Cadabra Design Automation

"The layout synthesis company"

www.cadabradesign.com

Cadabra's Mission

Improve designer productivity and Quality-of-Results by providing automated layout creation tools & methodologies

Cadabra Timeline

1994 • Company founded

 Technology based upon 5 years of research in the area of layout synthesis

1995 • Texas Instruments becomes an early access customer

- First product shipment Lila™
- 1996 Major customers added in both U.S. and international markets

1997 ◆ CLASSIC-SC[™] introduced

- GDSII migration introduced
- **1998** Installed base quadruples

Cadabra in 1999

- \$6.25 Million in new financing secured
- New board and management
- 65 employees

Leading edge customer base

- 11 of top 15 semiconductor suppliers worldwide
- 3 largest PC microprocessor suppliers
- Leading 3rd-party library suppliers
- Leading system houses and COT companies

Technical Advisory Board

TAB Charter:"Provide technical direction that enablesCadabra to dominate the layout synthesismarket"

Prof. Kurt Keutzer Prof. Andrew Kahng Prof. Carl Sechen Dr. Martin Lefebvre Dr. David Marple Univ. of Berkeley UCLA Univ. of Washington Cadabra Cadabra

The Cadabra Value

Product Development Flow



For library development layout is in the critical path of creating cells
 For design optimization creation of libraries/cells is in critical path

Cadabra offers a powerful solution

The Library Factory from Cadabra



The Library Factory: Summary

Ability to explore architectures for process and designs

 Layout activity is no longer the bottleneck in the library development process

Library generation is fast while maintaining quality

Libraries are customized for applications and processes

Design Optimized Libraries



Design Optimization: Summary

 Ability to resize transistors to optimize for power or performance

 Layout is no longer a bottleneck in the product design process

 Size (no. of cells) of library is no longer a bottleneck in the design process

"Fluid Libraries" from Cadabra!



The Cadabra Value: Summary

 Cadabra offers tools & methodology that removes layout bottlenecks from design and development process

 Cadabra is driving towards design optimization utilizing transistor re-sizing and automatic layout creation

Cadabra's goal is to enable higher QoR for IC designs by providing better circuits automatically

The Cadabra Product CLASSIC - SC

CLASSIC-SC

Converts a SPICE netlist or existing GDSII into an optimized transistor level layout based upon your layout constraints



Cadabra Methodology

•**{**} **Transistor Netlist Placement tool supports** heavily folded transistors as Placement well as stacked placements. **User-controllable router** Routing supports 45° routing. **Intelligent 2-dimensional** Compaction compactor accurately handles 45° routing and gate bends, asymmetrical contacts and **Final Layout** hammerhead gate extensions.

Phase 1 - Explore

Architectural trade-off analysis

- Cell height matched to performance target
- Power busing structure
- Substrate and well ties
- Explore the impact of design rule variations



High Performance

Find the Best Architecture for Your Design Needs

Phase 2 - Create

Support for advanced layout techniques

- 45° gate bends and routing
- Stacked placement
- Asymmetrical contacts and gate extensions
- Fast and intelligent 2-D compactor





 Cloning boosts productivity by reusing portions of layouts to create cell variants



Rapidly Create the Highest Quality Layouts

Phase 3 - Migrate



Easily Migrate the Cells to Different Processes

CLASSIC-SC: Summary

Foundation technology for Cadabra's future plans
Robust product that is already in its second release
Extensive in-field use by diverse set of customers
New release planned for Q4 1999

The Best Quality

"We decided to use CLASSIC-SC so we didn't have to purchase a new library every time our foundry changed it's design rules.

We've been able to reduce typical cell sizes compared to off-the-shelf libraries, and have seen select cells more than 20% smaller."

Raj Verma Manager of IC Development ATI Technologies

The Best Architecture

"... we need to quickly design fully characterized libraries for various deep submicron processes, while maintaining handcrafted cell density, high performance and low power. The advanced features of Cadabra's CLASSIC-SC enable us to rapidly evaluate design tradeoffs, helping us build the best libraries possible."

Al Aronoff VP and GM of Silicon Library Group Synopsys

Productivity

"It used to take me a month and a half to do a library this size by hand. After just a little experience with the Cadabra tools, I was able to reduce my work time to about two weeks."

Dan Xie Layout Engineer NeoMagic