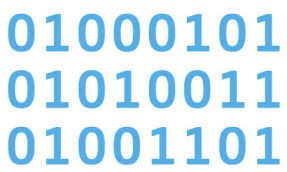
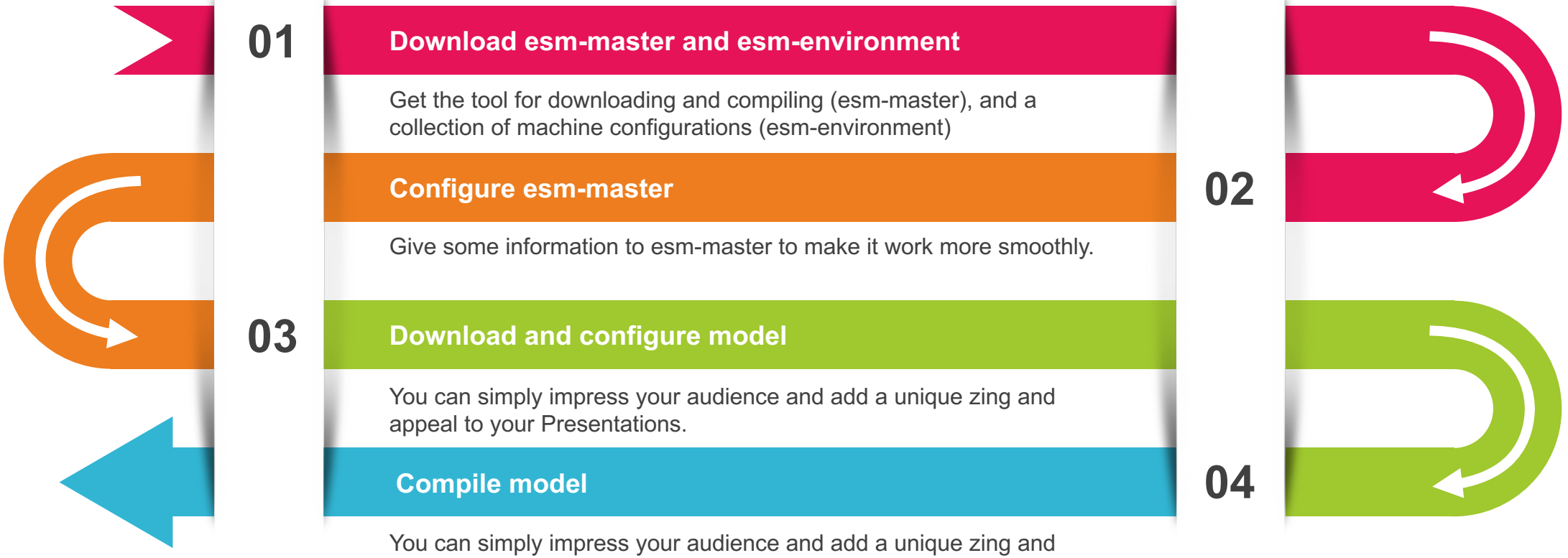
Obtain and Compile Models / Setups



ESM-Tools

esm-master /
esm-environment

esm-master / esm-environment



01

Download esm-master and esm-environment

Get the tool for downloading and compiling (esm-master), and a collection of machine configurations (esm-environment)

02

Configure esm-master

Give some information to esm-master to make it work more smoothly.

03

Download and configure model

You can simply impress your audience and add a unique zing and appeal to your Presentations.

04

Compile model

You can simply impress your audience and add a unique zing and appeal to your Presentations.

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01001101 ESM-Tools

1st: Download esm-master and esm-environment

Three possible ways:

01

```
git clone https://gitlab.dkrz.de/esm-tools.de/esm-master.git
cd esm-master; make
make get-esm-environment
make get-esm-runscripts
make get-esm-usermanual
```

02

```
git clone https://gitlab.dkrz.de/esm-tools.de/esm-master.git
cd esm-master; make
make get-esm-tools
```

03

```
git clone https://gitlab.dkrz.de/esm-tools.de/esm-tools.git
cd esm-tools
./install.sh
```

