

Supported Platforms and Hardware Requirements & Recommendations

GT-SUITE V7.3

This document is intended to inform potential customers and current users about what software and hardware is needed to run GT-SUITE. The first section on Supported Platforms covers what platform the GT-SUITE GUI and solver will run on, as well as what platforms may be used as a license server for GT-SUITE. The second section on Hardware Recommendations gives typical recommendations for what to consider when buying a new computer for a GT-SUITE workstation. The third section on Minimum System Requirements presents general information about what hardware is required to run the software on each operating system. Finally the fourth section on Video Card Support explains recommended and required video card hardware and drivers, and a troubleshooting guide for diagnosing and fixing video card problems.

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1.1 Supported Platforms for GT-SUITE v7.3 and the License Server

Below is the most recent list of supported platforms for GT-SUITE and the License Server at the time that this build was released. If a platform is listed as "Yes" for GT-SUITE, but "No" for the License Server, then it cannot be the license server, and must checkout a license from a supported License Server platform. We do not support GT-SUITE or the license server on a virtual machine.

Please see the minimum system requirements section for more information on the minimum requirements to run GT-SUITE software. Please refer to the hardware recommendations section for recommendations when purchasing new hardware.

Platform	Operating System	Version	Architecture (x86 CPUs must have SSE2 to run the solver)	GT-SUITE V7.3	License Server (See specific notes below table for details)
Windows	Windows	XP, 2003 & 2008 Server, Vista, 7, 8	x86 32 or 64 bit See below for the future of 32 bit Linux	Yes (See "Services on Vista/Windows 7/8" below)	Yes* Win8 is not supported as a license server yet.
Linux See below for required patches	RedHat Enterprise Server	4-6.1		Yes – See below for future version support	Yes - See below for known platform specific issues
	SuSE	10-11.4		Yes – See below for future version support	Yes - See below for known platform specific issues
	SuSE Enterprise Server	10-SP3, 11		Yes – See below for future version support	Yes - See below for known platform specific issues
License Server Only	Any above	-	N/A	Yes - See below for known platform specific issues	
	UNIX	-	-	N/A	NOT SUPPORTED
<u>Virtual Machines</u>	Any	-	-	Unsupported, but might work	NOT SUPPORTED

Specific Notes: (please read to the end, as they are listed in order of importance / expected frequency)

Future Version Linux Support – For the next version of GT-SUITE, we intend to drop Linux support for RHEL 4, SLES 10, OpenSuse 10.0, 10.1, and 10.2. If this would cause a disruption in your organization, please contact support@gtisoft.com

32 bit Linux - We are considering discontinuing support of 32 bit Linux operating systems in the next version of GT-SUITE. If we discontinue support for 32 bit Linux, all versions up to and including v7.3 will continue to be supported on 32/64 throughout their life cycle. In making this decision, we would like to know if discontinuing support for 32 bit Linux in new versions of GT-SUITE would cause a disruption for your organization. If you expect that your organization would like to run the latest version of GT-SUITE on 32 bit Linux in 2014, please let us know by sending an email to support@gtisoft.com.

GT-SPACECLAIM - GT-SPACECLAIM is a Windows only application, supported for Windows XP (service pack 3), Windows Vista, and Windows 7. Both 32 and 64 bit versions of these operating systems are supported, but a Linux version is not available. It also requires the Microsoft .NET Framework version 4.0 for all platforms, and version 3.5 for Windows XP. These updates will be installed during the GT-SPACECLAIM installation if they are not already in place.

CONVERGE-LITE - CONVERGE-LITE is supported for all platforms except for 32 bit Linux. The CONVERGE UI tool needed to set up CONVERGE-LITE coupling models requires glibc 2.5 or higher (i.e., CONVERGE UI is not supported by RHEL 4).

