



# Corporate Memory Control (cmemc)

v20.06

System Manual



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# 1 Introduction

This manual describes how to install and set up *eccenca Corporate Memory Control* (cmemc), a command line client for eccenca Corporate Memory. cmemc is intended for system administrators and Linked Data Expert, who wants to automate / remote control activities on Corporate Memory.

To use this manual, cmemc users should have basic knowledge on command line interfaces, terminal usage and config file creation and editing.

This system manual includes the following parts:

- Installation
- Configuration

This document covers installation and basic usage pattern of cmemc and is not intended to be complete in terms of being a reference for all available options and commands. However, cmemc provides detailed documentation for users via the `--help` option.

## 1.1 About eccenca Corporate Memory Control (cmemc)

cmemc is the eccenca Corporate Memory Command Line Interface (CLI). It is developed in python and build and delivered as a stand alone single binary for Linux and Windows.

Main features of cmemc include:

- List, import, export, delete and open graphs.
- List, import, export, create and delete projects.
- List and execute local as well as remote SPARQL queries.
- List, execute, open or inspect workflows.
- Import and export the workspace.

## 1.2 Scope of delivery

The cmemc release package consists of the following files:

- `cmemc` - the Linux ELF 64-bit LSB executable (x86-64, version 1 (SYSV), dynamically linked), tested with Ubuntu
- `cmemc-rhel` - the Linux ELF 64-bit LSB executable (x86-64, version 1 (SYSV), dynamically linked), tested with RHEL
- `cmemc-macosx` - the Mach-O 64-bit executable (x86\_64), tested with macOS Mojave

- `cmemc.exe` - the PE32+ executable (console, x86-64), for Microsoft Windows, tested with Windows 10
- `cmemc_vXX.YY_SystemManual.pdf` - this document

## 2 Installation

Since cmemc is a stand alone binary, installation is not needed. cmemc can be started from a local path and also from a central binary path, such as `/usr/local/bin`. The only needed installation activity is to copy the binary to a path on your system which is in the `PATH` variable.

### 2.1 Linux installation

As a first step, output the content of the `PATH` variable in order to determine, the path to use:

```
user@ubuntu:/home/user/$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
```

Then unzip the distribution package and copy the binary to an acceptable path (in this example: `/usr/local/bin`)

**Note:** XXX depends on your actual version

```
user@ubuntu:/home/user/$ unzip cmemc-vXXX.zip
user@ubuntu:/home/user/$ cp cmemc-vXXX/cmemc /usr/local/bin
user@ubuntu:/home/user/$ chmod +x /usr/local/bin/cmemc
```

Finally, test your installation.

**Note:** XXX depends on your actual version

```
user@ubuntu:/home/user/$ cmemc --version
cmemc, version XXX
```

In case you are using bash or zsh as your shell, you can optionally enable tab completion for cmemc. This is documented on the [click framework homepage](https://click.palletsprojects.com/en/7.x/bashcomplete/#activation)<sup>1</sup>.

In order to enable tab completion with **bash** run the following command in your shell:

```
eval "$(_CMEMC_COMPLETE=source cmemc)"
```

In order to enable tab completion with **zsh** run the following command in your shell:

---

<sup>1</sup><https://click.palletsprojects.com/en/7.x/bashcomplete/#activation>

```
eval "$(_CMEMC_COMPLETE=source_zsh cmemc)"
```

You may want to add the corresponding line to your `.bashrc` or `.zshrc` file for your convenience.

