Keycloak in Docker #2 – How to import a Keycloak realm

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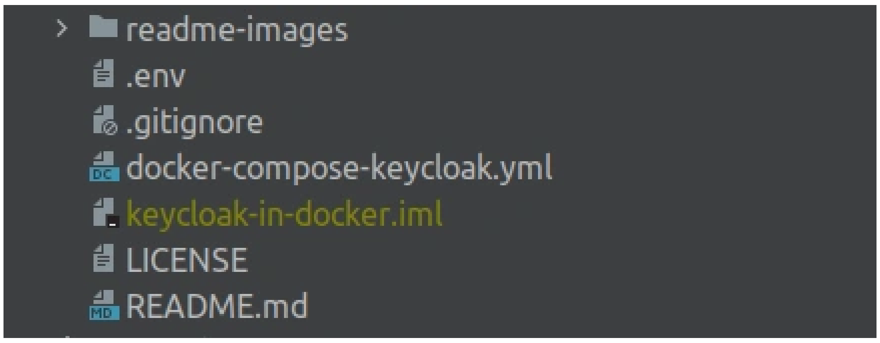
Having a dockerized Keycloak service that works out-of-the-box and contains an imported realm with its default users is very useful. Not only does this greatly simplify the setup process, it also allows us to share a replicable Keycloak instance with other developers.

I'm going to describe two ways of importing a realm from a file:

- with a **Docker volume and an environment variable** that triggers an import every time we start the container but only executes it if the realm doesn't exist yet,
- with a **Docker volume and a command** executed in our running `keycloak` service that will use a mounted volume but has to be triggered (manually or with a script) and can be configured to always replace an existing realm.

However, if you need to import multiple realms or a realm that has been exported to many files, see the Keycloak in Docker #6 – How to import realms from a directory post.

For the reference, below you'll see how the keycloak directory tree will look like in my project after finishing the work described in this article:


readme-images
.env
.gitignore
docker-compose-keycloak.yml
keycloak-in-docker.iml
LICENSE
README.md

Prerequisites

- I'm going to work with Keycloak running as a Docker service. You can learn how to run Keycloak with Docker in the Keycloak in Docker #1 – How to run Keycloak in a Docker container post. As a result of my previous work, I have two services running on my machine:

```
docker ps
CONTAINER ID   IMAGE                    PORTS
774a1d259bf9   jboss/keycloak:15.0.2    8443/tcp, 0.0.0.0:8024->8080/tcp, :::802
6f10181d012b   postgres:14.1-alpine     0.0.0.0:5433->5432/tcp, :::5433->5432/tc
```

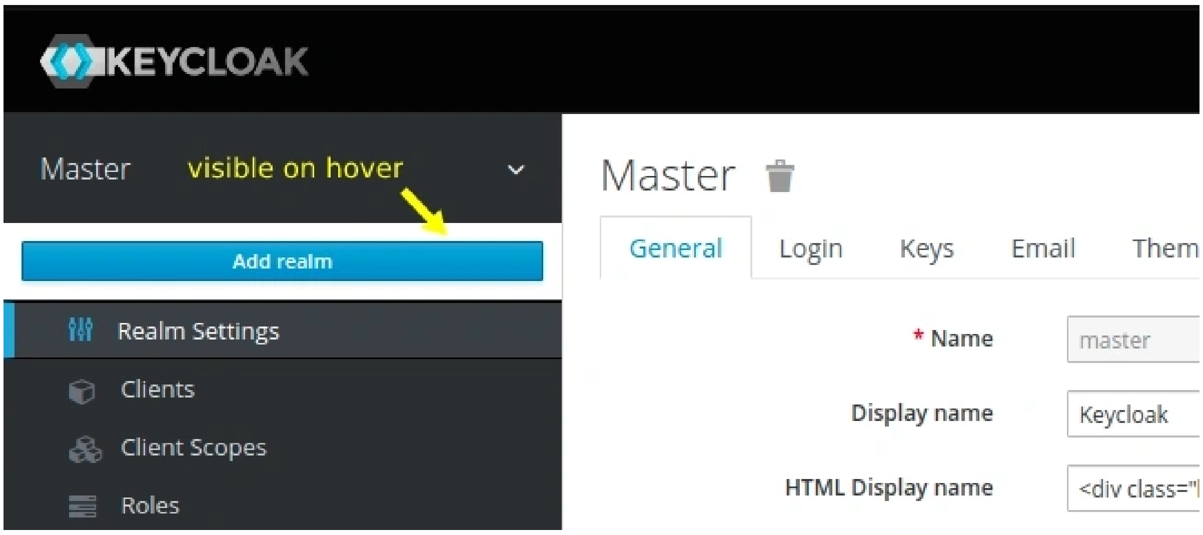
- The starting point for the work presented in this post is contained in the commit 05e4c72e4a01f33304b45e8410352060e1a17044.

