1 Tekla Structures 2016 Hardware Recommendations

1.1 Recommendations for Tekla Structures workstations

Tekla Structures hardware recommendations are based on the set-ups that have been used in testing Tekla Structures and proven to be compatible with Tekla Structures. In addition to the set-ups presented in this document, there are many other suitable set-ups available. You can use this document as a guideline in choosing new hardware, but bear in mind that the equipment and labels presented in this document are not the only suitable hardware set-up.

The main criterion when choosing hardware is reliable performance. If you are considering a new hardware component, for example, a graphics card, test it beforehand to ensure that it fulfills the requirements. If you are considering purchasing a large number of computers for your Tekla Structures users, test and verify the set-up first with one or two computers before purchasing a large batch. Tekla Structures is designed to be used on a desktop or laptop computer.

Tekla Structures 2016 can be used with application and desktop virtualization. You can find more information in the Using Tekla Structures with application and desktop virtualization article. To start Tekla Structures 2016 you need to use Tekla Structures License Server 20.1 or newer. Tekla Structures 2016 will not start with older versions of Tekla Structures License Server.

1.1.1 Operating system

Tekla Structures 2016 is supported in the following operating systems:

64-bit Windows 10
64-bit Windows 8/8.1
64-bit Windows 7 SP1

64-bit Windows is required by Tekla Structures 2016. 32-bit Windows is not supported.

1.1.2 Additional software components

Tekla Structures 2016 uses Microsoft .NET Framework 4.5.1 and Microsoft Visual C++ 2010 and 2013 Redistributables. These software components are installed automatically by the Tekla Structures 2016 installation package, if needed. However, if you are distributing Tekla Structures 2016 in a centralized manner using .msi packages, then you need to download these software components from Microsoft’s web site and install them separately before distributing Tekla Structures.
1.1.3 Internet connection

**Tekla Downloads** is a service for downloading versions and updates for Tekla software. Tekla Downloads can be accessed from [https://download.tekla.com](https://download.tekla.com). You need to have an Internet connection to access the service and a Tekla account to download software packages. In case your Internet connection is restricted, you need to allow communications to the Tekla Downloads servers. Use the following server addresses in your firewall settings:

- [https://download.tekla.com](https://download.tekla.com)
- [https://account.tekla.com](https://account.tekla.com)

**Tekla Warehouse** is a service for storing and sharing Tekla Structures content. Tekla Warehouse can be accessed from [https://warehouse.tekla.com](https://warehouse.tekla.com). You need to have an Internet connection to access online content. If you are offline, you can access your local and installed Tekla Structures content from [http://localhost:8092](http://localhost:8092). In case your Internet connection is restricted, you need to allow communications to the Tekla Warehouse servers. Use the following Warehouse server addresses in your firewall settings:

- [https://warehouse.tekla.com](https://warehouse.tekla.com)
- [https://account.tekla.com](https://account.tekla.com)

**Tekla Model Sharing** enables global collaborative modeling within one Tekla Structures model. Tekla Model Sharing gives users the freedom to work with the same model at the same time in different locations and time zones. In Tekla Model Sharing the models and their changes are shared over the Internet using a Microsoft Azure cloud service. When a model is shared, it is connected to the sharing service. You can then easily share your changes by writing out them to the sharing service. When you want to update your model with the changes done by other users, you do it by reading in the changes from the sharing service. In case your Internet connection is restricted, ensure that your firewall TCP port 443 (the default HTTPS) outbound is open. If an HTTP proxy is used, it must support HTTP 1.1.

Tekla Model Sharing **prerequisites** are available in Tekla User Assistance.
**Tekla User Assistance** for Tekla Structures is a service where Tekla Structures users can find all the product guides, knowledge-base articles, instructional videos and extension helps related to the Tekla Structures product. You need to have a working Internet connection in order to use the Tekla User Assistance service.

In case your Internet connection is restricted, you need to allow access to the Tekla User Assistance servers. Use the following Tekla User Assistance server addresses in your firewall settings:

- [https://teklastructures.support.tekla.com](https://teklastructures.support.tekla.com)
- [https://support.tekla.com](https://support.tekla.com)
- [https://account.tekla.com](https://account.tekla.com)

**Tekla Discussion Forum** is a service where Tekla Structures users having a valid maintenance contract can ask questions and discuss issues related to the Tekla Structures product. You need to have a working Internet connection to access the service.

In case your Internet connection is restricted, you need to allow access to the Tekla Discussion Forum server. Use the following server addresses in your firewall settings:

- [https://forum.tekla.com](https://forum.tekla.com)
- [https://account.tekla.com](https://account.tekla.com)

1.1.4 Hardware components

Every component plays a role in the reliability, performance and usability of the computer. The important components for reliability and performance are power supply unit, memory, graphics card, and processor. From an ergonomic point of view, the important components are monitor(s), graphics card, keyboard, and mouse.

