



INSTALLATION GUIDE
VERSION 2016



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This document describes how to run the AST software. It does not attempt to discuss all the concepts of computational fluid dynamics required to obtain successful solutions. It is the user's responsibility to determine if he/she has sufficient knowledge and understanding of fluid dynamics to apply this software appropriately.

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Table of Contents

1. Introduction	1-1
1.1. Symbols	1-1
1.2. Configurations	1-1
2. Software Installation	2-1
2.1. Supported Platforms and Build Environment	2-1
2.1.1. BOOST, EXCITE, FIRE® and FIRE® M	2-1
2.1.2. Model.CONNECT™	2-1
2.1.3. CRUISE and CRUISE M	2-2
2.2. Hardware Requirements	2-3
2.3. Software Requirements	2-3
3. Installation For Windows	3-1
3.1. Start Up	3-1
3.2. Installation	3-1
3.2.1. Introduction	3-2
3.2.2. Registration Information	3-2
3.2.3. License Agreement	3-3
3.2.4. Installation Folder	3-4
3.2.5. Platform Selection	3-4
3.2.6. Installation Set	3-5
3.2.7. Server Installation	3-6
3.2.8. Shortcut Folder	3-6
3.2.9. Associate File Types	3-6
3.2.10. License Definition	3-7
3.2.11. Only For CRUISE M: ARTE.Lab SDK Installation	3-9
3.2.12. Pre-Installation Summary	3-10
3.2.13. Installation Progress	3-10
3.2.14. Installation Complete	3-11
3.2.15. Post Installation	3-12
3.3. Verifying the Installation	3-12
3.3.1. AVL AST Product GUI	3-12
3.3.2. Simulation Program	3-13
3.3.3. Software Administration Tool	3-13
3.4. Windows Server Installation	3-13
3.5. Silent Installations	3-13
3.6. Uninstall	3-14
3.6.1. Uninstall Introduction	3-14
3.6.2. Uninstall Progress	3-14
3.6.3. Uninstall Complete	3-15
4. Installation for Linux	4-1
4.1. Mounting the DVD	4-1
4.2. Mounting the iso Package	4-1

4.3. Run the Installer	4-2
4.3.1. Introduction	4-2
4.3.2. License Agreement	4-2
4.3.3. Installation Folder	4-2
4.3.4. Installation Set	4-2
4.3.5. License Definition	4-3
4.3.6. Pre-Installation Summary	4-3
4.3.7. Installation Progress	4-3
4.3.8. Modify Login Scripts	4-4
4.3.9. Post-Installation Configuration	4-4
4.3.10. Installation Complete	4-4
4.4. Environment Variables	4-5
4.4.1. How to Setup Environment Variables	4-5
4.4.2. Important Environment Variables	4-5
4.5. Verifying the Installation	4-6
4.5.1. AVL AST product GUI	4-6
4.5.2. Simulation Program	4-6
4.5.3. Software Administration Tool	4-6
4.6. Frequently Asked Questions	4-7
4.7. Silent Installations	4-8
4.8. Uninstall	4-8
5. Settings and Templates	5-1
5.1. Location of Settings and Templates	5-1
5.1.1. General	5-1
5.1.2. AVL Workspace	5-2
5.2. Location of Temporary Files	5-2
5.2.1. AVL Workspace	5-2
5.3. Browser and Editor Settings	5-2
5.3.1. AVL Workspace	5-3
6. Licensing	6-1
6.1. Requesting a license	6-1
6.2. Expected FlexNet Hostids	6-1
7. ANSYS Interface Installation	7-1
8. Windows MPI Environment Installation	8-1
8.1. 3 rd Party Software Installation	8-1
8.1.1. MPI Remote Connection Software	8-1
8.1.2. AST Product Runtime Environment	8-2
8.2. AST Product Software Installation	8-3
8.3. MPI Environment Setup	8-3
8.4. MPI Project Folder	8-4
8.5. AVL FIRE Job Submission	8-5
8.6. MS Windows Firewall	8-6
8.7. Checklist	8-7
8.8. Diagnosis	8-7

9. User Function Environment Setup	9-1
9.1. Environment Setup	9-1
9.2. MPI	9-2

List of Figures

Figure 3-1: Installation Extraction.....	3-2
Figure 3-2: Introduction.....	3-2
Figure 3-3: Registration Information	3-3
Figure 3-4: License Agreement.....	3-3
Figure 3-5: Choose Install Folder	3-4
Figure 3-6: Platform Selection.....	3-5
Figure 3-7: Installation Set	3-5
Figure 3-8: Shortcut Folder	3-6
Figure 3-9: Associate File Types.....	3-7
Figure 3-10: License Definition - No Licensing Configuration.....	3-7
Figure 3-11: Advanced License Configuration Settings.....	3-8
Figure 3-12: ARTE.Lab SDK Installation	3-9
Figure 3-13: Existing ARTE.Lab SDK Installation	3-9
Figure 3-14: Pre-Installation Summary	3-10
Figure 3-15: Installation Progress	3-11
Figure 3-16: Installation Complete.....	3-11
Figure 3-17: AST Launcher Window	3-12
Figure 3-18: Control Panel	3-14
Figure 3-19: Uninstall Progress.....	3-15
Figure 4-1: Modify Login Scripts	4-4
Figure 5-1: Show Hidden Files and Folders	5-1
Figure 8-1: Platform MPI Installation Components.....	8-2
Figure 8-2: MPI Simulation Mode	8-5
Figure 8-3: Advanced Job Setup Settings.....	8-6

1. INTRODUCTION

This document describes the basic methods for installing the AST software from DVD on Linux platforms and Intel Processor-based PC's running under Windows.

1.1. Symbols

The following symbols are used throughout this manual. Safety warnings must be strictly observed during operation and service of the system or its components.



Caution: Cautions describe conditions, practices or procedures which could result in damage to, or destruction of data if not strictly observed or remedied.



Note: Notes provide important supplementary information.

Convention	Meaning
<i>Italics</i>	For emphasis, to introduce a new term or for manual titles.
<code>monospace</code>	To indicate a command, a program or a file name, messages, input / output on a screen, file contents or object names.
MenuOpt	A MenuOpt font is used for the names of menu options, submenus and screen buttons.

1.2. Configurations

Software configurations described in this manual were in effect on the publication date. It is the user's responsibility to verify the configuration of the equipment before applying procedures.

2. SOFTWARE INSTALLATION

2.1. Supported Platforms and Build Environment

2.1.1. BOOST, EXCITE, FIRE[®] and FIRE[®] M

The following platforms and compilers are supported:

Platform & Operating Systems	Fortran 90 Compiler [*]	C++ Compiler [*]	MPI (FIRE [®] only)	License Manager
INTEL Architecture (64-bit) Windows 7/8/10 Windows Server 2008 R2 and Windows Server 2012	Intel Fortran 14.0.3.202	Visual C++ [®] 2010 SP1 Pro	Platform-MPI 8.2.1 ^{**})	FlexNet Licensing 11.12
INTEL EM64T and AMD64 Architecture (64-bit) Linux ¹⁾ RHEL 5 and 6 SLES 11	Intel Fortran 12.1.7.367	Intel C++ 12.1.7.367	Platform-MPI 8.2.1	FlexNet Licensing 11.12

RHEL – Red Hat[®] Enterprise Linux [®]

SLES – SUSE[®] Linux Enterprise Server

FIRE[®] only:

¹⁾ A CATIA v5 CAD Translator is not available under Linux

^{*}) compiler installations are required for compiling user functions. To execute the software the respective runtime environment is required.

^{**}) compiling user functions for MPI on Microsoft Windows requires a valid Perl installation. A Perl installation package can be downloaded from e.g. [ActiveState](http://ActiveState.com).

The compiler libraries are required for the Interactive products and the Solver during run-time. Compiler licenses are required for the Solver only if user-functions or other source files are to be compiled and linked.

2.1.2. Model.CONNECT[™]

The following platforms are supported:

Platform & Operating Systems		Model.CONNECT [™]	C ++ compiler
32-bit Architecture Windows 7/8/10	Solver	X	Visual C++ [®] 2010 SP1
64-bit Architecture Windows 7/8/10	Pre- /Post	X	–
	Solver	X	Visual C++ [®] 2010 SP1

2.1.3. CRUISE and CRUISE M

The following platforms are supported:

Platform & Operating Systems		CRUISE	CRUISE M	C ++ compiler
32-bit Architecture Windows 7/8/10	Solver	X	X	Visual C++® 2008 Pro/Express Visual C++® 2010 SP1
32-bit Architecture Linux: RHEL 5 and 6, SLES 11	Solver	X	X	Intel C++ v11.1.059
64-bit Architecture Windows 7/8/10	Pre-/Post	X	X	–
	Solver	X	X	Visual C++® 2008 Pro/Express Visual C++® 2010 SP1
64-bit Architecture Linux: RHEL 5 and 6, SLES 11	Solver	X	X	Intel C++ v12.1.7.367 v2011 SP1, update 13.
ia32-ASCET-v6.1	Solver	X	X	Visual C++® 2008 Pro/Express Visual C++® 2010 SP1
ia32-INTECRIO-v4.1	Solver	X	X	Visual C++® 2008 Pro/Express Visual C++® 2010 SP1
ia32-dSPACE-DS1006	Solver	X	X	Cross Compiler/SDK under Windows
ia32-ETAS-v5.x Linux-based	Solver	X	X	Intel C++ v11.1.059
ia32-INtime-v3.1x INtime OS under Windows	Solver	X	X	Visual C++® 2008 Pro with INtime SDK
ia32-NIVerstand-v2010 Windows-based	Solver	X	X	Visual C++® 2008 Pro with special settings
ia32-OPAL-RT-v10.4 Linux-based	Solver	X	–	Intel C++ v11.1.059
InMotion CarMaker/CarSim TruckMaker/TruckSim Linux 32-bit-based (for HIL) Windows 32-bit-based (for office)	Solver	X	X	Intel C++ v11.1.059 Visual C++® 2008 Pro/Express Visual C++® 2010 SP1

RHEL – Red Hat® Enterprise Linux ®

SLES – SUSE® Linux Enterprise Server

2.2. Hardware Requirements

The minimum hardware requirements for Linux and Windows are:

Processor(s)	recent x86 or x86_64 processor architecture
Main Memory	8 GB*
Graphic card	hardware OpenGL & Direct-X support / 1GB
HDD	30 GB**

* AVL Workspace and FIRE: approx. 100 MByte per 100,000 cells to calculate

** AVL Workspace and FIRE: for the software only (all interactive tools and the solver, excluding examples)

The graphic boards used on Linux and Windows PCs for testing AVL AST software are Nvidia Quadro 2000 and Nvidia Quadro K4200 boards.

2.3. Software Requirements

- Internet Browser
(Microsoft Internet Explorer, Mozilla Firefox or Google Chrome on Windows;
Mozilla Firefox, Google Chrome or Opera on Linux/Unix)
Note: Internet Explorer 8 and higher and Firefox 14 are required for the html online documentation.

Note: Google Chrome the option `--allow-file-access-from-files` should be used to overcome the problem that javascript is not executed as Google Chrome browser will not load the local file by default due to security reasons. This influences the documentation main page and the documentation provided in HTML format.
- PDF Reader
e.g. Adobe Acrobat Reader for Windows and Linux

3. INSTALLATION FOR WINDOWS

An ISO image of the installation DVD can be downloaded from the Service World and then mounted directly by using a program like SlySoft

(<http://www.slysoft.com/en/virtual-clonedrive.html>)

The ISO image can also be extracted using certain archive utilities (e.g. 7-Zip, <http://www.7-zip.org/>) or can also be mounted using operating system features starting with MS Windows 8.

Alternatively, the ISO image can be burned onto a DVD and installed as described below.



Note: When downloading, the Internet Explorer may rename the executable/ISO image by adding [], please remove these and ensure the executable has the original name.

The following steps are necessary to perform the installation:

1. Insert the installation media and/or mount the DVD/ISO image.
2. Run the installation GUI.
3. Setup new path.
4. Setup the license.

Additionally, the following third party tools are installed:

- Microsoft C++ Redistributable
- Platform MPI (AVL FIRE® only) – refer to chapter 8 for further information.



Note: To avoid problems during installation please consider temporarily switching off virus and malware protection as such utilities might considerably increase the installation duration and might interfere and corrupt the installation process.

