



part of Hexagon



Cluster Extension for Structural Mechanics Simulation

System Requirements

If you have any questions regarding our products and services, do not hesitate to contact us:

Europe, Latin America (without Mexico), and Africa:

Volume Graphics GmbH, 69115 Heidelberg, Germany

Sales:

E-mail: sales@volumegraphics.com

Phone: +49 6221 73920 60

Support:

E-mail: support@volumegraphics.com

Phone: +49 6221 73920 80

Japan:

Volume Graphics Co., Ltd., Nagoya 464-0858, Japan

Sales:

E-mail: sales@volumegraphics.jp

Phone: +81 52 508 9682

Support:

E-mail: support@volumegraphics.jp

Phone: +81 50 5305 1829

Canada, USA, and Mexico:

Volume Graphics, Inc., Charlotte, NC 28217, USA

Sales:

E-mail: sales-us@volumegraphics.com

Phone: +1 704 248 7736

Support:

E-mail: support-us@volumegraphics.com

Phone: +1 704 248 7736

China, including Mainland China, Hong Kong, Macao, and Taiwan:

Volume Graphics (Beijing) Technology Co., Ltd., Beijing, China

Sales:

E-mail: sales@volumegraphics.cn

Phone: +86 10 8532 6305

Support:

E-mail: support@volumegraphics.cn

Phone: +86 10 8532 6305

Asia (except China and Japan), Australia, and parts of Oceania:

Volume Graphics Pte. Ltd., Singapore 068914

Sales:

E-mail: sales@volumegraphics.sg

Phone: +65 6665 0310

Support:

E-mail: support@volumegraphics.sg

Phone: +65 6665 0311

Printed in Germany, December 2022.

© 2001-2022 Volume Graphics GmbH. All rights reserved. VGL is a trademark of Volume Graphics GmbH. The Cluster Extension for Structural Mechanics Simulation software described in this document is provided under license. The software may be used or backed up only in accordance with the terms of the license agreement. Information in this document is subject to change without notice and does not represent product specification or commitment on the part of Volume Graphics GmbH. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form without the express prior written permission of Volume Graphics GmbH.

All product names mentioned in this document are used for identification purposes only and may be trademarks or registered trademarks of their respective companies. Registered and unregistered trademarks used herein are the exclusive property of their respective owners.

TABLE OF CONTENTS

1	INTRODUCTION	1
2	SYSTEM REQUIREMENTS	2
	General Information	2
	Operating System	3
	Processor	3
	RAM	3
	Disk Space	3
	Network	4
	User Rights	4
	User Administration	4
	Third Party Software	4
3	FAQ	5

The Cluster Extension for Structural Mechanics Simulation is a high performance computing solution for performing structural mechanics simulations with VGSTUDIO MAX. It distributes the computational load required for structural mechanics simulations to many computers and thus enables you to

- calculate large projects which require more memory than exists in one computer and/or
- calculate large projects faster than with only one computer.

TABLE 1-1: PRODUCT DETAILS

FEATURE	DESCRIPTION
Product name	Cluster Extension for Structural Mechanics Simulation
Release	2022.4
Document ID	SystemRequirements-1034-v011-001-en

GENERAL INFORMATION

The Cluster Extension for Structural Mechanics Simulation works in conjunction with the VGSTUDIO MAX software. The cluster extension consists of a scheduler service (VGCLUSTER SCHEDULER) and several network-connected computers running a worker software (VGCLUSTER WORKER). VGCLUSTER SCHEDULER is usually installed on one of the worker computers (or on the same computer as VGSTUDIO MAX or on any other computer) and distributes the jobs among the worker computers. The cluster extension makes the CPU and RAM resources of all worker computers accessible to VGSTUDIO MAX in connection with the Structural Mechanics Simulation add-on module.



VGCLUSTER SCHEDULER, VGCLUSTER WORKER, and VGSTUDIO MAX must be of the same software version and service pack.

All computers belonging to the Cluster Extension for Structural Mechanics Simulation system must be connected via the same local network:

