

### **The missing link?**

TechSearch International's soon to be published 3D IC Gap Analysis<sup>1</sup> report has a section for a new class of tools called Path-finding which are separated from the classical EDA Tools. The classical EDA Tools discuss Implementation and Verification tools for IC, package and PCB. Path Finding tools are used well before the Implementation/Verification cycles begin and should help reduce the number of cycles, resources and time required before release to manufacturing. One 'all in one' Path Finding tool does not exist and current Path Finding tools focus in specific areas. Path Finding solutions exist for: RTL/Floorplanning, SI/PI electrical analysis, thermal analysis and mechanical. A cost modeling of the various Path Finding test cases is also required to ensure that cost targets are achieved for the end product.

### **Design Flows and Interfaces Resolved.....**

In a technical cost modeling paper written by SavanSys Solutions LLC titled: "Cost Trade-off Analysis of Pop versus 3D TSV"<sup>2</sup>, discussed EDA co-design barriers where each EDA vendor's tools do not easily interface between each other. SavanSys was not discussing tools within an IC or Package or PCB environment, but rather when an IDM uses one EDA supplier's tools for IC design, another EDA supplier's tools for Package and possibly a third EDA supplier's tools for PCB design. Trying to span the chasm between these design areas is difficult at this point and requires lots of manual work to enable co-design/co-verification. Since Path Finding tools are used BEFORE the actual implementation, importing/exporting of design data is not required. So the IC/Packaging/PCB database and interface issues do not exist. In addition, this implementation chasm is AFTER significant resources and time has been invested implementing a design: a KEY reason why Path Finding tools can be invaluable early in the planning phase.

### **....But this causes other issues for Path Finding tools**

But solving these database/interface issues places a burden on Path Finding tools: they need to work with many different materials (examples: glass/silicon interposers, balls/pillars of various sizes and materials, wire bonds of various materials, diameters and lengths, etc). Each material has its own physical and electrical properties that need to be accurately and objectively analyzed to help find that optimum solution. In addition, the complexity and size of these structures require CPU and memory efficient algorithms that allow larger structures to be analyzed: simulating a few TSVs is insufficient for accurate analysis of a structure.

### **Promising future?**

The EDA industry continues to improve the links between Implementation and Verification. Path Finding tools have the potential to resolve issues faced early in product development planning. I believe that Path Finding tools are the missing link between Planning and Implementation. Is P=IV a coincidence? Path Finding "Power" applied to Implementation and Verification? Time will tell as product development explores alternatives to homogeneous silicon and how efficient and effective they are exploring.

### **Notes:**

1 <http://www.techsearchinc.com/>

2 <http://www.savansys.com/papers.html>