Comparison of Quartus Software with Xilinx Alliance Series Version 2.1i Software

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Introduction

With many new features and an emphasis on advanced technology, the Altera® Quartus™ software represents a revolution in programmable logic development tools. The Quartus software—Altera's fourth-generation development system for programmable logic—incorporates state-of-the-art features to shorten design cycles. Recently, Xilinx announced their new Alliance Series version 2.1i software, which offers additional design capabilities for their Virtex field-programmable gate arrays (FPGAs). This technical brief compares the Altera Quartus software to the Xilinx Alliance Series version 2.1i software.

Features

The Quartus software offers many features, including:

- Advanced integration with third-party EDA tools
- SignalTap™ embedded logic analysis solution
- Intellectual property (IP) support
- Workgroup computing
- Internet integration

Advanced Integration with Third-Party EDA Tools

The Quartus software features NativeLink™ integration, which facilitates the seamless transfer of information between the Quartus software and third-party EDA tools. Third-party EDA synthesis tools have an unprecedented level of control over the final implementation of designs by mapping directly to APEX™ logic elements (LEs), allowing the Quartus software to simply route the optimized design. This feature allows third-party EDA tools to offer more accurate area and timing estimates to designers, and enables the Quartus software to take full advantage of the third-party EDA tool's optimization of the original design.

In contrast, designs targeting Xilinx devices require third-party synthesis tools to translate the source code into a standard EDIF netlist gate representation which may include applicable Xilinx macrofunctions for selected common functions. Xilinx tools then must perform an additional level of synthesis to prepare the design for mapping into a device. Third-party EDA synthesis tools also do not possess any level of control over mapping the final design. Because the Xilinx tools re-synthesize the netlist, the optimization performed by the third-party EDA tool (e.g., logic duplication or netlist changes) may be negated, making third-party EDA design flows with Xilinx tools inefficient.

SignalTap Embedded Logic Analysis Solution

The SignalTap logic analyzer, which is integrated into the Quartus software, allows designers to perform hardware debugging and verification on a device running at actual system speeds. Internal nodes and device pins can be assigned for capture using the Node Finder in the Quartus software. Designers can specify a single "trigger pattern" that tells the embedded logic analyzer when to begin capturing internal signals. Once triggered, the acquired data is automatically transferred from the APEX device and displayed in the Quartus Waveform Editor.

Xilinx does not currently offer any similar hardware debugging capabilities in the Alliance Series version 2.1i software.

Intellectual Property Support

The Quartus software supports the Altera OpenCore™ program, which allows designers to evaluate all Altera MegaCore™ functions and selected third-party megafunctions (available directly from Altera Megafunction Partners Program (AMPP℠) vendors) for free. Although this feature has been promised to Xilinx customers for over a year, Xilinx does not currently offer free evaluation of their megafunctions.

Workgroup Computing

Standard revision control software programs such as RCS, PVCS, and SCCS work seamlessly with the Quartus software. Designers using an existing third-party revision control software program can also write custom scripts in tool command language (Tcl), C++, or Visual Basic to integrate the Quartus software with any custom revision control software.

Designers cannot use Xilinx tools together with standard revision control software programs. Instead, Xilinx offers a proprietary web-based revision control system named Internet Team Design (ITD), which must be purchased separately.

Internet Integration

The Quartus software integrates with Microsoft's Internet Explorer to provide customers with direct access to Altera's on-line database. In this way, Altera offers customers access to the most up-to-date information in the form of help files, solutions, and software updates. The Quartus software even provides proactive notification when software updates are available for download. Designers can also submit service requests to Altera Applications and register their software over the Internet from within the Quartus user interface. A copy of Internet Explorer is included with the Quartus software. In contrast, Xilinx tools do not offer direct internet connectivity.

Conclusion

The Quartus software gives designers the advanced features and flexibility necessary for multi-million-gate designs. Although both the Quartus and Alliance Series version 2.1i software programs allow users to design for their respective devices, the Quartus software clearly provides more flexibility with features such as NativeLink integration, the SignalTap embedded logic analyzer, and OpenCore evaluation.

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