



Lucent Perspectives on SoC Testing

**Sudipta Bhawmik, Rajagopalan Srinivasan,
Tapan J Chakraborty**

Test and Reliability Center of Excellence

Bell Laboratories, Lucent Technologies

Princeton, N.J. 08542

Lucent SoC Design Trends

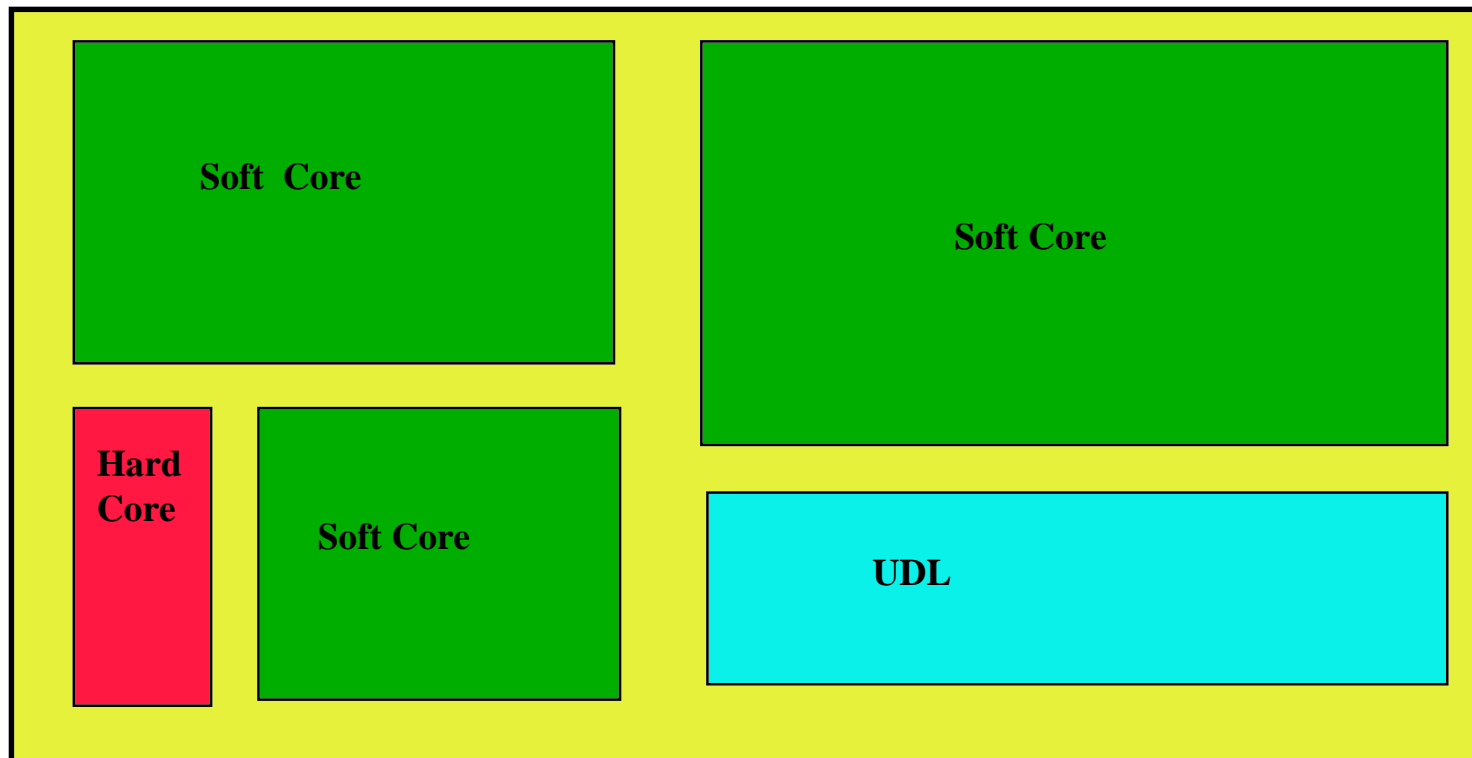
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- Design Reuse
 - Internal IP : Today's ASIC (or part) is tomorrow's core
 - External IP : Reduce design interval, optimize resources
- Synthesizable Soft Cores
 - Flexibility, Reconfigurability and Customizability
 - Portability : ASIC vendor decision can wait
 - Reusability
- Test Reuse
 - Leverage on testability investment



Increased Usage of Soft Cores





- ISD Magazine Survey (1997): What type of cores do you plan to use in your next design?
Hard core : 40%
Firm core: 32%
Soft core : 68%
- Silicon Intellectual Property (IP) Market Issues Survey Results (1998)
What Level of IP do you use?
Standard cell library : 56%
Memory Compiler : 46%
Soft IP cores : 42%
Hard IP cores : 28%

Industry Trends



- Bus Interface Cores: 29 IP companies delivering 94 cores

Soft cores : 88%

Firm cores : 43%

Hard cores : 13%

(Silicon Strategies, April 1998)

