



ALTAIR

ONLY FORWARD

Altair Simulation 2022

Quick Installation Guide

Updated: 03/21/2022

altair.com

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Altair Simulation Products

Altair® AcuSolve® ©1997-2022

Altair Activate® ©1989-2022

Altair® BatteryDesigner™ ©2019-2022

Altair Compose® ©2007-2022

Altair® ConnectMe™ ©2014-2022

Altair® EDEM™ ©2005-2022 Altair Engineering Limited, ©2019-2022 Altair Engineering Inc.

Altair® ElectroFlo™ ©1992-2022

Altair Embed® ©1989-2022

Altair Embed® SE ©1989-2022

Altair Embed®/Digital Power Designer ©2012-2022

Altair Embed® Viewer ©1996-2022

Altair® ESAComp® ©1992-2022

Altair® Feko® ©1999-2022 Altair Development S.A. (Pty) Ltd., ©1999-2022 Altair Engineering Inc.

Altair® Flow Simulator™ ©2016-2022

Altair® Flux® ©1983-2022

Altair® FluxMotor® ©2017-2022

Altair® HyperCrash® ©2001-2022

Altair® HyperGraph® ©1995-2022

Altair® HyperLife® ©1990-2022

Altair® HyperMesh® ©1990-2022

Altair® HyperStudy® ©1999-2022
Altair® HyperView® ©1999-2022
Altair® HyperWorks® ©1990-2022
Altair® HyperXtrude® ©1999-2022
Altair® Inspire™ ©2009-2022
Altair® Inspire™ Cast ©2011-2022
Altair® Inspire™ Extrude Metal ©1996-2022
Altair® Inspire™ Extrude Polymer ©1996-2022
Altair® Inspire™ Form ©1998-2022
Altair® Inspire™ Friction Stir Welding ©1996-2022
Altair® Inspire™ Mold ©2009-2022
Altair® Inspire™ PolyFoam ©2009-2022
Altair® Inspire™ Play ©2009-2022
Altair® Inspire™ Print3D ©2022
Altair® Inspire™ Render ©1993-2016 Solid Iris Technologies Software Development One PLLC,
©2016-2022 Altair Engineering Inc
Altair® Inspire™ Resin Transfer Molding ©1990-2022
Altair® Inspire™ Studio ©1993-2022
Altair® Material Data Center™ ©2019-2022
Altair® MotionSolve® ©2002-2022
Altair® MotionView® ©1993-2022
Altair® Multiscale Designer® ©2011-2022
Altair® nanoFluidX® ©2013-2022 FluiDyna GmbH, ©2018-2022 Altair Engineering Inc.
Altair® OptiStruct® ©1996-2022
Altair® PolIEx™ ©2003-2022
Altair® Pulse™ ©2020-2022
Altair® Radioss® ©1986-2022
Altair® SEAM® ©1985-2019 Cambridge Collaborative, Inc., ©2019-2022 Altair Engineering Inc.
Altair® SimLab® ©2004-2022
Altair® SimSolid® ©2015-2022
Altair® ultraFluidX® ©2010-2022 FluiDyna GmbH, ©2018-2022 Altair Engineering Inc.
Altair® Virtual Wind Tunnel™ ©2012-2022
Altair® WinProp™ ©2000-2022

Altair® WRAP™ ©1998-2022 Altair Engineering AB

Altair® S-FRAME® ©1995-2022 Altair Engineering Canada, Ltd., ©2021-2022 Altair Engineering Inc.

Altair® S-STEEL™ ©1995-2022 Altair Engineering Canada, Ltd., ©2021-2022 Altair Engineering Inc.

Altair® S-PAD™ ©1995-2022 Altair Engineering Canada, Ltd., ©2021-2022 Altair Engineering Inc.

Altair® S-CONCRETE™ ©1995-2022 Altair Engineering Canada, Ltd., ©2021-2022 Altair Engineering Inc.

Altair® S-LINE™ ©1995-2022 Altair Engineering Canada, Ltd., ©2021-2022 Altair Engineering Inc.

Altair® S-TIMBER™ ©1995-2022 Altair Engineering Canada, Ltd., ©2021-2022 Altair Engineering Inc.

Altair® S-FOUNDATION™ ©1995-2022 Altair Engineering Canada, Ltd., ©2021-2022 Altair Engineering Inc.

Altair® S-CALC™ ©1995-2022 Altair Engineering Canada, Ltd., ©2021-2022 Altair Engineering Inc.

Altair Packaged Solution Offerings (PSOs)

Altair® Automated Reporting Director™ ©2008-2022

Altair® e-Motor Director™ ©2019-2022

Altair® Geomechanics Director™ ©2011-2022

Altair® Impact Simulation Director™ ©2010-2022

Altair® Model Mesher Director™ ©2010-2022

Altair® NVH Director™ ©2010-2022

Altair® Squeak and Rattle Director™ ©2012-2022

Altair® Virtual Gauge Director™ ©2012-2022

Altair® Weld Certification Director™ ©2014-2022

Altair® Multi-Disciplinary Optimization Director™ ©2012-2022

Altair HPC & Cloud Products

Altair® PBS Professional® ©1994-2022

Altair® Control™ ©2008-2022

Altair® Access™ ©2008-2022

Altair® Accelerator™ ©1995-2022

Altair® Accelerator™ Plus ©1995-2022

Altair® FlowTracer™ ©1995-2022

Altair® Allocator™ ©1995-2022

Altair® Monitor™ ©1995-2022

Altair® Hero™ ©1995-2022

Altair® Software Asset Optimization (SAO) ©2007-2022

Altair Mistral™ ©2022

Altair Drive ©2021-2022

Altair® Grid Engine® ©2001, 2011-2022

Altair® DesignAI™ ©2022

Altair Breeze™ ©2022

Altair Data Analytics Products

Altair® Knowledge Studio® ©1994-2022 Altair Engineering Canada, Ltd., ©2018-2022 Altair Engineering Inc.

Altair® Knowledge Studio® for Apache Spark ©1994-2022 Altair Engineering Canada, Ltd., ©2018-2022 Altair Engineering Inc.

Altair® Knowledge Seeker™ ©1994-2022 Altair Engineering Canada, Ltd., ©2018-2022 Altair Engineering Inc.

Altair® Knowledge Hub™ ©2017-2022 Datawatch Corporation, ©2018-2022 Altair Engineering Inc.

Altair® Monarch® ©1996-2022 Datawatch Corporation, ©2018-2022 Altair Engineering Inc.

Altair® Panopticon™ ©2004-2022 Datawatch Corporation, ©2018-2022 Altair Engineering Inc.

Altair® SmartWorks™ ©2021-2022

Altair SmartCore™ ©2011-2022

Altair SmartEdge™ ©2011-2022

Altair SmartSight™ ©2011-2022

Altair One™ ©1994-2022

2022

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Technical Support

Altair provides comprehensive software support via web FAQs, tutorials, training classes, telephone, and e-mail.

Altair One Customer Portal

Altair One (<https://altairone.com/>) is Altair's customer portal giving you access to product downloads, a Knowledge Base, and customer support. We recommend that all users create an Altair One account and use it as their primary portal for everything Altair.

When your Altair One account is set up, you can access the Altair support page via this link:
www.altair.com/customer-support/

Altair Community

Participate in an online community where you can share insights, collaborate with colleagues and peers, and find more ways to take full advantage of Altair's products.

Visit the Altair Community (<https://community.altair.com/community>) where you can access online discussions, a knowledge base of product information, and an online form to contact Support. These valuable resources help you discover, learn and grow, all while having the opportunity to network with fellow explorers like yourself.

Altair Training Classes

Altair's in-person, online, and self-paced trainings provide hands-on introduction to our products, focusing on overall functionality. Trainings are conducted at our corporate and regional offices or at your facility.

For more information visit: <https://learn.altair.com/>

If you are interested in training at your facility, contact your account manager for more details. If you do not know who your account manager is, contact your local support office and they will connect you with your account manager.

Telephone and E-mail

If you are unable to contact Altair support via the customer portal, you may reach out to technical support via phone or e-mail. Use the following table as a reference to locate the support office for your region.

When contacting Altair support, specify the product and version number you are using along with a detailed description of the problem. It is beneficial for the support engineer to know what type of workstation, operating system, RAM, and graphics board you have, so include that in your communication.

