

News & Analysis

VSIA quality metric upgrade may ease IP selection

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SANTA CRUZ, Calif. — Selecting silicon intellectual property is one of the most difficult tasks faced by system-on-chip designers. It may get a little easier this week, as the VSI Alliance releases its Quality IP Metric 2.0, available to the public without charge.

The QIP consists of spreadsheets that are filled out by IP providers. The spreadsheets consist of yes/no questions covering such topics as documentation, ease of integration, design quality and verification quality. Questions are ranked and scored, and the result is metrics that should reflect the quality of the IP block, as well as the design and verification practices of the vendor.

Evidence has been building for a need for objective metrics. In a recent *EE Times* Industry Challenge survey (see Dec. 12, page 27), IP integrators complained of long selection times, lack of customer support and inadequate verification suites run by IP providers. Of the 220 respondents, 14 percent said it was highly important, and 39 percent said it was somewhat important, to have "a scorecard or other means to quantify the IP deliverables."

That's exactly the idea behind QIP. "It's not rocket science, but what it really does is provide a common baseline," said Kathy Werner, chair of the IP quality working group at the VSI Alliance (VSIA) and IP reuse manager at Freescale Semiconductor Inc. "It's a communication mechanism so that purchasers can really understand what they're getting from vendors, and do a real apples-to-apples comparison for IP."

Gary Delp, the VSIA's CTO and a distinguished engineer at LSI Logic Corp., cited another advantage. "This is a really nice way of reducing the cost of integrating IP by making it simple to compare various sources of IP." He added, "On the producer side, it reduces the cost of preparing collateral for customers."

The initial QIP 1.0 release in 2003, however, did not find widespread adoption beyond the handful of integrated device manufacturers and EDA vendors that put it together. Two things are different this time, said Werner and Delp. One is that QIP 2.0 is much easier to use than its predecessor. And perhaps most important, IP providers don't have to become paying members of VSIA to get the spreadsheets, as they did with QIP 1.0.

Focus on soft IP

QIP 2.0's release follows a six-month beta program involving such companies as Cadence Design Systems, Denali Software, Edacentrum, Freescale, LSI Logic, Mentor Graphics, Philips Semiconductors, STMicroelectronics and the Japanese Starc consortium. The spreadsheets are available for downloading at www.vsi.org.

The current release focuses on soft digital IP, with hard IP, analog IP and verification IP to follow at a later time.

LSI Logic used QIP 1.0 to augment its internal evaluation guidelines, and the company noticed three things, said Delp. First, it provided a valuable list of questions. Second, it matched fairly well the criteria that LSI had already developed internally.

And third, it was hard to use. "We found it was a huge amount of work to put together," Delp

said. The requirement of VSIA membership, he added, was a "clear roadblock" to widespread adoption.

"What 2.0 does is work very hard at focusing the questions so they're appropriate to your stage of evaluation," Delp said. For example, as you go through the spreadsheet, questions that are no longer applicable become hidden and are removed from the evaluation.

QIP 1.0, said Werner, was a "flat spreadsheet" with some 300 questions and was "a little overwhelming." QIP 2.0, in contrast, includes three spreadsheets. One evaluates the vendor's overall capabilities, one evaluates the design and verification practices of the IP design team and the third evaluates the piece of IP being delivered. Thus, only the third spreadsheet needs to be filled out for each new piece of IP.

Questions on the spreadsheet are rated as "imperative," "rule" or "guideline." This, noted Delp, lets users sort out showstoppers from "nice to have" items. The scoring keeps track of how many imperatives, rules and guidelines are unsatisfied, and uses color coding to differentiate them. Users can decide what is "imperative."

Werner said Freescale used QIP 1.0 to evaluate incoming and outgoing IP, and expects to make use of QIP 2.0 similarly. Delp said LSI uses QIP for its internal evaluations and believes its third-party providers will have an easier time using QIP 2.0 "now that it's open."

Denali Software Inc. was involved in the beta process, and plans to use QIP 2.0 to "drive future development," said Denali technical marketing manager Mark Greenberg. That company did not use QIP 1.0 because adoption was not as strong, he said.

"Part of the significance [of QIP] is to demonstrate that there's a process and a commitment," Greenberg said. "It's a level of commitment that goes beyond what an individual provider of IP or a small design house might do. It's showing that you really have the whole shooting match covered, from start to finish."

One small IP provider that did make use of QIP 1.0, and plans to conform to 2.0 "in every way we can," is Cast Inc., said Paul Lindemann, documentation consultant. "What QIP calls for in documentation requirements is commonsense stuff, and we might as well do it that way," he said.

But Hal Barbour, Cast president, noted that there hasn't been a lot of customer demand for the metric. "We have a lot of small and mid-size companies with critical projects that need to get to market fast," he said. "Their own quality metric and assessment probably take a stronger position than some formal metric they might not be fully aware of."

Cadence Design Systems Inc. was involved in the QIP 2.0 beta evaluation, and the company uses the QIP metric as the "first tier" in the qualification process for members of its OpenChoice IP program, said Saverio Fazzari, technical marketing director at Cadence. The intent of that program is to prequalify IP to be used within the Cadence flow.

Fazzari said that 24 third-party IP providers are members of the program, and most have filled out the QIP spreadsheets.

"It's nice to have a base set of questions that everybody is comfortable with, and recognizes that they need to answer," Fazzari said.

The QIP spreadsheets are no replacement for due diligence. There is no external audit to confirm that the spreadsheets are filled out accurately. IP vendors can pay a fee to display the QIP logo, but this does not amount to an endorsement by VSIA.

"VSIA does not guarantee the quality," Delp said. "What we are saying is, here are the terms you can use to discuss quality."

'Imperative' QIP queries include:

- Is an IP Integration manual or chapter available?
- Does the document fully define the interfaces to the IP?
- Is the IP designed to support instance-by-instance configurability?
- Does the verification environment support configurable IP?

- Can the provider show proof that all the simulation runs complete and pass at RTL level?
- Are synthesis scripts with timing constraints provided?
- Are all required files included within the IP delivery?
- Has metastability protection been used?

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