INTEL® PARALLEL STUDIO XE 2016 UPDATE 2

Windows and Linux* Release Notes*

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1 Introduction

Intel® Parallel Studio XE has three editions: Composer Edition, Professional Edition, and Cluster Edition.

Intel® Parallel Studio XE Composer Edition provides a software tools environment for developing Fortran, C, and/or C++ code using Intel® Compilers. Intel® Parallel Studio XE Composer Edition also includes Intel® Math Kernel Library, Intel® Performance Primitives, Intel® Threading Building Blocks, and Intel® Data Analytics Acceleration Library (Intel® DAAL).

Intel® Parallel Studio XE Professional Edition adds Intel® VTune™ Amplifier XE for performance analysis, Intel® Inspector XE for correctness analysis, and Intel® Advisor XE for parallelism discovery.

Intel® Parallel Studio XE Cluster Edition adds support for distributed memory computing via Intel® MPI Library, Intel® MPI Benchmarks, and Intel® Trace Analyzer and Collector. Intel® Cluster Checker provides cluster health monitoring tools.

On completing the Intel® Parallel Studio XE installation process, locate the `getstart*.htm` file in the `documentation_2016` folder under the target installation path. This file is a documentation map to navigate to various information resources of the Intel® Parallel Studio XE.

1.1 What Every User Should Know About This Release

- Licensing has been changed from Intel® Parallel Studio XE 2015 versions. Please see section 5.1 for details.

2 Product Contents

The table below shows which Intel® Software Development Tools are present in each edition of Intel® Parallel Studio XE 2016.

Component	Composer Edition	Professional Edition	Cluster Edition
Intel® C++ Compiler	X	X	X
Intel® Fortran Compiler / Intel® Visual Fortran	X	X	X
Intel® Integrated Performance Primitives (Intel® IPP)	X	X	X
Intel® Math Kernel Library (Intel® MKL)	X	X	X
Intel® Data Analytics Acceleration Library (Intel® DAAL)	X	X	X
Intel® Threading Building Blocks (Intel® TBB)	X	X	X
Intel-provided Debug Solutions	X	X	X
Microsoft Visual Studio Shell* for Intel® Visual Fortran **(for Windows* OS only)**	X	X	X
Intel® Advisor XE		X	X
Intel® Inspector XE		X	X
Intel® VTune™ Amplifier XE		X	X
Intel® Cluster Checker **(For Linux* OS only)**			X
Intel® MPI Benchmarks			X
Intel® MPI Library			X
Intel® Trace Analyzer and Collector			X

The table below lists the product components and related documentation.

Component	Version	Documentation
Intel® Advisor XE	2016 Update 3	get_started.htm
Intel® C++ Compiler	16.0 Update 2	get_started_wc.htm for Windows* OS get_started_lc.htm for Linux* OS
Intel® Cluster Checker **(For Linux* OS only)**	3.1 Update 2	get_started.htm
Intel® Data Analytics Acceleration Library (Intel® DAAL)	2016 Update 2	get_started.htm
Intel® Fortran Compiler / Intel® Visual Fortran Compiler	16.0 Update 2	get_started_wf.htm for Windows* OS get_started_lf.htm for Linux* OS
Intel® Inspector XE	2016 Update 2	get_started.htm
Intel® Integrated Performance Primitives (Intel® IPP)	9.0 Update 2	get_started.htm
Intel® Math Kernel Library (Intel® MKL)	11.3 Update 2	get_started.htm
Intel® MPI Benchmarks	4.1 Update 1	ReadMe_IMB.txt IMB_Users_Guide.htm
Intel® MPI Library	5.1 Update 3	get_started.htm
Intel® Threading Building Blocks (Intel® TBB)	4.4 Update 3	get_started.htm
Intel® Trace Analyzer and Collector	9.1 Update 2	get_started.htm
Intel® VTune™ Amplifier XE	2016 Update 2	get_started.htm
Intel-provided Debug Solutions		See below for additional information.
Microsoft Visual Studio Shell* for Intel® Visual Fortran **(For Windows* OS; installs only on the master node)**		See below for additional information.

2.1 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.