Create and export a custom realm

You can skip this part, if you already have a valid json file for your realm.

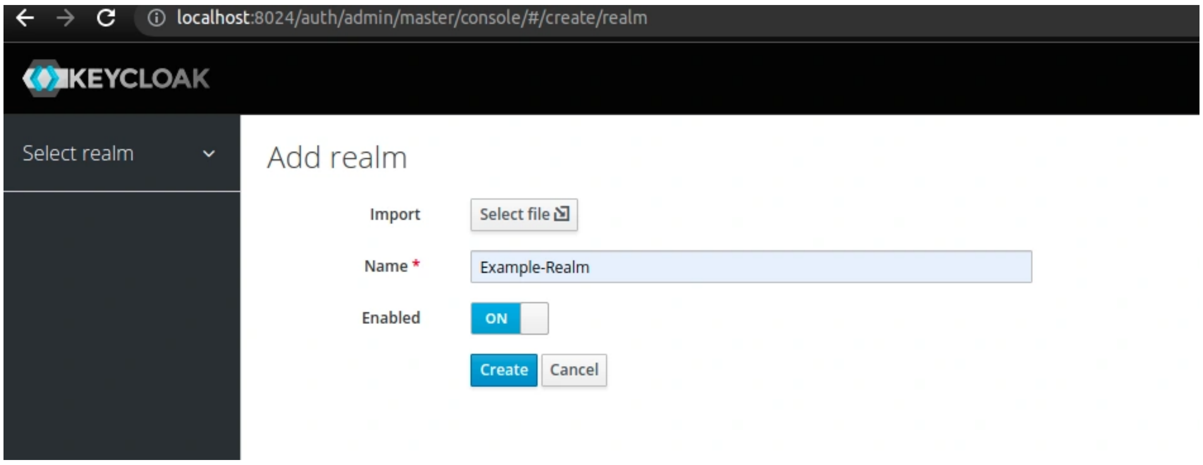
- use the UI to create a simple realm,
- export the realm using the Admin console export (not all resources can be exported with this method but it'll be enough for this example),
- add some default users to my exported realm file,
- destroy the dockerized services.

Visit the http://localhost:8024/auth/ url and log in with admin credentials (`keycloak:keycloak` in my example). Hover the mouse over the name of the default "Master" realm in the top left corner of the page:



