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Periodic Review

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AW Server 3.2

Powering advanced applications
across the healthcare enterprise

Continuous improvement in image acquisition capabilities are rapidly expanding your everyday clinical practice and providing new ways to improve patient care. As a result, a solution for manipulating and distributing access to volumetric images becomes as important as the acquisition modalities themselves.

AW Server is your platform supporting a broad portfolio of efficient and automated workflows that allow you to manage your time, equipment resources and costs while enhancing your team's ability to collaborate and provide diagnoses. The AW Server adds speed, efficiency, and diagnostic flexibility to your workflow. Its applications portfolio helps boost your diagnostic confidence as you analyze and evaluate exams from angiography to X-ray and almost everything in between. With its novel, easy to use, intuitive interfaces and reporting flexibility, the AW Server streamlines your workflow and helps make your entire department more productive.

Overview

AW Server 3.2 introduces an extensive portfolio of advanced applications that is virtualization-ready. With a local cache receiving DICOM images from your modalities and priors from your PACS, this streamlined advanced visualization workflow engine enables rapid preparation and communication of 3D results throughout the enterprise with access to innovative AW applications.

What's new

- Designed with VolumeShare 7, a multi-modality advanced visualization workflow solution that helps to enhance diagnostic confidence and productivity.
- Simplified user experience with powerful support for advanced applications workflows.
- Virtualization-ready platform provides enterprise-wide access to advanced processing applications.
- Support for dual monitors expands screen space to hang more views.
- New hardware supports expanded number of slices - up to 160,000.
- DICOM Direct Connect adds standards-based study retrieval from DICOM storage to expand and improve integration with your enterprise workflow



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Features

- Choice of IT-friendly rack mount chassis or virtualized deployment on VMWare® environment
- Receives DICOM® images from modalities and PACS
- Patient list for management of images on server cache.
- Advanced search for fast and easy search of a patient's exam history on PACS or any other DICOM-compliant device.
- Enhanced Quick Filters of the Patient List filters studies by Modality, Date, End Review Status or Exam Description.
- Offers pre-processing for automation and acceleration of workflows
- Powers advanced visualization and image processing applications
- Delivers diagnostic quality client software to PC and MAC®¹ clients and specific GE Healthcare CT consoles
- Dual monitor client support for symmetric displays²
- 2D Viewer for image display, manipulation, annotation, review.
- Integrated Filmer with enhanced flexibility to perform filming and data exporting tasks.
- End Review automates routine filming and networking tasks with just one click.
- Supports Saved State selection
- Provides common tools by 2D and 3D applications, e.g. Window/Level, Zoom, Pan, distance measurement, 2D ROI selection²
- Supports core AW Volume Viewer³ software
- Supports Advanced Applications² for automated post-processing vessel analysis and oncology with streamlined reporting
- Supports IT remote "lights-out" management
- 3rd Party PACS integration supports launching advanced applications directly from the PACS workflow.
- DICOM Direct Connect⁴ enables quick access to DICOM images by directly fetching data from a VNA, PACS, or Modality console which limits routing images to multiple destinations for post processing

Server Requirements

AW Server 3.2 may be purchased as a turnkey solution that includes off-the-shelf enterprise-class server hardware supporting concurrent processing of up to 160,000 slices.

Alternatively, AW Server 3.2 may be purchased for use with existing VMware installations for large enterprises that choose to centralize their infrastructure. AW Server 3.2 is also available as a virtual machine whose tight integration with GE Universal Viewer provides a single environment for 2D and advanced visualization radiology workflows.

Indication for Use

AW Server is a medical software system that allows multiple users to remotely access AW applications from compatible computers on a network. The system allows

networking, selection, processing and filming of multimodality DICOM images. Both the client and server software are only for use with off the shelf hardware technology that meets defined minimum specifications.

The device is not intended for diagnosis of mammography images. The device is not intended for diagnosis of lossy compressed images. For other images, trained physicians may use the images as a basis for diagnosis upon ensuring that monitor quality, ambient light conditions and image compression ratios are consistent with clinical application.

Notes:

- ¹ Requires purchase of Parallels® 10 and Windows® 7, Windows 8.1, Windows 10 32-bit or 64-bit software.
- ² Maximum resolution recommendations vary based on the network bandwidth and latency; maximum resolution might be limited by the specific clinical applications.
- ³ Requires purchase of appropriate application licenses.
- ⁴ Requires purchase of backend integration license. Only compatible with certain GE CT console check CT Scanner product data sheet



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Product Details

2D Viewer

The 2D Viewer is an application used to display, manipulate, annotate and review 2D images by a trained physician for diagnostic interpretations.

