

kxn_dev: Konnexions' Development Image

This image supports the use of a Docker container for the development of the Konnexions' projects in an Ubuntu environment.

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1. Installed core components

With the following command you can check in detail which software versions are included in the Docker image:

```
apt list --installed
```

Version 2.1.2

Component	Version	Remark	Status
Alien	8.95	base version	
asdf	v0.8.1-847ec73	base version	
CMake	3.21.3		
curl	7.79.1		
DBeaver	21.2.1	for virtual machine only	
Docker Compose	1.29.2		
Docker Desktop	20.10.9	base version [Docker Image & VM]	upgrade
dos2unix	7.4.2		
Eclipse	2021-09-R		
Elixir	1.12.3-otp-24		
Erlang/OTP	24.1.2		upgrade
GCC & G++	10.3.0		
Git	2.33.0		

Component	Version	Remark	Status
GNU Autoconf	2.71		
GNU Automake	1.16.4		
GNU make	4.3		
Go	1.17.2		upgrade
Gradle	7.2		
htop	3.1.0		
ImageMagick	7.1.0-9		upgrade
Java	17	openjdk	
Julia	1.6.3		
Kotlin	1.5.31		
LCOV	1.14	base version	
nginx	1.18.0	base version	
Node.js [npm]	v14.18.0 [6.14.15]		
ODBC	2.3.7	base version	
OpenSSL	1.1.1l		
Oracle Instant Client	21.3.0.0.0		
procps-ng	3,3,16	base version	new
Python3	3.10.0		upgrade
- cx-Oracle	8.2.1	base version	
- pip	21.2.4	base version	
- pyyaml	5.4.1	base version	
R	4.1.1		
rebar3	3.16.1		
RStudio	2021.09.0+351	for virtual machine only	
Rust	1.55.0		
tmux	3.2a		
Ubuntu	20.04.3 LTS	base version [focal]	
Vim	8.2.3458		
wget	1.21.2		
wget2	2.0.0		

Component	Version	Remark	Status
Yarn	1.22.15		

Version 2.1.1

Component	Version	Remark	Status
Alien	8.95	base version	
asdf	v0.8.1-cb79c69	base version	
CMake	3.21.3		upgrade
curl	7.79.1		upgrade
DBeaver	21.2.1	for virtual machine only	new
Docker Compose	1.29.2		
Docker Desktop	20.10.8	base version [Docker Image & VM]	
dos2unix	7.4.2		
Eclipse	2021-09-R		upgrade
Elixir	1.12.3-otp-24		upgrade
Erlang/OTP	24.1		upgrade
GCC & G++	10.3.0		
Git	2.33.0		
GNU Autoconf	2.71		
GNU Automake	1.16.4		
GNU make	4.3		
Go	1.17.1		upgrade
Gradle	7.2		
htop	3.1.0		upgrade
ImageMagick	7.1.0-8		upgrade
Java	17	openjdk	upgrade
Julia	1.6.3		upgrade
Kotlin	1.5.31		upgrade
LCOV	1.14	base version	
nginx	1.18.0	base version	
Node.js [npm]	v14.18.0 [6.14.15]		upgrade

Component	Version	Remark	Status
ODBC	2.3.7	base version	
OpenSSL	1.1.1l		upgrade
Oracle Instant Client	21.3.0.0.0		upgrade
Python3	3.9.7		upgrade
- cx-Oracle	8.2.1	base version	
- pip	21.2.4	base version	
- pyyaml	5.4.1	base version	
R	4.1.1		
rebar3	3.16.1		
RStudio	2021.09.0+351	for virtual machine only	upgrade
Rust	1.55.0		upgrade
tmux	3.2a		
Ubuntu	20.04.3 LTS	base version [focal]	
Vim	8.2.3458		upgrade
wget	1.21.2		upgrade
wget2	2.0.0		new
Yarn	1.22.15		upgrade

Version 2.1.0

Component	Version	Remark	Status
Alien	8.95	base version	
asdf	v0.8.1-95f2cdf	base version	
CMake	3.21.1		upgrade
curl	7.78.0		upgrade
Docker Compose	1.29.2		
Docker Desktop	20.10.8	base version [Docker Image & VM]	
dos2unix	7.4.2		
Eclipse	2021-06-R		
Elixir	1.12.2-otp-24		
Erlang/OTP	24.0.5		upgrade

