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Overview
This document provides a general summary of new features and important notes about the Intel® Integrated Performance Primitives (Intel® IPP) library software product.

Please see the following resources available online for the latest information regarding the Intel® Integrated Performance Primitives (Intel® IPP):

- [Intel® IPP Main Product Page](#)
- [Intel® IPP Installation Guide](#)
- [Intel® IPP 2019 System Requirements](#)
- [Intel® IPP Documentation](#)

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What's New in Intel® IPP 2019 Update 1
- Added new functions to support SM2 public key cryptographic algorithm.
- Added support for Universal Windows driver and Universal Windows Platform (UWP) in the sequential static libraries.
- Added optimization for Intel® AVX-512 instruction set in the ippsFIRMR32f_32fc functions.
- Added support for Android* OS and Threading Layer libraries in the Intel IPP Custom Library Tool based on Python*.
- Removed support for IA-32 libraries on macOS* in this release.

What's New in Intel® IPP 2019
- Added new functions to support [ZFP](#) floating-point data compression and decompression. This release also introduces the optimization patch files for ZFP 0.5.2 source to provide drop-in optimization with the Intel® IPP functions.
  - ZFP is a lossy floating point data compression with controlled compression accuracy and compression rate. Intel® IPP ZFP functions are highly optimized for Intel® AVX2 and Intel® AVX-512 instruction sets.
  - Intel® IPP ZFP provides easy-to-use interfaces which allow for use of its functions directly in application source code. Intel® IPP ZFP also provides drop-
in optimization patch files for open-source ZFP 0.5.2. Users’ applications can use open-source ZFP library interfaces with Intel® IPP optimized functions.

- Added Intel® Threading Building Blocks threading technology support in the Threading Layer APIs. Check the “Threading Notes” below to get more information.

- Added new version of Intel IPP Custom Library Tool based on Python*. This version provides better compatibility on different operation systems. The previous version of Intel IPP Custom Library Tool is deprecated and will be removed in the future Intel IPP releases.

- Added new APIs to compute CRC24 and CRC16 checksum with 1U input data. The APIs support CRC24A, CRC24B, CRC24C and CRC16 polynomial functions, and are included in the Intel® IPP embedded domain.

- Color Conversion:
  - Added color conversion functions to convert RGB image to CIE Lab color model, or CIE Lab color model to RGB (ippiRGBToLab/ippiLabToRGB).

- Data Compression:
  - Added the optimization patch files for the bzip2 source to provide drop-in optimization with Intel® IPP functions. The patches now support bzip2 version 1.0.6.

- Performance:
  - Extended optimization for the Intel® Advanced Vector Extensions 512 (Intel® AVX-512) instruction sets.

- Other Changes:
  - Removed support for Intel® Xeon Phi™ 72** product family coprocessor (formerly code name Knights Landing) on Windows* platform in this release.
  - Removed support for Intel® Quark™ microprocessors in this release.
  - The IA-32 libraries on macOS* are deprecated and will be removed in a future release.

**Threading Notes**

Intel® IPP provides Threading Layer APIs on top of sequential Intel® IPP libraries. The APIs include two variants 1) functions with _T suffix in the names, providing threading
implementation based on classic IPP APIs; 2) functions with _LT suffix, providing
threading implementation based on Intel IPP Platform-Aware functions. The Threading
Layer APIs support both OpenMP* and Intel® Threading Building Blocks threading
technology. Source code of Intel® IPP Threading Layer is also available in IPP package
as example and basis to organize threading for pipeline inside a customer application.

The legacy Intel IPP threaded libraries are still available by custom installation, and the
code written with these libraries will work as before. However, the threaded library will
not expand its threading functions, and the new threading will be developed only in the
new Intel® IPP threading layer APIs.

User applications are recommended to use the new Intel® IPP Threading Layer APIs or
implement the threading based on IPP Threading Layer source code examples in their
applications. Check the “Threading Layer Functions” section in the Intel® IPP
Developer Reference, to get more information on these APIs.

**Known Intel® IPP 2019 Update 1 Issues and Limitations**

- The IPP functions dispatch Intel® AVX2 optimization code on the Intel® AVX-512 processor
  with macOS* systems. The problem will be fixed in future releases. Please contact the
technical support if you need further help on this problem.

- The threading libraries example at components\interfaces\tl example folder fails to build
  with Microsoft* Visual Studio* Project. The issues will be fixed in the future Intel® IPP
  releases. As a workaround, in “/core/tl_core.vcxproj” and “/tl/ippi/tl_ippi.vcxproj” files,
  replace “<RuntimeLibrary>MultiThreadedDebugDLL</RuntimeLibrary>” by
  “<RuntimeLibrary>MultiThreadedDebug</RuntimeLibrary>”,
  and replace “<RuntimeLibrary>MultiThreadedDLL</RuntimeLibrary>” by
  “<RuntimeLibrary>MultiThreaded</RuntimeLibrary>”

**System Requirements**
For information about the Intel® IPP system requirements, please visit the Intel® Integrated
Performance Primitives (Intel® IPP) 2019 System Requirements page.

**Intel® IPP 2019 Documentation**
Starting with this version of Intel IPP, most of the documentation is only available online
at Intel® Software Documentation Library. You can also download it from the Intel®
Software Development Products Registration Center > Product List > Intel® Parallel Studio
XE(or Intel® System Studio) Documentation.
Product Contents

The Intel® IPP for Windows*, Linux* OS, and macOS* is provided as part of the Intel® Parallel Studio XE and Intel® System Studio product. It is also available from the free Intel® performance libraries program:

- Installation package only supports 64-bit host system. It includes both the 64-bit and 32-bit target libraries.
- Installation package also provides the online installer that downloads materials chosen during installation

Intel® IPP Cryptography is provided as the following optional packages:

- Intel® IPP Cryptography for Windows*
- Intel® IPP Cryptography for Linux* OS
- Intel® IPP Cryptography for macOS*

Intel® IPP Cryptography

Intel® IPP Cryptography is a separate installation package that contains the binaries and header files needed to utilize the functions contained in the Intel IPP cryptography domain. To obtain the Intel IPP Cryptography libraries, please review the knowledge base article: where do I download the Intel® IPP cryptography libraries.

Intel® IPP Cryptography library is also available through open source. Visit the Intel® IPP cryptography open source page on GitHub to access the library source code.

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- zlib library:
  
zlib.h -- interface of the 'zlib' general purpose compression library version 1.2.8, April 28th, 2013
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  Jean-loup Gailly  Mark Adler
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- bzip2:
  
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