Supported Platforms and Hardware Requirements & Recommendations

GT-SUITE V7.0

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.

1.1 Supported Platforms for GT-SUITE v7.0 and the License Server

Below is a list of supported platforms for GT-SUITE v7.0 and the License Server. 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	GT-SUITE V7.0	License Server * - see "64 Bit License Server"
PC	Windows	2000	x86, 32 bit	Yes	Yes
		NT 4.0	None	No	No
		2000/ 2003 Server	x86, 32/64 bit	Yes	Yes *
		XP Pro	x86, 32/64 bit	Yes	Yes *
		Vista	x86, 32/64 bit	Yes (See "Vista/Windows7 Services" below)	Yes * (See "Vista/Windows7 Services" below)
		7	x86, 32/64 bit	Yes (See "Vista/Windows7 Services" below)	Yes * (See "Vista/Windows7 Services" below)
Linux - **See "Linux" section below for required patches.**	RedHat	7.2-7.3	x86, 32 bit	No	No
		8	x86, 32 bit	No	No
		9	x86, 32 bit	No	Yes
		FC 9	x86, 32 bit	Yes	Yes
	RedHat Enterprise Server	3	x86, 32/64 bit	Yes	Yes *
			IA_64 (Itanium)	No	No
		4	x86, 32/64 bit	Yes	Yes *
			IA_64 (Itanium)	No	No
		5.0-5.3	x86, 32 bit	Yes	Yes
			x86, 64 bit	Yes	Yes
			IA_64 (Itanium)	No	No
	SuSE	8.2	x86, 32/64 bit	No	Yes *
		9.0-9.2	x86, 32 bit	Yes	Yes
		10.0-10.2	x86, 32/64 bit	Yes	See "SUSE License Server" below
		10.3-11.2	x86, 32 bit	Yes (see "SUSE xorg" below)	See "SUSE License Server" below
			x86, 64 bit	Yes (see "SUSE xorg" below)	See "SUSE License Server" below
	SuSE Enterprise Server	9	x86, 32/64 bit	Yes	Yes *
			IA_64 (Itanium)	No	No
		10	x86, 32/64 bit	Yes	Yes *
			IA_64 (Itanium)	No	No
		11	x86, 32/64 bit	Yes	Yes *
			IA_64 (Itanium)	No	No
Sun **See "UNIX Platforms"**	Solaris	2.8 (8)	SPARC	No	Yes
		2.9 (9)	SPARC	see "UNIX Platforms" below	Yes

Platform	Operating System	Version	Architecture	GT-SUITE V7.0	License Server * - see "64 Bit License Server"
below.		2.10 (10)	SPARC	see "UNIX Platforms" below	Yes
IBM **See "UNIX Platforms" below.**	AIX	5.1	-	No	Yes
		5.3	-	see "UNIX Platforms" below	Yes
HP **See "UNIX Platforms" below**.	HP-UX	11.00	PA-RISC	No	Yes
		11.i v1 (11.11)	PA-RISC	see "UNIX Platforms" below	Yes
Virtual Machines	Any	-	-	Unsupported, but it may work	No

General Notes:

- The 3D-DISCRETIZATION TOOL and the MUFFLER application are no longer supported in v7.0. They have been replaced by the GEM3D application.

Specific Notes:

64 Bit License Server - Support is unofficial for licensing servers on 64 bit systems. 32 bit drivers are used and have been trouble free, but cannot be 100% guaranteed. The 32 bit hardlock driver does not work correctly on OpenSUSE 11.2 64 bit.

Linux - All Linux platforms must have one or both of the following /usr/lib/libstdc++.so.5 and/or libstdc++.so.6 installed. The version required by v7.0 is based on the version of glibc which is installed and detailed below. libstdc++.so.5 is required to run v6.2 or older, regardless of the v7.0 requirement

To determine the version of libstdc++.so required, run the command below:

    rpm -q --queryformat '%{VERSION}' glibc

The value reported by the command above indicates the following:

- If glibc is less than or equal to 2.2.93, this version of glibc is is not supported.
- If glibc is less than 2.6.0 but more than 2.2.93, then libstdc++.so.5 is required for v70 and later.
- If glibc is equal or greater than 2.6.0, then libstdc++.so.6 is required for v70 and later.
  Note that libstdc++.so.5 is also required to run 62 and older.

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 can not 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-suse* ` and `rpm –i aksusbd-suse*` 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.

UNIX Platforms - Support for GT-SUITE on SUN, IBM, and HP will be discontinued in the next version (v7.1). Additionally the 3-D graphical applications (GEM3D, 3D plots in GT-POST, flowsplit viewer in GT-ISE) are not supported in v7.0 on HP UNIX and IBM AIX due to lack of current libraries for these platforms. CFD coupling will continue to be available in v7.1 on these platforms via socket communications to GT-SUITE on a supported platform. Support will continue for these platforms as a license server.

UNIX System Patches - Before running GT-SUITE, the following UNIX system level patches need to be in place.

