# ADAPT 5 - Installation and Validation

## **1. System Requirements**

ADAPT 5 is supported for the following platforms:

HARDWARE	COMPILER	<b>OPERATING SYSTEM</b>
PC	Intel oneAPI Base Toolkit + oneAPI HPC Toolkit	Windows 11/10/8/7
	Requires separate installation of MVS <sup>1</sup> 2019 or 2022.	
PC	Intel Parallel Studio XE 2020 and XE 2019 (updates 3-5)	Windows 10/8/7
	Only Composer Edition w/Fortran needed.	
	Requires separate installation of MVS <sup>1</sup> 2019 or 2017.	
PC	Intel Parallel Studio XE 2019 (initial release, updates 1 & 2)	Windows 10/8/7
	Only Composer Edition w/Fortran needed. Distribution	
	will automatically install MVS <sup>1</sup> 2015 Shell & Libraries	
	when MVS 2017 or 2015 <u>not</u> already installed.	
PC	Intel Parallel Studio XE 2018	Windows 10/8/7
	Only Composer Edition w/Fortran needed. Distribution	
	will automatically install MVS <sup>1</sup> 2015 Shell & Libraries	
	when MVS 2017 or 2015 <u>not</u> already installed.	
PC	Intel Parallel Studio XE 2017	Windows 10/8/7
	Only Composer Edition w/Fortran needed. Distribution	
	will automatically install MVS <sup>1</sup> 2013 Shell & Libraries	
	when MVS 2017, '15, '13 or '12 not already installed.	
PC	Intel Parallel Studio XE 2016	Windows 10/8/7
	Only Composer Edition w/Fortran needed. Distribution	
	will automatically install MVS <sup>1</sup> 2013 Shell & Libraries	
	when MVS 2015,2013,2012 not already installed.	
PC	Intel Fortran 2013, 2011, 11.x, 10.x also supported	Windows 7

<sup>1</sup>Microsoft Visual Studio.

With its release of the oneAPI (Application Programming Interface) toolkit, <u>the Intel Fortran</u> <u>compiler is now available at no cost to all users</u> and does not require license files. The required version of Microsoft Visual Studio (Community edition) is also freely available.

The platforms listed in the table above are the only ones on which ADAPT 5 has been tested and validated.

## 2. Installing ADAPT

#### 2.1 Installation of ADAPT with Intel oneAPI

To install ADAPT, the following steps are required in order:

- 1) install Microsoft Visual Studio
- 2) install Intel oneAPI Toolkits
- 3) install ADAPT

Each of these installation steps is detailed below.

#### 2.1.1 Installing Microsoft Visual Studio – Free Community Edition

You can install either MVS 2019 or 2022. The description below is for MVS 2022.

From the link below, download and install the free Community Edition of MVS 2022:

https://visualstudio.microsoft.com/downloads/

Select the Visual Studio Community 2022 Edition from the list.

During installation, you will need to add the "Desktop development with C++" toolset by checking the box as illustrated in the screen shot below (your install screen may have a different arrangement – you may need to scroll to see all options). No other options (workloads) are needed, and you <u>do not</u> need to create a Visual Studio Account when the installation completes.



#### 2.1.2 Installing Intel oneAPI Base Toolkit and Intel HPC Toolkit

Installation of both Intel's oneAPI Base Toolkit and oneAPI high Performance Computing (HPC) Toolkit are required in that order. Use the following link to download the current versions (2024.0, as of this date) of each of these two toolkits:

https://www.intel.com/content/www/us/en/developer/tools/oneapi/toolkits.html#base-kit

Note: Some earlier versions of these Toolkits contain a bug that make them incompatible with ADAPT (and other software). Intel corrected this problem in its 2022.3 release.

<u>Intel oneAPI Base Toolkit</u>: The following are <u>some</u> of the windows that will appear during installation:

		V, 2024 <u>–</u>
Summary		
What's Included • Intel* DPC++ Compatibility • Intel* Distribution for GDB • Intel* oneAPI DPC++ Libra • Intel* oneAPI DPC++/C++ I • Intel* oneAPI DPC++/C++ • Intel* oneAPI Data Analyti • Intel* Integrated Performa • Intel* Integrated Performa	(Tool (2024.0.0) * (2024.0.0) ry (2022.3.0) ailding Blocks (2021.11.0) Compiler (2024.0.0) cs Library (2024.0.0) nce Primitives (2021.10.0) nce Primitives Cryptography (2021.9.0)	Integrate with IDE • Microsoft Visual Studio*.
Installation Location C:\Program Files (x86)\Intel	oneAPI	Required Space Installation size: 19.2 GB
Select your installation mode		
I accept the terms of the license	agreement	
Recommended Installati	on monly used features	Continue
Custom Installation Configure your installation		Customize
Create a customized offline package *Other names and brands inay be claimed	for future use as the property of others	Software Installer v.4.3.4.1166
əl.	Intel® oneAPI Base Toolkit, v. 2024	-
1 Wildcome	2 Integrate IDE Software Improvement Program	4 Irotal
Would you like to integrate with an ID	DE? (optional)	
Microsoft Visual Studio*		
Microsoft Visual Studio* This product can be integrated with the foll	owing versions of Microsoft Visual Studio. Select a version to integrate (optional):	
Microsoft Visual Studio* This product can be integrated with the foll Microsoft Visual Studio* 2022.	owing versions of Microsoft Visual Studio. Select a version to integrate (optional):	
Microsoft Visual Studio* This product can be integrated with the foll Microsoft Visual Studio* 2022. Microsoft Visual Studio* 2019, front New	owing versions of Microsoft Visual Shudio, Select a version to integrate (optional) nd on machine)	
Microsoft Visual Studio* This product can be integrated with the foll Microsoft Visual Studio* 2022. Microsoft Visual Studio* 2019 Evolver *Other names and brands may be claimed as the pr	owing versions of Microsoft Values Snudio, select a version to integrate (optional); nd on machine) operty of others	

intel	Intel® oneAPI Base Toolkit, v. 2024	- 0 ×
	1 2 3 Welcome Integrate IDE Software Improvement Pr	rogram Instal
	Installation in progress Integrity check complete	100%
	Process completed. The following tools have been installed auccessfully, Instel* oneAPI DPC++ Library Instel* oneAPI DPC++ Library Instel* oneAPI DPC++ (C++ Compiler Instel* oneAPI Data Analytics Library Instel* insegrated Performance Primitives Instel* oneAPI Data Analytics Library Instel* insegrated Performance Primitives Instel* insegrated Performance Primitives Instel* insegrated Performance Primitives Instel* Advior	1006
	V Instel * oneAPI Deep Neural Network Library	

You may see some warning messages (e.g., missing Intel Graphics Driver), which can be ignored.

## 2.1.3 Installing ADAPT

Download ADAPT 5 from the BMSR the web site via the link: <u>https://bmsr.usc.edu/software/adapt/</u>

The following windows (and others) will appear during installation:

🚰 ADAPT 5 — 🗆 🗙	ji∰ ADAPT 5 — □ X
Welcome to the ADAPT 5 Setup Wizard	Select Installation Folder
The installer will guide you through the steps required to install ADAPT 5 on your computer.	The installer will install ADAPT 5 to the following folder. To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
	Eolder: C:\BMSR\ADAPT 5\ Disk Cost
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.	Install ADAPT 5 for yourself, or for anyone who uses this computer: Everyone     Just me
Cancel < Back Next >	Cancel < Back Next >

🛃 ADAPT 5	– 🗆 X	Recompile Utility for ADAPT	15	– 🗆 ×
License Agreement	Ø		ADAPT 5 Compile	
Please take a moment to read the license agreement now. Agree", then "Next". Otherwise click "Cancel". I understand that my use of ADAPT is subje 1. I will not distribute ADAPT, in whole or p expressed permission of the Biomedical Simu 2. I understand that neither the University of nor the BMSR make any warranties, express free of errors or is consistent with any stand it will meet my requirements for any particul	If you accept the terms below, click "I ect to the following conditions: art, to others without the alations (BMSR). Southern California (USC) sed or implied, that ADAPT is ard of merchantability, or that ar application. I understand	Compiling Files SIM D SAMPLE ADPTSUBS PACKSUBS PLOTSUBS MEM ITS STS NPD		
	c Bask Maulto	-		
Cancer	K Dack Next >	Biomedical Simulation	s Resource	University of Southern California
Recompile Utility for ADAPT 5		– 🗆 ×	🛃 ADAPT 5	– 🗆 X
ADAPT	<u> 5 Compile</u>		Installation Complete	Ø
Creating Libraries			ADAPT 5 has been successfully installed.	
PACKSUBSLIB PLOTSUBSLIB ADPTWINIE ADPTSUBSLIB	Click here to Exit		Click "Close" to exit.	
	-			

After installing ADAPT it may be necessary to change the <u>Properties</u> of the following files in the ADAPT 5 folder: <u>ADAPT 5.exe</u>; <u>Recompile.exe</u>; <u>ValidateADAPT.exe</u>. For each, change the <u>Compatibility</u> as follows: <u>Privilege Level – Administrator (Run this program as administrator)</u>.