3.1. Start Up

First insert the DVD in the PC or mount the ISO image. If the setup program does not start automatically, perform the following steps:

1. Use the Explorer to show the contents of the DVD.
2. Find the file `setup.exe`.
3. Execute this file by double clicking it.



Note: A user account control dialog might pop up asking to allow the installer to make changes to the computer. Please confirm by clicking **Yes** to continue.

3.2. Installation

As soon as the AVL AST software installer is started, it temporarily extracts the required resources. A window similar to the following displays the progress.

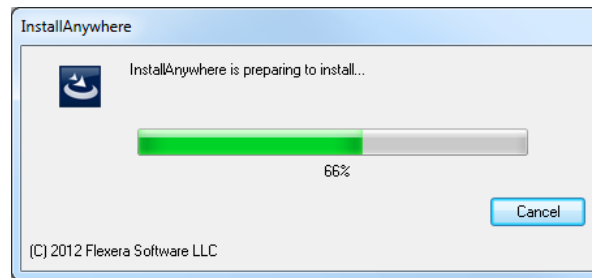


Figure 3-1: Installation Extraction

To navigate through the following dialogs click **Next** to proceed to the next dialog or, if necessary, click **Previous** to go one step back.

Cancel can be used at any time to abort the installation.

3.2.1. Introduction

The Introduction dialog gives basic information about the installation and allows this document to be opened in a PDF document reader.

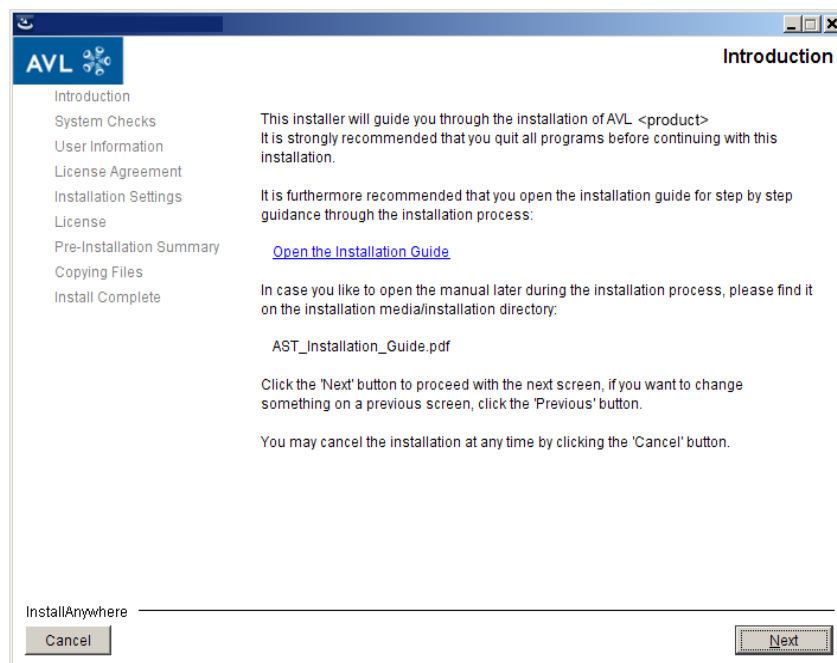


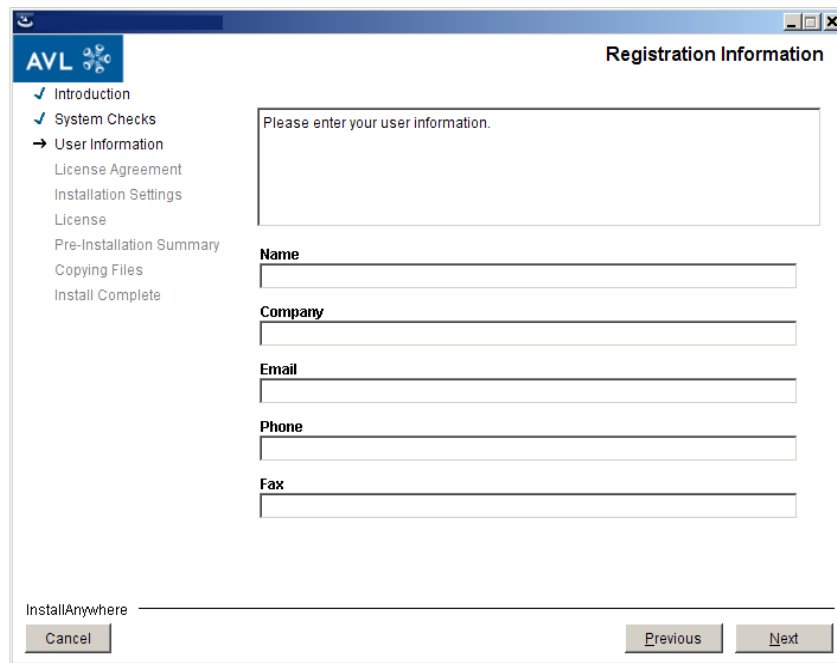
Figure 3-2: Introduction

Click on the provided link to open this document and/or click **Next** to continue.

3.2.2. Registration Information

To support the user in various workflows (e.g. preparing a license request form) the installer gathers user information, like name, company name, etc., in the Registration Information dialog.

Please enter at least **Name**, **Company** and **Email** and continue by clicking **Next**.

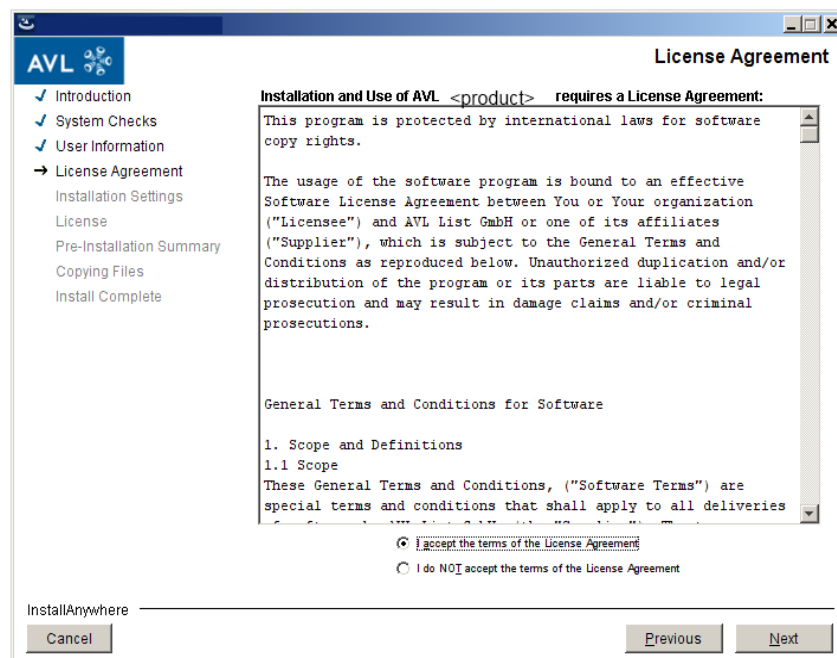


The image shows the 'Registration Information' dialog box in the AVL software installer. The left sidebar contains a list of steps: Introduction, System Checks, User Information (highlighted), License Agreement, Installation Settings, License, Pre-Installation Summary, Copying Files, and Install Complete. The main area is titled 'Registration Information' and contains a text box for 'Please enter your user information.' Below this are input fields for Name, Company, Email, Phone, and Fax. At the bottom, there is a 'Cancel' button and 'Previous' and 'Next' buttons. The 'InstallAnywhere' logo is visible in the bottom left corner.

Figure 3-3: Registration Information

3.2.3. License Agreement

The License Agreement dialog asks to confirm the AVL AST Software License Agreement and lists licenses and acknowledgements for incorporated software.



The image shows the 'License Agreement' dialog box in the AVL software installer. The left sidebar contains a list of steps: Introduction, System Checks, User Information, License Agreement (highlighted), Installation Settings, License, Pre-Installation Summary, Copying Files, and Install Complete. The main area is titled 'License Agreement' and contains the following text: 'Installation and Use of AVL. <product> requires a License Agreement: This program is protected by international laws for software copy rights. The usage of the software program is bound to an effective Software License Agreement between You or Your organization ("Licensee") and AVL List GmbH or one of its affiliates ("Supplier"), which is subject to the General Terms and Conditions as reproduced below. Unauthorized duplication and/or distribution of the program or its parts are liable to legal prosecution and may result in damage claims and/or criminal prosecutions. General Terms and Conditions for Software 1. Scope and Definitions 1.1 Scope These General Terms and Conditions, ("Software Terms") are special terms and conditions that shall apply to all deliveries'. Below the text, there are two radio buttons: 'I accept the terms of the License Agreement' (selected) and 'I do NOT accept the terms of the License Agreement'. At the bottom, there is a 'Cancel' button and 'Previous' and 'Next' buttons. The 'InstallAnywhere' logo is visible in the bottom left corner.

Figure 3-4: License Agreement

To continue please select **I accept the terms of the License Agreement** and then click **Next**.

3.2.4. Installation Folder

The Choose Install Folder dialog allows the target folder to be specified where the installer installs the software.

If this is the first AVL AST product being installed on this computer, the operating systems default will be suggested.

To change the default either type in the installation directory or click **Choose** to browse to the desired location.

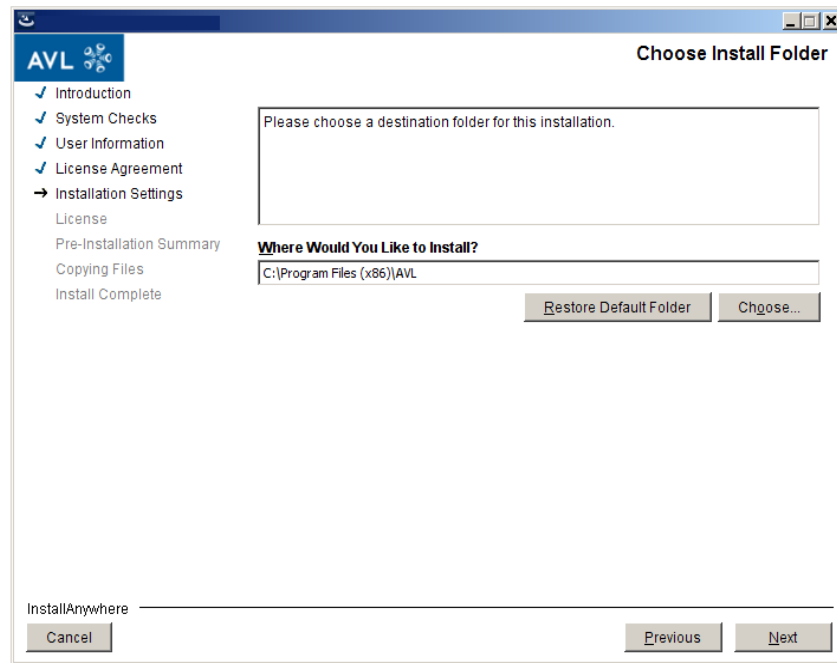


Figure 3-5: Choose Install Folder

Continue the installation by accepting/specifying the installation folder and clicking **Next**.

3.2.5. Platform Selection

The Windows installer offers the possibility to decide which platforms will be installed. The default platform for the current computer is automatically selected but it is possible to change the selected default or add additional platforms if required.