Services on Vista/Windows 7/8 - An account with administrator rights must be used to install either of the following optional services on Vista and Windows 7/8: FLEXnet license services & distributed computing services. (Windows 8 is not supported as license server as per below) Additionally, the distributed computing services must be set to run as a specified user. Please see the [DistributedComputing.pdf](#) document in the %GTIHOME%\<version>\documents\DistributedComputing directory for more information.

Windows 8 License Servers: This platform is not supported as a license server yet.

Linux - All Linux platforms must have /usr/lib/libstdc++.so.6 installed to run v7.3. Additionally, libstdc++.so.5 might be required to run version v72 or older. Please see the older documentation for details concerning older versions if necessary.

General Linux License Servers: To run the license server on a Linux machine it must conform to LSB 3.0+ (Linux standard base)

Red Hat Enterprise Server 6 64-Bit - The 64-bit version of RHEL 6 does not install the necessary 32-bit libraries to run our applications. The following 32-bit (i686) libraries will need to be installed. These can be installed using the yum utility.

- libstdc++-4.4*.i686 (This will install the libstdc++.so.6 for i686).
- libXext - This will also install the dependencies libX11, libXau, and libxcb for i686.
- libXtst - This will also install the dependency libXi for i686.
- libXxf86vm
- libXinerama
- libXrender

SUSE License Server - The drivers depend on a USB setting that is not enabled by default on SuSE 10.3 (and some later builds of 10.2). There is a work-around, but there is a security risk, please see below.

To mount the /proc/bus/usb for the Aladdin drivers, change the mount line in /etc/fstab similar to that shown below. Then run `mount -a`. Doing this may be a security risk, and as such we cannot officially recommend it.

```
#The original line might look like the following:
#usbfs          /proc/bus/usb  usbfs  noauto          0 0
#
#Newer systems use "devmode" while older ones still use "mode". Please try one of the
# following lines. If it gives a warning when mounting, unmount it and then use the other option.
#usbfs          /proc/bus/usb  usbfs  mode=0666       0 0
usbfs          /proc/bus/usb  usbfs  devmode=0666    0 0
```

If the above mount was not present when the drivers were installed, remove and reinstall the drivers. This can be done by running `rpm -e aksusbd-*` and `rpm -i aksusbd-*` from the flexlm folder.

The mount above requires that the kernel has the option CONFIG_USB_DEVICEFS enabled. If your kernel does not have this enabled, you must either update to the latest kernel, or re-compile with this option enabled. (It was completely disabled due to security concerns in a few builds of 10.2 & 10.3) See the link below for full details:

https://bugzilla.novell.com/show_bug.cgi?id=210899#c47

SUSE xorg - Requires system patch xorg-x11-libxcb 7.2-51.2 or later. The error below or similar will be generated if this requirement is not met.

```
java: xcb_xlib.c:52: xcb_xlib_unlock: Assertion `c->xlib.lock' fa
```

If you do not wish to install the above patch on your system, an environment variable can be set as a work around. This is a last resort and may have other effects. See the link below for full details before setting this variable.

http://bugs.sun.com/bugdatabase/view_bug.do?bug_id=6532373

```
export LIBXCB_ALLOW_SLOPPY_LOCK=1
```

OpenSUSE 11.2 64 bit - The 32 bit hardlock driver does not work correctly on OpenSUSE 11.2 64 bit.

OpenSUSE 11.3 - Linking in GT-ISE may not work on this platform due to a problem in the JAVA implementation. A work around for this is to disable the automatic panning when a link is pulled outside the map. This can be disabled by adding the entry "gti.disableDragLink=true" under the heading [GUI-gtise default] in the file */v*/GTsuite/bin/product.cfg.

Supported Architecture: All x86 hardware must support the SSE2 instruction set to run the GT-SUITE solver in v7.3 or later. This instruction set was added in by Intel in Pentium 4's and AMD in many processors following their socket-A based CPUs.

