

RivieraWaves and Cadence

“SimVision and the Incisive Enterprise Simulator deliver the highest possible performance for our low-power IP designs. This unified simulation and debug environment enables us to manage multiple simulation runs easily and to analyze both design and testbench behavior at any point in the verification process.”

Benjamin Lauret, Senior Hardware Engineer, RivieraWaves

The Customer

RivieraWaves is a startup company, founded in 2010, that specializes in wireless connectivity semiconductor intellectual property (IP). The company offers a unique, proven portfolio of Bluetooth® and Wi-Fi™ IP for integration into application-specific integrated circuits (ASICs) and field-programmable gate arrays (FPGAs). RivieraWaves also provides design services ranging from simple IP customization to complete ASIC and application development.

The company’s IP portfolio consists of digital hardware, software, and radio frequency (RF) building blocks that enable its customers to develop low-power, low-cost, and innovative solutions that make a significant impact on the market. This makes RivieraWaves an ideal partner for companies that deliver wireless connectivity IC for the mobile, medical, sports and fitness, watch, entertainment, metering, and industrial markets, as well as other wireless sensor-based applications.

The Challenge

Three years ago, RivieraWaves started using Open Verification Methodology (OVM) for its Bluetooth 4.0 designs. Responding to a competitive need to increase automation and produce highly differentiated low-power products in shorter time-to-market windows, the company decided to migrate to Universal Verification Methodology (UVM) for its next-generation Bluetooth 4.1 IP designs.

RivieraWaves needed a verification environment and solution that would keep pace with this migration and enable the company to get IP verified and integrated into Bluetooth devices much faster than previously possible.

Business Challenge

- Produce highly differentiated low-power Bluetooth 4.1 IP in aggressive timeframes

Design Challenges

- Migrate from OVM to UVM for next-generation Bluetooth 4.1 IP design verification
- Find bugs faster and sooner
- Effectively manage new, complex IP challenges
- Meet robustness goals while achieving new levels of efficiency

Cadence Solutions

- Incisive Enterprise Simulator
 - SimVision
 - Incisive Metric Center
- Incisive Enterprise Manager

Results

- Reduced the debug cycle in the overall verification project by 30%
- Accomplished higher levels of IP quality and robustness
- Quickly and easily migrated from OVM to UVM environment
- Achieved faster IP delivery to customers, enabling faster time to market
- Met efficiency goals

The Solution

RivieraWaves had already used Cadence® Incisive® verification technologies to verify its Bluetooth 4.0 IP designs, so it was a natural fit for the company to use Cadence solutions for its next-generation Bluetooth 4.1 verification requirements.

Specifically, the company relies on Cadence Incisive Enterprise Simulator, the SimVision unified debug analysis environment, and Cadence Incisive Enterprise Manager. The company also finds special value in the Cadence Low-Power Solution, leveraging the common power format (CPF) flow for low-power ICs, Incisive Metric Center, and the metric-driven verification methodology.

“We considered developing the Bluetooth 4.1 version of our IP designs to be a great opportunity to migrate to UVM and take advantage of the advanced integration of UVM in the Incisive platform,” says Benjamin Lauret, Senior Hardware Engineer, RivieraWaves. “UVM is still a new technology, and it’s great to see that the Incisive SimVision solution keeps getting better, with an increasingly tight integration to the library capabilities. For example, the SimVision UVM Register Visualization tool is amazing. We also really like the UVM toolbar, which allows more control over the simulation parameters.”

“SimVision and the Incisive Enterprise Simulator deliver the highest possible performance for our low-power IP designs,” Lauret adds. “This unified simulation and debug environment enables us to manage multiple simulation runs easily and to analyze both design and testbench behavior at any point in the verification process.”

Throughout RivieraWaves’ design and verification flows, SimVision provides source browsing with intelligent inline value annotation and multi-level macro expansion, transaction and mixed-signal waveform analysis, complete code/transaction/assertion analysis, and integrated display and debug of power behaviors. It also provides hardware analysis and lint checks, and seamless connections to downstream implementation flows.

Enterprise Simulator enables testbench automation, reuse, and analysis to verify designs from the system level, through register-transfer level (RTL), and to the gate level. It supports the metric-driven approach implemented by Enterprise Manager, and its native-compiled architecture speeds the simultaneous simulation of transaction-level, behavioral, low-power, RTL, and gate-level models.

Incisive Enterprise Manager accelerates RivieraWaves’ verification plan execution by automating time-consuming manual tasks at the block, chip, system, and project levels. With SystemVerilog and

e functional coverage capabilities, Enterprise Manager drives an advanced coverage-based verification and debug methodology so that RivieraWaves can reach verification closure quickly.

“Incisive Enterprise Manager automatically deploys simulation runs, analyzes data, debugs our design, and generates additional verification scenarios that increase our overall coverage,” Lauret explains.

“These Cadence Incisive solutions now handle all of our front-end simulation efforts,” Lauret says. “One key benefit was the ability to quickly port the wireless local area network (WLAN) testbench originally written for another simulator to the Incisive flow.”

The Results

Using Incisive verification offerings and migrating to an UVM environment enabled RivieraWaves to meet aggressive time-to-market goals by finding bugs faster than previously possible. It also helped the company meet its robustness and efficiency goals.

Bluetooth 4.X is a complex standard, and using the Cadence CPF flow enabled RivieraWaves to meet all its low-power requirements. With Cadence verification technologies, the company is able to bring advanced power management design to its customers. Using the CPF flow also helps RivieraWaves speed the integration of the design into customers’ chips.

Summary and Future Plans

Incisive verification solutions enabled RivieraWaves to easily migrate from OVM to UVM for its next-generation Bluetooth 4.1 IP designs. This enabled the company to increase automation and enable its customers’ time-to-market goals.

In the future, RivieraWaves plans to develop more functional coverage and virtual platform prototyping. Partnering with Cadence, the company has begun to evaluate Incisive Formal apps to bring more formal and assertion-based verification (ABV) tools and techniques into the automated process. RivieraWaves is also looking into Incisive Formal Verifier, which uses a formal, assertion-based approach and analysis capabilities to increase verification quality and speed RTL block verification.

“We’ve had great success using Cadence solutions, and Cadence has done a great job supporting us from day one,” Lauret says. “As a startup, we really appreciate and rely upon Cadence as part of our team and as an essential part of our success.”

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