1 Introduction

Intel provides Intel® Software Guard Extensions (Intel® SGX) SDK, a software isolation technology, to help you protect your applications.

This document provides system requirements, installation instructions, limitations and legal information.

Product Contents

Intel® Software Guard Extensions SDK package includes:

- An Intel® Software Guard Extensions SDK installer for Microsoft® Windows® OS. It includes binaries to develop enclave applications. The main components include:
  - Trusted libraries, including standard C library, C++ runtime support, C++ STL, and so on
  - Development tools, including edger8r, signing tool, Microsoft Visual Studio® IDE plug-in, and so on
  - Sample projects
2 What's New

Intel® Software Guard Extensions SDK includes the following changes in this release:

- Upgrade the Cryptography for Intel® Integrated Performance Primitives (Intel® IPP) library to version 9.0 Update 4
- Support nested HW exception in a trusted environment
- Extended C11 and C++11 support

To improve support for C++11 in Windows, the SDK 1.7 includes a new trusted C++ library based on libc++ (see http://llvm.org/svn/llvm-project/libcxx/trunk). If you create a new enclave project with Visual Studio 2015 and check the “C++11” box under Additional Libraries, the new trusted library (sgx_tcxx) will be added to your project. If you update an enclave project to Visual Studio 2015, you are recommended to follow the instructions in the Developer Reference (section C++ Standard Library) to upgrade the C++ library. Otherwise, you will continue to use the trusted library based on STLPt (sgx_tstdcxx). Note that the Standard C++ Library based on STLPt (sgx_tstdcxx) will be deprecated in the next release.

- Support for Protected File System - a basic subset of the regular 'C' file API for Intel SGX enclaves that provides files with both confidentiality and integrity protection.
- Bug fixes

Changes in Previous Releases

Intel® Software Guard Extensions SDK includes the following changes in version 1.6.101.33070:

- Changed the key exchange library to support remote attestation with a custom key derivation function (KDF).
- Added a new interface in the sgx_uae_service library to query EPID group ID.
- Removed the trusted library sgx_tcrypto_opt.lib.
- Linked the Intel® Integrated Performance Primitives (Intel® IPP) Cryptographic library into sgx_tcrypto.lib and provided direct access to its API. Included the Intel® IPP Cryptographic library in Intel SGX SDK under the Community Licensing for Intel Performance Primitives.
- Support for new trusted event synchronization library.
- Support for Macros and conditional compilation in EDL.
- Support for a portion of C11 and C++11 features.
- Support for a subset of OpenSSL* APIs in Intel® SgxSSL* library. Exposed APIs are fully compliant with unmodified OpenSSL APIs.
- Support for profiling Intel SGX applications using Intel® VTune™ Amplifier XE. To profile Intel SGX applications, use VTune™ Amplifier XE 2016 Update 2, which contains an analysis type “SGX Hotspots”.
- Provided new APIs (sgx_mac_aadata, sgx_mac_aadata_ex and sgx_unmac_aadata) in the seal library.

Intel® Software Guard Extensions SDK includes the following changes in version 1.1. 30214:
- Support Microsoft* Windows* 10 post-RTM Update (codenamed Threshold 2) along with Windows 8.1, Windows 7, and Windows 10
- Provide sgx_enable_device API in the sgx_capable library
- Deprecate sgx_enum_enclaves API
- Fixed the localization issue with Microsoft Visual Studio® Plug-in
- Add the Key Exchange library built with the /MT option (sgx_ukey_exchangemt.lib)

Intel® Software Guard Extensions SDK includes the following changes in version 1.0:
- Support Microsoft Windows* 7 64-bit version
- Support Microsoft Windows* 10 64-bit version

### 3 System Requirements

**Software Requirements**
- Supported operating systems for Intel® SGX SDK installer:
  - Microsoft Windows* 7 64-bit version
  - Microsoft Windows* 10 November Update (version 1511) 64-bit version
  - Microsoft Windows* 10 Anniversary Update (version 1607) 64-bit version
• Supported compiler for Intel® SGX SDK installer:
  o Intel® Parallel Studio XE for Windows* Version 2016 Update 3

• Supported IDE for Intel® SGX SDK installer:
  o Microsoft Visual Studio* Professional 2015 with Update 3
  Microsoft Visual C++ compiler from Microsoft Visual Studio* Professional 2015 is required.

Notes:

1. The Visual Studio 2015 Add-in Tool has been designed to work with the Microsoft Visual Studio Professional 2015 environment. While Visual Studio* Professional 2015 is the recommended environment, the tools may also be installed with the Community and Enterprise versions of Visual Studio 2015.

2. For hardware requirements of Intel® Software Guard Extensions Platform Software for Windows* OS, see the Revision History section of Intel® Software Guard Extensions Platform Software for Windows* OS Release Notes.

4 Known Issues and Limitations

• sgx_create_enclave API does not respond if you call sgx_create_enclave API in global object of C++ class in DLL.

• Intel® SGX Debugger might stop working after reinstalling Intel SGX SDK because of an issue with Visual Studio* 2015. The workaround is to delete the contents of “%USERPROFILE%\AppData\Local\Microsoft\VisualStudio\14.0\ComponentModelCache” and restart Visual Studio.

• Intel® SGX debugger does not work for X64 mode on the Windows 10 Anniversary Update (version 1607).

• The legacy Intel SGX SDK installation entry cannot be removed from “Programs and Features” in Windows Control Panel if you install legacy Intel SGX SDK and upgrade with the 1.7 version installer. To work around the issue, please manually uninstall Intel SGX SDK before installing the 1.7 version.

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