Intel® Parallel Studio XE 2016 Composer Edition Update 2 for OS X* Installation Guide and Release Notes

25 January 2016

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1 Introduction

This document describes how to install the product, provides a summary of new and changed features and includes notes about features and problems not described in the product documentation. For the most current update to these release notes, see the release notes posted at the Intel® Software Development Products Registration Center where you downloaded this product.

Additional release notes for each component, with details of changes and additional technical information, can be found online and are linked below. First-time users should view the Getting Started page that is displayed at the end of product installation.

The default top-level installation folder is `/opt/intel`.

Features may be documented as deprecated. This means they are still supported in this release but may be removed in future releases.

Due to the nature of this comprehensive integrated software development tools solution, different Intel® Parallel Studio XE components may be covered by different licenses. Please see the licenses included in the distribution as well as the Disclaimer and Legal Information section of these release notes for details.

1.1 What's New

This section highlights important changes from the previous product version. For more information on what is new in each component, please read the individual component release notes. The latest documentation for all components can be found at https://software.intel.com/en-us/intel-parallel-studio-xe-support/documentation

Changes since Intel® Parallel Studio XE 2016 Update 1

- All components updated to current versions
- Documentation updates
- Intel® compiler support for new features in OpenMP* API Specification 4.5
- Intel® SIMD Data Layout Templates (Intel® SDLT)
- Fixes for reported problems
- Support for Xcode* 7.2

Changes since Intel® Parallel Studio XE 2016

- All components updated to current versions
- Documentation updates
- Intel® compiler support for new features in OpenMP* 4.1 draft version TR3 [1]
- Fixes for reported problems
- Support for OS X* 10.11

[1] *subjected to be changed and improved for standard conformance with respect to the official version of the OpenMP* 4.5 specification (expected to be released in November 2015)*

- Support for Xcode* 7.0, 7.1

Changes since Intel® Parallel Studio XE 2015:

- All components updated to current versions
- Intel® Data Analytics Acceleration Library (Intel® DAAL)
- Intel® compiler support for additional OpenMP* 4.0 features
- Documentation updates
- Licensing changes will require updated license for renewals
- Directory layout and name change

1.2 Product Contents

*Intel® Parallel Studio XE 2016 Composer Edition Update 2 for OS X** includes the following components:

The table below lists the product components and related documentation.

Component	Version	On-Disk Documentation	Release Notes
Intel® C++ Compiler	16.0.2	documentation_2016/en/ps2016/get_started_mc.htm	http://intel.ly/1Mai0Nh
Intel® Fortran Compiler	16.0.2	documentation_2016/en/ps2016/get_started_mf.htm	http://intel.ly/1Mai0Nh
Intel® Integrated Performance Primitives (Intel® IPP)	9.0 update 2	• documentation_2016/en/ipp/ps2016/get_started.htm • Obtain the cryptography package	http://intel.ly/1Mai0Nh
Intel® Math Kernel Library (Intel® MKL)	11.3 update 2	• documentation_2016/en/mkl/ps2016/get_started.htm • Attributions	http://intel.ly/1Mai0Nh
Intel® Threading Building Blocks (Intel® TBB)	4.4 update 3	documentation_2016/en/tbb/ps2016/get_started.html	http://intel.ly/1Mai0Nh
Intel® Data Analytics Acceleration Library (Intel® DAAL)	2016 update 2	documentation_2016/en/daal/ps2016/get_started.html	http://intel.ly/1Mai0Nh
GNU*	7.8	documentation_2016/en/debugger/ps2016/gdb.pdf	http://intel.ly/1Mai0Nh

Project Debugger (GDB*) (GPL licensed)			
Integration into the Xcode* development environment		• C++: documentation_2016/en/ps2016/get_started_mc.htm • Fortran: documentation_2016/en/ps2016/get_started_mf.htm	http://intel.ly/1Mai0Nh

1.3 Additional Information for Intel-provided Debug Solutions

The Intel-provided Debug solutions are based on GNU* GDB. Please see https://software.intel.com/en-us/articles/intel-parallel-studio-xe-2016-composer-edition-fortran-debug-solutions-release-notes and https://software.intel.com/en-us/articles/intel-parallel-studio-xe-2016-composer-edition-c-debug-solutions-release-notes for information specific to this component.

