C++11 Library Setup for Migrating Intel® Software Guard Extensions (Intel® SGX) Applications

Scope
This paper describes the process for migrating an Intel® Software Guard Extensions (Intel® SGX) project created in Microsoft® Visual Studio® 2013 that uses the (STLport based) trusted C++ Standard Library to Visual Studio 2015. General information on Intel SGX can be found on the Intel SGX portal at: https://software.intel.com/en-us/sgx.

Introduction
Intel SGX 1.7/1.8 applications for Microsoft Windows require the software listed in Table 1.

<table>
<thead>
<tr>
<th>Software</th>
<th>Intel SGX SDK 1.7 for Windows</th>
<th>Intel SGX SDK 1.8 for Windows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel SGX SDK for Windows</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Full set of Intel® Management Engine (Intel® ME) software components</td>
<td>11.6.0.1126 or newer</td>
<td>11.6.0.1126 or newer</td>
</tr>
<tr>
<td>Platform Software (PSW) Installer</td>
<td>1.7</td>
<td>1.8</td>
</tr>
</tbody>
</table>


Versions of the Intel SGX SDK prior to 1.7 included a trusted C++ Standard Library, which was ported from the STLport Standard Library Project. However, this library only provides partial C++11 feature support.

Starting with 1.7, the Intel SGX SDK added a C++11 Standard Library. This Standard Library is ported from libc++ and provides a fuller implementation of the C++ language. (For SDK 1.8, the C++11 support is the same as for 1.7.)

The C++11 Standard Library is part of the Intel SGX SDK package and is installed during SDK installation. Inside the enclave, most of the features of the C++11 Standard Library are supported. However, there are some limitations. Details on feature support and limitations are provided in: https://software.intel.com/en-us/documentation/sgx-sdk-developer-reference.
Linking to the C++ Standard Library

Intel SGX applications developed using Visual Studio 2013 that use C++ are, by default, linked with sgx_tstdcxx.lib.

Intel SGX applications developed using Visual Studio 2015, however, use sgx_tcxx.lib by default. (This library supports most C++11 features.)

If an Intel SGX application developed with SDK version 1.6 and Visual Studio 2013 needs to be migrated to Visual Studio 2015 and SDK version 1.7/1.8, so that you can use the fuller C++ feature support, perform the following steps:

1. sgx_tcxx.lib must be added manually to the Visual Studio project settings. If sgx_tstdcxx.lib is present, replace it with sgx_tcxx.lib. Otherwise, simply add sgx_tcxx.lib to the linker dependency list for the enclave project.

2. Modify your application's enclave code as needed to take advantage of the additional C++ feature support provided by the C++11 Standard Library.

References


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