* Name	master
Display name	Keycloak
HTML Display name	<div class="|

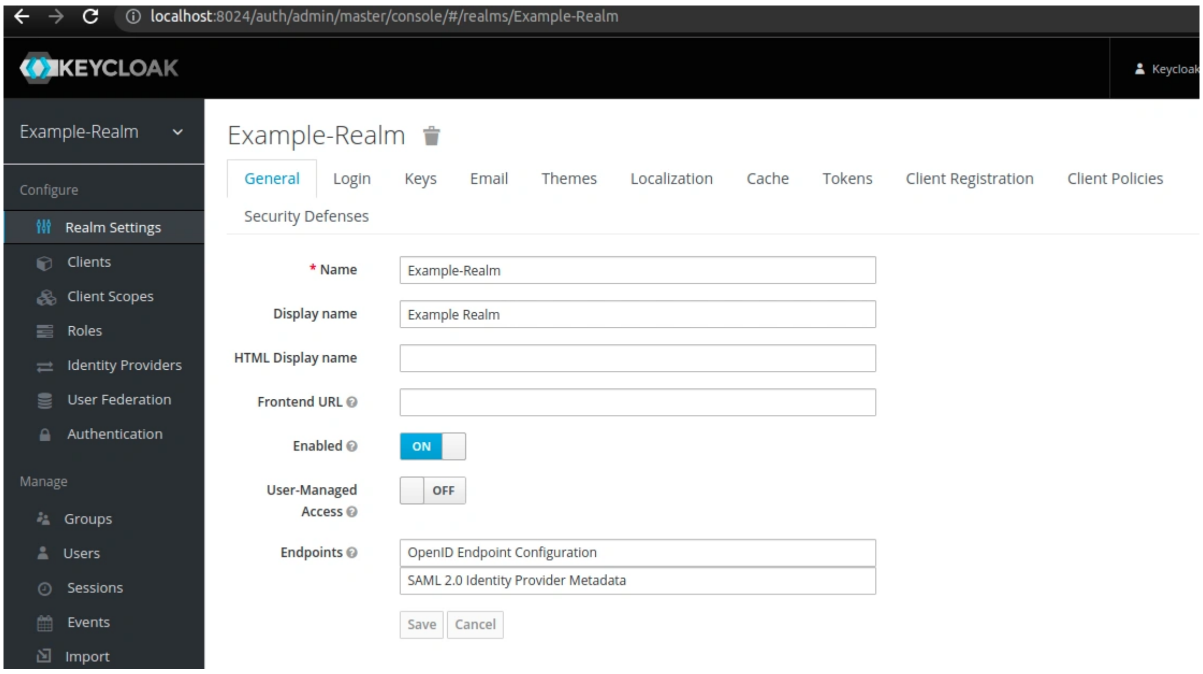
Click the `Add realm` option to go to the form where we're going to provide our realm name:



Import	Select file
Name *	Example-Realm
Enabled	ON

As we can read in the official documentation:

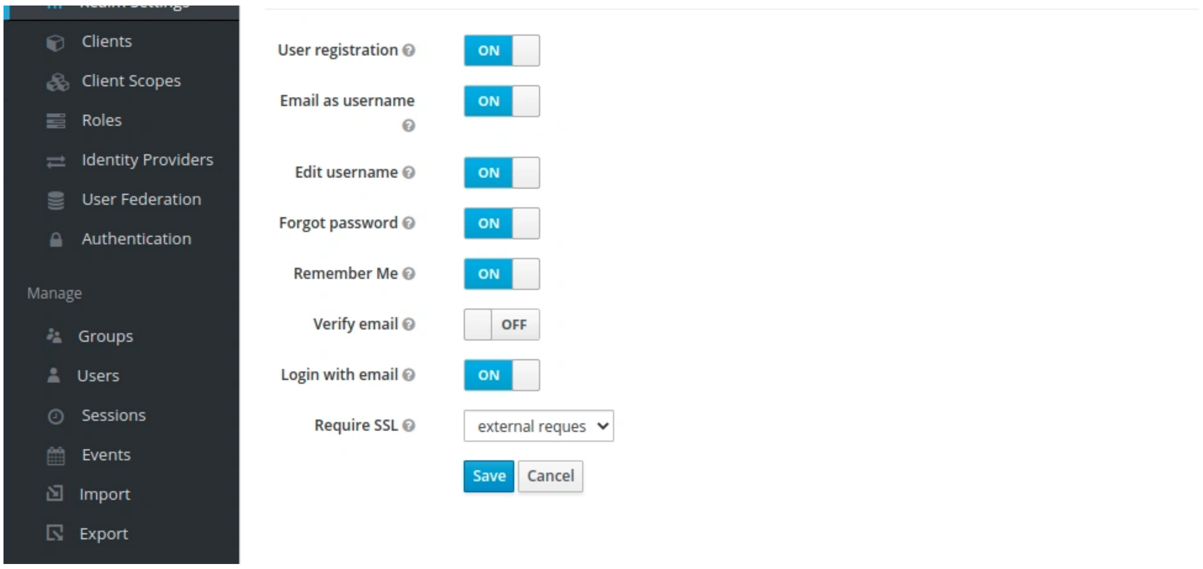
I'm going to name my realm `Example-Realm` and provide `Example Realm` name as a value that will be displayed to users:


