SIMULIA

COMPUTER AIDED TECHNOLOGY

CST STUDIO SUITE

Hardware Requirements & Recommendations

EM simulations can be classified as high-performance computing tasks. This means that computers used for CST applications must meet high requirements in terms of CPU, RAM, and GPU specifications in order to achieve optimal performance. Sufficient power supply and cooling must also be ensured for the workstation or server.

CATI note: *This information comes courtesy of Dassault Systèmes circa early 2022, and is subject to change as new hardware is released. Contact your CATI simulation rep for the most up-to-date and personalized hardware advice.*

	Minimum Requirement	High-End Recommendation	Notes
Processor	*x86-64 processor from Intel or AMD*	*Dual 3rd Generation Intel Xeon Scalable Processors (also known as "Cooper Lake") or Dual 2nd Gen AMD EPYC Processors (also known as "Rome")*	*We recommend high processor base clock frequency (>3 GHz) and 8-16 cores per CPU for a general-purpose simulation workstation.*
Memory (RAM)	*16 GB*	*64-128 GB per CPU*	*We recommend fastest RAM memory modules available.*
Graphics Card	*100% OpenGL 2.0 (or above) compatible graphics card*	*NVIDIA Quadro® series card dedicated to CAD/CAE applications*	
Storage	*30GB of free disk space*	*At least 500GB hard disk drive*	*We recommend SSDs for better performance.*
GPU Computing (Optional)	*Supported GPU card*	*High-end NVIDIA Quadro or NVIDIA Tesla card*	*Please refer to the GPU computing guide.*
MPI Computing (Optional)	*Dedicated compute cluster hardware*		*Fast network interconnects with low latency, e.g. Infiniband or Intel OmniPath, are strongly recommended.* *Please refer to the MPI computing guide.*
Distributed Computing (Optional)	*For optimal simulation performance, the solver servers should run on separate computers from the frontend and the main controller. A fast network connection between the solvers servers, the main controller, and the frontend is recommended as simulations may generate a lot of data that needs to be transferred.*		

PROCESSOR

Minimum requirement: x86-64 CPU from Intel or AMD

For Intel processors, we recommend the latest Intel® Xeon® processors in a dual socket configuration for a high-end workstation or server configuration; currently these are the 3rd Generation Intel® Xeon® Scalable Processors, also known as "Cooper Lake".

For AMD processors, we recommend AMD EPYC™ 7002 Series processors in a dual socket configuration for a high-end workstation or server configuration; currently these are the 2nd Gen AMD EPYC™ Processors also known as "Rome".

Please note that the processor's turbo frequency cannot usually be used for long periods due to electrical and thermal limits, so for general performance and for long simulation times the base frequency gives a more realistic performance expectation.

We also recommend 8-16 cores per CPU for a general-purpose simulation workstation. It is in general advisable to have a high processor base frequency rather than a large amount of cores. The performance scaling as a function of number of cores depends on the used solver technology, the simulation model, and other factors.

For some applications and solver technologies, a high amount of processor cores and more than two processors may be a good option to obtain better performance. If you are planning a large hardware investment in high-end HPC hardware like a cluster system or a system with more than two CPU sockets, we recommend that you contact our technical support team directly so that we can help you during the configuration process.

A single processor system with a high base clock frequency may also deliver sufficient simulation performance for many applications. For that purpose, we recommend the Intel® Xeon® or AMD Ryzen™ Threadripper™ processor. The above advice is also valid for such configurations.

MEMORY

Minimum requirement: At least 16 GB for a typical simulation workstation

Simulation memory requirement is highly application and solver technology dependent. For a high-end workstation or server system, we recommend at least 64-128 GB RAM per CPU depending on the complexity of your application and the used solver technology. We recommend the fastest RAM memory module available, currently DDR4 memory.

To make use of the total available memory bandwidth in the system, the memory modules should be arranged in such a way that it occupies all the memory channels provided for the system memory per processor. For the recommended Intel and AMD processors above, it should be 8 memory modules per processor. A high memory channel bandwidth is essential to obtain the best possible performance for many of the CST solvers. The maximum memory channel bandwidth depends on the number of RAM modules as well as the type of the modules. Please ask your hardware vendor to provide you with a configuration that achieves the best possible memory channel bandwidth.

GRAPHICS CARD

Minimum requirement: 100% OpenGL 2.0 (or above) compatible graphics card

For the best performance of the 3D modeling and post-processing interface, we recommend a fast 3D graphics card. The NVIDIA Quadro® graphics cards are well tested with CST Studio Suite & Opera and so we recommend using a card of this series that is dedicated to CAD/CAE applications.

STORAGE

Minimum requirement: 30GB of free disk space for the installation of CST Studio Suite.