Component	Version	Remark	Status
GCC & G++	10.3.0		
Git	2.33.0		upgrade
GNU Autoconf	2.71		
GNU Automake	1.16.4		upgrade
GNU make	4.3		
Go	1.16.7		upgrade
Gradle	7.2		upgrade
htop	3.0.5		
ImageMagick	7.1.0-4		new
Java	16.0.2	openjdk	upgrade
Julia	1.6.2		upgrade
Kotlin	1.5.21		upgrade
LCOV	1.14	base version	
nginx	1.18.0	base version	
Node.js [npm]	v14.17.5 [6.14.14]		upgrade
ODBC	2.3.7	base version	new
OpenSSL	1.1.1k		
Oracle Instant Client	21.1.0.0.0		
Python3	3.9.6		
- cx-Oracle	8.2.1	base version	
- pip	21.2.4	base version	upgrade
- pyyaml	5.4.1	base version	
R	4.1.1		new
rebar3	3.16.1		
RStudio	1.4.1717	for virtual machine only	
Rust	1.54.0		upgrade
tmux	3.2a		
Ubuntu	20.04.3 LTS	base version [focal]	upgrade
Vim	8.2.3336		upgrade
wget	1.21.1		

Component	Version	Remark	Status
Yarn	n/a	asdf plugin is faulty	

Version 2.0.5

Component	Version	Remark	Status
Alien	8.95		
asdf	v0.8.1-a1ef92a		
CMake	3.20.5		upgrade
curl	7.77.0		
Docker Compose	1.29.2		
Docker Engine	20.10.7		
Eclipse	2021-06-R		upgrade
Elixir	1.12.2-otp-24		upgrade
Erlang/OTP	24.0.3		upgrade
GCC & G++	10.3.0		upgrade
Git	2.32.0		
GNU Autoconf	2.71		
GNU Automake	1.16.3		
GNU make	4.3		
Go	1.16.3		
Gradle	7.1.1		upgrade
htop	3.0.5		
Java	16.0.1	openjdk	
Julia	1.6.1		new
Kotlin	1.5.20		upgrade
LCOV	1.14		
nginx	1.18.0		
Node.js [npm]	v14.17.2 [6.14.13]		upgrade
OpenSSL	1.1.1k		
Oracle Instant Client	21.1.0.0.0		
Python	3.9.6		upgrade

Component	Version	Remark	Status
- cx_Oracle	8.2.1		
- pip	21.1.3		
- pyyaml	5.4.1		upgrade
rebar3	3.16.1		
Rust	1.53.0		upgrade
tmux	3.2a		
Ubuntu	20.04.2 LTS	focal	
Vim	8.2.3083		upgrade
wget	1.21.1		
Yarn	1.22.10		

Version 2.0.4

Component	Version	Remark	Status
Alien	8.95		
asdf	v0.8.1-a1ef92a		
CMake	3.20.3		upgrade
curl	7.77.0		upgrade
Docker Compose	1.29.2		
Docker Engine	20.10.7		upgrade
Eclipse	2021-03-R		
Elixir	1.12.1-otp-24		upgrade
Erlang/OTP	24.0.2		upgrade
GCC & G++	10.2.0		
Git	2.32.0		upgrade
GNU Autoconf	2.71		
GNU Automake	1.16.3		
GNU make	4.3		
Go	1.16.5		upgrade
Gradle	7.0.2		
htop	3.0.5		

Component	Version	Remark	Status
Java	16.0.1	openjdk	
Kotlin	1.5.10		upgrade
LCOV	1.14		
nginx	1.18.0		
Node.js [npm]	v14.17.0 [6.14.13]		
OpenSSL	1.1.1k		
Oracle Instant Client	21.1.0.0.0		
Python	3.10.0b2		upgrade
- cx_Oracle	8.2.1		upgrade
- pip	21.1.2		upgrade
- pyyaml	5.4.1		
rebar3	3.16.1		upgrade
Rust	1.52.1		
tmux	3.2a		upgrade
Ubuntu	20.04.2 LTS	focal	
Vim	8.2.2984		upgrade
wget	1.21.1		
Yarn	1.22.10		

