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Assembling the Future

A Newsletter About the Design and Production of Electronics

ISSUE 006 • JULY 2011

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In this issue:

When Will EDA Wake Up?

Gabe Moretti

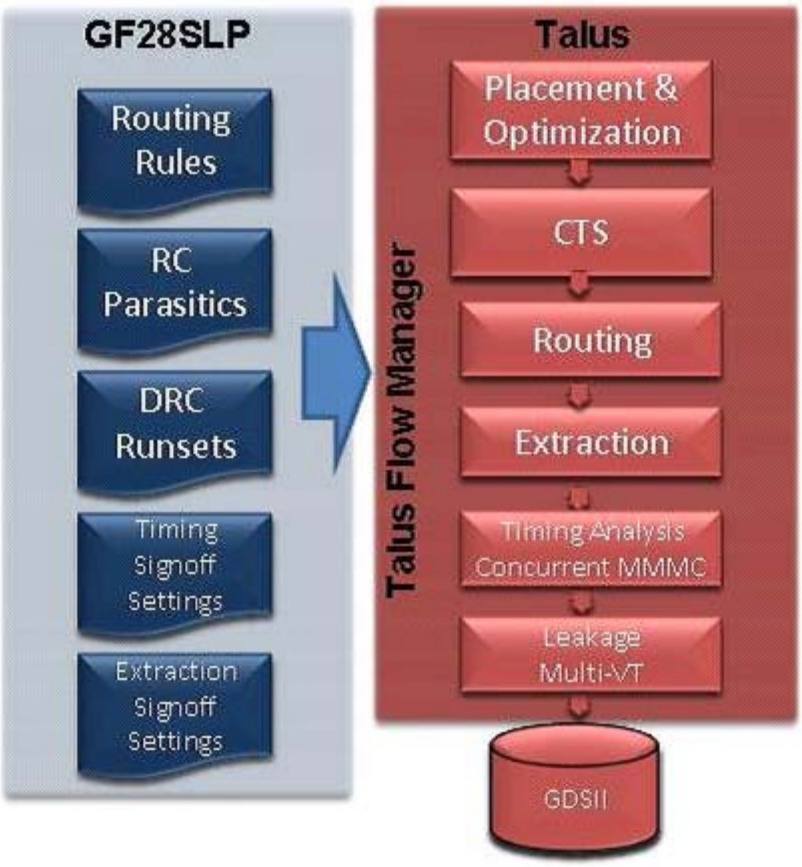
Lou Covey has written recently about the poor, or lacking, ability of EDA companies to do marketing, implying that if a company would only be smart enough to hire someone who "gets marketing" things would turn significantly better not only for that company but for the entire EDA industry.

But facts argue against his conclusions. In a piece titled "Mousetraps, alligators and EDA", Lou starts by stating that he did not go to DAC this year and instead relied on what "I could pick up virtually from video, audio and news coverage day to day." He then proceeds to tell what is wrong with EDA obviously because going to DAC to understand EDA is now superfluous. I beg to differ, with all respect for the frequent trivialities that pass for social media these days.

Lou repeats the old mantra that EDA companies area really not making the tools that the costumers want, and that should they ever get smart enough to just do that they would become widely profitable. There is nothing farther from the truth than this statement. I agree that EDA could benefit form an injection of capable marketing know how, may be even using social media. We do not need to discover what is needed to take a design to silicon: we have done that for over thirty years as an industry and longer than that as in-house CAD departments.

One very important thing that EDA customers want is to be able to build silicon with as much

confidence as a third party can guarantee as possible. The various reference flows developed by EDA companies in conjunction with the foundries are proof that EDA vendors are developing what the customers want. if there is any doubts about this, one can look at examples. Take the GLOBALFOUNDRIES/Magma reference flow for 28 nm process. As you can see in figure 1 the Talus product from Magma provides developers with all the functionality required to produce foundry compliant GDSII files.



