

IMS Web Viewer User Manual

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IMS

The Power of Partnering

Revision History

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Proprietary Notice

The information contained in this document is proprietary to IMS and shall be treated as confidential. It is presented to the client for evaluation purposes only. It should thus be distributed internally to members of the clients' personnel on a need-to-know basis only. It should not be copied and/or distributed otherwise to any other persons or companies without the express written consent of IMS.

Important notice

Caution

Computer viruses and system updates may prevent the IMS Web Server (Server) from functioning properly. We recommend that you protect the Server with anti-virus software and disable system updates. Data may be lost if the Server is improperly shut down (i.e. power failure). We recommend that you install an Uninterruptable Power Supply (UPS) to prevent unwanted powering down of the Server. DICOM images will be copied from the DICOM Archive to the Server when requested by the user or when triggered by the “pre-fetch” functionality. These images are stored in the local disk for a period of time, which will depend on system usage. Once the Server is required to display a study where the images are still present on the disk, it will check with the DICOM Archive that the total image number is consistent with the images present; these images will be reused if this is the case. The server will not check the image contents, pixel data, or DICOM tags.

Warning

Lossy images

The Viewer may display “lossy” images, as outlined in the section, “Viewer layout

The Viewer layout includes three different areas (**Fig. 1**):

1. Toolbar (red): the area in which all tools that can be applied to the image are displayed.
2. Screen (yellow): the area in which images and Cine controls are displayed.
3. Thumbnail Panel (blue): the area in which thumbnails of all images in the selected study are displayed.

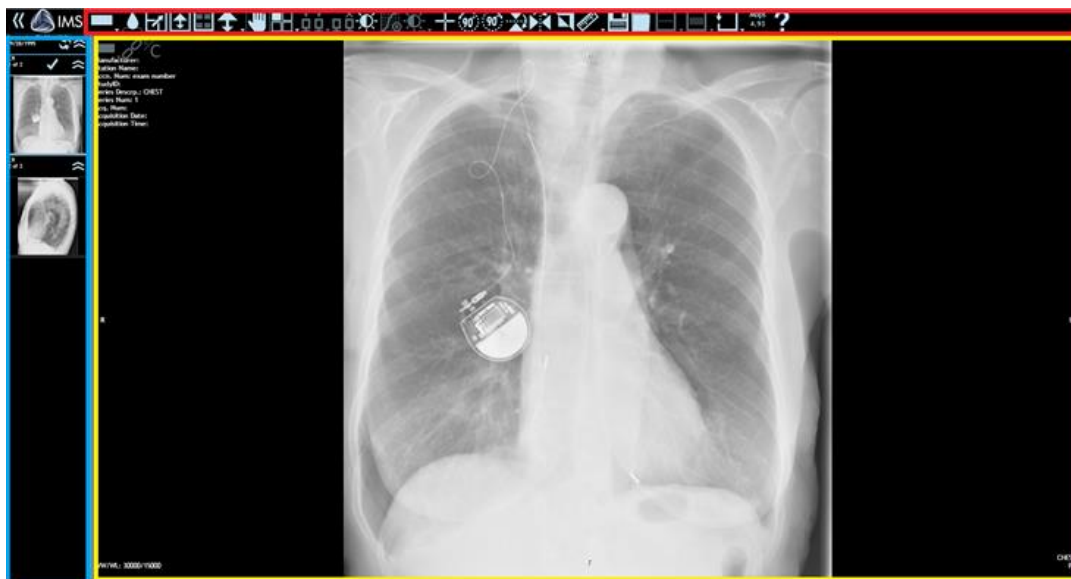


Figure 1. The three different areas of the Viewer. The toolbar (red), screen (yellow), and thumbnail panel (blue) are shown here.



Refresh icon – this icon is displayed on the top right corner of the screen if new images are available for the series in the DICOM Archive. Selecting this icon retrieves the new images.

Stacks

Studies are composed of images that can be grouped into series called stacks. A stack can comprise a single series, multi-frame images, or single images depending on the Server settings. One stack is represented by one thumbnail group in the thumbnail panel (**Fig. 1, blue region**). There is always a current stack and a current image at any point in which the Viewer is open. The current stack is the stack on which the stack tools will operate on (**Fig. 1, upper left corner in yellow region**). The current stack can be identified by a blue border around its thumbnail group in the thumbnail panel. Displayed from the current stack is the current image, which is the image that the tools will operate on (**Fig. 1, red region**). The current image is bordered by a blue border in the main screen. In the thumbnail panel, the current image is identified also by a blue border within its thumbnail group.

Thumbnail panel

The thumbnail panel is displayed on the left side of the Viewer (**Fig. 1, blue region**). Both the current stack and the current image thumbnail are marked by a blue boundary (**Fig. 2**). The thumbnail panel can be scrolled through and individual thumbnails can be selected or dragged to be viewed in the main screen. The thumbnails are grouped by study and further sub-grouped into series. The display format (default versus single) of the thumbnails depends on:

- User preferences – option for single thumbnail display.
- Device – tablet devices only display a single thumbnail per series.
- Modality – CR and DX only display a single thumbnail per image.

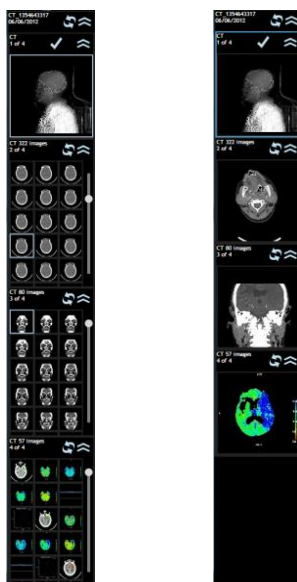


Figure 2. Thumbnails modes.
Default mode (left) versus
single mode (right).

Layout management

The Viewer has two levels of layouts: screen layout and stack layout.

Screen layout

The screen layout refers to the layout of the main screen (**Fig. 1, yellow region**), which can be displayed as one tile (1x1) or several tiles (1x2, 2x2, etc.). This layout can be changed by selecting the screen layout tool shown below. The tool allows splitting of the screen into ($n \times n$, $n = 1, 2, 3$, etc.) tiles of equal size. The current implementation of the Viewer limits the maximum number of columns and rows to be no more than 6.



Screen layout tool. Selecting the arrow allows selection of a number of layouts.

Stack layout

Within each tile of the screen layout is an option to further subdivide the tile to display more images within a stack called the stack layout (**Fig. 3**). This layout can be changed by selecting the stack layout tool shown below. The tool allows splitting of the selected screen tile into ($n \times n$, $n = 1, 2, 3$, etc.) tiles of equal size. The current implementation of the Viewer limits the maximum number of columns and rows to be no more than 6.



Stack layout tool. Selecting the arrow allows selection of a number of layouts.

The user can scroll through the stacks with the following tools:



Next stack tool



Previous stack tool

In order to display a stack on a specific screen tile:

- Select the stack by selecting the appropriate thumbnail group in the thumbnail panel.
- Drag and drop the thumbnail group into the desired screen tile.
- Click the desired image within the stack and it will load into the selected screen tile.

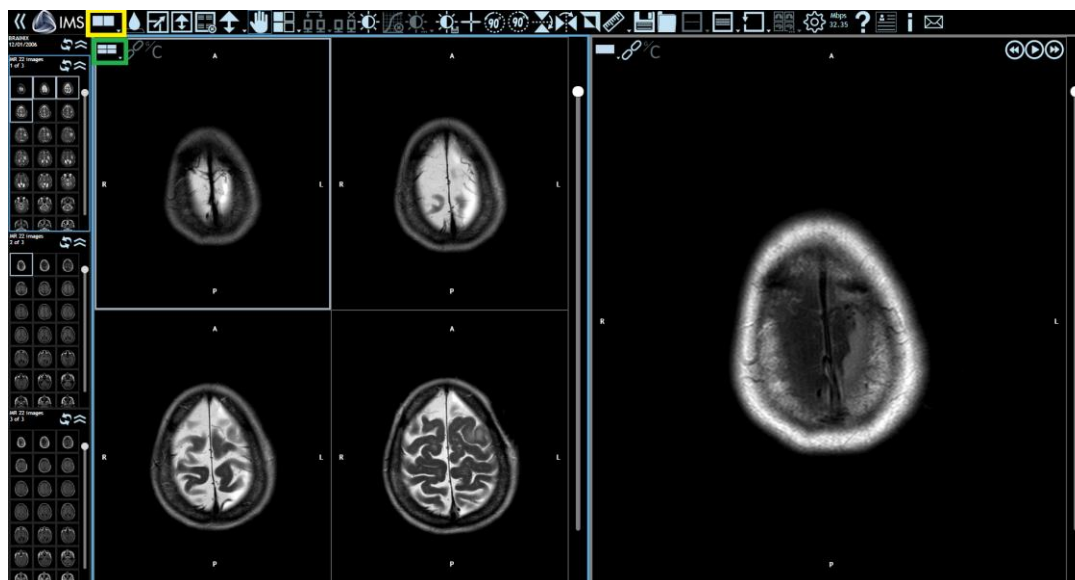


Figure 3. Viewer showing a 1x2 screen layout. The first tile shows a 2x2 stack layout (left) and the second tile shows a 1x1 stack layout (right). Indicator boxes show the screen layout tool (yellow) and the stack layout tool (green).

