ALIGN INSTALLATION HELP

Install native flow using install.sh

ALIGN runs on docker though you can use setup.sh file for running your first native flow installation. We have included a setup.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

First example telescopic ota using python

- source $VENV/bin/acitivate
- schematic2layout.py <input_directory> -f <spice file> -s <design_name> -p <pdk path> -flat <0/1> -c -g (to check drc)
- e.g., > schematic2layout.py $ALIGN_HOME/examples/telescopic_ota/ -f $ALIGN_HOME/examples/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 setup.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`

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]
JSONLabelTerminals(PnRDB::hierNode& node, const PnRDB::Drc_info& drc_info, json& elmAry, double unit)

Solution:

Ignore these warnings