Version 2.0.3

Component	Version	Remark	Status
Alien	8.95		
asdf	v0.8.1-a1ef92a		upgrade
CMake	3.20.2		upgrade
curl	7.76.1		
Docker Compose	1.29.2		upgrade
Docker Engine	20.10.6		
Eclipse	2021-03-R		
Elixir	1.12.0-otp-24		upgrade
Erlang/OTP	24.0.1		upgrade

Component	Version	Remark	Status
GCC & G++	10.2.0		
Git	2.31.1		
GNU Autoconf	2.71		
GNU Automake	1.16.3		
GNU make	4.3		
Go	1.16.4		upgrade
Gradle	7.0.2		upgrade
htop	3.0.5		
Java	16.0.1	openjdk	upgrade
Kotlin	1.5.0		upgrade
LCOV	1.14		
nginx	1.18.0		
Node.js [npm]	v14.17.0 [6.14.13]		upgrade
OpenSSL	1.1.1k		
Oracle Instant Client	21.1.0.0.0		
Python	3.10.0b1		upgrade
- cx_Oracle	8.2.0		upgrade
- pip	21.1.1		upgrade
- pyyaml	5.4.1		
rebar3	3.15.1		upgrade
Rust	1.52.1		upgrade
tmux	3.2		upgrade
Ubuntu	20.04.2 LTS	focal	
Vim	8.2.2876		upgrade
wget	1.21.1		
Yarn	1.22.10		

Version 2.0.2

Component	Version	Remark	Status
Alien	8.95		

Component	Version	Remark	Status
asdf	v0.8.0-c6145d0		
CMake	3.20.1		upgrade
curl	7.76.1		upgrade
Docker Compose	1.29.1		upgrade
Docker Engine	20.10.6		upgrade
Eclipse	2021-03-R		upgrade
Elixir	1.11.4-otp-23		upgrade
Erlang/OTP	23.3.1		upgrade
GCC & G++	10.2.0		
Git	2.31.1		upgrade
GNU Autoconf	2.71		
GNU Automake	1.16.3		
GNU make	4.3		
Go	1.16.3		upgrade
Gradle	7.0		upgrade
htop	3.0.5		
Java	16	openjdk	upgrade
Kotlin	1.4.32		upgrade
LCOV	1.14		
nginx	1.18.0		
Node.js [npm]	v14.16.1 [6.14.12]		upgrade
OpenSSL	1.1.1k		upgrade
Oracle Instant Client	21.1.0.0.0		
Python	3.9.4		upgrade
- cx_Oracle	8.1		
- pip	21.0.1		
- pyyaml	5.4.1		
rebar3	3.14.3		
Rust	1.51.0		upgrade
tmux	3.2		upgrade

Component	Version	Remark	Status
Ubuntu	20.04.2 LTS	focal	
Vim	8.2.2771		upgrade
wget	1.21.1		
Yarn	1.22.10		

Version 2.0.1

Component	Version	Remark	Status
Alien	8.95		
asdf	v0.8.0-c6145d0		
CMake	3.19.5		upgrade
curl	7.75.0		
Docker Compose	1.28.4		upgrade
Docker Engine	20.10.3		
Eclipse	2020-12-R		
Elixir	1.11.3-otp-23		
Erlang/OTP	23.2.5		upgrade
GCC & G++	10.2.0		
Git	2.30.0		
GNU Autoconf	2.71		
GNU Automake	1.16.3		
GNU make	4.3		
Go	1.16		upgrade
Gradle	6.8.2		upgrade
htop	3.0.5		
Java	15.0.2	openjdk	
Kotlin	1.4.30	release-302	upgrade
LCOV	1.14		
nginx	1.18.0		
Node.js [npm]	v14.15.5 [6.14.11]		upgrade
OpenSSL	1.1.1j		upgrade

