



# Intel<sup>®</sup> High Level Synthesis Compiler

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## Release Notes

Updated for Intel<sup>®</sup> Quartus<sup>®</sup> Prime Design Suite: **18.0**



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**RN-1146 | 2018.05.07**

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## 1. Intel® High Level Synthesis Compiler Release Notes

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The *Intel® High Level Synthesis Compiler Release Notes* provide late-breaking information about the Intel High Level Synthesis Compiler included with Intel Quartus® Prime Design Suite Version 18.0.

### 1.1. New Features and Enhancements

The Intel High Level Synthesis Compiler included with Intel Quartus Prime Design Software Version 18.0 includes the following new features:

- Starting with Intel Quartus Prime Version 18.0, the features and devices supported by the Intel HLS Compiler depend on what edition of Intel Quartus Prime you have. Intel HLS Compiler publications now use icons to indicate content and features that apply only to a specific edition as follows:

**PRO** Indicates that a feature or content applies only to the Intel HLS Compiler provided with Intel Quartus Prime Pro Edition.

**STD** Indicates that a feature or content applies only to the Intel HLS Compiler provided with Intel Quartus Prime Standard Edition.

- **PRO** Compilations that target Intel Stratix® 10 devices (`-march=Stratix10`) now take advantage of the following Intel Stratix 10 specific compiler optimizations and reporting:
  - Fast Loop Orchestration
  - HyperFlex Control Optimizations
  - Reset Minimization
- **PRO** Intel HLS Compiler now includes templated libraries to help speed the development of your component by providing you with FPGA-optimized code for some commonly used code. The following Intel HLS Compiler libraries were added in Version 18.0:
  - Random Number Generator Library
  - Matrix Multiplication Library



- **PRO** Added new stream interface declarations:
  - `ihc::useempty`  
Use this declaration when your stream packets have more than one data symbol per clock cycle. This declaration indicates the number of symbols at the end of a packet cycle that do not represent valid data.
  - `ihc::firstSymbolInHighOrderBits`  
Use this declaration to indicate if the data symbols in your stream are in big endian order or little endian order. The default is little endian order.
- Added the following new tutorials:
  - **PRO** `best_practices/ac_datatypes`
  - **PRO** `best_practices/loop_coalesce`
  - **PRO** `best_practices/random_number_generator`
  - **PRO** `interfaces/explicit_streams_packets_empty`
  - **PRO** `interfaces/explicit_streams_ready_latency`
  - `interfaces/overview`
- **PRO** Renamed tutorials to reflect the renamed Intel Quartus Prime components:
  - `usability/qsys_2xclock` is now `usability/platform_designer_2xclock`
  - `usability/qsys_stitching` is now `usability/platform_designer_stitching`

## 1.2. Intel High Level Synthesis Compiler Prerequisites

The Intel HLS Compiler is installed as part of the Intel Quartus Prime software installation, but it requires additional software to use.

For detailed instructions about installing Intel Quartus Prime software, including system requirements, prerequisites, and licensing requirements, see [Intel FPGA Software Installation and Licensing](#).

The Intel HLS Compiler requires the following additional software:

### C++ Compiler

For Linux, install the GCC compiler and C++ Libraries version 4.4.7. These libraries are included in the version of Linux supported by the Intel HLS Compiler.

**Important:** The Intel HLS Compiler software does not support newer versions of the GCC compiler.

For Windows, install Microsoft Visual Studio 2010 Professional.

**Important:** The Intel HLS Compiler software does not support newer versions of Microsoft Visual Studio.



### Mentor Graphics\* ModelSim\* Software

You can install the ModelSim\* software from the Intel Quartus Prime software installer. The available options are:

- ModelSim - Intel FPGA Edition
- ModelSim - Intel FPGA Starter Edition

Alternatively, you can use your own licensed version of Mentor Graphics\* ModelSim software.

On Linux systems, ModelSim software requires the Red Hat development tools packages. Additionally, any 32-bit versions of ModelSim software (including those provided with Intel Quartus Prime) require additional 32-bit libraries. The commands to install these requirements are provided in [Installing the Intel HLS Compiler on Linux Systems](#).

For information about all the ModelSim software versions that the Intel software supports, refer to the *EDA Interface Information* section in the Software and Device Support Release Notes for your edition of Intel Quartus Prime

### Related Information

- [Intel High Level Synthesis Compiler Getting Started Guide](#)
- [Supported Operating Systems](#)
- [Software Requirements](#)  
in *Intel FPGA Software Installation and Licensing*
- [EDA Interface Information](#)  
in *Intel Quartus Prime Standard Edition Software and Device Support Release Notes*
- [EDA Interface Information](#)  
in *Intel Quartus Prime Pro Edition Software and Device Support Release Notes*
- [Mentor Graphics Website](#)

## 1.3. Known Issues and Workarounds

This section provides information about known issues that affect the Intel High Level Synthesis Compiler Version 18.0.

Description	Workaround
(Windows only) Compiling a design in a directory with a long path name can result in compile failures.	Compile the design in a directory with a short path name.
(Windows only) A long path for your Intel Quartus Prime installation directory can prevent you from successfully compiling and running the Intel HLS Compiler tutorials and example designs.	Move the tutorials and examples to a short path name before trying to run them.
(Windows only) Pragmas used in templated code are not recognized.	Manually specialize the templated code.
(Windows only) C++ libraries are not supported.	Use C libraries where possible. For example, use <code>printf</code> instead of <code>cout</code> .
<i>continued...</i>	



Description	Workaround
<p>(Windows only) When you compile your component, the compiler might issue the following warning:</p> <pre data-bbox="256 373 799 420">warning LNK4088: image being generated due to /FORCE option; image may not run</pre>	<p>Ignore this warning. The executable is expected to work correctly.</p>

## 1.4. Document Revision History for Intel HLS Compiler Version 18.0 Release Notes

Document Version	Intel Quartus Prime Version	Changes
2018.05.07	18.0	<ul style="list-style-type: none"><li>Initial release.</li></ul>