

April 10, 2015

To whom it may concern:

Please find attached a new original manuscript submission for consideration for publication in IEEE Transactions on VLSI Systems.

This work has not been previously published. It builds upon an earlier conference publication "CAD and Routing Architecture for Interposer-Based Multi-FPGA Systems," A. Hahn Pereira and V. Betz, *ACM Int. Symposium on FPGAs*, 2014, pp. 75 - 84, but greatly improves on and extends this earlier work. More specifically, new content includes:

* Partitioning is now included in the CAD flow. We investigate multiple ways to formulate the partitioning problem for interposer-based FPGAs and compare the results to CAD flows without partitioning. All of Section V of the paper (4 pages) is completely new material vs. the conference paper.
* Section III, Architecture Models has been expanded vs. the conference paper, and the method of modeling the architecture in the CAD tools is new. Section III.D is completely new and Section III.E uses a different method than the conference paper and has been rewritten and expanded.
* Section IV, CAD enhancements contains mostly new material vs. the conference paper. The router enhancements section (IV.B) is entirely new, while the placement enhancement section (IV.A) is shortened and the effectiveness of the enhancements section (IV.C) is new.
* All of the architecture results have been re-run with the new CAD flow and architectural enhancements proposed in this paper, so all the results in Section VI are different and markedly better than those of the conference paper; this entire section has been re-written. Sections VI.A and VI.E investigate entirely new architecture questions proposed in this paper; there is no analog to these sections in the earlier conference paper.
* The Introduction, Background and Conclusions (Section I, II and VII) have been updated to highlight the new results of this paper and to describe recent developments in commercial interposer-based FPGAs at 20 nm.

Please feel free to contact us if there are any questions.

Yours truly,



Vaughn Betz

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