Location	Telephone	E-mail
Australia	+61 3 9866 5557	anzsupport@altair.com
Brazil	+55 113 884 0414	br_support@altair.com

Location	Telephone	E-mail
Canada	+1 416 447 6463	support@altairengineering.ca
China	+86 400 619 6186	support@altair.com.cn
France	+33 141 33 0992	francesupport@altair.com
Germany	+49 703 162 0822	hwsupport@altair.de
Greece	+30 231 047 3311	eesupport@altair.com
India	+91 806 629 4500 +1 800 425 0234 (toll free)	support@india.altair.com
Israel		israelsupport@altair.com
Italy	+39 800 905 595	support@altairengineering.it
Japan	+81 3 6225 5830	support@altairjp.co.jp
Malaysia	+60 32 742 7890	aseansupport@altair.com
Mexico	+52 55 5658 6808	mx-support@altair.com
New Zealand	+64 9 413 7981	anzsupport@altair.com
South Africa	+27 21 831 1500	support@altair.co.za
South Korea	+82 704 050 9200	support@altair.co.kr
Spain	+34 910 810 080	support-spain@altair.com
Sweden	+46 46 460 2828	support@altair.se
United Kingdom	+44 192 646 8600	support@uk.altair.com
United States	+1 248 614 2425	hwsupport@altair.com

If your company is being serviced by an Altair partner, you can find that information on our web site at <https://www.altair.com/PartnerSearch/>.

See www.altair.com for complete information on Altair, our team, and our products.

This guide provides instructions for installing and operating Altair Simulation products on supported platforms.

This chapter covers the following:

- [About Altair Simulation](#) (p. 10)

There are three versions of the Altair Simulation Installation Guide.

- Quick: Instructions for installing Altair Simulation products.
- Basic: In addition to installation instructions, this guide also includes comprehensive installation options like console and silent mode installs.
- Advanced:
 - Details on installing Radioss HMPP, OptiStruct SPMD, nanoFluidX, and ultraFluidX.
 - Configuration options for the AcuSolve products.
 - Minimum operating system requirements for Feko products. Refer to the *Feko Installation Guide* for details on installing and configuring Altair Feko.

Refer to the Altair Units Licensing Guide for procedures on connecting to the Altair Units licensing system.

Altair Simulation 2022 uses InstallAnywhere 2020 SP2 web installers as its installation tool. InstallAnywhere provides the consistent look and feel of an installation wizard across all platforms for Altair Simulation products.

In order to run Altair Simulation 2022 applications, you need to connect the applications to the Altair License Management System 15.0 (or higher, using the latest version is recommended). Details of the installation and how to start the Altair License Manager can be found in the *Altair License Management System 15.0 Installation Guide*. The license packages are available on [Altair One Marketplace](#).

About Altair Simulation

Quick introduction to Altair Simulation products.

Solutions for Every Stage of Product Development

Altair Simulation offers solutions for all engineers – from model-based systems design and early geometry ideation, to detailed multiphysics simulation and optimization. Our simulation-driven approach to innovation is powered by our integrated software that optimizes design performance across multiple disciplines encompassing structures, motion, fluids, thermal management, electromagnetics, system modeling and embedded systems.

Industry Leading Optimization and Physics Workflows

Altair has been the industry leader for generative design software for over two decades. Altair Simulation optimizes structures, mechanisms, composites and additive manufactured parts. Regardless of how your product is produced, Altair Simulation products can enhance creativity by proposing designs that are as manufacturable as they are efficient and innovative.

Shared User Experience

Your designers, engineers, and CAE specialists can now work within a single intuitive and consistent user-experience. Each release of the Altair Simulation products provides more tools that deliver class-leading workflows employing this same user-interface.

Tools for Both Experts and Part-time Analysts

Altair Simulation's broad workflow implementations enable design engineers and part-time analysts to drive more of your product design with optimization. Simulation experts can draw upon the advanced features of Altair Simulation products including multiphysics simulations of interacting structural, mechanical, thermal, electromagnetic, and fluid behavior.

Access to Products

Altair Simulation provides value and flexibility through a patented, units-based licensing system. Altair Units allows metered usage of our Altair Simulation products and an expanding library of Altair Partner Alliance solutions. We have revolutionized the way you obtain software by eliminating the hurdles that prevent you from getting the tools you need.

Prepare to Install Altair Simulation Products


Summary of the items required and procedures needed to install and successfully run Altair Simulation applications on supported platforms.

This chapter covers the following:

- [Platform Support](#) (p. 13)
- [Installation Media](#) (p. 14)
- [Download from Altair One Marketplace](#) (p. 15)
- [Download Model Files](#) (p. 16)

Before starting installation, make sure you have everything you need.

- Altair Simulation 2022 and Altair License Manager software, delivered from Altair in USB/DVD format or Altair Simulation 2022 image packages downloaded from [Altair One Marketplace](#).

 **Tip:** Altair recommends that you create an [Altair One](#) account and use it as your primary portal to access product downloads, documentation, a Knowledge Base, and customer support.

- A USB compatible input port on the machine or a DVD compatible drive.
- Access to an activated and running Altair License Manager 15.0 license server or a node locked license.
- A compatible machine that contains the minimum hardware/software requirements to run Altair Simulation applications. Refer to the [Hardware Recommendations and Certifications](#) section in the Appendix for details.
- Sufficient disk space for install: The full suite of Altair Simulation 2022 applications and help files needs 8 GB of temp space. The temp files are removed after successful completion of an installation.

Reference the *Altair Simulation 2022 Platform Support* documentation for operating systems and minimum requirement considerations, and the *Altair Simulation 2022 Hardware Recommendations and Certifications* document for further hardware inquiries.

General steps for installing Altair Simulation are:

1. Install and activate an Altair License Manager (the latest version) if one does not already exist. Alternatively, use a node locked license.
2. Install Altair Simulation 2022 on the designated machine(s).
3. Set an environment variable that points the Altair Simulation 2022 application to an activated and running Altair license server. Alternatively, set the environment variable to point to a node locked license.
4. Set up Altair Simulation online help, if needed.

5. The software to install the Altair License Manager is a separate package from the Altair Simulation 2022 application packages. Download the Altair license package from the Altair website and follow the *Altair License Management System 15.0 Installation and Operation Guide* to install and start the Altair License Manager properly.

Platform Support

Platforms, operating systems, and processors supported by Altair Simulation 2022 products, which includes 2022 solver packages.

Platforms			Altair Simulation 2022	
OS	Version	Architecture	GUI Products	Solvers
Windows	10	x86_64	YES	YES
Linux	RHEL / Oracle Linux 8.3 SLES 15 SP2	x86_64	YES	YES

Windows Ultra High Definition (UHD/HiDPI) support requires Windows 10 Update 1709 or higher

RHEL= Red Hat Enterprise Linux

SLES = SUSE Linux Enterprise Server

Linux

Altair Simulation products may install and run on other non-supported Linux distributions not mentioned or referred to in this documentation, but Altair does not test, certify, verify or warrant the reliability of the products on these platforms.

- Altair™ products are tested on Gnome Desktop Manager (GDM)
- Xen kernels are currently not supported kernels for Altair Simulation products
- VirtualGL and other third-party remote visualization tools are not officially supported by Altair Simulation products

Ultra High Definition (UHD)

- UHD resolution support (2160p) is only available for Windows 10 (1709 or higher).
 - Using Windows 200% scaling for 2160p is recommended.
- Our recommended HD setting is 1080p for FHD and our Ultra HD setting is 2160p.
- Java based tools within our products may still show some scaling issues under Ultra HD resolution.

Refer to the [Hardware Recommendations and Certifications](#) section for details.

Installation Media

The Altair Simulation 2022 software package you received from Altair includes a set of DVDs or a USB thumb drive containing Altair Simulation 2022, the Altair License Manager and documentation.

The software is available for registered customers to download from Altair One Marketplace.