[Figure 1 - Flow shown at DAC 2011]

Yes it is true that most startups are solely engineering driven, and that marketing there takes a secondary role. These companies isolate a problem, have the technological competence to develop a solution, find a handful of companies that use the solution, and believe they should be acquired for millions of dollars. It almost never happens, and when it does, it has nothing to do with how many engineering patents the small company has. It has to do with protecting the installed customer base. We continue to hear the cry of the engineers about how big, bad, company A is now killing the wonderful technology of company B it has just acquired.

A Fundamental Problem

Having granted that the EDA industry in general needs better marketing professionals, I must point out that solving that problem would not do much to change today's reality.

The problem is much more fundamental. The EDA industry is based on the premise that an outside organization can produce design tools cheaper than an inside organization can. The proposition is: "Let me do it for you and you will save money and in the long run have a better quality tool. This

partnership is worth money and thus I can bill you for the services".

EDA sells computer programs, together with some consulting services and lately virtual IP, and so, superficially, it looks like a technical software industry. But looks can be deceiving. EDA has set itself up to be a service organization, and services are not highly valued anywhere, aside from restaurants and hotels.

What is also true is that EDA is populated by very creative and competent engineers. Thus, given the description of a problem some interested EDA vendors will develop good and practically equivalent tools. Thus, given that a customer can choose from more than one equivalent tool, albeit with some differences in the payback algorithms, EDA vendors are left with only one powerful competitive lever: price.

Before I get email from companies that consider themselves leaders in a specific market, I will grant that a new product introduction can give a technical advantage over the competition. But in a period of time shorter than the length of a typical license contract competitors will have closed the gap and probably even surpassed the capabilities of the new tool. What matters to those who purchase EDA tools is not the short term advantage. What matters is the robustness of the business relationship coupled with the cost every design project must bear. The goal is to prove to the CFO that the license was a good investment by defraying the cost well within the life of the license.

Let me take Apache as an example. Apache is the leader in the power analysis market, with around $60 million in annual revenue. Synopsys, an investor in Apache, has revenue of $1.5 billion. There was no financial reasons for Synopsys to purchase Apache as long as it could co-exist with it The Ansys acquisition has produced long term capital gains for Synopsys.

Electronics companies can find an equivalent replacement for any EDA tool. I said equivalent and not "the same". It is true that there are differences between two EDA tools solving the same problem, but the differences can be overcome with relatively small investments. It is also true that at times EDA vendors introduce products before they are production quality, and thus it is possible to point to examples where a vendor tool is significantly better than one from another vendor. (see for an example "The IP Market Is A Way Out From Business As Usual For EDA Vendors") Since the fortunes of any EDA vendor turn around its "corporate customers" who represent not only a significant portion of the yearly income but also the only security in forecasting future revenue, it is clear that "bundling" and "discounting" are the predominant legal tools a sales person has to meet quota and keep the customer.

This business approach can be changed, but there are obstacles in the way. Some are regulatory, but the most important is the human nature aversion to change. To the engineer this seems illogical. Without change, after all, there is no progress, and engineering creativity is all about change that fosters progress.

In particular the industry problem is the fear of trying a new approach to business. We must find a way to escape from "just" being a service industry that is a substitute for a large internal CAD department. The goal is not to save customers money, it is to provide value built in the products the customers sell.

The Courage To Change

Ed Sperling, in an article in its System-Level Design Community, does a good job to describe what will be needed to translate a design into silicon, but such EDA future is constrict to its present role, it has no built-in growth. EDA is once more at the service of its customers.

The recent announcements about National Instruments finalizing its purchase of AWR, the announced acquisition of Apache by Ansys, or even the acquisition of Verigy by Advantest, have caused much rejoicing among EDA observers. They concluded that the EDA industry will be revitalized by such acquisitions. I do not think so. The acquisitions were in fact designed to improve the competiveness of the acquiring companies in their own original markets, not to develop the market of the acquired EDA vendors. (see "The AWR, Apache, and Verigy Acquisitions").

Mathworks, another "outsiders" that tried its fortunes in the EDA market, is the perfect example. Mathworks, who started by entering into a marketing agreement with Mentor Graphics almost ten years ago, and then eventually developed tools to increased the importance of Matlab especially in FPGA design, even exhibited at DAC for a couple of years. This year they were not present at all as exhibitors. Instead they now rely on more marketing agreements, with Cadence and Synopsys in addition to Mentor, to increase their leverage in their original markets by providing a proven integration with EDA tools when necessary. The reason is obvious: the EDA market is a low margins market.