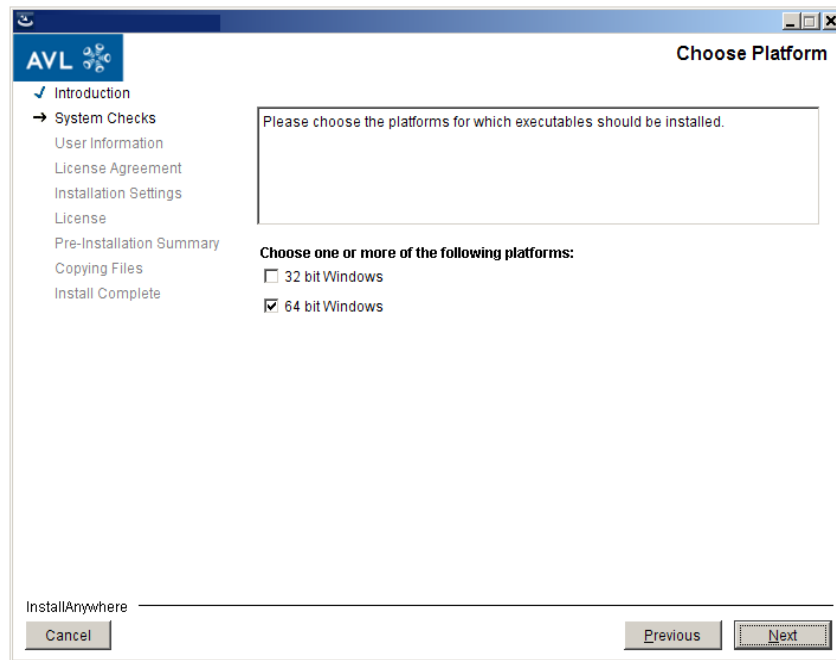


Figure 3-6: Platform Selection

Select the desired platform(s) and click **Next**.

3.2.6. Installation Set

Depending on the product being installed, one or more predefined Installation Sets might be available.

Please choose the one matching the installation scope best or use the **Custom** option to define a user defined set.

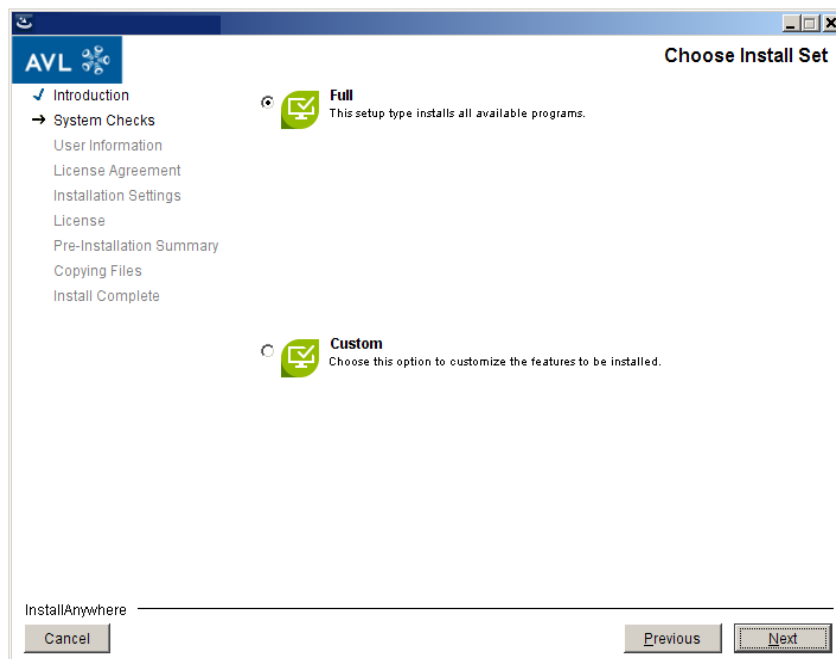


Figure 3-7: Installation Set

Select the desired installation set and click **Next** to continue.

If the **Custom** option is selected, an additional dialog will open, listing the available product features. Select/deselect the various features in this dialog to define the installation range and click **Next** to continue.

3.2.7. Server Installation

If this is a server installation, please select **Yes**.

Activating this option creates a configuration folder in the server installation, which allows site level configurations for hosts accessing this installation.

Not selecting this option creates a folder in the local Program Data folder, i.e. the configuration is only available on this computer.

3.2.8. Shortcut Folder

The Choose Shortcut Folder dialog has the available options for the product shortcut creation. The user can decide which shortcuts will be automatically created during the installation.

Available options include the product **Programs** menu folder creation and its name, a shortcut for the currently installed product version and a shortcut for starting the highest available version.

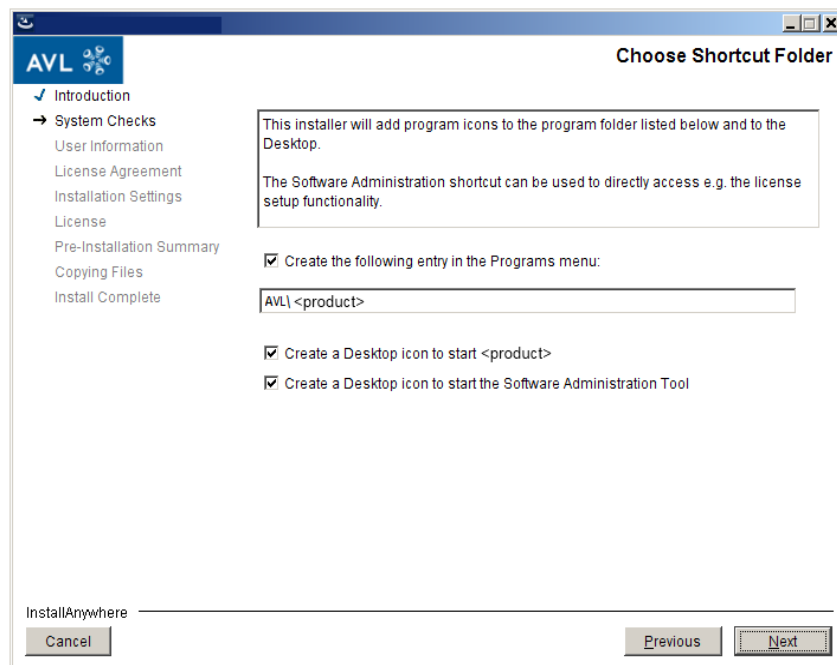


Figure 3-8: Shortcut Folder

Select/deselect the desired option to meet the user's request and click **Next** to continue.

3.2.9. Associate File Types

For some AVL AST products it is possible to associate them with the product.



Note: This dialog is optional and might not appear during the installation.

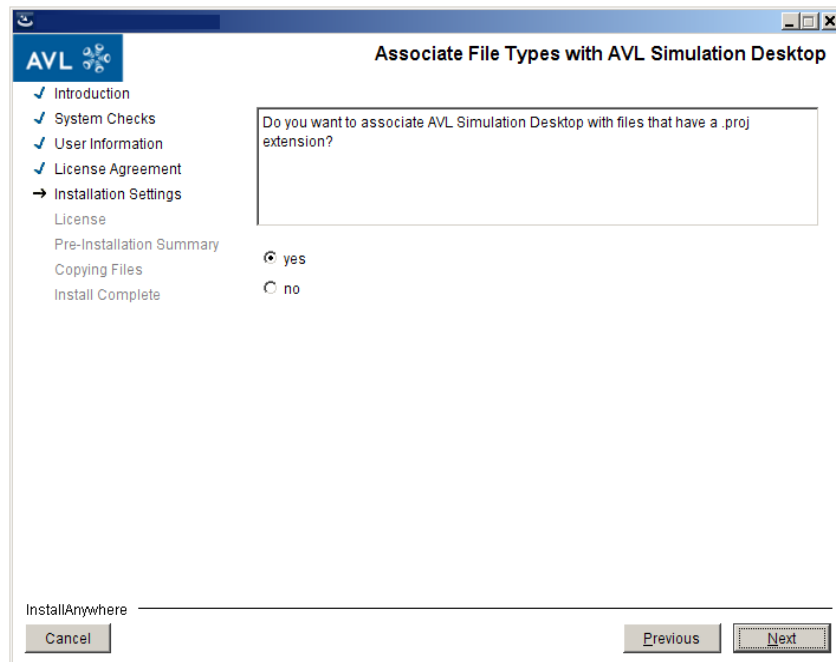


Figure 3-9: Associate File Types

Select the desired associations and click **Next** to continue.

3.2.10. License Definition

The license definition offers three configuration options and an advanced option which combines all three that can be defined manually:

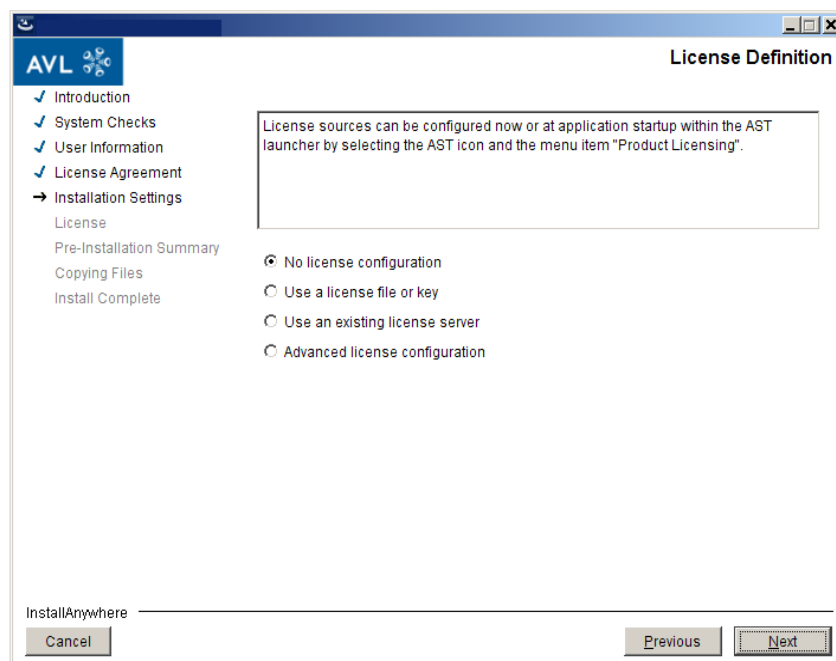


Figure 3-10: License Definition - No Licensing Configuration

- **No license server configuration**

This option should be used if a license configuration already exists or if the license configuration will be done after the installation.

Select **No license server configuration** and click **Next** to continue.

- **Use a license file or key**

If a license file or key already exists, this option can be used to refer to this license. Click on **Load License File** to load the license key or copy and paste the license key into the input field.

Click **Next** to continue.

- **Use an existing license server**

If a license file/server already exists/is running, this option can be used to refer to this license. Enter the name and the port number of your license server.

Click **Next** to continue.

- **Advanced license configuration**

This option is for experienced users of license setups. It allows a license file to be added, a license server to the license path to be defined or the license path to be manipulated manually.

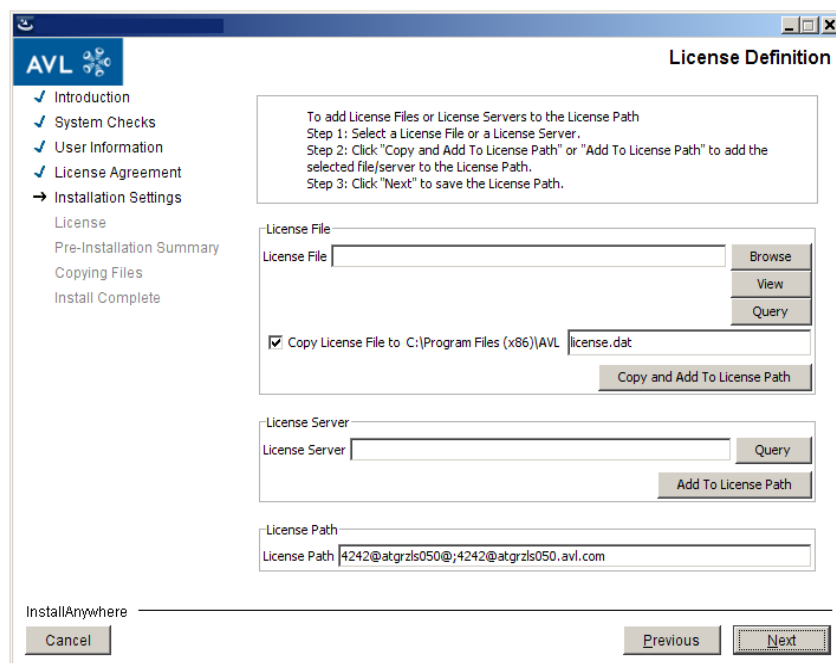


Figure 3-11: Advanced License Configuration Settings

For more information about the license server and the typical license server configuration use cases, refer to the [AST Licensing Guide](#).

If you have problems setting up the license server and for questions concerning AVL AST licensing, please contact ast_licensing@avl.com.

Click **Next** to continue.