Download the images for the platforms on which you expect to launch Altair Simulation products. There are 23 packages required for a complete Altair Simulation installation on Windows, and 14 for Linux. Here is an example list of the Simulation Products Installer and product sub-installers for Windows:

- 1.** Altair Simulation Products Installer
- 2.** Altair HyperWorks Desktop
- 3.** Altair HyperWorks Desktop Help
- 4.** Altair SimLab
- 5.** Altair Feko
- 6.** Altair Flux
- 7.** Altair Mechanical Solvers
- 8.** Altair Mechanical Solvers Help
- 9.** Altair CFD Solvers
- 10.** Altair CFD Solvers Help
- 11.** Altair Virtual Wind Tunnel ultraFluidX
- 12.** Altair Activate
- 13.** Altair Compose
- 14.** Altair EDEM
- 15.** Altair Inspire
- 16.** Altair Inspire Cast
- 17.** Altair Inspire Extrude
- 18.** Altair Inspire Form
- 19.** Altair Inspire Mold
- 20.** Altair Inspire PolyFoam
- 21.** Altair Inspire Render
- 22.** Altair Inspire Studio
- 23.** Altair ConnectMe

The two Help sub-installers together make up a complete Altair Simulation 2022 Help installation.

Download from Altair One Marketplace

Instructions on how to download Altair products from Altair One Marketplace.

Before you begin, go to the [Altair One Marketplace](#) site in a web browser and log in.

1. Type the name of the product in the search box and press Enter.
2. In the right pane on the screen, click the **Download** tab.
3. From the Suite Version drop-down menu, select a suite version.
4. From the Operating System drop-down menu, select a platform.
5. Click **Download** to the right of each software package you would like to download. The Altair Simulation Products Installer and other products are listed under Related Downloads.

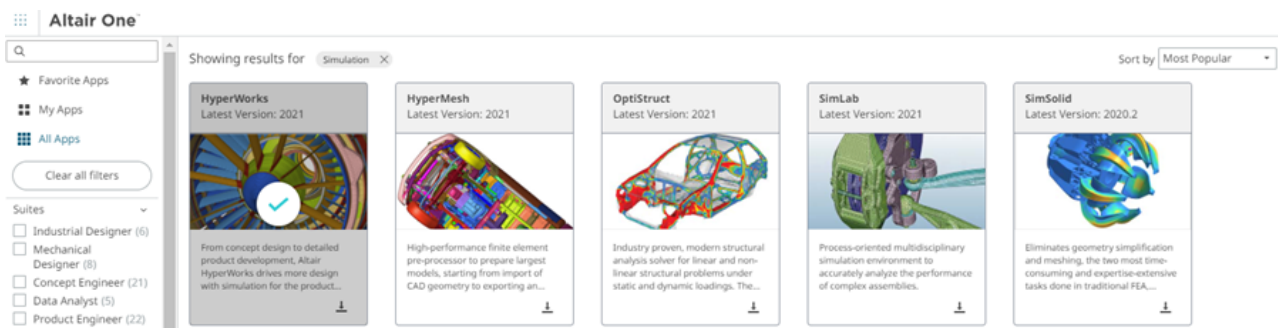


Figure 1:

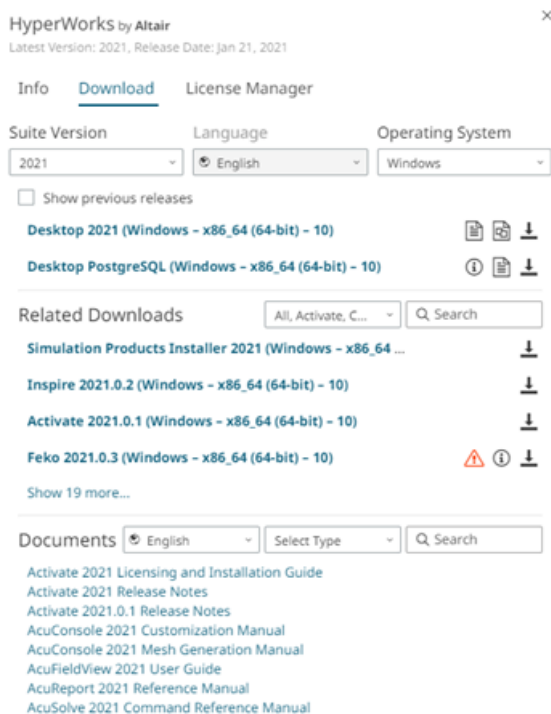



Figure 2:

Download Model Files


You can find required model files on Altair One via the Altair Community and Altair Marketplace sites.

Altair recommends that you create an [Altair One](#) account and use it as your primary portal to access product downloads, documentation, a Knowledge Base, and customer support.

1. Go to any of the following Altair One sites to download model files (tutorials and demos):
 - [Altair Community](#): Click the **Documentation** link, choose filter options, and select **Model** as the Output Type.
 - [Altair Marketplace](#): Search for and select the product you want, click the **Download** tab, and in the **Select Type** list, select the applicable model file option.

 **Tip:** You must unzip the model files before proceeding with the tutorials. When extracting zipped files, preserve any directory structure included in the file package.

2. If required, enter your username and password.


 **Note:** If logging in for the first time, click **Need help signing in?** to create an account, and follow the instructions on the Altair One site.

Instructions for installing Altair Simulation.

This chapter covers the following:

- [Install Altair Simulation: Local Installation](#) (p. 18)

Two procedures are necessary to enable Altair Simulation. First, using the installation configuration you selected in [Prepare to Install Altair Simulation Products](#) as a guide, install the Altair Simulation software on your machine(s). Secondly, you must be able to point to an activated license server that allows Altair Simulation applications to draw license units.

 **Important:** You should not mix installers of different minor release versions, for example – 2022 with 2022.1 installers, updates and hotfixes.

Altair Simulation 2022 can be installed via a Graphical User Interface (GUI) mode, silent mode, or console mode. The following sections describe how to install the software via each method.

The Altair Simulation 2022 Help is a browser-based HTML system that uses ActiveX on Windows and Java Script on Linux. It can be installed with the applications or installed alone behaving as an online help server.

For Help installations on a network server, make sure to have the Help UNC or network path prior to running the installer. You will be prompted for this information during the install.

Install Altair Simulation: Local Installation

Installation Files

Altair Simulation 2022 has the ability to install the individual product installers separately from one another, referenced as *sub-installers* in this document, while also giving you an option to install all of them at once via the Altair Simulation Products Installer in a batch-like mode (recommended).

The Windows installers have added the Altair Engineering, Inc. digital signatures for enhanced security. Reference [Table 1](#) for specific file names and details on the product groups per individual sub-installers.

The Altair Simulation Products Installer, for example `hw2022_win64.exe` for Windows, is a quick and easy setup installer allowing for various combinations of the independent sub-installers to be installed at one time. It is done without the need to wait for all the packages to extract prior to setting up the installation, which should allow for a quick setup to install a complete Altair Simulation 2022 installation. Using the Altair Simulation Products Installer is the recommended method for installing Altair Simulation 2022 products.


Table 1: Altair Simulation 2022 Installer File Names

Installer Name	Description
<code>hw2022_win64.exe</code> <code>hw2022_linux64.bin</code>	Master Installer (Altair Simulation Products Installer) is used to setup and install the separate individual Altair Simulation products simultaneously. You can select which products to install, or install them all at once.
<code>hwCFDSolvers2022_win64.exe</code> <code>hwCFDSolvers2022_linux64.bin</code>	Installer of the CFD Solvers suite of products (includes AcuSolve on Windows and Linux, and nanoFluidX and ultraFluidX on Linux).
<code>hwDesktop2022_win64.exe</code> <code>hwDesktop2022_linux64.bin</code>	Installer of the HyperWorks Desktop suite of products (includes most GUI applications, such as HyperView, HyperMesh, HyperGraph, HyperStudy, and so on).
<code>hwSolvers2022_win64.exe</code> <code>hwSolvers2022_linux64.bin</code>	Installer of the Mechanical Solvers suite of products (includes Radioss, OptiStruct, MotionSolve, and so on).
<code>hwCFDSolversHelp2022_win64.exe</code>	Installer of the CFD Solvers Help content.

