

Synopsys and CCL/ITRI

CCL/ITRI Insources R&D to Help Create Opportunities for High-Tech Companies in Taiwan

The Computer and Communications Research Laboratories/Industrial Technology Research Institute (CCL/ITRI) develops new technologies for commercialization by high-tech companies in Taiwan. Strategically focused on broadband Internet and wireless communications, one of CCL's major initiatives is an innovative DSLAM (digital subscriber loop access multiplexor) system. When CCL needed telecommunications expertise for key elements of their DSLAM R&D project, CCL turned to Synopsys Professional Services for implementing two ATM queue managers in FPGA levels.

“The Synopsys team worked very hard. They focused on our project, delivered on time and made it work. We were impressed by their excellent communications and project management skills and their expertise in ATM design and RTL coding. We will continue to use Synopsys.” Eric Chen, CCL Department Manager, N200 Transmission Systems

Internet

Issues

- Insufficient specialized expertise in-house to meet strategic R&D schedule requirements
- Architectural flexibility, scalability, and long-term performance for CCL's Taiwanese industry customers
- Product development costs

Solution

- Synopsys Professional Services
- Architectural consulting, design services, implementation and debugging of two queue managers for DSLAM telecommunications equipment
- Synopsys VSS™, MemPro™, FPGA *Express*™, Telecom Workbench products

Benefits

- Highly competitive, low-cost chip architecture
- Faster completion of strategic R&D

Business

The Computer and Communications Research Laboratories (CCL) is a division of the Industrial Technology Research Institute (ITRI). ITRI, a 6000-person, non-profit R&D center, was established by the Ministry of Economic Affairs to support industrial growth in Taiwan.

“Synopsys knows the secret. They have engineering and telecom expertise and they also know how to manage a project. They made sure that everyone communicated quickly and clearly and they assigned and followed-up on action items. I could get a clear status report at any time and track every issue.” Eric Chen, CCL Department Manager, N200 Transmission Systems

time-to-

Technology diffusion—from government-sponsored R&D to the private sector—allows small companies to grow, and large companies to compete more effectively. In Taiwan, technology diffusion is the mission of the Industrial Technology Research Institute (ITRI), which develops technology that can be licensed to various industries and commercialized.

The Computer and Communications Research Laboratories (CCL), a division of ITRI, maintains a 1000-person workforce engaged in creating new technology. A key strategic focus for CCL is to enable the integration of computers, communications, and consumer electronics.

One of CCL's major initiatives is an innovative DSLAM (digital subscriber loop access multiplexor) system. The technology they develop for this initiative will be made available to companies seeking to deliver ADSL (asymmetric digital subscriber loop) data streams to end-users. Voice, data and video applications will then be available over the same line.

Two of these key components are queue managers to control ATM (asynchronous transfer mode) traffic. In order to develop these components, CCL needed highly specialized expertise. So, facing time-to-market pressures, CCL decided to seek help outside of its own agency.

System-Level Competence

One of CCL's biggest challenges was developing the system-level specifications for the project. Everything involved in developing the queue managers was clearly laid out: system-level options, tradeoffs to consider in the architecture phase, how to make the best use of Synopsys tools and techniques, implementation within the stringent requirements, and how to effectively verify the design using the available equipment.

CCL was able to avoid missteps because the Synopsys team had previously built similar types of systems. From experience, Synopsys was able to identify the features the system would need, and what interfaces would be required to other telecommunications chips. In short, CCL gained knowledge of how to make the best features come together at a system level. They also gained a clearly documented, repeatable process.

market

Implementation Expertise

Synopsys provided much of the actual design work for the queue managers. The Synopsys telecom design team was in direct touch with the CCL team and conducted extensive and effective discussions during the regular business day. Clear communication was paramount, especially since the contract was deliverables-based.

The Synopsys team traveled to Taiwan for periodic design reviews. The trips were an opportunity for hands-on training in Synopsys' tools and methodologies, and writing scripts. The CCL team learned various Synopsys' tools including VSS for logic simulation, MemPro for memory models, FPGA *Express* for synthesis and Telecom Workbenches for system verification.

Reusable Verification Environment

The Synopsys telecom design team brought their telecom expertise in defining the overall verification strategy. They built a comprehensive environment to ensure conformance of the design to the ATM standards. This greatly shortened the verification phase and provided CCL with a robust and reusable verification environment.

Conclusion

Now CCL has two queue managers on the floor. The architecture of the queue managers met their requirements for a modular, low-cost, highly competitive solution. In addition, CCL gained new knowledge and expertise, and is currently creating 64-port versions of the chips. CCL expects to release these versions for licensing to Taiwanese high-tech companies in the near future.

“Most of CCL is adopting Synopsys tools. They are like having a friend working together with you.” Eric Chen,
CCL Department Manager, N200
Transmission Systems

For more information on Synopsys Professional Services call your local Synopsys sales representative, or visit us on the Web at www.synopsys.com/psg

For information related to products, training or support services please visit us on the Web at www.synopsys.com. For sales assistance, please call 1.650.584.5000.

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