2nd : Configure esm-master

Typing any

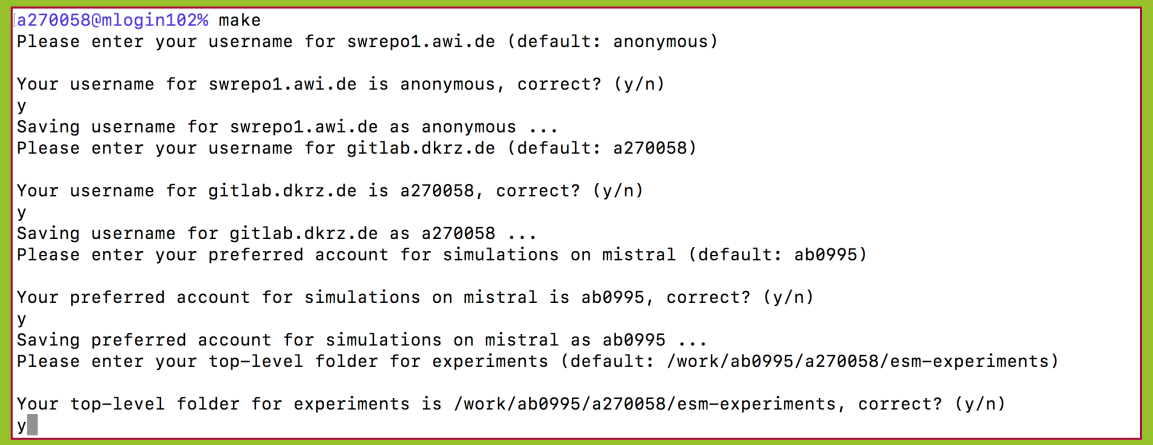
```
make
```

command in the esm-master folder for the first time opens the configuration dialogue.
This writes a config-file called

```
esm-master.conf.
```

To re-configure, either remove this file and type ‘make’ again, or type

```
make reconf-esm-master
```



esm-environment configuration files

```
module purge
# make the contents as shell agnostic as possible so we can include them with bash, zsh and others
module load pism_externals
#module unload python && module load python3

module load cmake
module load udunits

module unload intel.compiler intel.mpi && module load intel.compiler intel.mpi
module unload netcdf
module load centoslibs cdo nco netcdf/4.4.0_intel

export PATH=/work/ollie/jhegewal/sw/cmake/bin:$PATH

export FC="mpiifort -mkl" CC=mpiicc CXX=mpiicpc

export ZLIBROOT=/usr

export MPIROOT=${I_MPI_ROOT}/intel64
export MPIFC='mpiifort'
export MPICC='mpiicc'

export NETCDFFROOT=${NETCDF_DIR}
export NETCDFROOT=${NETCDF_DIR}
export NETCDF_Fortran_INCLUDE_DIRECTORIES=${NETCDF_DIR}/include

export HDF5ROOT=/usr//

export LAPACK_LIB='-lmkl_intel_lp64 -lmkl_core -mkl=sequential -lpthread -lm -ldl'

export CC='mpiicc'
export CXX='mpiicpc'
#export FC='mpiifort'
export F77='mpiifort'
```

Have a look into

`esm-environment`

There is a standard configuration for each HPC system, which is NOT optimized for a certain model / setup, but has proven to be OK for most models instead.

In the upcoming python version, it will be much easier to define optimized configs too.

```
Available download options:
                get-esm-tools
                get-esm-runscripts
                get-esm-environment
                get-esm-workshop
                get-esm-usermanual
                get-git-workshop
                get-amip
                get-awicm
                get-awicm-CMIP6
                get-awicm-1.1
                get-awicm-1.0
                get-awicm-2.0
                get-awicm-3.0
                get-awicm-test
                get-echam-6.3.04p1
                get-echam-6.3.02p4
                get-fesom-1.4
                get-fesom-1.4-recom
                get-fesom-1.4-recom-modular
                get-fesom-2.0
                get-fesom-2.0-recom-modular
                get-metos3d
                get-metos3d-data
                get-mpiesm
                get-mpiesm-1.2.01p1
                get-mpiesm-1.2.01
                get-mpiesm-1.2.00p4
                get-mpiesm-1.2.00p1
                get-mpiesm-1.1.00p2
                get-mpiesm-1.0.02p1
                get-nemo-3.6
                get-oasis3-mct
                get-oifs-40r1
                get-oifsamip
                get-recom
                get-recom-lib
                get-rnfmap
                get-vilma
                get-xios-2.0_r
```

```
Available configure options:
                conf-esm-master
                conf-esm-runscripts
                conf-mpiesm-1.2.01p1
                conf-mpiesm-1.2.01
                conf-mpiesm-1.2.00p4
```

```
Available compile options:
                comp-amip
                comp-awicm-CMIP6
                comp-awicm-1.1
                comp-awicm-1.0
                comp-awicm-2.0
                comp-awicm-3.0
                comp-awicm-test
                comp-echam-6.3.04p1
                comp-echam-6.3.02p4
                comp-fesom-1.4
                comp-fesom-1.4-recom
                comp-fesom-1.4-recom-modular
                comp-fesom-2.0
                comp-fesom-2.0-mesh-part
                comp-fesom-2.0-recom-modular
                comp-mpiesm-1.2.01p1
                comp-mpiesm-1.2.01
                comp-mpiesm-1.2.00p4
                comp-nemo-3.6
                comp-oasis3-mct
                comp-oifs-40r1
                comp-oifsamip
                comp-recom-lib
                comp-rnfmap
                comp-xios-2.0_r982
```

```
Available clean options:
                clean-am
                clean-aw
                clean-aw
                clean-aw
                clean-aw
                clean-aw
                clean-aw
                clean-ecl
                clean-ecl
                clean-fe
                clean-fesom-1.4-recom
                clean-fesom-1.4-recom-modular
                clean-fesom-2.0
                clean-fesom-2.0-recom-modular
                clean-mpiesm-1.2.01p1
                clean-mpiesm-1.2.01
                clean-mpiesm-1.2.00p4
                clean-nemo-3.6
                clean-oasis3-mct
                clean-oifs-40r1
                clean-oifsamip
                clean-recom-lib
                clean-rnfmap
                clean-xios-2.0_r982
```