Component	Version	Remark	Status
Oracle Instant Client	21.1.0.0.0		
Python	3.9.2		upgrade
- cx_Oracle	8.1		
- pip	21.0.1		
- pyyaml	5.4.1		
rebar3	3.14.3		
Rust	1.50.0		upgrade
tmux	3.1c		new
Ubuntu	20.04.2 LTS	focal	
Vim	8.2.2541		upgrade
wget	1.21.1		new
Yarn	1.22.10		upgrade

Version 2.0.0

Component	Version	Remark	Status
Alien	8.95		new
asdf	v0.8.0-c6145d0		new
CMake	3.19.4		new
curl	7.75.0		new
Docker Compose	1.28.2		upgrade
Docker Engine	20.10.3		
Eclipse	2020-12-R		
Elixir	1.11.3-otp-23		upgrade
Erlang/OTP	23.2.3	erts-11.1.7	upgrade
GCC & G++	10.2.0		G++ new
Git	2.30.0		upgrade
GNU Autoconf	2.71		new
GNU Automake	1.16.3		new
GNU make	4.3		new
Go	1.15.7		

Component	Version	Remark	Status
Gradle	6.8.1		
htop	3.0.5		new
Java	15.0.2	openjdk	
Kotlin	1.4.21	release-351	
LCOV	1.14		
nginx	1.18.0		
Node.js [npm]	v14.15.4 [6.14.10]		npm new
OpenSSL	1.1.1i		upgrade
Oracle Instant Client	21.1.0.0.0		
Python	3.9.1		
- cx_Oracle	8.1		
- pip	21.0.1		
- pyyaml	5.4.1		
rebar3	3.14.3		
Rust	1.49.0		
Ubuntu	20.04.2 LTS	focal	upgrade
Vim	8.2 1-2453		upgrade
Yarn	1.22.5		

2. Creating a new Konnexions development container

2.1 Getting started

```

> REM Assumptions:
> REM   - you want to map the container port 8443 to the host port 443
> REM   - the name of the Docker container should be: my_kxn_dev
> REM   - the path the host repository is: //C/projects/my_repro
> REM   - the directory name for this repository inside the container should be:
my_repro_dir
> REM   - you want to use the latest version of the Konnexions development image
> docker run -it -p 443:8443 \
    --name my_kxn_dev \
    -v //C/projects/my_repro:/my_repro_dir \
    konnexionsgmbh/kxn_dev:latest

> REM Stopping the container
> docker stop my_kxn_dev

```

```
> REM Restarting the container
> docker start my_kxn_dev

> REM Entering a running container
> docker exec -it my_kxn_dev bash
```

2.2 Detailed syntax

A new container can be created with the **docker run** command.

Syntax:

```
docker run -it
    [-p <port>:8443] \
    [--name <container_name>] \
    [-v <directory_repository>:/dderl] \
    konnexionsgmbh/kxn_dev[:<version>]
    [<cmd>]
```

Parameters:

- **port** - an optional listener port
- **container_name** - an optional container identification
- **directory_repository** - an optional host repository directory - the default value is expecting the repository inside the container
- **version** - an optional version number of the image or the constant **latest**
- **cmd** - an optional command to be executed in the container, default is **bash** for running the **bash** shell

Detailed documentation for the command **docker run** can be found [here](#).

Examples:

1. Creating a new Docker container named **my_kxn_dev** using a repository inside the Docker container:

```
docker run -it --name my_kxn_dev konnexionsgmbh/kxn_dev:latest
```

2. Creating a new Docker container named **my_kxn_dev** using the host repository of a Windows directory **D:\projects\my_repro**:

```
docker run -it --name dderl_dev -v //D/projects/my_repro:/my_repro
konnexionsgmbh/kxn_dev:latest
```

3. Creating a new Docker container named **my_kxn_dev** using the host repository of a Linux directory **/my_repro** and mapping port **8443** to port **8000**:

```
docker run -it --name my_kxn_dev -p 8000:8443 -v /my_repro:/my_repro
konnexionsgmbh/kxn_dev:latest
```

3. Working with an existing Konnexions development container

3.1 Starting a stopped container

A previously stopped container can be started with the `docker start` command.

Syntax:

```
docker start <container_name>
```

Parameter:

- **container_name** - the mandatory container identification, that is an UUID long identifier, an UUID short identifier or a previously given name

Detailed documentation for the command `docker start` can be found [here](#).

