Vitrea® Advanced Visualization 7.16 Table of Contents

Vitrea Advanced Visualization Workstation Deployment

Recommended Hardware Technical Specifications

Modalities → Vitrea Workstation

Workstation Deployment

Single-User Systems (1)

HP Z4 G5 workstation (SKU# 9Z7J1UC) §

- One (1) Intel Xeon W3-2425 3.0 GHz Base/4.4 GHz Turbo 4400 MHz 6C CPU
- 32GB (4x8GB) DDR4 4800 DIMM ECC Registered Memory
- SSD (2) 2 TB 2280 PCIe M.2 with VROC RAID 1
- NVIDIA Quadro RTX™ A2000 12 GB graphics card (Standard or Extended life)
- Optional monitors (These are not included in the SKU.)
  - o HP Z24n G3 24-inch widescreen monitor (native resolution: 1920 x 1200) (optional)
  - o HP Z27k G3 27-inch widescreen monitor (native resolution: 3840 x 2160) (optional)
- Supported Operating Systems:
  - Microsoft® Windows 11 Professional 64-bit edition 22h2+ (Installed)
  - Microsoft Windows 10 Professional 64-bit edition
- Network: 1.0 Gbps network connection
- Heat dissipation Typical 950+ BTU/HR
- Mini display adapter comes with system

End of life messaging

Windows workstation 10 support from Microsoft will end on October 14th, 2025. Canon Medical recommends that you plan for upgrading your Windows workstation OS accordingly. Vitrea Advanced Visualization version 7.16 will continue to operate on Windows 10, but we recommend that customers upgrade to newer version of Windows workstation OS for future compatibility, supportability, and security. https://learn.microsoft.com/en-us/lifecycle/products/windows-10-home-and-pro

Dell equivalent hardware using the same CPU, RAM, and Graphics card of which is performance equivalent hardware may be used.

Disk configuration results in approximately 2TB of available storage for the above system.

Microsoft SQL Server Express edition is provided at the time of the deployment for the workstation deployment.

Vitrea Advanced Visualization Workstation Deployment
Recommended Hardware Technical Specifications

Modalities → Vitrea Workstation
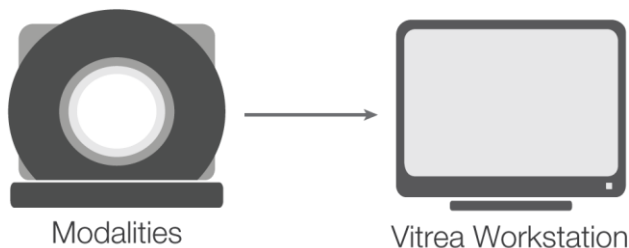
Precision Workstation Deployment

Single-User Systems (1)

HP Z8 Fury G5 Workstation (SKU# 9D5U8UC) §

- One (1) Intel Xeon W5-3423 3.20 GHz Base/4.60 GHz Turbo 4800 MHz 12C CPU
- 128GB (8x16GB) DDR5 4800 DIMM ECC Registered Memory
- Two (2) 4 TB SSD 2280 PCIe M.2 with VROC in RAID 1
- NVIDIA Quadro RTX™ A4000E 16 GB graphics card
- Optional monitors (These are not included in the SKU.)
  - HP Z32K G3 32-inch widescreen monitor (native resolution: 4k) (optional)
  - HP Z27k G3 27-inch widescreen monitor (native resolution: 3840 x 2160) (optional)
- Supported Operating Systems:
  - Microsoft® Windows 11 Professional 64-bit edition 22h2+ (Installed)
  - Microsoft Windows 10 Professional 64-bit edition
- Network: 1.0 Gbps network connection
- Heat dissipation Typical 1364 BTU/HR Max 3184 BTU/HR
- Mini display adapter comes with system
- Supports 1k and 2k datasets

End of life messaging

Windows workstation 10 support from Microsoft will end on October 14th, 2025. Canon Medical recommends that you plan for upgrading your Windows workstation OS accordingly. Vitrea Advanced Visualization version 7.16 will continue to operate on Windows 10, but we recommend that customers upgrade to newer version of Windows workstation OS for future compatibility, supportability, and security. https://learn.microsoft.com/en-us/lifecycle/products/windows-10-home-and-pro

Dell equivalent hardware using the same CPU, RAM, and Graphics card of which is performance equivalent hardware may be used.

