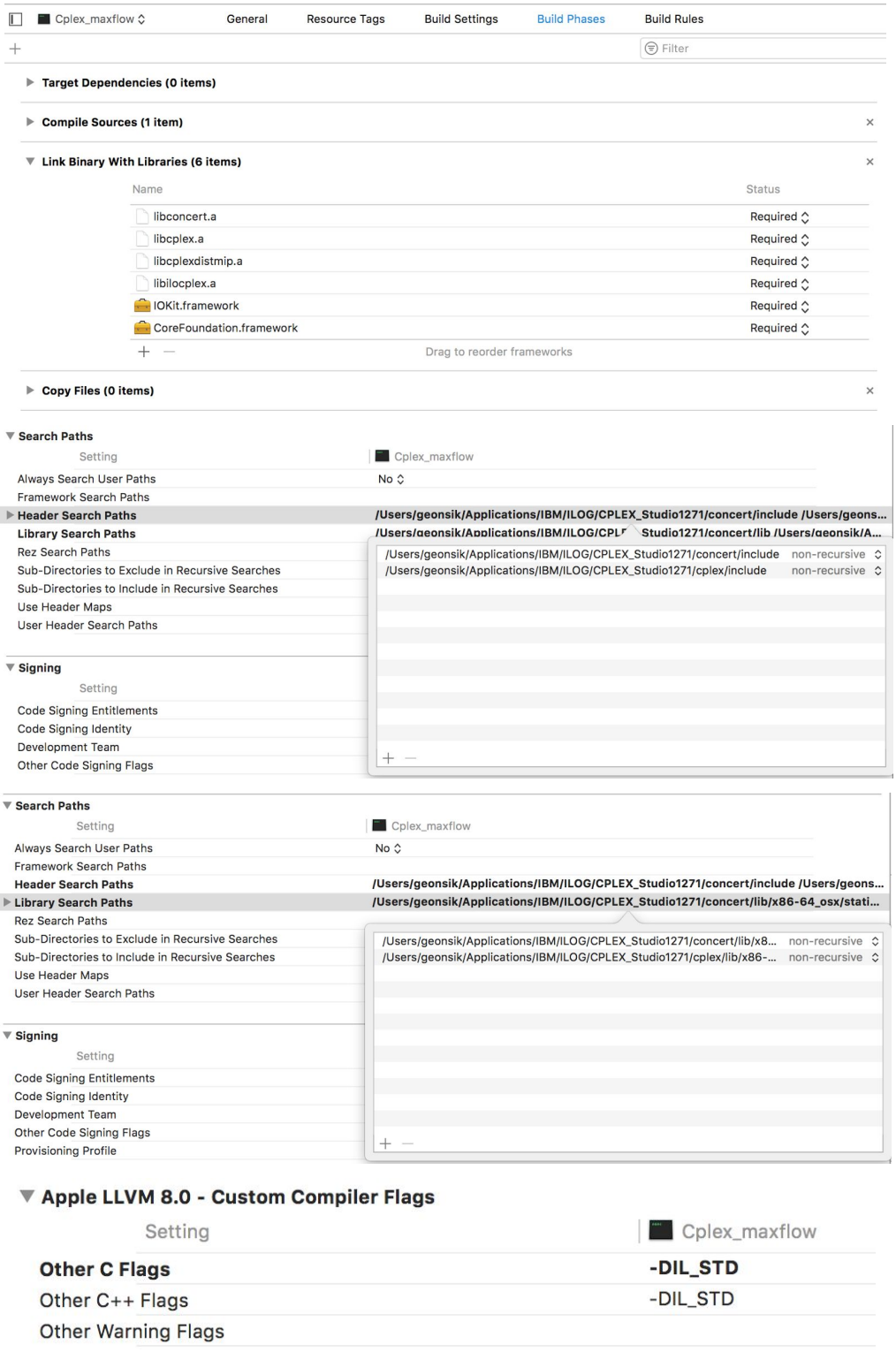
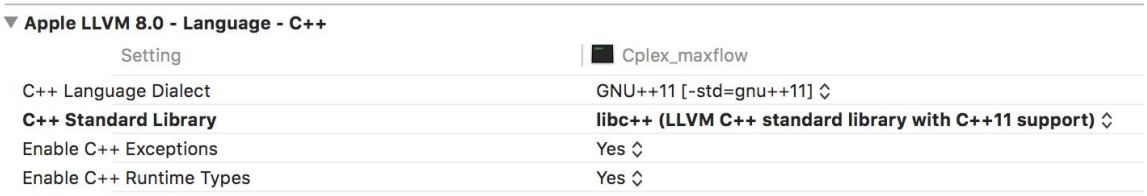
1. Configure Apple XCode to use IBM CPLEX Concert