Overlay display

The overlay display tools shown below allow the user to show/hide image information including the institution name, patient name, patient ID, study ID, series description, acquisition date and time, etc.



Enable overlay – shows all image information.



Disable overlay – hides all image information.

Download speed

The Viewer displays the effective download speed from the Server in the toolbar. This allows the user to judge the quality of the internet connection.



Transfer Rate indicator

Lossy and lossless display Lossy images are meant to be a preview and may hide relevant anatomical details. Be sure to wait for the “Lossy” indicator to disappear before reviewing the images.

Display contrast and resolution

The contrast and resolution of the display depends on the device used, lighting conditions, and the browser used. The Viewer is intended to be used at a minimum device resolution of 1280x1024.

Date format

The Viewer displays the date in the format mm/dd/yyyy.

About screenshots in this document

All patient information has been anonymized or obscured prior to inclusion in this document.

Due to parallel development of this document and the product as well as customization of the Viewer, discrepancies may exist between the Viewer layout of the product and that depicted in screenshots in this document. Any such discrepancies will be minor and should not affect the user's understanding of the system.

About features and tools

All relevant features and tools have been described in this document; however, some features and tools may not be available for use in all installations.

Liability disclaimer

The IMS Web Viewer is intended to be operated by qualified personnel in accordance with applicable national and local standards. Access to the Viewer and equipment is restricted to authorized users by passwords or other identification means. It is the responsibility of the hospital or imaging center to ensure that only authorized users are given the password. The IMS Web Viewer is a reference viewer and it is not intended for diagnostic usage.

About IMS Web Viewer

About the software

The IMS Web Viewer (Viewer) is a multi-modality viewer, which allows for the display and manipulation of medical images using an Internet/web browser. It is designed to give easy and economic access to multi-modality softcopy images in multiple locations within and outside the hospital. The Viewer is intended to be used by a health professional that is capable of operating a computer device (including tablet) and understanding the functionalities and interface of the application. The Viewer displays patient studies and other patient data, but does not interpret or provide a diagnosis. It is not intended for diagnostic usage.

About the installation of the IMS Web Server

This user manual does not provide instructions on the installation of the IMS Web Server (Server). To install and configure the Server, please refer to the “iNetTK Web Server Installation” user manual.

Browser support

HTML5 browser support is required to operate the Viewer. If the user attempts to use an unsupported browser, the Viewer will notify the user that the browser is not supported and will not display any images.

DICOM support

The Viewer supports the following modalities: CT, MR, US, CR, DX, and XA.

The Viewer supports the following Transfer Syntaxes:

- Implicit VR Little Endian (1.2.840.10008.1.2)
- Explicit VR Little Endian (1.2.840.10008.1.2.1)
- JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14) (1.2.840.10008.1.2.4.70)
- JPEG Baseline (Process 1) (1.2.840.10008.1.2.4.50)
- JPEG 2000 Image Compression (Lossless Only) (1.2.840.10008.1.2.4.90)
- JPEG 2000 Image Compression (1.2.840.10008.1.2.4.91)

The Viewer supports the following Photometric Interpretations:

- MONOCHROME1
- MONOCHROME2
- YBR_FULL
- RGB

System overview

The Viewer supports the following set of functionalities:

- Administrator functionalities: the Administrator role allows for Viewer support. The Administrator is able to create and delete user accounts and audit user activities.
- Study selection: the user is able to select studies for viewing and select studies from the DICOM archive.
- Viewing functionalities: the user is able to view studies using a browser with HTML5 support.

Application interface

The application interface is designed to be simple and easy to understand. The application can be used from a desktop with a mouse interface or from a tablet with a touch interface. The application supports the same set of functionalities on both interfaces; however the interface may differ slightly on a desktop compared to a tablet. For example, some of the commands on a touch interface are implemented with a multi-touch gesture rather than a button.

Viewer URLs

The default Viewer URLs are listed below. These can be changed during the installation and configuration of the Server.

- Administrator URLs:
 - For User Management: <https://servername/Im viewer/Account/UserManagement>
 - For HIPAA Log: <https://servername/Im viewer/HipaaLog>
- User URL:
 - <https://servername/Im viewer>
 - <https://servername/Im viewer/UserPreference>
 - <https://servername/Im viewer/ServerStatus>

Help tool

The Help tool can be found throughout the Viewer. The icon shown below directs the user to the functions of the various tools available.



Help tool

IMS Web Viewer

Introduction

The Viewer displays images within the browser window and allows the user to modify the display settings of these images in an interactive manner. These images are first retrieved from the Server and all image manipulation is then performed without requesting data from the Server. Note that the device in use may not have sufficient memory to store all images from particular studies due to the large number of associated images.

Viewer layout

The Viewer layout includes three different areas (**Fig. 1**):

4. Toolbar (red): the area in which all tools that can be applied to the image are displayed.
5. Screen (yellow): the area in which images and Cine controls are displayed.
6. Thumbnail Panel (blue): the area in which thumbnails of all images in the selected study are displayed.

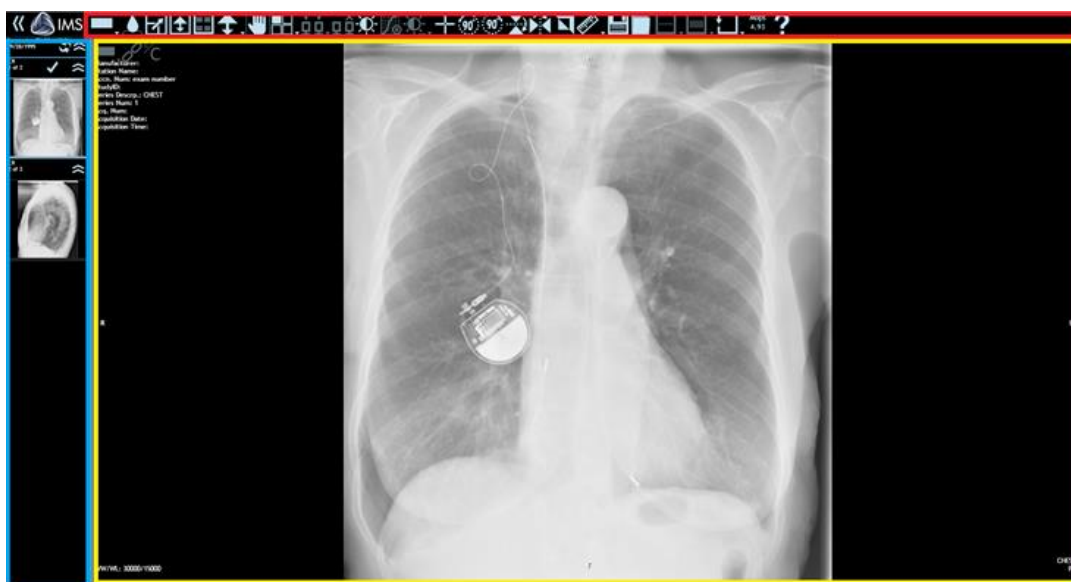


Figure 1. The three different areas of the Viewer. The toolbar (red), screen (yellow), and thumbnail panel (blue) are shown here.



Refresh icon – this icon is displayed on the top right corner of the screen if new images are available for the series in the DICOM Archive. Selecting this icon retrieves the new images.

Stacks

Studies are composed of images that can be grouped into series called stacks. A stack can comprise a single series, multi-frame images, or single images depending on the Server settings. One stack is represented by one thumbnail group in the thumbnail panel (**Fig. 1, blue region**). There is always a current stack and a current image at any point in which the Viewer is open. The current stack is the stack on which the stack tools will operate on (**Fig. 1, upper left corner in yellow region**). The current stack can be identified by a blue border around its thumbnail group in the thumbnail panel. Displayed from the current stack is the current image, which is the image that the tools will operate on (**Fig. 1, red region**). The current image is bordered by a blue border in the main screen. In the thumbnail panel, the current image is identified also by a blue border within its thumbnail group.

Thumbnail panel

The thumbnail panel is displayed on the left side of the Viewer (**Fig. 1, blue region**). Both the current stack and the current image thumbnail are marked by a blue boundary (**Fig. 2**). The thumbnail panel can be scrolled through and individual thumbnails can be selected or dragged to be viewed in the main screen. The thumbnails are grouped by study and further sub-grouped into series. The display format (default versus single) of the thumbnails depends on:

- User preferences – option for single thumbnail display.
- Device – tablet devices only display a single thumbnail per series.
- Modality – CR and DX only display a single thumbnail per image.

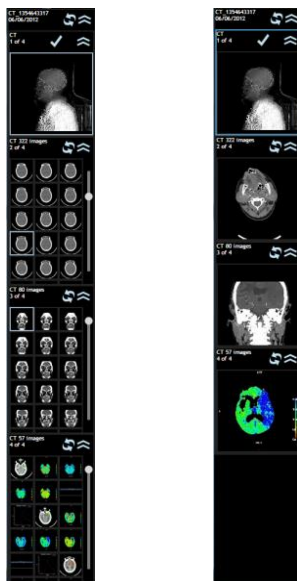


Figure 2. Thumbnails modes.
Default mode (left) versus
single mode (right).