3.2 Entering a running container

A running container can be entered with the `docker exec` command.

Syntax:

```
docker exec -it <container_name> <cmd>
```

Parameter:

- **container_name** - the mandatory container identification, that is an UUID long identifier, an UUID short identifier or a previously given name
- **cmd** - the command to be executed in the container, e.g. `bash` for running the `bash` shell

Detailed documentation for the command `docker exec` can be found [here](#).

4. Best practices

4.1 Use of a root repository directory on the host computer

If all relevant repositories are located within a common parent directory, then development work in all these repositories can be done within a single Konnexions development container.

Example:

In the following example we assume that the host directory is named `C:\Temp\my_projects` and should be mapped to the `projects` directory in the container.

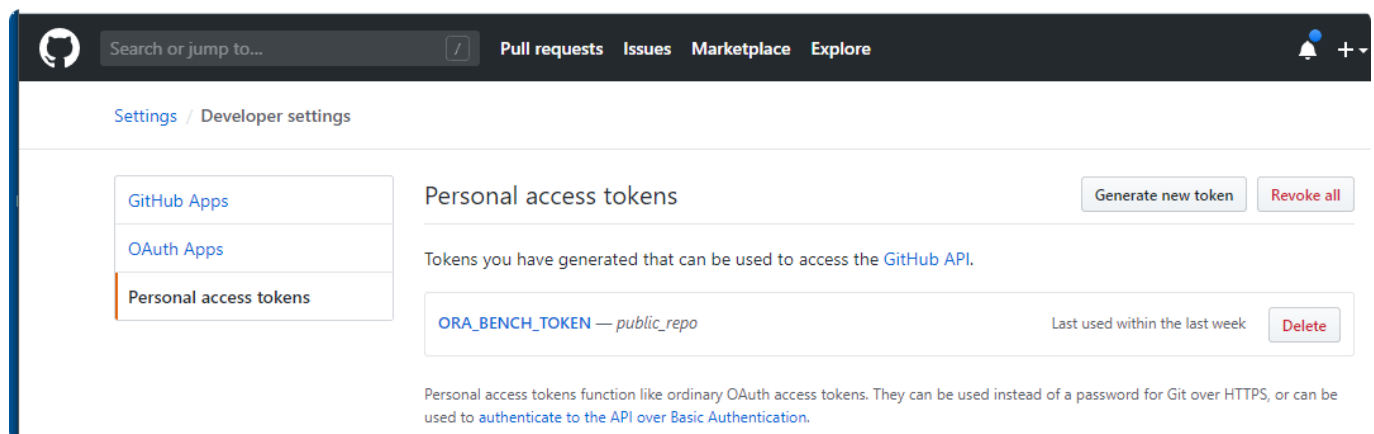
```
>C:\Temp\my_projects>docker run -it --name kxn_dev -v
//C/Temp/my_projects:/projects konnexionsgmbh/kxn_dev:latest
root@35b9310932f1:/# cd projects
root@35b9310932f1:/projects# ls -ll
total 0
drwxrwxrwx 1 root root 4096 May  2 14:05 dderl
```