2.2 Additional Information for Microsoft Visual Studio Shell* for Intel® Visual Fortran

A Fortran-only Integrated Development Environment (IDE) based on Microsoft Visual Studio Shell 2013* is provided for systems that do not have a supported Microsoft Visual Studio installed. Installation of the Fortran IDE has the following additional requirements:

- Microsoft Windows 7 SP1* or newer, or Microsoft Windows Server 2008 R2 SP1* or newer operating system
    - On Windows 8.1* and Windows Server 2012 R2*, KB2883200 is required
- Microsoft Windows 8.1 SDK*

3 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. A current list of deprecated features can be found at https://software.intel.com/en-us/articles/intelparallel-studio-xe-deprecation-information.

Changes since Intel® Parallel Studio XE 2016 Update 1:

- All components updated to current versions.
- First Intel® Xeon Phi™ Processor and Coprocessor (code name Knights Landing) Leveraged boot support on Linux* in Intel® Math Kernel Library.
- Basic checks added in Intel® Cluster Checker for Intel® Omni-Path Fabric (Intel® OPA).
- Intel® MPI Library adds new algorithms and selection mechanism for non-blocking collectives.
- Intel® MPI Library fixed long count support for some collective messages.

Changes since Intel® Parallel Studio XE 2016:

- All components updated to current versions.
- Japanese content added to Composer Edition.
- Intel® C++ Compiler:
    - Intel® SIMD Data Layout C++ Template Library (ISDL).
- Intel® VTune™ Amplifier XE:
    - Event-based sampling collection for multiple ranks per node with an arbitrary MPI launcher.
    - Support for Intel® Manycore Platform Software Stack (Intel® MPSS) version 3.6.
    - Support for Linux* kernel 4.1 and 4.2
- Intel® MPI Library:
    - Support for YARN cluster manager.
- Intel® Trace Analyzer and Collector:
    - MPI Performance Snapshot HTML5 report.
- Documentation updates.
- Bug fixes.

Changes since Intel® Parallel Studio XE 2015 Update 3:

- All components updated to current versions.
- License changes, see section 5.1 for details.
- Support for Windows 10*

- Support for Microsoft Visual Studio 2015*
- IA-32 host installation support is deprecated.
- Microsoft Visual Studio Shell* for Intel® Visual Fortran for Windows* is updated to 2013.
- Visual Studio* 2010 support is deprecated.
- Red Hat Enterprise Linux* 5.0 support is deprecated.
- Fedora* 20 support removed
- Debian* 6 support removed
- Documentation updates.
- Intel® Data Analytics Acceleration Library (Intel® DAAL):
    - New component Intel® DAAL added to Composer Edition
- Added support in some components for Intel® AVX-512 instructions for Intel® Many Integrated Core Architecture (Intel® MIC Architecture) used by Intel® Xeon Phi™ Processor and Coprocessor (code name Knights Landing)

4 System Requirements

4.1 Processor Requirements

Systems based on Intel® 64 architecture:

Intel® Core™ processor family or higher

Intel® Xeon® E5 v3 processor families recommended

Intel® Xeon® E7 v3 processor families recommended

NOTE: It is assumed that the processors listed above are configured into homogeneous clusters. For Windows* OS, only processors based on the Intel® 64 architecture are supported.

4.2 Disk Space Requirements

12 GB of disk space (minimum) on a standard installation. Cluster installations require an additional 4 GB of disk space.

NOTE: During the installation process, the installer may need up to 12 GB of additional temporary disk storage to manage the intermediate installation files.

4.3 Operating System Requirements

The operating systems listed below are supported by all components on Intel® 64 Architecture. Individual components may support additional operating systems and architecture configurations. See the individual component release notes for full details.

- Intel® Cluster Ready
- Debian* 7.0, 8.0
- Fedora* 21, 22

- Red Hat Enterprise Linux* 5, 6, 7
- SUSE Linux Enterprise Server* 11, 12
- Ubuntu* 12.04 LTS, 13.10, 14.04 LTS, 15.04
- Microsoft* Windows* 7, 8.x, 10
- Microsoft* Windows* Server 2008, 2008 R2, 2012, 2012 R2

The Intel® MPI Library and Intel® Trace Analyzer and Collector are supported on Intel® Cluster Ready systems and HPC versions of the listed versions of Microsoft* Windows* Server. These components are not supported on Ubuntu non-LTS systems.

