Running Docker images using Shifter

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When you want to run Docker containers on the clusters.

Authentication

You can use public images without being authenticated (shifterimg login) in the following cases:

<table>
<thead>
<tr>
<th>Image source</th>
<th>Public image</th>
<th>Login required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dockerhub</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Dockerhub</td>
<td>No</td>
<td>Yes, dockerhub</td>
</tr>
<tr>
<td>C4science registry</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>C4science registry</td>
<td>No</td>
<td>Yes, c4science registry</td>
</tr>
</tbody>
</table>

When using authentication, it's relative to the source you want to use (dockerhub and c4science registry supported) and the authentication is saved per cluster.

You need to ask for an account on the c4science registry, see Account request.

Running a Docker image with Shifter - Step by step

Prerequisite

You need to have Docker installed on your machine

1. Get a docker image from dockerhub for instance

   $ docker pull alpine:latest
   $ docker images

2. Set up your machine

   Login on the registry from your local Docker installation (you need an account, see Account request)

   $ docker login registry.c4science.ch
   Username (username): username
   Password:
   Login Succeeded

3. Upload a Docker image to the registry

   - On the web interface, create a Project on the registry (private or public)
   - Tag the image you want to upload on your local machine and push it to the registry
   **NOTE:** Do not use the `-' character in the tag name, only letters, numbers and underscore

   $ docker tag alpine:latest registry.c4science.ch/yourproject/alpine:latest
   $ docker push registry.c4science.ch/yourproject/alpine:latest

4. Pull an image on Shifter and specify a user or group ACL

   - From each cluster frontend (i.e.: fidis.epfl.ch), login to the registry, pull the image and check it's was pulled with success.
4.

```
$ shifterimg login
  default username: <username>
  default password:
$ shifterimg pull yourproject/alpine:latest
$ shifterimg images
  tcm     docker   READY   9797e5e798   2018-03-15T16:00:59 yourproject/alpine:latest
```

- You can specify one or multiple (separated by a comma) LDAP username and/or group so the image is only available to those people

```
$ id
$ shifterimg --group scitas-ge --user aubort,user2 pull yourproject/alpine
```

- To update the user/group ACL you can re-run the pull command
- The images are unique for each cluster (deneb, fidis, helvetios, izar)
- To view the full info about the images (warning: JSON):

```
$ shifterimg -v images
  Message: {
    "list": [
      {
        "ENTRY": null,
        "ENV": [
          "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
        ],
        "WORKDIR": "MISSING",
        "groupACL": [],
        "id": "9797e5e798a034d53525968de25bd25c913e7bb17c6d68ebc778cb33e3ff65",
        "itype": "docker",
        "last_pull": 1536842228.15727,
        "status": "READY",
        "status_message": "",
        "system": "fdata2-int.fidis",
        "tag": [
          "scitas/alpine:latest"
        ],
        "userACL": []
      },
      [...]
    ]
  }
```

5. Run the image

You can submit the following Slurm script with the `sbatch` command

```
#!/bin/bash
#SBATCH --nodes 1
#SBATCH --ntasks 1
#SBATCH --cpus-per-task 1
#SBATCH --mem 1024
srun shifter --image yourproject/alpine lf /etc
```

Interactive Shell (Bash)

To have an interactive shell within your image, simply use this:

```
$ srun --pty shifter --image yourproject/alpine bash
```

Using GPUs
On Deneb shifter runtime is installed on the GPU nodes. You need prior access to the GPUs nodes, see FAQ

```
[aubort@deneb ~]$ srun --gres gpu:1 --partition gpu --qos gpu shifter --image library/debian:stable-slim
nvidia-smi -L
GPU 0: Tesla K40m (UUID: GPU-21730043-7144-85e7-d251-7834adb2d1ee)

[aubort@deneb ~]$ srun --gres gpu:1 --partition gpu --qos gpu shifter --image library/nvidia-cuda:9.1-runtime
/home/aubort/gpu/cuda-samples/bin/x86_64/linux/release/simpleCUFFT
[simpleCUFFT] is starting...
GPU Device 0: "Tesla K40m" with compute capability 3.5

Temporary buffer size 448 bytes
Transforming signal cufftExecC2C
Launching ComplexPointwiseMulAndScale<<< >>>
Transforming signal back cufftExecC2C
```

FEEDBACK is welcome as this feature is experimental.

**Account on the c4science registry**

- Request an account
- Change your password on https://registry.c4science.ch

**Related articles**

- Running Docker images using Shifter
- FAQ
- Licensed Software on the Clusters
- How to use Tensorflow on the GPU nodes
- Using the clusters