Installer Name	Description
hwCFDSolversHelp2022_linux64.bin	
hwDesktopHelp2022_win64.exe hwDesktopHelp2022_linux64.bin	Installer of the HyperWorks Desktop Help content.
hwSolversHelp2022_win64.exe hwSolversHelp2022_linux64.bin	Installer of the Mechanical Solvers Help content.
hwFeko2022_win64.exe hwFeko2022_linux64.bin	Installer for Feko, newFASANT, and WinProp GUI and solver products.
hwFlux2022_win64.exe hwFlux2022_linux64.bin	Installer for Flux and FluxMotor GUI and solver products.
hwVirtualWindTunnelUltraFluidX2022_win64.exe hwVirtualWindTunnelUltraFluidX2022_linux64.bin	Installer of the Virtual Wind Tunnel for ultraFluidX product.
AltairSimLab2022_win64.exe AltairSimLab2022_linux64.bin SimLab2022_Additionals_Windows.zip	Installer of the SimLab product. Refer to the SimLab installation guide for additional details.
AltairActivate2022_win64.exe AltairActivate2022_linux64.bin	Installer of the Activate product.
AltairCompose2022_win64.exe AltairCompose2022_linux64.bin	Installer of the Compose product.
AltairEDEM2022_win64.exe AltairEDEM2022_linux64.bin	Installer of the EDEM product.
AltairInspire2022_win64.exe	Installer of the Inspire product.
AltairInspireCast2022_win64.exe	Installer of the Inspire Cast product.
AltairInspireExtrude2022_win64.exe	Installer of the Inspire Extrude products.
AltairInspireForm2022_win64.exe	Installer of the Inspire Form product.
AltairInspireMold2022_win64.exe	Installer of the Inspire Mold product.
AltairInspirePolyFoam2022_win64.exe	Installer of the Inspire PolyFoam product.

Installer Name	Description
AltairInspireRender2022_win64.exe	Installer of the Inspire Render product.
AltairInspireStudio2022_win64.exe	Installer of the Inspire Studio product.
hwConnectMe2022_win64.exe	Installer of the ConnectMe tool.

To install Help along with the application, download and place the Help sub-installers `hwDesktopHelp`, `hwSolversHelp`, and `hwCFDSolversHelp` files, which are executable files on Windows and bin file types on Linux, in the same directory as the Altair Simulation Products Installer. In Altair Simulation 2022, Help packages can be installed independently.

 **Note:** You can find and download tutorial model files on [Altair One](#) via the [Altair Community](#) and [Altair Marketplace](#) sites.

Windows (Local) Installation

Complete the following steps to extract and install the software.

1. Log in to the machine on which the software is to be installed, then insert the USB/DVD, or place the downloaded files in a temporary directory.
Example of a directory with all the required sub-installers for a complete Altair Simulation 2022 installation on a Windows 64-bit platform, with the Altair Simulation Products Installer highlighted:

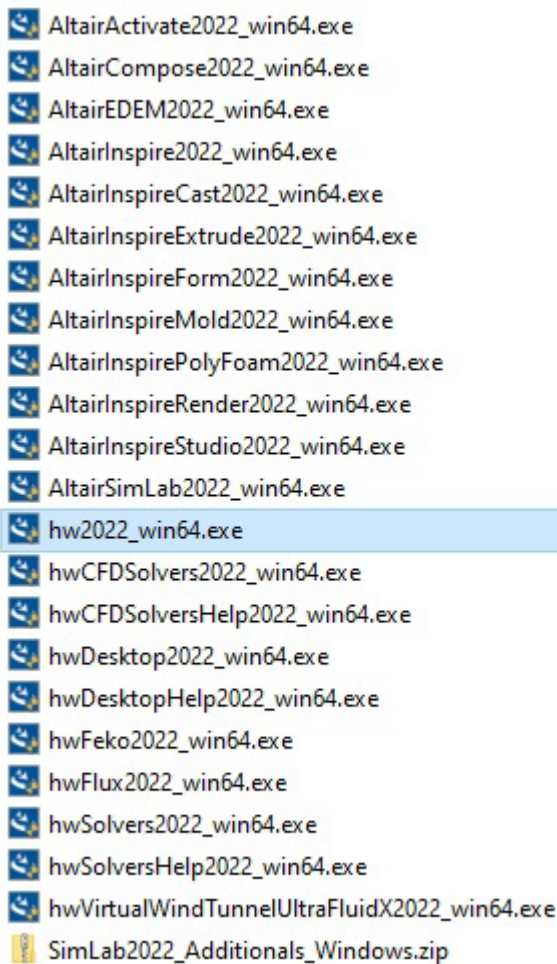



Figure 3:

Each local help installation can be done independently, and you do not need to install multiple Help packages together. You can also install help without using the Altair Simulation Products Installer.

 **Note:** Make sure that the downloaded files have “read + execute” permissions before continuing with an installation. Use Windows Explorer file properties to change the permissions.

2. Double-click the `hw2022_win64.exe` Altair Simulation Products Installer executable file to start the installer.
3. If UAC (User Account Control) is enabled, then a prompt displays showing the Altair Engineering, Inc. digital signature for elevated permissions. Click **Yes** to continue with installer.

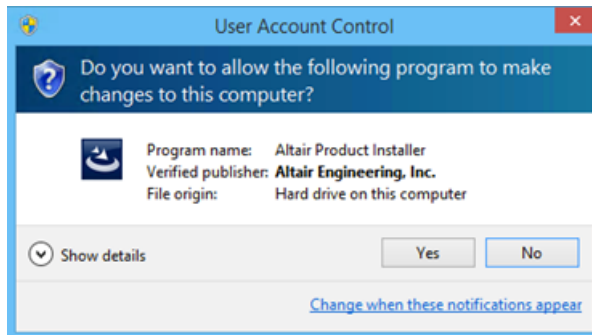


Figure 4:

4. In the multi-language selector prompt, select the proper locale and click **OK** to continue. The default locale setting is specific to the install machine regional settings. The language selection only corresponds to the installer settings not to the Altair Simulation product language settings. Altair Simulation products are in English.
5. In the **License Agreement** panel, review the agreement, select the **I accept the terms of the License Agreement** checkbox, and click **Next** to proceed.
6. In the **Introduction** panel, click **Next** to continue.
7. In the **Choose Installation Type** panel, choose **Local** and click **Next**.
8. In the **Choose Install Folder** panel, choose the Altair Simulation install directory and click **Next**.



Note:

- The installer does not allow the use of characters # and ;
- Installing to a root drive is not permitted, for example C:\

9. In the **Change Shortcut Folder** (Local) panel, choose a Start Menu name for the Altair Simulation install and select whether desktop shortcuts are created. There are options on this panel to associate Altair Simulation file types to products, install ConnectMe, and to generate thumbnail previews for HyperMesh files. These options are selected by default. Once options are chosen, click **Next** to continue.

10. In the **Choose Install Set** panel, select the products to install. Click **Next** to continue.


You can now install compatible hotfixes, that are not selected by default, for HyperWorks Desktop, Mechanical Solvers, CFD Solvers, and Flux as well.

Install Sets, which group products by discipline, can be accessed using the **Install Set** dropdown menu. Selecting an Install Set picks the products that are part of that set.


Products that do not have sub-installer present or were not picked up by the Altair Simulation Products Installer in the residing directory will be listed as (Unavailable) and are not available to be installed.



Note: Altair Manufacturing Solutions and Altair Engineering Solutions require both the hwDesktop and hwSolvers sub-installers to be present. Help installers and hotfixes will only be displayed if present.

 **Note:** You can no longer install a different version of an already installed product to the same location (for example, HyperWorks Desktop 2022.1 on top of HyperWorks Desktop 2022).

11. If Help was NOT selected to be installed, the **Help Configuration** panel is displayed. Select one of the options:
 - Choose **Connect to a network installed Help location** to input the path, either UNC or drive path, to where the Help was installed to create the product link.
 - Choose **Connect to the Altair website Help** to allow the products to connect to the Altair website Help. A working Internet connection is needed for this functionality.
 - Choose **Set up Later** to allow for a post Help install over the current installation. This option defaults to the website help if an existing help configuration file is not present.
12. In the **Set up Licensing** panel, your current license is displayed. Select one of the following options:
 - Choose **Enter license server** to input the license server (port@host) or choose a license file.
 - Choose **Skip this step** if you do not want to change your license settings at this time.
13. In the **Pre-Installation Summary** panel, review the Product Features list, Install Folder and disk space requirements. Click **Install** to continue.