1.1.5 Power supply unit

The power supply unit (PSU) is one of the few items in the computer that will affect the reliability of your entire system. It is often the most undervalued, under-appreciated component, yet one of the first components to cause failure. Your computer has a specific amount of power that it needs to draw to work. What you need to consider when choosing a PSU is the average running load that your PC consumes when running. On the Internet there are many power supply calculators that you can use to calculate the running load. We recommend using a >600W PSU.
1.1.6 Memory

Memory requirements depend on the size of the model. Large models require more memory.

An average set-up for lighter projects is a 64-bit operating system with 8 GB of RAM.

If you are working with heavier projects, you should consider having a computer with more RAM. It is not unusual to have 16 GB or even more RAM when working with large models.

Note that the supported amount of RAM varies within different 64-bit Windows editions. Also note that especially with laptops the physical limit of supported RAM modules may be low.

Memory problems are usually difficult to trace. Do not buy the cheapest kind of memory, but consider some quality brand.

1.1.7 Processor

"The faster, the better" is the rule that applies with processors. Note that Tekla Structures does not support Itanium processors.

1.1.8 Graphics card

Tekla Structures rendering uses by default OpenGL technology, and graphics cards with good hardware support for OpenGL give the best performance. You can set Tekla Structures to use DirectX rendering instead of OpenGL by enabling the DirectX rendering switch in Tekla Structures settings.

We do not have resources to test all cards on the market, so we have chosen cards based on the NVIDIA graphics processor to be our test platform.

In 3D software the importance of a good graphics card is highlighted, but up-to-date graphics drivers are equally important. You can install the most recent graphics driver from the manufacturer’s website.

Graphics card manufacturers have slight differences in their OpenGL implementation, and there might be differences in the picture quality even between cards using NVIDIA chips. Therefore, it is good to evaluate and test the cards before purchasing. A special application has been developed for testing and evaluating graphics cards for Tekla Structures OpenGL purposes. The application is called Steelmark and you can download it from Tekla Warehouse: Tekla Structures graphics hardware test.

If you want to share your experiences of different graphics cards, feel free to post your experiences on the Tekla Discussion Forum > Tekla Structures Forums > Hardware & operating system.
1.1.9 Monitor(s)

The 24” LCD monitor with full HD support is a good solution both from the technical and ergonomic point of view.

Many customers are using two monitors with Tekla Structures as it enhances productivity. Therefore, we have included two monitors in the recommendation table. To equip the workstation with two monitors you need a graphics card that is capable to drive two monitors. There is a wide selection of dual monitor capable graphics cards on the market, and many of those can combine good performance with a reasonable price.

1.1.10 Mouse

Some Tekla Structures commands require a click on the mouse middle button to finish the command. Also zooming, panning and rotating are executed with the middle button. Therefore, a 3-button wheel mouse is needed when working with Tekla Structures.

Tekla Structures also supports the following 3D mice provided by 3Dconnexion: SpaceNavigator, SpaceExplorer, SpacePilot and SpacePilot Pro. A 3D mouse can be used besides a regular mouse to enhance zooming, panning and rotating. A 3D mouse does not replace the ordinary mouse but it may improve ergonomics and productivity.

To take a 3D mouse into use, you need to install the configuration files with which you can configure the mouse functionality, depending on the 3D mouse you are using. The configuration files and instructions on how to use them are available in Tekla Warehouse: **3Dconnexion Device Installer**.

1.1.11 Printers

The principle of plotting in the Windows environment is that all applications can use Windows printers, and the printer driver takes care of the rest. Software providers may also bypass the Windows driver interface, and write their own plotter-specific drivers.

Tekla Structures relies on Windows drivers, which are provided by the hardware manufacturer. The quality and the functionality of the driver is therefore dependent on the hardware manufacturer. Because some manufacturers pay more attention to their Windows drivers than others, the quality of the drivers varies quite much. Therefore, it is essential to test the plotter with Tekla Structures before purchasing it.
## 1.1.12 Recommended hardware

The following table presents two different hardware configurations. The recommendation is mainly for desktop computers, but the same guidelines can also be applied when purchasing laptops.

<table>
<thead>
<tr>
<th></th>
<th>Recommendation</th>
<th>Best performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating system</strong></td>
<td>Windows 10 (64-bit)</td>
<td>Windows 10 (64 bit)</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>8+ GB</td>
<td>16+ GB</td>
</tr>
<tr>
<td><strong>Hard disk</strong></td>
<td>240-480 GB, SSD</td>
<td>480+ GB, SSD</td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>Intel® Core™ i5 CPU 2+ GHz</td>
<td>Intel® Core™ i7 CPU 3+ GHz</td>
</tr>
<tr>
<td><strong>Graphics card</strong></td>
<td>Two monitor support e.g. NVIDIA GeForce GTX 1060</td>
<td>Two monitor support e.g. NVIDIA GeForce GTX 1070/1080</td>
</tr>
<tr>
<td><strong>Monitor(s)</strong></td>
<td>Two 24”/27” 1920x1200 each</td>
<td>30” 2560x1600 or two 27” 2560x1440</td>
</tr>
<tr>
<td><strong>Mouse</strong></td>
<td>3-button wheel mouse, optical</td>
<td>3-button wheel mouse, cordless &amp; optical + 3Dconnexion SpacePilot</td>
</tr>
<tr>
<td><strong>Web browser</strong></td>
<td>Internet Explorer</td>
<td>Internet Explorer</td>
</tr>
<tr>
<td><strong>Backup equipment</strong></td>
<td>External hard drive</td>
<td>External hard drive with scheduled backups</td>
</tr>
<tr>
<td><strong>Network adapter</strong></td>
<td>100 Mbit/s</td>
<td>1 Gbit/s full-duplex</td>
</tr>
</tbody>
</table>
1.2 Recommendations for Tekla Structures License Server

