

## Electronic System Level (ESL) Market Trends 2016 Bump in the Road for ESL Growth

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#### 2016 MARKET SHARE SUMMARY

Just a year ago, it seemed that the electronic system level (**ESL**) market was hitting its stride at long last, following a prolonged period during which growth seemed like it was always right around the corner. Regrettably, growth of the ESL market in 2015 was far below that of the CAE market as a whole or the growth of the total EDA market. But that isn't quite the full picture. Most segments of the ESL market actually grew at a much higher-than-average rate. Transaction-based acceleration and emulation was dragged down by Mentor Graphics. The sheer size of this market segment as a percentage of ESL had an outsized impact on the ESL numbers. Barring the unusually poor ESL numbers for Mentor, which we expect to be a one-off phenomenon, the ESL market actually did quite well during 2015.

The register transfer level (**RTL**) tools market turned in decent growth in 2015, although it is important to note that this figure is much greater than what we have typically reported. Starting with our 2014 market data, we added a new sub-application in RTL – intellectual property (IP), which significantly increases the overall size of the RTL market by about one-third. Over the past six years, the RTL-and-Below market has been continually growing, though always in the single digits. It is clear from our numbers that users have continued to put steady investment into RTL and gate-level tools for the past six years, but no more than that.

Growth of **IC CAD** tools was quite respectable. After a decade of successful mergers, collaborations and acquisitions within the EDA, semiconductor, and systems industries, new IC CAD techniques for processing silicon and related materials into faster and more functional solid-state circuits are being consistently introduced to the market. At advanced nodes, it is clear that the current design-then-fix approach is not adequate to address next generation circuits. They instead necessitate high-performing CAD/CAM tools. In fact, rapid advancement on the manufacturing technology front may force EDA vendors to step up their game and accelerate innovation for IC CAD/CAM design tools.

During the last two years, collaborative agreements, mergers and acquisitions of tools and engineering power expanded the printed circuit board (**PCB**) tools landscape. Most notable was the Siemens acquisition of Mentor Graphics for \$4.5 billion in cash. Being a broad-line EDA vendor, Mentor's products span all three major EDA segments of CAE, IC CAD, and PCB. However, the most immediate tie-in with the Siemens design tools portfolio is via Mentor's thermal analysis, computational fluid dynamics (CFD) and cable and wire harness tools that have direct crossover with mechanical CAX tools. (CAX includes the full spectrum of mechanical design tools--CAD, CAM, CAE and PLM Product Lifecycle Management). Customers are clamoring for products that deliver high-speed design capabilities addressing enhanced productivity and time-to-market challenges with an increased need for integrated solutions for the next areas of semiconductor and systems growth. PCB tools saw a pullback in customer spending in 2015.

## Slicing and Dicing Market Statistics Data

Like so many technology industries, EDA is perpetually facing new technical and business challenges. Between progressing to an era of System Level Design and contending with the world of Internet of Things (IoT) designs, we need to look at the market, and therefore the numbers, from other perspectives. Design methodologies and business requirements are often developed within vertical industry markets. There is no single, overarching systems market for all types of end products; fighter jets and cell phone have vastly different design challenges, after all. Therefore, it makes sense to present Market Trends data in an alternate way also, to correspond to this vertical industry approach.

These types of second-cut data reports are usually created on an on-demand basis. With frequent demand, though, a second-cut report may become standard report. The Analog Market Trends report is a prime example of this. As the system level design methodology begins to take shape, we may extend our reporting into multiple industry reports, depending on demand.

## INTRODUCTION

The Electronic System Level encompasses tools used to concurrently design hardware and software. These tools are involved in the architecting and partitioning of high-level designs very early in the design flow. At this stage of design, the behavioral and algorithmic description of the design is formulated and refined. Growth of the ESL market in 2015 was a rather disheartening 1.2 percent overall, but this was almost entirely due to the impact of Mentor Graphics' drop in ESL revenue. All the other primary vendors in the ESL space grew at very healthy rates. We continue to anticipate robust growth for ESL in the coming years. The five-year compound annual growth rate (CAGR) for the ESL market is projected to reach 10.2 percent through 2020.

## OVERVIEW

This report comprises the ESL section of the EDA Market Trends. ESL, RTL and gate-level tools, along with miscellaneous tools (e.g., interoperability tools and design libraries), make up the CAE market for EDA tools. In this report we will discuss market share, trends, and forecasts for the ESL sub-applications that are most significant in the overall EDA landscape. Readers should note that we classify design tools at their highest level of use.

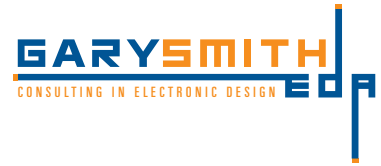
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