

LINKING ABAQUS® 6.13/6.12 WITH INTEL® FORTRAN COMPILER AND MICROSOFT® VISUAL STUDIO

(64-bit architecture systems only)

Operating Systems: Windows® Vista, 7, 8, 8.1

Simulia Abaqus is quite selective concerning the FORTRAN and C++ compilers to be used, their editions and also the linking environment, namely a program like MS Visual Studio. A common setup consists of an Intel compiler with MS Visual Studio. Not all Abaqus editions however, are able to be linked and function properly with every Intel Visual FORTRAN compiler and MS VS edition. The following instructions extensively describe the procedures to be followed in the setup and linking of Abaqus 6.12/6.13 with Intel Visual FORTRAN 11.1 and MS VS 2008. There are a few other alternatives when choosing the editions of Intel Compilers and MS VS, most of whom are summarized in the following table.

Abaqus 6.10/6.11/6.12	Abaqus 6.13	
Intel Visual Fortran 11.1	Intel Visual Fortran 11.1	Intel Parallel Studio XE13
Microsoft Visual Studio 2008	Microsoft Visual Studio 2008	Microsoft Visual Studio 2012
Microsoft Visual Studio Professional editions should be used. EPXRESS editions are not going to work. Note that Intel Parallel Studio XE13 best works with MS VS2012		

If you are not looking for instructions regarding the Abaqus product installation and only want to know how to link the programs, then go to directly to **Step 6**.

It is a common misconception that this kind of setup is sensitive to the order of installation, which is not true however. The only think to keep in mind is that the Fortran Compiler should be installed after installing Microsoft Visual Studio in order to integrate the Compiler with MS VS. Abaqus could be installed either before or after installing these two.

Abaqus 6.13 note:

A rather large number of Abaqus users is experiencing an error code titled after: **1073741819**. This error is typical of Intel Haswell (4th - 5th gen) processors and to solve it do the following. Go to the directory **C:\SIMULIA\Abaqus\6.13-x\code\bin** and scroll down to find the file named **mkl_avx2.dll**. Just rename it to **mkl_avx2.dll.11.0.0**. Keep in mind however, that is error may be caused by numerous other issues other than this avx2.dll file. Source code errors in a UMAT for instance, are going to cause such errors if the compiler is unable to identify it.

Although the order of installation does not affect the overall procedure as mentioned above, the order presented in the following steps would be **i. MS VS**, **ii. FORTRAN Compiler**, **iii. Abaqus** just for the sake of consistency.

STEPS 6a and 7a ARE FOR VISUAL STUDIO 2008 WITH INTEL VISUAL FORTRAN 11.1

STEPS 6b and 7b ARE FOR VISUAL STUDIO 2012 WITH INTEL PARALLEL STUDIO XE13

Step 1. Install Microsoft Visual Studio 2008/2012 (All Components)

Step 2. Install Intel FORTRAN Compiler/Intel Parallel Studio

(You must check the INTEGRATE WITH VISUAL STUDIO option during the installation)

Step 3. Install Abaqus 6.13

A step by step video showing the installation of Abaqus 6.13 can be found in the link below:

<http://www.youtube.com/watch?v=YRt4QHQBliw>

3.1. You will choose install SIMULIA FLEXNet license server, and then select

Just install the licensing utilities.

Note: If you have any Abaqus FLEXNet license server installed by a previous Abaqus version you must force stop the old server first and then uninstall the old server from the windows programs list.

3.2. Once the FLEXNet license server installation is complete, you will be asked if you want to continue by installing the remaining Abaqus products.

Caution: Do not proceed in installing Abaqus product. We are not ready yet.

You will not check anything in that dialogue at the moment (do not click next or yes and do not exit the setup. Just leave it as it is. We will return and continue the setup after Step 4)

Before Installing Abaqus products you have to properly configure the license server.

Step 4. Configure FLEXNet license server

4.1. Copy all files located inside the folder Crack and paste them into the License folder created by the installation of FLEXNet on your machine.

4.2. Now run lmttools.exe

4.3. Select tab labeled "Config/Service"

4.4. Add the path to lmgrd.exe , ABAQUS.lic and ABAQUS.log files that you previously copied to the License folder.

4.5. Select: Save Service

4.6. Select tab labeled: "Start/Stop/Reread" and click on Start Server. You will probably see a message Start Server Successful.