1.4 System Requirements

For an explanation of architecture names, see http://intel.ly/q9JVjE

- A 64-bit Intel®-based Apple* Mac* system host (development for 32-bit is still supported)
- 2GB RAM minimum, 4GB RAM recommended
- 3GB free disk space
- One of the following combinations of OS X*, Xcode* and the Xcode SDK:
  - Xcode* 6.0, 6.1, 6.2, 6.3, 6.4, 7.0, 7.1, or 7.2
  - OS X* 10.10, 10.11, 10.11.1
  - If you will be installing on OS X* 10.11, please see Installation on OS X* 10.11.
- If doing command line development, the Command Line Tools component of Xcode* is required

Note: Advanced optimization options or very large programs may require additional resources such as memory or disk space.

1.5 Documentation

Product documentation can be found in the `documentation_2016` folder as shown under Installation Folders.

Optimization Notice

Intel's compilers may or may not optimize to the same degree for non-Intel microprocessors for optimizations that are not unique to Intel microprocessors. These optimizations include SSE2, SSE3, and SSSE3 instruction sets and other optimizations. Intel does not guarantee the availability, functionality, or effectiveness of any optimization on microprocessors not manufactured by Intel. Microprocessor-dependent optimizations in this product are intended for use with Intel microprocessors. Certain optimizations not specific to Intel microarchitecture are reserved for Intel microprocessors. Please refer to the applicable product User and Reference Guides for more information regarding the specific instruction sets covered by this notice.

Notice revision #20110804

1.6 Samples

Samples for each product component can be found in the `samples_2016` folder as shown under Installation Folders.

1.7 Technical Support

If you did not register your compiler during installation, please do so at the Intel® Software Development Products Registration Center at http://registrationcenter.intel.com. Registration entitles you to free technical support, product updates and upgrades for the duration of the support term.

For information about how to find Technical Support, Product Updates, User Forums, FAQs, tips and tricks, and other support information, please visit http://www.intel.com/software/products/support/

Note: If your distributor provides technical support for this product, please contact them for support rather than Intel.

1.7.1 Submitting Issues

To submit an issue via the Intel® Premier Support website, please perform the following steps:

1. Ensure that Java* and JavaScript* are enabled in your browser.
2. Go to https://premier.intel.com/.
3. Type in your Login and Password. Both are case-sensitive.
4. Accept the "Confidentiality Statement" if prompted. You will only have to do this the first time you log in.
5. Click the "Submit Issue" button in the upper right corner.
6. Search for a product (e.g. "Intel® Fortran Compiler for Linux*") and select from the dynamic drop-down list. Hit Next.
7. Complete the fields and enter a description of your issue. You may attach a log file or a reproducer at this time. Hit Next.
8. Review the text you have entered and hit Submit.

Follow these guidelines when forming your problem report or product suggestion:

1. Describe your difficulty or suggestion. For problem reports, please be as specific as possible (for example, including compiler and link command-line options), so that we may reproduce the problem. Please include a small test case if possible.
2. Describe your system configuration information. Be sure to include specific information that may be applicable to your setup: operating system, name and version number of the installed applications, and anything else that may be relevant to helping us address your concern.

2 Installation Notes

The installation of the product requires a valid license file or serial number. If you are evaluating the product, you can also choose the "Evaluate this product (no serial number required)" option during installation.

If you will be using Xcode*, please make sure that a supported version of Xcode is installed. If you install a new version of Xcode in the future, you must reinstall the Intel Parallel Studio XE 2016 afterwards.

The Command Line Tools component, required for command-line development, is not installed by default. It can be installed using the Components tab of the Downloads preferences panel.

You will need to have administrative or "sudo" privileges to install, change or uninstall the product.

Follow the prompts to complete installation.

Note that there are several different downloadable files available, each providing different combinations of components. Please read the download web page carefully to determine which file is appropriate for you.

You do not need to uninstall previous versions or updates before installing a newer version – the new version will coexist with the older versions.

2.1 Installation on OS X* 10.11

OS X* 10.11 introduces a new security policy called System Integrity Protection. This significantly impacts certain installation scenarios. Please see OS X* 10.11 Support in Intel® Parallel Studio XE 2016 for important information before attempting to install on OS X* 10.11.

2.2 License Changes

The 'named-user' license provisions in the Intel software EULA (available as 'EULA.rtf' or 'EULA.txt' in the same product directory as this release note) changed to only allow the software to be installed on up to three systems. During the Intel® Parallel Studio XE 2016 program, product licensing will be updated to check for this when it checks for valid licenses, and it will track systems by the system host ID. In order to install on another system after you have reached this limit, you will need to release an old system host ID from the registration system

As an additional consequence to this change as well as some changes to the license design, you will need an updated license to use the production version of Intel® Parallel Studio XE 2016. Additional information is provided here. If you have further questions or concerns, please contact Technical Support.