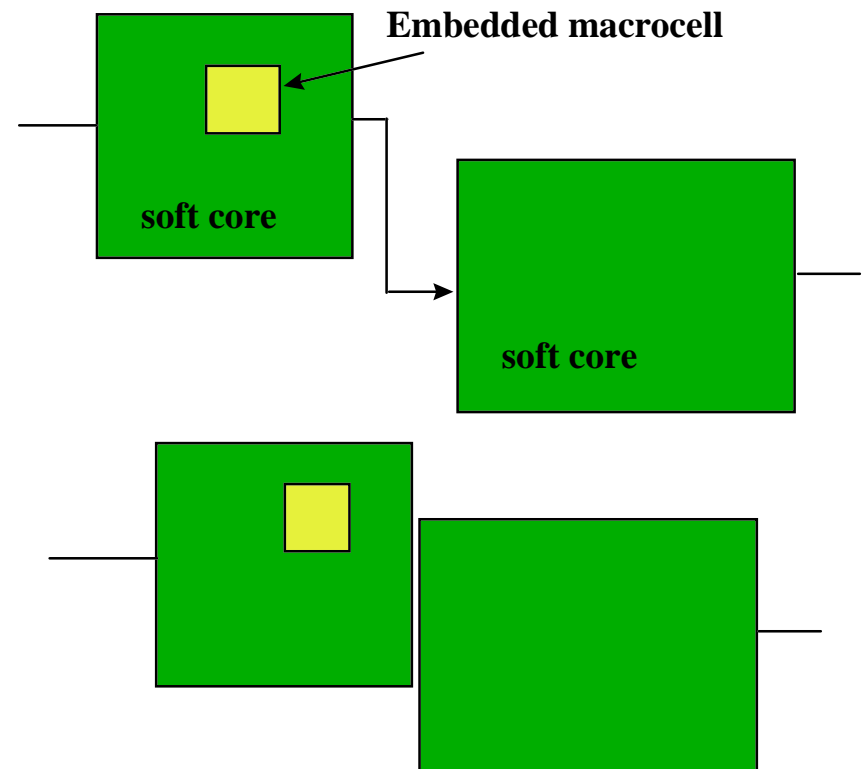
- Of 197 soft cores (<http://www.isdmag.com/Eedesign/SoftCoretables.html>)

Encrypted cores : 10%

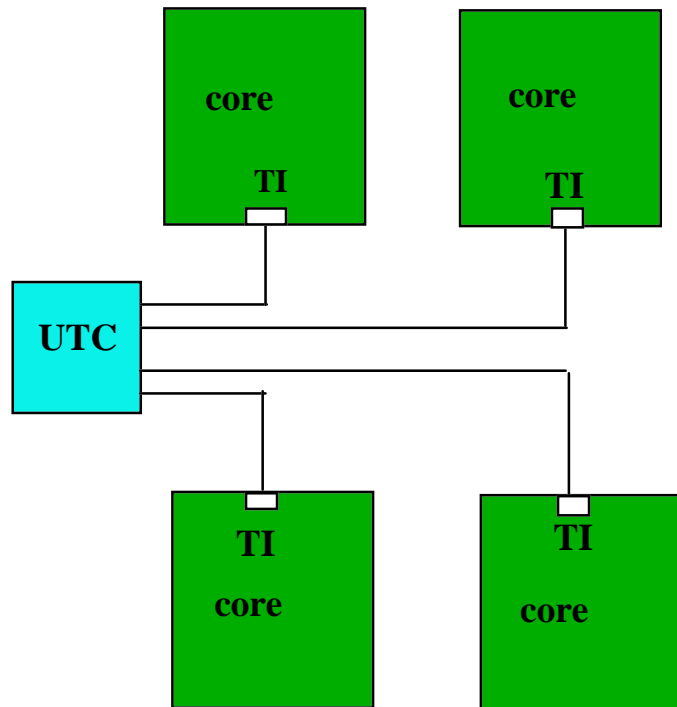
Lucent SoC Test Perspective



- Soft cores are too large to merge for testability
- Treat soft cores as “non-mergeable” with identical test access problems
 - Test complexity
 - Test reuse
 - Minimize effects of design change
- Each core to have its own built-in test solution
- Move towards reconfigurable RTL test solution



Lucent SoC Test Perspective



- Easy test integration
- Simple and uniform Test Interface
- UTC to schedule test invocation and interface to external world
- UTC - parameterizable and reconfigurable soft core
- Legacy cores tested using proprietary access methods

UTC: Universal Test Controller

TI : Test Interface

Lucent Perspective on SoC Test Standard

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- Standard must consider “mergeable” or soft cores.
- Test access mechanism must be simple and easy to integrate.
- Too much flexibility may defeat the purpose.
- Trying to satisfy heterogenous test strategies on an SoC will be too expensive to implement and will result in non-compliance.
- Core developers must be responsible for core testability.
- Core based design methodology is still not mature. Look ahead into the future before standardizing any method.
- Let legacy cores not be the key driver for the standard.