4.7. Now close lmttools and proceed with the installation of Abaqus Products.

Step 5. Configuring and finishing Abaqus Installation

You will see a window "License Server name" for "License Server 1 (REQUIRED)

You must type ---> **27011@<Computer Name>** without the < > symbols

Your computer name can be found if you click properties on the computer icon.

*If for instance your computer is named **Abaqus-PC** then you must type **27011@Abaqus-PC***

You do not have to type anything in the rest boxes.

You can now proceed with the installation and let it finish normally.

Step 6a. Combining Visual Studio 2008- Intel Visual FORTRAN 11.1- Abaqus 6.13

You must refresh your computer's environment variables, which can be found by clicking properties on Computer and then choosing Advanced System Settings

Then select Environment Variables.

You have to locate variable named "Path" and add two lines.

WARNING: You are strongly discouraged to modify any of the rest environment variables. Be extra careful at this point.

You must locate the **ifortvars.bat** and copy the directory. This file is usually located in a directory which looks like this:

```
C:\Program Files (x86)\Intel\Compiler\11.1\048\bin\
```

Once you find the exact directory in your system, you must copy it and paste it in the environment variable path like this:

```
;%C:\Program Files (x86)\Intel\Compiler\11.1\048\bin
```

Be careful! Do not miss the mark before C.

You must repeat this procedure for MS Visual Studio as well. You must locate the **vcvarsamd64.bat**. The path to that batch file usually looks like this:

```
C:\Program Files (x86)\Microsoft Visual Studio 9.0\VC\bin\amd64
```

Once you verify that **vcvarsamd64.bat** is located in the directory, you are ready to copy that directory to the "Path" environment variable we are modifying. The path should be copied like this:

```
;%C:\Program Files (x86)\Microsoft Visual Studio 9.0\VC\bin\amd64
```

We are almost done. Just a few lines to finish the set-up.

Be careful! Do not miss the mark before C.

Step 6b. Combining Visual Studio 2012- Intel Parallel Studio XE13- Abaqus 6.13

You must refresh your computer's environment variables, which can be found by clicking properties on Computer and then choosing Advanced System Settings

Then select Environment Variables.

You have to locate variable named "Path" and add two lines.

WARNING: You are strongly discouraged to modify any of the rest environment variables. Be extra careful at this point.

You must locate the **ifortvars.bat** and copy the directory. This file is usually located in a directory which looks like this:

C:\Program Files (x86)\Intel\Composer XE 2013\bin

Once you find the exact directory in your system, you must copy it and paste it in the environment variable path like this:

;C:\Program Files (x86)\Intel\Composer XE 2013\bin

Be careful! Do not miss the mark before C.

You must repeat this procedure for MS Visual Studio as well. You must locate the **vcvars64.bat**. The path to that batch file usually looks like this:

C:\Program Files (x86)\Microsoft Visual Studio 11.0\VC\bin\amd64

Once you verify that **vcvars64.bat** is located in the directory, you are ready to copy that directory to the "Path" environment variable we are modifying. The path should be copied like this:

;C:\Program Files (x86)\Microsoft Visual Studio 11.0\VC\bin\amd64

We are almost done. Just a few lines to finish the set-up.

Be careful! Do not miss the mark before C.

Step 7a. Invoke Intel FORTRAN Compiler 11.1 and Visual Studio 2008 every time Abaqus runs.

Locate the Abaqus Command file and the Abaqus CAE file.

The path to locate these files usually looks like this:

Abaqus 6.13: "C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Abaqus 6.13-1"

Abaqus 6.12: "C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Abaqus 6.12-1"

Abaqus Command: Right Click and then choose properties. On Target you will see this:

C:\Windows\SysWOW64\cmd.exe /k

You must change it into this:

"C:\Program Files (x86)\Intel\Compiler\11.1\048\bin\ifortvars.bat" intel64 vs2008 & C:\Windows\SysWOW64\cmd.exe /k

Save changes

Note: Notice that the icon that the shortcut icon that used to be a black display has now changed and shows some gears. We deliberately made this happen so as to distinguish if the Abaqus Command has been setup correctly.

Abaqus CAE: Right Click and choose properties as well. On Target you will see this:

Abaqus 6.13: C:\SIMULIA\Abaqus\Commands\abq6131.bat cae || pause

Abaqus 6.12: C:\SIMULIA\Abaqus\Commands\abq6121.bat cae || pause

You must change it into this:

Abaqus 6.13:

```
"C:\Program Files (x86)\Intel\Compiler\11.1\048\bin\ifortvars.bat" intel64 vs2008 &  
C:\SIMULIA\Abaqus\Commands\abq6131.bat cae || pause
```

Abaqus 6.12:

```
"C:\Program Files (x86)\Intel\Compiler\11.1\048\bin\ifortvars.bat" intel64 vs2008 &  
C:\SIMULIA\Abaqus\Commands\abq6121.bat cae || pause
```

Save changes

Step 7b. Invoke Intel Parallel Studio XE13 and Visual Studio 2012 every time Abaqus runs.