Layout management

The Viewer has two levels of layouts: screen layout and stack layout.

Screen layout

The screen layout refers to the layout of the main screen (**Fig. 1, yellow region**), which can be displayed as one tile (1x1) or several tiles (1x2, 2x2, etc.). This layout can be changed by selecting the screen layout tool shown below. The tool allows splitting of the screen into ($n \times n$, $n = 1, 2, 3$, etc.) tiles of equal size. The current implementation of the Viewer limits the maximum number of columns and rows to be no more than 6.



Screen layout tool. Selecting the arrow allows selection of a number of layouts.

Stack layout

Within each tile of the screen layout is an option to further subdivide the tile to display more images within a stack called the stack layout (**Fig. 3**). This layout can be changed by selecting the stack layout tool shown below. The tool allows splitting of the selected screen tile into ($n \times n$, $n = 1, 2, 3$, etc.) tiles of equal size. The current implementation of the Viewer limits the maximum number of columns and rows to be no more than 6.



Stack layout tool. Selecting the arrow allows selection of a number of layouts.

The user can scroll through the stacks with the following tools:



Next stack tool



Previous stack tool

In order to display a stack on a specific screen tile:

- Select the stack by selecting the appropriate thumbnail group in the thumbnail panel.
- Drag and drop the thumbnail group into the desired screen tile.
- Click the desired image within the stack and it will load into the selected screen tile.

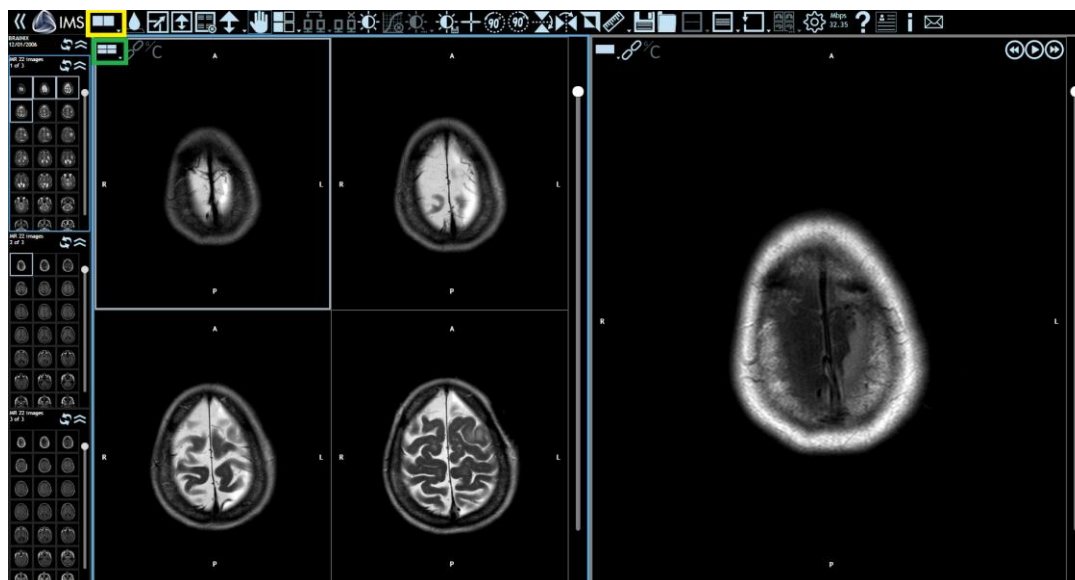


Figure 3. Viewer showing a 1x2 screen layout. The first tile shows a 2x2 stack layout (left) and the second tile shows a 1x1 stack layout (right). Indicator boxes show the screen layout tool (yellow) and the stack layout tool (green).

Overlay display

The overlay display tools shown below allow the user to show/hide image information including the institution name, patient name, patient ID, study ID, series description, acquisition date and time, etc.



Enable overlay – shows all image information.



Disable overlay – hides all image information.

Download speed

The Viewer displays the effective download speed from the Server in the toolbar. This allows the user to judge the quality of the internet connection.



Transfer Rate indicator

Lossy and lossless display

Once the user accesses an image, the Viewer will first download both a preview and pixel data of the DICOM image. The preview image is “lossy”, which is clearly indicated on lower left corner of the image. The Viewer allows the manipulation (window level, pan, zoom, gray scale, inversion, etc.) of both the

preview and lossless image. Therefore, the user can access and review the image before full pixel data is downloaded. This “Lossy” label disappears when full pixel data is downloaded after which a full resolution (lossless) image will be displayed (Fig. 4).

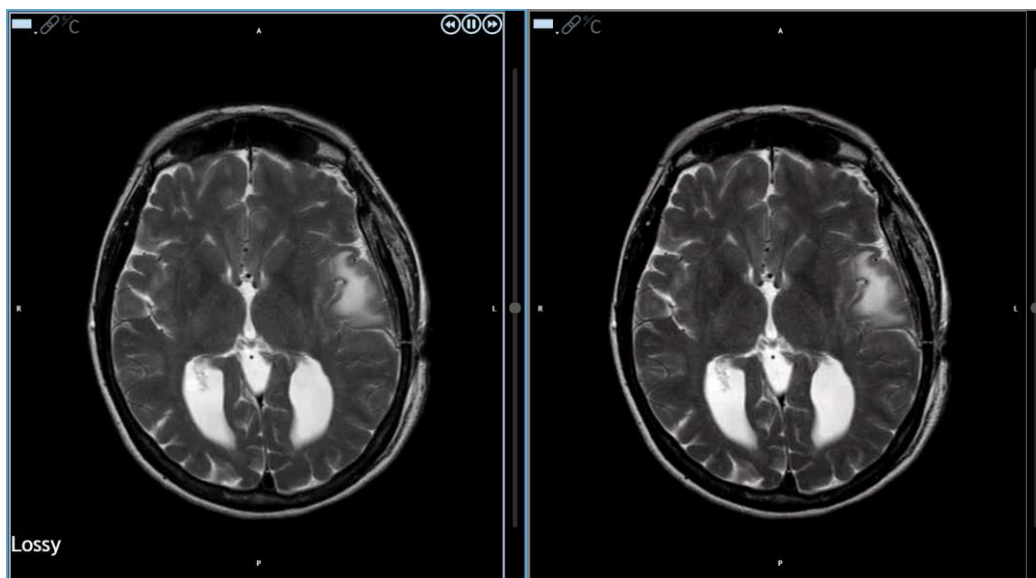


Figure 4. Lossy image (left) versus full resolution image (right).

In certain cases, the original DICOM Archive image is actually lossy. When this happens, the Viewer will display “DICOM Image Lossy” on the lower left corner of the image (Fig. 5).

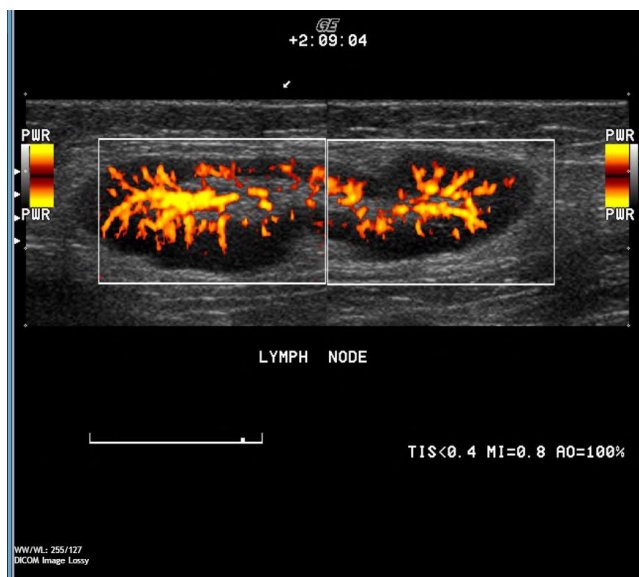


Figure 5. A lossy DICOM image.

Full screen mode

The current image can be displayed at full browser size using the tools shown below. This feature expands the image over the thumbnail panel, but leaves the toolbar accessible. The same tool functionalities are also available while in full screen mode.



Enter full screen mode.



Exit full screen mode.

Fill screen tool

The Fill tool can be used to quickly display several series on the main screen by first selecting the desired screen layout and then selecting the Fill tool shown below. This tool will load stacks in order of display in the thumbnail panel such that the first stack will load if the screen layout is set to 1x1, the first 4 stacks will load if the screen layout is set to 2x2, etc. Additionally, the fill tool can be used to view images within a stack.



Fill tool

Tool scope

The images on which the tools are applied depend on the scope of view. Shown below are the three levels of scope that the user can select.



Image scope. Tools are applied to the selected image only.



Series scope. Tools are applied only to all images within the selected stack.



Screen scope. Tools are applied to all images within all stacks on the screen.

Image manipulation

The image manipulation tools shown below allow changes to be made to the display settings (window level, pan, zoom, etc.) of the image within the Viewer. When an image has been manipulated and placed

in another screen tile, the changes are conserved because these display settings are associated with the image. However, the display settings are not kept when the user closes or changes the web page.