IA-32 support has been removed from the Intel® MPI Library and Intel® Trace Analyzer and Collector. Other components of Intel® Parallel Studio XE Cluster Edition still support IA-32 on the listed operating systems.

Support for Microsoft* Windows XP* has been removed from Intel® Parallel Studio XE.
Intel® Cluster Ready is an applications platform architecture standard for Linux* OS clusters. Please convey to your users the Linux* OS platform needed for your MPI application with:

This application has been verified to run correctly on Linux* OS clusters that conform to the Intel® Cluster Ready platform architecture. Each Intel® Cluster Ready system is shipped and tested with a diagnostic tool: Intel® Cluster Checker. Please see the Intel® Cluster Checker Getting Started Guide for information on how to use this tool.

For more information on Intel® Cluster Ready and on the alliance of partner vendors, please visit http://www.intel.com/go/cluster.

4.4 Memory Requirements

2 GB RAM (minimum)

4.5 Additional Software Requirements

Development for a 32-bit on a 64-bit host may require optional library components (ia32-libs, lib32gcc1, lib32stdc++6, libc6-dev-i386, gcc-multilib, g++-multilib) to be installed from your Linux distribution.

5 Installation Notes

If you have installed Intel® Parallel Studio XE 2016 Beta, please remove this before installing Intel® Parallel Studio XE 2016. Otherwise installation will not proceed correctly.

For instructions on installing and uninstalling the Intel® Parallel Studio XE Cluster Edition on Linux* OS and Windows* OS, see the Installation Guide (Install_Guide.htm).

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.

To begin installation on Linux*, first unpack the installation tarball into a writeable directory of your choice using the command:

```
tar –xzvf name-of-downloaded-file
```

Then change the directory (`cd`) to the directory containing the unpacked files and begin the installation using the command:

`Command line:` `./install.sh`
GUI: ./install_GUI.sh

When on Linux, please do not run the install script as a background process (i.e. running "./install.sh &"). This is not supported.

To being installation on Windows*, after downloading your product, double-click on the executable file (.EXE) to begin installation.

Then for both Windows* and Linux*, 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. However, it should be noted that when installing updates to a major release Intel Parallel Studio XE common files, documentation, and samples as well as the product components Intel® Advisor XE, Intel® Inspector XE, and Intel® VTune™ Amplifier XE belonging to that major release will be updated.

To uninstall on Linux*, removing the product should be done by the same user who installed it (root or a non-root user). If `sudo` was used to install, it must be used to uninstall as well. It is not possible to remove the compilers while leaving any of the performance libraries installed.

1. Open a terminal window and set default (`cd`) to any folder outside `<install-dir>`
2. Type the command: `<install-dir>/parallel_studio_xe_2016.<n>.<pkg>/uninstall.sh` for a command-line uninstall or `<install-dir>/parallel_studio_xe_2016.<n>.<pkg>/uninstall-GUI.sh` for a GUI uninstall.
3. Follow the prompts
4. Repeat steps 2 and 3 to remove additional platforms or versions

To uninstall on Windows*, use the Windows Control Panel "Add or Remove Products" applet to change which product components are installed or to remove the product.

5.1 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, tracked 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.

5.2 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.

5.3 Online Installation

The electronic installation package for Intel® Parallel Studio XE now 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.

5.4 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 <Program Files>\Intel\Download on Windows or /tmp/<UID>. This location may be changed with the online installer command line option "--download-dir [FOLDER]". 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 "--download-only" command line option.

5.5 Silent Install

For information on automated or "silent" install capability, please see http://intel.ly/nKrzhv

5.5.1 Support of Non-Interactive Custom Installation

Intel® Parallel Studio XE 2016 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:

- `--duplicate=config_file_name`: it specifies the configuration file name. If full path file name is specified, the "`--download-dir`" is ignored and the installable package will be created under the directory where configuration file is.
- `--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:

```
Windows: %Program Files%\Intel\Download\<package_id>
Linux: /tmp/<UID>/<package_id>
```

For example: `parallel_studio_xe_<version>_setup.exe --duplicate=ic16_install_config.ini --download-dir="C:\temp\custom_pkg_ic16"`
The configuration file and installable package will be created under "`C:\temp\custom_pkg_ic16`".

