Experience of Using OpenROAD Flow Scripts on PICORV32i

Shubham Garg
(VLSI Design)
C-DAC Noida
Noida, UttarPradesh
shubhamgarg1299@gmail.com

Abstract— In this paper, I present my experience of using OpenROAD Flow Scripts (ORFS) on PICORV32i RISCV Core. The objective of the project is to perform the RTL-to-GDSII Layout which is DRC and LVS Clean and analyse the Performance of RISCV32i.

Keywords— OpenROAD Flow Scripts, RTL-to-GDSII flow, open-source tools, instruction set.

I. INTRODUCTION

OpenROAD Flow Scripts (ORFS) is a powerful toolset that enables full RTL-to-GDS flow using open-source tools. The OpenROAD Flow project aims to automate digital circuit design with no human intervention and achieve a 24hour turnaround time. RISC-V comprises of a base user-level 32-bit integer instruction set. Called RV32I, it includes 47 instructions, which can be grouped into six types: R-type: register-register. I-type: short immediates and loads [1].

DESIGN FLOW OVERVIEW

My experience of using ORFS on a specific design project has been positive overall. The use of open-source tools allows for flexibility and cost-effectiveness, while the automation of the design flow significantly reduces the time and effort required for the design process. [2]

I will be performing all the steps to Develop the GDS-II Layout using Open-Source EDA Tools. The Automated RTL-GDS Flow is a great advantage of using OpenROAD.

II. EXPERIENCE OF USING ORFS

Due to the use of Automated RTL-GDS flow we can easily performs the checks and steps like floorplan, STA, Synthesis etc. with no human intervention.

After that we can perform CTS and Macro Placement followed by exploration using Autotuner.

1. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, my experience of using OpenROAD Flow Scripts on a specific design project has been largely positive. Once the steps are performed we can easily analyse the performance of the design of any RISCV core, in my case RISCV 32i.

REFERENCES

[1] https://devopedia.org/risc-v-instruction-sets

[2] T. Ajayi et al., "INVITED: Toward an Open-Source Digital Flow: First Learnings from the OpenROAD Project," 2019 56th ACM/IEEE Design Automation Conference (DAC), Las Vegas, NV, USA, 2019, pp. 1-4.