3.2.11. Only For CRUISE M: ARTE.Lab SDK Installation

When installing CRUISE M on Windows, an ARTE.Lab SDK installation is required. The installer detects if a MATLAB installation exists and then allows ARTE.Lab SDK to be installed.

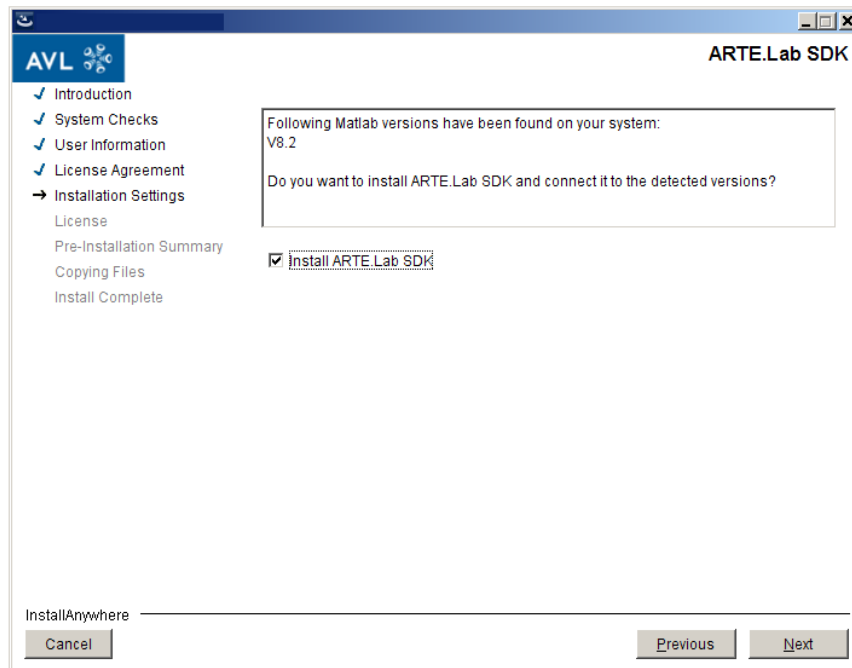


Figure 3-12: ARTE.Lab SDK Installation

If an ARTE.Lab SDK installation exists, the following information provides options to deal with the conflict issue.

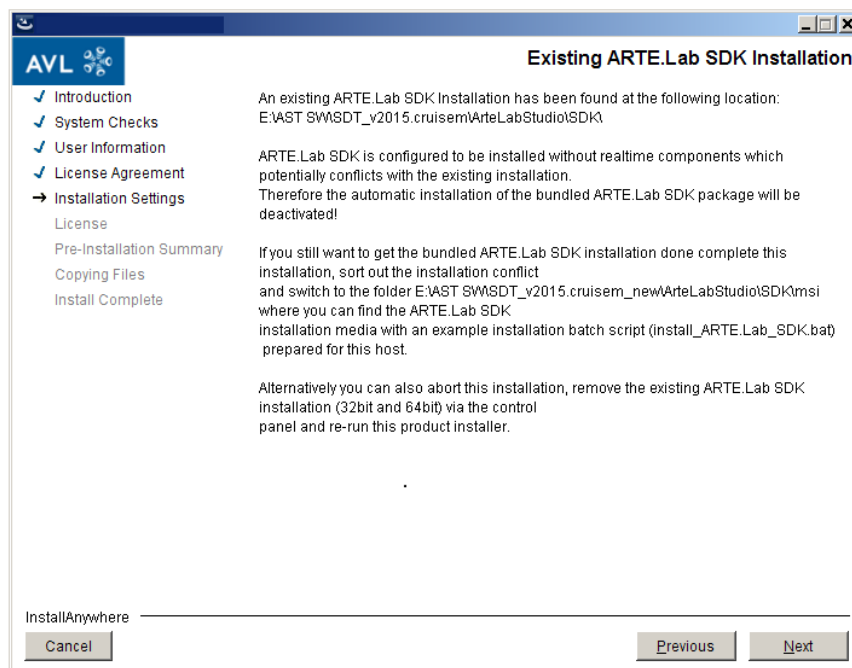


Figure 3-13: Existing ARTE.Lab SDK Installation

3.2.12. Pre-Installation Summary

The Pre-Installation Summary dialog summarizes the basic installation information before the installer starts transferring files to the specified installation target directory.

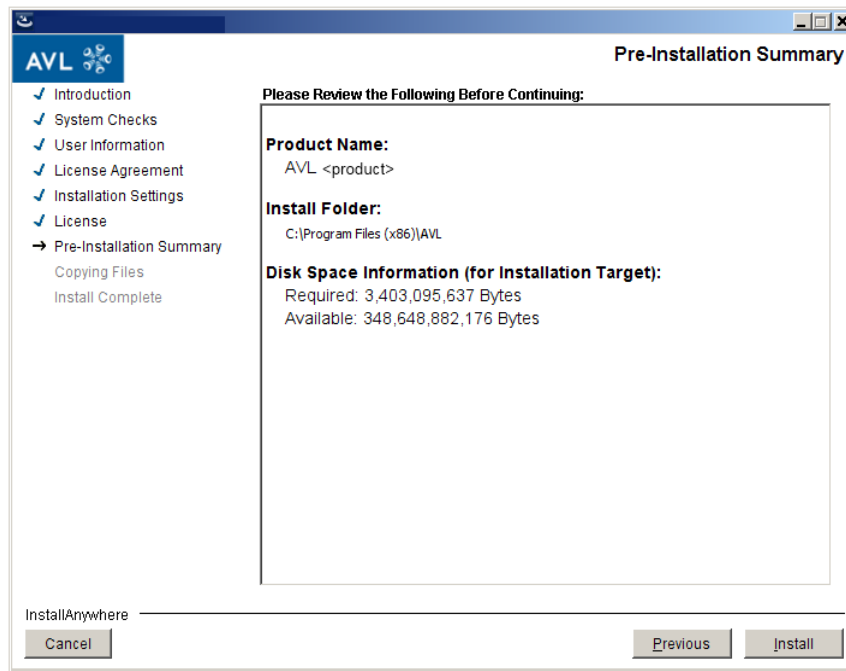


Figure 3-14: Pre-Installation Summary

Click **Next** to start the file copy process.

3.2.13. Installation Progress

The Installation Progress dialog is non-interactive and is there primarily to inform the user about the installation progress.



Note: If an AVL AST product is already installed in the installation target folder, it might occur that File Overwrite Confirmation dialogs appear during the installation. If the product being installed is the most recent, allow the installer to overwrite these files.

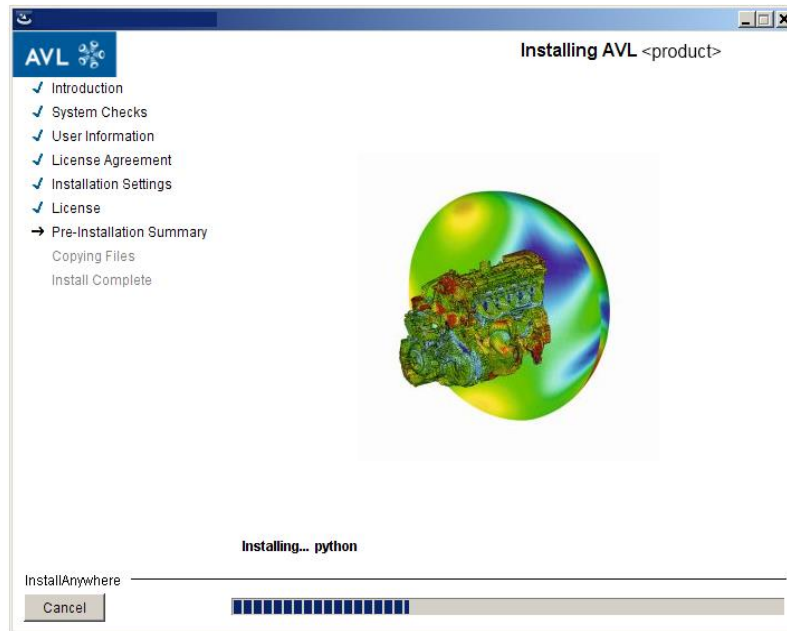


Figure 3-15: Installation Progress

After all product files have been transferred to the installation folder, various post-installation tasks are executed in the background.

The Post-Installation Configuration progress dialog is displayed during these background tasks. When it has finished, it will proceed to the next dialog.

3.2.14. Installation Complete

After all installation tasks have been completed the Install Complete dialog is displayed.

If listed, the user can open the Release Notes or otherwise open it from the product documentation.

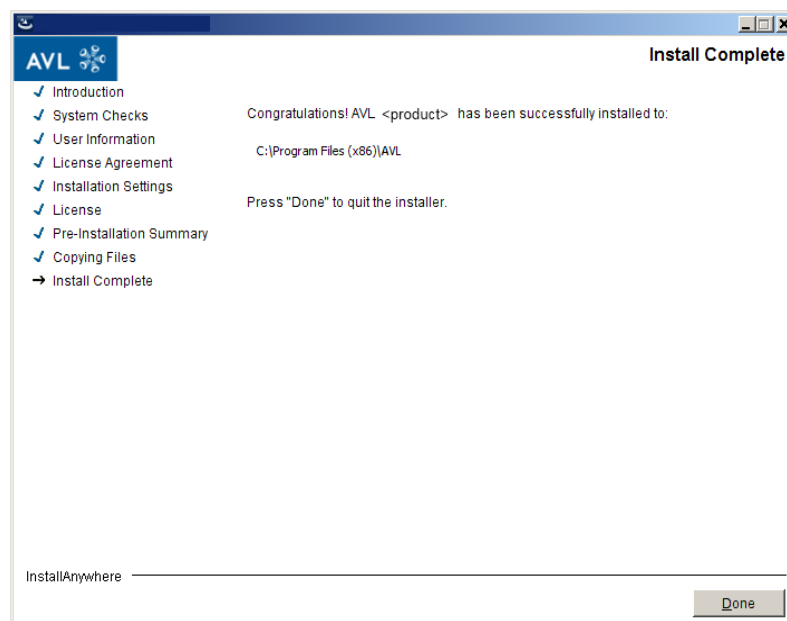


Figure 3-16: Installation Complete

Click **Done** to complete the installation and close the installer.

3.2.15. Post Installation

If the option to create a desktop icon was selected in Figure 3-8, then double click the product icon to start.

If the option to create a product entry in the Programs menu was selected in Figure 3-8, then select **Start – All Programs – AVL – <product>** to open the AST Launcher. The AST Launcher allows access to start further products and program parts.



Figure 3-17: AST Launcher Window

If you have not obtained a license yet or if want to install your license, use the AST Launcher to open the **Software Administration** from the  menu. Alternatively, double click on the  AVL AST Software Administration icon on the desktop.

3.3. Verifying the Installation

Verify the installation to check that

- the AVL AST product GUI can start
- the simulation program can start

3.3.1. AVL AST Product GUI

Open the AST Launcher from the Windows Start Menu by clicking Start -> AVL -> <product> v2016 -> <product> v2016.

In the startup window, select the required client, then the main window for the required client appears on the screen.

Choose the required program and select **File |Open** to open an existing model from the examples under e.g. `$AVLAST_HOME/examples/<PRODUCT>/v2016`. Load the file and save the model in your working directory.

3.3.2. Simulation Program

Each client has its own characteristic on how to start the calculation run. In the case of a software update, an advanced user should do this with one of his models.

3.3.3. Software Administration Tool

3.3.3.1. Diagnostics

If you have problems starting the AST product GUI, please use the Diagnosis functionality in the Software Administration Tool. Refer to the [AST Diagnosis Guide](#) for details.

3.3.3.2. Patching

The Patching functionality is also available in the Software Administration Tool. Refer to the [AST Patching Guide](#) for details.

3.4. Windows Server Installation

To install the AVL AST software on a server, use the regular installation process as described in section 3.2.

Software which might be additionally required depending on the AVL AST product can be found on the [AVL AST Service World](#).

3.5. Silent Installations

Silent installations work for local installations, server installations and Client Runtime installations. To make a silent installation, perform the following two steps:

1. Create a response file by starting the setup program with the following flags:

```
setup.exe -r <path-to-response-file>
```

After running through the setup procedure as described above, a response file with the name `installer.properties` is created at the path that was passed via the `-r` flag. This file holds information about the responses the user has given during the run of the setup program. It can now be edited by hand if needed.