4.2 Use of private GitHub repositories inside the container

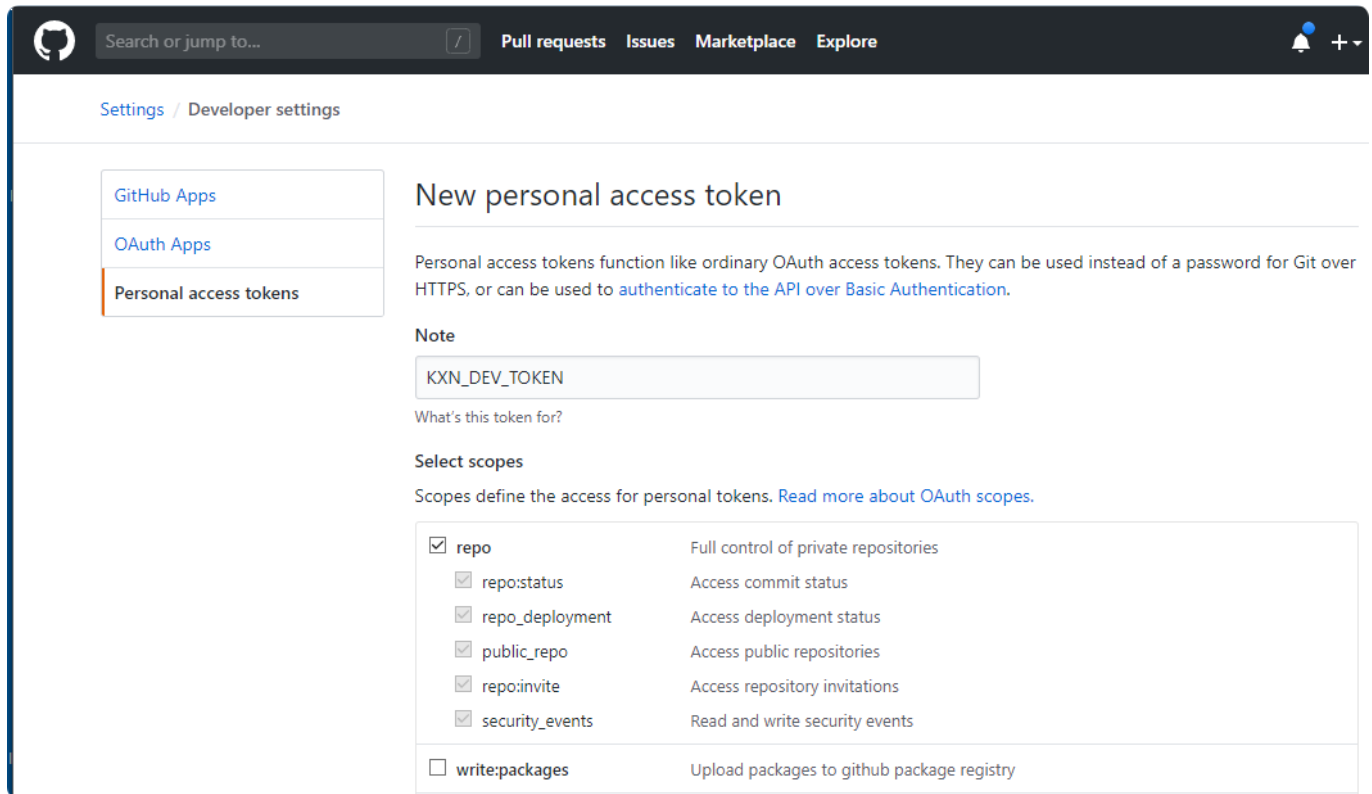
To access private repositories in GitHub, you must first create a new personal access token in GitHub and then add it to your git configuration inside the container.

1. Create a new personal access token in GitHub

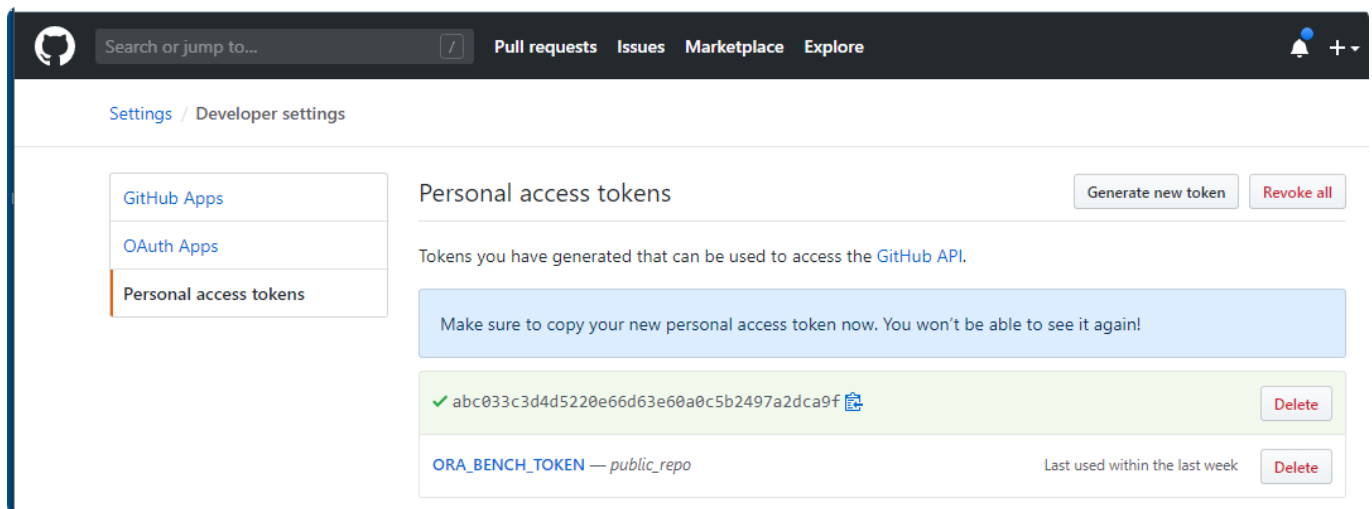
- With the following URL you can create the access token: <https://github.com/settings/tokens>