 **Note:** Install times are machine hardware dependent. Anti-virus software may lengthen the install times. The Altair Simulation sub-installer and Altair Simulation Products Installer may need to be allowed through any third party firewalls or virus scanning software in order to not be prompted during install time to allow them access to be installed.

14. Once the installation completes, click **Done** to exit the installer.

Linux Installation

Complete the following steps to extract and install the software.

Altair Simulation install directories with spaces are not supported on Linux.

1. Run the shell command `sh` with the installer binary as an argument.
2. In the multi-language selector prompt, select the proper locale and click **OK** to continue.
The language selection only corresponds to the installer settings not to the Altair Simulation product language settings. Altair Simulation products are in English.
3. In the **License Agreement** panel, review the agreement, select the **I accept the terms of the License Agreement** checkbox, and click **Next** to proceed.
4. In the **Introduction** panel, click **Next** to continue.
5. In the **Choose Install Folder** panel, choose the Altair Simulation install directory and click **Next**.

 **Note:**


- The installer does not allow the use of characters # and ;
- Installing to a root drive is not permitted, for example /


6. In the **Choose Install Set** panel, select the products to install. Click **Next** to continue.

You can now install compatible hotfixes, that are not selected by default, for HyperWorks Desktop, Mechanical Solvers, CFD Solvers, and Flux as well.

Install Sets, which group products by discipline, can be accessed using the **Install Set** dropdown menu. Selecting an Install Set picks the products that are part of that set.


Products that do not have sub-installer present or were not picked up by the Altair Simulation Products Installer in the residing directory will be listed as (Unavailable) and are not available to be installed.

 **Note:** Altair Manufacturing Solutions and Altair Engineering Solutions require both the hwDesktop and hwSolvers sub-installers to be present. Help installers and hotfixes will only be displayed if present.


 **Note:** You can no longer install a different version of an already installed product to the same location (for example, HyperWorks Desktop 2022.1 on top of HyperWorks Desktop 2022).

7. If Help was NOT selected to be installed, the **Help Configuration** panel is displayed. Select one of the options:

- Choose **Connect to a network installed Help location** to input the path, either UNC or drive path, to where the Help was installed to create the product link.
- Choose **Connect to the Altair website Help** to allow the products to connect to the Altair website Help. A working Internet connection is needed for this functionality.
- Choose **Set up Later** to allow for a post Help install over the current installation. This option defaults to the website help if an existing help configuration file is not present.

 **Note:** A valid Linux web browser will need to also be defined in this panel (HW_MSG_BROWSER).

8. In the **Pre-Installation Summary** panel, review the Product Features list, Install Folder and disk space requirements. Click **Install** to continue.

 **Note:** Install times are machine hardware dependent. Anti-virus software may lengthen the install times. The Altair Simulation sub-installer and Altair Simulation Products Installer may need to be allowed through any third party firewalls or virus scanning software in order to not be prompted during install time to allow them access to be installed.

9. Once the installation completes, click **Done** to exit the installer.

Connect to the Altair License Management System 15.0

The Altair License Management System 15.0 (ALMS) provides a common units-based licensing model for all Altair software related to CAE, on-demand computing, and business intelligence.

This chapter covers the following:

- [Requirements](#) (p. 26)
- [Node Locked Licenses](#) (p. 27)

This new system has been designed to enable Altair Simulation Partner Products (selected third party products) to be licensed via Altair Units as well.

The ALMS is comprised of two components: the License Server and the Usage Reporting System (URT). The license system is based on X-Formation's LM-X license server. The URT is a java application that reports anonymous transactional logs to Altair. As part of the license agreement that enables partner software to be used, product usage must be reported to Altair.

Altair License Management System 15.0 is based on X-Formation's LM-X License Management System Version 5.

Requirements

In order for applications to use the ALMS, the environment variable, `ALTAIR_LICENSE_PATH`, must point to the appropriate location.

Multiple license paths are allowed and should be separated by a semicolon (;) on Windows and a colon (:) on Linux. The proper format for a network license location is `port@hostname`. If you are using a local license file, simply set the value to the full pathname of the file.

A few examples of license paths:

On Windows:

```
ALTAIR_LICENSE_PATH=6200@server.foo.bar.com  
ALTAIR_LICENSE_PATH=6200@srv1;6200@srv2;6200@srv3  
ALTAIR_LICENSE_PATH=c:\Program Files\Altair\Licensing14.5\altair_lic.dat
```

On Linux:

```
ALTAIR_LICENSE_PATH=6200@server.foo.bar.com  
ALTAIR_LICENSE_PATH=6200@srv1:6200@srv2:6200@srv3  
ALTAIR_LICENSE_PATH=/usr/local/altair/licensing14.5/altair_lic.dat
```

For High Availability License (HAL) System and/or multiple servers setups, list the three servers in the order: primary; secondary; tertiary.

Examples of license paths:

BASH shell (`.profile`, `.bashrc`):

```
export ALTAIR_LICENSE_PATH=6200@server.name.com
```

C shell (`.tcshrc`, `.cshrc`):

```
setenv ALTAIR_LICENSE_PATH 6200@server.name.com
```

Node Locked Licenses

For node-locked license (a license that is locked to a local machine), set the environment variable, `ALTAIR_LICENSE_PATH`, to point to the appropriate location where the license file resides.


The preferred method is to save your license to a location separate from Altair Simulation installations and set the environment variable to point at this license.

This chapter covers the following:

- [Uninstall: Windows](#) (p. 29)
- [Uninstall: Linux](#) (p. 31)

Uninstall: Windows

The Altair Simulation Products Uninstaller will remove **all** files from the install.

 **Note:** Any modified files or added files, like the `altair_lic.dat` file, will also be removed from within that particular install location. Backup any and all files you wish to save prior to running the uninstaller. Each sub-installer has its own uninstaller if you want to remove a single product or group of products.

1. Choose one of the following methods:
 - From the Start Menu, click **Altair 2022 > Tools > Uninstall_SimulationProductsInstaller 2022**
 - From the Control Panel, click **Add/Remove** or **Uninstall a Program** and double-click Altair Simulation Products Installer 2022.
2. Follow the prompts to proceed with uninstallation.

Windows Silent Uninstalls Using a Response File

Silent uninstalls for Altair Simulation only allows for complete uninstalls of the products, this includes all folders, directories and files of the Altair Simulation install.

1. Backup any important files before proceeding with a silent uninstall.
2. A response file is necessary for using the silent uninstall capabilities. Create a response file adding the following three variables within it and save it as `hw2022_silent_uninstaller.properties`.

```
INSTALLER_UI=silent  
FEATURE_UNINSTALL=COMPLETE  
INSTALL_CLEANUP_ALL=1
```
3. Open a command prompt (Administrative elevation is recommended to bypass any User Account Control prompts as shown in image below):

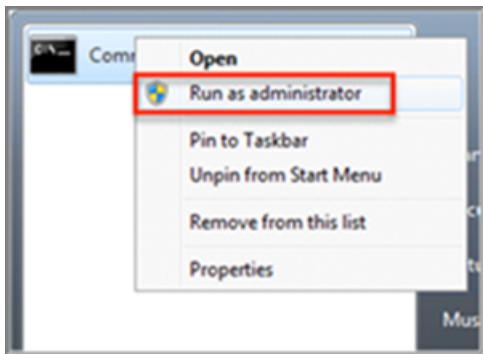


Figure 5:

4. Run the Altair Simulation Uninstaller executable with the `hw2022_silent_uninstaller.properties` file using the syntax in the example below (where

<INSTALL_PATH> is the path used to install Altair Simulation and <RESPONSE_PATH> is the path where the response file resides):

```
"C:\<INSTALL_PATH>\2022\uninstalls\Uninstall_SimulationProductsInstaller2022\Uninstall_SimulationProductsInstaller2022.exe" -f C:\<RESPONSE_PATH>\hw2022_silent_uninstaller.properties
```

This will remove the Altair Simulation install completely in silent mode.



Note: Files in the installation directory and the Start Menu folder will be removed, but any Desktop Shortcuts may remain and need to be manually deleted.

Uninstall: Linux

Run the command `rm -rf install_directory` to uninstall the product, where `install_directory` is where the Altair Simulation installation you would like to remove resides.