localhost:8024/auth/admin/master/console/#/realms/Example-Realm

Example-Realm

* Name	Example-Realm
Display name	Example Realm
HTML Display name	
Frontend URL	
Enabled	ON
User-Managed Access	OFF
Endpoints	OpenID Endpoint Configuration SAML 2.0 Identity Provider Metadata

Next we should define all the other settings for our realm. For instance, you can see my example `Login` configuration on the image below:

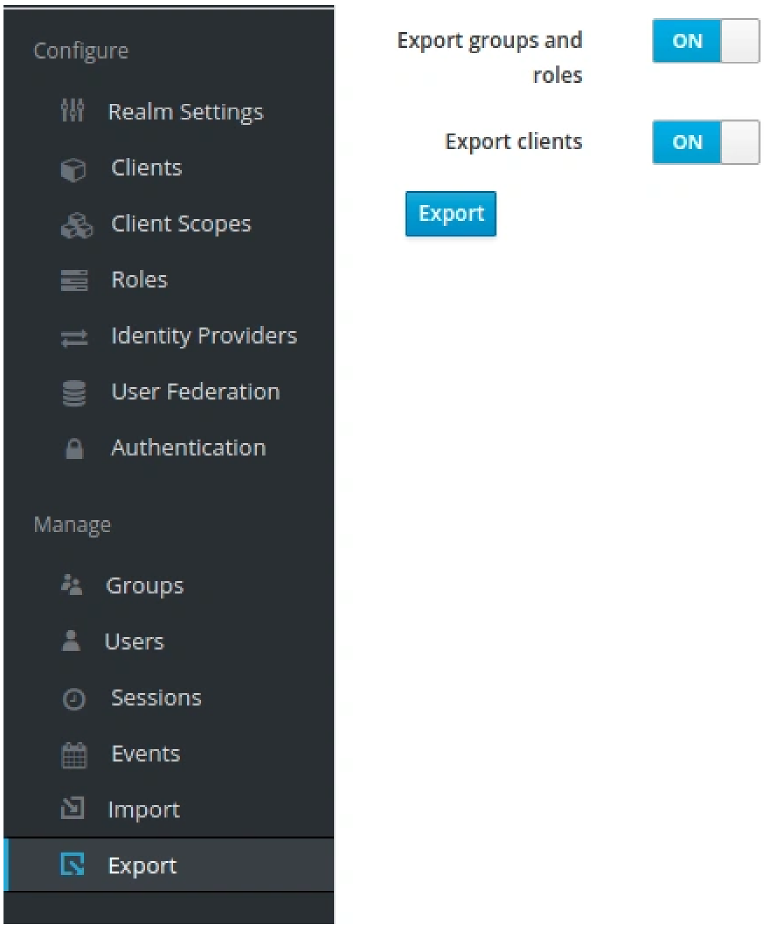


User registration: ON
Email as username: ON
Edit username: ON
Forgot password: ON
Remember Me: ON
Verify email: OFF
Login with email: ON
Require SSL: external reques

This is all I will need in my example realm. You can freely configure yours before exporting it.