- Press the button `Generate new token`



- Name the new token, select the scopes and press the button **Generate token**



- Write down the secret code and keep it in a safe place

2. Setting up the Docker container on the host machine

In the following example we assume that the host directory is named **C:\Temp\my_projects** and should be mapped to the **projects** directory in the container.

```
C:\Temp\my_projects\dderl>docker run -it --name kxn_dev -v
//C/Temp/my_projects:/projects konnexionsgmbh/kxn_dev:latest
Unable to find image 'konnexionsgmbh/kxn_dev:latest' locally
latest: Pulling from konnexionsgmbh/kxn_dev
d51af753c3d3: Pull complete
...
a6bb30d1a5cf: Pull complete
```

```
Digest: sha256:5f6d6afc566ef9142d2d85b85dd331c0558eafaaf286179fd0ae787988c1b89b
Status: Downloaded newer image for konnexionsgmbh/kxn_dev:latest
```

3. Initial configuration of git in the container

```
root@332206c300f1:/# export XDG_CONFIG_HOME=/projects
root@332206c300f1:/# mkdir -p $XDG_CONFIG_HOME/git/
root@332206c300f1:/# touch $XDG_CONFIG_HOME/git/config
root@332206c300f1:/# touch $XDG_CONFIG_HOME/git/credentials
root@332206c300f1:/# git config --file=$XDG_CONFIG_HOME/git/config
credential.helper 'store --file=/projects/git/credentials'
root@332206c300f1:/# git config --file=$XDG_CONFIG_HOME/git/config user.name "John
Doe"
root@332206c300f1:/# git config --file=$XDG_CONFIG_HOME/git/config user.email
"john.doe@company.com"
root@332206c300f1:/# git config --list --show-origin
file:/projects/git/config      credential.helper=store --
file=/projects/git/credentials
file:/projects/git/config      user.name=John Doe
file:/projects/git/config      user.email=john.doe@company.com
```

4. Verification of the settings

```
root@332206c300f1:/# cat /projects/git/config
[credential]
    helper = store --file=/projects/git/credentials
[user]
    name = John Doe
[user]
    email = john.doe@company.com
```

5. Clone a repository for the first time

When prompted provide your github user name and the new personal access token from (1).

```
root@332206c300f1:/# cd projects
root@332206c300f1:~# git clone https://github.com/KonnexionsGmbH/docker_images
Cloning into 'docker_images'...
Username for 'https://github.com': John Doe
Password for 'https://john.doe@company.com':
abc033c3d4d5220e66d63e60a0c5b2497a2dca9f
remote: Enumerating objects: 78, done.
remote: Counting objects: 100% (78/78), done.
remote: Compressing objects: 100% (49/49), done.
remote: Total 78 (delta 33), reused 68 (delta 23), pack-reused 0
```

```
Receiving objects: 100% (78/78), 167.83 KiB | 867.00 KiB/s, done.
Resolving deltas: 100% (33/33), done.
```

6. Verify if the clone completed with success

```
root@332206c300f1:~# cat /projects/git/credentials
https://John Doe:abc033c3d4d5220e66d63e60a0c5b2497a2dca9f@github.com
```