2. Configure MS Visual Studio to use IBM CPLEX Concert

In this tutorial I will describe how to configure Microsoft Vis ㄷ ㅁ ual Studio Express to use IBM CPLEX with Concert technology in a C++ project. This tutorial assumes you already have CPLEX installed.

<Setting up CPLEX Concert with C++ on Windows in Release Mode / Debug Mode>

To use IBM ILOG CPLEX with Microsoft Visual C++, first consult the file c_cpp.html available in the folder <CPLEXDIR>. Then follow the directions you find there. The information below applies to the Visual C++ 2008 multi-threaded STL library. If you use another version of the library, set the Runtime Library option to match the library version. If you use Visual Studio 2010, the instructions below should apply, except that x64_windows_vs2008 should be replaced with x64_windows_vs2010 whenever a path name is specified. It is important to remember that CPLEX Concert Technology using ISEN lab systems cannot be linked to Visual C++ 2010.

The Visual C++ run-time library with debug settings detects incorrect iterator use, and asserts and displays a dialog box at run time. To enable debug iterator support, you must use a debug version of a C++ run-time library to compile your program. From the Concert point of view, the only difference between the Win32 Release and Win32 Debug targets is: • the NDEBUG macro is defined for the Win32 Release target. • the NDEBUG macro is not defined for the Win32 Debug target. This is why we have suggested using Win32 Release in the examples, even though it is not the default proposed by Visual C++. Refer to the Visual C++ Reference Manual for full information on Win32 Release and Win32 Debug. The interaction of the NDEBUG macro and the Concert inline member functions is documented in the ILOG Concert Technology Reference Manual. The information below applies to the Visual C++ 2008 multi-threaded STL library. If you use another version of the library, set the Runtime Library option to match the library version. If you use Visual Studio 2010, the instructions below should apply, except that x64_windows_vs2008 should be replaced with x64_windows_vs2010 whenever a path name is specified. It is important to remember that CPLEX Concert Technology using ISEN lab systems cannot be linked to Visual C++ 2010.

Step I. Create a Project Workspace in MS Visual Studio.
(1) Start Microsoft Visual Studio 2008.
(2) From the File menu, select New, and then New Project.
(3) The New Project dialog box appears.

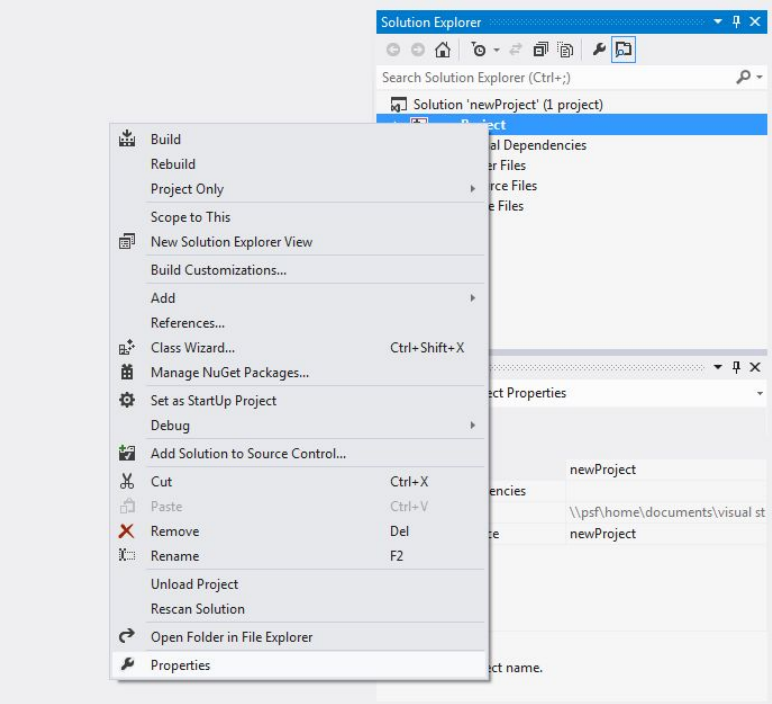
(4) In the Project Types pane, select **Visual C++ Projects**.
(5) In the Templates pane, select the **Win32 Project** icon.
(6) Fill in the project name, <ProjName>.
- If necessary, correct the location of the project (to <MYPROJDIR>)