Pan – moves the image around the screen.



Zoom – changes the magnification of the image.



Window level – changes the brightness (vertical movement) and contrast (horizontal movement) of the image.



Auto window level – applies an optimized brightness/contrast setting for the image.



Save window level – saves the current window level settings.



Load window level – loads a saved window level setting.



Magnifying glass – magnifies the region around the mouse tip when click/touch is held down.



Enable Look-Up Table (LUT) display – converts image values based on an existing LUT that is associated with a DICOM image.



Disable LUT display – revert the changes to the original image.



Invert – inverts the pixel intensities.

Image orientation

The image orientation tools shown below allow changes to be made to the orientation of the image.



Vertical mirror – flips the image on its horizontal axis.



Horizontal mirror – flips the image on its vertical axis.



Rotate 90 degrees right – rotates the image by 90 degrees clockwise.



Rotate 90 degrees left – rotates the image by 90 degrees counterclockwise.

Resetting changes

The reset tools shown below allow reversion of the display settings to the original settings of the image.



Reset window level



Reset orientation



Reset pan and zoom



Reset all display settings (window level, orientation, pan, zoom)

Measurement

The measurement tools shown below allow the user to create/edit/delete markings (drawing, text, measurements). These changes only apply to the current image regardless of scope.



Line – measures the length of a straight line.



Area – measures the area of a drawn region.



Arrow – draw an arrow on the image.



Ellipse – measures the area and average intensity of the drawn region.



Circle – measures the radius, area, and average intensity of the drawn region.



Calibrate image by units – sets a linear measurement based on a selected pixel range.



Calibrate image by percentage – changes the selected measurement to a percentage value.



Angle – measures the angle between two straight lines that intersect.



Cobb angle – measures the angle between two straight lines that do not intersect.



Text – adds annotations to the image.



Show all annotations – shows all markings on the image.



Hide all annotations – hides all markings on the image.



Edit annotation – allows changes to the shape/size/position of markings on the image.



Delete one annotation – erases the selected marking on the image.



Delete all annotations – erases all markings on the image.



Pixel intensity – displays the pixel value at the point at which the click/touch is held down.



Next annotated image – displays the next annotated image.



Save annotation – saves the selected annotations for that image.



Load annotation – loads a saved annotation for the same image.

Zoom

The zoom tools shown below allow the user to resize the image.



True size zoom – displays the image with a size ratio of 1:1.



Fit to screen zoom – displays the image to fit the entire viewing area of the tile.

Cine mode

The Cine tools shown below allow the user to play a “video” of all images within a stack. The tools are displayed on the top right corner of each screen tile only when the stack layout is set to 1x1. Cine mode currently supports stacks with multi-frame images or same image sizes (i.e. MR and CT scans, etc.). While Cine mode can be activated on stacks that display lossy or lossless images, video behaviour will change depending on image quality. Playing Cine on stacks with lossless images results in play behaviour that moves forwards through the stack and then backwards. In contrast, playing Cine on stacks with lossy images results in faster play behaviour that only moves forward through the stacks with the “Lossy” label appearing on the lower left corner of the image. This is due to the quick retrieval of preview images versus full resolution images. Note that the “Lossy” label always appears during Cine play of multi-frame stacks regardless of image quality.



Play Cine



Pause Cine



Increase Cine speed



Decrease Cine speed

Synchronized scrolling

Two or more stacks can be scrolled in synchronization once they are “linked”. The link and unlink tools are shown below. Synchronized scrolling is only available when the stack layout is 1x1, but can function on any stack combination regardless of differences in quantity, quality, or size of the images.



Stack is unlinked. Click to link.



Stack is linked. Click to unlink.

Scroll tool

The Scroll tool shown below allows the user to view single images in a scrolling fashion. By selecting the Scroll tool and then holding the mouse selection while moving up or down, images are quickly displayed in a single succession. This allows the user to quickly browse through every image in the series without manually scrolling with the scrollbar or arrow keys.



Enable Scroll Tool.

Scout tool

The Scout tools shown below allow the user to view the relative positions of stacks within a selected scout image. One scout image in one tile and at least one associated reference stack in another tile must be displayed in order for the Scout tool to be activated. Once activated, two blue boundary lines will appear on the scout image indicating the upper and lower limits of image positions within the reference stack (**Fig. 6**). A cyan line in between these marked boundaries represents the relative position of the current image in the reference stack on the scout image. Therefore, scrolling of the reference stack results in an interactive experience as the cyan line moves along with the relative position of the current image. In addition, the cyan line itself can be moved on the scout image when the Scout Jump tool is enabled, allowing the user to select a desired “slice” of the anatomy. This tool can be used with multiple reference stacks as long as one scout image is selected.



Enable Scout.



Disable Scout.



Enable Scout Jump.

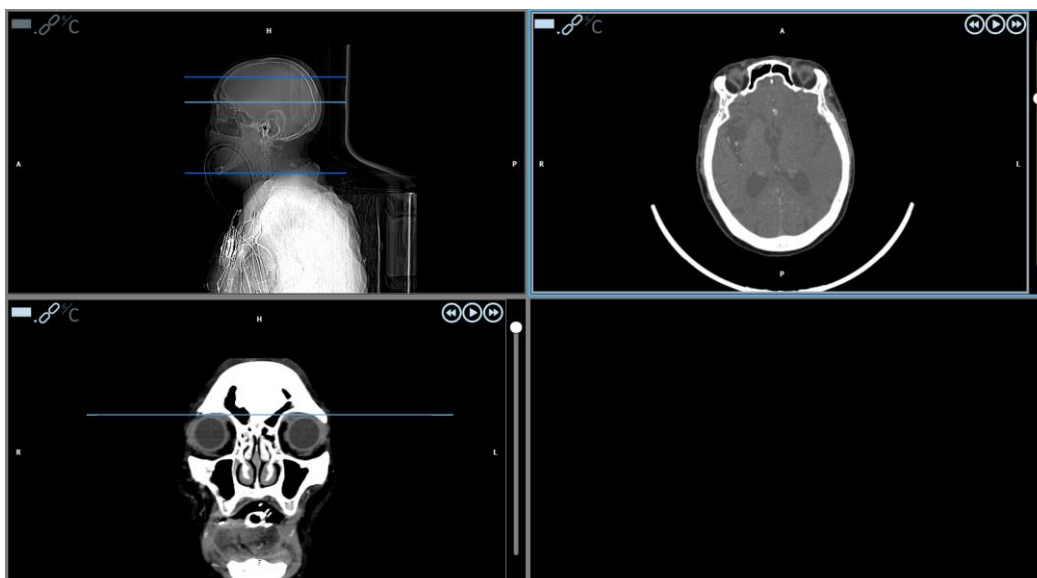


Figure 6. The Scout tool applied on the scout image (top left corner). The position of the current image in the reference stack (top right corner) is indicated by the cyan line in the scout image and the cyan line in another reference stack (bottom left corner).

In certain cases, the current image in the reference stack may not intersect the anatomy of the scout image. In this case, no boundary lines will be visible on the scout image (Fig. 7, 8).

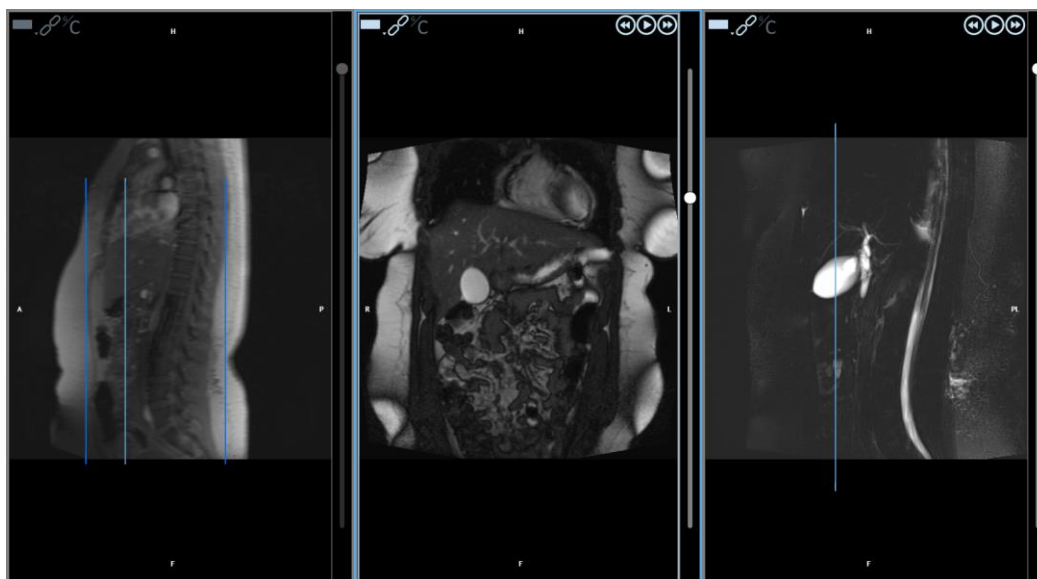


Figure 7. The Scout tool applied on the scout image (left). The position of the current image in the reference stack (middle) is indicated by the cyan line in the scout image and the cyan line in another reference stack (right).

