

## Chapter 04 - OpenROAD first run - TRAINING - Advanced

Course authors (Git file)



## 1 Build an external example



# EDA tools

- One of the options of chapter 0 (preparations) is needed.
- Navigate to the `/flow` folder



## Clone the design “masked AES” from the HEP Alliance

Clone the masked AES design from Github. Use the tutorial from the HEP Alliance Repository:

<https://github.com/HEP-Alliance/masked-aes-tapeout>

In a nutshell (clone via https):

```
1 | git clone https://github.com/HEP-Alliance/masked-aes-tapeout.git <ORFS-Root>/flow/designs/ihp-sg13g2/masked_aes
```



# Enable the design in the Makefile

- Edit the Makefile:

- Uncomment the line with your chosen DESIGN\_CONFIG from ihp-sg13g2. In this case the cloned masked\_aes:

```
1 DESIGN_CONFIG=./designs/ihp-sg13g2/masked_aes/config.mk
```

- Re-comment the previous uncommented line with DESIGN\_CONFIG. For example the gcd on SKY130 design:

```
1 # DESIGN_CONFIG=./designs/asap7/gcd/config.mk
```

- The line with the default design does not need to be commented. This only applies when no previous line with DESIGN\_CONFIG is set.



# Run the flowscript

- Run `make` from inside the `/flow` folder.



# Success

- The chosen design should finish after a while and a lot of console output with a table (time/memory) like this:

```
1 | Log                               Elapsed seconds Peak Memory/MB
```

CONGRATS! Your design got build to a GDS!

