying blob baee49be4542 done
Copying blob 7b4354700ca4 done
Copying blob 69a5d9e1ecd6 done
Copying blob 8a7a15cee421 done
Copying blob 5f4e24b7e321 done
Copying config 51871566f8 done
Writing manifest to image destination
Storing signatures
2023/08/29 21:46:55 info unpack layer: sha256:3f4ca61aafcd4fc07267a105067db35c0f0ac630e1970f3cd0c7bf552780e985
2023/08/29 21:46:57 info unpack layer: sha256:69a5d9e1ecd6566da53d0978004bdf37dddfaba1d8a6117966f397b41cbbbc529
2023/08/29 21:46:59 info unpack layer: sha256:7b4354700ca480732ead22a553cc45916dc5466709ca64d964c4647b5b9343e9
2023/08/29 21:47:02 info unpack layer: sha256:baee49be454261f20f9770566da694b7e7845cf7d279ccc2421c6b3eed68c012c
2023/08/29 21:47:02 info unpack layer: sha256:8a7a15cee4219b244df17b401664119dfd5b7e52a5659107f1ee3ec210722373
2023/08/29 21:47:20 info unpack layer: sha256:3389e9eb8624f21330c272ba23defc59ba31d46273e38cde475e7256edeaa80cb
2023/08/29 21:47:20 info unpack layer: sha256:5f4e24b7e32113995e0417eb5c4de5cbe9f9be70a4a3841a19cdb2fa1f3f12a34
INFO: Creating SIF file...
INFO: Build complete: conda-numpy.sif
```

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job.lsf

```
#BSUB -q 6140ib
#BSUB -n 1

module load singularity/latest

SINGULARITY="singularity run --env MKL_NUM_THREADS=$LSB_DJOB_NUMPROC conda-numpy.sif"
${SINGULARITY} python test.py
```

```
bsub < job.lsf
```

??

CI/CD Docker HPC eScience

- / docker.nju.edu.cn gcr.nju.edu.cn mirror.nju.edu.cn
- CI/CD git.nju.edu.cn reg.nju.edu.cn
- hpc.nju.edu.cn