Export the realm

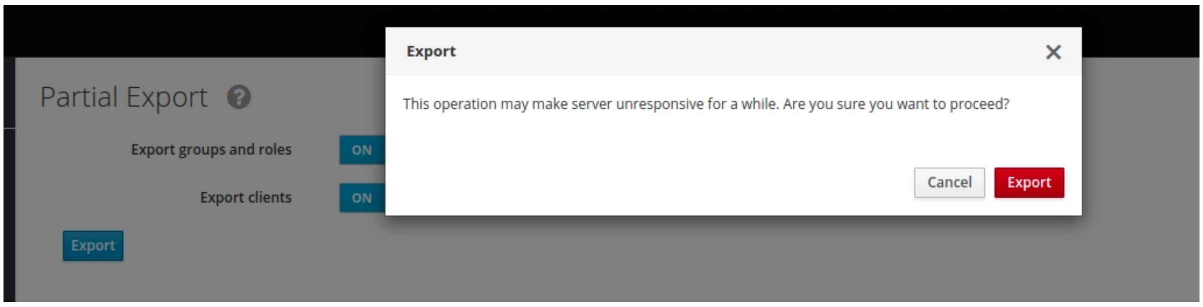
We're going to export our realm to a `json` file. Select the `Export` option from the side menu and choose what you want to include in the exported file:



Export groups and roles: ON

Export clients: ON

Remember that realm export may take some time and make the service unresponsive for other requests:



Export groups and roles: ON

Export clients: ON

Export

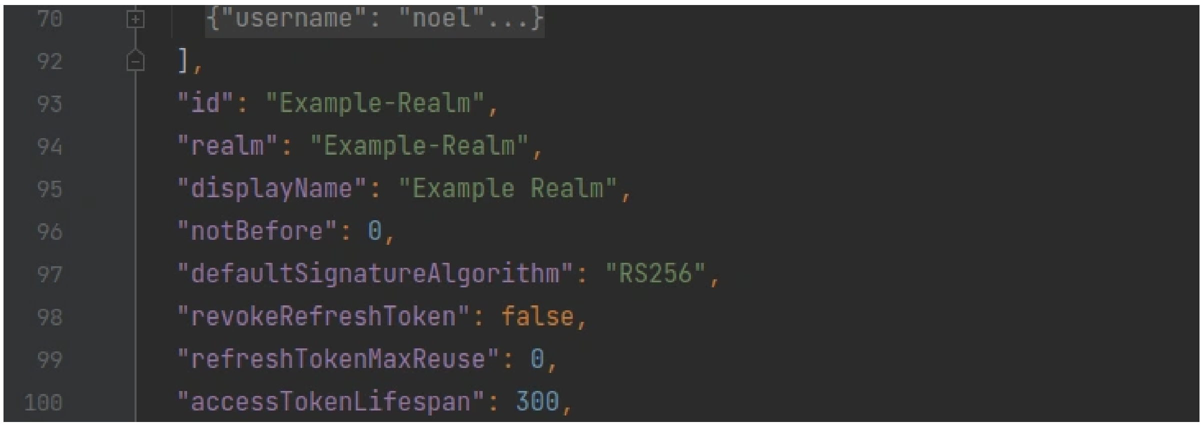
This operation may make server unresponsive for a while. Are you sure you want to proceed?

As a result, we'll have the `realm-export.json` file saved on our machine. Remember the location of this file as you'll use it to provide the volume content for our dockerized Keycloak.

Add default users

```json
{
  "users": [
    {
      "username": "christina",
      "enabled": true,
      "email": "christina@test.com",
      "firstName": "Christina",
      "lastName": "Travis",
      "credentials": [
        {
          "type": "password",
          "value": "test"
        }
      ],
      "realmRoles": [
        "user"
      ],
      "clientRoles": {
        "account": [
          "view-profile",
          "manage-account"
        ]
      }
    },
    …
  ]
}
```

Now, we're going to add the `users` list at the beginning of the `relam-export.json` file (users' details are folded so that we can see the list and the start of the realm config) as you can see on the following screenshot from my IDE:


```
    {"username": "noel"...}
],
"id": "Example-Realm",
"realm": "Example-Realm",
"displayName": "Example Realm",
"notBefore": 0,
"defaultSignatureAlgorithm": "RS256",
"revokeRefreshToken": false,
"refreshTokenMaxReuse": 0,
"accessTokenLifespan": 300,
```

Remove containers

Now, we can remove the containers and the database volume with the following command:

```
docker-compose -f docker-compose-keycloak.yml down --volumes
```

Import a Keycloak realm on a container startup using an env variable

We're going to map a volume to our `realm-export.json` file and use the KEYCLOAK_IMPORT environment variable.