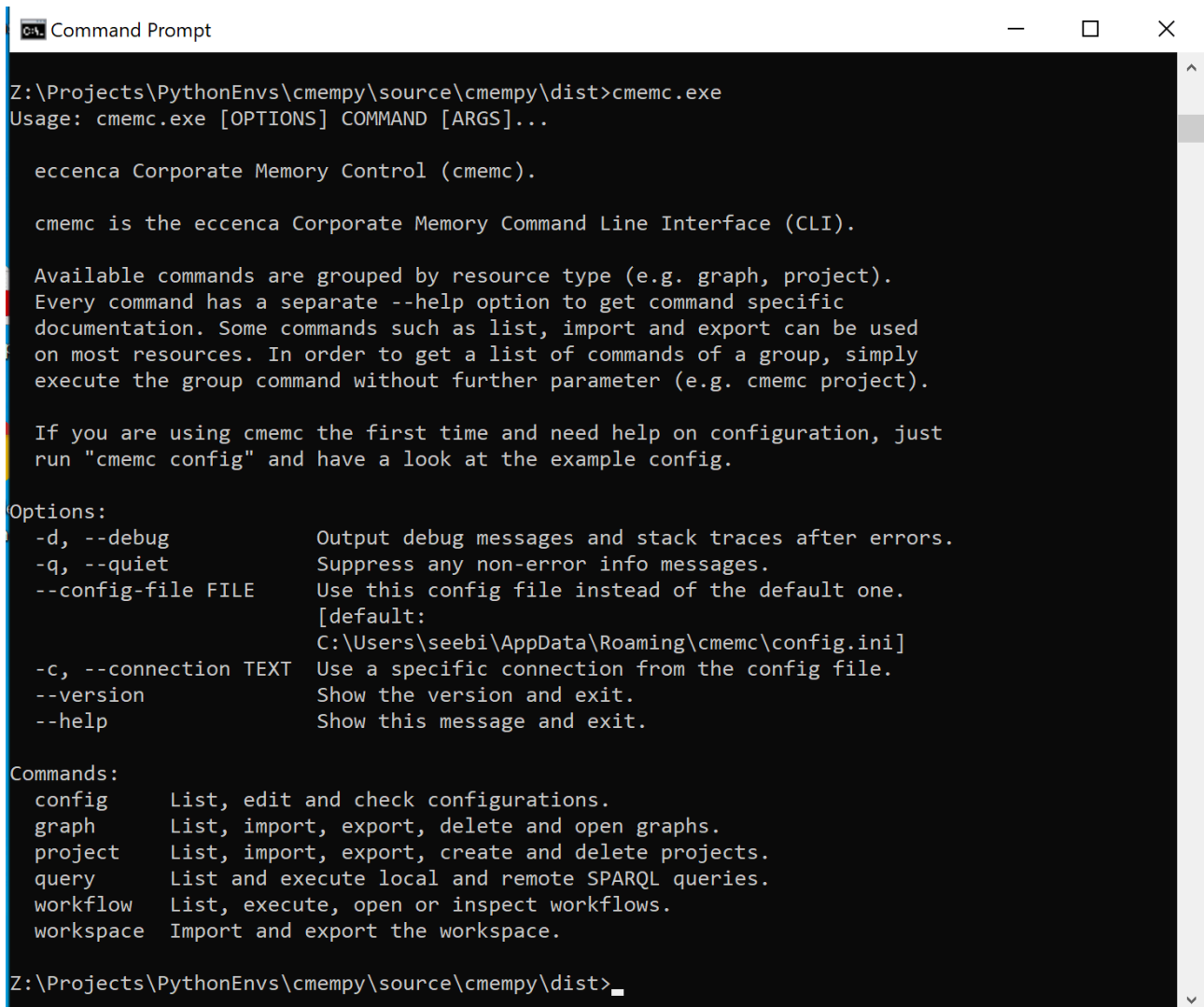
## 2.2 MacOS installation

Installation on MacOS is similar to installation on Linux. Please copy the unpacked `cmemc-macosx` binary to a directory in your PATH (renaming it to `cmemc`). Since **zsh** is the default shell on MacOS, use the zsh completion as described above.

## 2.3 Windows installation

The installation for Windows is similar. As a first step, unzip the distribution file ( `cmemc-vxxx.zip` ), then open `cmd.exe` and go to the directory where the cmemc files are extracted. Then you can start `cmemc.exe`.