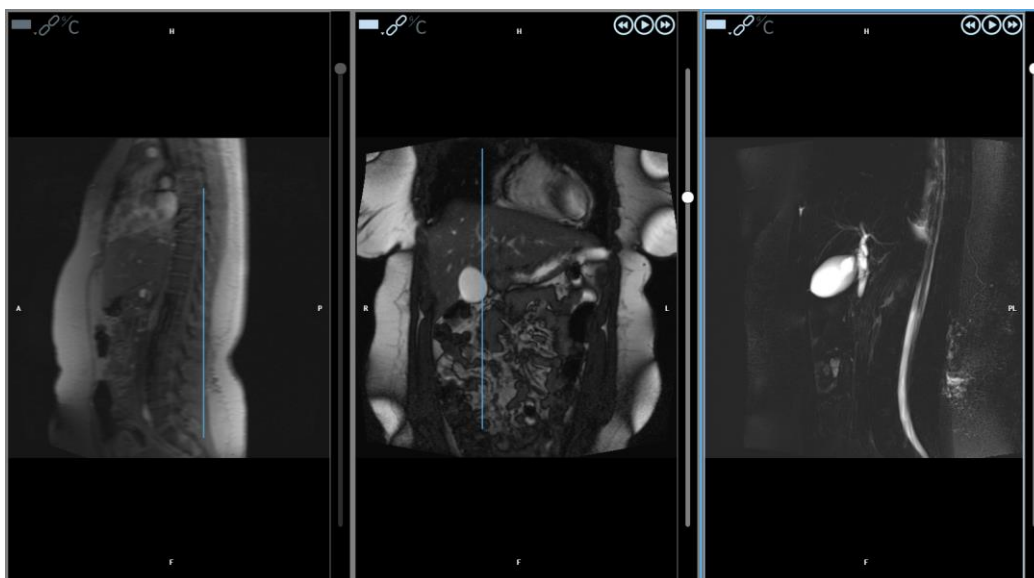


Figure 8. The Scout tool applied on the scout image (left). The position of the current image in the reference stack (right) is indicated cyan line in another reference stack (middle). Note that no boundary lines are indicated in the scout image because the current image in the reference stack does not intersect the anatomy of the scout image.

Multi-monitor

The multi-monitor feature allows the user to view studies on multiple windows using the tools shown below. The current implementation of the Viewer supports up to four monitors with this feature. When a single study is selected, the Viewer will load the study in multiple windows. When multiple studies are selected, the Viewer will load all studies in each window. The user can enable and disable multi-monitor display within the Viewer as well as set the scope for the image manipulation tools.



Enable multi-monitor display.



Disable multi-monitor display.



Multi-monitor scope selection. The user can select the scope of image manipulation.



No multi-monitor scope. Changes are only applied to the current Viewer.



Multi-monitor study scope. Changes are only applied to the selected study and possibly across Viewers.



Multi-monitor all monitor scope. Changes are applied across all images according to their scope settings.

In addition to being able to view studies across multiple windows, this feature can also automatically populate all monitors with the loaded Viewer windows. For Chrome browsers, the Viewer has an extension available under the multi-monitor section of the User Preferences page that when added to the browser, will fill each monitor with a Viewer window. For Internet Explorer, this feature can be turned on by navigating to Internet Options > Security > Custom Level > Enabling “Allow script-initiated windows without size or position constraints”.

Other tools

Other useful tools are shown below.



Refresh – synchronizes with the DICOM Archive to update images.



User preferences – sets various display and tool settings.



Export study – downloads the current study into the local disk or DICOM DIR.



Email page – provides the user with an email link for the study.



DICOM tags page – displays all study information for that image.

User Preferences

The User Preferences page can be accessed in three ways:

- 1) Directly from the Study List by selecting the “Configuration” tab on the upper right hand corner of the page.
- 2) Selecting the User Preference icon within the Viewer itself.
- 3) Manually by accessing the web address: <https://servername/lmsViewer/UserPreference>

The User Preferences page contains several tabs listed below that can be used to modify or automate specific display settings.

- **General (Fig. 8)**
 - Cine – sets the default Cine speed at any value between 0.5 – 2.
 - Overlay level – specifies the information that is displayed on the image and sets the default measurement unit (pixel, inch, cm, mm).
 - Thumbnail settings – specifies single/multiple thumbnails and size of thumbnails.
 - Magnifying glass – sets the size and zoom of the tool.
 - Annotations – automates display settings for images.
 - Zoom – sets the default zoom speed.
 - Window level – sets the default window level speed for any given modality.
 - Multi-monitor – sets the default number of monitors in use.

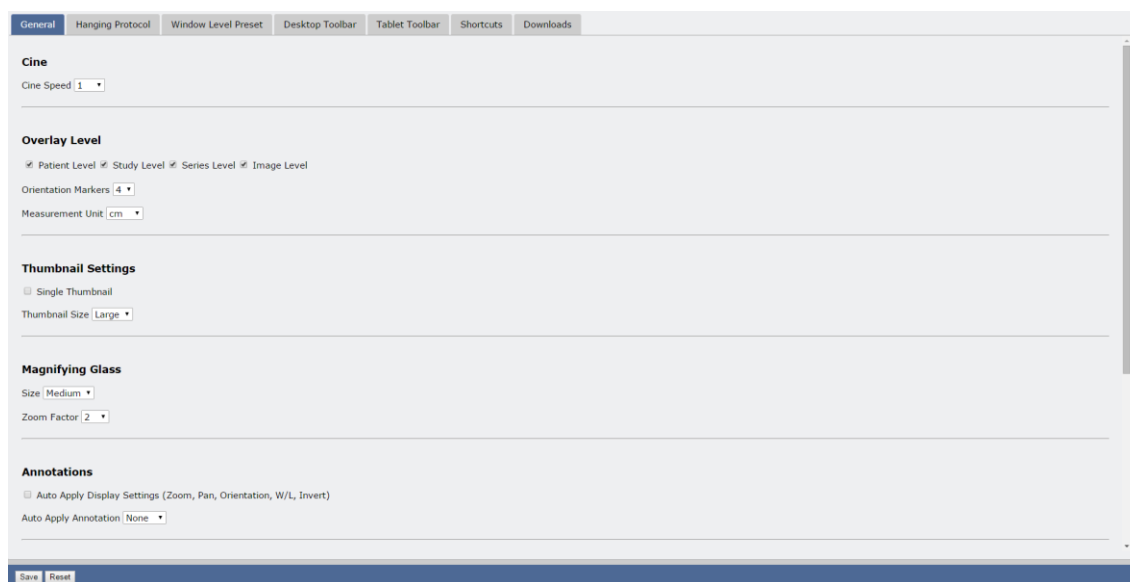


Figure 8. User Preferences – General tab.

- **Hanging Protocol (Fig. 9)** – creates automated display setting procedures for any given modality.

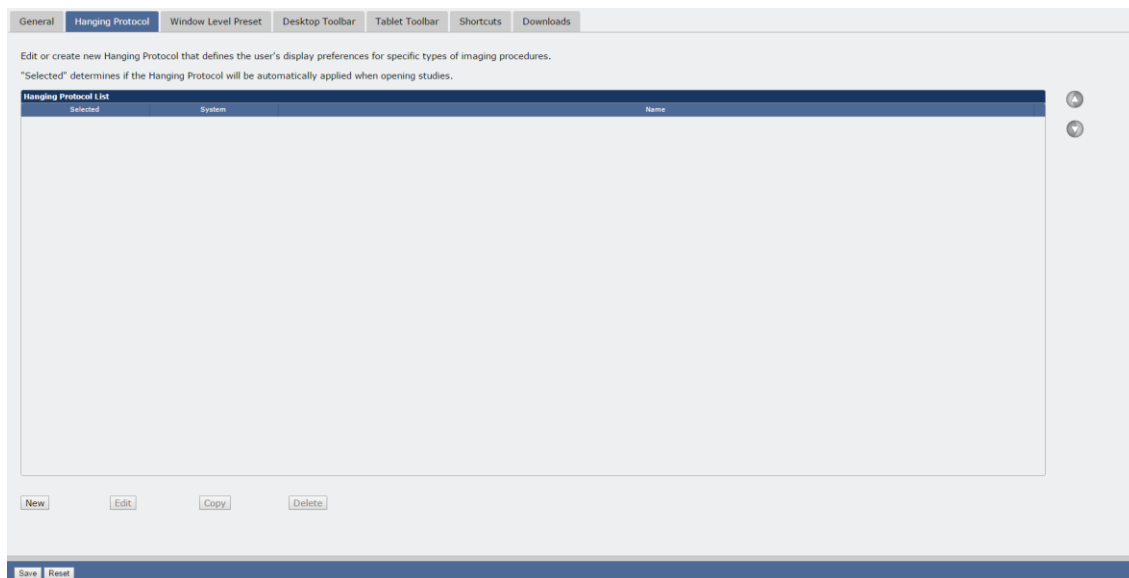


Figure 9. User Preferences – Hanging Protocol tab.

- Window Level Preset (**Fig. 10**) – creates and lists saved window level settings for any given modality.