5.6 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.

6 Documentation

The documentation index file getstart*.html provides more information about Intel® Parallel Studio XE.

Note: Some hyperlinks in HTML documents may not work when you use Internet Explorer. Try using another browser, such as Chrome or FireFox, or right-click the link, select **Copy shortcut**, and paste the link into a new Internet Explorer window.

7 Issues and Limitations

1. When installing the Linux* packages via RPM, the installation will fail due to dependency errors, such as:

   ```
   intel-comp-l-all-common-031 = 16.0 is needed by intel-comp-l-all-031-16.0.0-0.i486
   ```

   In order to install via rpm, use

   ```
   rpm –uv --nodeps [RPMs_to_install]
   ```

   Where *`[RPMs_to_install]`* is either individual RPMs to be installed or a wildcard representation of all RPMs to install. This will allow installation to proceed normally.

2. There have been situations where during the installation process, `/tmp` has been filled up. We recommend that you have **at least 12 GB of free space** in `/tmp` when installing

the Intel® Parallel Studio XE. Also, the installer script install.sh has the command-line options:

`-t [FOLDER]`

or

`--tmp-dir [FOLDER]`

where *[FOLDER]* is a directory path, which can direct the use of intermediate storage to another disk partition referenced by *[FOLDER]*. *[FOLDER]* should be a non-shared storage location on each node of the cluster. Note that *[FOLDER]* should also contain **at least 12 GB of free space**.

3. On Linux* OS, if any software component of the Intel® Parallel Studio XE is detected as pre-installed on the head node, that software component will not be processed by the installer. There is a similar problem on Windows* OS in the 'Modify' mode. For Windows* OS, if some software component of the Intel® Parallel Studio XE is pre-installed on the head node using the installer, that software component will not be installed on the compute nodes of the cluster. For either Linux* OS or Windows* OS, if you already installed some of the software components only on the head node, and you want to install them on the other nodes using the installer, you need to uninstall such components from the head node manually before starting the installer.

4. If you use the Intel® MPI Library command `mpirun` with the Intel® Inspector XE as follows:

```
mpirun -f ./mpd.hosts -nolocal -ppn 1 -n 4 inspxe-cl -c ti2 -r
r003_{mpirank} `pwd`/inspxe_mpirank.exe inspxe-cl -c mi2 -r
r000_{mpirank} `pwd`/inspxe_mpirank.exe
```

where the above command line is collecting two types of instrumentation data (`ti2` and `mi2`), and you encounter a run-time error that may look as follows:

```
HYDU_create_process (./utils/launch/launch.c:94): execvp error on
file r000_{mpirank} (No such file or directory)
```

In this case, you can use the `mpiexec` command in lieu of the `mpirun` command:

```
mpiexec -nolocal -ppn 1 -n 4 inspxe-cl -c ti2 -r
/shared/cluster_common/inspector_test/cluster/r003_{mpirank}
`pwd`/inspxe_mpirank.exe inspxe-cl -c mi2 -r r000_{mpirank}
inspxe_mpirank.exe
```

where `/shared/cluster_common/inspector_test/cluster/r003_{mpirank}` is a shared path for collecting `ti2` instrumentation data.

Alternatively, you can create a Bourne* Shell or C Shell script that contains instrumentation information that may look as follows:

```
inspxe-cl -c ti2 -r
/shared/cluster_common/inspector_test/cluster/r003_{mpirank}
`pwd`/inspxe_mpirank.exe inspxe-cl -c mi2 -r r000_{mpirank}
inspxe_mpirank.exe
```

Using Bourne* Shell syntax, the script might be called `run.sh`, where it is used with the `mpirun` command in the following manner:

```
mpirun -ppn 1 -n 4 ./run.sh
```

You also need to remove the `-nolocal` command-line option because the `-f` *`<hosts_file>`* option was not specified, and therefore all processes are started locally.

