

Geoteric 2021.1 & AI Faults

Geoteric installation consist of two separate installers.

1. Geoteric 2021.1
2. Optional: Geoteric 2021.1 AI Faults (Formerly Geoteric Collaborative AI)
 - o Geoteric 2021.1 AI Faults includes the server and functionality for running both 2D and 3D AI Fault networks.

These two installers must be installed together on the same workstation.

If the Geoteric AI Faults functionality for running 2D and 3D AI Fault networks is not required, option 2 above does not need to be installed.

Failure to update a previously installed Geoteric AI Fault server (formerly Geoteric Collaborative AI) will result in errors when running 2D and 3D AI Fault networks.

For Geoteric 2021.1 only, please ensure that you have Visual Studio (VS) 2013 redistributable x64 and x86 redistributable runtime installed on your machine. The VS2013 redistributable x64 and x86 installers can be found on the Geoteric FTP site.

Windows 10

Recommended & Minimum Requirements for GPU Hardware

The minimum specification requires a **single** GPU with a minimum of 6GB of free GPU Memory, CUDA computes capability 3.5 or greater, up to and including CUDA 11, recommended running a NVIDIA 471.41 drivers (and a minimum of NVIDIA 452.57 drivers).

N.B. Geoteric AI Faults will utilise all available GPU memory when the service is running. Please stop the service before closing Geoteric to free the memory.

Please see table below for supported versions of Windows 10.

Version	Microsoft supported until	Geoteric supported until
21H1	13 th December 2022	Yes
20H2	10 th May 2022	Yes
2004	14 th December 2021	Yes
1909	11 th May 2021	No

Microsoft no longer supports Windows 10 Version 1909, we recommend an upgrade from this version. For more information, please visit the Microsoft information page here:

<https://docs.microsoft.com/en-us/lifecycle/products/windows-10-home-and-pro>

Geoteric makes intensive use of the graphics and system hardware on which it is run. Choosing the right combination of system components to best avoid bottlenecks is essential. Combining that with the right GPU configuration, Geoteric users can get the best from the software in terms of performance, interactivity and visualisation quality.

The following configuration options are highly recommended to get the best out of Geoteric.

- Microsoft Windows Desktop Workstation
- Primary GPU: Quadro P6000 or higher
- Secondary GPU: for display purposes only



The table below show the supported NVIDIA graphics cards for running Geoteric 2021.1 and Geoteric 2021.1 AI Server – 2D Networks (formerly Geoteric Collaborative AI)

NEWER<-		SUPPORTED NVIDIA GRAPHICS CARDS				->OLDER	
RTX 8000	GV100	GP100	P6000	P5200	M6000 (24GB)	K6000	K5200
RTX 6000			P5000	P2200	M6000		
RTX 5000			P4000		M5000		
RTX 4000			P2000		M4000		
RTX 3000					M2000		

The table below show the supported NVIDIA graphics cards for running Geoteric 2021 AI Server – **3D Networks**. 3D AI Fault networks require >16GB cards to run and fine-tune.

SUPPORTED NVIDIA GRAPHICS CARDS				
RTX 8000	GV100	P6000	P5200	M6000 (24GB)
RTX 6000		P5000		
RTX 5000				

Drivers

Certified graphics driver version: 471.41

On the NVIDIA webpage from the link below, you can see a list of supported cards on the Supported Products tab. Please be aware that not all cards on that list have a CUDA compute version of 3.5.

If you are unsure of the CUDA compute version of your GPU, please check the link below:

<https://developer.nvidia.com/cuda-gpus>

TCC mode

Geoteric supports Tesla Compute Cluster (TCC) mode. More information can be found here: https://docs.nvidia.com/gameworks/content/developertools/desktop/nsight/tesla_compute_cluster.htm

Windows Virtualisation Support

Graphics cards and CUDA processing

Geoteric is known to work in a virtual desktop infrastructure (VDI) environment when configured correctly. Geoteric can utilise both GPU Passthrough and nVidia GRID to run CUDA processes and accelerated graphics. If you have either of these technologies enabled Geoteric will be able to detect a CUDA capable GPU, and you can check this in Tools > Options > Accelerated Computing.

In GPU Passthrough mode, an entire physical GPU is directly assigned to one Virtual Machine (VM), bypassing the NVIDIA Virtual GPU Manager. The GPU is then accessed exclusively by the NVIDIA driver running in the VM to which it is assigned. The GPU is not shared among other VMs.

When using NVIDIA GRID (vGPU) mode one single physical GPU is virtualised into a number of smaller virtual GPUs. Depending on the physical GPU installed there will be a selection of “Q” profiles from which to choose. The Q profile will indicate the amount of GPU RAM available, e.g. an 8Q profile will provide 8GB of GPU RAM to Geoteric. Please see our recommended specifications section for details of the GPU memory required for specific features.

We do not support the use of Mirror Drivers as they take precedence over NVIDIA drivers and have shown to be unstable when processing. You can check that NVIDIA drivers are being used by checking the Device Manager or the Geoteric Support Info tool which can be found in Help > Support Info - NVIDIA drivers and their details will be listed when the system is configured correctly.

While we are unable to provide specific hardware and configuration support for VDI systems, Geoteric has been tested and used successfully on correctly configured solutions provided by Cegal, VMWare, Citrix, Azure, and AWS. An example known good VDI environment is detailed below.