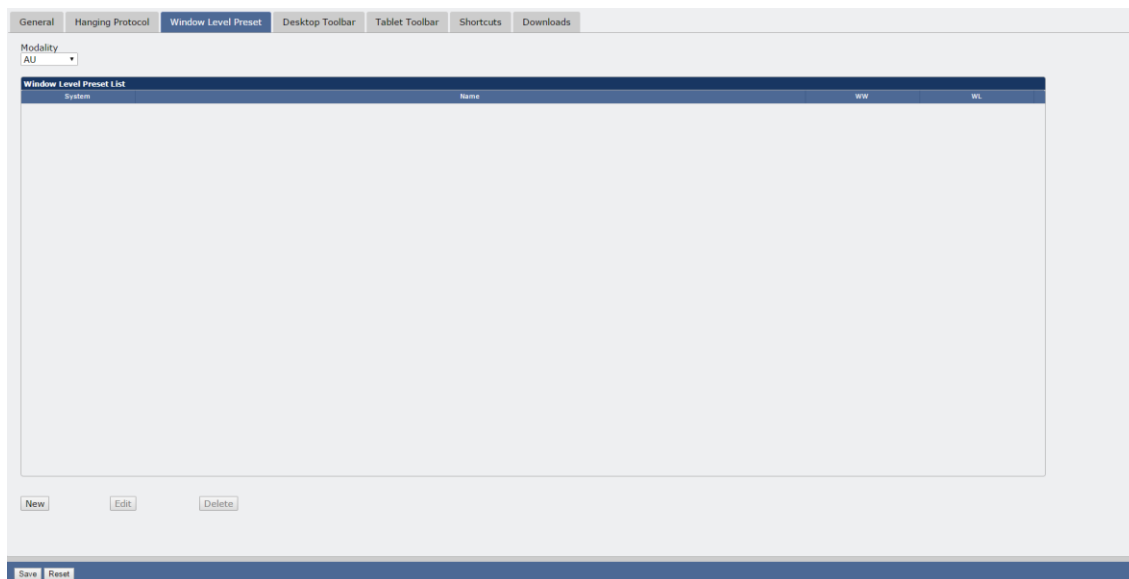


Figure 10. User Preferences – Window Level Preset tab.

- Desktop Toolbar (**Fig. 11**) – sets the default icons displayed in the Viewer toolbar for any given modality.

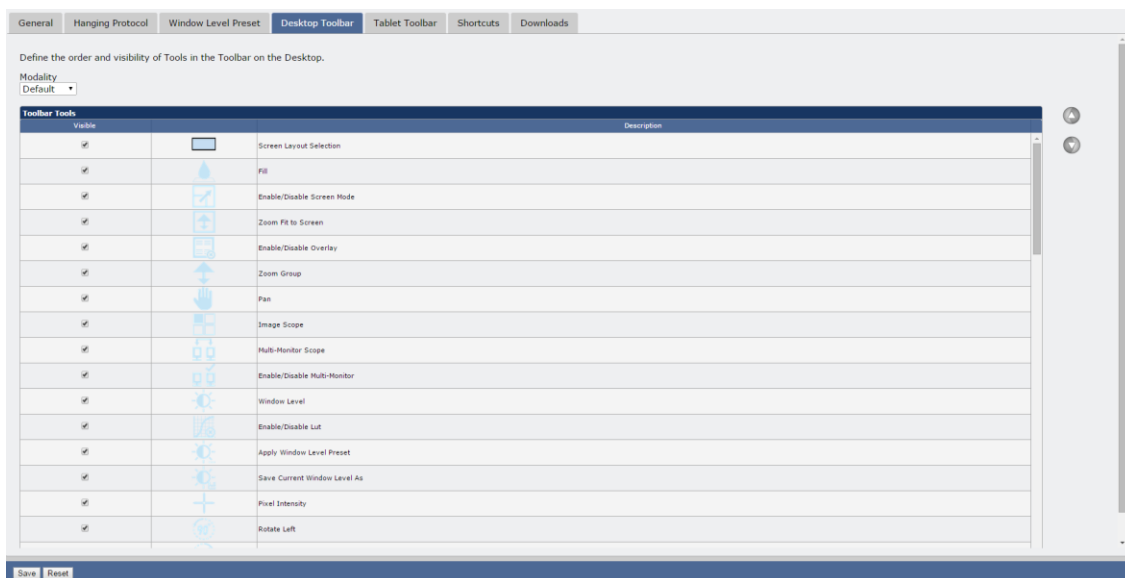


Figure 11. User Preferences – Desktop Toolbar tab.

- Tablet Toolbar (**Fig. 12**) – sets the default icons displayed in the Viewer toolbar for any given modality.

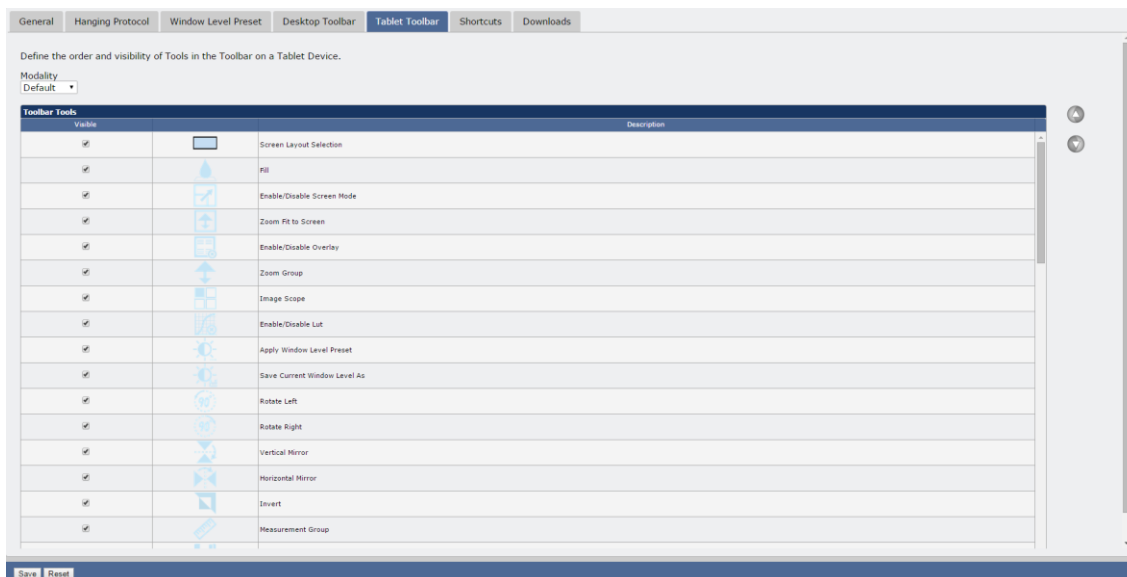


Figure 12. User Preferences – Tablet Toolbar tab.

- Shortcuts (**Fig. 13**) – customizes keyboard shortcuts for various Viewer tools.

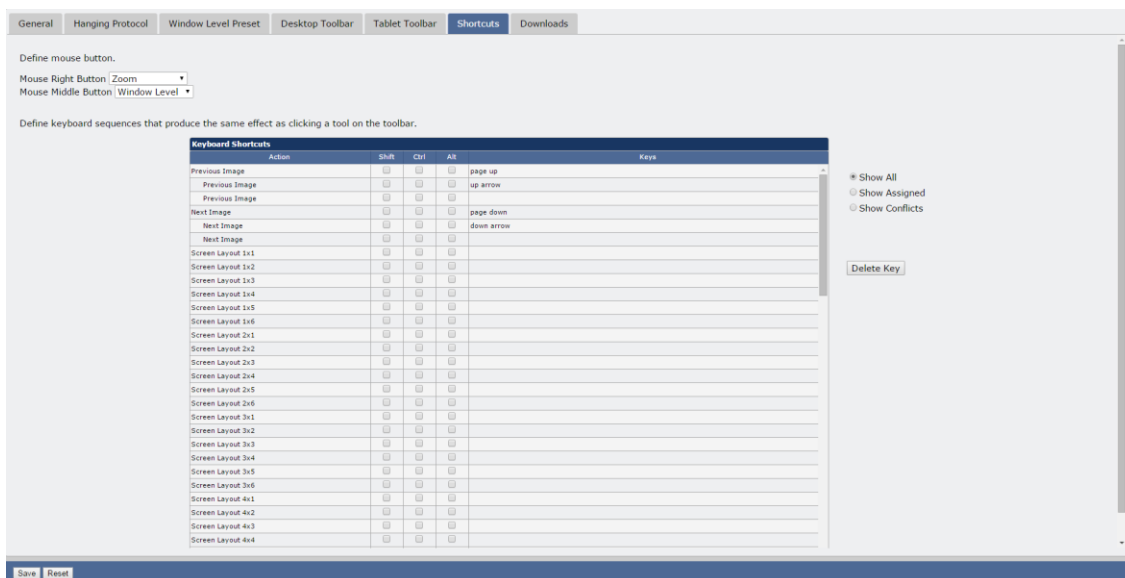


Figure 13. User Preferences – Shortcuts tab.

- Downloads (Fig. 14) – sets the default image download preferences for any given modality.

