



Velocity oncology imaging informatics system

Product Specifications

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Section 1: Technology Introduction

The Velocity™ oncology imaging informatics system allows historically unconnected data from different systems, in different points of time, and in different positions to be transformed into clinical knowledge. Combining this powerful data with seamless integration into your team's IT infrastructure allows you to optimize productivity and efficiency across your entire department with ease. Velocity version 4.0 includes three software packages: VelocityGRID™ server software, VelocityGRID™ client software, and Velocity™ standalone workstation software.

1.1 Velocity environments

The Velocity oncology imaging informatics system software may be installed either in a standalone workstation environment, or with a client/server infrastructure. Velocity standalone workstations are termed "Velocity standalone workstations" and the Velocity client/server model is comprised of an installation of a "VelocityGRID server" and a "VelocityGRID client." Between these two models, the client software is identical, but the Velocity standalone workstation accesses files and executes queries against a database, which is located directly on the client computer, whereas the VelocityGRID client communicates over a network to the database server present on the VelocityGRID server.

1.2 Installation types

Velocity standalone workstation, VelocityGRID client, and VelocityGRID server software may be installed on customer-provided hardware or Varian-provided hardware. This document outlines recommended baseline specifications for such hardware.

1.3 Server virtualization and application virtualization

VelocityGRID software is required for both server virtualization and use of application virtualization technologies. Virtualization of the Velocity standalone workstation is not supported. Using application virtualization, VelocityGRID clients may be made available on both physical servers and virtual server infrastructure, commonly using Citrix® XenApp® and XenDesktop® software platforms. The graphics acceleration requirement does not change for application virtualization, meaning that any application virtualization of VelocityGRID clients will require hardware graphics acceleration. For Citrix XenApp and XenDesktop platforms, graphics acceleration technology is branded as "HDX™ 3D Pro" and requires a hardware accelerator card on both physical and virtualized platforms.

1.4 Storage and file systems

For use of Velocity software on Microsoft® Windows® platforms, the New Technology File System (NTFS) is required. For use of Velocity software on Apple® macOS® platforms, the HFS+ and APFS file systems are supported. FAT16 and FAT32 are not supported file systems. Use of network file systems, including NFS and SMB/CIFS, is not approved for Velocity data, including both SQL and image data, or Velocity system software binaries. Block-level storage is required for Velocity software installation, which includes direct attached storage (DAS) volumes, pass-through volumes on virtual machines, or remote storage area network (SAN) volumes, including iSCSI, FibreChannel, and SAS volumes. It is recommended that all logical volumes storing image data, SQL data, and software binaries be formatted in the NTFS format.

1.5 Backup

It is strongly recommended that all Velocity data be backed up on a regular schedule. Additionally, it may be advantageous to create periodic file system level snapshots using the Microsoft Volume Shadow Copy Service. When backing up or restoring Velocity data, it is a requirement that all data and SQL information derive from a single point in time. Data loss or corruption will occur if files or SQL information is either backed up or restored piecemeal from differing points in time. Most commercial backup software will support making either file system level snapshots, memory level snapshots, or operating system level snapshots to ensure database backups are consistent. This functionality is also present in the Windows Server Backup software which ships integrated into Microsoft Windows Server. If it is not possible to guarantee that a backup occurs from a single point in time, it is also acceptable to shut down the Velocity software by stopping the Windows Service before backup. For Velocity standalone workstations there is no additional service running when the client application is closed which can modify the database. For VelocityGRID server software, the Windows Service is generally named "VelocityGRID" or "Velocity Grid" along with a version number. Backups may occur to any medium – network file systems are acceptable for backup data, provided they support long file names and files larger than 2 GB.

Section 2: Velocity Standalone Workstation

Technical Specifications

2.1 Recommended Specifications

The following technical specifications represent baseline hardware and software environment specifications for the Velocity standalone workstation. A full documentation of minimum specifications may be found in the Velocity software user manual. These recommendations provide a baseline for usable performance. Increasing memory, CPU, and graphics beyond this baseline may deliver significant performance improvements and should be considered carefully during new deployments.

Table 1: System Requirements

Description	Specification
Operating System Software	Microsoft Windows 7 (64 bit) or Microsoft Windows 10 (64 bit) or Apple macOS 10.12 Sierra (64 bit) or Apple macOS 10.13 High Sierra (64 bit)
Processor	Dual core x86-64 processor with performance at or above SPECint [®] 2006 score of 30, and Geekbench™ 4 score of 2200 (single-core) and 4400 (multi-core). Four cores recommended
Memory	4 GB RAM minimum, 16 GB RAM recommended
Storage System	Software and database require direct attached storage, or block-level storage. All other storage methods are unsupported. Supported file systems for storage volumes: NTFS (Windows) APFS (macOS) HFS+ (macOS) All other file systems are unsupported. Network file systems, including SMB, are unsupported. Velocity software requires full rights and permissions to the file system volume, drive, or logical user node used to run Velocity software and database.
Disk Space	100 GB available free disk space, 500 GB recommended
Video Adapter	Hardware graphics acceleration in the form of a graphics processing unit (GPU), either integrated or discrete. 1 GB of video memory (VRAM) recommended. GPU hardware and driver must support OpenGL® 3.2 or above for full software functionality.
Display	32 bits per pixel (32 bpp) color support. 8 bpp color rendering for red, green, and blue channels (24 bpp RGB), along with transparency (alpha). Display capable of 1280 x 1024 resolution, 1920 x 1080 or higher recommended
Network Interface (NIC)	Minimum of 100 Mbps NIC, 1 Gbps recommended Permanent IP address (static IP or reserved DHCP address)
Other	Microsoft Windows compatible 101-key keyboard, 2-button mouse with scroll wheel