**Note:** XXX depends on your actual version



```
Command Prompt

Z:\Projects\PythonEnvs\cmempy\source\cmempy\dist>cmemc.exe
Usage: cmemc.exe [OPTIONS] COMMAND [ARGS]...

eccenca Corporate Memory Control (cmemc).

cmemc is the eccenca Corporate Memory Command Line Interface (CLI).

Available commands are grouped by resource type (e.g. graph, project).
Every command has a separate --help option to get command specific
documentation. Some commands such as list, import and export can be used
on most resources. In order to get a list of commands of a group, simply
execute the group command without further parameter (e.g. cmemc project).

If you are using cmemc the first time and need help on configuration, just
run "cmemc config" and have a look at the example config.

Options:
  -d, --debug          Output debug messages and stack traces after errors.
  -q, --quiet          Suppress any non-error info messages.
  --config-file FILE   Use this config file instead of the default one.
                      [default:
                      C:\Users\seebi\AppData\Roaming\cmemc\config.ini]
  -c, --connection TEXT Use a specific connection from the config file.
  --version            Show the version and exit.
  --help              Show this message and exit.

Commands:
  config    List, edit and check configurations.
  graph     List, import, export, delete and open graphs.
  project   List, import, export, create and delete projects.
  query     List and execute local and remote SPARQL queries.
  workflow  List, execute, open or inspect workflows.
  workspace Import and export the workspace.

Z:\Projects\PythonEnvs\cmempy\source\cmempy\dist>
```

Figure 2.1: Example execution of cmemc under Windows



## 3 Configuration

cmemc needs to know where your Corporate Memory is deployed. For this, you need to provide some key variables in a configuration file. Per default, cmemc looks for this configuration file on a reasonable place depending on your operating system.

For Linux, this is `$HOME/.config/cmemc/config.ini`.

For Windows, this is `%APPDATA%\cmemc\config.ini`

**Note:** `USER` is your actual user name.

Once you start cmemc the first time, it will create an empty config file at this location and will output a general introduction. In order to do so, open the terminal application of your choice.

**Note:** All further examples given here are based on Linux commands. For Windows, the output is the same, however, you need to start cmemc as `cmemc.exe`.

```
user@ubuntu:/home/user/$ cmemc
Empty config created: /home/user/.config/cmemc/config.ini
Usage: cmemc [OPTIONS] COMMAND [ARGS]...

eccenca Corporate Memory Control (cmemc).

cmemc is the eccenca Corporate Memory Command Line Interface (CLI).

Available commands are grouped by affecting resource type (such as graph,
project and query). Each command / group has a separate --help screen to
get command / group specific documentation.

In order to see possible commands in a command group, simply execute the
group command without further parameter (e.g. cmemc project). Some
commands such as list, import and export can be executed in most command
groups. Please have a look at the cmemc manual page for more
information:

    https://eccenca.com/go/cmemc

Options:
  -d, --debug          Output debug messages and stack traces after errors.
```

```
-q, --quiet          Suppress any non-error info messages.
--config-file FILE   Use this config file instead of the default one.
                     [default: /Users/seebi/Library/Application
                     Support/cmecmc/config.ini]
-c, --connection TEXT Use a specific connection from the config file.
--version            Show the version and exit.
-h, --help           Show this message and exit.
```

#### Commands:

```
config    List, edit and check configurations.
graph     List, import, export, delete and open graphs.
project   List, import, export, create and delete projects.
query     List and execute local and remote SPARQL queries.
workflow  List, execute, open or inspect workflows.
workspace Import and export the workspace.
```

You should now edit your config file and add credentials and URL parameter to your Corporate Memory deployment. You either search the config manually in your home directory or you can use the `config edit` command, which opens the config file in your default text editor.

```
user@ubuntu:/home/user/$ cmecmc config edit
Open editor for config file /home/user/.config/cmecmc/config.ini
```