1.2 Hardware Recommendations (Which computer should I buy?)

There are several factors that can affect the performance of GT-SUITE, which are addressed below. Also see the next section *Operating System and Hardware Requirements*

CPU: The most important factor is the CPU. CPUs have evolved to such a state that the clock speed is no-longer the only important factor in determining its processing power. However, when comparing within a processor family, the simulation times will roughly scale inversely with the clock speed. The speed of our simulations can roughly be correlated to the floating point math operations of the system. As a reference to help in deciding on new hardware, the following will describe the hardware that Gamma Technologies is using internally as of March 2012. We are not endorsing these products, but rather they are provided as a reference. Our desktops and cluster machines are running Intel Core i7 2600 @3.4 GHz (Quad-Core), and our laptops are running Intel Core i5 540M @2.53 GHz (Dual-Core). For other types of CPU, a comparative listing of computation speed can be found by viewing the latest benchmarks from <http://www.cpubenchmark.net/>. Please see our webpage http://www.gtisoft.com/products/p_Supported_Platforms.php for our currently supported platforms.

32/64 bit: GT-SUITE is exclusively a 32 bit application and it will have similar performance on 32 and 64 bit systems. However, when purchasing a new system 64 bit is the preferred choice for both the hardware and the OS, as this allows for more system memory and we may supply 64 bit applications in the future.

Multiple Processors or Cores: Each case of a simulation must be run on a single processor/core and as such multiple processors will not decrease computation time for a single case. A multiple-case model may be divided into single cases or packets of cases, and sent to multiple processors for solving by using our distributed computing feature. Additionally, with a multiple processor system other software applications will have improved responsiveness while a simulation is running.

A solver license will be required for each core which is simultaneously processing a simulation. A multi core machine will function with a single solver license, but it will be limited to only solve one model/packet at a time.

RAM (Memory): The amount of RAM may limit the responsiveness of the GUI, but has not been found to limit the computational speed. 2 GB of RAM is the minimum requirement. More may be desirable if other memory intensive applications are being concurrently used or on multiple processor/core machines. The RAM should be increased if significant memory paging is found to occur. Please note that a 32-bit operating system is limited to 4 GB of RAM, but more can be installed for 64 bit systems.

Hard Disk: GT-SUITE does not rely heavily on I/O, so the disk choice has a minimal effect.

Video Card: The video card performance is only important for the 3D parts of GT-SUITE, such as: GEM3D, COOL3D, 3D Flowsplit Viewer in GT-ISE, and 3D Plots in GT-POST. We recommend that you use a stand-alone video card rather than one that is built into the computer's motherboard. Please see the section below for full requirements.

Monitor: The absolute minimum is 1280x768. This is true for projectors as well because a widescreen projector is recommended. Monitors are cheap, larger is better, and dual monitors are recommended for maximum productivity.

1.3 Minimum System Requirements (PC and UNIX)

All systems must have 1280x768 or more screen resolution, an x86 processor with the SSE2 instruction set (P4+ / Athalon64+), 2GB Free Disk Space; DVD-ROM Drive and 2 GB RAM. The computation time is highly dependent on the CPU and the above is simply a minimum which has the necessary instruction set to run. It is highly recommended that a better CPU is used. Please see the section [Hardware Recommendations \(Which computer should I buy?\)](#) for recommendations. Additionally, to use the 3D graphical features, the system must have a modestly powerful video card. Platform and OS requirements for coupling GT-SUITE with CFD codes are shown later in this manual

Additionally, to compile the user subroutines, the machine must have Intel FORTRAN 11/12 & Visual Studio 2005 (or higher) on PC; or Intel FORTRAN Compilers 11/12 (ifort/icpc/icc) on Linux.

1.4 Virtual Machines

Virtual machines of any sort are officially unsupported. We do not plan to support virtualization as there are too many possibilities. Furthermore, if the visualization product is working correctly, there should not be any issues over those from the base operating system. GT-SUITE clients (GT-ISE, solver, GT-POST, etc...) might run on virtual machines, but Gamma Technologies will not be able to assist with issues specific to a virtual machine.