2. Run the installer in silent mode with the information from a response file by starting the setup program with the following flags:

```
setup.exe -i silent -f <response-file-including-path>
```

So in the default case:

```
setup.exe -r <path-to-response-file>/installer.properties
```

3.6. Uninstall

To uninstall an AVL AST software product, open the **CONTROL PANEL** window by clicking **Start - Control Panel**.

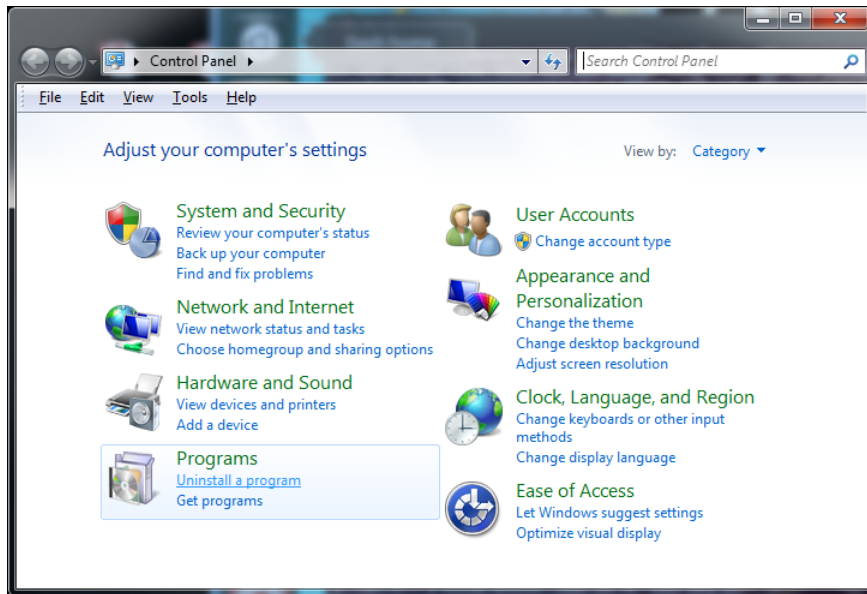


Figure 3-18: Control Panel

Click **Uninstall a program** to open the **Program and Features** window with all listed software on the computer.

Select the AVL AST program to be removed and click **Uninstall/Change** to start the AVL AST Uninstaller.

3.6.1. Uninstall Introduction

The Introduction dialog provides basic information about what product will be removed and which tasks will be performed.

Click **Uninstall** to continue the deinstallation and to start the file/folder removal process.

3.6.2. Uninstall Progress

To inform the user about the progress of the deinstallation, the Uninstall Progress window shows a list of tasks and marks them depending of their state.

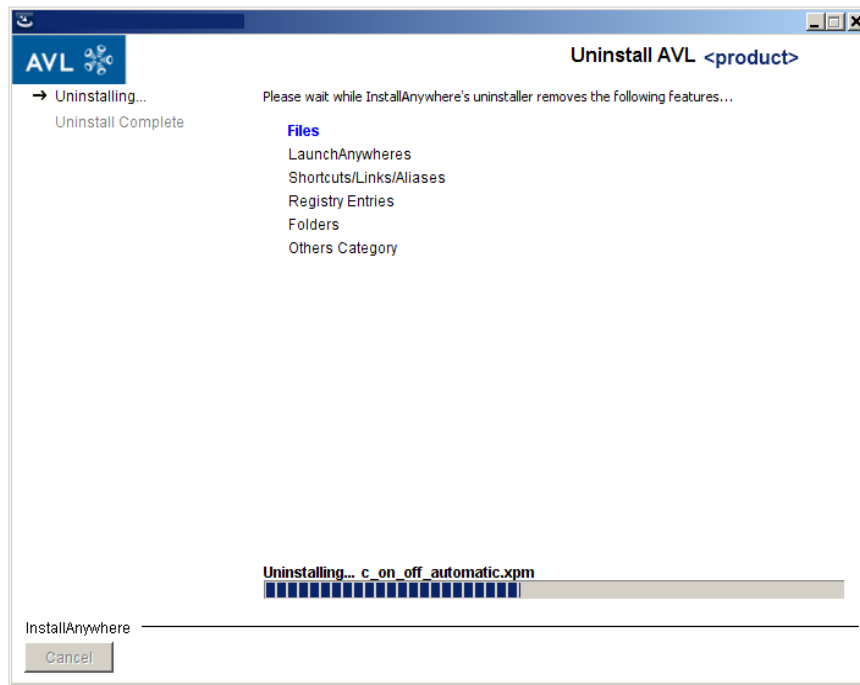


Figure 3-19: Uninstall Progress

3.6.3. Uninstall Complete

When all uninstall tasks have been completed the Uninstall Complete dialog is shown.

Click **Done** to close the AVL AST Uninstaller and to complete the removal of the selected product.

4. INSTALLATION FOR LINUX

An ISO image of the installation DVD can be downloaded from the [Service World](#) and then mounted as described in section 4.2.

Alternatively, the ISO image can be burned onto a DVD and installed as described. Mounting a DVD is described in section 4.1.

The following steps are necessary to perform the installation:

1. Insert the installation media and/or mount the DVD/ISO image
2. Run the installation GUI.
3. Setup new path.
4. Setup the license.

4.1. Mounting the DVD

AVL AST DVDs contain data stored in ISO 9660 format.

If the DVD has not been mounted as a file system, login as `root` and use the appropriate command for the system (please consult your system administrator). On some systems DVDs are mounted automatically when attempting to access `setup.sh` as follows (depending on your system):

Type:

```
ls -l /DVD/setup.sh
```

or

```
ls -l /dvd/setup.sh
```

or

```
ls -l /dvd/dvd0/setup.sh
```

A line similar to the following should appear:

```
-rwxrwxr-x  1 username groupname 1024 Apr 16 11:36 /DVD/setup.sh
```

If a line similar to the following line appears then the DVD drive must be mounted manually:

```
/DVD/setup.sh: No such file or directory
```

4.2. Mounting the iso Package

The mounting of the iso-image is system dependent, please consult your system administrator for more information. A typical scenario for mounting the iso-image is:

1. Get root privileges (either log in as `root` or - if available - use `sudo`)
2. Create a directory for the mount point (e.g. `mkdir -p /mnt/disk`)
3. Mount the image (e.g. `mount -o loop <downloaded image filename>.iso /mnt/disk`)
4. Install software from the image, now accessible through `/mnt/disk`

If you have problems using the ISO images, a workaround could be to burn the ISO image on a DVD and perform the installation from the DVD.

4.3. Run the Installer

Root privileges are not required to install the software. Start the installation script located on the DVD/in the ISO image or double-click the self-extracting executable. The installation tool runs using a Graphical User Interface, so the environment variable **DISPLAY** must be set up before starting the installer (*hostname* is the name of the computer where you sit in front of).

C-shell	Bourne / Korn shell
<pre>setenv DISPLAY <hostname>:0.0</pre>	<pre>DISPLAY= <hostname>:0.0 Export DISPLAY</pre>

Type `/DVD/setup.sh` or `/dvd/setup.sh` depending on what your DVD directory is called.

The following sections will guide you through the installation.

4.3.1. Introduction

The [Introduction](#) dialog gives basic information about the installation and allows this document to be opened in a PDF document reader.

Click on the provided link to open this document and/or click **Next** to continue.

4.3.2. License Agreement

The [License Agreement](#) dialog asks to confirm the AVL AST Software License Agreement and lists licenses and acknowledgements for incorporated software.

To continue please select **I accept the terms of the License Agreement** and click **Next** to continue.

4.3.3. Installation Folder

The [Choose Install Folder](#) dialog allows the target folder to be specified where the installer installs the software. If an AVL AST software product is already installed, the installer will try to determine the existing installation location and suggests this folder.

If this is the first AVL AST product being installed on this computer, the operating systems default will be suggested.

To change the default either type in the installation directory or click **Choose** to browse to the desired location.

Continue the installation by accepting/specifying the installation folder and clicking **Next**.

4.3.4. Installation Set

Depending on the product being installed, one or more predefined [Installation Sets](#) might be available.

Please choose the **Full** or use the **Custom** option to define a user defined set. Then click **Next** to continue.

If the **Custom** option is selected, an additional dialog will open, listing the available product features. Select/deselect the various features in this dialog to define the installation range and click **Next** to continue.

4.3.5. License Definition

The [License Definition](#) dialog offers three configuration options and an advanced option which combines all three that can be defined manually:

- **No license server configuration**

This option should be used if a license configuration already exists or if the license configuration will be done after the installation.

Select **No license server configuration** and click **Next** to continue.

- **Use a license file or key**

If a license file or key already exists, this option can be used to refer to this license. Click on **Load License File** to load the license key or copy and paste the license key into the input field.

Click **Next** to continue.

- **Use an existing license server**

If a license file/server already exists/is running, this option can be used to refer to this license. Enter the name and the port number of your license server.

Click **Next** to continue.

- **Advanced license configuration**

The [Advanced License Configuration](#) option is for experienced users of license setups. It allows a license file to be added, a license server to the license path to be defined or the license path to be manipulated manually.

For more information about the license server and the typical license server configuration use cases, refer to the [AST Licensing Guide](#).

If you have problems setting up the license server and for questions concerning AVL AST licensing, please contact ast_licensing@avl.com.

Click **Next** to continue.

4.3.6. Pre-Installation Summary

The [Pre-Installation Summary](#) dialog summarizes the basic installation information before the installer starts transferring files to the specified installation target directory.

Click **Next** to complete the Pre-Installation setup and to start the file copy process.

4.3.7. Installation Progress

The [Installation Progress](#) dialog is non-interactive and is there primarily to inform the user about the installation progress.



Note: If an AVL AST product is already installed in the installation target folder, it might occur that File Overwrite Confirmation dialogs appear during the installation. If the product being installed is the most recent, allow the installer to overwrite these files.

After all product files have been transferred to the installation folder various post-installation tasks are executed in the background.

4.3.8. Modify Login Scripts

When the installer has finished copying files, the installer provides support for changing your login scripts as required for the AVL AST product.

Depending on the used shell and login scripts select the corresponding check boxes.

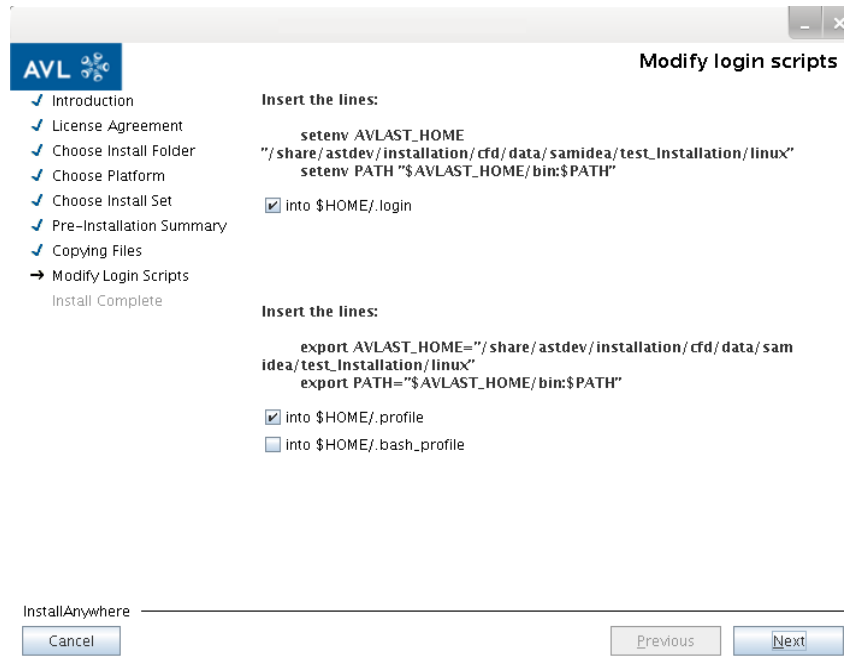


Figure 4-1: Modify Login Scripts

Click **Next** to confirm the login scripts modifications and to continue the installation.

4.3.9. Post-Installation Configuration

The Post-Installation Configuration progress dialog is displayed during these background tasks. When it has finished, it will proceed to the next dialog.