The rules for the config file are similar to a Windows INI file and are explained in detail at [docs.python.org](https://docs.python.org/3/library/configparser.html)<sup>1</sup>. Here is an basic example:

```
[my-local]
CMEM_BASE_URI=http://localhost/
OAUTH_GRANT_TYPE=client_credentials
OAUTH_CLIENT_ID=cmem-service-account
OAUTH_CLIENT_SECRET=c9c12831-000c-464b-9b1d-2d8b7e20df6a
```

This basically creates a named section `my-local` which is a connection to a Corporate Memory deployment on `http://localhost`. The authorization will be done with a system account `cmem-service-account` and the given client secret. Using this combination of config parameter is based on a typical installation where all components are available under the same hostname.

However, if you need to fine tune all locations, the following config file parameter can be used in addition to this example:

- `DI_API_ENDPOINT` - Data Integration API endpoint, default: `CMEM_BASE_URI/dataintegration`
- `DP_API_ENDPOINT` - Data Platform API endpoint, default: `CMEM_BASE_URI/dataplatform`

<sup>1</sup><https://docs.python.org/3/library/configparser.html>

- `OAuth_TOKEN_URI` - OAuth 2.0 Token endpoint, default: `CMEM_BASE_URI/auth/realms/cmem/protocol/openid-connect/token`
- `OAuth_GRANT_TYPE` - OAuth 2.0 grant type, default: `client_credentials`
- `OAuth_USER` - Username to retrieve the token, default: `admin`
- `OAuth_PASSWORD` - Password to retrieve the token, default: `admin`
- `OAuth_CLIENT_ID` - OAuth 2.0 client id, default: `cmem-service-account`
- `OAuth_CLIENT_SECRET` - OAuth 2.0 client secret, default: `secret`
- `SSL_VERIFY` - Use SSL verification for requests to DP/DI default: `True`

In order to verify your configuration, you should try to get a list of graphs via cmemc:

```
user@ubuntu:/home/user/$ cmemc -c my-local graph list
https://vocab.eccenca.com/dsm/
https://ns.eccenca.com/example/data/dataset/
https://vocab.eccenca.com/sketch/
https://ns.eccenca.com/example/data/vocabs/
https://vocab.eccenca.com/shacl/
urn:elds-backend-access-conditions-graph
https://ns.eccenca.com/data/queries/
http://di.eccenca.com/project/cmem
```

If you get a similar list of graphs, you successfully configured cmemc to access your deployment.

## 4 Reference

This section lists the help texts of all commands as a reference and to search for it.

### 4.1 Command group: config

Usage: cmemc config [OPTIONS] COMMAND [ARGS]...

List, edit and check configurations.

Configurations are identified by the section identifier in the config file. Each configuration represent a Corporate Memory deployment with its specific access method as well as credentials.

A minimal configuration which uses client credentials has the following entries:

```
[example.org]
CMEM_BASE_URI=https://cmem.example.org/
OAUTH_GRANT_TYPE=client_credentials
OAUTH_CLIENT_ID=cmem-service-account
OAUTH_CLIENT_SECRET=my-secret-account-pass
```

In addition to that, the following config parameters can be used as well:

```
SSL_VERIFY=False    - for ignoring certificate issues (not recommended)
DP_API_ENDPOINT=URL - to point to a non-standad DataPlatform location
DI_API_ENDPOINT=URL - to point to a non-standad DataIntegration location
OAUTH_TOKEN_URI=URL - to point to an external IdentityProvider location
OAUTH_USER=username - username (only if OAUTH_GRANT_TYPE=password)
OAUTH_PASSWORD=pass - password (only if OAUTH_GRANT_TYPE=password)
```

In order to request passwords on start, you can use the following parameter instead the PASSWORD parameter: OAUTH\_PASSWORD\_ENTRY=True  
OAUTH\_CLIENT\_SECRET\_ENTRY=True.

