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Major Changes are Occurring With EDA Software Tools

Gary Breed
Editorial Director

Something is going on in the world of electronic design automation (EDA). For several months I have been trying to figure out what all the symptoms are leading to, so bear with me as I explore this subject here.

At first, I thought I was seeing the results of simple necessity—engineers were using software tools to accomplish tasks in an environment of too many new ideas to be developed too quickly for traditional design methods. Then I though it was a matter of acceptance—that EDA tools have developed to the point where they are trusted by more engineers. These things are certainly true, but I think the situation is bigger than that, so I made the following list of things that have changed in recent weeks, months and years. First are the computing technology issues:

- More powerful PCs that put maximum power on any engineer's desk.
- Network advances that allow access to project files and communications with colleagues while away from the office.
- Continued academic work on mathematical methods to solve new and more complex problems.
- Highly capable programming tools that let software developers get the math into usable code more quickly than ever.

Then there are the demand issues:

- Accelerating "lowest cost, fastest time-to-market" pressures.
- Fewer engineering man-hours available for a given project (an issue that needs a lot explanation—but not here).
- Rapidly increased use of RFIC foundries, LTCC technology and other solutions for custom integrated components and subsystems.
- Higher performance demands due to complex modulation, wide bandwidth technologies and the need to coexist with other users and systems.
- Greater complexity at the project level, involving all portions of the product from the battery to the antenna.
- Incredible variety of applications from throw-away consumer items to high performance, high reliability military and space systems.
- Compressed or "pipelined" design, test and manufacturing schedules.

So far, we can see *why* there are changes, now let's look at *how* some these changes have been addressed by EDA developers:

- Seamless interoperability among tools from the same vendor, and with complementary tools from other vendors.
- Ability to simulate a system at the block diagram level, circuit design level, and device level.
- Simulation of physical design (package and board level) with the rest of the circuit.
- Use of models developed by various means, such as EM simulation, measurement-based, or equivalent-circuit.
- More accurate models in the standard libraries, usually in a joint effort with component companies.
- Ability to handle each block as a behavioral definition, simulated circuit or using as-built measured data.
- Direct links to test equipment from simulation, and back.
- Faster algorithms that speed computation time and allow more powerful optimization.
- Internal setups for common types of simulation, and for many system standards.
- A move toward full integration with specialized RFIC and other vendor fabrication tools that currently use a different "language" for models and parameters.
- Lots of attention to the user interface.

I could add many more items to the above list, but those that came to mind quickly show the vast scope of work that has been done, and is still underway, by EDA developers.

Usability is the Holy Grail

We can see that EDA is making great strides toward pulling everything into a "master program," but that's not enough to meet engineers' needs.

I think the reason I could not put my finger on "what's happening" is that there is one area that still has significant work to be done—usability. While the usability of complex software is light-years ahead of what was available a few years ago, there remain some important issues in the management of such complex tools.

Right now, a user (individual or company) is forced to spend a lot of time and effort learning to use a specific vendor's EDA tools.

The logical next step—perhaps the only remaining big step—is for the software to be flexible enough to adapt (easily) to the users' preferred design methodologies.

That's what I think is going on with EDA tools—now let me know what *you* think!

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