Startup's open p-cells poised to roil analog EDA

By Richard Goering

Santa Cruz, Calif. — Generating parameterized cells (p-cells) that can be instantiated in any custom IC layout tool may seem like a modest goal. But if analog EDA startup CiraNova Inc. succeeds in its mission, it may reorder the analog IC layout market and establish a new EDA distribution model as well.

CiraNova hasn't publicly announced a product, but its Web site is offering free downloads of PyCell Studio, a Python-based tool that generates PyCells, or "universal" OpenAccess-based p-cells. Until now, most p-cells have been created in Cadence Design Systems Inc.'s Skill programming language, and are thus restricted to Cadence IC layout tools.

Proprietary p-cells are the key to Cadence's dominance of the analog IC design market, said Gary Smith, chief EDA analyst at Gartner Dataquest.

But CiraNova's impact may extend beyond the analog layout market. By offering a free tool for download over the Internet, and planning future offerings that build on that tool, it's proposing a novel business model as well. "We're trying to reinvent the distribution model for EDA, which is one of the largest inefficiencies in the industry," said Jim Solomon, Cadence founder and a director of CiraNova.

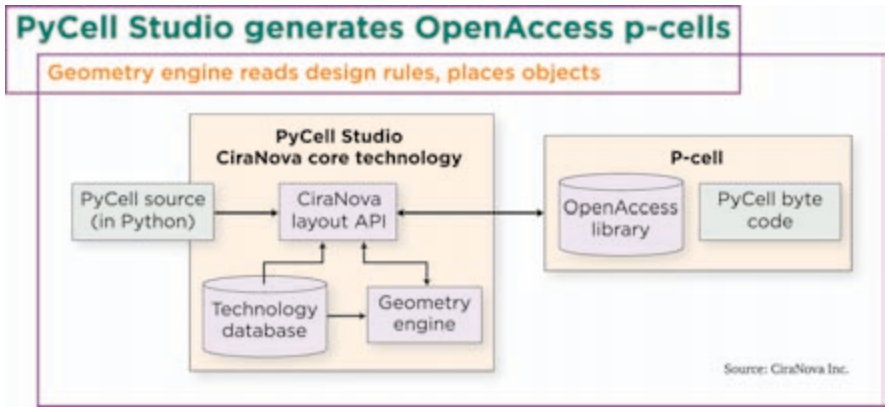
What makes CiraNova's mission possible is the OpenAccess data model, developed by Cadence and offered to the industry as a new standard. IC design tools that make use of OpenAccess should be interoperable. But it doesn't always work out that way, noted Dave Millman, CiraNova's vice president of marketing.

"There's a gaping hole in OpenAccess in the p-cell arena," Millman said. "Skill only works with [Cadence] Virtuoso. OpenAccess is a great open data model, but the next step is not there, so we decided to pursue it."

As of today, CiraNova has raised almost $15 million in venture capital. Its management team includes Ed Petrus, COO and vice president of engineering, who was a key developer of Skill at Cadence. Millman was previously director of marketing for EDA products at IBM Corp.

CiraNova quietly made PyCell Studio available in January, and since then, Millman said, there have been hundreds of downloads from users in 25 countries.

"The CiraNova strategy is to break Cadence's monopoly position and then take them on with superior technology," Gartner's Smith said. "I don't know if they can pull it off, but if they do it will make the analog market fun again."



CiraNova wants a "cooperative" relationship with Cadence, Solomon said. "To continue OpenAccess, they need to go beyond Skill," he said. "If they don't, customers will have IP [intellectual property] that's not portable to other tools in OpenAccess."

Cadence had no comment about CiraNova, but the company's new Virtuoso platform supports "p-cell interoperability," according to Anthony Gadient, product-marketing group director for Virtuoso. "We are continuously enhancing our ability to allow Skill p-cells to be transportable to other EDA vendors who are built upon OpenAccess," he said.

The EDA user community has been pushing for a "Skill evaluation utility" that will let any OpenAccess-based application read, write and modify p-cells, noted Ed Lechner, marketing director for analog and mixed-signal at Synopsys Inc. "PyCell Studio is a great example of the power of open standards in action," he said. "It provides a development platform for creating parameterized cells that are interoperable in any EDA tool that is built on OpenAccess."

Parameterized layout cells have gained widespread use because they can generate many variations of elements such as transistors, resistors and capacitors. Millman estimated that 80 to 90 percent of all analog and RF layout is done with p-cells today, as well as perhaps 50 percent of custom digital layout.

CiraNova's goal is to provide language-based p-cell generation technology for analog/mixed-signal and custom digital design. The company's argument, however, is that Python is a far better language than Skill for this purpose, even aside from the proprietary nature of Skill.

"Python is a more modern language, it's more object-oriented and it's easier to use than Skill," Solomon said. "It takes care of memory management and data typing, and it's completely portable and very fast." Solomon said users have found that their productivity in creating p-cells is much higher in Python than in C++.

PyCells work with Skill

CiraNova claims that its PyCells are fully compatible with Cadence IC layout tools. PyCells and Skill p-cells can coexist in the same design, and Cadence's Virtuoso layout editor can instantiate and manipulate PyCells. Skill scripts can create and manipulate PyCells. Solomon acknowledged, however, that CiraNova will need to provide a solution for legacy Skill p-cells.

CiraNova also claims to have a complete development environment for PyCells. Its PyCell Studio includes a Python-based layout application programming interface with classes and methods, an interactive layout viewer for OpenAccess cells, a PyCell integrated development environment with debugging capabilities, an OpenAccess library generator and a PyCell developer kit. Also included is PyCell Explorer, which provides immediate visual feedback on new coding ideas.

PyCell Studio itself is free, and CiraNova sells such services as custom layout generator development, Python code development consulting, custom layout consulting and analog/mixed-signal design services. "The idea is to make PyCell Studio ubiquitous and develop products for sale that go on top," said Solomon.

Millman noted that the company's Internet-based business model means that a large sales and marketing infrastructure will not be required. "What we created for free is what we believe is a critical OpenAccess infrastructure component," he said.

Millman cited another reason for keeping PyCell Studio free. "If I have a single, proprietary license for viewing or migrating my IP, it's not my IP," he said. Engineers are losing access to older IP, he said, because they no longer have licenses for the tools needed to view or manipulate it.

CiraNova's long-range mission goes far beyond p-cell generation, Solomon said. "We're attacking full automated layout for analog," he said, noting that "automated" is not the same thing as "automatic." While analog layout won't be fully automatic, he said, CiraNova plans to add automated layout capabilities on top of PyCell Studio.

CiraNova is planning its first product announcement for later this fall. ■

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