

sam-test-conf

Report of Contributions

Contribution ID: 1

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test contribution 1

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Description of test contribution 1

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Track Classification: Main Track

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abstract-1

Chiplet integration using 2.5D packaging is gaining popularity nowadays which enables several interesting features like heterogeneous integration and drop-in design method. In the traditional die-by-die approach of designing a 2.5D system, each chiplet is designed independently without any knowledge of the package RDLs. In this paper, we propose a Chip-Package Co-Design flow for implementing 2.5D systems using existing commercial chip design tools. Our flow encompasses 2.5D-aware partitioning suitable for SoC design, Chip-Package Floorplanning, and post-design analysis and verification of the entire 2.5D system. We also designed our own package planners to route RDL layers on top of chiplet layers. We use an ARM Cortex-M0 SoC system to illustrate our flow and compare analysis results with a monolithic 2D implementation of the same system. We also compare two different 2.5D implementations of the same SoC system following the drop-in approach. Alongside the traditional die-by-die approach, our holistic flow enables design efficiency and flexibility with accurate cross-boundary parasitic extraction and design verification.

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Track Classification: Main Track

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PowerNet: Transferable Dynamic IR Drop Estimation via Maximum Convolutional Neural Network

IR drop is a fundamental constraint required by almost all chip designs. However, its evaluation usually takes a long time that hinders mitigation techniques for fixing its violations. In this work, we develop a fast dynamic IR drop estimation technique, named PowerNet, based on a convolutional neural network (CNN). It can handle both vector-based and vectorless IR analyses. Moreover, the proposed CNN model is general and transferable to different designs. This is in contrast to most existing machine learning (ML) approaches, where a model is applicable only to a specific design. Experimental results show that PowerNet outperforms the latest ML method by 9% in accuracy for the challenging case of vectorless IR drop and achieves a 30 times speedup compared to an accurate IR drop commercial tool. Further, a mitigation tool guided by PowerNet reduces IR drop hotspots by 26% and 31% on two industrial designs, respectively, with very limited modification on their power grids.

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