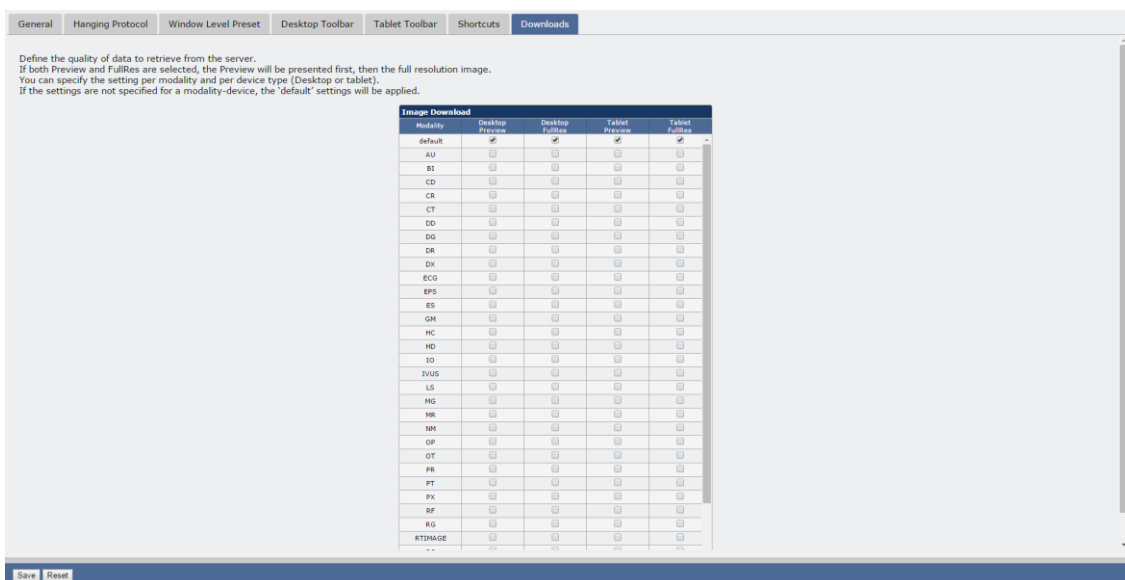
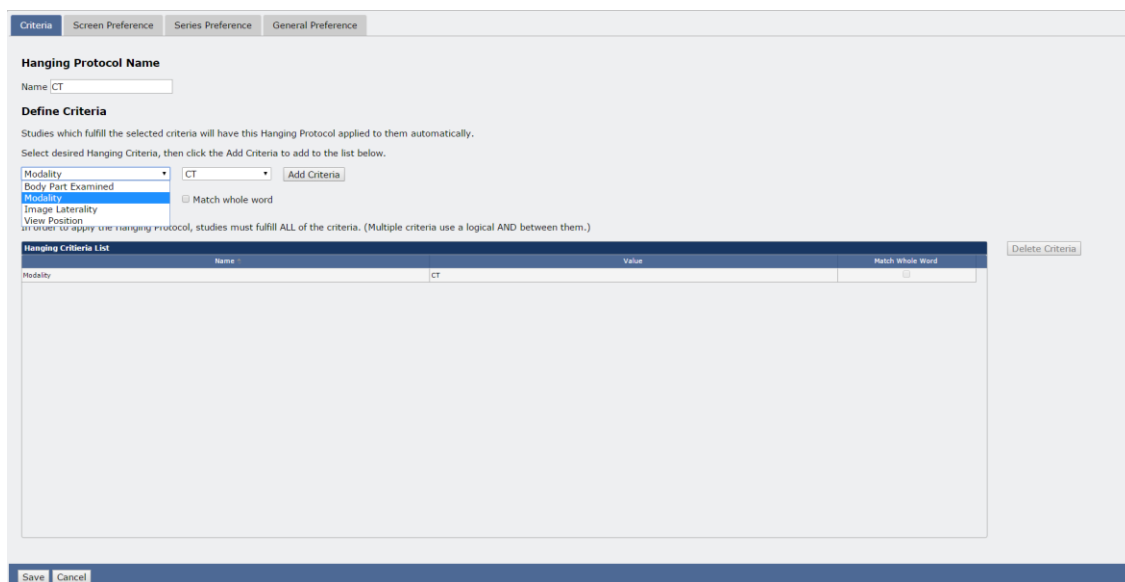


Figure 14. User Preferences – Downloads tab.

User Preferences: Hanging Protocols

Hanging protocols can be used to automate display settings for specified image properties by creating “hanging criteria”. Currently, hanging criteria can be created for sets of images determined by the type

of body part examined, modality, image laterality, and view position (Fig. 15). After adding the hanging criterion to the list, the user may then specify other automated display settings indicated by the tabs.



Criteria | Screen Preference | Series Preference | General Preference

Hanging Protocol Name
Name: CT

Define Criteria
Studies which fulfill the selected criteria will have this Hanging Protocol applied to them automatically.
Select desired Hanging Criteria, then click the Add Criteria to add to the list below.

Modality: CT | Add Criteria
Body Part Examined: | Match whole word
Image Laterality: |
View Position: |

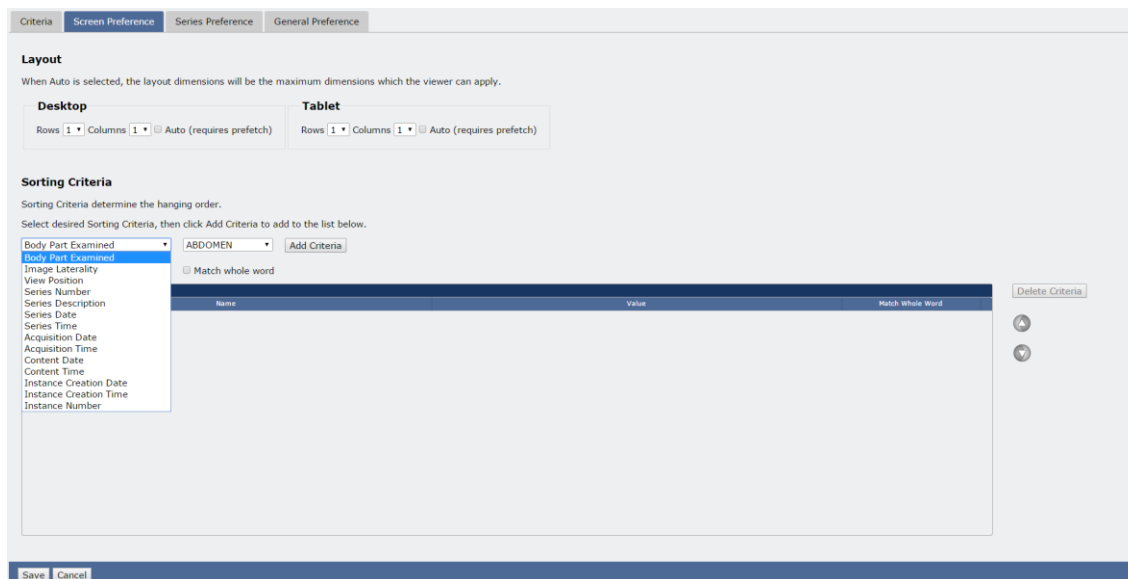
Hanging Criteria List

Name	Value	Match Whole Word
Modality	CT	<input type="checkbox"/>

Save Cancel

Figure 15. Adding a hanging criterion to a hanging protocol.

Under the Screen Preference tab, the user can specify the default screen layout for both desktop and tablet devices (Fig. 16). In addition, sorting criteria can be added to the hanging protocol based on various image properties.



Criteria | **Screen Preference** | Series Preference | General Preference

Layout
When Auto is selected, the layout dimensions will be the maximum dimensions which the viewer can apply.

Desktop
Rows: 1 | Columns: 1 | Auto (requires prefetch)

Tablet
Rows: 1 | Columns: 1 | Auto (requires prefetch)

Sorting Criteria
Sorting Criteria determine the hanging order.
Select desired Sorting Criteria, then click Add Criteria to add to the list below.

Body Part Examined: ABDOMEN | Add Criteria
Image Laterality: | Match whole word
View Position: |
Series Number: |
Series Description: |
Series Date: |
Series Time: |
Acquisition Date: |
Acquisition Time: |
Content Date: |
Content Time: |
Instance Creation Date: |
Instance Creation Time: |
Instance Number: |

Hanging Criteria List

Name	Value	Match Whole Word
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Save Cancel

Figure 16. Changing screen preferences for a hanging protocol.

Next, the default display settings can be set for series of images by specifying the series layout and orientation of images under the Series Preference tab (**Fig. 17**).

