ALIGN INSTALLATION HELP

Install native flow using install.sh

ALIGN runs on docker though you can use install.sh file for running your first native flow installation. We have included an install.sh file which can be sourced on a Linux terminal to run your first design through ALIGN flow.

Contents of install.sh

You should use these set of commands from in ALIGN-public directory
Set align home and work directory (You can use any path for work directory)

- export ALIGN_HOME=$PWD
- export ALIGN_WORK_DIR=$ALIGN_HOME/work

Install Prerequisites

Install Packages

sudo apt-get update && sudo apt-get install -yq python3 python3-pip python3-venv g++ cmake libboost-container-dev graphviz gnuplot curl xvfb \
&& sudo apt-get clean

Install klayout

sudo curl -o /klayout_0.26.3-1_amd64.deb https://www.klayout.org/downloads/Ubuntu-18/klayout_0.26.3-1_amd64.deb
sudo apt-get install -yq /klayout_0.26.3-1_amd64.deb

Install lpsolve

- git clone https://www.github.com/ALIGN-analoglayout/lpsolve.git

Install json

- git clone https://github.com/nlohmann/json.git

Install boost

- git clone --recursive https://github.com/boostorg/boost.git
- cd $ALIGN_HOME/boost
- ./bootstrap.sh -prefix=$ALIGN_HOME/boost
- ./b2 headers

Install googletest

- cd $ALIGN_HOME
- git clone https://github.com/google/googletest
- cd googletest/
- cmake CMakeLists.txt
- make

- mkdir googletest/mybuild
- cp -r lib googletest/mybuild/.

Set prerequisite paths

- export LP_DIR=$ALIGN_HOME/lpsolve
- export BOOST_LP=$ALIGN_HOME/boost
- export JSON=$ALIGN_HOME/json
- export GTEST_DIR=$ALIGN_HOME/googletest/googletest/
- export VENV=$ALIGN_HOME/general

install align

- cd $ALIGN_HOME
- python3.6 -m venv $VENV
- source $VENV/bin/activate
- pip install --upgrade pip
- pip install -e .
- deactivate

install align_PnR

- cd $ALIGN_HOME/PlaceRouteHierFlow/ && make
- export LD_LIBRARY_PATH=$ALIGN_HOME/lpsolve/lp_solve_5.5.2.5_dev_ux64/

Run first example

Set work directory

- mkdir $ALIGN_WORK_DIR
- cd $ALIGN_WORK_DIR
- ln -s $ALIGN_HOME/build/Makefile .

First example telescopic ota using make flow

- make VENV=$VENV

Explore align features using python (These commands can be run after editing the makefile)

- source $VENV/bin/activate
- schematic2layout.py <input_directory> -f <spice file> -s <design_name> -p <pdk path> -flat <0/1> -c (to check drc) -g (to generate layout image)
- e.g., > schematic2layout.py $ALIGN_HOME/examples/telescopic_ota/ -f $ALIGN_HOME/examples/telescopic_ota/telescopic_ota.sp -s telescopic_ota -p $ALIGN_HOME/pdks/FinFET14nm_Mock_PDK -flat 0 -c -g

Errors due to improper prerequisite installation

Despite using install.sh if something fails, we have collected a basic set of errors and how to resolve them.

- **Error due to gcc version:**

Error: PlaceRouteHierFlow/pnr_compiler: /usr/lib64/libstdc++.so.6: version `GLIBCXX_3.4.21' not found
Solution: C++ version is old. Please update C++ version > 4.2

➢ To use inside UMN use “module load gcc/8.2.0”

- **Error due to LD_LIBRARY_PATH prerequisite missing:**

Error: Unable to load lpsolve shared library (liblpsolve55.so).
It is probably not in the correct path.
LP test flag 2
TotNumberOfNest 14 TotNumberOfSTs 70
align.cmdline ERROR : Fatal Error. Cannot proceed

Solution:
It can be due to LD_LIBRARY_PATH not present or LD_LIBRARY_PATH path not correct
To install lpsolve:

➢ git clone https://www.github.com/ALIGN-analoglayout/lpsolve.git

To set lpsolve environment path:
Ubuntu/bash:

➢ export LD_LIBRARY_PATH=$ALIGN_HOME/lpsolve/lp_solve_5.5.2.5_dev_ux64/

RedHat/tcsh:

➢ Setenv LD_LIBRARY_PATH $ALIGN_HOME/lpsolve/lp_solve_5.5.2.5_dev_ux64/

- **Error due to xvfb library used to generate image of layout:**

Error: ERROR : Call to 'gds2png.sh /ALIGN-public/work/telescopic_ota/telescopic_ota_0.gds /ALIGN-public/work/telescopic_ota/telescopic_ota_0.png /ALIGN-public/align/config/image_png.rb' failed:
Solution:
sudo apt-get install xvfb