A license server will require the use of a USB hardlock and as such a license server should be run on physical hardware, not on a virtual machine.

1.5 Video Card Support

GT-SUITE has many features (GEM3D, GT-ISE 3D viewer, GT-POST 3D viewer, etc.) related to 3D graphics. In order to make these new features function properly, the video card hardware AND the driver for the system must meet specific requirements described below. If the requirements are not met, the graphically intensive parts of GT-SUITE may not work, but the remainder of the product will function. In summary, a stand-alone video card should be used and not motherboard integrated graphics, the card must generally have a minimum of 64 MB of dedicated video memory, and the driver must support GLX 1.3+ and OpenGL 1.2+. For GT-SPACECLAIM, the driver must also support DirectX 9c, and Shader Model 3.0. 256 MB of graphics memory is also recommended. Please see below for details.

1.5.1 Video Card Hardware

A modestly powerful video card is required which is supported by Java3D. In general, stand-alone video cards have adequate support for 3D graphics. We do not recommend using graphic cards that are integrated to the computer's motherboard. Below are the hardware requirements for the video card:

1. Stand-alone video cards should be used and video cards integrated on the computer's motherboard are not recommended. *Note on laptops: Some laptops that include NVIDIA graphics cards may try to maximize battery life by automatically selecting the integrated video processor instead of the NVIDIA card for applications that it does not think are graphics intensive. Please make sure that all GT-SUITE applications are forced to use the NVIDIA card, rather than use the "automatic detection" algorithm (the automatic detection will use the weaker integrated processor and may result in graphical issues).*
2. The video card should have at least 64M (128M is suggested, 256M recommended for GT-SPACECLAIM) of dedicated video card memory.
3. The latest video card driver from the video card vendors should be used and the video card's hardware acceleration should be fully enabled. See the section below for specific requirements for the driver.

Below is a list of video cards known to be compatible with GT-SUITE, but only a limited number of cards have been tested and so this list is not complete. If your video card is not on this list, we recommend trying it before investing in a new video card. Based on our testing of GT-SUITE, NVIDIA cards work well more often than other brands.

NVIDIA Graphic Cards:	AMD Graphic Cards:
- GeForce 9500 Series	- Radeon HD 6300 Series
- GeForce 9300 Series	- Radeon HD 3400 Series
- GeForce 8400 Series	- Radeon HD 2400 Series
- GeForce 7300 Series	- Mobility Radeon X1400
- Quadro NVS 140M	-
- Quadro NVS 4200M	-

Known Issues

- It is not recommended to use AMD video cards on Linux 64-bit platforms. There are known driver and compatibility issues with AMD video card drivers and Linux operating systems that can cause 3D application to fail. Depending on the exact configuration, this may work, but no guarantees can be made.
- We have received reports of problems with the NVIDIA Quadro series of graphics cards on the Windows XP operating system. The use of program-specific video card settings may reduce these problems. These settings are available in the NVIDIA Control Panel, which is usually accessed through the NVIDIA system tray icon or by right-clicking on the Windows desktop. In the Manage 3D Settings window the Program Settings folder can be used to specify graphics card settings for specific applications. Add cool3d.exe, gem.exe, and gtise.exe from %GTIHOME%\v7.3.0\GTsuite\bin\win32 to the program list with the following overrides:

Antialiasing – Mode:	Override any application setting
Antialiasing – Setting:	2x (2xMS)
Antialiasing – Transparency:	Off
Threaded optimization:	Off

1.5.2 Video Card Drivers

For the graphically intensive features, the video driver must have a GLX version of at least 1.3 and OpenGL version as shown below. For GT-SPACECLAIM, the additional driver requirements are DirectX 9c and Shader Model 3.0 support. A driver from the video card manufacturer is more likely to meet the requirements than a generic one from the operating system, especially on Windows. Linux may not come with GLX 1.3 and an updated version is only known to be available through video card manufacturers.