Display customization

Display customization allows the user to manage layouts to display data. Key benefits include:

- Allows modification of number of exams or series displayed to facilitate either single or multi-exam reviews.
- Standard layouts give you flexibility to tailor the image display from 1x1 to 8x8. The current layout is retained if the images are from the same modality and orientation.
- Annotation levels allow selection of the image information fields to display.
- Toolbar customization puts you in control of which buttons are displayed to meet your needs.

Study Navigation

- The navigator lets you assign a series to a view on the fly.
- Cine mode also provides temporal, spatial, or manual playback loops.
- With two exams or series loaded, Cine mode supports a side-by-side display format with synchronized playback loops for more efficient comparisons.

Image Review

- The initial image window and level setting is based on the DICOM header. Once displayed, several methods of adjusting image window and level are provided.
- Provides routine image manipulation features:
 - Flip/Rotate, Zoom, Pan, Magnifying Glass,
 - Inverse Video: inverts grayscale color map,
 - Display normal: lets you return the image to its default viewing parameters.

You can access the following features using a single mouse click directly on the image. Having these direct manipulation tools easily at hand gives you fast access with less distraction from your review task by eliminating the need to return to the graphical user interface controls.

- Several tools are available:
 - 2D distance
 - Angle

- Report cursor
 - Box ROI, elliptical ROI and free-hand ROI
- The program continuously updates statistics on the fly.

- The Annotation feature lets you highlight areas of interest by adding text and line/arrow pointers to any image feature.
- The Copy/Paste/Erase feature lets you copy/paste/remove any text or graphic placed on an image.
- Cross-reference indicates the position of the current slice over the scout or localizer or any other non-parallel series.
- Save lets you store a copy of the image as it appears on the screen for future review.
- The Key Images feature allows you to flag images and create key objects.

Batch Filming

The Print Series feature lets you automatically batch film an entire series with a single keystroke.

Filmer

The integrated Filmer enhances the efficiency of the review station and gives you greater filming and exporting flexibility. This feature supports two modes: the Mini Filmer mode and Full-Screen mode, which provides the ability for customization and film layout template creation.

Three key mechanisms give you flexibility:

1. Free format filming
2. DICOM structured reporting (SR)
3. Data export (HTML/PDF and JPEG, PNG, MPEG, or AVI)

With the Filmer you can easily extract significant images from any AW application (2D Viewer, Volume Viewer¹ etc.).

- You can film images individually by dragging and dropping to the on-screen Filmer, or by a single keystroke.
- Multiple image formatting lets you film multiple images in a single page frame
- With Film MID you can send multiple images to a single Filmer frame
- Batch filming is supported from applications that provide that capability (Print Series in the Viewer, Batch Film Protocols in Volume Viewer¹).

Communication between applications and the Filmer is accomplished in the Mini Filmer mode, which provides a minimized footprint. The Mini Filmer mode provides the following:

- Compatibility with Batch Filming from Volume Viewer¹
- Store and position images transferred from an



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application.

- Type of export (film, media, database).
- Rapid switching between Full-Screen Filmer and application.

The resultant electronic films become a quick summary of the patient study and radiological interpretation to be reviewed by clinicians and physicians. They can also be saved as independent files (DICOM SR and Secondary Captures) for teaching purposes.

The Filmer works on the What You See Is What You Get (WYSIWYG) approach and the electronic film can contain one or several pages with specific layouts for each page or all pages.

A flexible Edit Mode provides the ability to easily add, manipulate, format, or delete images from the film. Images can contain text and graphics from measurements and your annotations, and may be window/leveled, magnified, flipped, rotated, or cine. You can add additional annotation to the image in edit mode.

The Preview Mode displays the film as it will be printed or exported, taking into account the layout applied to each page and the compression level specified for non-DICOM exporting (JPEG/PNG and MPEG/AVI/QTVR).

Printing

- AW Server 3.2 includes printing from local client Windows application, post script, and Network DICOM Printing (B&W and color).

Volume Viewer Application

- The AW Server supports AW's 3D image analysis package with a broad range of multimodality image analysis tools including Multiplanar Reformat, Volume Rendering and Navigation.
- For detailed description of Volume Viewer features, please refer to the Volume Viewer Product Data Sheet.

Workflow Capabilities

- 3rd party PACS integration provides an interface to launch advanced applications directly from the PACS client in the same context¹.
- DICOM media export allows user to select exams/series/images within AW Server client and burn DICOM data to local (USB, CDRom or DVD)
- Ability to manually adjust image compression during user interaction including lossless to multiple lossy levels to improve performance for sluggish network situations. Static images will always be displayed at full resolution.
- Support for Saved State creation and selection.
- Common tools by 2D and 3D applications

(Window/Level, Zoom, Pan, Distance measurement, 2D ROI selection).