The installation can be validated by running the Validation application in the ADAPT Program Group (see Section 3 below). The pdf file for the <u>ADAPT User's Guide</u> can also be accessed via the ADAPT Program Group after installation.

The installation folder (default: C:\BMSR\ADAPT 5\) also includes the subfolders:

<u>Validation</u>, that contains all the model, data, parameter and control input files used to validate the ADAPT 5 installation

<u>\Example</u>, that includes the files used for the examples in this User's Guide <u>\Library</u>, contains all the model files that are available in the ADAPT Library

#### 2.2 Installation of ADAPT with Intel Parallel Studio XE 2020 and XE 2019 (updates 3-5)

To install ADAPT, the following steps are required in order:

- 1) install Microsoft Visual Studio
- 2) install Intel Parallel Studio XE 2020
- 3) install ADAPT

Each of these installation steps is detailed below.

#### 2.2.1 Installing Microsoft Visual Studio – Free Community Edition

Follow the MVS 2019 installation instructions given above in <u>Section 2.1.1</u>. Note: MVS 2017 is also compatible.

#### 2.2.2 Installing Intel Parallel Studio XE 2020 and XE 2019 (updates 3-5)

All versions of Intel Parallel Studio XE 2020 and XE 2019 (updates 3-5) can be installed following the details below: free academic (student & educator), free noncommercial open-source contributor, paid academic research, paid commercial and free trial versions.

Intel(R) Parallel Studio XE 2019 Update 4 Composer Edition for Fortran Windows*	Intel(R) Parallel Studio XE 2019 Update 4 Composer Edition for Fortran Windows*
Destination Directory: C:\Program Files (x86)\IntelSWTools Target platform architecture:	Warnings are detected. However they will not block the installation. You can continue with the installation. Click "Next" to proceed. Image: A standard of the installation of the installation of the installation. Click "Next" to proceed. Image: A standard of the installation of the installation of the installation of the installation of the installation. Click "Next" to proceed the studies of the installation. Click "Next" to proceed the installation. Click "Next" to prove the installation. Click "Next" to prove the installation. Click "Next" to proceed the installation. Click "Next" to prove t
Required: 3.5GB, Available: 324GB Select Recommended Select All	Da Charle Dark Novt Cancel
By clicking "Next", I acknowledge that I accept the <i>End User License Agreement (EULA)</i> .	

No other warning messages, besides the one in the right panel above should appear.

#### 2.2.3 Installing ADAPT

Follow the ADAPT installation instructions given above in Section 2.1.3.

## 2.3 Installing Intel Parallel Studio XE 2019 (initial & updates 1 & 2) and XE 2018 (all updates)

To install ADAPT, the following steps are required in order:

- 1) install Microsoft Visual Studio
- 2) install Intel Parallel Studio XE 2019 and 2018
- 3) install ADAPT

#### 2.3.1 Installing Microsoft Visual Studio

#### For paid commercial and academic versions of Intel Parallel Studio XE

For the 2019 and 2018 versions of Intel Parallel Studio XE it is <u>NOT necessary</u> to separately install Microsoft Visual Studio (MVS). The Intel Fortran download will include a version of MVS (MVS 2015 Shell). It will, however, be necessary to first install Microsoft Windows Software Development Kit (SDK) 10 <u>before</u> installing the Intel Parallel Studio. To do so, install the version of Windows SDK from the following link:

https://drive.google.com/open?id=19GJmvkso3PosPflK4aUP77yKEwquHJvw.

Skip to the installation instructions for Intel Parallel Studio XE 2019 and 2018 in Section 2.3.2 below.

For evaluation licenses or the "free tools" license obtained through the free software program for students and educators

For these versions, the MVS 2015 Shell is <u>not</u> included with the Intel Fortran as it is with the paid versions. Therefore, you must have <u>MVS installed separately</u> (MVS 2017 or 2015, previous versions are not supported) as described below.