Options:

```
-h, --help  Show this message and exit.
```

**Commands:**

check Check the status of deployment.  
edit Edit the user-scope configuration file.  
list List configured CMEM connections.

**4.1.1 Command: config check**

Usage: cmemc config check [OPTIONS] [CONFIGS]...

Check the status of deployment.

**Options:**

-a, --all Export all (readable) graphs  
-h, --help Show this message and exit.

**4.1.2 Command: config edit**

Usage: cmemc config edit [OPTIONS]

Edit the user-scope configuration file.

**Options:**

-h, --help Show this message and exit.

**4.1.3 Command: config list**

Usage: cmemc config list [OPTIONS]

List configured CMEM connections.

**Options:**

-h, --help Show this message and exit.

**4.2 Command group: graph**

Usage: cmemc graph [OPTIONS] COMMAND [ARGS]...

List, import, export, delete and open graphs.

Graphs are identified by an IRI. The get a list of existing graphs, execute the list command or use tab-completion.

Options:

-h, --help Show this message and exit.

Commands:

count Count triples in graph(s).  
delete Delete graph(s) from the store.  
export Export graph(s) as NTriples to stdout (-), file or directory.  
import Import graph(s) to the store.  
list List accessible graphs.  
open Open / explore a graph in the browser.

#### 4.2.1 Command: graph count

Usage: cmemc graph count [OPTIONS] [IRIS]...

Count triples in graph(s).

This command lists graphs with their triple count. Counts are done without following imported graphs.

Options:

-a, --all Count all graphs  
-s, --summarize Display only a sum of all counted graphs together  
-h, --help Show this message and exit.

#### 4.2.2 Command: graph delete

Usage: cmemc graph delete [OPTIONS] [IRIS]...

Delete graph(s) from the store.

Options:

-a, --all Drop all (writeable) graphs  
-h, --help Show this message and exit.

#### 4.2.3 Command: graph export

Usage: cmemc graph export [OPTIONS] [IRIS]...

Export graph(s) as NTriples to stdout (-), file or directory.

In case of file export, data from all selected graphs will be concatenated in one file. In case of directory export, .graph and .nt files will be created for each graph.

Options:

-a, --all	Export all (readable) graphs
--output-dir DIRECTORY	Export to this directory
--output-file FILE	Export to this file [default: -]
-h, --help	Show this message and exit.

#### 4.2.4 Command: graph import

Usage: cmemc graph import [OPTIONS] INPUT\_PATH [IRI]

Import graph(s) to the store.

If input is an directory, it scans for file-pairs such as xxx.ttl and xxx.ttl.graph where xxx.ttl is the actual triples file and xxx.ttl.graph contains the graph IRI as one string: "https://mygraph.de/xxx/". If input is a file, content will be uploaded to IRI. If --replace is set, the data will be overwritten, if not, it will be added.

Options:

--replace	Replace (overwrite) original graph data.
-h, --help	Show this message and exit.

#### 4.2.5 Command: graph list

Usage: cmemc graph list [OPTIONS]

List accessible graphs.

Options:

--raw	Outputs raw JSON.
--filter [readonly writeable]	Filter list based on access conditions.
-h, --help	Show this message and exit.

### 4.2.6 Command: graph open

Usage: cmemc graph open [OPTIONS] IRI

Open / explore a graph in the browser.

Options:

-h, --help Show this message and exit.

## 4.3 Command group: project

Usage: cmemc project [OPTIONS] COMMAND [ARGS]...

List, import, export, create and delete projects.

Projects are identified by an PROJECTID. The get a list of existing projects, execute the list command or use tab-completion.

Options:

-h, --help Show this message and exit.

Commands:

create Create empty new project(s).

delete Delete project(s).

export Export project(s) to file(s).

import Import a project from a file.

list List available projects.

### 4.3.1 Command: project create

Usage: cmemc project create [OPTIONS] PROJECTIDS...