Available targets: `make`

Download targets

Clone a repository of the chosen model as subfolder to esm-master.

Configure targets

Some few models / setups need to be configured before compiling.

Compile Targets

Compiles the chosen model on the hardware you are working on, if a configuration file is present.

Clean targets

Basically ‘make clean’, removes the object files.

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01001101 ESM-Tools

Before you try to download…

1st

Choose the desired model or coupled setup. There are sometimes more than one available version (tag), so check which one is the one you need.

2nd

Make sure you have the right (“license“) to use the model. While the
ESM-Tools are OpenSource under GPL, most models are not. If you don‘t have access to the repository, the Tools will not download the model for you. If that happens, contact your project leader to get access to the repo. If you need help, feel free to ask us using the mail address info@esm-tools.net

The ESM-Tools do not replace / create / circumvent / … licenses!

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3rd : Download model / setup

Type

```
make get-…
```

followed by the name of the model you want, e.g.

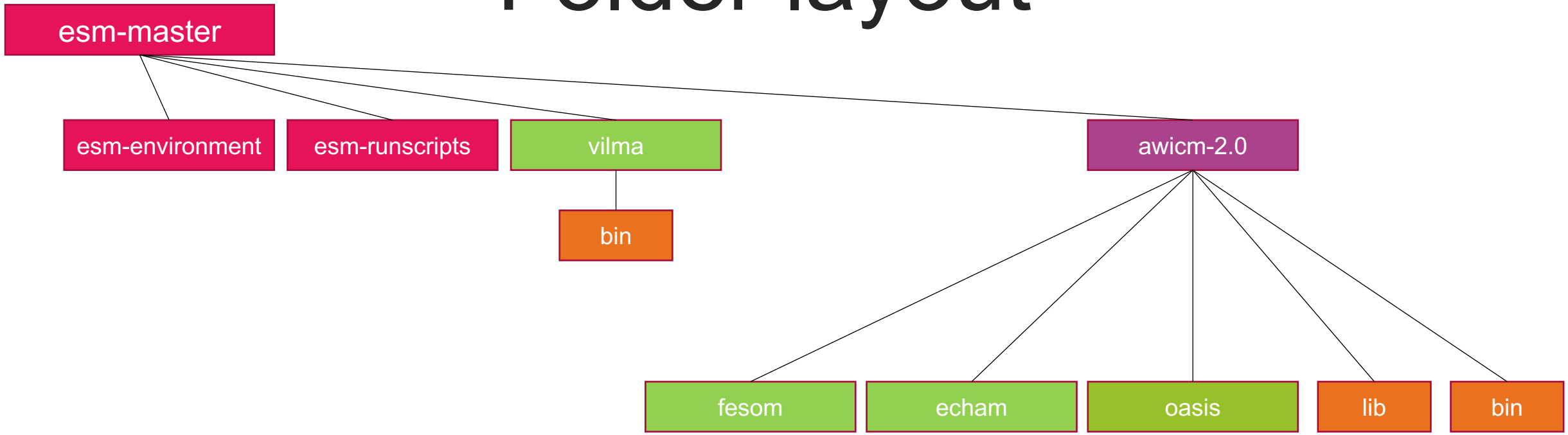
```
make get-awicm-2.0
```

Download will start, and (probably) ask you for the password for the repository server.

After successful download, you will find a subfolder with the name of the model.