4.3.10. Installation Complete

After all installation tasks have been completed the [Installation Complete](#) dialog is displayed.

If listed, the user can open the Release Notes or otherwise open it from the product documentation.

Click the **Done** button to complete the installation and to close the installer.

Open a new terminal window (login shell) when the installer has finished. The software will be ready for use as soon as the license is activated.

4.4. Environment Variables

4.4.1. How to Setup Environment Variables

The variables described below should be setup in your login file (e.g. `.login` for a TCSH) so that they are setup every time a new terminal window is opened. It may happen that a terminal window is opened without activating the settings in your login file. This behavior can be changed, please ask your system administrator. A possible solution is to insert the definitions in the main login script (e.g. `.cshrc` for a TCSH), but this is not recommended by AVL.

csch or tcsh	Login File: <code>\$HOME/.login</code> Define: <code>setenv <VARIABLE> <Value></code>
other shells	Login File: <code>\$HOME/.profile</code> Define: <code><VARIABLE>=<Value></code> <code>export <VARIABLE></code>

4.4.2. Important Environment Variables

Variable	Description
PATH	Modify this environment variable if not done during installation. csch/tcsh: <code>setenv PATH <Installation Path>/bin:\$PATH</code> other shells: <code>PATH=<Installation Path>/bin:\$PATH ; export PATH</code>
LM_LICENSE_FILE	Setup this environment variable if the license file is not placed in the default location (<code><Installation Path>/license/license.dat</code>). csch/tcsh: <code>setenv LM_LICENSE_FILE <Installation Path>/license/license.dat</code> other shells: <code>LM_LICENSE_FILE=<Installation Path>/license/licens e.dat ; export LM_LICENSE_FILE</code>
AVLAST_HOME	Setup the installation base directory: csch/tcsh: <code>setenv AVLAST_HOME <Installation Path></code> Others: <code>AVLAST_HOME=<Installation Path> ; export AVLAST_HOME</code>
DISPLAY	The graphic display is redirected to the specified screen. Common used values are <code>:0.0</code> <code>localhost:0.0</code> <code><hostname>:0.0</code> csch/tcsh: <code>setenv DISPLAY :0.0</code> Others: <code>DISPLAY=:0.0 ; export DISPLAY</code>

4.5. Verifying the Installation

Verify the installation to check that

- the AVL AST product GUI can start
- the simulation program can start

Login as the **AVL Software user** (do not use the root account) and open a new window or a new shell. The necessary environment will be set up automatically.

4.5.1. AVL AST product GUI

Enter the command `astlauncher` to start the AVL AST product launcher.

Ensure the environment variable `DISPLAY` is set up correctly. The command `echo $DISPLAY` should report e.g. `:0.0` if the AVL AST product runs on the local host, otherwise e.g. `hostname:0.0` where `hostname` is the name or TCP/IP address of the computer where the installed product should be used.

In the startup window, select the required client, e.g. BOOST. Then the main window for the required client appears on the screen.

Choose the required program and select **File |Open** to open an existing model from the examples under e.g. `$AVLAST_HOME/examples/<PRODUCT>/v2016`. Load the file and save the model in your working directory.

4.5.2. Simulation Program

Each client has its own characteristic on how to start the calculation run. In the case of a software update, an advanced user should do this with one of his models.

4.5.3. Software Administration Tool

4.5.3.1. Diagnostics

If you have problems starting the AST product GUI, please use the Diagnosis functionality in the Software Administration Tool. Refer to the [AST Diagnosis Guide](#) for details.

4.5.3.2. Patching

The Patching functionality is also available in the Software Administration Tool. Refer to the [AST Patching Guide](#) for details.

4.6. Frequently Asked Questions

I have to split the AST software installation due to limited disk space

Installing the software at another location is no problem if it is the first time an AST software is installed. If other AST products are already installed, the following may be helpful:

Case	What to do
A new AST product is added, e.g. FIRE	<installpath> ... Installation location of AST software products <installpath2> ... Path to some free disk space Create symbolic link to another location and start then the installation tool. <pre>mkdir -p <installpath2> cd <installpath2> ln -s <installpath>/FIRE FIRE /DVD/setup.sh</pre>
A new version of an existing AST product is installed (e.g. v2016)	Create symbolic link to another location and start then the installation tool. <pre>mkdir -p <installpath2>/<product> cd <installpath2>/<product> ln -s <installpath>/<product>/v2016 v2016 /DVD/setup.sh</pre>

Who should verify the <product> installation?

The user who installs the software and also the end-user.

AST-Installer does not support your platform

Install the software on a workstation and perform the following steps:

- (a) move the complete installation directory (<installationpath>) to the desired computer
- (b) setup the user's path in .login file

```
set path = (<installationpath>/bin $path)
```

Problems during installation - how should I inform AVL?

Send the file <Installation Target Folder>/AVL_<product>_..._InstallLog.log to AVL

Setup.sh cannot be run from DVD - no execute permission

```
cd /DVD
cp -i -r * <temporaryinstalldirectory>
cd <temporaryinstalldirectory>
chmod -R 777 *
./setup.sh
```

AVLAST_basedir is already setup in my .login, do I have to remove it?

No, it does no harm. It is also possible to use AVLAST_HOME instead. This is useful in case an AVL Workspace product is installed.

4.7. Silent Installations

To make a silent installation, perform the following two steps:

1. Create a response file by starting the setup program with the following flags:

```
./setup.sh -r <path-to-response-file>
```

After running through the setup procedure as described above, a response file is created at the path that was passed via the `-r` flag. This file holds information about the responses the user has given during the run of the setup program. It can now be edited by hand if needed.

2. Run the installer in silent mode with the information from a response file by starting the setup program with the following flags:

```
./setup.sh -i silent -f <path-to-response-file>
```

4.8. Uninstall

Uninstall is supported provided that a local Java installation is available on your machine. Version requirements: Java 1.6 or later on Linux.

To uninstall <product> change to the top directory of your <product> installation and execute:

```
./Uninstall/<product>_v2016/Uninstall\ AVL\ <product>\ v2016
```

After the uninstall program has started and you have confirmed to uninstall <product> v2016, all components of <product> v2016 will be removed.

Note: the file name contains space characters, these have to be escaped by a `'\'`.

5. SETTINGS AND TEMPLATES



Note: On Windows, some folders like Application Data and Local Settings may be hidden. To make them visible, edit the “Folder Options” via the Windows “Control Panel” and select “Show hidden files and folders” as shown in Figure 5-1.

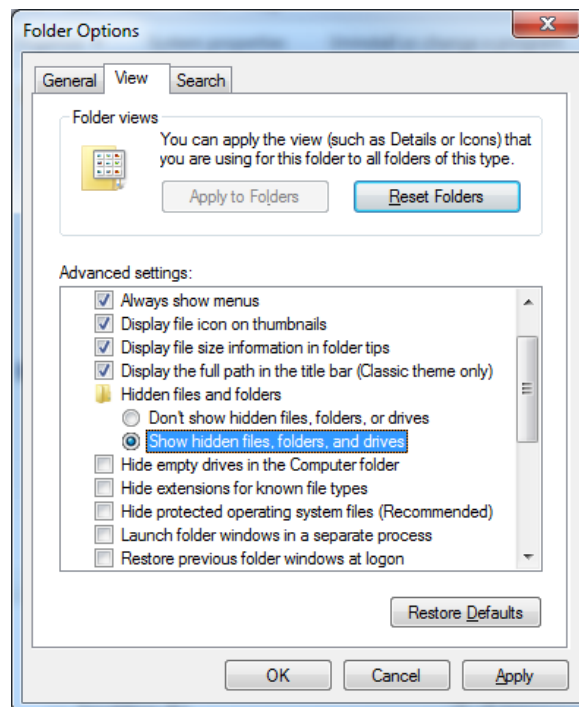


Figure 5-1: Show Hidden Files and Folders

5.1. Location of Settings and Templates

5.1.1. General

AVL AST products store user-specific data and site-specific data (i.e. data to be shared by all users) in the following default locations. To change these locations, any of the environment variables below may be predefined (i.e. customized) by the user.

AVLAST_USERHOME

Purpose: user specific settings and log files
 Windows: C:\Users\
 Linux: \$HOME/.avl

AVLAST_SITEHOME

Purpose: same settings as AVLAST_USERHOME but shared by all users
 Windows: C:\ProgramData\AVL
 Linux: \$AVLAST_HOME

5.1.2. AVL Workspace

AVL_APPDATA

Purpose: see AWS_USERHOME, AWS_LOCAL_APPDATA
Windows: C:\Documents and Settings\...\Application Data\AVL
Linux: \$HOME/.avl

AVL_COMMON_APPDATA

Purpose: see AWS_SITEHOME
Windows: %AVLAST_HOME%
Linux: \$AVLAST_HOME

AWS_USERHOME

Purpose: user-specific settings such as unit system, IMPRESS Chart templates, Python utility scripts, user defined results functions, user joints, etc.
Windows: %AVL_APPDATA%\AWS\v2016\user
Linux: \$AVL_APPDATA/AWS/v2016/user

AWS_SITEHOME

Purpose: same settings as AWS_USERHOME but shared by all users
Windows: %AVL_COMMON_APPDATA%\AWS\v2016\site
Linux: \$AVL_COMMON_APPDATA/AWS/v2016/site

5.2. Location of Temporary Files

5.2.1. AVL Workspace

AVL AST products store temporary data in the following location. To change this location the environment variable AWS_LOCAL_APPDATA may be predefined

AWS_LOCAL_APPDATA

Purpose: temporary IMPRESS Chart data etc.
Windows: C:\Documents and Settings\...\Local Settings\Application Data\AVL\AWS\tmp
Linux: \$AVL_APPDATA/AWS/tmp

5.3. Browser and Editor Settings

At different places AVL AST products open standard applications for viewing the contents of files or directories. To control which applications shall be used, the environment variables below may be predefined (i.e. customized) by the user.

5.3.1. AVL Workspace

AWS_HTML_BROWSER

Windows default: iexplore (alternatives: firefox, opera)
Linux default: firefox (alternatives: chrome, opera, ...)

AWS_FILE_BROWSER

Windows default: explorer.exe
Linux default: nautilus (alternatives: konqueror, ...)

AWS_WINEDITOR

Windows default: notepad.exe (alternatives: write.exe, ...)
Linux default: nedit (alternatives: kedit, gedit, ...)

6. LICENSING

The installation and setup process is described in the [AST Licensing Guide](#).

6.1. Requesting a license

If you have not received a license key, request one from your local representative or from AVL Graz (ast_license@avl.com).

Include the following information:

- Software Product
- Name
- Telephone, Fax, E-Mail address
- Company
- System ID
 - Local installation: of every computer where the AVL AST software should be used
 - Network installation: of the license server computer
- Installation Type (Node locked, Network)

The above information can be obtained in the **License Definition** utility. In the AST launcher select **AST | Software Administration**, then select the **License Request** tab which contains the necessary information. Please complete the template text and send it to AVL.

6.2. Expected FlexNet Hostids

The program `lmhostid` (or `lmcomposite` on Windows and Linux) will print the exact hostid that FlexNet expects to use on any given machine. The following table lists alternate methods to obtain the required hostid for each machine architecture. FlexNet also supports a group of special hostids and vendor-defined hostids.

