SYNOPSYS®
Silicon to Software™

Core Optimization Services

Highlights

▸ Experienced engineers optimize leading-edge core implementations for performance, power and area

▸ Jumpstart your implementation team with best practices and new methodologies

Compete Effectively With a Processor Core That's Tailored for Your Application

Reminiscent of the "MHz wars" in the PC industry, performance often headlines product announcements. But, designers rarely have the luxury of pursuing speed at all costs. Consumer and mobile device users care about battery life and product cost. Even developers of teraflop-class servers must consider how energy consumption impacts power supplies, reliability and cooling costs. Processor cores (i.e., CPUs and GPUs) are some of the most critical IP blocks in most SoC designs.

Achieving the best performance, power and area (PPA) for processor cores is both a science and an art. A variety of interrelated factors affect the achievable performance, power and area of a processor implemented in a SoC. The number of processor cores, the size and organization of cache memories, the underlying silicon process and the range of operating conditions are some of the more common parameters that effect a core's performance, power and area. The standard cells and embedded memories used to implement the core also have a significant impact on the PPA results that can be achieved and the time it takes to attain them. Other factors, such as test and debug features, power control circuits, clock noise and on-chip variation, also play important roles. Of course, getting from "baseline" results to "expert" results in the fastest timeframe possible often means the difference between product success and failure.
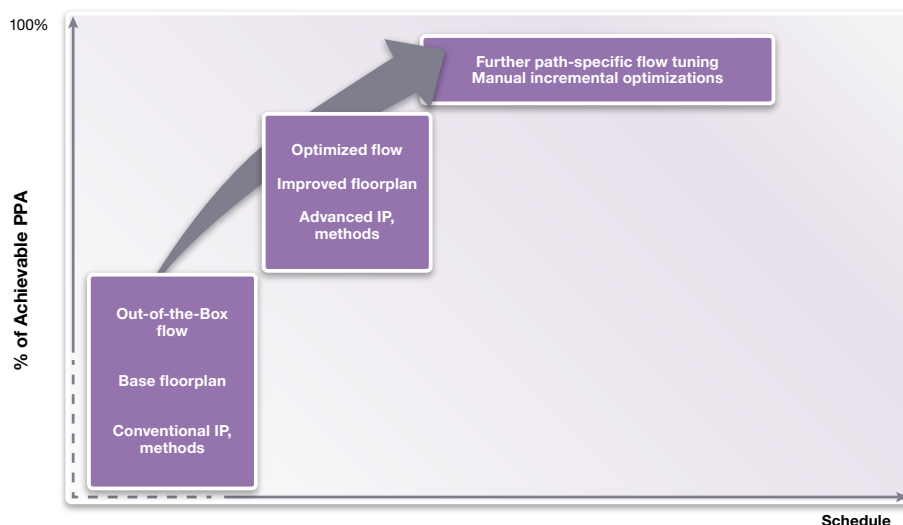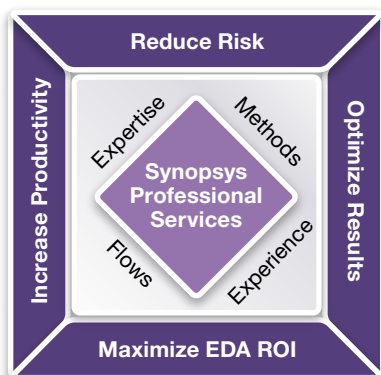

Figure 1: Optimized results require specialized expertise

As Figure 1 illustrates, for complex designs, conventional flows and design techniques only get you part way to the best possible PPA. Maximum PPA results are achieved with optimized flows, deep tool expertise and design-specific implementation experience.

Synopsys Professional Services has extensive experience helping designers optimize their CPU and GPU cores for performance, power and area. Leveraging leading-edge tools from the Galaxy™ Design Platform, optimized core hardening scripts, extensive experience with processor-optimized logic libraries and memories such as the DesignWare® HPC Design Kit and the Lynx Design System, Synopsys core optimization specialists are uniquely qualified to help customers realize their specific processor PPA goals in the shortest amount of time. As part of a broader portfolio of core hardening services, Synopsys' FastOpt services can help design teams achieve a CPU or GPU core implementation in as little as four to six weeks.

Specialized Core Optimization Services

Synopsys' services include assistance with:

▶ Determining design feasibility and performance estimates

▶ Core configuration and cache partitioning

▶ Creating an optimal floorplan, including alignment of cache memories

▶ Addressing test, clock and physical effects early in synthesis

▶ Managing dynamic and leakage power

▶ Choosing the best clocking scheme to minimize power and skew

▶ Timing-optimized placement and critical path optimization

▶ Deploying core hardening flows/scripts, methodologies and best practices

▶ Knowledge transfer from consultants with extensive experience implementing CPU and GPU cores from leading processor IP companies such as ARM® and Imagination Technologies™

▶ FastOpt, EnhanceOpt and MaxOpt service packages

Find more information about factors impacting the optimization of processor cores; see the white paper Reality Check: A Guide to Understanding Optimized Processor Cores. To get more information on how we can customize our services for you, please contact Synopsys Professional Services or call your local sales representative.

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