OpenROAD Flow Scripts on a asap7 riscv32i Design

Abstract— In this paper, we present our experience of using OpenROAD Flow Scripts (ORFS) on a riscv32i design project.ORFS is a set of integrated scripts that allow for RTL-to-GDSII flow using open-source tools. The OpenROAD Flow project aims for automated, no-human-in-the-loop digital circuit design with 24-hour turnaround time. We will discuss the benefits and challenges of using ORFS on risciv32i.

I. INTRODUCTION

OpenROAD is the leading open-source, foundational application for semiconductor digital design. It eliminates the barriers of cost, risk and uncertainty in hardware design to foster open access, expertise, rapid innovation, and faster design turnaround. In this paper, we describe our experience of using ORFS on a riscv32i design project.

II. DEFAULT RUN

Our experience on ORFS on doing the asap7 rsciv32i design. It is okay to have that but it is taking more time to run the design that I observed and also faced some issues while doing the design process. Sometimes we get unexpected design results because of no human intervention that requires careful analysis and debugging.

III. ANALYSIS

That the cell list is more, buffer size is low, testing for timing violations along all conceivable paths in the cts stage and there is high blockage, cell density in some places, in the routing stage.

IV. MODIFICATION

In riscv32i design we can change the cell list, increasing the transmission time in cts stage and changing the metal layers, blockage size and spreading the cell this may reduce the congestion in the routing stage. By changing this we can reduce the run time of the design and it will give a good run time.

V. EXPERIENCE OF USING ORFS

The OpenROAD project has characteristics that differentiate it from a regular EDA project. We have stated it before: this is not research. However, this is not a company either. The OpenROAD project has a team composed of dozens of contributors, mostly students from different universities, who are located in different places around the world. The teams are divided according to the universities, and we also have a few experienced designers, researchers and program- mers who give us support for tools, guidance in coding and design choices, and infrastructure management. Due to OpenROAD being an international project, certain challenges come up when discussing organisation and task management.

VI. CONCLUSIONS AND RECOMMENDATIONS

In this paper, we have presented the experience of being a contributor to the OpenROAD project. The OpenROAD Flow Scripts on riscv32i design has been positive overall. The use of open-source tools and automation made the design process easy. By doing those modifications we can get a good PPA.

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