5. Intel® Parallel Studio XE for Windows* OS requires **the creation and use of symbolic links for installation of the Intel® software product components**. If you have a File Allocation Table (FAT32) file system deployed on your Windows* OS platform, these symbolic links cannot be created and the integrity of the Intel® Parallel Studio XE installation is compromised.

6. For Intel® MIC Architecture, Intel® MPI Library supports only Intel® Xeon Phi™ coprocessor.

   This release of the Intel® MPI Library for Linux* OS does not support the MPD process manager for Intel® Xeon Phi™ coprocessor.

   Intel® MPI Library for Linux* OS supports multiple DAPL* providers for communication between the host and the Intel® Xeon Phi™ coprocessor and between several Intel® Xeon Phi™ coprocessors inside one node.

   Currently supported providers are DAPL over InfiniBand* Architecture and DAPL over Intel® Symmetric Communication Interface (Intel® SCI). This feature requires using symbolic names in the host file.

7. Intel® Software Manager will always install to either `/opt` or `$HOME` on Linux* OS even if a custom installation path is chosen. This can slow installation when the destination folder is a slow NFS shared folder, even if locally hosted.

8. Coarray Fortran (CAF) with Intel® Fortran Compiler 14 is incompatible with Intel® MPI Library 5.0. If using CAF, ensure that either Intel® Fortran Compiler 15 or higher is used,

or use a 4.x version of Intel® MPI Library.

9. The product is fully supported on Ubuntu* and Debian* Linux distributions for IA-32 and Intel® 64 architecture systems as noted above under System Requirements. Due to a restriction in the licensing software, however, it is not possible to use the Trial License feature when evaluating IA-32 components on an Intel® 64 architecture system under Ubuntu or Debian. This affects using a Trial License only. Use of serial numbers, license files, floating licenses or other license manager operations, and off-line activation (with serial numbers) is not affected. If you need to evaluate IA-32 components of the product on an Intel® 64 architecture system running Ubuntu or Debian, please visit the Intel® Software Evaluation Center (http://intel.ly/nJS8y8) to obtain an evaluation serial number.

10. Installation of the Fortran-only Integrated Development Environment (IDE) based on Microsoft Visual Studio Shell 2013* may cause the system to reboot. The reboot is a rare condition, but it has been observed on Windows 8* systems which needed to have Windows updates applied. Normally this can be recovered from by installing the Windows updates and starting the installation again.

11. The csh environment variable settings for Intel® Trace Analyzer and Collector are disabled due to an issue in the mpsvars.csh script. In order to enable the environment settings for Intel® Trace Analyzer and Collector, perform the following steps:

    a. Uncomment the lines calling itacvars.csh in the psxevars.csh script.
    b. Edit the $SCRIPTPATH/itac_9.1/bin/mpsvars.csh file by changing

    ```
    setenv MPS_FILE_POSTFIX=”_%D-%T”
    ```

    to

    ```
    setenv MPS_FILE_POSTFIX “_%D-%T”
    ```

8 Technical Support

Your feedback is very important to us. To receive technical support for the tools provided in this product and technical information including FAQ's and product updates, you need to register for an Intel® Premier Support account at the Intel® Registration Center.

NOTE: Registering for support varies for release product or pre-release products (alpha, beta, etc.) – only released software products have support web pages at http://software.intel.com/sites/support/.

To register for an account, please visit the Intel® Registration Center website at http://www.intel.com/software/products/registrationcenter/index.htm. If you have forgotten

your password, please email a request to: quadsupport@mailbox.intel.com. Please do not email your technical issue to this email address.

The product support web site, located under the SUPPORT tab of the http://www.intel.com/go/clustertools product page, provides top technical issues, FAQs & Known Issues, Documentation and Training, and product errata. For more information, and to connect with the Intel HPC community, visit the Intel® Clusters and HPC Technology forum: https://software.intel.com/en-us/forums/intel-clusters-and-hpc-technology.

8.1 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. "Parallel Studio XE") 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.

9 Attributions for Intel® Math Kernel Library

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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