Hardware Platform	Hostid	Type this command on the license server:	Example
Linux	Composite Hostid	<code>\$AVLAST_HOME/bin/ast_license_composite</code>	<code>COMPOSITE=C25C48BF77F9</code>
Windows	Composite Hostid	<code>%AVLAST_HOME%\bin\ast_license_composite.exe</code>	<code>COMPOSITE=88F360B80245</code>

7. ANSYS INTERFACE INSTALLATION

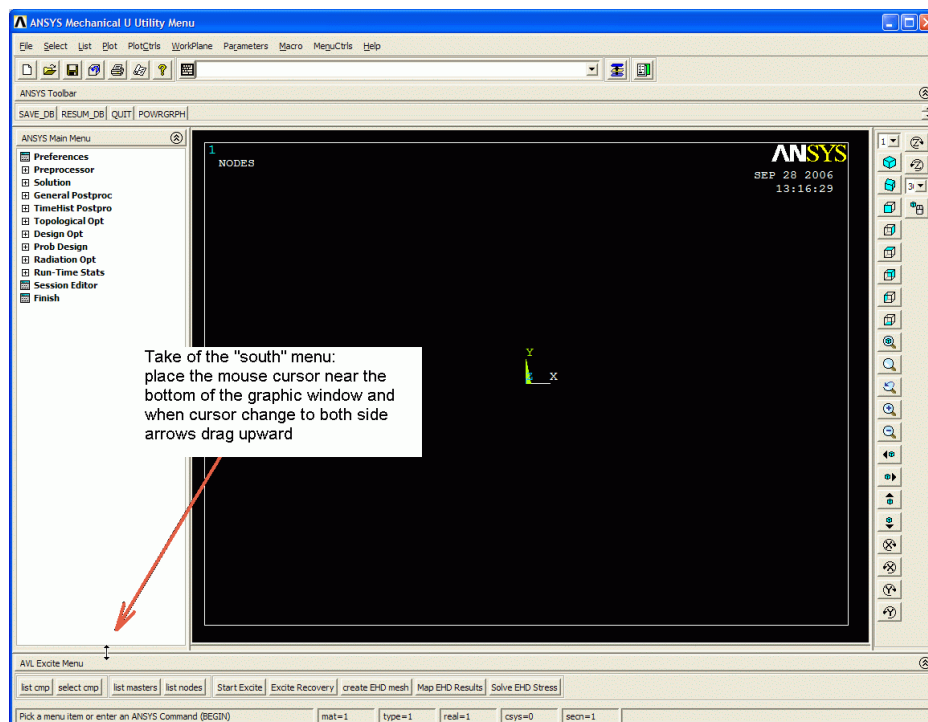
The ANSYS to AVL EXCITE Interface can be installed on each platform and operating system that is supported by ANSYS. Administration privileges are required for editing ANSYS installation files.

The installation process involves copying the interface files, which can be found in the installation folder: <AWS_installation_folder>\EXCITE\version\fem\ansys\.

1. Define ANSYS environment variable "ANSYS_MACROLIB" to point to the <AWS_installation_folder>\EXCITE\version\fem\ansys\, where the interface files are located (to define the environment variable refer to the ANSYS Installation and Configuration Manual or ask your system administrator)
2. Update the file: "menulistXX.ans"
 <ANSYS_installation_folder>\vXX\ANSYS\gui\en-us\UIDL\menulistXX.ans (where XX is the ANSYS version) by adding the name of the granula files (**EXCITE.GRN**, **EXCITEN.GRN**, **DSUBRCVY.GRN** and **SHAFTM.GRN** with full path name) at the end of this file (administration privileges are required for this and next step)
3. Update the file "tlbrlistXX.ans"
 <ANSYS_installation_folder>\vXX\ANSYS\gui\en-us\toolbars\tlbrlistXX.ans (where XX is the ANSYS version) by adding the name of the menu file (AVL.TLB or AVL16.TLB for ANSYS 16.0 and higher with full path name) at the end of this file

The ANSYS to AVL EXCITE Interface is now ready for use.

Start the ANSYS session. If the AVL EXCITE menu is not visible then place the mouse cursor near the bottom of the ANSYS window (above "Pick a menu item or") and when cursor change the shape to both side arrows, drag upward about 2 cm. Now, the AVL EXCITE Menu is visible (see following for details).



The ANSYS to AVL EXCITE Interface is independent of the hardware platforms.

It was developed with ANSYS version 9.0, but it will also work with newer versions, as it based on pure APDL macro language.

The interface can be used with the following ANSYS products:

- Multi-physics
- Mechanical
- Structural
- Professional (only static condensation possible)

The user may also refer to:

- ANSYS Documentation, especially Mechanical APDL
 - ♦ Substructuring Analysis Guide
 - ♦ Chapter 5 – Component Mode Synthesis
 - ♦ Appendix B - ANSYS Interface to AVL EXCITE
 - ♦ B.1. Performing a CMS Generation Pass to Create File.EXB
 - ♦ Advanced Analysis Guide - Chapter 10 - User-Programmable Features and Nonstandard Uses
 - ♦ Structural Analysis Guide - Chapter 3 - Modal Analysis
 - ♦ Structural Analysis Guide - Chapter 5 - Transient Dynamic Analysis
 - ♦ Structural Analysis Guide - Chapter 6 - Spectrum Analysis
 - ♦ Multibody Analysis Guide
 - ♦ Contact Technology Guide
 - ♦ ANSYS Parametric Design Language Guide
- AVL EXCITE Power Unit Documentation

If you have any problem using the EXCITE and EXCITE_R command or ANSYS to EXCITE Interface, contact the technical support at excite_support@avl.com.

Please specify the following:

- ANSYS version
- AWS and EXCITE version (can be found under Menu Help | About)
- hardware platform
- body type
- short description of the problem
- if possible, attach
 - Ansys model database or model input file
 - Ansys ERR file
 - File <bodyname>.PROC_STATUS
 - any other information that might help in detecting the problem

8. WINDOWS MPI ENVIRONMENT INSTALLATION

To run MPI simulations locally on one computer basically only the AST product installation is sufficient. This changes if a MPI simulation should be distributed among a list of hosts.

In most cases Linux already provides suitable communication channels with the operating system installation, but on Windows this has to be enabled separately.

Therefore, to enable AST software communicating via the *Message Passing Interface* (MPI) protocol a few requirements have to be fulfilled.

This includes installations of 3rd party software, specific setup and installation guidelines for the software and project directories and also additional options and configurations for the various AST simulation kernels.

The following chapters will explain these requirements in detail and follow a recommended approach minimizing maintenance effort, complexity and increasing stability.

A final checklist validating the MPI environment setup should help to verify the correct function and support how to find possible error sources.

8.1. 3rd Party Software Installation

8.1.1. MPI Remote Connection Software

The MPI remote submission/simulation on Windows is based on a service provided by a 3rd party software installation.

At the moment *IBM Platform MPI* is the software used to provide this functionality.

Its installation also registers a Windows service starting a background daemon allowing e.g. AVL FIRE to connect between hosts and remotely submit simulation jobs on multiple hosts.

The installation executable can be found and downloaded from the [AST Service World](#).



Note: An active AVL Extranet Account is required to login and access the AST Service World. You can register for an account using [this](#) link.

The mentioned installation executables can be found in the **Download Area** when selecting the product **Shared Components** and the version **Platform MPI**.

Please download the executable **Platform-MPI-V7.01.00-20091019r.exe**. Higher versions should already be automatically installed by recent versions.

Once the software is completely downloaded, start the installation by double clicking the executable and follow the installation wizard.

The installation should be self-explanatory and the suggested default can be accepted in nearly every dialog. One exception might be the suggested installation components as shown in the following dialog.

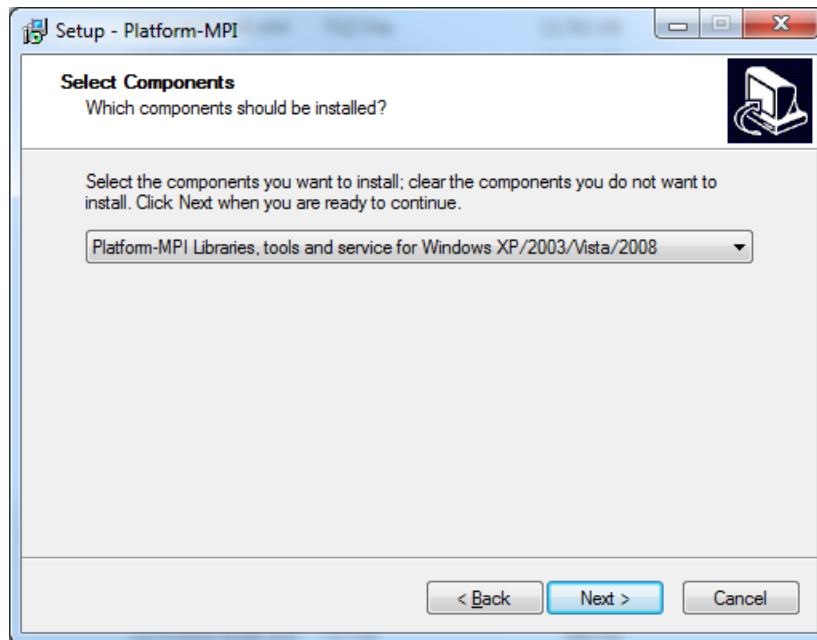


Figure 8-1: Platform MPI Installation Components

If the default settings were accepted, the installer should have already registered and started the required remote connection service and it should not be necessary to manually do that.

The process visible in the MS Windows task manager should be named `hmpiw32service.exe`.

It might be necessary to show the processes for all users as the service is most likely running under a MS Windows system account.



Note: As this service is required on every host which later on should accept and run simulation jobs, please do this installation on all of the hosts you are planning to use for MPI simulations with AST software!

8.1.2. AST Product Runtime Environment

If a central AST product software installation is used it might be necessary to install a set of runtime redistributable packages which usually is automatically installed during the product installation.

Therefore please once more download the files matching your operating system and architecture (32 or 64bit) from the AST Service World as described in the previous chapter 8.1.1.

The redistributables can be found in the **Shared Components** product group under the **3rd Party Redistributables** version category.

Download and install the packages by executing it one after the other on every host planned to be used for MPI simulations.

You can skip this installation on the host where the official AST product installer is executed as this one will install the required packages anyway.

8.2. AST Product Software Installation

There are various approaches how to deal with AST product software installations when used in a MPI perspective. The most common and therefore recommended way is to install the software centrally on one host and share this location with other users and hosts. This usually offers the most advantages and also is quite simple to setup. In fact you can install the software as usual into a local folder on a specific host without taking care about any extra option during the installation itself. Refer to chapters 3 and 4 for detailed information regarding the installation.

After the installation (or even before) you should use the MS Windows sharing functionality to share the main installation folder with a meaningful name and with the appropriate access permissions.

This allows other users on different hosts to access this exact installation via the *Uniform Naming Convention* (UNC) path.

A UNC path looks something like:

[\\server\sharename\](#)

E.g.: An installation in the local folder C:\Program Files (x86)\AVL on server01 and shared as FIRE_v2013 should then be accessible from every host in the same network as [\\server01\FIRE_v2013](#).



Note: Please make sure that the users finally starting the installation have the appropriate access permissions for the share as well as for the installation folder itself.

It should be possible to start the software from the GUI or from a command shell, using the UNC installation path directly or extend the PATH environment variable to include this installation path.

It is of course also possible to install multiple versions into the same folder, exactly as it would work with locally used installations. Just make sure you follow the basic installation folder and not installing older versions onto newer versions and skip eventual platform MPI installations if already existing.

8.3. MPI Environment Setup

After checking the correct installation of the IBM Platform MPI Remote Service (see chapter 8.1.1) it must be ensured that it is possible to connect multiple hosts via MPI.

The essential step for that is setting up the login information for the user which afterwards should be used to submit simulations.

Open a standard DOS command shell using the Command Prompt Windows Start Menu item or just run the cmd.exe executable.

Setup the MPI_ROOT environment variable and extend the PATH variable as shown in the following commands (please replace the placeholders with the actual installation root path):

```
set MPI_ROOT=\\<server>\<sharename>\common\platform-mpi\v8.2.1-ast1\x86_64-unknown-winnt_i11
set PATH=%MPI_ROOT%\bin;%PATH%
```

Alternatively, in the latest IBM Platform MPI installations bundled with the FIRE installation, a script named mpi_env.bat can be used to setup the necessary environment:

```
call \\<server>\<sharename>\common\platform-mpi\v8.2.1-ast1\x86_64-unknown-winnt_i11\bin\mpi_env.bat
```

In such a prepared shell, on every host which will be used later to run simulations, execute the following commands to make sure the correct passwords are cached:

```
mpidiag -s localhost -at -cache
mpidiag -s <remotehost> -at -cache
```

When prompted with a password request please confirm with your current MS Windows login password.