VDI Tested Environment

nVidia Tesla P40 24G GPU configured as Shared Direct in VMWare vCenter – Firmware 86.02.23.00.1 with the latest VIB for VMware 7.0.3

VMWare ESXi vSphere 7.0.3 HyperVisor

Virtual Servers

1 vCenter Server Version 7.0.3

1 Citrix Storefront Version 1912.0.3000.9

1 Windows 10 Desktop 16 vCPU's and 128GB RAM

nVidia GPU Grid Driver 471.68 (30.0.14.7168)

Tested with 24Q, 12Q & 8Q vGPU profiles

Display Scaling and Driver Control

Ensure that the scaling of the display is 'fixed' on the Citrix desktop by setting to 'actual size' on the Citrix side of the display preferences. Otherwise the rescaling or downscaling of the display to fit in a window may cause instabilities.

To reduce the sensitivity of Windows to TDR events which could falsely indicate a video driver error, add a registry key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\GraphicsDrivers
```

and create a key of type "DWORD (32-bit)" and name "TdrDelay" with a value of 10 as Decimal value and reboot the VM.

Licensing and environment

Check that the MAC address isn't going to change, especially if using a node-locked license. If the MAC address isn't static, then it is possible to run a floating license type setup locally.

Avoid using clear down scripts when users log off as Geoteric settings are stored against user profiles.

Additional notes

Geoteric will always perform best when running on a local workstation with a dedicated GPU. Bandwidth, latency, and network quality can impact the performance of VDI solutions.

Project storage

The amount of disk space a Geoteric project requires increases in direct relation to the size of the source data volume loaded.

For example: If the source data is 10GB, then Geoteric will need 10GB + 1.8GB for its display file. This means a total of 11.8GB in space (internal or external) is required to load and visualise the source volume.

If any processing is to be carried out on the volume, the same amount of space is needed again for the resulting volume and display file. Once the project contains 10 volumes, 118GB will be required.

RAID

- RAID 0 or non-RAIDED disks are the best performing configuration for Geoteric.
- Certain other RAID configurations can have a very negative impact on performance. Please contact Geoteric support for further information if you think this is the case.

Geoteric temporary folder

The location of the Geoteric temp folder has an impact on performance and is an important consideration. Ideally, this folder should be set to reside on a fast, local hard drive such as an SSD with plenty of space available (see below).

- The 'temp' directory is specified on setup (though it can be changed from within the Geoteric options at any time) and is the target for all temporary files.
- Temp disk space: Geoteric requires a certain amount of temporary disk space to use during volume processing. Once processing is complete, all temp files are deleted.

- We recommend that a large amount of disk space is reserved for temporary files, though this value depends on the size of your data. We recommend around 3-4 times the size of your data in free space. E.g. if your data is 10Gb, the drive housing your Geoteric temp folder should have at least 30Gb of free space to ensure Geoteric can process your data.
- We recommend if possible, placing 'temp' on a different physical drive to the Geoteric project data to minimise drive data bottlenecks.

Optional System Tweaks

Drives

- For optimal performance, we recommend turning off the Windows write-cache buffer as this is known to improve disk performance.
- When using an SSD, a proportion of the maximum disk space should be allocated to be used by the disks' controllers. As per manufacturer's recommendations, a partition of at least 10% of the disk should be left as unallocated space when initially formatting the drive for use. Failure to do this will result in reduced performance when writing to the disk.
- All non-SSD hard drives slow down considerably as they become full. If the drive where your Geoteric projects are stored, or where Geoteric is installed is close to being full, then consider deleting any unnecessary files and free up some space on the drive, then perform defragmentation on the drive to optimise the data (see below).
- Disk fragmentation – Windows only. We would always recommend that the computer running Geoteric is regularly defragmented to increase performance.
- A reduction in performance may be observed for some older SSD drives.

Network

- If your Geoteric projects are stored on a network drive, you can check if network issues are causing a drop in performance by performing a ping trace to the machine where the projects are stored to look at the response times and for any data packet loss. Recommended latency is <1ms with zero packet loss. Geoteric can quickly saturate a 10Gbit SAN or LAN link; lower performance networking is not recommended for storage.

Antivirus and other software

- We recommend that you add the Geoteric program folder (and the entire contents) to your antivirus exceptions whitelist.
- You should also ensure that your antivirus is not scanning the Geoteric temp folder and the project folders whilst they are in use.
- Ensure that any backup or indexing software is not actively running on your machine whilst you are using Geoteric as this would noticeably impact performance.

GPU and drivers

- In a multi-GPU system, we recommend dedicating one card to screen rendering and the other to processing. The settings for this are in Geoteric and can be found in the Options dialogue in the Tools menu.
- Ensure that your NVIDIA driver is up-to-date, ideally at the versions listed above. Recent drivers should work in most cases however please contact Geoteric support for specifically recommended drivers.
- We recommend a dual GPU configuration where a dedicated GPU would handle displays. Recommended for multiple 4k monitor setup, a single GPU

configuration is supported.

System specification

CPU	Minimum: Single 8 core CPU
	Recommended: Dual 8 core CPU
	Notes: Parts of Geoteric are multithreaded, and performance increases will be seen if a multiprocessor/core system is chosen.
Memory	Minimum: 64 GB
	Recommended: 128 GB
Internal hard disks	<p>Bus type: SATAIII, SAS</p> <p>Capacity: We recommend systems have a minimum 1.5TB of internal hard disk space. An example configuration would be:</p> <ol style="list-style-type: none"> 1. Primary drive: 500GB (HDD minimum 7200rpm or SSD) for OS and software 2. Additional high capacity (1TB+ HDD Minimum 7200rpm, SSD, or M.2) drives for Geoteric projects and temporary files. <p>However, the more internal hard disk space, the better.</p>
External storage	<p><i>We recommend using SSD over USB3 enabled hardware or drives with fast SCSI connection.</i></p> <p>iSCSI SAN drives are supported - please consult your IT department with regards to available bandwidth for this connectivity.</p> <p>Note: use of USB 1.1 and USB 2.0 devices is not recommended.</p>

For further information, please contact support on support@geoteric.com.