These recommendations apply for Tekla Structures License Server 2016.

The server that is used as Tekla Structures License Server does not have to be very efficient or have maximum performance. Reliability is the keyword. Therefore, it is good to remember that server hardware itself is an important issue in terms of reliability, but maintaining the server system is equally important.

1.2.1 Operating system

The FlexNet licensing system for Tekla Structures is designed to work in:

- Microsoft Windows 7 (including SP1)
- Microsoft Windows 8
- Microsoft Windows 8.1
- Microsoft Windows 10
- Microsoft Windows Server 2008 (including SP1, SP2 and R2)
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2

It is a best practice to install Tekla Structures License Server on a server-based OS.

Supported virtual machine platforms:

- VMware ESXi 5.5
- VMware Workstation 10
- Microsoft Hyper-V from Windows 8.1
- Microsoft Hyper-V from Windows Server 2012
- Citrix XenServer 6.2
- Oracle VirtualBox 4.3
- PARALLELS
- QEMU-KVM

Linux or Unix based servers are not supported. Cloud environments are not supported. You can install Tekla Structures License Server on a normal workstation, but the most reliable solution for serving multiple clients is to use a separate server computer with a server operating system. Servers are designed to operate properly for a longer time period without rebooting as often as normal workstations.
1.2.2 RAID

RAID (Redundant Array of Independent Disks) is a technology that employs the simultaneous use of two or more hard disk drives to achieve a greater level of reliability, performance and/or larger data volume size. Hardware-based RAID is a good way of increasing the reliability of your license server.

RAID 1 is a mirrored solution that can be recommended for a Tekla Structures license server. RAID 1 protects data against the loss of one disk, so the data is not lost as long as one of the disks survives. RAID 6 can be considered as a high-end solution for a license server. It protects the data against the loss of any two of the disks.

Hardware-based RAID requires special controllers. SCSI, SATA or SAS controllers can be recommended. Most of the controllers contain some kind of monitoring software that enables, for example, pop-up messages if one of the disks in the system fails. That kind of software is very useful in the monitoring and maintaining point of view.

1.2.3 Internet connection

You need to have an Internet connection in order to activate, deactivate or repair your Tekla Structures licenses. License activation, deactivation and repairing are the only cases when your license server contacts Tekla Software’s activation server, and an Internet connection on your license server is needed.

Direct communication from the server computer to the Internet needs to be allowed while the license server at your company contacts the activation server at Trimble Solutions Corporation. The activation communication is done using Simple Object Access Protocol (SOAP) over HTTP on TCP port 80. Your firewall should not block any incoming or outgoing information during the activation. To allow the activation communication, use the activation server address in your firewall settings: http://activate.tekla.com:80/flexnet/services/ActivationService?wsdl

1.2.4 Other infrastructure

Tekla Structures license server and Tekla Structures workstations need to be in the same local area network. The workstations need to be able to contact the license server. The internal firewall of your company (for example, Windows Firewall) must allow the communication between the server computer and the Tekla Structures computers. You need to allow the applications tekla.exe and lmgrd.exe to operate through the firewall. The applications are located in the ..\TeklaStructures\License\Server folder. If there is no local area network in your company, we recommend that you install the license server on each computer that Tekla Structures is running on, and activate one license on each computer.
The MAC address of your network adapter where the license server is installed should not be changed. In case you are using a virtual environment, ensure that you are using static MAC addressing instead of dynamic MAC addressing.

The IP address of your license server should be fixed.

1.3 Recommendations for Tekla Structures multi-user server

These recommendations apply for Tekla Structures Multiuser Server 2.301s.

The Tekla Structures multi-user server enables several users to work simultaneously in one model.

The Tekla Structures multi-user server runs as a service. This means that the Tekla Structures multi-user server is always started automatically when you start the computer, and is always available when the computer is running. There is no need to log in and no need to start it manually every time you start the computer.

The server that is used as the Tekla Structures multi-user server does not have to be very efficient or have maximum performance. You can run the Tekla Structures multi-user server on the same computer as, for example, Tekla Structures License Server, as long as you have dedicated different TCP ports for each of the servers.

1.3.1 Operating system


1.3.2 Other infrastructure

The computers on the same multi-user network need to have a unique ID number and identical Subnet masks.

The IP address of your multi-user server should be fixed.