The base installation of CST Studio Suite requires approximately 7GB of disk space while additional space is required for the installation of the service packs and other CST Studio Suite programs and tools.

Simulations may generate a lot of data, so sufficient storage space should be ensured. We recommend at least a 500 GB hard disk drive for a typical simulation workstation. You may use SSDs for storage, but they are not necessary for good simulation performance.

GPU COMPUTING

Minimum requirement: A supported GPU card, please see the GPU Computing Guide.

The high memory bandwidth and parallel processing abilities of GPU cards provide a significant simulation speed-up compared to CPU computing alone. Options are available for server-class and workstation configurations. Please see the GPU Computing Guide for a list of supported GPU devices as well as information about the requirements that the host system must fulfill.

MPI COMPUTING

Some CST Studio Suite solvers support MPI computing. It typically requires dedicated compute cluster hardware (e.g. InfiniBand or Intel® OmniPath network interconnects). Please refer to the MPI Computing Guide for more information about the requirements and general setup information.

If you are planning a large hardware investment in high-end HPC hardware like a cluster system, we strongly recommend that you contact us directly so that we can help you during the configuration process.

DISTRIBUTED COMPUTING

Distributed computing divides the simulation workload across three different components: frontend, main controller, and one or more solver servers. For optimal simulation performance, the solver servers should run on separate computers from the frontend and the main controller. A fast network connection between the solvers servers, the main controller, and the frontend is recommended as simulations may generate a lot of data that needs to be transferred.

For solver server computers the above advice for hardware configuration is valid, as they run the most resource intensive part of the simulation. The frontend is used mainly for post-processing and graphical analysis of the results, so it does not require powerful hardware. The main controller maintains a simple job queue and transfers simulation data from the solver servers to the frontend, so it also does not require powerful hardware.

OPERATING SYSTEM

Minimum requirement: A supported 64-bit operating system, please see the supported operating systems.

We support the latest 64-bit Microsoft Windows operating systems as well the latest 64-bit Red Hat Enterprise Linux and Suse Linux Enterprise versions. Please note that there are some limitations when running CST Studio Suite or other CST Studio Suite tools on Linux, i.e. not all solvers and modules are supported. For more information, please refer to the supported operating systems document.

EXAMPLE CONFIGURATIONS

The following system configurations provide examples of low-end and high-end workstations that are suited to EM simulations using CST Studio Suite.

Low-End Configuration (Laptop):

Windows 10
Intel® Core™ i7-1165G7 11th Generation
100% OpenGL compatible graphics hardware, e.g. NVIDIA® T600
16GB Memory
1TB SSD

Note that this configuration is not expected to deliver ideal performance for most practical use-cases. This configuration is appropriate for simple simulations, post-processing calculations and graphical rendering purposes.

High-End Configuration (Workstation):

Windows 10
Dual Intel® Xeon® Gold 6334 Processor, 8 cores per processor, 3.60 GHz base clock
GPU acceleration/graphics: NVIDIA Quadro® GV100 (32GB)
96 GB (16 x 8 GB DIMMs) DDR4-3200 RAM
4TB SSD
SSD boot drive

If a system is used only for results post-processing and analysis, e.g. for distributed computing frontend, then it does not need powerful hardware. A powerful graphics card and enough disk space for storing the results are usually sufficient.

NOTE: THESE EXAMPLE CONFIGURATIONS ARE FOR ILLUSTRATIVE PURPOSES ONLY. CONSULT YOUR CST PROVIDER FOR PERSONALIZED HARDWARE ADVICE.

LEARN MORE ABOUT CST TECHNOLOGY

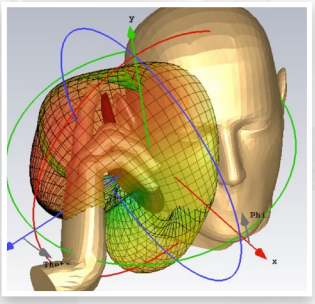
WEBINAR

CST STUDIO SUITE & SOLIDWORKS FOR ELECTROMAGNETIC DESIGN

*This e-seminar is **an introduction to CST Studio Suite**, a 3D electromagnetic simulator with unmatched speed, ease of use, and breadth of capability. Coming from the makers of SOLIDWORKS, it is also your **best choice for a well-integrated design-and-simulation solution**.*

HIGHLIGHTS:

- *Quick EM background*
- *History of CST software*
- *Benefits of simulation*
- *Key technologies & industries*
- *SOLIDWORKS integration*



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BROCHURE

CST STUDIO SUITE

***Getting your design right the first time** is the ideal for product development. With virtual prototyping, electromagnetic simulation can help you to cut down design iteration cycles.*

*This substantial brochure will give you **a great look at CST Studio Suite**'s many capabilities and applications that will improve your engineering process.*

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