- **Error due to lpsolve library prerequisite missing:**

Error: ./router/GcellGlobalRouter.h:47:10: fatal error: lp_lib.h: No such file or directory
#include "lp_lib.h"
^~~~~~~~~~
compilation terminated.
Makefile:37: recipe for target 'depend' failed

make: *** [depend] Error 1

Solution:
It can be due to LD_DIR not present or LD_LIBRARY_PATH path not correct
To install lpsolve:

- ➢ git clone https://www.github.com/ALIGN-analoglayout/lpsolve.git

To set lpsolve environment path:
Ubuntu/bash:

- ➢ export LP_DIR=$ALIGN_HOME/lpsolve

RedHat/tcsh:

- ➢ Setenv LD_DIR $ALIGN_HOME/lpsolve

- **Error due to googletest prerequisite missing:**

Error: unit_tests.cpp:2:10: fatal error: gtest/gtest.h: No such file or directory
#include <gtest/gtest.h>
^~~~~~~~~~~~~~~
compilation terminated.
Solution:
It can be due to googletest not present or googletest path not correct
Installing googletest

- ➢ cd $ALIGN_HOME
- ➢ git clone https://github.com/google/googletest
- ➢ cd googletest/
- ➢ cmake CMakeLists.txt
- ➢ make
- ➢ mkdir googletest/mybuild
- ➢ cp -r lib googletest/mybuild/.

To set googletest path
Ubuntu/bash:

- ➢ export GTEST_DIR=$ALIGN_HOME/googletest/googletest/

RedHat/tcsh:

- ➢ setenv GTEST_DIR $ALIGN_HOME/googletest/googletest/

- **Error due to JSON prerequisite missing:**

Error: PnRdatabase.h:23:10: fatal error: nlohmann/json.hpp: No such file or directory
#include <nlohmann/json.hpp>
^~~~~~~~~~~~~~~~~~
compilation terminated.
Solution:
It can be due to JSON not present or JSON path not correct
Installing JSON

- ➢ cd $ALIGN_HOME
- ➢ git clone https://github.com/nlohmann/json.git

To set JSON path

Ubuntu/bash:

- ➢ export JSON=$ALIGN_HOME/json

RedHat/tcsh:

- ➢ setenv JSON $ALIGN_HOME/json

- **Error due to python virtual environment prerequisite missing**

Error:

/bin/bash: /opt/venv/bin/activate: No such file or directory

Solution:

ALIGN is installed inside a python virtual environment. The default path of the virtual environment is assumed to be /opt/venv/bin/activate. You can edit the makefile to the path of your virtual environment or pass the virtual environment path as a parameter.

Install python virtual environment:

- ➢ cd $ALIGN_HOME
- ➢ export VENV=$ALIGN_HOME/general
- ➢ python3.6 -m venv $VENV
- ➢ source $VENV/bin/activate
- ➢ pip install --upgrade pip
- ➢ pip install -e .
- ➢ deactivate

To use virtual environment from a path:

- ➢ make VENV=$VENV DESIGN=telescopic_ota

- **Error due to klayout prerequisite missing**

Error: Call to klayout failed.

Solution: Install klayout tool for visualization

- ➢ `curl -o /klayout_0.25.4-1_amd64.deb https://www.klayout.org/downloads/Ubuntu-18/klayout_0.25.4-1_amd64.deb`
- ➢ `apt-get install -yq /klayout_0.25.4-1_amd64.deb`

- **Error due to missing align installation**

Error: python: can't open file '$ALIGN_HOME/general/bin/schematic2layout.py': [Errno 2] No such file or directory

Makefile:36: recipe for target 'telescopic_ota/telescopic_ota_0.png' failed

make: *** [telescopic_ota/telescopic_ota_0.png] Error 2

Solution: This happens due to issues with pip version resulting in missing align package installation.

- ➢ cd $ALIGN_HOME
- ➢ source $VENV/bin/activate
- ➢ pip Install --upgrade pip
- ➢ pip Install -e .

- ➢ deactivate

Warnings which can be ignored:

- **Warnings during PnR installation:**

Warning:
WriteJSON.cpp:144:1: warning: ‘void JSONLabelTerminals(PnRDB::hierNode&, const PnRDB::Drc_info&, nlohmann::json&, double)’ defined but not used [-Wunused-function]

MNASimulation.cpp:: warning: narrowing conversion
Solution:
Ignore these warnings