Table 2: Optional Hardware Guidelines

Description	Specification
Peripherals	Optical drive (CD/DVD) for importing documents or images
Backup	Tape drive, network backup server, or external hard disk drive (HDD) storage is recommended for backup of data on Velocity system. Maintaining backups is customer responsibility for all customer-owned systems.

Section 3: VelocityGRID Server Technical Specifications

3.1 Recommended Specifications

The following technical specifications represent baseline hardware and software environment specifications for the VelocityGRID server software. A full documentation of minimum specifications may be found in the Velocity software user manual. These recommendations provide a baseline for usable performance. Increasing memory, CPU, and disk performance beyond this baseline may deliver significant performance improvements and should be considered carefully during new deployments.

Table 3: System Requirements

Description	Specification
Operating System Software	Microsoft Windows Server 2012R2 (64 bit) or Microsoft Windows Server 2016 (64 bit)
Processor	Dual core x86-64 processor with performance at or above SPECint2006 score of 30, and Geekbench 4 score of 2200 (single-core) and 4400 (multi-core). For each additional user, add ½ processor core per simultaneous connected client
Memory	4 GB RAM minimum, 16 GB RAM recommended For each additional user, add 1 GB RAM per simultaneous connection
Storage System	Software and database require direct attached storage, or block-level storage. All other storage methods are unsupported. Supported file systems for storage volumes: NTFS (Windows) All other file systems are unsupported. Network file systems, including SMB, are unsupported. Velocity software requires full rights and permissions to the file system volume, drive, or logical user node used to run Velocity software and database.
Disk Space	100 GB available free disk space, 500 GB recommended For use of the system over time, add 500 GB of storage per year, for each connected treatment device with imaging. Some sites will require less than this amount of storage, as storage usage varies with clinical usage.
Network Interface (NIC)	Minimum of 100 Mbps NIC, 1 Gbps recommended Permanent IP address (static IP or reserved DHCP address)

Table 4: Optional Hardware Guidelines

Description	Specification
Peripherals	Optical drive (CD/DVD) for importing documents or images, or installation media
Backup	Tape drive, network backup server, or external hard disk drive (HDD) storage is recommended for backup of data on Velocity system. Maintaining backups is customer responsibility for all customer-owned systems.

Section 4: VelocityGRID Client Technical Specifications

4.1 Recommended Specifications

The following technical specifications represent baseline hardware and software environment specifications for the VelocityGRID client workstation computer. A full documentation of minimum specifications may be found in the Velocity software user manual. These recommendations provide a baseline for usable performance. Increasing memory, CPU, and graphics beyond this baseline may deliver significant performance improvements and should be considered carefully during new deployments. VelocityGRID client software installs out of a web browser hosted by the VelocityGRID server without requiring administrative rights and may be run on a variety of hardware. The VelocityGRID client environment may be shared with the ARIA® oncology information system and/or Eclipse™ treatment planning system if the following requirements are met.

Table 5: System Requirements

Description	Specification
Operating System Software	Microsoft Windows 7 (64 bit) or Microsoft Windows 10 (64 bit) or Apple macOS 10.12 Sierra (64 bit) or Apple macOS 10.13 High Sierra (64 bit)
Processor	Dual core x86-64 processor with performance at or above SPECint2006 score of 30, and Geekbench 4 score of 2200 (single-core) and 4400 (multi-core). Four cores recommended
Memory	4 GB RAM minimum, 16 GB RAM recommended
Disk Space	4 GB available free disk space, recommended that available disk space exceed size in GB of system RAM for virtual memory use
Video Adapter	Hardware graphics acceleration in the form of a graphics processing unit (GPU), either integrated or discrete. 1 GB of video memory (VRAM) recommended. GPU hardware and driver must support OpenGL 3.2 or above for full software functionality.
Display	32 bits per pixel (32 bpp) color support. 8 bpp color rendering for red, green, and blue channels (24 bpp RGB), along with transparency (alpha). Display capable of 1280 x 1024 resolution, 1920 x 1080 or higher recommended
Network Interface (NIC)	Network connectivity to VelocityGRID server is required. Minimum of 50 Mbps network connection to VelocityGRID server, with 1 Gbps server connection recommended
Other	Microsoft Windows compatible 101-key keyboard, 2-button mouse with scroll wheel

Table 6: Optional Hardware Guidelines

Description	Specification
Peripherals	Optical drive (CD/DVD) for importing documents or images

Section 5: VelocityGRID Server Virtualization Technical Specifications

5.1 Recommended Specifications

The following technical specifications represent baseline hardware and software environment specifications for operating-system level virtualization of the VelocityGRID server software. A full documentation of minimum specifications may be found in the Velocity software user manual. These recommendations provide a baseline for usable performance. Increasing memory, CPU, and disk performance beyond this baseline may deliver significant performance improvements and should be considered carefully during new deployments.

