



# Methodology of extraction of reliable energy data on a basic block level

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# Energy efficient Software

- Reduced energy cost
- Reduced Heat dissipation
- Reduce energy footprint – GHG emmision
- Longer battery life
- Hardware unable to satisfy increasing energy needs



To achieve



Energy efficient  
software

First

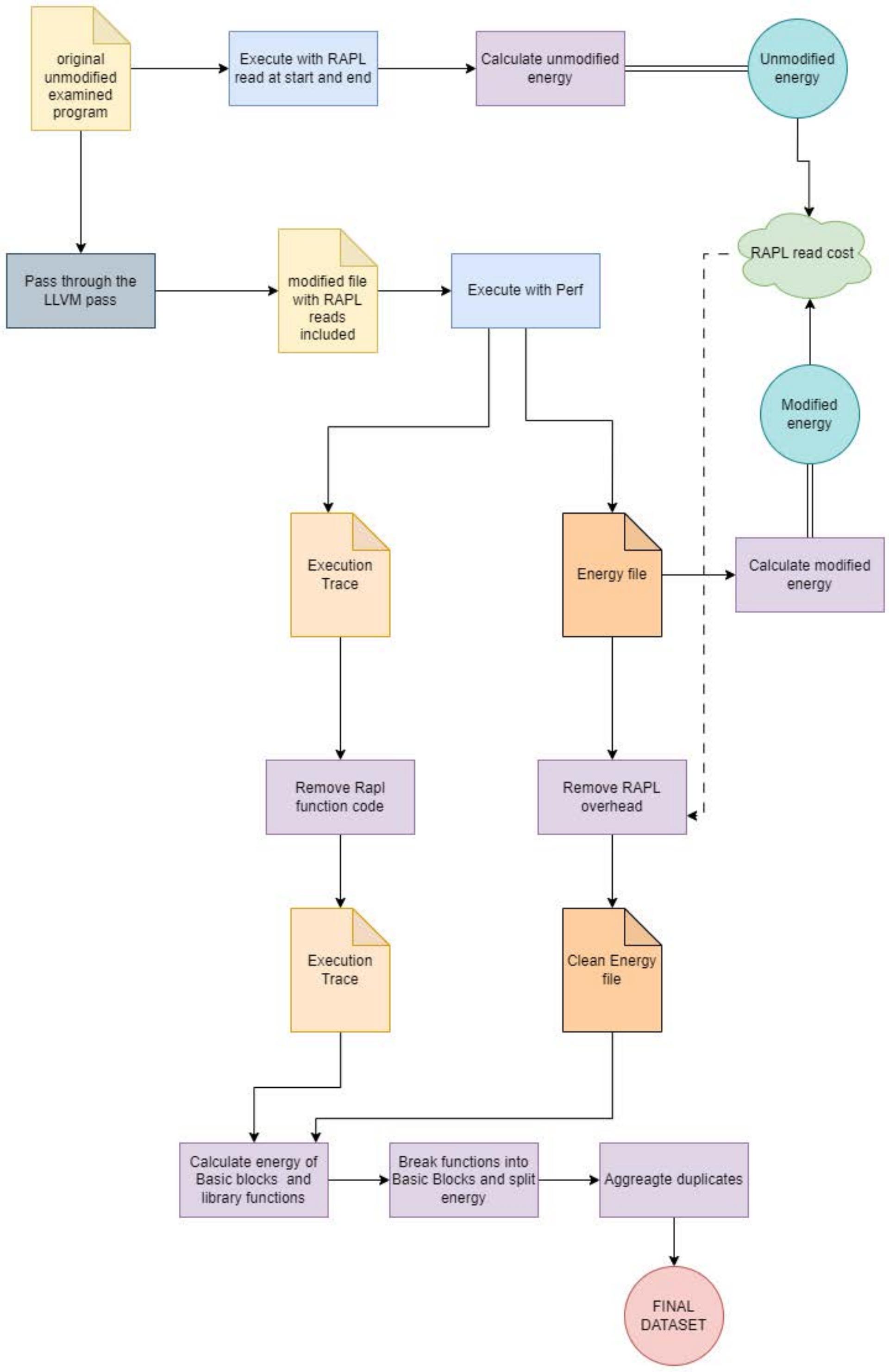


Software energy  
measuring tool



## 3 different approaches:

- Individual basic block measuring with RAPL calls
- Binary Lifting to LLVM IR
- Post analysis of execution trace





# Successful approach : Execution tracing using Intel perf

- Insert 3 types of RAPL calls
- Run executable and collect trace
- Remove RAPL call energy and code
- Analyze trace corresponding energy to BBS or functions
- Split functions into BBS
- Split function energy to its BBS
- aggregate duplicate BBS



# Final Dataset

- 3828 unique Basic Blocks from >565K total
- 24 C benchmarks
- Average energy : 0.64 energy units
- Mean error : 2.63%

**Comparable error to the state of the art**

**Higher accuracy or granularity than similar works**

**Open source and reproducible**



# Current continuation and Future work

- Dataset for Dram and Uncore
- Energy predicting Neural Network
- Energy efficiency code transformation (probably compiler based)



# Thank You

**Don't forget to check out the project  
codebase on github repo :  
[https://github.com/jimbou/dataset\\_tool.git](https://github.com/jimbou/dataset_tool.git)**