- AW Server 3.2 provides local DICOM cache allowing rapid launching of 3D applications and temporary storage of derived imagery.
- Allows you to save the exam to the PACS database in an intermediate post processing state at any time and then to restore it, allowing multiple radiologists or technologists to contribute to post processing studies.
- DICOM Direct Connect utilizes DICOM standards for data retrieval to improve your workflow environment by directly accessing DICOM data from multiple archival sources and loading that information into your desired AW application for analysis.⁴

IT and Security Capabilities

- Active directory integration allows enterprise level user authentication. Directories supported include Microsoft® Active Directory® (MSAD) and other LDAP authentication services
- Provides a centralized user management system in case integration with enterprise directory is unavailable.
- Centralized web-based administration interface for configuration, diagnostics, usage and day-to-day server management.
- Provides group privileges for full access to exams or to enforce mandatory exam search by configurable criteria.
- Centralized Enterprise Audit trails capture user access to patient data using industry standard protocols: IHE ATNA compliant audit messages (RFC3881), TCP, BSD Syslog, and Reliable Syslog (Cooked profile Experimental) transport to third party audit repositories. Audit logs are kept on local storage and managed with log rotation.
- Display of annotations and patient protected information can be controlled for privacy
- Provides support for deployment of client software through Microsoft Windows® Installer (MSI), making it easy to manage enterprise client PCs.
- Features a stateful server firewall to track network connections and detect malicious intrusion attempts.
- Allows thin client access over the internet with either http port (80) or encrypted https port (443).³

Notes

¹ Requires purchase of separate application licenses.

² Please refer to Volume Viewer datasheet for details.

³ For security reasons, GE Healthcare always recommends VPN access to the server.

⁴ Not all AW applications will support DDC, check with your sales representative for the latest list



Performance

Performance and interactivity of AW Advanced Applications depends on the network bandwidth, latency and client workstation configuration. For optimal performance, a minimum network bandwidth of 40 Mbps with a latency of 2.7ms or lower is required. High bandwidth such as a hardwired local area network (LAN) permits faster interactions at lower compression ratios.

AW Server may also be used over WIFI or WAN/Internet although performance will depend on round-trip latency between the client workstation and the server. A minimum of 3 Mbps bandwidth per client with latency less than 50ms is recommended for reasonable performance when compression is used.

To optimize performance, GE Healthcare's "Smart Compression" technology applies a user-selectable level of compression to displayed images only while you page, browse or rotate the images. Images are displayed automatically at full fidelity once user interaction stops. A clear visual display on the images indicates when compression is being applied. The device is not intended to meet diagnostic quality criteria with lossy-compressed images.

The AW Server 3.2 supports the following compression levels:

- Lossless
- Lossy 15:1 (compression ratio is 15:1)
- Lossy 22:1 (compression ratio is 22:1)
- Lossy 33:1 (compression ratio is 33:1)

Turn-Key Server Specifications

AW Server 3.2 is deployed on one of two physical server configurations supporting three sizes: L, XL and XXL. The L size supports 3 active concurrent users¹ sharing 40,000 slices in memory. The XL size supports 6 concurrent users sharing 80,000 slices and the XXL up to 12 users sharing 160,000 slices. Turn-key server hardware specifications listed here are minimum server hardware capabilities. Specific server hardware is subject to change without prior notice. AW Server 3.2 software is also supported on some previously deployed AW Server systems although slice counts⁵ may be restricted by available memory.

Server Hardware L

Processor	2 Intel® Xeon® E5-2640 10-core CPUs
Memory	64GB RAM ⁵ supporting 40,000 slices
Disk drive	300GB RAID -1 OS disk, 2.4TB RAID-6 storage disk
Network	4 1-Gbps NICs
Management	Dedicated Embedded Lights Out Manager
Power	Fully redundant power and cooling
OS	GE HELIOS 6

Server Hardware XL, XXL

Processor	2 Intel Xeon E5-2697A 16-core CPUs
Memory	256GB RAM ⁵ supporting 80,000 (XL) or 160,000 (XXL) slices
Disk drive	300GB RAID-1 OS disk, 7.2TB RAID-6 storage disk
Network	4 1-Gbps NIC
Additional NIC:	2 ports 10Gbps
Management	Dedicated Embedded Lights Out Manager
Power	Fully redundant power and cooling
OS	GE HELIOS 6

Virtualized Server Specifications

AW Server 3.2 is available for deployment as a software only system on existing VMware installations. The enterprise node configuration in conjunction with DICOM Direct Connect enables the AW Server to scale horizontally to support up to a 30 node cluster offering. This provides a flexible enterprise solution that can grow as your needs for advance visualization expand. Customers must provide a VMWare environment for which CPU and RAM overcommit are not recommended. The use of hyperthreading is not recommended and if enabled may result in performance degradation for compute-intensive features of AW Server. Hard disk drives are required to store all VM data with thick provisioning.