Define the volume for realm import

The image documentation tells us to use the KEYCLOAK_IMPORT environment variable to specify the realm file mounted to the `/tmp` directory:

Therefore, I'm going to add the volume with the realm to my **`docker-compose.yml`** file:

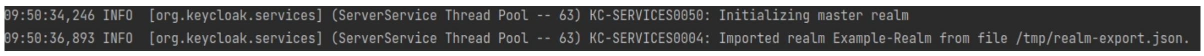
```
#  backend/docker/docker-compose-keycloak.yml
…
services:
  keycloak:
    image: …
    ports:
      …
    environment:
      - KEYCLOAK_IMPORT=/tmp/realm-export.json
      …
    volumes:
      - ./keycloak/realms/realm-export.json:/tmp/realm-export.json
    networks:
      …
    depends_on:
      …
…
```

Recreate the container

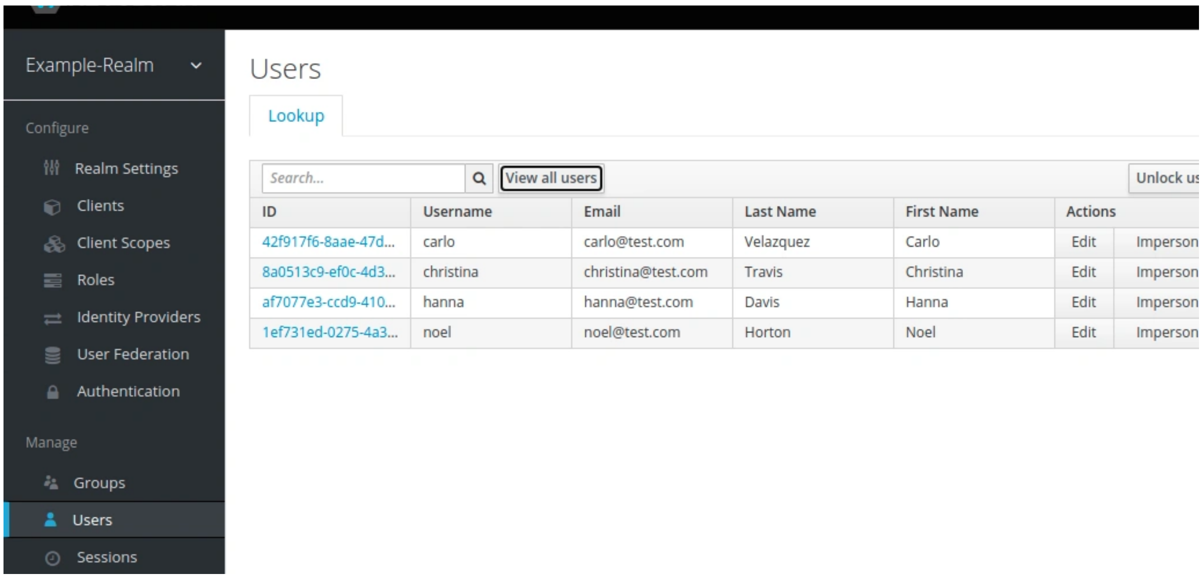
Make sure that the **`keycloak`** and **`keycloakdb`** services (and their volumes) were purged from your system after you had exported your realm. Now, we're going to recreate the containers with the following command:

```
docker-compose -f docker-compose-keycloak.yml up -d
```