This chapter covers the following:

- [Hardware Recommendations and Certifications](#) (p. 33)


Hardware Recommendations and Certifications

View the most recent recommended graphic boards, laptops and desktop hardware configurations.

Recommended Graphics Boards

Recommended CAE/CAD graphic boards to use with Altair Simulation applications.

The most recent vendor/manufacturer drivers should be used and all driver support for these cards should be addressed to the appropriate manufacturer of the graphic board.

 **Note:** AMD graphics cards will no longer be supported on Linux x86_64 operating systems in Altair Simulation 2022 and higher products.

AMD Graphics Cards

Products	GPU Model	Driver Version
Radeon™ Pro	W6800	<i>Windows 10 (64-bit)</i> 21.Q4
	W6600	
	VII	<i>Linux (64-bit)</i> Not Supported
	WX 9100	
	W5700	
	WX 8200	
	W5500	
	WX 7100	
	WX 5100	
	WX 4100	
	WX 3200	
	WX 3100	
	WX 2100	
Radeon™ Pro Mobility	WX 7130	<i>Windows 10 (64-bit)</i> 21.Q4
	WX 7100	
	WX 4170	<i>Linux (64-bit)</i> Not Supported
	WX 4150	
	WX 4130	
	WX 3100	

Products	GPU Model	Driver Version
	WX 2100	

NVIDIA Graphics Boards

Products	GPU Model					Driver Version
	M (Maxwell)	P (Pascal)	V (Volta)	RTX (Turing)	A* (Ampere)	
Quadro Series	M2000	P400	GV100	RTX 3000	RTX A2000	<i>Windows 10 (64-bit)</i> 472.47
	M4000	P420		RTX 4000	RTX A3000	
	M5000	P600		RTX 5000	RTX A4000	<i>Linux (64-bit) ODE</i> <i>Long Live</i> 470.94
	M6000	P620		RTX 6000	RTX A5000	
		P1000		RTX 8000	RTX A6000	
		P2000		T400		
		P2200		T600		
		P4000		T1000		
		P5000				
		P5200				
	P6000					
	GP100					
Quadro Mobility	M500M	P500	N/A	T400	RTX A2000	<i>Windows 10 (64-bit)</i> 472.47
	M520M	P520		T600	RTX A3000	
	M600M	P600		T1000	RTX A4000	<i>Linux (64-bit) ODE</i> <i>Long Live</i> 470.94
	M620M	P620		T1200	RTX A5000	
	M1000M	P1000		T2000		
	M2000M	P2000		RTX 3000		
	M2200M	P3000		RTX 4000		
	M3000M	P3200		RTX 5000		
	M4000M	P4000				
	M5000M	P4200				
	P5000					

Products	GPU Model					Driver Version
	M (Maxwell)	P (Pascal)	V (Volta)	RTX (Turing)	A* (Ampere)	
		P5200				



Note:

Minimum OpenGL 3.2 and OpenCL 2.1 Requirement

Virtual server/clients and VirtualGL setups may work, but are not officially tested or supported.

NVIDIA Optimus or AMD Switchable Graphics

In order to ensure best performance, these options should be set to use discrete NVIDIA or AMD GPU and not the Intel GPU.

Power Options and Mobility Center

In order to ensure best performance, these options should be maximum performance for both GPU and CPU.

Graphics Driver Corruption or Installation Issues

In order to ensure best driver compatibility, it is recommended to use "Custom" and "Clean" install options instead of the general "Express" driver installer options.

Recommended Workstation Desktop and Laptop/ Notebook Hardware

DELL Workstations - Desktops (1 of 3)

Product	Workstation Model			
	3240C	3420T / 3430T	3440 SFF	3450 SFF
NVIDIA Quadro GPU	P400	P400	P400	P400
	P620	P600	P620	P620
	P1000	P620	P1000	P1000
	RTX 3000	P1000		T400 T600 T1000

Product	Workstation Model			
	Precision Workstation	3240C	3420T / 3430T	3440 SFF
AMD Radeon™ Pro GPU		WX2100 WX3100 WX4100	WX3200	WX3200

DELL Workstations - Desktops (2 of 3)

Product	Workstation Model			
	Precision Workstation	3460 (mini)	3650	3930 Rack
NVIDIA Quadro GPU		RTX 3000	P400 P620 P1000 P2200 T400 T600 T1000 RTX 4000 RTX 5000 RTX A2000 RTX A4000 RTX A5000 RTX A6000	P400 P620 P1000 P2200 T400 T600 T1000 RTX 4000 RTX 5000 RTX A2000
AMD Radeon™ Pro GPU		N/A	W6600 W6800 WX3200 WX5500 WX5700	W5500 W5700 WX3200

DELL Workstations - Desktops (3 of 3)

Product	Workstation Model			
	Precision Workstation	5810	5820 / 7820 / 7920	7920 Rack
NVIDIA Quadro GPU	P400	P400	P400	P400
	P600	P620	P620	P620
	P1000	P1000	P1000	P1000
	P2000	P2200	P2200	P2200
	P4000	T400	T400	T400
	P6000	T600	T600	T600
		T1000	T1000	T1000
		RTX 4000	RTX 4000	RTX 4000
		RTX 5000	RTX 5000	RTX 5000
		RTX 6000	RTX 6000	RTX 6000
		RTX 8000	RTX 8000	RTX 8000
		RTX A2000	RTX A2000	RTX A2000
		RTX A4000	RTX A4000	RTX A4000
	RTX A5000	RTX A5000	RTX A5000	
RTX A6000	RTX A6000	RTX A6000		
AMD Radeon™ Pro GPU	W7100	W5500	W5500	
	W8100	W5700	W5700	
	W9100	W6600	WX3200	
	WX4100	W6800		
	WX5100	WX3200		
	WX7100			

DELL Workstations - Laptops (1 of 5)

Product	Workstation Model			
	Precision Workstation	3550	3551	3560
NVIDIA Quadro GPU	P520	P620	T500	T600

Product	Workstation Model			
Precision Workstation	3550	3551	3560	3561
				T1200
AMD Radeon™ Pro GPU	N/A	N/A	N/A	N/A

DELL Workstations - Laptops (2 of 5)

Product	Workstation Model			
Precision Workstation	5530	5540 / 5740	5520 AIO	5520
NVIDIA Quadro GPU	P1000M P2000M	T1000 T2000 RTX 3000*	N/A	M1200M
AMD Radeon™ Pro GPU	N/A	N/A	WX 4150	N/A

DELL Workstations - Laptops (3 of 5)

Product	Workstation Model			
Precision Workstation	5550 / 5750*	5560	5720	5760
NVIDIA Quadro GPU	T1000 T2000 RTX 3000*	T1200 RTX A2000	N/A	RTX A2000 RTX A3000
AMD Radeon™ Pro GPU	N/A	N/A	WX7100M	N/A

DELL Workstations - Laptops (4 of 5)

Product	Workstation Model			
Precision Workstation	7520	7530	7540 / 7740	7550 / 7750
NVIDIA Quadro GPU	P3000M P5000M	P2000M P3200M	T1000 T2000 RTX 3000	T1000 T2000 RTX 3000

Product	Workstation Model			
	Precision Workstation	7520	7530	7540 / 7740
		P4000M	RTX 4000 RTX 5000	RTX 4000 RTX 5000
AMD Radeon™ Pro GPU	WX 7100	WX 4150	WX 3200 WX 7130	N/A

DELL Workstations - Laptops (5 of 5)

Product	Workstation Model			
	Precision Workstation	7560	7720	7730
NVIDIA Quadro GPU	T1200 RTX A2000 RTX A3000 RTX A4000 RTX A5000	M1200M P3000M P4000M P5000M	P3200M P4200M P5200M	T1200 RTX A3000 RTX A4000 RTX A5000
AMD Radeon™ Pro GPU	N/A	WX 7100	WX 4150 WX 7100	N/A

Lenovo Workstations - Desktops (1 of 2)

Product	Workstation Model				
	Lenovo ThinkStation	P320 SFF / P320 TWR*	P330 SFF / P330 TWR*	P340 SFF / P340 TWR*	P348
NVIDIA Quadro GPU (442.92 or higher)	P400 P600 P1000 P2000* P4000*	P400 P620 P1000 P2000* P2200*	P400 P620 P1000 P2200 RTX A2000	T400 T600 T1000	P2200 RTX A2000 RTX A4000* RTX A5000* T400