Had it been the other way around, like Cadence buying Advantest, or Synopsys purchasing Ansys, then there would have been reasons to celebrate. The difference is one of market emphasis. EDA companies need to move away from focusing on selling tools to develop silicon devices (or in very few cases Printed Circuit Boards), and look at the end applications. The EDA360 document says just that, but it still talks too much about tools and not enough about the end markets.

What a leading EDA company needs to do is to identify an application market, then discover the common building blocks required, its components, both hard and soft, and then build such components. We must achieve a share of the product revenue, not just a share of the development cost. EDA products must play a role **both** in the development of the product and in its functionality in the field.

Thus it is imperative that EDA companies must focus on developing an inventory of components, what we now call IP, both hardware and software, without concerns about competing with its own customers. In the article I previously referred to ("The IP Market Is A Way Out From Business As Usual For EDA Vendors"), I told how ARM switched from Synopsys to Mentor because they felt that the purchase of Virage Logic by Synopsys made them a competitor in the IP market. A good company would have never done that. A good company would have used the tools of its competitors to develop even better IP, and turned the tables on its new present competitor. This is what Intel would do, unless they have changed drastically since I left. After all Synopsys has all the motivation to keep its tools as leaders in their own market segment. They would not make their tools less competitive just to hurt ARM while loosing revenue from its other customers and risking a bad reputation in the industry.

At 20nm, and even more at 14nm, engineers will have less and less discretion on how they "improve" the design. Ed Sperling in the above cited article calls for *"a giant step to another level of abstraction."* This step can be achieved only if there is a trusted inventory of hard and soft

components that can be reliably integrated in a cost effective manner.

Keeping the development cost as low as possible is the goal. Thus customers will always demand the lowest possible price for tools licenses. Sharing a few percentage points of the eventual revenue is less of a problem, since the market will allow the leaders to markup the price. I have yet to hear of one instance where a customer did not purchase an iPhone because it cost $5 more than what he thought it should. Or what about $10 for every TV set Samsung sells? Do the math, and you will see that EDA companies need to become what components manufacturers were in the seventies and eighties, at least for a while. Twenty years from now, the model may need changing again: but that is progress.

EDA and other TLAs

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The 48th Design Automation Conference is now history. As DACs go, this one was pretty good. There were some interesting announcements, some great parties and an overall air of optimism on the show floor. At Atrenta, we talked a lot about SoC Realization - that part of the SoC design process that sits between system level design and silicon implementation. Pictorially speaking:

[Figure 2 - SoC Realization]

The diagram, above, borrows a market segmentation that was originally proposed by Cadence about a year and a half ago in their White Paper entitled “EDA360, the Way Forward for Electronic Design”. Among other things, that White Paper advanced the premise that SoC design is composed of a system design component, a silicon implementation component, and a piece in the middle that ties the two together.

Silicon Realization is where most EDA suppliers make the bulk of their money today. That's where the heavy lifting of synthesis, place & route, extraction, verification and tapeout occurs. It's also an area that has become highly competitive and is seeing some consolidation. Chip complexity is going up and tapeouts are going down, as are the number of foundries in the world. Does this mean that someday there will only be a few monster chips being built by a few foundries? That's quite unlikely. The market will find a way to differentiate.

Reuse will help, especially as we move from IP reuse to subsystem reuse. New technology advances like stacked die 3D design will also help. The complexity of these new SoCs, or whatever we will call them, will demand design at a higher level of abstraction. It will simply be too hard to design any other way.

But what about the foundation of EDA - what about Silicon Realization? Will this segment of EDA continue to consolidate? Will a shrinking number of foundries mean this market becomes much smaller? Maybe each foundry will simply buy a Silicon Realization flow to call their own. If some of the market dynamics play out this way, what will EDA become in the future? Will the regimes of System Realization and SoC Realization become the new battleground for design wins? In that world, should we even call it EDA anymore? Maybe it's time for a new three letter acronym (TLA).