How to clone a Git repository

Asked 3 years, 7 months ago Modified 3 years, 7 months ago Viewed 30k times

We have a tool which needs to clone several Git repositories for aggregating documentation data. We want to put that tool in a Docker container for easily running it locally and with Jenkins, and enabling reproducibility.

The Git repositories are hosted on a private server requiring authentication with SSH keys. Thus the Docker container must somehow gain access to the SSH keys of the user running the container.

We have a list of constraints:

1. we do **not** want to embed SSH keys in the Docker image
2. we do **not** want users to build the Docker image. We consider a `Dockerfile` does not enable reproducibility whereas an already generated Docker image do
3. we do **not** want the container to run as the `root` user
4. we **want** to use the SSH keys of the host user running the container
5. parameters can be provided to the command starting the container (`-v`, `-u`, ...)

Question: How can we achieve this, if it is possible?

Related:

- Using SSH keys inside docker container (the SSH keys are passed at build time – we want run time)
- Clone private git repo with dockerfile (same problem)
- Inject host's SSH keys into Docker Machine with Docker Compose (running as `root`)

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asked Jun 7, 2019 at 9:15

Jim

414 ● 1 ● 4 ● 16

1 I'm curious as to why you consider that a Dockerfile does not enable reproducibility. – SiHa Jun 7, 2019 at 9:21

The Dockerfile question aside, I'd have thought that you could simply mount the local user's `/home/user/.ssh` folder (read-only) into the container. Then doing a `git clone git@your.git/repo` should use their ssh key. – SiHa Jun 7, 2019 at 9:23

1 @SiHa See e.g. this or this. A Docker image is a self-sufficient and self-contained snapshot – a `Dockerfile` is a list of instructions relying on dependencies that can change (other images, host, ...). As for your suggestion: the container's user could not read the host user's keys because of different ownership. – Jim Jun 7, 2019 at 12:00

No reason you couldn't change the membership of the user, I'd have thought. – SiHa Jun 7, 2019 at 12:06

1 Maybe giving a specific group for host and docker users, and giving this group permission to read the ssh keys? – Vitor Falcão Jun 7, 2019 at 12:34

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2 Answers

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25

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You can use something like:

```
echo "git-user:x:$(id -u):$(id -g):Git User:/tmp:/bin/bash" > /tmp/fal
docker run \
   -u $(id -u):$(id -g) \
   -w /tmp \
   -v $HOME/.ssh:/path/to/.ssh \
   -v /tmp/fake_passwd:/etc/passwd  \
   --entrypoint sh \
   -it \
   alpine/git

  # commands in the container:
```

```
$ export GIT_SSH_COMMAND='ssh -i /path/to/.ssh/id_rsa -o "StrictHos
$ git clone [path to git repo]
```

This will ensure the container runs with the same UID/GID as the host user, thus being able to read the keys without changing their permissions or using root rights. In details:

- `-u $(id -u):$(id -g)` set the container user to match the host user
- `-w /tmp` ensure we work in a directory we can write in (we may also mount a volume on which we have read/write permissions or build the image with such directory)
- `-v $HOME/.ssh:/path/to/.ssh` mounts the local user SSH key from the host
- `--entrypoint sh` and `-it` are specific to `alpine/git` to have an interactive shell session, you may not need it with your image

Why mount a fake `/etc/passwd` file?

When you running a linux-based container (such as `alpine` or `debian`) with an unknown UID/GID (one which is not present in `/etc/passwd`), `git clone` command may result in error with a message such as:

```
Cloning into 'myrepo'...
No user exists for uid 1000
fatal: Could not read from remote repository.
```

By mounting this "fake" passwd file we ensure the OS will recognize the user running the container and allow our git clone command to work. Our password file will look like:

```
git-user:x:1000:1000:Git User:/tmp:/bin/bash
```

Which means roughly:

- `git-user` exists with UID 1000 and GID 1000
- it's HOME directory is `/tmp` (it's optional but this directory is writable and avoid some warning from `git clone`)

By setting `/tmp` (or another directory which may be created during image build) we ensure we have a writable HOME directory for `git-user` which will prevent a warning from `git clone` saying it could not created a `.ssh` directory

However this may have other side effects if you intend to run different tasks with your container.

Why use `GIT_SSH_COMMAND` ?

`GIT_SSH_COMMAND='ssh -i /path/to/.ssh/id_rsa'` will ensure `git clone` is using our key, but this can be done using ssh-agent as well - see https://serverfault.com/questions/447028/non-interactive-git-clone-ssh-fingerprint-prompt

In the example I use `-o "StrictHostKeyChecking=no"` **but it may be insecure**, another solution would be to mount a known host file in the container with the git repo server host key and using `-o "UserKnownHostsFile=/path/to/KnownHostFile"`

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edited Jun 13, 2019 at 8:23

answered Jun 10, 2019 at 13:27

Pierre B.
10.4k ● 1 ● 37 ● 56

This does work, although cloning will spam `Could not create directory '/.ssh'` even when the `known_hosts` file is referenced with `UserKnownHostsFile`. It's unfortunate that all this feels like a hack – but at this point I expect all the solutions will, especially looking at issues like this. I'm curious to see other solutions though. – Jim Jun 10, 2019 at 15:21

I understand, it's true the fake `passwd` file is a bit of a hack (I first tried without it but had to because of the issue I mentioned), however for the rest I believe it's a perfectly sane way of using git and ssh. The spam of `could not create directory` seems like a bug of SSH client - maybe it can be solved by setting a home directory for the user to a writable directory – Pierre B. Jun 11, 2019 at 10:12

I'm unsure how that can be done because at runtime root privileges are required for setting the home directory of a user, including self. And at build time the user is yet not known, so its home cannot be created. – Jim Jun 12, 2019 at 21:15

You may do this by setting a writable directory as home in the fake `passwd` file, for example: `git-user:x:1000:1000:Git User:/tmp:/bin/bash` which will have `/tmp` as home for `git-user` (you can also create a directory in the image during build and use it). `git clone` won't complain anymore (and it seems a .ssh/known_hosts file is created in set home dir), I edited answer to mention this – Pierre B. Jun 13, 2019 at 8:17

Related: running git or ssh client in docker as user: No user exists for uid and docker: set running user while launch container. – Jim Mar 5, 2020 at 20:24

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Would cloning the repositories on the host machine and mounting the directories in the docker image be ok ?

e.g. :

```
git clone github:repo1
git clone github:repo2
  ...

docker run -v repo1:/path/to/repo1 -v repo2:/path/to/repo2 ...
```

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answered Jun 11, 2019 at 15:00

LeGEC

42.2k ● 2 ● 52 ● 92

3 It would not work for a client missing Git for example. That's why we are "dockerizing" our tool, for reproducibility. – Jim Jun 12, 2019 at 21:12

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