In the same shell you can start various commands to test the function of the MPI setup:

- Running the command `mpidiag.exe -s localhost -sys` should result in a short system summary on every host running the MPI remote service.
As a second step you can replace the hostname `localhost` by a remote computer name also running the MPI connection service which should result in a system summary of the remote computer.
- Running the command `mpidiag -s remote_Host1 -et test_echo` tests whether the communication to a remote host is working correctly and should reply with the specified message `test_echo`.
- A more advanced tests finally runs a simple example already using basic MPI commands:

```
mpirun.exe -np 2 -v -prot \\<server>\<sharename>\
common\platform-mpi\v8.2.1-ast1\x86_64-unknown-
winnt_i11\bin\hello_world.exe
```

This command starts a simple hello world example with two processes on the local host.

Beside some verbose output you should get two “hello world” responses identifying the origin of the message.

```
mpirun.exe -np 2 -v -prot -hostlist "localhost <remotehost>"
\\<server>\<sharename>\ common\platform-mpi\v8.2.1-ast1\x86_64-
unknown-winnt_i11\bin\hello_world.exe
```

This command should start two processes of `hello_world.exe` again but this time one process on the localhost and one on the host specified with `<remotehost>`.

Again you should see the “hello world” response with the hostname as confirmation.

8.4. MPI Project Folder

Another requirement for MPI simulation distributed over multiple hosts is a common project directory for every involved simulation host.

Similar to the shared installation folder mentioned in chapter 8.2 this can be achieved by sharing a local folder on one host and accessing it via the UNC path from all hosts.

In contrary to the installation folder requirement, where it would be also possible to avoid a shared installation by several local installation with the same path name, in this case it really must be one physical folder shared for all hosts as every host must access it and must use the data from there.

8.5. AVL FIRE Job Submission

The job setup for MPI simulations and the list of hosts for multi-host simulations can be specified from the GUI and from the command shell.

The GUI therefore provides a separate input dialog which can be activated by switching to the MPI simulation mode. Multiple hosts can be added using the **Add Host** button.

In this step also the number of CPUs per host can be specified. The other settings do not need to be changed as long as no special host setup requires it.

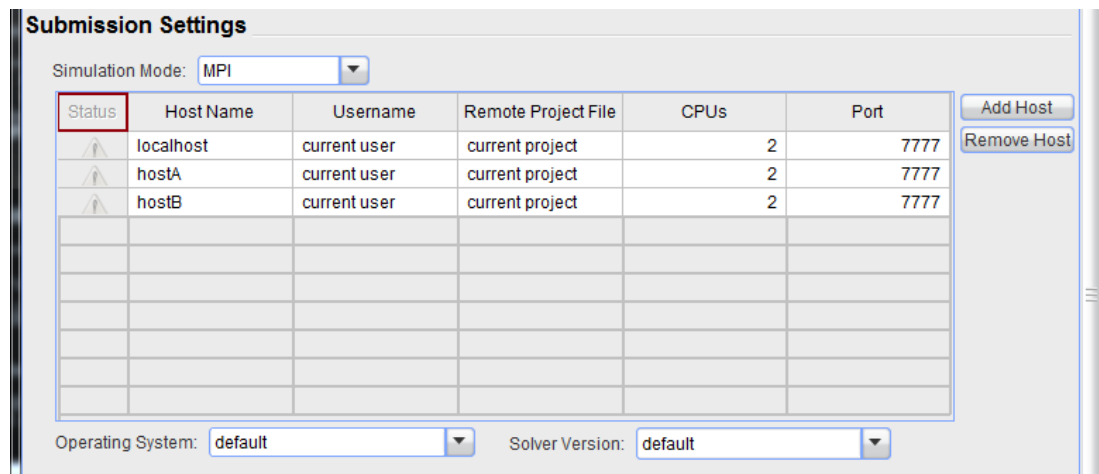


Figure 8-2: MPI Simulation Mode

The command line pendant for the shown GUI options are the `-mpi`, `-hostlist` and the `-cpu` command line argument.

The `-hostlist` argument specifies the list of hosts with the number of CPUs to be used and the `-cpu` argument just should contain the summed up number of CPUs. Finally the `-mpi` argument is for activating the MPI mode at all.

e.g.:

```
<FIRE install_path>\bin\fire_cmd.exe
  -project_dir=<UNC path to project directory>
  -project=projectname.fpr
  -case=<case name>
  -solver_vers=v2013.2
  -mpi
  -cpu=6
  -hostlist=localhost,2,MPI::hostA,2,MPI::hostB,2,MPI
```

As mentioned at the beginning a few additional options are necessary to adjust the standard FIRE job submission for the distributed MPI job submission.

The two most important ones are the deactivation of the file locking which is not correctly supported for such MPI jobs and the other one controls the submission mode which differs from the standard submission because of reasons mentioned before.

Regardless if a simulation is started from the shell or from the GUI using the job setup wizard, those two flags have to be specified as additional solver arguments.

In the command line this can be achieved by just adding the argument at the end of the command line and in the job setup wizard a separate section at the bottom of the windows can be used specifying such options.

The two arguments are:

- `-no_file_locking`
- `-mpi_remote`

In the GUI `-no_file_locking` can also be activated by the corresponding checkbox in the following dialog.

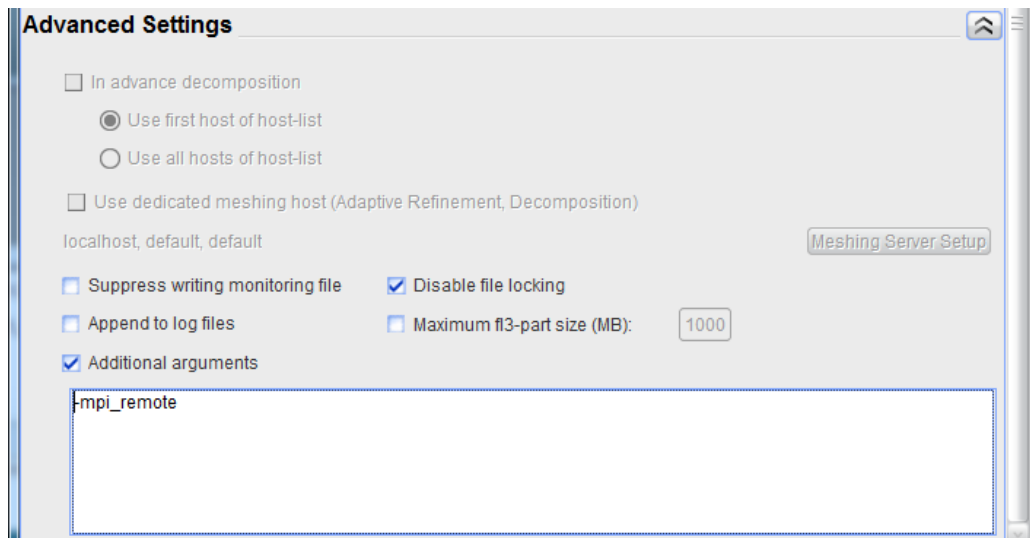


Figure 8-3: Advanced Job Setup Settings

8.6. MS Windows Firewall

Depending on the systems Firewall settings it might be necessary to adjust the configuration to allow connections from and to the computer by the MPI services and the simulation kernel executables.

In some cases the operating cases automatically asks you to allow a certain connection attempt through a pop-up dialog. If you can assign the request to the just started simulation please allow this request so the communication between the simulation hosts can be established.

In other cases it is necessary to manually allow connections for certain executables. In such a case please allow the executables `mpid.exe`, `mpirun.exe` and, as an example for a simulation kernel executable, `cfdsolver.<PLATFORM>.mpi.exe`, in case of FIRE.

The first two MPI executables are located in the common subdirectory of the product installation, the kernel executables in the product directory itself.

8.7. Checklist

In this chapter the most important steps and requirements are summarized and therefore can serve as a checklist verifying the correct setup:

- The Platform MPI remote software/service installed and running on all hosts (see chapter 8.1)
- The desired AVL AST software is installed in a shared installation directory and accessible from all hosts using the same UNC path (see chapter 8.2)
- The necessary MPI environment setup has been configured and could be successfully tested as described in chapter 8.3.
- The project directory to be used is shared and accessible from all hosts using the same UNC path (see chapter 8.4)
- Starting the simulation is done using the additional arguments mentioned in chapter 8.5
- Is a local MPI simulation working on each simulation host?

This should ensure the common runtime environment and license setup is correct and working.

8.8. Diagnosis

If a problem occurs when starting the simulation, the error diagnosis can start the same as when a local simulation has been performed.

- That means first of all visible error message (pop-up windows, command shell messages, log files) should be analyzed and verified.

When starting directly from the GUI most likely the kernel ASCII output file (e.g. the fla file in the case directory for FIRE) should be checked.

If you need help analyzing the kernel ASCII log messages please do not hesitate to contact the support fire@avl.com

- Please make sure you once more check the requirements explained in the previous chapters and quickly check whether the basic setup is done.

E.g. files shares accessible from all hosts, runtime environment and license setup working (local starts), ...

- Additionally, if not checked already as setup verification steps mentioned in the checklist chapter 8.6, a local MPI simulation could verify the basic function of a MPI run.
- Is the *IBM Platform MPI Remote Service* running on the hosts used for the simulation?
- Have you checked the simple MPI remote connection status commands mentioned in the corresponding chapter 8.3?
- Have you checked/adjusted your Firewall settings or is it possible to temporarily disable the Firewall to check whether the Firewall is blocking a required connection?

9. USER FUNCTION ENVIRONMENT SETUP

AVL FIRE® supports the possibility to extend the solvers functionality by writing and compiling/linking so called user functions.



Note: Please refer to the FIRE documentation for the User Functions manual.

This section offers additional information about the necessary environment setup so the built-in FIRE utilities can be used to get started with FIRE user functions.

9.1. Environment Setup

Usually the compiler installations necessary to compile and link user functions into a new custom FIRE solver executable already come with environment setup scripts which can be used to setup a basic environment.

The FIRE runtime environment does not setup this compiler environment itself but expects the necessary tools to be setup and found in the operating system environment before starting.

A detailed specification about which compiler is necessary for the actual FIRE version can be found in section 2.1.1.

Microsoft Windows

On MS Windows typically a combination of a MS Visual Studio installation (covering the C/C++ part) and a Fortran compiler (actually Intel) is necessary.

Having the MS Visual Studio Visual C compiler installed before the Intel Fortran installation makes the environment easier but is not necessary.

To setup the necessary environment to use FIRE user functions conveniently, a Windows batch file *calling* the setup scripts provided by the compiler installations can be used.

The following examples use default installation paths and example versions. Please adjust them for your specific version.

@echo off

```
call "C:\ Program Files (x86)\Intel\Composer XE 2013  
SP1\bin\ifortvars.bat" intel64
```

```
call "C:\Program Files (x86)\Microsoft Visual Studio  
10.0\VC\vcvarsall.bat" x64
```

```
REM "C:\Program Files (x86)\AVL\bin\astlauncher.exe"
```

The example batch script should give an idea about how the environment setup could look.

Such a script could either be sourced on demand just by calling it in, for example, a DOS command shell or can be appended by an actual start command (e.g. AST Launcher) to directly start FIRE right after the environment setup.

As mentioned, the script can be simplified if the Intel compiler installation is able to locate the MS Visual Studio installation. In this case calling the MS Visual Studio batch script can be omitted.

Linux

Similar to the environment setup for MS Windows the setup scripts provided by the compiler installation can also be used on Linux to, for example, extend the users login scripts. This is a convenient way to make the compiler available in a Linux shell and further on allows FIRE to directly call the configured compile and link commands.

Depending on the login shell, one of the following lines can be used to source the pre-configured environment setup scripts and should be added to the desired position of the login sequence.

(ba)sh:

```
/share/astenv/devtools/compilers/x86_64-unknown-  
linux_r5i12/intel/composer_xe_2013.5.192/bin/compilervars.sh  
intel64
```

(t)csh:

```
source/share/astenv/devtools/compilers/x86_64-unknown-  
linux_r5i12/intel/composer_xe_2013.5.192/bin/compilervars.sh  
intel64
```

9.2. MPI

To correctly support user functions also for the MPI simulation mode in addition to the compiler installation, a Perl installation is also necessary on Windows as the compiler internal compile process in this use case is based on a set of Perl scripts.

To fulfill this requirement please make sure you have a recent Perl installation installed and that the interpreter is found in the operating system (PATH) environment.

Internal tests are done with Active State Perl but as no complex tasks are done by the mentioned Perl scripts, basically every working Perl interpreter should work.

Active State Perl can be downloaded directly from [Active State](#).