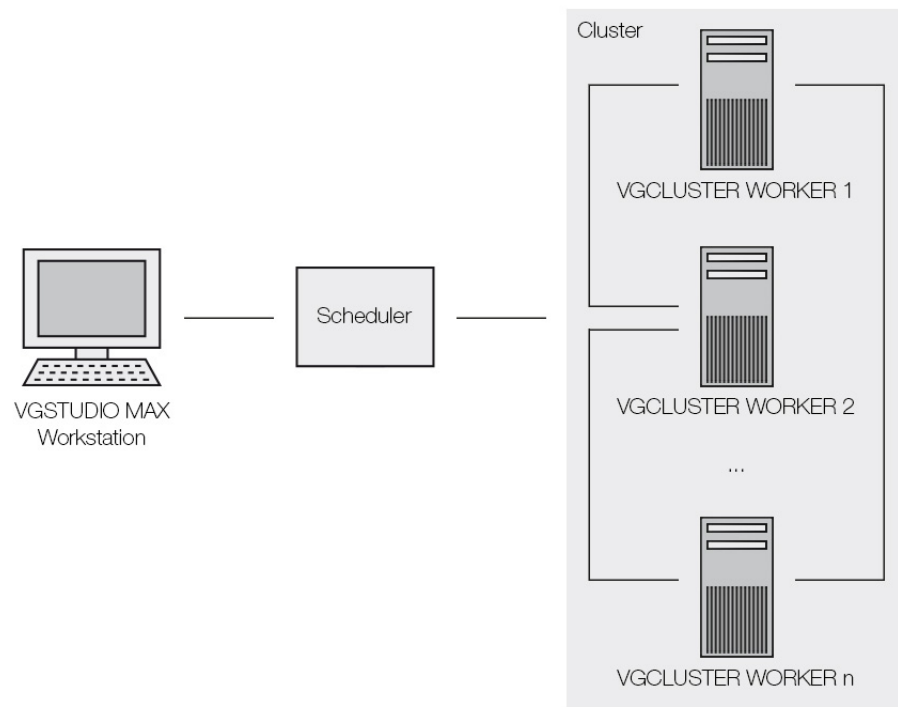


FIGURE 2-1: COMPONENTS OF A CLUSTER EXTENSION FOR STRUCTURAL MECHANICS SIMULATION SYSTEM



VGCLUSTER WORKER and/or VGCLUSTER SCHEDULER may be installed on the same computer as VGSTUDIO MAX. In this case, it is recommended that you increase the RAM on this computer.

VGCLUSTER SCHEDULER may also be installed on one of the worker computers or on any other computer.

OPERATING SYSTEM

The software supports the following operating systems:

TABLE 2-1: SUPPORTED OPERATING SYSTEMS

PLATFORM	OPERATING SYSTEM
Windows:	Windows 10 Enterprise 64 bit Windows 10 Professional 64 bit
Linux:	Please contact Volume Graphics.

PROCESSOR

- Minimum:
x86-64 CPU with instruction set SSE 4.1.



ARM and M1 processors are not supported.

- Recommended:
Performant Intel or AMD multi-core processors, e.g., Intel® Core™ i7 or i9 or Xeon® Gold processors with 2.4 GHz or higher.



All worker computers should have approximately the same CPU power (number of cores and clock rate). The weakest worker computer determines the cluster performance.

RAM

All worker computers should be equipped with at least 32 GB of RAM; however, 64 GB or more is recommended.



All worker computers should have approximately the same amount of RAM. The weakest worker computer determines the cluster performance.

The scheduler computer should be equipped with at least 4 GB of RAM.

For the requirements for the computer running VGSTUDIO MAX, please also refer to VGSTUDIO MAX System Requirements.

DISK SPACE

Except for the files created during installation (approx. 25 MB) and the log files created during operation, no further disk space is required on the worker and scheduler computers.

NETWORK

TCP network communication must be enabled between VGSTUDIO MAX, scheduler computers, and worker computers. The default ports are 13022 to 13033 and 8677.

The worker and scheduler computers should be interconnected with 1 Gbps Ethernet or better. The data transfer rate between the VGSTUDIO MAX computer and the worker and scheduler computers should be at least 100 Mbps Ethernet (preferably 1 Gbps).

Faster interconnections and lower latency will allow you to efficiently distribute your projects to more worker computers.

USER RIGHTS

Make sure every user either has user or administrator rights. The license might not work when using guest accounts.

USER ADMINISTRATION

The Windows services installed by this software run under the same user account. It is recommended that you create a dedicated user (domain user or local users on each computer) for this purpose.

THIRD PARTY SOFTWARE

The Cluster Extension for Structural Mechanics Simulation is based on Microsoft MPI (MS MPI) 8.0.12438.0.

Unless already present, the Cluster Extension for Structural Mechanics Simulation installers will automatically install the required version of MS MPI on the worker and scheduler computers.

TABLE 3-1: FREQUENTLY ASKED QUESTIONS

QUESTION	ANSWER
Where are the log files located?	Usually, they are located in the directory <i>C:\Users\mpiuser\AppData\Local\Volume Graphics\</i> .
How much RAM do I need on the computer running VGSTUDIO MAX?	When using the cluster extension, the amount of RAM needed on the local VGSTUDIO MAX computer is considerably smaller compared to a fully local computation (i.e., without cluster extension). However, in order to set up simulation structures and view the results, a considerable amount of RAM is still required. The minimum recommended amount of RAM for the computer running the VGSTUDIO MAX application can be computed as follows: number of voxels in the CT volume x 10 bytes.
How many worker computers at a time can I use in total with the Cluster Extension for Structural Mechanics Simulation for 4/16 licenses?	You can use a total of up to 4 or 16 worker computers, respectively, for a given job.
How can I test the Cluster Extension for Structural Mechanics Simulation before I purchase a license?	Two worker computers can be used with a normal license for a Structural Mechanics Simulation module. For more worker computers, please contact Volume Graphics to obtain an evaluation license.
Can I use the Cluster Extension for Structural Mechanics Simulation with my Linux cluster?	Yes. Please contact Volume Graphics if you would like to set up a Linux cluster.
Can I set up the cluster on a cloud service?	Yes. The Cluster Extension for Structural Mechanics Simulation has been tested with the Amazon Elastic Compute Cloud. Please contact Volume Graphics if you would like to set up a Linux cluster.
Can I use the cluster over a slow web connection?	The computation will be as fast as when using a fast web connection, but the speed for transmitting data to and from the cluster at the start and end of the job can be very low for large data sets.
Can I assign a worker computer to several schedulers?	No. This is not the intended setup and will lead to an undefined behavior. A worker computer must be included in one cluster (i.e., assigned to one scheduler) only.