You should see the Keycloak realm import info in the **`keycloak`** container logs:



```
09:50:34,246 INFO  [org.keycloak.services] (ServerService Thread Pool -- 63) KC-SERVICES0050: Initializing master realm
09:50:36,893 INFO  [org.keycloak.services] (ServerService Thread Pool -- 63) KC-SERVICES0004: Imported realm Example-Realm from file /tmp/realm-export.json.
```



ID	Username	Email	Last Name	First Name	Actions	
42f917f6-8aae-47d...	carlo	carlo@test.com	Velazquez	Carlo	Edit	Imperson
8a0513c9-ef0c-4d3...	christina	christina@test.com	Travis	Christina	Edit	Imperson
af7077e3-ccd9-410...	hanna	hanna@test.com	Davis	Hanna	Edit	Imperson
1ef731ed-0275-4a3...	noel	noel@test.com	Horton	Noel	Edit	Imperson

After restarting the **keycloak** service, we'll see the following message in its logs:

```
09:46:09,016 INFO  [org.keycloak.services] (ServerService Thread Pool -- 66) KC-SERVICES0003: Not importing realm Example-Realm from file /tmp/realm-export.json.  It already exists.
```

You can see the work presented in this article in the ada085f379746d91bf8f3024843780b2585c415f commit.

Import a Keycloak realm with a command

Alternatively, we can execute the following command in a running **keycloak** service (the container from this example is called **keycloakindocker_keycloak_1**):

```
docker exec -it keycloakindocker_keycloak_1 /opt/jboss/keycloak/bin/standalone.s
-Djboss.socket.binding.port-offset=100 \
-Dkeycloak.migration.action=import \
-Dkeycloak.migration.provider=singleFile \
-Dkeycloak.migration.realmName=Example-Realm \
-Dkeycloak.migration.file=/tmp/realm-export.json
```

```
…
services:
  keycloak:
    image: …
    ports:
      …
    environment:
      …
    volumes:
      - ./keycloak/realms/realm-export.json:/tmp/realm-export.json
    networks:
      …
    depends_on:
      …
…
```

The default strategy is to replace an existing realm. Therefore, we can see in the logs the following info:

```
…
09:48:00,855 INFO  [org.keycloak.services] (ServerService Thread Pool -- 61) KC-SERVICES0031: Import of realm 'Example-Realm' requested. Strategy: OVERWRITE_EXISTING
09:48:00,855 INFO  [org.keycloak.exportimport.singlefile.SingleFileImportProvider] (ServerService Thread Pool -- 61) Full importing from file /tmp/realm-export.json
09:48:00,956 INFO  [org.keycloak.exportimport.util.ImportUtils] (ServerService Thread Pool -- 61) Realm 'Example-Realm' already exists. Removing it before import
09:48:03,279 INFO  [org.keycloak.exportimport.util.ImportUtils] (ServerService Thread Pool -- 61) Realm 'Example-Realm' imported
09:48:03,303 INFO  [org.keycloak.services] (ServerService Thread Pool -- 61) KC-SERVICES0032: Import finished successfully
…
```

Quit the process with `Ctr+C` after a successful import.

What to check when the command import didn't work as planned?

No such file or directory

If you see `FileNotFoundException` in the logs make sure that the value you provided for the `Dkeycloak.migration.file` property value is consistent with the volume mapping. The following example error shows what happens if I provide `/tmp/realm-export-test.json` to the command but my volume maps to `/tmp/realm-export.json`:

```
Error during startup: java.lang.RuntimeException: java.io.FileNotFoundException: /tmp/realm-export-test.json (No such file or directory)
```

Permission denied

Make sure that the volume on your local machine wasn't created by the `root` user.

Learn more on how to import a Keycloak realm

- How to run Keycloak in a Docker container
- Keycloak in Docker #6 – How to import realms from a directory
- Keycloak export and import documentation
- Importing a realm and exporting a realm chapters in the image documentaion
- KeyCloak: Display name vs HTML Display name

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Docker Keycloak user management

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