Platforms requiring OpenGL 1.2 or higher
- Win32/x86,x86_64
- Linux/x86,x86_64

1.5.3 Remote X-Windows

When using X-Windows to display the graphics on another machine's display, both the client and server's GLX version must be at least 1.3 and have the required OpenGL version shown above. The hardware on the machine displaying the graphical image is the one that is important for the speed of updating the image. Network traffic or speed limitations may also affect the frame rate.

We do not officially support any third-party X-Windowing software. However, as a service to our users we have tested the following: Cygwin, Exceed, and Exceed Power Suite 2006. We have found that the base Exceed package does not support GLX 1.3 and does not work with the advanced 3D features. The Exceed 3D add-on which was tested as found in "Exceed Power Suite 2006" does meet the minimum requirements, however it gives ~20% slower frame rates compared to displaying graphics generated locally on the same machine. The option "GLX 1.3 Support" must be enabled from Start> Exceed Tools> XConfig> Exceed 3D and GLX. Cygwin only has a GLX version of 1.2, so it does not work with most machines. It was found to work with a remote machine with a GLX version of 1.4 (RHEL4.0), but its frame rate is 50% slower than compared to the local machine. Again, the above products are not supported or endorsed.

1.5.4 Testing the video card

The script `gttestj3d`, located in the `$GTIHOME/bin` directory, may be used to test whether OpenGL and GLX is installed and working properly on your machine. If the required versions are not installed, it can typically be upgraded by installing the latest graphics driver for the video card from the graphics card manufacturer, not Microsoft (in the case of Windows operating system).

1.5.5 Troubleshooting 3D Issues

If you are experiencing problems with our 3D applications, please read through the "Video Card Support" section first. There are many details above that will more than likely resolve your problem. If the above information does not help, please follow the steps below.

- I. Check that your video card meets the minimum requires as stated above.
 - a. If you do not meet these requirements, please update your card. Refer to our list of recommended cards that are known to work well with our 3D applications.
- II. Update the video card driver from the video card vendor.
 - a. The driver must be provided by the vendor and not the OS default driver.
 - b. This is necessary to ensure that you are using the proper version of OpenGL and GLX (refer to the information above). Using an outdated video driver with an older version of OpenGL or GLX will prevent our 3D applications from running.
- III. Run our `gttestj3d` script, located in the `$GTIHOME/bin` directory and read the instructions. This will check that you are running the required version of OpenGL.
 - a. Select the "Test J3D Support" button.
 - i. This will test if your video card OpenGL and GLX version is acceptable.
 - b. If the above succeeds, then select the "Test J3D Performance" button.
 - i. This will test if your video card's performance meets the expectations for our 3D applications. If not, it will be suggested for you to upgrade your card.
 - c. As long as the "J3D Support" test passes, then your system will be enabled for running our 3D applications.
 - i. Even if your performance isn't great, you should at least be able to use the minimal features of the 3D applications.
- IV. Another option is to test with upgraded video card. Install and test 3D on your machine, but with an upgraded video card. Make sure that this new card meets the minimum requirements we specify. Run the `gttestj3d` script as mentioned in Step 3.

1.6 Coupling GT-SUITE with 3rd Party Software (CFD/Simulink)

The follow sections contain information regarding coupling of GTI software with other software code. Please note the versions which are supported as well as licensing considerations.

1.6.1 Coupling GT-SUITE with CFD Codes

The following table provides a summary of the supported versions of CFD codes that are confirmed compatible with released versions of GT-SUITE.

Confirmed incompatibilities are indicated. Absence from the below table does not imply incompatibility, but rather lack of compatibility testing. Please contact support@gtisoft.com (or the CFD software support if the CFD version is new) if it is desired to use a combination not that is listed or if the planned dropping of official support listed may be problematic.