Disk configuration results in approximately 4TB of available storage for the above system.

Microsoft SQL Server Express edition is provided at the time of the deployment for the workstation deployment.

Vitrea Advanced Visualization Extend Specification
Recommended Technical Specifications
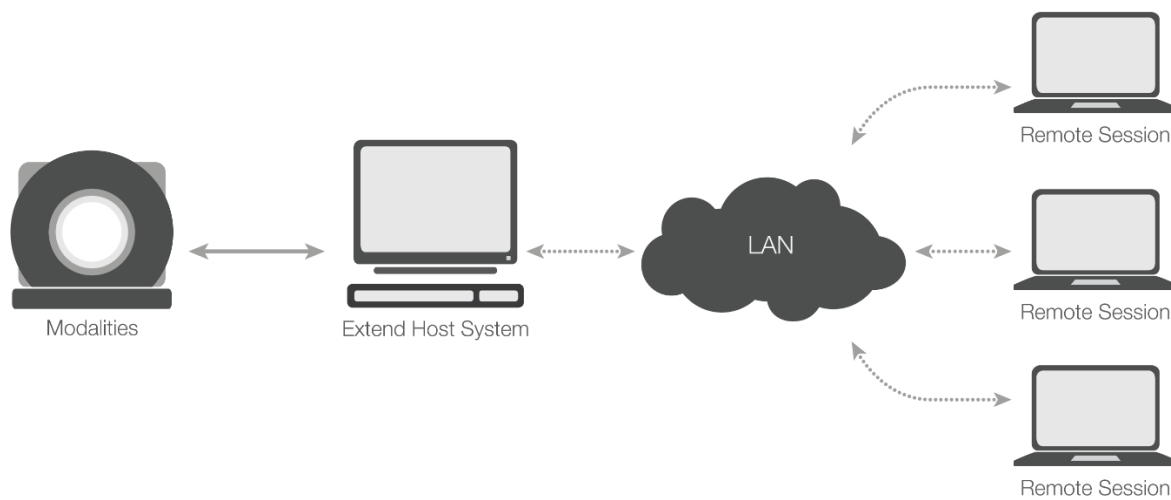
Extend Deployment

Three-User System (3)

HP Z8 G5 workstation (SKU # 9T5Q1UC) §
- Two (2) Intel Xeon Gold 5416S 2.0 GHz Base/4.00 GHz Turbo 4400 MHz 16C CPU
- 128 GB (8x16GB) DDR5-4800 ECC RAM
- Two (2) 2 TB SSD 2280 PCIe TLC M.2
- 2 NVIDIA Quadro RTX A2000 12 GB graphics cards
- Optional monitors (These are not included in the SKU.)
  - HP Z24n G3 24-inch widescreen (native resolution: 1920 x 1200) (optional)
  - HP Z27k G3 27-inch widescreen (native resolution: 3840 x 2160) (optional)
- Supported Operating Systems:
  - Microsoft Windows Server 2022 Standard with Desktop Experience (16 Core)
    - One (1) Windows Server 2022 Standard additional license APOS (16 Core)
    - Server OS License purchased separate from the hardware
- Network: 1.0 Gbps network connection
- Heat dissipation typical 1735 BTU/HR max 3336 BTU/HR
- 5U Height
- 2x Mini display adapter comes with system
- Single power supply: 110 Volt