Table 7: System Requirements

Description	Specification
Operating System Software	Microsoft Windows Server 2012R2 (64 bit) or Microsoft Windows Server 2016 (64 bit)
Recommended Hypervisor Software	Microsoft Windows Hyper-V® or Citrix XenServer or VMware® vSphere®
Processor	Two logical x86-64 cores with performance at or above SPECint2006 score of 30, and Geekbench 4 score of 2200 (single-core) and 4400 (multi-core). For each additional user, allocate ½ logical core per simultaneous connected client
Memory	4 GB RAM minimum, 16 GB RAM recommended For each additional user, allocate 1 GB RAM per simultaneous connection
Storage System	Software and database require direct attached storage, or block-level storage. All other storage methods are unsupported. Supported file systems for storage volumes: NTFS (Windows) All other file systems are unsupported. Network file systems, including SMB, are unsupported. Velocity software requires full rights and permissions to the file system volume, drive, or logical user node used to run Velocity software and database.
Disk Space	100 GB available free disk space, 500 GB recommended For use of the system over time, add 500 GB of storage per year, for each connected treatment device with imaging. Some sites will require less than this amount of storage, as storage usage varies with clinical usage.
Network Interface (NIC)	Minimum of 100 Mbps NIC, 1 Gbps recommended
Other	Remote access to the system is required. Running the Velocity client software on a virtualized server is only intended for service use and installation.

Table 8: Optional Hardware Guidelines

Description	Specification
Backup	Snapshots are recommended for virtualized servers, along with backup of data directories. Maintaining backups of virtual servers is a customer responsibility.

Section 6: VelocityGRID Client Application Virtualization Technical Specifications

6.1 Recommended Specifications

The following technical specifications represent baseline hardware and software environment specifications for application level virtualization of the VelocityGRID client software. A full documentation of minimum specifications may be found in the Velocity software user manual. These recommendations provide a baseline for usable performance. Increasing memory, CPU, and graphics performance beyond this baseline may deliver significant performance improvements and should be considered carefully during new deployments. This section covers both application virtualization of the VelocityGRID client software on both physical hosts and virtualized operating system hosts.

Table 9: System Requirements

Description	Specification
Operating System Software	Microsoft Windows Server 2008R2 (64 bit) or Microsoft Windows Server 2012R2 (64 bit) or Microsoft Windows Server 2016 (64 bit)
Recommended Application Virtualization Platform	Citrix XenApp / XenDesktop 6.5, Enterprise Edition or Platinum Edition or Citrix XenApp / XenDesktop 7.5 or greater, all editions
Recommended Hypervisor Software	Microsoft Windows Hyper-V (Windows Server 2016 only) or Citrix XenServer or VMware vSphere (Physical installation of Windows operating system on bare metal is also supported.)
Processor	Two logical x86-64 cores with performance at or above SPECint2006 score of 30, and Geekbench 4 score of 2200 (single-core) and 4400 (multi-core). For each additional user, allocate between one and two logical cores per simultaneous session, depending on expected performance.
Memory	4 GB RAM minimum, 16 GB recommended For each additional user, allocate a minimum of 4 GB RAM per simultaneous session
Graphics	Hardware graphics acceleration in the form of a graphics processing unit (GPU). Citrix XenApp / XenDesktop HDX 3D Pro OpenGL hardware graphics acceleration is required. http://support.citrix.com/article/CTX131385 1 GB of video memory (VRAM) recommended per each simultaneous user session of application-virtualization client software GPU hardware and driver must support OpenGL 3.2 or above for full software functionality.
Display	32 bits per pixel (32 bpp) color support. 8 bpp color rendering for red, green, and blue channels (24 bpp RGB), along with transparency (alpha). Display capable of 1280 x 1024 resolution, 1920 x 1080 or higher recommended
Disk Space	4 GB available free disk space, recommended that available disk space exceed size in GB of system RAM for virtual memory use
Network Interface (NIC)	Minimum of 100 Mbps NIC, 1 Gbps recommended



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Specifications subject to change without notice. Not all features or products are available in all markets.

Intended Use Summary

Velocity is a stand-alone software product that provides the physician a means for comparison of medical imaging data from multiple DICOM conformant imaging modality sources. It allows the display, annotating, volume rendering, registration and fusing of medical images as an aid during use by diagnostic radiology, oncology, radiation therapy planning and other medical specialties. Velocity is not intended for mammography diagnosis.

Important Safety Information

Velocity solutions present data and images using approximations for imaging and treatment planning data visualization and are to be used solely for informational purposes.

Medical Advice Disclaimer

Varian as a medical device manufacturer cannot and does not recommend specific treatment approaches. Individual treatment results may vary.

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