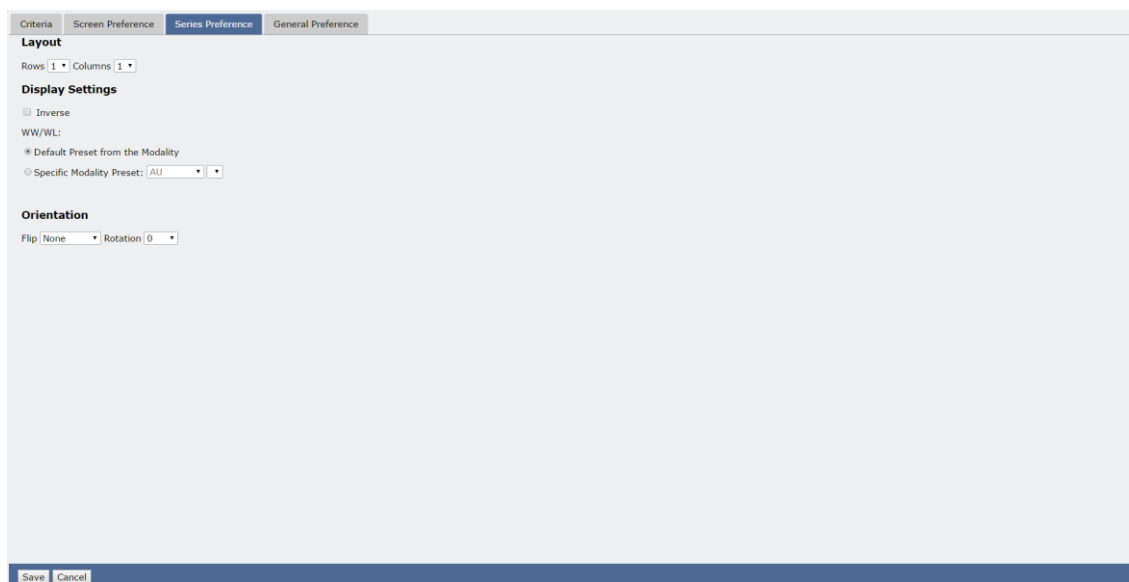


Figure 17. Changing series preferences for a hanging protocol.

The General Preference tab can be used to set the scope of the hanging protocols. Once the hanging protocol has been customized, it must be saved in order to be loaded under the Hanging Protocol List. Once selected and saved (**Fig. 18, yellow indicator boxes**), the changes will be applied when the user refreshes or returns to the Viewer.

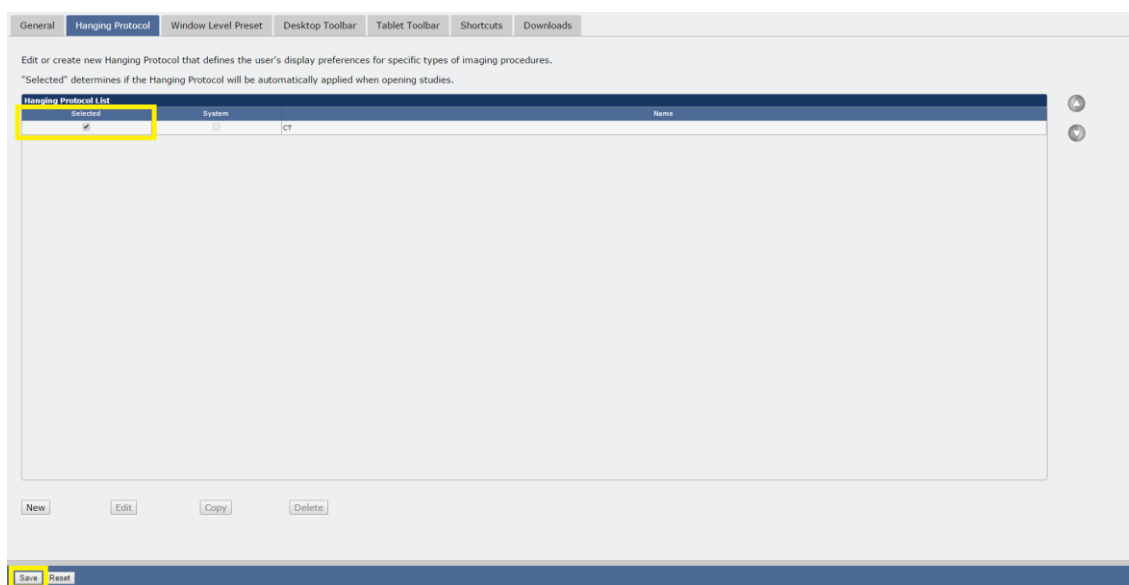


Figure 18. Selecting hanging protocols to be applied to the Viewer.

The following Viewer toolbar icons will be available for use:



Loads a list of hanging protocols available for the current study.



Applies the hanging protocol by replacing image display settings.



Applies the hanging protocol by keeping image display settings.

In a relatively simple hanging protocol example shown below, studies with CT images have been set to display 4 images in a 2x2 screen layout. Two studies (MR and CT) have been loaded to show the difference and specificity in the hanging protocol settings. The MR study loads with the default 1x1 screen layout, but hanging protocols cannot be selected (Fig. 19). As expected, the CT hanging protocol becomes available when the CT study is selected from the thumbnail panel. After application of the CT hanging protocol, the viewer shows the specified 2x2 screen layout (Fig. 20).

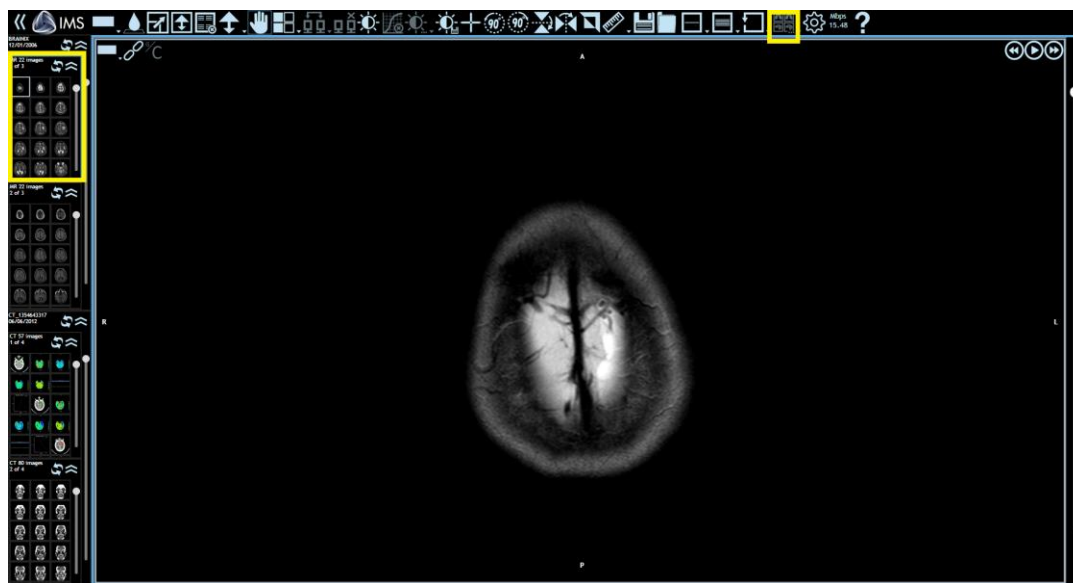


Figure 19. Loading an MR study and attempting to select the CT hanging protocol. Yellow indicator boxes show that the MR study is selected from the thumbnail panel and the hanging protocol icon is inactive.

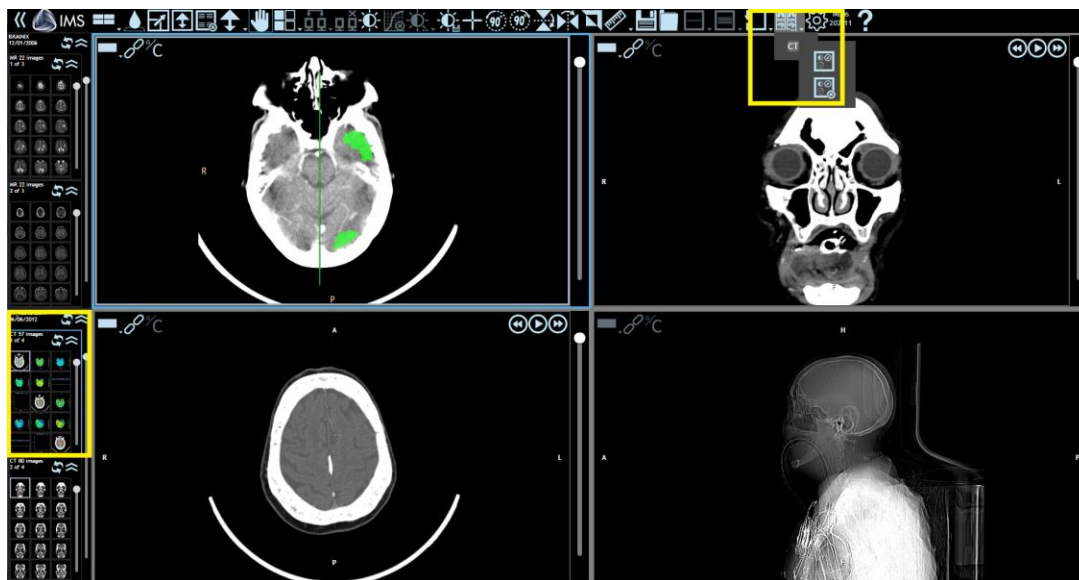


Figure 20. Loading a CT study and attempting to select the CT hanging protocol. Yellow indicator boxes show that the CT study is selected from the thumbnail panel and the hanging protocol icon is active with the option to select the CT hanging protocol.