2.3 Online Installation now available

The electronic installation package for Intel® Parallel Studio XE offers as an alternative a smaller installation package that dynamically downloads and then installs packages selected to be installed. This requires a working internet connection and potentially a proxy setting if you are behind an internet proxy. Full packages are provided alongside where you download this online install package if a working internet connection is not available. The online installer may be downloaded and saved as an executable file which can then be launched from the command line.

2.3.1 Storing Online Installer Download Content

The online installer stores the downloaded content in the form-factor of the standard install package which can then be copied and reused offline on other systems. The default download location is /tmp/intel/downloads. This location may be changed with the INTEL_SWTOOLS_DOWNLOAD_DIR environment variable. The online installer also supports a download only mode which allows the user to create a package without installation. This mode is enabled with the INTEL_SWTOOLS_DOWNLOAD_DIR environment variable.

2.4 Intel® Software Manager

The installation now provides an Intel® Software Manager to provide a simplified delivery mechanism for product updates and provide current license status and news on all installed Intel® software products.

You can also volunteer to provide Intel anonymous usage information about these products to help guide future product design. This option, the Intel® Software Improvement Program, is not enabled by default – you can opt-in during installation or at a later time, and may opt-out at any time. For more information please see http://intel.ly/SoftwareImprovementProgram.

2.5 Using a License Server

If you have purchased a "floating" license, see http://intel.ly/pjGfwC for information on how to install using a license file or license server. This article also provides a source for the Intel® License Server that can be installed on any of a wide variety of systems.

2.6 Silent Install

For information on automated or “silent” install capability, please see http://intel.ly/1gcW0Bl

2.6.1 Support of Non-Interactive Custom Installation

Intel Parallel Studio XE supports the saving of user install choices during an ‘interactive’ install in a configuration file that can then be used for silent installs. This configuration file is created when the following option is used from the command line install:

- `export INTEL_SWTOOLS_DUPLICATE_MODE=config_file_name`: it specifies the configuration file name. If full path file name is specified, the

INTEL_SWTOOLS_DOWNLOAD_DIR environment variable is ignored and the installable package will be created under the directory where the configuration file is.

- `export INTEL_SWTOOLS_DOWNLOAD_DIR=dir_name`: optional, it specifies where the configuration file will be created. If this option is omitted, the installation package and the configuration file will be created under the default download directory:
  `/tmp/intel/downloads/<package_id>`

2.7 Installation Folders

In an effort to improve and more tightly unify the user experience when using multiple compilers and libraries from multiple Intel® Software Development Tools, the directory layout has changed in this release of Intel® Parallel Studio XE. This directory structure should remain stable for the next future major release. If you have questions, please see this explained in more detail at http://intel.ly/1Nn2GjV.

The compiler installs, by default, under `/opt/intel` – this is referenced as `<install-dir>` in the remainder of this document. You are able to specify a different location.

Under `<install-dir>` are the following directories (not all may be present in a given installation):

- `bin` – contains symbolic links to executables for the latest installed version
- `lib` – symbolic link to the lib directory for the latest installed version
- `include` – symbolic link to the include directory for the latest installed version
- `man` – symbolic link to the directory containing man pages for the latest installed version
- `ipp` – symbolic link to the directory for the latest installed version of Intel® Integrated Performance Primitives
- `mkl` – symbolic link to the directory for the latest installed version of Intel® Math Kernel Library
- `tbb` – symbolic link to the directory for the latest installed version of Intel® Threading Building Blocks
- `ism` – contains files for Intel® Software Manager
- `compilers_and_libraries` – symbolic link to the `compilers_and_libraries_2016` directory
- `compilers_and_libraries_2016` – directory containing symbolic links to subdirectories for the latest installed Intel® C++ Compiler and Libraries 2016 release
- `compilers_and_libraries_2016.<n>.<pkg>` - physical directory containing files for a specific compiler and libraries version. `<n>` is the update number, and `<pkg>` is a package build identifier.
- `documentation_2016` – directory containing documentation for Intel® Parallel Studio XE 2016
- `ide_support_2016` – directory containing IDE integration files for Intel® Parallel Studio XE 2016

- parallel_studio_xe_2016.<n>.<pkg> - directory containing license and support information for Intel® Parallel Studio XE 2016, uninstall application, and symbolic links to Intel Parallel Studio XE 2016 components
- samples_2016 – directory contains samples codes for Intel® Parallel Studio XE 2016

Each compilers_and_libraries_2016 directory contains a mac subdirectory that contains the following directories that reference the latest installed compilers and libraries for Intel® Parallel Studio XE 2016:

- bin – directory containing scripts to establish the compiler and libraries environment and symbolic links to compiler executables for the host platform
- pkg_bin – symbolic link to the compiler bin directory
- include – symbolic link to the compiler include directory
- lib – symbolic link to the compiler lib directory
- ipp – symbolic link to the ipp directory
- mkl – symbolic link to the mkl directory
- tbb – symbolic link to the tbb directory
- debugger – symbolic link to the debugger directory
- man – symbolic link to the man directory
- documentation – symbolic link to the documentation_2016 directory

Each compilers_and_libraries_2016.<n>.<pkg> directory contains a mac subdirectory that contains the following directories that reference a specific update of the Intel® Compilers and Libraries 2016:

- bin – all executables
- compiler – shared libraries and header files
- debugger – debugger files
- documentation – documentation files
- man – symbolic link to the man directory
- ipp – Intel® Integrated Performance Primitives libraries and header files
- mkl – Intel® Math Kernel Library libraries and header files
- tbb – Intel® Threading Building Blocks libraries and header files

If you have both the Intel C++ and Intel Fortran compilers installed, they will share folders for a given version and update.

This directory layout allows you to choose whether you want the latest compiler, no matter which version, the latest update of the Intel® Parallel Studio XE 2016 compiler, or a specific update. Most users will reference <install-dir>/bin for the compilervars.sh [.csh] script, which will always get the latest compiler installed.

2.8 Relocating Product After Install

The Xcode integration is relocatable simply by dragging and dropping the Xcode directory tree to another location.

2.9 Removal/Uninstall

It is not possible to remove the compiler while leaving any of the performance library components installed.

1. Open the file `<install-dir>/parallel_studio_xe_2016.<n>.<pkg>/uninstall.app`.
2. Follow the prompts

If you are not currently logged in as `root` you will be asked for the `root` password.

3 Intel® IPP Cryptography Libraries are Available as a Separate Download

The Intel® IPP cryptography libraries are available as a separate download. For download and installation instructions, please read http://intel.ly/ndrGnR

4 Intel® Math Kernel Library 11.3 Attributions

As referenced in the End User License Agreement, attribution requires, at a minimum, prominently displaying the full Intel product name (e.g. "Intel® Math Kernel Library") and providing a link/URL to the Intel® MKL homepage (http://www.intel.com/software/products/mkl) in both the product documentation and website.

The original versions of the BLAS from which that part of Intel® MKL was derived can be obtained from http://www.netlib.org/blas/index.html.

The original versions of LAPACK from which that part of Intel® MKL was derived can be obtained from http://www.netlib.org/lapack/index.html. The authors of LAPACK are E. Anderson, Z. Bai, C. Bischof, S. Blackford, J. Demmel, J. Dongarra, J. Du Croz, A. Greenbaum, S. Hammarling, A. McKenney, and D. Sorensen. Our FORTRAN 90/95 interfaces to LAPACK are similar to those in the LAPACK95 package at http://www.netlib.org/lapack95/index.html. All interfaces are provided for pure procedures.

The original versions of ScaLAPACK from which that part of Intel® MKL was derived can be obtained from http://www.netlib.org/scalapack/index.html. The authors of ScaLAPACK are L. S. Blackford, J. Choi, A. Cleary, E. D'Azevedo, J. Demmel, I. Dhillon, J. Dongarra, S. Hammarling, G. Henry, A. Petitet, K. Stanley, D. Walker, and R. C. Whaley.

The Intel® MKL Extended Eigensolver functionality is based on the Feast Eigenvalue Solver 2.0 http://www.ecs.umass.edu/~polizzi/feast/

PARDISO in Intel® MKL is compliant with the 3.2 release of PARDISO that is freely distributed by the University of Basel. It can be obtained at http://www.pardiso-project.org.

Some FFT functions in this release of Intel® MKL have been generated by the SPIRAL software generation system (http://www.spiral.net/) under license from Carnegie Mellon University. The Authors of SPIRAL are Markus Puschel, Jose Moura, Jeremy Johnson, David Padua, Manuela Veloso, Bryan Singer, Jianxin Xiong, Franz Franchetti, Aca Gacic, Yevgen Voronenko, Kang Chen, Robert W. Johnson, and Nick Rizzolo.

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MPEG-1, MPEG-2, MPEG-4, H.261, H.263, H.264, MP3, DV, VC-1, MJPEG, AC3, AAC, G.711, G.722, G.722.1, G.722.2, AMRWB, Extended AMRWB (AMRWB+), G.167, G.168, G.169, G.723.1, G.726, G.728, G.729, G.729.1, GSM AMR, GSM FR are international standards promoted by ISO, IEC, ITU, ETSI, 3GPP and other organizations. Implementations of these

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The GNU* Project Debugger, GDB, is provided under the General GNU Public License GPL V3.

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