In addition to the discontinuation of official support for the CFD products indicated in GT-SUITE v7.3 in the below table, support for CFD coupling with a CFD solver using previously supported UNIX platforms (i.e. IBM AIX 5.3 or Sun SPARC Solaris 2.9) is not planned for shipment in GT-SUITE v7.3 due to dwindling usage. Additionally, *italicized* version numbers in the below table indicate a planned removal from support for the next major release of GT-SUITE. Please contact support@gtisoft.com if any of the planned removals are problematic.

	GT-SUITE v7.3	GT-SUITE v7.2	GT-SUITE v7.1
STAR-CCM+	v7.02***, v7.04***, v7.06	v6.06, v7.02***, v7.04***, v7.06	v6.06, v7.02***, v7.04***
STAR-CD	v4.08, v4.10, v4.12, v4.14, v4.16, v4.18	v4.08, v4.10, v4.12, v4.14, v4.16, v4.18	v3.26, v4.08, v4.10, v4.12, v4.14, v4.16
CONVERGE	v2.0 (Linux 112112, <i>101012††</i> Windows 120412, <i>101912††</i>)	v2.0† (Linux 112112, <i>101012††</i> , Windows <i>101912††</i>) v1.4.1†	v1.4.1†
FLUENT	R12.0, R12.1 (R13.0 SP2 only)* R14.0, R14.5	v6.3, R12.0, R12.1 (R13.0 SP2 only)* R14.0, R14.5	v6.3, R12.0, R12.1 (R13.0 SP2 only)* R14.0
OpenFOAM	v1.4.1-dev‡	v1.4.1-dev	v1.4.1-dev
FIRE**	v2010.1	v2009.0, v2010.1	v2009.0, v2010.1

* - Due to a critical bug in the first release of FLUENT R13.0 and R13.0 SP1, GT-SUITE coupling was not supported (for all GT-SUITE versions). This is fixed for R13.0 SP2 and higher.

** - Newer FIRE packages are likely supported, but only compatibility with v2009.0 and v2010.1 has been verified at GTI.

*** - STAR-CCM+ v7.02.008 and v7.04.006 are supported for 64-bit Windows, 64-bit Linux, and 32-bit Linux platforms only. The 32-bit Windows version of STAR-CCM+ v7.02.008 and v7.04.006 is not supported due to a bug in these builds of STAR-CCM+.

‡ - OpenFOAM coupling is supported on Linux only.

† - CFD cylinder coupling with 'EngineCrankTrain' communication is only available using GT-SUITE v7.3+ and CONVERGE v2.0 101112+ at this time. GT-SUITE v7.2 and/or CONVERGE v1.4.1 does not support CFD cylinder coupling with 'EngineCrankTrain' communication.

†† - If using a v2.0 CONVERGE version 101012-110712, a particular and rarely occurring CONVERGE timestep reduction method that reduces its timestep by a factor of 10 does not report to GT-SUITE the correct time to advance its solution. Consequently, GT-POST results may not be generated appropriately despite proper model setup using these versions. This is fixed in CONVERGE v2.0 112112+. This bug may require that the simulation is extended a bit further in a restart to obtain GT-POST data, but the impact on results will be negligible unless this 10x timestep reduction happens regularly in the simulation (which would be very atypical).

When coupling GT-SUITE with CFD codes, the applied CFD software does NOT necessarily need to be run on the same machine that runs the GTI software. The user has the option to run both codes on separate machines OR on the same machine. If using different machines, the CFD software only needs to be installed on one machine.

1.6.2 Coupling GT-SUITE with Simulink

Coupling of GT-SUITE with Simulink is currently supported for Matlab/Simulink versions R14 to R2011a. Coupling is performed via a GTI supplied S-Function Block in the Simulink model and through the use of a 'SimulinkHarness' object in the GT-SUITE model. For additional information regarding coupling with Simulink, please refer to the Controls Coupling Manual, which is accessible from GT-ISE under Help -> Manuals -> Co-Simulation And User Routines.