IP Day: How to Choose Semiconductor IP?

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Introduction

The semiconductor industry gave the most tremendous challenge to the electronic design community and EDA industry by making available a silicon capacity that exceeds by far what today's designer can utilise in a reasonable amount of time. Reasonable timeframes for System-on-a-Chip developments in the multimedia and communication markets are less than eighteen months, when not even nine! I would like to give credit to Gary Smith, Chief Analyst at Dataquest, to have raised a very pertinent media alert in his article, 'The Revolution isn't Coming -- It's Already Here', in Virtual Chip Design, May 1997. It was clearly stated that in order to fill the design gap between available gates on silicon and design methodology, the solution was through system-level integration (SLI) using what was called at that time system-level macros (SLM). The electronic design community and EDA companies picked up the gauntlet and started what will be known as the Virtual Components creation through the industry organisation called the Virtual Socket Interface Alliance (VSIA). This was followed by Mentor Graphics and Synopsys who signed a Design Reuse Partnership, which led to the publishing of the 'Reuse Methodology Manual for SoC Designs'. The last stage was to create an industry accepted Virtual Component Quality Spreadsheet by merging the two efforts.

1. VSIA

The goal of the VSI standardisation effort was "*to specify or recommend a set of hardware and software interfaces, formats, and design practices for the creation of functional blocks that enable the efficient and accurate integration, verification and testing of multiple blocks on a single piece of silicon*". Key to this industry wide effort was the fact that those standards would be open. It was recognised very early that without open standards, interfacing the IP blocks would be a nightmare. The first document that VSIA released was the Architecture Document. It is the cornerstone of the standardisation efforts that will start in 1997. VSIA has produced since numerous VC specification documents. The most important aspects, which are the deliverables and the transfer of the VC, have been covered. Therefore the IP providers and users have reference documents.

2. The Industry

Once the industry groups took the challenge to get together and started working on a series of specifications, standards and documents, the next challenge was how to get the EDA companies involved? Mentor Graphics and Synopsys signed a design reuse partnership in 1997. Target was to work together to offer to the mainstream users a complete solution for SoC design methodology based on reusable IPs. One of the goals was to develop, demonstrate, and document a reuse-based methodology that works. The Reuse Methodology Manual is the result of this effort, together with the availability of an IP rating spreadsheet downloadable from the Web called OpenMORE program. Key was that the spreadsheet was freely accessible. The RMM outlines by simple rules and guidelines the necessary steps to the efficient development of reusable soft and hard IPs, IP integration and system verification. Today the main effort with VSIA, RMM and OpenMORE has been to create open standards and offer tools to help the qualification process.

3. Next Step?

VSIA, Mentor and Synopsys took then the initiative to merge the VC quality standards spreadsheet and OpenMORE Program under the responsibility of the newly created VSIA Quality Development Working group, whose task is to put a system of metrics in place in order to measure the IP to known rules and guidelines. The group had its first meeting in Sophia Antipolis last November and laid down its work plan for 2002. 4 quality axes are defined: Authoring Process – VC Verification – VC Maturity -Vendor Capabilities. It was also proposed to have something like what was established with the OpenMORE rating system, that is a number of 'STARS' given to a VC, associated with the set of attributes that comply or not to the rules and guidelines. The release the VC Quality spreadsheet is scheduled for DAC 2002.