(7) Click OK

(8) When the Win32 Application Wizard appears, click on Application Settings.
(9) Select **Console Application** as Application type.
(10) Make sure that **Empty project** is checked in Additional Options.
(11) Click Finish.

(12) Right Click on the Project Name in the Project Tree, choose Add New Item.
(13) Select C++ File (.cpp). Enter a valid file name and appropriate path.
(14) Click Open.

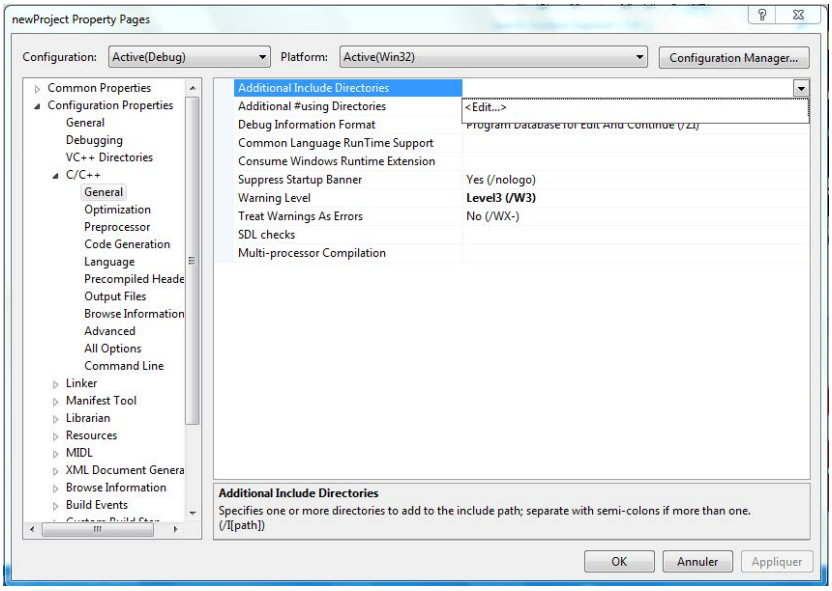
Step II. Link CPLEX and Concert libraries to the properties of your project in Visual Studio.
(1) From the Project menu, choose **Properties**.



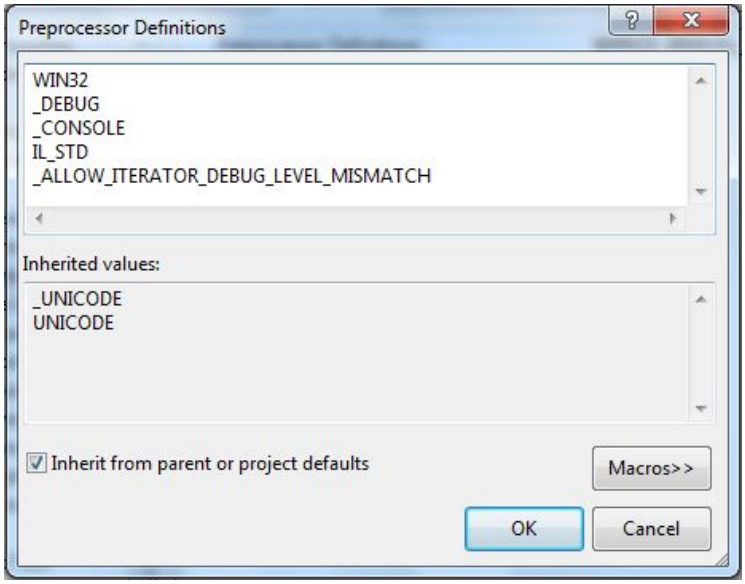
(2) The Property Pages dialog box appears.
(3) In the **Configuration drop-down list**, select **Release**.
// Or **Build** > **Configuration Manager** > select **Release**.
(4) Select **C/C++** in the **Configuration Properties tree**.