Locate the Abaqus Command file and the Abaqus CAE file.

The path to locate these files usually looks like this:

Abaqus 6.13: "C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Abaqus 6.13-1"

Abaqus 6.12: "C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Abaqus 6.12-1"

Abaqus Command: Right Click and then choose properties. On Target you will see this:

C:\Windows\SysWOW64\cmd.exe /k

You must change it into this:

```
"C:\Program Files (x86)\Intel\Composer XE 2013\bin\ifortvars.bat" intel64 vs2012  
& C:\Windows\SysWOW64\cmd.exe /k
```

Save changes

Note: Notice that the icon that the shortcut icon that used to be a black display has now changed and shows some gears. We deliberately made this happen so as to distinguish if the Abaqus Command has been setup correctly.

Abaqus CAE: Right Click and choose properties as well. On Target you will see this:

Abaqus 6.13: C:\SIMULIA\Abaqus\Commands\abq6131.bat cae || pause

Abaqus 6.12: C:\SIMULIA\Abaqus\Commands\abq6121.bat cae || pause

You must change it into this:

Abaqus 6.13:

```
"C:\Program Files (x86)\Intel\Composer XE 2013\bin\ifortvars.bat" intel64 vs2012 &  
C:\SIMULIA\Abaqus\Commands\abq6131.bat cae || pause
```

Abaqus 6.12:

```
"C:\Program Files (x86)\Intel\Composer XE 2013\bin\ifortvars.bat" intel64 vs2012 &  
C:\SIMULIA\Abaqus\Commands\abq6121.bat cae || pause
```

Save changes

Step A8. Verify

Open Abaqus Command and type:

- **abaqus verify –all** , to verify all Abaqus products.
- **abaqus verify –user_std** , to verify Abaqus Standard with user subroutines has been set up correctly.

Note: The Abaqus Command you opened must show one of these two screens, depending on your setup:

MS VS 2008 – Intel FORTRAN Compiler 11.1

```
Intel(R) Visual Fortran Intel(R) 64 Compiler Professional for applications running on Intel(R) 64, Version 11.1.048  
Copyright (C) 1985-2009 Intel Corporation. All rights reserved.  
Setting environment for using Microsoft Visual Studio 2008 Beta2 x64 tools.
```

MS VS 2012 – Intel Parallel Studio XE13

```
Intel(R) Parallel Studio XE 2013  
Copyright (C) 1985-2013 Intel Corporation. All rights reserved.  
Intel(R) Composer XE 2013 Update 5 (package 198)
```

Step A9. Polishing (Optional)

Note: The following changes are not necessary. If you followed the steps up to this point, you have already verified that your Abaqus version now runs and compiles User Subroutines. If you try to run a sample job with a user sub however, you may notice that the following messages appear in the .log file.

(col. 18) remark: <SUBROUTINE NAME> has been targeted for automatic cpu dispatch

There is a way to circumvent automatic cpu dispatching and eliminate these messages, which is described below:

Find the Abaqus environment file, named after **abaqus_v6.env** located in the following directory:

Abaqus 6.13: “C:\SIMULIA\Abaqus\6.13-1\SMA\site”

Abaqus 6.12: “C:\SIMULIA\Abaqus\6.12-1\SMA\site”

Open it with a program like **WordPad** and do the following:

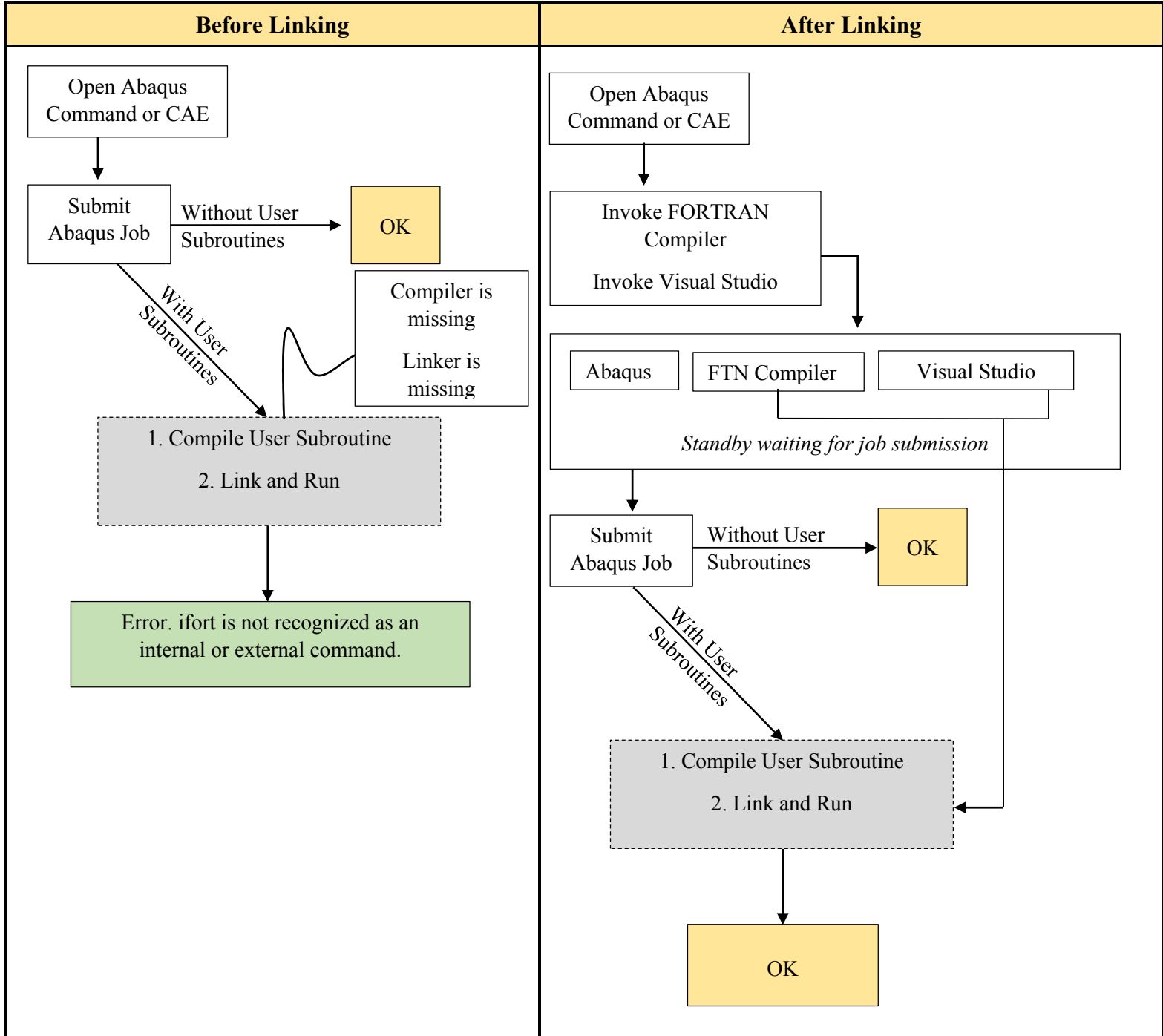
Scroll down to find the `compile_fortran` command and remove the `#` symbols before the commands. (This symbol is the comment descriptor in PYTHON®. By removing it, you activate internal optimization and debugging while compiling your source code.)

```
# '/Od', '/Ob0',          # <-- Optimization  
# '/Zi',                 # <-- Debugging
```

If your processor is not multi-threaded then those ('/Od', '/Ob0') commands may not appear in the env file or the # symbols may be already missing.

Between the commands '/Od', '/Ob0' there must be a comma descriptor ",". If one does not exist, then you may have to insert in manually.

If the User Subroutine verification "passed" and completed successfully then you are now ready to submit any Abaqus job with User Subroutines or without. Keep coding...



Disclaimer:

a. The user is solely responsible for any harm caused to his computer in the process of modifying the computer's environment variables. Derogations from the prescribed instructions may provoke the malfunctioning of other installed programs. The procedures presented above however are tested in numerous cases and certified to cause no harm whatsoever.

b. The statements and/or instructions in this document are neither endorsed nor approved by the legal owners of the software. This document solely intends to provide a solution to a rather common and obscure problem amongst Abaqus users.

For any corrections, suggestions or objections please feel free to contact me at nikvasios@yahoo.com

Sincerely,

Nick Vasios
Senior Undergraduate Mechanical Engineer
University of Thessaly, School of Engineering