7. Verification after a restart of the Docker container

```
C:\Temp\my_projects\dderl>docker start knx_dev
knx_dev
C:\Temp\my_projects\dderl>docker exec -it knx_dev bash
root@332206c300f1:/# export XDG_CONFIG_HOME=/projects
root@332206c300f1:/# git config --list --show-origin
file:/projects/git/config credential.helper=store --
file=/projects/git/credentials
file:/projects/git/config user.name=John Doe
file:/projects/git/config user.email=john.doe@company.com
```

8. Verification after the removal of the Docker container

- Deleting the Docker container and image

```
C:\Temp\my_projects\dderl>docker stop knx_dev
knx_dev

C:\Temp\my_projects\dderl>docker rm knx_dev
knx_dev

C:\Temp\my_projects\dderl>docker images
REPOSITORY          TAG          IMAGE ID          CREATED
SIZE
konnexionsgmbh/knx_dev latest       51757b5e414e     6 hours ago
3.71GB

C:\Temp\my_projects\dderl>docker rmi 51757b5e414e
Untagged: konnexionsgmbh/knx_dev:latest
Untagged:
konnexionsgmbh/knx_dev@sha256:5f6d6afc566ef9142d2d85b85dd331c0558eafaaf286179fd0ae
787988c1b89b
Deleted: sha256:51757b5e414e5333ace7b163484c06e4685c29312ad09d5d7d648c6936011a60
...
Deleted: sha256:7789f1a3d4e9258f5469a8d657deb6aba168d86967063e9b80ac3e1154333f
```

- Recreating the Docker container (and image)

```
C:\Temp\my_projects\dderl>docker run -it --name kxn_dev -v
//C:/Temp/my_projects:/projects konnexionsgmbh/kxn_dev:latest
Unable to find image 'konnexionsgmbh/kxn_dev:latest' locally
latest: Pulling from konnexionsgmbh/kxn_dev
d51af753c3d3: Pull complete
...
a6bb30d1a5cf: Pull complete
Digest: sha256:5f6d6afc566ef9142d2d85b85dd331c0558eafaaf286179fd0ae787988c1b89b
Status: Downloaded newer image for konnexionsgmbh/kxn_dev:latest
root@ad1f036bbc44:/# export XDG_CONFIG_HOME=/projects
root@ad1f036bbc44:/# git clone https://github.com/KonnexionsGmbH/docker_images
Cloning into 'docker_images'...
remote: Enumerating objects: 78, done.
remote: Counting objects: 100% (78/78), done.
remote: Compressing objects: 100% (49/49), done.
remote: Total 78 (delta 33), reused 68 (delta 23), pack-reused 0
Receiving objects: 100% (78/78), 167.83 KiB | 895.00 KiB/s, done.
Resolving deltas: 100% (33/33), done.
```

- If we use the same path - where `git/config` and `git/credentials` exist - as in Step 4, `git` access (clone/push/pull) doesn't ask for username/password anymore.

5. Development Project Specifics

5.1 DDErI

Inside the Docker container you can either clone a `dderl` repository or switch to an existing `dderl` repository. If a Docker container with an Oracle database is located on the host computer it can be accessed by using the IP address of the host computer. Any `dderl` script can be executed inside the Docker container, for example:

```
rebar3 compile
rebar3 as prod release
./start.sh
```

The following port numbers are exposed and can be mapped if necessary:

```
1236
7000-7020
8125
8443
9443
```

5.2 OraBench

Inside the Docker container you can either clone a `ora_bench` repository or switch to an existing `ora_bench` repository.

If there is a docker container with an Oracle database on the host computer, it can be accessed in two ways:

1. via the IP address of the host computer,
2. via the docker network `ora_bench_net` - the development container `kxn_dev` must be included in this network beforehand

Any `ora_bench` script can be executed inside the Docker container, for example:

```
./scripts/run_properties_standard.sh > run_properties_standard.log 2>&1
```

Important: If the repository was previously used on Windows, then all files in the following directories must also be deleted from Windows first:

- `src_elixir/deps`
- `src_elixir/mix.lock`
- `src_erlang/_build`