From the link below, download and install MVS 2017 or 2015:

https://visualstudio.microsoft.com/vs/older-downloads/

In addition, you will need to ensure that 'Common Tools for Visual C++ 2015' component from Visual Studio is installed. This component is <u>not</u> installed by default in MVS 2017 and 2015. Please see the following link to install this component for MVS 2017 or MVS 2015:

https://software.intel.com/en-us/articles/intel-c-fortran-compilers-for-windowsintegration-into-microsoft-visual-studio-2017

## 2.3.2 Installing Intel Parallel Studio XE 2019 and 2018

#### For paid commercial and academic versions of Intel Parallel Studio XE

If SDK 10 is installed properly, you will see the following window during Intel Parallel Studio XE 2018 installation (XE 2019 is similar).

rogra		
	am Files (x80) (IntelSW IOOIS	
et pla	atform architecture: 🔽 IA-32 🔽 Intel® 64	
~	ntel Visual Fortran Compiler 18.0 for Windows* Target	_
~	Microsoft Visual Studio 2015 Shell*	
	Intel Visual Fortran Compiler for IA-32 Intel Visual Fortran Compiler for Intel® 64	
	ntel Math Kernel Library 2018 for Windows* Target	
	ntel Debugger Extension 7.12	
_		
h	ntel Debugger Extension 7.12 will not be installed, since this compo equires Intel(R) C++ / Visual Fortran Compiler for Intel(R) 64 and	onen
h n	ntel Debugger Extension 7.12 will not be installed, since this compo equires Intel(R) C++ / Visual Fortran Compiler for Intel(R) 64 and	onen
	ntel Math Kernel Library 2018 for Windows* Target ntel Debugger Extension 7.12	

For evaluation licenses or the "free tools" license obtained through the free software program for students and educators

If MVS is installed properly, you will see the following window during Intel Parallel Studio XE 2018 installation (XE 2019 is similar).

estina	ation Directory:
:\Pro	gram Files (x86)\IntelSWTools
reat	national architectures 2 10-32 2 Intel® 64
get	
~	Intel Visual Fortran Compiler 18.0 for Windows" larget Microsoft Visual Studio 2015 Shell*
	Microsoft Visual Studio 2015 Shell* can not be installed because Microsoft Visual Studio* 2017 is installed or Microsoft Windows SDK
	✓ Intel Visual Fortran Compiler for IA-32
	✓ Intel Visual Fortran Compiler for Intel <sup>®</sup> 64
	Intel Math Kernel Library 2018 for Windows* Target
8	Intel MKL for C/C++
ň	Intel Debugger Extension 7.12
_	Intel Debugger Extension 7.12 will not be installed, since this component

#### 2.3.3 Installing ADAPT

Follow the ADAPT installation instructions given above in Section 2.1.3.

<u>\*\*\* Note</u>: When using MVS 2017, there is now a 15-20 sec delay to invoke the Intel Fortran Compiler due to licensing checking. If the "Link" button is selecting before compilation is complete, you will see the message "Error compiling Model File".

Update: December 28, 2023

## 3. Validating the Installation

After successful installation, the installation can be validated by running the Validation application in the ADAPT 5 Program Group as indicated shown below.

🖬 ADAPT 5 🔹 🕨	D ADAPT 5
	🖸 RecompileADAPT
	📄 User's Guide.pdf
	🔟 ValidateADAPT

This process will run 29 examples invoking various features of the ADAPT applications and will compare the results obtain from the user's installation to the set of results distributed with ADAPT. If these two sets of results agree, the window shown below will be displayed. The full set of results from the validation (all files created by ADAPT) are archived in the validation folder. ADAPT 5 has been validated for all the platforms listed in in the table above.

Installation Validation Utility for ADAPT 5	-		×
ADAPT 5 Installation Val	lidation		
Results of Installation Validtion			
ADAPT Installation Status: VALIDATED Date of Validation Run: Thu 3/29/2018 12:29:3 File containing this notification: C:\BMSR\ADAI	8 PM PT 5\AdaptValidationLog.txt		
<u> </u>			
Biomedical Simulations Resource	University of Southern Ca	liforn	ia

The file <u>installSTATUS.txt</u> in the top level of the ADAPT installation folder also indicates the Installation Status.

If ADAPT is uninstalled, all the files in the installation director will be removed, including those in the <u>Validation</u>, <u>Example</u> and <u>Library</u> folders and any files created by the user. Thus, the user should not place his or her project files in the ADAPT installation folder. The <u>globals.inc</u> file, however, <u>with any changes made by the user will be retained</u> and used on reinstallation of ADAPT 5 (see Appendix A of the User's Guide).