IBM Design Technology Framework

A Tightly Integrated Hierarchical System Approach to Design Automation

Design (Construction) Tools
- System level design
  - SOC (core-based)
- Logical and physical design
  - Design planning
  - Synthesis (high-level, logic, and physical)
  - Circuit/transistor timing
- Custom layout (physical design) and optimization
- Manufacturing and product engineering
  - Yield, reliability, failure analysis
- Data languages

Design Verification Tools
- Fractional verification
- Test generation
- Symbolic model-checking
- Functional equivalence checking
- Timing verification
- Technology checking
- Data languages

Design Analysis Tools
- Electrical
  - Electromigration
  - Signal integrity
  - Chip/package noise and power
  - Mixed-signal noise
- Manufacturability
  - Yield calculations
  - Three-sigma process variations
  - Interconnect materials optimization
- Design quality – Just-in-Time (JIT) design factory
- Power
  - Leakage/standby
  - Functional
  - SoC optimization
- Design productivity
  - Design execution performance
- Product life cycle
  - Product engineering support (yield, reliability, failure analysis)

Design Styles:
- Custom
- Semicustom
- Automated

Used to build, verify, and analyze:
- Entire computing systems (hardware and software)
- Multi-processor subsystems (chips and modules)
- Microprocessors (chips and modules)
- ASIC/SoC chips
- Interconnect hardware (package, card, board)

Deployed by IBM Technology Group partners of the IBM Research Division
- E&TS Division (on-demand services delivery)
- Microelectronics Division (chip design factory silicon foundry, EDA tooling)

Estimated Access to IBM EDA Technology (Percent of IBM Tools)

IBM Mainstreet Customers and Partners, Under 5%
IBM Internal Use Only, Over 75%
IBM Deep Engagement Customers, 20% Range (function of engagement “depth”)

Design Framework Tools
- Chip design system specific

Home grown in IBM Research Division
Primary centers in Yorktown (NY), Austin (TX), and Haifa (Israel)

Source: 2004 Chip Design Factory™ Study

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