***Reference number 12***

***“Are we there yet? A*** ***study on the state of high level synthesis”***

*Summary:*

* HLS is currently a viable option for fast prototyping and for designs with short time to market.
* The Quality of Result of RTL flow is still better than that of the state-of-the-art HLS tools. However, the average development time with HLS tools is only a third of that of the RTL flow, and a designer obtains over four times as high productivity with HLS.
* In HLS, the application is described on a behavioral level, omitting implementation details. This leads to solution of performance bottleneck in RTL.
* These (implementation) details are determined using an HLS tool that takes the behavioral description as an input. The designer can select the target technology in the tool and map the interface and memory variables to specified technology-dependent elements. The HLS tool then produces an RTL description based on the target technology and micro architectural choices.
* The microarchitecture can be explored by making choices in the HLS tool, which require little or no modifications to the code.
* HLS is accessible to software engineers. HLS tools usually use familiar languages such as C/C++. The HLS tool can take care of most of the hardware specific implementation details, so the threshold of software engineers to tackle hardware projects is greatly reduced.
* HLS is accessible to software engineers. Whereas RTL design requires knowledge of languages such as VHDL and Verilog, HLS tools usually use familiar languages such as C/C++. The HLS tool can take care of most of the hardware specific implementation details, so the threshold of software engineers to tackle hardware projects is greatly reduced.
* Vivado HLS (formerly known as Autopilot) is the most popular HLS tool. All the other tools gain only scattered usage. Vivado’s popularity is probably due to Xilinx being the leading FPGA vendor.
* RTL is time consuming, required more planning, and would have been harder to redesign.
* The size of the HLS input code was almost halved, being 52% of the RTL code size on average