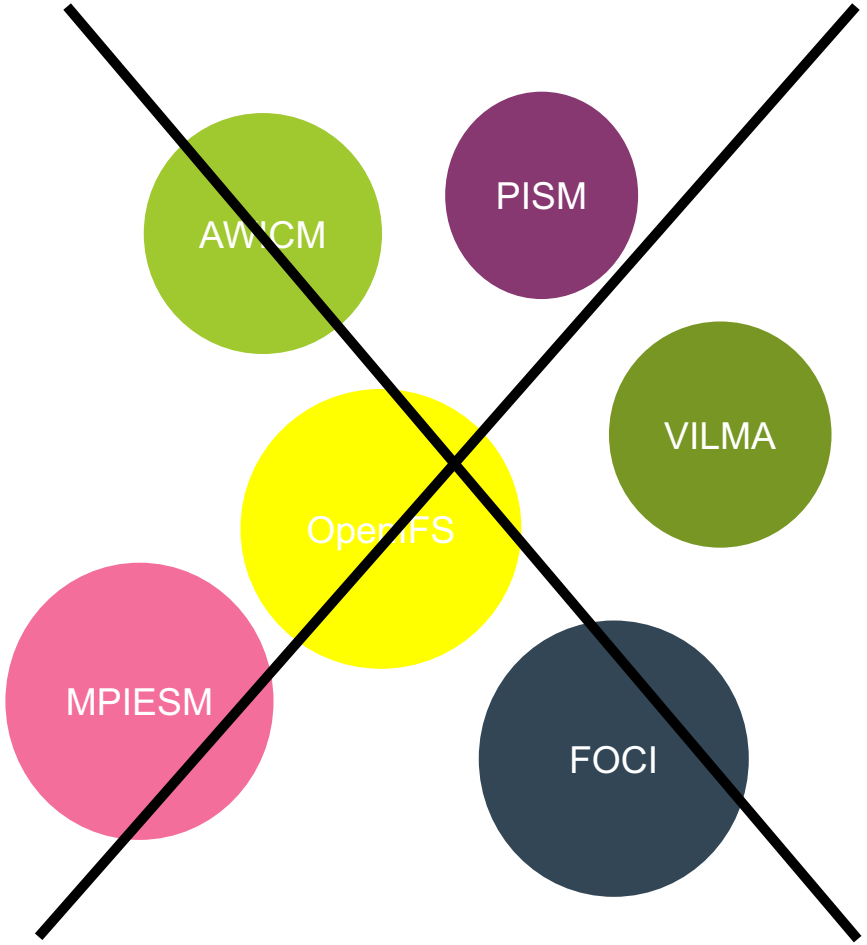
```
a270058@mlogin102% make get-awicm-test
mkdir -p awicm-test; cd awicm-test; cp ../Makefile .; cp ../esm-master.conf .; cp -r ../.esm .;\
        make get-fesom-1.4; \
        make get-oasis3-mct; \
        make get-echam-6.3.04p1; \
        rm Makefile esm-master.conf
```

Folder layout



- ESM-Tools
- Model
- Coupled setup
- Binary folders (created during compile time)

Repository Layout



(Configure and) compile the model

If available (mpiesm), run:

```
make conf-…
```

followed by the name of your model.
Then, compile by:

```
make comp-…
```

This will compile the chosen model/setup.
You can remove all object files by typing

```
make clean-…
```

```
a270058@mlogin102% make comp-awicm-test
cd awicm-test; cp ../Makefile .; cp ../esm-master.conf .; cp -r ../esm-environment .; cp -r ../.esm .;\
        make comp-oasis3-mct;\
        sed -i '/FESOM_COUPLED/s/OFF/ON/g' fesom-1.4/CMakeLists.txt; \
        make comp-fesom-1.4; \
        sed -i '/ECHAM6_COUPLED/s/OFF/ON/g' echam-6.3.04p1/CMakeLists.txt; \
        make comp-echam-6.3.04p1; \
        mkdir -p bin; cp fesom-1.4/bin/fesom bin; cp echam-6.3.04p1/src/echam/bin/echam6 bin; \
        rm -rf Makefile esm-master.conf esm-environment .esm; cd ..; \
        cd .esm; source ./esm-master.functions; add_model /pf/a/a270058/to_merge/esm-master awicm-test
```

Compile process – awicm-2.0

ESM-Tools triggers the compile systems that come with the model components, these are not replaced!

fesom-2.0

Fesom is compiled next, and linked against the libraries.

bins

The executables are copied to awicm-2.0/bin

Libraries

We compile libraries like the coupler first. Files go to lib-folder

echam-6.304p1

Echam is compiled, using the same libraries

esm-master.conf

gets an entry for the newly compiled model setup

Alternative: esm-master GUI

Open the GUI by typing:

```
make conf-…
```

You can choose the coupled setup by choosing the components independently.

(Prototype, will be extended much further)