Product	Workstation Model				
Lenovo ThinkStation	P320 SFF / P320 TWR*	P330 SFF / P330 TWR*	P340 SFF / P340 TWR*	P348	P350 SFF / P350 TWR*
		P4000*	RTX 4000* RTX 5000* RTX A4000* T400 T600 T1000		T600 T1000
AMD Radeon™ Pro GPU	N/A	N/A	N/A		

Lenovo Workstations - Desktops (2 of 2)

Product	Workstation Model				
Lenovo ThinkStation	P350 Tiny	P520* / P520c	P620 (AMD Ryzen PRO 3975X)	P720 / P920	NEC (mini)
NVIDIA Quadro GPU (442.92 or higher)	P1000 T600 T1000	P400 P620 P1000 P2200 RTX 4000 RTX 5000 RTX 6000* RTX A2000 RTX A4000 RTX A4500 RTX A5000 RTX A6000* T400 T600	GP100 P620 P1000 P2200 RTX 4000 RTX 5000 RTX 6000 RTX 8000 RTX A2000 RTX A4000 RTX A4500 RTX A5000 RTX A6000 T400	P400 P620 P1000 P2200 RTX 4000 RTX 5000 RTX 6000 RTX 8000 RTX A2000 RTX A4000 RTX A4500 RTX A5000 RTX A6000 T400	P1000

Product	Workstation Model				
Lenovo ThinkStation	P350 Tiny	P520* / P520c	P620 (AMD Ryzen PRO 3975X)	P720 / P920	NEC (mini)
		T1000	T600 T1000	T600 T1000	
AMD Radeon™ Pro GPU		N/A	W5500 W5700	N/A	N/A

Lenovo Workstations - Laptops (*Windows 10 support only) (1 of 4)

Product	Workstation Model						
Lenovo ThinkPad	P1 Gen1	P1 Gen2*	P1 Gen3	P1 Gen4	P14s	P14s Gen1	P14s Gen2
NVIDIA Quadro GPU	P1000M P2000M	T1000 T2000	T1000 T2000	T1200 RTX A2000 RTX A3000 RTX A4000 RTX A5000	P520	P520	T500
AMD Radeon™ Pro GPU	N/A	N/A	N/A	N/A	N/A	AMD Ryzen 7 PRO 4750U with Radeon Graphics (2 GB) AMD APU 4400	AMD APU 5500

Lenovo Workstations - Laptops (*Windows 10 support only) (2 of 4)

Product	Workstation Model						
	Lenovo ThinkPad P15 Gen1	P15 Gen2	P15s Gen1	P15s Gen2	P15v Gen1	P15v Gen2	P17 Gen1
NVIDIA Quadro GPU	T1000 T2000 RTX 3000 RTX 4000	T500 T1200 RTX A2000 RTX A3000 RTX A4000 RTX A5000	P520	T500	P620	T600 T1200 RTX A2000	T1000 T2000 RTX 3000 RTX 4000 RTX 5000
AMD Radeon™ Pro GPU	N/A	N/A	N/A		N/A	N/A	N/A

Lenovo Workstations - Laptops (*Windows 10 support only) (3 of 4)

Product	Workstation Model						
	Lenovo ThinkPad P17 Gen2	P40 Yoga	P43s*	P50	P50s	P51	P51s
NVIDIA Quadro GPU	T1200 RTX A2000 RTX A3000 RTX A4000 RTX A5000	M500M	P520	M1000M M2000M	M500M	M1200M M2200M	M520M
AMD Radeon™ Pro GPU	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lenovo Workstations - Laptops (*Windows 10 support only) (4 of 4)

Product	Workstation Model						
Lenovo ThinkPad	P52	P52s	P53*	P53s*	P71	P72	P73*
NVIDIA Quadro GPU (442.92 or higher)	P1000 P2000 P3200	P500	T1000 T2000 RTX 3000 RTX 4000	P520	M620M P3000 P4000 P5000	P600 P2000 P3200 P4200 P5200	P620 T2000 RTX 3000 RTX 4000 RTX 5000
AMD Radeon™ Pro GPU	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Acer Workstations and Laptops (*Windows 10 support only)

Product	Workstation Model		
Acer	ConceptD 500*	ConceptD 700*	Veriton K8
NVIDIA Quadro GPU	RTX 4000	RTX 4000	RTX 4000
AMD Radeon™ Pro GPU	N/A	N/A	N/A

Product	Mobile Workstation Model				
Acer	ConceptD 3 Pro*	ConceptD 3 Ezel Pro*	ConceptD 5 Pro*	ConceptD 7 Pro*	ConceptD 7 Ezel Pro*
NVIDIA Quadro GPU	T1000	T1000	RTX 3000	RTX 3000	RTX 5000
AMD Radeon™ Pro GPU	N/A	N/A	N/A	N/A	N/A

Altos Workstations and Laptops (*Windows 10 support only)

Product	Workstation Model	
	BrainSphere™ P130 F5	BrainSphere™ P530 F4
NVIDIA Quadro GPU	RTX 2000	K420 P400 K620 K1200 P1000 P2000 P4000 P5000 P6000 GP100 RTX 2000 RTX 4000 RTX 5000
AMD Radeon™ Pro GPU	N/A	N/A

Comments

For NVIDIA GPU based laptops/notebooks the Optimus power saving option in the BIOS should be disabled and the NVIDIA drivers properly installed for optimal performance in Altair Simulation products.

For AMD GPU based laptops/notebooks; the Enduro/Switchable Graphics power saving option should be disabled and the AMD drivers properly installed for optimal performance in Altair Simulation products.

Optimus (Intel/NVIDIA) enabled drivers may create performance issues with notebooks/laptops compared to a dedicated non-shared GPU driver. Disabling the Optimus feature in BIOS, if available, will help give the best overall graphics performance.

Disable nView Window manager under NVIDIA drivers if you experience random crashes and/or issues.

All power saving modes, settings and governors for CPU frequencies and GPU performance should be set to maximum settings in order to get the optimal performance out of Altair Simulation products. This includes smooth graphics and high frame rates (FPS) on Windows and Linux platforms.

Altair Simulation 2022 Solver Hardware Configuration Recommendations

Recommended hardware configurations for Altair Solvers.

AcuSolve Solver

Table 2:

Problem Size	Small	Medium	Large
Typical Workload Steady State or Transient	Steady state: Up to 1M nodes Transient: Up to 100K nodes	Steady state: Up to 10M nodes Transient: Up to 1M nodes	Steady state: Greater than 10M nodes Transient: Greater than 1M nodes
Throughput ¹	Single job	Single job	Single job
CPU ²	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake" or AMD EPYC 7002 or 7003 series	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake" or AMD EPYC 7002 or 7003 series	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake" or AMD EPYC 7002 or 7003 series
Number of CPU / node	1-4	1-4	1-4
Number of cores / node	32 – 128	32 – 128	32 – 128
Number of nodes	1-8	8 – 48	>48
Minimum Memory Configuration / node ³	300MB to 3GB	3GB to 30GB	More than 30GB (3KB per CFD node)
Storage (minimum)	500 GB SATA or SSD	1.5 TB local storage	1.5 TB local storage
Network Interconnect	Gigabit Ethernet Or Infiniband	Infiniband	Infiniband
Operating System	Linux kernel 2.6.32 or higher Windows 7 or 10	Linux kernel 2.6.32 or higher	Linux kernel 2.6.32 or higher
GPU	Yes	Yes	Yes
MPI	Intel MPI 2018.4 or higher	Intel MPI 2018.4 or higher	Intel MPI 2018.4 or higher

Problem Size	Small	Medium	Large
Setup (2000-3000 computational nodes per core)	Pure OpenMP or Hybrid OpenMP/MPI	Hybrid OpenMP/MPI	Hybrid OpenMP/MPI
Hyper Threading	Not recommended	Not recommended	Not recommended

Feko Solver

Table 3:

Problem Size	Small	Medium	Large
General recommendations given for MoM and MLFMM dependent on problem size in terms of number of unknowns / mesh elements. For other solution methods (FEM, FDTD, RL-GO, PO, UTD) many factors to be considered.	Pure MoM: less than 50k unknowns. MLFMM: between 100k and 500k unknowns	Pure MoM: between 50k and 100k unknowns. MLFMM: between 500k and 5M unknowns	Pure MoM: >100k unknowns MLFMM: >5M unknowns
Throughput ¹	Single job	Single large job or few jobs in parallel	Single very large job or multiple jobs
CPU ²	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake" or later	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake" or later	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake" or later
Number of CPU / node	2	2	2
Number of cores / node	32 – 56	32 – 56	32 – 56
Number of nodes	1	8 – 16	> 16
Minimum Memory Configuration / node ³	64 GB	128 GB	256 GB
Storage (minimum)	500 GB SATA or SSD	500 GB SATA or SSD	500 GB SATA or SSD

Problem Size	Small	Medium	Large
Network Interconnect	Gigabit Ethernet	Infiniband	Infiniband
Operating System	RHEL or CentOS 8.3 Windows 10	Linux kernel 2.6.32 or higher	Linux kernel 2.6.32 or higher
GPU	Yes	No	No
MPI	Intel MPI 2018.4 or higher	Intel MPI 2018.4 or higher	Intel MPI 2018.4 or higher
Setup	Pure MPI	Pure MPI	Pure MPI
Hyper Threading	Not recommended	Not recommended	Not recommended

Flux Solver

Table 4:

Problem type	Small	Medium	Large
Typical Workload (depending on number of DOF, element type, and other factors)	< 300 000 DOF	Around 500 000 DOF	Around 5M DOF
Throughput ¹	Single	Single	Single
CPU ²	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake"	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake"	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake"
Number of CPU / node	1	2	2
Number of cores / node	8	16	16+
Number of nodes	1	1	1-4
Minimum Memory Configuration / node ³	8 GB	16-32 GB	300GB
Storage (minimum)	500 GB SATA or SSD	1 TB local storage SSD	1.5 TB local storage SSD
Network Interconnect			Infiniband

Problem type	Small	Medium	Large
Operating System	Linux kernel 3.10.0-693 or higher Windows 7 or 10 with SSD	Linux kernel 3.10.0-693 or higher Windows 7 or 10 with SSD	Linux kernel 3.10.0-693 or higher Windows 7 or 10 with SSD
GPU	No	No	No
MPI	Intel MPI 2018.4 or higher	Intel MPI 2018.4 or higher	Intel MPI 2018.4 or higher
Setup	SMP	SMP or Hybrid 2MPI/node	SMP or Hybrid 2MPI/node
Hyper Threading	Not recommended	Not recommended	Not recommended

Radioss Solver

Table 5:

Problem Size	Small	Medium	Large
Typical Workload Crash & Impact	Component tests, sled test, drop test, ... Less than 500K elements	Medium crash model, between 1 and 6 millions of elements model	Accurate car crash model (rupture), very large model with size > 6 million elements
Throughput ¹	Single job	Single large job or few jobs in parallel	Single very large job or multiple jobs
CPU ²	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake" or AMD EPYC 7002 or 7003 series	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake" or AMD EPYC 7002 or 7003 series	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lke" or AMD EPYC 7002 or 7003 series
Number of CPU / node	2	2	2
Number of cores / node	32 – 64	32 – 128	32 – 128
Number of nodes	1	8 – 16	> 16
Minimum Memory Configuration / node ³	64-128GB	64-256GB	64-256GB

Problem Size	Small	Medium	Large
Storage (minimum)	500 GB SATA or SSD	1,5 TB local storage	1,5 TB local storage
Network Interconnect	Gigabit Ethernet	Infiniband	Infiniband
Operating System	Linux kernel 2.6.32 or higher Windows 7 or 10	Linux kernel 2.6.32 or higher	Linux kernel 2.6.32 or higher
GPU	No	No	No
MPI	Intel MPI 2018.4 or higher	Intel MPI 2018.4 or higher	Intel MPI 2018.4 or higher
Setup	Pure MPI	Pure MPI or Hybrid with 2 or 4 OpenMP threads per MPI	Hybrid with 2 or 4 OpenMP threads per MPI
Hyper Threading ⁵	Yes, Hybrid with 2 OpenMP per MPI	Not recommended	Not recommended

OptiStruct Solver

Table 6:

Problem type	Small or medium	Large static	Large dynamic
Typical Workload (depending on number of DOF, element type, and other factors)	Nonlinear - less than 2M DOF; linear static - less than 5M DOF; NVH - less than 5M DOF	Nonlinear - more than 2M DOF; linear static - more than 5M DOF	NVH - more than 5M DOF
Throughput ¹	Single	Single	Single or few jobs in parallel
CPU ²	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake"	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake"	Dual CPU socket For example, Intel Xeon Gold "Cascade Lake" or "Ice Lake"
Number of CPU / node	2	2	2
Number of cores / node	8-24	24+	24+
Number of nodes	1	1-8	1-8

Problem type	Small or medium	Large static	Large dynamic
Minimum Memory Configuration / node ³	16-64GB	128GB	256GB
Storage (minimum)	512GB local storage	1TB local storage	3 TB local storage, SSD and RAID0 recommended
Network Interconnect		Infiniband	Infiniband
Operating System	Linux kernel 2.6.32 or higher Windows 7 or 10 with SSD	Linux kernel 2.6.32 or higher Windows 7 or 10 with SSD	Linux kernel 2.6.32 or higher Windows 7 or 10 with SSD
GPU	Yes	Yes	Yes (Eigenvalue Extraction – AMSES or Lanczos)
MPI	Linux: Intel MPI 2018.4 (recommended) Windows: Intel MPI 5.1.0.078 (recommended)	Linux: Intel MPI 2018.4 (recommended) Windows: Intel MPI 5.1.0.078 (recommended)	Linux: Intel MPI 2018.4 (recommended) Windows: Intel MPI 5.1.0.078 (recommended)
Setup	SMP or DDM hybrid or SMP+GPU	DDM hybrid or SMP+GPU	SMP or DDM hybrid or SMP+GPU
Hyper Threading	Not recommended	Not recommended	Not recommended

1. Number of simultaneous jobs. Use of a workload management middleware like Altair PBS is highly recommended to insure optimal and dedicated usage of the CPU resource
2. Typical node configuration is based on dual CPU socket processors
3. It is extremely important to populate all the memory banks on the mother board.
4. In Hybrid mode, it is recommended to set a number of MPIs that is a multiple of the number of sockets and then set the number of OpenMP in a way that number of MPIs x number of OpenMP equal number of physical cores.
5. Hyper Threading (HT) may increase performance by around 10% on single node. In this case, recommended setup is to run 2 OpenMP per MPI, with a number of MPIs that matches the total number of physical cores on the node. On multi-node, it is better not using HT

Recommended GPU Computing Processor List

Recommended graphic boards for use with the Altair Solver applications for high-powered GPU computing.

The following table lists the recommended graphic boards for use with the Altair Solver applications for high-powered GPU computing.

	Manufacturer and Model	Graphics Card	Driver Version (Minimum or Higher)
AcuSolve	NVIDIA (Tesla)	P100 V100	Linux (64-bit) 418.39 Windows (64-bit) 396.26
	NVIDIA (Quadro)	GP100 GV100	Linux (64-bit) 418.39 Windows (64-bit) 396.26
OptiStruct	NVIDIA (Tesla)	P100 V100	Linux (64-bit) 440.33 Windows (64-bit) 441.22
	NVIDIA (Quadro)	GP100 GV100	Linux (64-bit) 440.33 Windows (64-bit) 441.22



Note:

- The most recent vendor/manufacturer drivers should be used and all driver support for these cards should be addressed to the appropriate manufacturer of the graphics board.
- Double Precision GPU cards should be used to run OptiStruct. Single precision GPU cards (such as RTX 600, etc) are not recommended for OptiStruct runs.

Additional Information on Driver Installations

The NVIDIA Driver Update recommendation is to use the **Custom installation** option and select the **Perform clean installation** option to validate that there are no conflicts in DLL/drivers.

The same should be done with AMD hardware and drivers as well using AMD's custom uninstall tools.



Figure 6: