Design Advantage™

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Extending Verilog Simulation

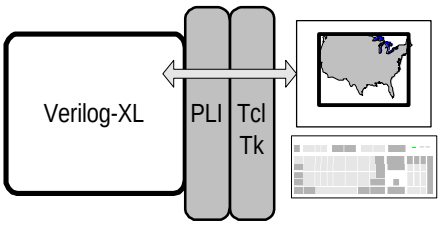
Venkat Iyer

Have you ever wondered if there was a better way to test the functionality of your chip than looking at the waveforms? With designers targeting higher densities with more functionality, and the corresponding increase in data, spotting functionality problems by browsing waveforms is like searching for the proverbial needle in a haystack.

At Comit we realize the importance of demonstrating the user-level effects of our Verilog designs, and we seek innovative ways to do this, using our knowledge of software development and EDA tools.

One of our customers was designing an on-line video image-processing chip, that took image data as input, processed and output the image as RGB data. Seeing the waveforms in the viewer did not quite capture the effectiveness of the chip in processing and converting the input images. The true test of the device would have been to see the output image and verify that it was indeed what the chip was supposed to do. Since the simulations took a long time, the customer wanted to see the processed image as it was being generated.

Comit's knowledge of current software tools, and our experience with everything from simulation environments to windowing systems, helped us come up with a simple, effective, quick and inexpensive solution for the customer. Comit integrated the freely available Tcl/Tk toolkit, with the Verilog simulator through the PLI. By building an interface only once between the toolkit and the simulator, we were able to use the many features of the toolkit, including the scripting



language, and a simple, yet powerful, GUI building tool. This interface could be reused and remained the same for every design. It provided for easy adaptability and a fast turn-around time, as we did not have to rebuild the Verilog executable for any user interface modifications. We built a GUI, which could control the simulation – pause it or quit it. In addition to displaying the image, we provided for simultaneous zooming to parts of an image, seeing the exact pixel values at each pixel, additional dithering to be rendered on non-true color displays, and gamma correction.

This approach can be easily extended to designs requiring any type of graphical display, for writing customized simulation debuggers and run-time configurable test benches.

Comit is not just another Design center. Our knowledge of software tools, EDA processes and flows brings unique value to our customers. ■

6QT™

A Project Planning Technique based on Common Sense.

The technique called '6QT' involves answering 6 basic questions namely ***What, Why, Where, When, Who,*** and ***How***, over and over again.

What

This defines the system boundary. When someone wants something delivered, ask 'what' repeatedly till you have all the answers that fully define what you have to deliver. Do not accept 'commonly understood' definitions, instead ask questions such as: what it will include. Is it source, object, VHDL or Verilog, tested or not, tested for what, are test cases and test results included, what kind of tests, what interfaces will it contain, what interfaces will be tested, what documentation, what format, what media etc.

Why

This validates all your assumptions. It will show you paths to better, cheaper, faster solutions. Many times, I have noticed big chunks of requirements being thrown out of the window, when searching for answers to why, saving tons of effort, time and money.

Where

This focuses on logistics, as something may have to be done at a different site, needing resources of a certain kind. You will end up planning for these, in advance.

When

Define it as hour, am/pm, MM/DD/YY, at ***where***. With businesses going global, it is obvious that we have to be specific. Do not use today, tomorrow, three days from now, Fri, Jan, third quarter etc.

Who

This clarifies who will have to do what; who will test, who will approve, who will accept, and fix responsibility for various actions. When getting answers to this Q avoid pronouns like, 'he, she or they', in stead use real names like Susan or Gomathinayagam. If a 'committee' or 'department' is involved, ask for that 'one person' that you'd have to deal with.

How

The ability to get answer to this all-important

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The newsletter of:

COMIT® SYSTEMS

Comit Systems, Inc.
3375 Scott Blvd. Suite 330
Santa Clara, CA 95054

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6QT (continued from other side)

Q, and making a judgment on the validity of the answer, differentiates a successful professional from the pathetic mediocrity we see all around. This Q essentially brings out all the problems and roadblocks to success.

These problems, usually, will belong to two categories. The known, for which solutions exist, if resources can be applied. The other, harder kind of problem, will require research.

Not being able to deliver a solution is OK, if the problem is of the latter kind. When you don't share that concern, work with your customer, and establish the details such as how you propose to do the research, what you see as the probability of success, you are creating a bigger problem for yourself than not knowing all the answers in the first place.

Clearly, the answer to this Q sets the expectations right, and that is three-fourths of any final solution.

The beauty of 6QT is that it is based on common sense. It is easy to follow. When you do this rigorously, and develop a plan after several iterations, you can be fairly certain that your project will be on track. If not, it is OK. At the least, it will earn you the respect of your peers and customers. ■

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Did You Know? Comit Also Designs Embedded Systems.