1) Solaris 2.9 (SunOS 5.9) (supporting Solaris 9, 10)
   a. Compilers: Sun Studio 12 (Free download from www.sun.com)
   b. Solaris 9 9/04
2) HP-UX 11i (supporting HP-UX 11i v1/v2)
   a. Compilers: HP F90(B.11.01.80)/aCC(C.03.55)/ansic(B.11.02.10)
   b. Minimum System Patch for HP-UX 11i v1 (PA-RISC) *
      HPUXBase64   B.11.11 HP-UX 64-bit Base OS
      HPUXBaseAux   B.11.11.0312 HP-UX Base OS Auxiliary
                    B.11.11.0312.4 Hardware Enablement Patches for HP-UX 11i v1,
      HWEnable11i   December 2003

<div align="right">

PHCO_25841   Add Rock Ridge extension to mount_cdfs(1M)
PHKL_26269   Rock Ridge extension for ISO-9660
PHKL_32035   Y2k; Rock Ridge extension for ISO-9660
PHSS_32223   Shared libF90 B.11.01.18
PHKL_29243   s700_800 11.11 vPar enablement, cumulative patch
PHSS_35385   s700_800 11.11 ld(1) and linker tools cumulative patch

</div>

    c. Minimum System Patch for HP-UX 11i v2 (PA-RISC) *

HPUXBaseOS	B.11.23 HP-UX Base OS
HPUXBaseAux	B.11.23.0609 HP-UX Base OS Auxiliary
QPKBASE	B.11.23.0609.053a Base Quality Pack Bundle for HP-UX 11i v2, September 2006
HWEnable11i	B.11.23.0609.053 Hardware Enablement Patches for HP-UX 11i v2, September 2006
PHSS_34397	s700_800 11.X FORTRAN Intrinsics [libF90 B.11.23.19]
PHSS_37201	s700_800 11.23 linker + fdp cumulative patch

  * - Patches are available from:
      http://h41214.www4.hp.com/SUPPORT_PLUS/

3) IBM AIX 5.3
    a. Compilers: xlC 9.0 / xlf 12.1
    b. xlC runtime library (xlC.aix50.rte 10.1.0.0, xlC.rte 10.1.0., xlfrte 12.1.0.0 and xlfrte.aix53 12.1.0.0)
    c. AIX 5300-10 Recommended Maintenance Package

4) Linux
    a. See "Linux" section above.

Vista and Window 7 Services - FLEXnet license services on Vista and Windows 7 must be installed as an administrator. FLEXnet V11.4 included with the GT-SUITE V7.0 Build 1-4 Installation CDs is not fully compatible with Windows 7. Contact us to get FLEXnet V11.8 which supports Windows 7.

Distributed computing services on Vista and Windows 7 must be installed as the user "administrator", and after installation the services must be configured to run as a specific user. Please see the DistributedComputing.pdf document in the %GTIHOME%\<version>\documents\Graphical_Applications directory for more information.

1.2 Virtual Machines

Error! Bookmark not defined.

1.3 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. CPU's 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 of November, 2006 **we have found the fastest CPU for GT-POWER on PC's to be the Intel Core 2 Duo and Intel Core 2 Quad** (multi-core Opterons were not tested.). For other types of hardware, a comparative listing of computation speed can be found by viewing the latest benchmarks from http://www.spec.org/. Please see our webpage http://www.gtisoft.com/platform.html for our currently supported platforms.

Multiple Processors or Cores : Each case of a simulation must be run on a single processor/core. Thus, 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. 1 GB of RAM is the minimum requirement. However, we recommend you have at least 2 GB of RAM. More may be desirable if other memory intensive applications are being concurrently used or on dual processor machines. The RAM should be increased if significant memory paging is found to occur.

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: There are no specific monitor requirements. However, it may be a benefit to use a fairly large monitor (ideally at least 19", but 20" or 22" widescreen are even better). It also may be efficient to use two monitors since most stand-alone video cards now support two monitors.

1.4   Minimum System Requirements (PC and UNIX)

All systems must have 1024x768 or more screen resolution, 700 MB Free Disk Space for an install of a single platform (800MB of additional temp space to install on Linux/UNIX); CD-ROM Drive and 1 GB RAM (2 GB recommended) unless otherwise specified. Additionally, to use the new graphical features in v7.0, the system must have a modestly powerful video card. System specific details and video card information are listed later in this section. Platform and OS requirements for coupling GT-SUITE with CFD codes are shown later in this manual. Below are platform hardware requirements.

Platform	Hardware Requirement	Windowing Environment	Compiler *** (required only to build user subroutines)
PC / Windows	Intel:P4+ AMD: Athlon+	See Supported Platforms Section	Intel Fortran v9-**11** & Visual Studio 2005 (std or pro)
Linux	Intel:P3+ AMD: Athlon+	KDE / Gnome	Intel Compilers v9-**11** (ifort/icpc/icc)
Sun	SPARC	X11R5 / Motif 1.2 CDE	Sun Studio 12 (Required to Run)
HP	9000, 700, or 800	X11R6 / Motif 1.2 CDE	HPF90(B.11.01.80) / aCC(C.03.55) / ansic(B.11.02.10)
IBM	RS/6000	X11R6/ Motif 1.2 CDE	xlC 9.0 / xlf 12.1

1.5   Video Card Support

GT-SUITE V7.0 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+. Please see below for details.

Note: OpenGL and Java 3D are <u>not</u> supported on the HP-UX or AIX platforms. Therefore the features that use Java 3D (GEM3D, 3D viewer, dynamic plots, run-time monitors, etc.) will not be available on these platforms.

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.

2. The video card should have at least 64M (128M is suggested) 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 V7.0, 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 V7.0 of GT-SUITE, NVIDIA cards work well more often than other brands.

- It is not recommended to use ATI video cards on Linux 64-bit platforms. There are known driver and compatibility issues with ATI 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.

NVIDIA Graphic Cards:	ATI Graphic Cards:
- GeForce 9300 Series	- Radeon HD 2400 Series
- GeForce 8000 Series	- Radeon 9600 Series
- GeForce 7300 Series	- Mobility Radeon 7000 IGP
- GeForce 6200V+	- Mobility Radeon x300
- GeForce 6200TC	
- GeForce FX5900XT	

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. 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
- Solaris/Sparc

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.