- Select ***General***:
  In the **Additional Include Directories** field, add the directories: <CPLEXDIR>\include, <CONCERTDIR>\include.

C:\Program Files\IBM\ILOG\CPLEX_Studio1263\cplex\include
C:\Program Files\IBM\ILOG\CPLEX_Studio1263\concert\include



- (R) Choose **Disabled** for **Debug Information Format**.
- (D) Choose **Program Database (/Zi)** for **Debug Information Format**.
- (R/D) Choose **No** for **Detect 64-bit Portability Issues**.
- (R) Select **Preprocessor**: Add **IL_STD** to the Preprocessor Definitions field. This defines the macro IL_STD which is needed to use the STL.
- (D) Select **Preprocessor**: Add **WIN32, NDEBUG, _CONSOLE**, and **IL_STD** to the Preprocessor Definitions field.
- (R/D) Select **Preprocessor**: Add **_ALLOW_ITERATOR_DEBUG_LEVEL_MISMATCH** to the Preprocessor Definitions field.



- (R/D) Select **Code Generation**: Set **Runtime Library** to **Multi-threaded** (**/MT**). (For Visual Studio 2012 and 2013, use **Multi-threaded DLL** (**/MD**))
- (D) Select **Optimization**: Choose **Disabled (/Od)** for **Optimization**

(5) Select **Linker** in the **Configuration Properties tree**.

- Select **Input** and then select **Additional Dependencies**.
- Add the files:
  wsock32.lib

<CPLEXDIR>\lib\x64_windows_vs2008\stat_mta\cplex121.lib
<CPLEXDIR>\lib\x64_windows_vs2008\stat_mta\ilocplex.lib
<CONCERTDIR>\lib\x64_windows_vs2008\stat_mta\concert.lib

wsock32.lib
C:\Program Files\IBM\ILOG\CPLEX_Studio1263\cplex\lib\x64_windows_vs2013\stat_mda\cplex1263.lib
C:\Program Files\IBM\ILOG\CPLEX_Studio1263\cplex\lib\x64_windows_vs2013\stat_mda\ilocplex.lib
C:\Program Files\IBM\ILOG\CPLEX_Studio1263\concert\lib\x64_windows_vs2013\stat_mda\concert.lib
(The latter two are necessary while using Concert Technology.)

- (D) Select **Debugging** and then in the **Generate Debug Info** field, select **/DEBUG**.

Additional Library Directories
C:\Program Files\IBM\ILOG\CPLEX_Studio1263\concert\lib\x64_windows_vs2013\stat_mda
C:\Program Files\IBM\ILOG\CPLEX_Studio1263\cplex\lib\x64_windows_vs2013\stat_mda
Input – Additional Dependencies
wsock32.lib
cplex1263.lib
ilocplex.lib
concert.lib

(6) Click OK to close the Property Pages dialog box.

(7) Next, you have to set the default project configuration. From the Build menu, select Configuration Manager.
(8) **(R)** Select **Release** in the **Active Solution Configuration drop-down list**.
(8) **(D)** Select **Debug** in the **Active Solution Configuration drop-down list**.

(9) Under **Active Solution Platform**, choose **New**.
(10) Type **x64** for the new platform.
(11) Choose copy settings from **Win32**.
(12) Click OK. (13) Click Close.

Step III. Add CPLEX DLL to the environment variable

- Either go to <CPLEXDIR>\bin\x64_win64 and copy the file cplex121.dll to folder <MYPROJDIR>\<ProjName>\<ProjName>

cplex1263.dll (to) <MYPROJDIR>\<ProjName>\<ProjName>

- Or do the following steps:
  (a) From the Start menu, select Control Panel.
  (b) In the Control Panel, select System.
  (c) In the System dialog, select the Advanced tab.
  (d) On the Advanced tab, click the Environment Variables button.
  (e) Add or extend the PATH environment variable. If the PATH environment variable already exists, extend it, like this: Name: PATH Value: <CPLEXDIR>\bin\x64_win64
  (f) Restart Visual Studio for this change in the operating system to take effect.