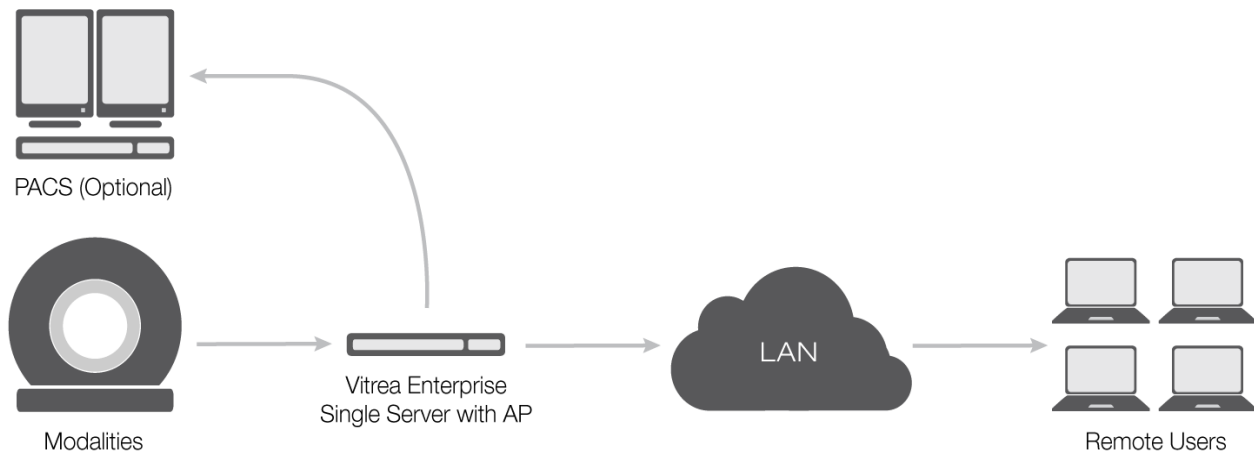Microsoft SQL Server Express edition is provided at the time of the deployment.

Vitrea Advanced Visualization Enterprise Single Server
Recommended Technical Specifications

The Enterprise Single server has two deployment types:

- Six User (6) Vitrea Advanced deployment
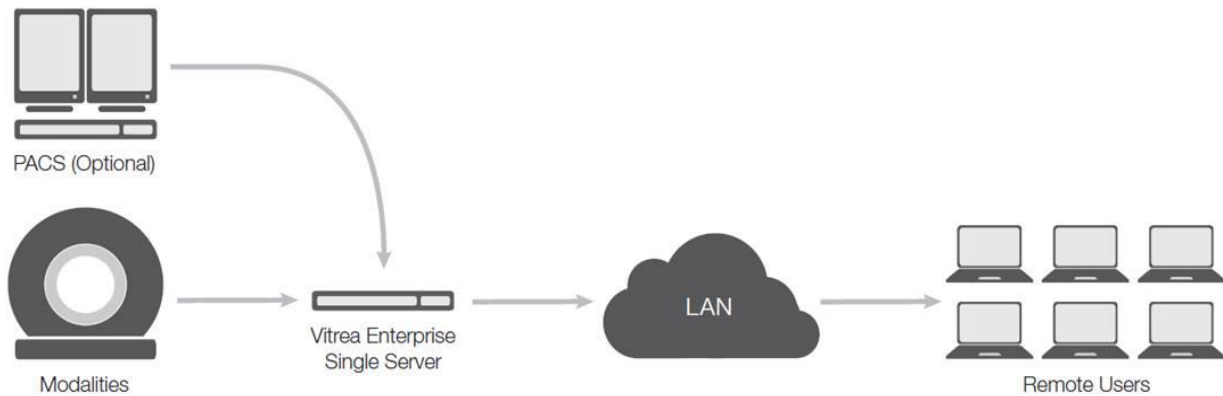
- Four User (4) Vitrea Advanced user deployment with integrated Automation platform.

Enterprise Single Server (Rack Mounted)

Six-User Servers (6) or Four-User (4) with Automation Platform

HPE DL380 Gen11 Server 8SFF (SKU# S2V44A) §

- Two (2) Intel Xeon Gold 6426Y 2.5 GHz Base / 4.10 GHz Turbo 4800MHz 16C CPU
- 192 GB (12x16GB) DDR5-4800 ECC RAM
- Four (4) 960 GB SATA 6 GB mixed-use SFF SSDs in RAID-10
- Three (3) NVIDIA Quadro RTX A4000E 16GB graphics cards
- Operating Systems:
  - Microsoft Windows Server 2022 Standard with Desktop Experience (Installed)
    - 2x (16 Core) Windows Server 2022 Standard additional license
  - Microsoft Windows Server 2019 Standard with Desktop Experience (Downgrade media included)
- Network: 1.0 Gbps network connection
- 2U Height
- Dual Power Supply – 1000 Watt 110 or 220 Volt
- iLO Advanced License

Enterprise Single Server (Tower Server)

Six-User Servers (6) Six-User Servers (6) or Four-User (4) with Automation Platform

HPE ML350 Gen11 Server SFF (SKU# S2V42A) §

- Two (2) Intel Xeon Gold 6426Y 2.5 GHz Base / 4.10 GHz Turbo 4800MHz 16C CPU
- 192 GB (12x16GB) DDR5-4800 ECC RAM
- Four (4) 960 GB SATA 6 G mixed-use SFF SSDs in RAID-10
- 3 NVIDIA Quadro RTX A4000E 16GB graphics cards
- Supported Operating Systems:
  - Microsoft Windows Server 2022 Standard with Desktop Experience (Installed)
    - 2x (16 Core) Windows Server 2022 Standard additional license
  - Microsoft Windows Server 2019 Standard with Desktop Experience (Downgrade media included)
- Network: 1.0 Gbps network connection
- 4U with rack conversion kit
- Dual Power Supply – 1000 watt 110 or 220 Volt
- iLO Advanced License

874578-B21 HPE ML350 Tower to Rack Conversion Kit (Sold Separately)

Microsoft SQL Server Express edition is provided at the time of the deployment for the Enterprise Single Server

Dell equivalent hardware using the same CPU, RAM, and vGPU Graphics card of which is performance equivalent hardware may be used. Visit https://dell.com/GPU for current supported graphics cards for Dell hardware. See vGPU section on following pages for Vitrea requirements.

Remote Access Client Computer Specification

Minimum Specification for Client

Minimum system to access Enterprise or Extend deployments
- 1 GHz 64-bit (x64) Processor with 2 or more cores are required.
- 4 GB of RAM
- 40 GB Win10/ 64 GB Win11 hard drive with at least 1 GB free space available for Thin Client installation.
- Internet Browser for PACS integrations (Chrome, Edge, Firefox)
- Resolutions:
  - Minimum 1280x1024
  - Recommended 1920x1200
  - Maximum 3840x2160 (4k)
- Supported Operating Systems:
  - Microsoft Windows 10 Professional 64-bit edition
  - Microsoft Windows 11 Professional 64-bit edition (Recommended)
  - Macintosh client access support – Microsoft remote desktop application 8.0.32 or later for Mac OS X 10.9
- Network: 1.0 Gbps network connection
- Bandwidth: Minimum 5Mbps bandwidth and 100ms latency.

End of life messaging
Windows workstation 10 support from Microsoft will end on October 14th, 2025. Canon Medical recommends that you plan for upgrading your Windows workstation OS accordingly. Vitrea Advanced Visualization version 7.16 will continue to operate on Windows 10, but we recommend that customers upgrade to newer version of Windows workstation OS for future compatibility, supportability, and security. https://learn.microsoft.com/en-us/lifecycle/products/windows-10-home-and-pro

Use of Virtual Desktop Infrastructure (VDI) or double remote desktop sessions to access the Vitrea software is not supported.

RDS CALs (device or user) must be purchased and are the responsibility of the customer to purchase, configure and install.

Recommended Hardware Technical Specifications
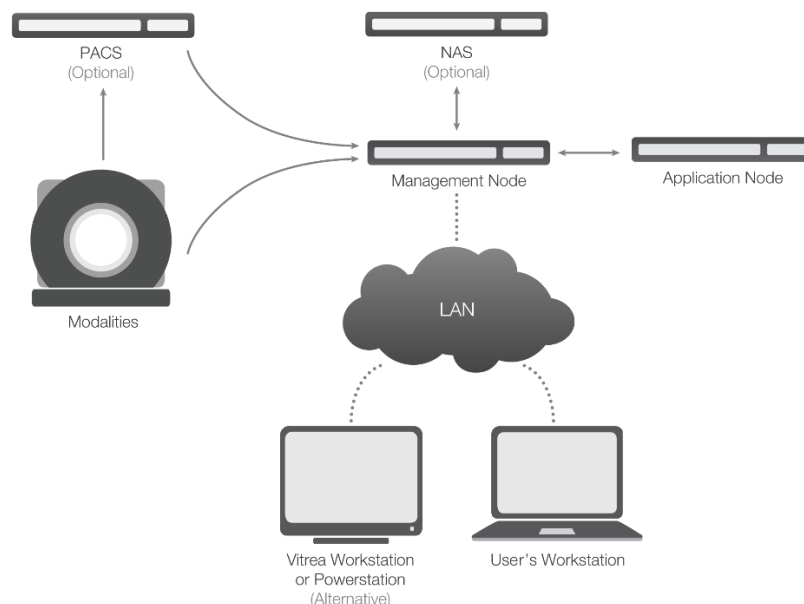
Hardware

Listed below are the validated hardware options for a Vitrea Enterprise deployment. Canon works with both HPE and Dell to ensure appropriately configured hardware. HPE servers may be purchased through Canon. If Dell hardware is preferred, it must be purchased directly.

SQL Server Deployment

SQL Server will be deployed on the Management server by default unless specified by the customer. Some customers may require SQL Server to be on its own server or within a SQL server cluster. This can be supported with this release. SQL Server Express with Advanced Services can be used in deployments of 6 concurrent users or less when deployed to the Management server only, some customer's workflows may require SQL Server Standard due to Microsoft's limitations on SQL Express.

SQL Server License and SQL CALs are the responsibility of the customer to purchase, configure and install.

External Storage

Patient storage will be installed on the Management server by default, unless specified by the customer. Any SMB2+ share used to store Vitrea Advanced Visualization data must supply 60-80 MB/sec SMB throughput with a response time of less than 2msec for both read and write operations (typical file size of 512 KB).

End of life messaging

Microsoft SQL Server 2014 support will end on July 9th, 2024. Canon Medical recommends that you plan for upgrading your Microsoft SQL Server accordingly. Vitrea Advanced Visualization version 7.16 will continue to operate with SQL Server 2014, but we recommend that customers upgrade to newer version of SQL Server for future compatibility, supportability, and security. https://learn.microsoft.com/en-us/lifecycle/products/sql-server-2014

Management Servers

HPE® ProLiant DL360 Gen 11 8SFF (SKU #S2H36A)
- One (1) 8-Core Intel® Xeon® Gold 5415+ processor 2.9 GHz Base/4.1 GHz Turbo 4400 MHz
- 64 GB of RAM (4x16 GB) DDR5-4400
- Four (4) 960 GB SATA 6 Gb mixed-use SFF SSDs in RAID-1 (250GB C:\ partition for OS, remaining space as E:\ partition for database, DICOM receive and patient data when external storage not present).
- Smart Array MR416i-o Gen11
- DVD-RW optical drive
- Two (2) 800-watt power supplies
- Supported Operating systems:
  - Microsoft Windows Server 2022 Standard with Desktop Experience (Installed)
    - 1x (16 Core) Windows Server 2022 Standard additional license
  - Microsoft Windows Server 2019 Standard with Desktop Experience (Downgrade media included)
- Network: 1.0 Gbps network connection
- SQL Server
  - Microsoft SQL Server 2016 Standard with latest SP's and CU's
  - Microsoft SQL Server 2017 Standard with latest CU's and General Distribution Release (GDR)
  - Microsoft SQL Server 2019 Standard with latest CU's and General Distribution Release (GDR)
- SQL Server License and SQL CALs (User and Device) are the responsibility of the customer to purchase, configure and install. SQL Server Express or Standard edition (x64) versions can be implemented.
- Heat dissipation typical 3067 BTU/hour
- 1U Height
- Dual Power Supply: 110 or 220 Volt
- iLO Advanced License

Dell equivalent hardware using the same CPU, RAM, and vGPU Graphics card of which is performance equivalent hardware may be used. Visit https://dell.com/GPU for current supported graphics cards for Dell hardware. See vGPU section on following pages for Vitrea requirements.

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Application Server(s)

Four-User Application Servers (4)

HPE ProLiant DL380 Gen11 8SFF (SKU #S2V43A) [*] [†] §

- Two (2) Intel Xeon Gold 6426Y 2.5 GHz Base / 4.10 GHz Turbo 4800MHz 16C CPU
- 128 GB of RAM (8x16 GB) DDR5-4800
- Four (4) 960 GB SATA 6 Gb mixed-use SFF SSDs in RAID 1
- Smart Array MR416i-o Gen11
- DVD-RW optical drive
- Two (2) NVIDIA Quadro RTX A4000E 16GB or equivalent Nvidia vGPU
- Two (2) 1000-watt power supplies
- Supported Operating systems:
  - Microsoft Windows Server 2022 Standard with Desktop Experience (Installed)
    - 2x (16 Core) Windows Server 2022 Standard additional license
  - Microsoft Windows Server 2019 Standard with Desktop Experience (Downgrade media included)
- Network: 1.0 Gbps network connection
- 1U Height
- Dual Power Supply: 1000 Watt 110 Volt or 220 Volt
- iLO Advanced License

Dell equivalent hardware using the same CPU, RAM, and vGPU Graphics card of which is performance equivalent hardware may be used. Visit https://dell.com/GPU for current supported graphics cards for Dell hardware. See vGPU section on following pages for Vitrea requirements.

Six-User Servers (6) Rack Mounted

HPE DL380 Gen11 Server 8SFF (SKU# S2V44A) §

- Two (2) Intel Xeon Gold 6426Y 2.5 GHz Base / 4.10 GHz Turbo 4800MHz 16C CPU
- 192 GB (12x16GB) DDR5-4800 ECC RAM
- Four (4) 960 GB SATA 6 GB mixed-use SFF SSDs in RAID-10
- Smart Array MR416i-o Gen11
- DVD-RW optical drive
- Three (3) NVIDIA Quadro RTX A4000E 16GB graphics cards
- Operating Systems:
  - Microsoft Windows Server 2022 Standard with Desktop Experience (Installed)
    - 2x (16 Core) Windows Server 2022 Standard additional license
  - Microsoft Windows Server 2019 Standard with Desktop Experience (Downgrade media included)
- Network: 1.0 Gbps network connection
- 2U Height
- Dual Power Supply – 1000 Watt 110 or 220 Volt
- iLO Advanced License

Dell equivalent hardware using the same CPU, RAM, and vGPU Graphics card of which is performance equivalent hardware may be used. Visit https://dell.com/GPU for current supported graphics cards for Dell hardware. See vGPU section on following pages for Vitrea requirements.

Microsoft SQL Server Express edition is provided at the time of the deployment for the Enterprise Single Server

Vitrea Advanced Visualization Virtualization Specification
Minimum Technical Specifications

Hypervisor
- VMware® vSphere 7.0+ with VMware Tools 11.3 or newer, and VMXNET3 drivers

Vitrea Management Server‡ §
- 18,000 MHz - up to 30 users
- 24 GB RAM
- 250 GB OS VMDK
- 50 GB DICOM receive VMDK
- Requires CPU of Haswell generation or newer and/or equivalent EVC mode
- Supported Operating systems:
  - Microsoft Windows Server 2019 Standard with Desktop Experience
  - Microsoft Windows Server 2022 Standard with Desktop Experience (Recommended)
- VMDK's must reside on storage that delivers at least 1500 IOPS and 80 MB/sec throughputs with less than 15msec latency.
- Specification does not include space for patient data. Additional storage must be allocated either locally or via NAS for study data, amount dependent on customer needs. Consult with your Canon representative if you have any questions.
  - NAS must provide 80MB/sec R/W throughput.
- Network: 1 Gb/sec uplink is required.

SQL Server
- 5900 MHz (vCPUs should be set as multi-core rather than multi-CPU)
- 4 GB RAM
- 250 GB OS VMDK
- 40 GB SQL VMDK
- Supported Operating systems:
  - Microsoft Windows Server 2019 Standard with Desktop Experience
  - Microsoft Windows Server 2022 Standard with Desktop Experience (Recommended)
- SQL Server
  - Microsoft SQL Server 2016 Standard with latest SP's and CU's
  - Microsoft SQL Server 2017 Standard with latest CU's and General Distribution Release (GDR)
  - Microsoft SQL Server 2019 Standard with latest CU's and General Distribution Release (GDR) (Recommended)
- Microsoft Server licenses and CALs, SQL Server license and CALs (user and device) and RDS CALs (user or device) are the responsibility of the customer to purchase, configure and install.
- Network: 1.0 Gbps network connection

End of life messaging
Microsoft SQL Server 2014 support will end on July 9th, 2024. Canon Medical recommends that you plan for upgrading your Microsoft SQL Server accordingly. Vitrea Advanced Visualization version 7.16 will continue to operate with SQL Server 2014, but we recommend that customers upgrade to newer version of SQL Server for future compatibility, supportability, and security. https://learn.microsoft.com/en-us/lifecycle/products/sql-server-2014

Vitrea Application Server - GPU Rendering[*]
(19K MHz, 24 GB RAM and One 4 GB User profile will be required / per user)
- 19,000 MHz (recommended Intel Xeon Processor E5/E7 v4 or better)
- 24 GB RAM
- 128 MB video memory
- 250 GB OS VMDK
- Requires CPU of Haswell generation or newer and/or equivalent for EVC mode
- Supported Operating systems:
  o Microsoft Windows Server 2019 Standard with Desktop Experience
  o Microsoft Windows Server 2022 Standard with Desktop Experience (Recommended)
- Network: 1.0 Gbps network connection
- GPU Acceleration options

CPU Calculations
To convert your MHz requirements into CPUS for your hypervisor environment do the following.
- Identify your CPU speed of your hypervisor environment. (Example: 2.4 GHz)
- Convert to MHz: 2.4 GHz converts to 2400 MHz
- Take the required MHz and divide by your CPU Speed and Round Up. (Example 18,000 MHz/2400 MHz = 7.5 CPUs. Then round up to 8 CPUs.
- Canon recommends that you assign all CPUs to one Processor with VMware

For GPU-based rendering/acceleration in a virtualized deployment you must select one of the following items under vDGA or vGPU:

Virtual Dedicated Graphics Acceleration (vDGA)
- NVIDIA Quadro P4000, P2000, P2200, or K2200, Tesla T4 GPUs
- Review the VMware compatibility guide for vDGA support with your hardware.

  VMware compatibility guide: https://www.vmware.com/resources/compatibility/search.php?deviceCategory-vdga

Data Center GPUs for Visual Computing (vGPU)
- NVIDIA Tesla P4/P6 GPU and NVIDIA T4 GPU requires ESXI 7.0 or better and NVIDIA vGPU software 16.X (up to 2 users per card), NVIDIA A10, NVIDIA A16, NVIDIA A40, NVIDIA L4, NVIDIA L40

Data Center GPUs for Visual Computing (vGPU)
- Data center GPU must be of the same generation/architecture as another Canon qualified/validated vGPU card.
- If the available GRID/data center GPU is not specifically listed as qualified by Canon at a minimum it must be of an equivalent generation/architecture
  o Tesla P Generation is the oldest supported generation of Data Center GPU that has been validated for use with Vitrea.
- Fixed Share or Equal Share scheduler must be set on vGPU Management.
- Data Center graphics card assigned to a VM must be a "Q" profile of at least 4GB framebuffer (xxx-4Q or larger).
- For performance reasons the quotient of the total number of CUDA cores available on the GRID/Data center GPU divided by the number of VMs assigned to that GPU must be greater than 900 (900 cores per user).
- Data center cards must be WDDM (Windows Display Drive Model) mode capable.
- For bare metal deployments please work with your Solutions Architect for correct system sizing.