- Intel Xeon CPU with SSE® 4.1 (45 nm or better)
- VMware ESXi® 5.0u1, 5.1, 5.5, 6.0,6.5

VM Configuration Requirements

Virtual machines supporting AW Server must be configured with the following resources:

L: 8 core vCPU, 24GB vRAM, 2 NICs, 70GB OS, 2TB vHDD (IOPS 800 or better). L system supports up to 3 concurrent users¹ with 8,000 shared slices

UV-L: Universal Viewer integration requires 8 core vCPU, 32GB vRAM, 2 NICs, 70GB OS, 2TB vHDD (IOPS 800 or better). This deployment supports up to 4 concurrent users¹ with 16,000 shared slices

ENT-L: Enterprise Node integration requires 8 cores vCPU, 64GB vRAM, 2 NICs, 70GB OS. This deployment supports up to 4 concurrent users¹ with 40,000 shared slices per node.

XXL: 24 core vCPU, 64GB vRAM, 2 NICs, 70GB OS, 2TB vHDD (IOPS 800 or better). XXL system supports up to 12 concurrent users¹ with 40,000 shared slices and can also be tightly integrated to support Universal Viewer.

Server Licensing

AW Server 3.2 may be purchased either as a single physical installation or as a virtual installation. Application licensing is structured to allow easy addition of clinically specific workflow tools. Applications licenses are sold separately, allowing you to purchase only what you need to support your facility.

Client Requirements

AW Server delivers user-installable client software to enable access to applications and data on the server. The minimum HW configuration is as follows:

Processor	2.33GHz Pentium®4 minimum, Pentium dual core processors recommended for optimal performance
Memory	1024 MB minimum
Disk drive	250MB free space available
Network card	100 Mbps minimum (1000 Mbps recommended)
Internet connection	Customer-provided IPSEC VPN, for internet/WAN operation
Mouse	Two or three-button mouse. Three button mouse suggested for best use of functions

Monitors

AW Server 3.2 supports identical horizontally aligned dual monitor clients with a recommended combined resolution of 4MP (2x2MP), larger monitors may be used³. Advanced applications may take advantage of the dual screen support to allow larger or more numerous views.

Screen resolution

Minimum: 1024 x 768 with full color (24 bit)

Recommended: dual 2MP (1600 x 1200) or a single 3MP (1536 x 2048)

Maximum: 6MP combined³

Supported client OS software

- Windows 7 SP1 32 and 64 bit,
- Windows 8.1 32 and 64bit
- Windows 10 32 and 64 bit
- Mac Parallels® (Mac OS X 10.10, Parallels 10. Windows 7 SP1 8.1 and 10, 32 & 64 bit)

User interface languages

- Chinese⁴
- Danish
- Dutch
- English
- Finnish
- French
- German
- Italian
- Japanese⁴
- Korean⁴
- Norwegian
- Portuguese
- Russian⁴
- Spanish
- Swedish

Keyboard layouts

- Danish
- Dutch
- Finnish
- French
- Canadian French
- German
- Italian
- Norwegian
- Portuguese
- Spanish
- Swedish
- United States English
- United Kingdom English

Standards

- DICOM Storage Service Class for RT, CT, MR, CR, X-ray (Angio and R&F), Digital X-ray (DX), MG, NM, PET, Key Image Notes (KIN), Structured Reporting (SR), Grayscale Softcopy Presentation State (GSPS), U/S, Secondary Capture, Secondary Capture Color DICOM Image Objects.
- DICOM Service Class User (SCU) for image send and Service Class Provider (SCP) for image receive
- DICOM Storage Commitment Service Class User (SCU)
- DICOM Print (Color and B&W)

Regulatory Compliance

This product complies with European Council Directive 93/42/EEC Medical Device Directive as amended by European Council Directive 2007/47/EC. This product or its features may not be available in some countries or regions. Please contact your sales associate

Rx Only



Notes

¹ Number of supported clients depends on the server configuration, purchased licenses, network and client monitor resolution.

² Capacity calculated at the advertised value of the hard disk manufacturer, available disk space might vary.

³ Maximum resolution recommendations vary based on the network bandwidth and latency; maximum resolution might be limited by the specific clinical applications.

⁴ Limited to Windows clients only, not available on Linux clients.

⁵ Not all hardware platforms will support or be upgradeable to all RAM amounts or slice counts.

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Manufacturer address:

GE Medical System SCS
283, rue de la Minière
78530 Buc
France

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