Create empty new project(s).

This creates one or more new projects. Existing projects will not be overwritten.

Example: cmemc project create my\_project

Projects can be listed by using the 'cmemc project list' command.

Options:



-h, --help Show this message and exit.

### 4.3.2 Command: project delete

Usage: cmemc project delete [OPTIONS] [PROJECTIDS]...

Delete project(s).

This deletes existing data integration projects from Corporate Memory.  
Projects will be deleted without prompting!

Example: cmemc project delete my\_project

Projects can be listed by using the 'cmemc project list' command.

Options:

-a, --all Delete all projects. This is a dangerous option, so use it with care.

-h, --help Show this message and exit.

### 4.3.3 Command: project export

Usage: cmemc project export [OPTIONS] [PROJECTIDS]...

Export project(s) to file(s).

Projects can be exported as different types. The default type is a zip archive which includes meta data as well as dataset resources. If more than one project is exported, a file is created for each project. By default, these files are created in the current directory.

Example: cmemc project export my\_project

Projects can be listed by using the 'cmemc project list' command.

Options:

-a, --all Export all projects.  
-o, --overwrite Overwrite existing files. This is a dangerous option, so use it with care.

--output-dir DIRECTORY Directory, where the project files will be created.

```

This directory will be created as well it does not
exists. [default: .]

--type TEXT      Type of the exported project file(s). [default:
xmlZip]

-h, --help      Show this message and exit.
```

#### 4.3.4 Command: project import

```
Usage: cmemc project import [OPTIONS] FILE PROJECTID

Import a project from a file.

Example: cmemc project import my_project.zip my_project

Options:
-h, --help  Show this message and exit.
```

#### 4.3.5 Command: project list

```
Usage: cmemc project list [OPTIONS]

List available projects.

Outputs a list of project IDs which can be used as reference for the
project create, delete, export and import commands.

Options:
-h, --help  Show this message and exit.
```

### 4.4 Command group: query

```
Usage: cmemc query [OPTIONS] COMMAND [ARGS]...

List and execute local and remote SPARQL queries.

Queries are identified either by a file path, an URI from the query
catalog or a shortened URI (qname, using a default namespace).

In order to get a list of queries from the query catalog, use the list
```

command. One or more queries can be executed one after the other with the execute command.

Queries can use a mustache like syntax to specify placeholder for parameter values (e.g. {{resourceUri}}). These parameter values need to be given as well, before the query can be executed (use the -p option).

#### Options:

-h, --help Show this message and exit.

#### Commands:

execute Execute queries which are loaded from files or the query catalog.  
list List available queries from the catalog.

### 4.4.1 Command: query execute

Usage: cmemc query execute [OPTIONS] QUERIES...

Execute queries which are loaded from files or the query catalog.

Queries are identified either by a file path, an URI from the query catalog, or a shortened URI (qname, using a default namespace).

If multiple queries are executed one after the other, the first failing query stops the whole execution chain.

Limitations: All optional parameters (e.g. accept, base64, ...) are provided for ALL queries in an execution chain. If you need different parameters for each query in a chain, run cmemc multiple times and use the logical operators && and || of your shell instead.

#### Options:

--accept TEXT	Accept header for the HTTP request(s). Setting this to 'default' means that cmemc uses an appropriate accept header for terminal output (text/csv for tables, text/turtle for graphs, * otherwise). Please refer to the Corporate Memory system manual for a list of accepted mime types. [default: default]
--no-imports	Graphs which include other graphs (using owl:imports) will be queried as merged

	overall-graph. This flag disables thisdefault behaviour. The flag has no effect on update queries.
<code>--base64</code>	This flag enables base64 encoding of the query parameter for the SPARQL request (the response is not touched). This can be useful in case there is an aggressive firewall between cmemc and Corporate Memory.
<code>-p, --parameter &lt;TEXT TEXT&gt;...</code>	In case of a parameterized query (placeholders with the '{{key}}' syntax), this option fills all placeholder with a given value before the query is executed.Pairs of placeholder/value need to be given as a tuple 'KEY VALUE'. A key can be used only once.
<code>-h, --help</code>	Show this message and exit.

#### 4.4.2 Command: query list

Usage: cmemc query list [OPTIONS]

List available queries from the catalog.

Outputs a list of query URIs which can be used as reference for the query execute command.

Options:

`--id-only` Lists only query identifier and no labels or other meta data.This is useful for piping the ids into other cmemc commands.

`-h, --help` Show this message and exit.

### 4.5 Command group: workflow

Usage: cmemc workflow [OPTIONS] COMMAND [ARGS]...

List, execute, open or inspect workflows.

Workflows are identified by a `WORKFLOW_ID`. To get a list of existing workflows, execute the `list` command or use tab-completion. The `WORKFLOW_ID` is a concatenation of an `PROJECT_ID` and a `TASK_ID`, such as "my-project:my-workflow".

Options:

`-h, --help` Show this message and exit.

Commands:

`execute` Execute workflow(s).  
`list` List available workflow ids.  
`open` Open a workflow in your browser.  
`status` Get status information workflow(s).

#### 4.5.1 Command: workflow execute

Usage: `cmemc workflow execute [OPTIONS] [WORKFLOW_IDS]...`

Execute workflow(s).

With this command, you can start one or more workflows at the same time or in a sequence, depending on the result of the predecessor.

Executing a workflow can be done in two ways: Without `--wait` just sends the starting signal and does not look for the workflow and its result (fire and forget). Starting workflows in this way, starts all given workflows at the same time.

The optional `--wait` option starts the workflows in the same way, but also polls the status of a workflow until it is finished. In case of an error of a workflow, the next workflow is not started.

Options:

`-a, --all` Execute all available workflows.  
`--wait` Wait for one workflow to complete.  
`--polling-interval INTEGER RANGE` How many seconds to wait between status polls. Status polls are cheap, so a higher polling interval is most likely not needed. [default: 1]  
`-h, --help` Show this message and exit.

### 4.5.2 Command: workflow list

```
Usage: cmemc workflow list [OPTIONS]

List available workflow ids.

Options:
  -h, --help  Show this message and exit.
```

### 4.5.3 Command: workflow open

```
Usage: cmemc workflow open [OPTIONS] WORKFLOW_ID

Open a workflow in your browser.

Options:
  -h, --help  Show this message and exit.
```

### 4.5.4 Command: workflow status

```
Usage: cmemc workflow status [OPTIONS] [WORKFLOW_IDS]...

Get status information workflow(s).

Options:
  --raw                Output raw JSON info.
  --filter [running|failed] Show only workflows of a specific status.
  -h, --help           Show this message and exit.
```

## 4.6 Command group: workspace

```
Usage: cmemc workspace [OPTIONS] COMMAND [ARGS]...

Import and export the workspace.

Options:
  -h, --help  Show this message and exit.

Commands:
  export  Export the workspace to a file.
  import  Import the workspace from a file.
```

`reload` Reload the workspace from the backend.

#### 4.6.1 Command: workspace export

Usage: `cmemc workspace export [OPTIONS] FILE`

Export the workspace to a file.

Options:

- `-o, --overwrite` Overwrite existing files. This is a dangerous option, so use it with care.
- `--type TEXT` Type of the exported workspace file. [default: xmlZip]
- `-h, --help` Show this message and exit.

#### 4.6.2 Command: workspace import

Usage: `cmemc workspace import [OPTIONS] FILE`

Import the workspace from a file.

Options:

- `--type TEXT` Type of the exported workspace file. [default: xmlZip]
- `-h, --help` Show this message and exit.

#### 4.6.3 Command: workspace reload

Usage: `cmemc workspace reload [OPTIONS]`

Reload the workspace from the backend.

Options:

- `-h, --help` Show this message and exit.