Visit https://dell.com/GPU for current supported vGPU graphics cards for Dell hardware.

NVIDIA Virtual GPU Software Documentation https://docs.nvidia.com/grid/index.html

Data Center GPU License Requirements
- NVIDIA Virtual GPU Software License Server software is required.
- A Nvidia license system is required.
- Delegated License Service (DLS) is the recommended deployment of the NVIDIA license system to prevent loss of License server access verses with Cloud License Service (CLS) which can lose connectivity due to loss of internet access.
- NVIDIA RTX vWS licenses, license renewal, and software is the responsibility of the customer to purchase, configure and install as is ensuring all hardware is present on hardware compatibility lists, supported by OS and server vendors, etc.
  o Perpetual License(s) + SUMS are recommended to prevent licenses from expiring.
  o Virtual Dedicated Graphics Acceleration (vDGA) usage may require the use of vWS license with some data center GPU. Please review the NVIDIA Virtual GPU licensing guide for proper licensing.

NVIDIA Virtual GPU Licensing Guide: https://www.nvidia.com/content/dam/en-zz/Solutions/design-visualization/solutions/resources/documents1/Virtual-GPU-Packaging-and-Licensing-Guide.pdf

NVIDIA License System User Guide: https://docs.nvidia.com/license-system/latest/nvidia-license-system-user-guide/index.html

Multi-Modality Server
Up to Four Concurrent Users and 8000 Concurrently Rendered Slices (2 servers per Deployment max)
- 19,000 MHz (recommended Intel Xeon Processor E5/E7 v4 or better)
- 24 GB RAM
- 16 MB video memory
- 250 GB OS VMDK
- Requires CPU of Haswell generation or newer and/or equivalent EVC mode
- Supported Operating systems:
  - Microsoft Windows Server 2022 Standard with Desktop Experience (Recommended)
  - Microsoft Windows Server 2019 Standard with Desktop Experience
- Network: 1 Gb/sec uplink is required

Caution:
Canon considers the published virtualization specification to be the minimum for up to 22 Vitrea application servers with 2 Multi-Modality Servers based on extensive in-house testing. If no Multi-Modality servers will be deployed a customer may have up to 30 Vitrea application servers. Varied workloads, user expectations or environmental factors may necessitate increases in compute or storage allocations; please address any questions or concerns to your Canon technical contact.

External Storage
Any SMB2+ share used to store Vitrea Advanced Visualization data must supply 80 MB/sec R/W throughput with an SMB response time of less than 2 msec (typical file size of 512 KB).

Client
- See Remote Access Client Computer above for Clients

† Deploying the TOMTEC® application on multiuser system, requires a reload with VMware ESXi and verification of the correct number of Microsoft Server licenses, please discuss the required hardware configuration with your Vitrea Solution Architect.

‡The values listed are appropriate for a Vitrea enterprise deployment using remote NAS storage and a remote SQL Instance. Changes to deployment methodology and/or additional application nodes may result in changes to CPU, RAM, and disk requirements. Ask your Canon technical consultant for more information.

Vitrea Advanced Visualization with the enterprise deployment is compatible with current versions of VMware, and each component is designed to scale horizontally. These specifications are considered guidelines. Please consult with Canon to properly size a solution for your virtual environment and clinical needs. For more information, please contact the Canon Sales Operations Team at 952.487.9505 or visit mi.medical.canon.

§The specific models of CPU, RAM and GPU are used to assign resources and have a specific system performance. If different models of these resources are used, a performance issue with the system could result. If an end user purchases hardware from a vendor other than Canon, the end user is responsible for validating it with their hardware vendor or supplier to make sure it meets the required minimum hardware specifications. Any discrepancies will be the responsibility of the end user and Canon will not be responsible for resolution. Canon will work with all customers procuring hardware to review general specifications, but final validation resides with the hardware provider.