



RESOURCE AND PATIENT MANAGEMENT SYSTEM

Electronic Health Record

(EHR)

Installation and User Manual for IHS Imaging Viewer

Version 1.1, Patch 27
June 2020

Office of Information Technology
Division of Information Technology

Table of Contents

1.0	Introduction.....	1
2.0	IHS EHR_1.1_27 and BMAG*3.0*190 Image Viewer Updates	2
2.1	Incorporated Change Requests, CR(s) with Associated Image Viewer Development Items.....	2
2.1.1	CR_10916	2
2.1.2	CR_11264	2
2.2	System Cryptography Issue.....	2
2.2.1	CR_10661	2
2.3	User Rights and Logging and Associated Change Requests	3
2.3.1	CR_09953	3
2.3.2	CR_09952	4
2.4	Connection Issues and Associated Change Requests	4
2.4.1	CR_09256	4
2.4.2	CR_09030	4
2.4.3	CR_10665	5
2.4.4	CR_10663	5
2.4.5	CR_10664	5
2.4.6	CR_09272	5
2.5	CR_11646	6
2.6	CR-11647	6
3.0	Using the IHS Image Viewer	7
4.0	Client Configuration	8
4.1	Adding the IHS Imaging Abstract Viewer Object to a Template.....	8
4.1.1	Properties Dialog.....	9
4.1.2	Setting Object Properties.....	10
4.1.3	IHS Image Viewer Property Settings	11
5.0	Using the IHS Image Viewer	14
5.1	Selecting a Patient.....	14
5.2	IHS Image Viewer Object	15
5.2.1	Notes	16
5.3	Full Resolution Viewer	18
5.4	Working with Note Images.....	19
5.5	Working with Radiology Images	21
5.5.1	Viewports.....	21
5.6	Manipulating Images.....	24
5.6.1	Changing Image Properties.....	24
Appendix A	RPCs	41
Appendix B	Troubleshooting	42
B.1	Information.....	42

B.1.1	Required Software and Security	42
B.1.2	RPMS Security Keys Required	42
B.1.3	File Version References for EHR_1.1_27 NOTES for the Image Viewer	42
B.1.4	For additional Technical Support for EHR_1.1_27 and the BMAG*3.0*190 Image Viewer	44
Appendix C	Rules of Behavior	45
C.1	All RPMS Users	45
C.1.1	Access	45
C.1.2	Information Accessibility	46
C.1.3	Accountability	46
C.1.4	Confidentiality	47
C.1.5	Integrity	47
C.1.6	System Logon	48
C.1.7	Passwords	48
C.1.8	Backups	49
C.1.9	Reporting	49
C.1.10	Session Timeouts	49
C.1.11	Hardware	49
C.1.12	Awareness	50
C.1.13	Remote Access	50
C.2	RPMS Developers	51
C.3	Privileged Users	51
Acronym List	54
Contact Information	54

Revision History

Version	Date	Author	Section	Page Number	Summary of Change
V1.1, P27	June 2020	Leslie White	Added New Section 2	Page 2	New section added

Preface

This manual provides information on the Indian Health Service (IHS) Imaging Viewer object.

VistA Imaging is used to attach images to Radiology Reports or Text Integration Utility (TIU) Progress Notes in RPMS. In the EHR application, Progress Notes and Radiology Reports are displayed in tabs that are part of the patient's electronic medical chart.

The ad-hoc patterns of usage common to the Image Viewer dictate the structure of this user manual. As a result, it became more of a description of the available tools and suggestions of best practices than a procedural, how-to manual.

Recommended Users

This document addresses the needs of the end users of the IHS Imaging Viewer.

1.0 Introduction

The Indian Health Service (IHS) Imaging Viewer object was developed to provide tight integration of images with reports in the IHS Electronic Health Record (EHR) application. To meet the requirements of Meaningful Use II, the context between images and reports must be maintained all times.

The EHR application is built on a flexible framework that allows the insertion of objects that communicate with the framework. The framework then handles all exchange of information with Resource and Patient Management System (RPMS).

VistA Imaging is used to attach images to Radiology Reports or Text Integration Utility (TIU) Progress Notes in RPMS. In the EHR application, Progress Notes and Radiology reports are displayed in tabs that are part of the patient's electronic medical chart. A user with access rights to Design Mode in the EHR application can add IHS Image Viewer objects to EHR templates. This allows users to easily display abstracts (thumbnail images) associated with a patient's Progress Note or Radiology Report.

The IHS Image Viewer object also allows the user to open the full resolution viewer to further interact with the images.

The IHS Imaging Viewer has two distinct visual parts. The first visual part (which is inserted into the framework) communicates with the RPMS database, displays abstracts, and launches the full resolution viewer when abstracts are selected for display. The second visual part is the full resolution viewer, which has no direct connection with the RPMS database. The full resolution viewer provides a rich set of tools to view and manipulate the images.

Additionally, this document contains information about the setup and configuration of EHR application to support the Imaging Viewer.

2.0 IHS EHR_1.1_27 and BMAG*3.0*190 Image Viewer Updates

2.1 Incorporated Change Requests, CR(s) with Associated Image Viewer Development Items

BMAG*3.0*190 focuses on addressing connection issues, viewer enhancements, Operating System/System Library upgrade or usage, and other intermittent installation issues.

Included are figures or examples as captured before development (issues) or during testing (fixes).

2.1.1 CR_10916

Incorporate Image Viewer changes into the EHR VueCentric release. EHR_1.1_27.

2.1.2 CR_11264

Automatic addition of the Viewer folder to the VueCentric folder – WIN10. Image Viewer files are automatically incorporated into the VueCentric <sitename> folder.

2.1.2.1 EHR_1.1_p27

Development eliminated the requirement for a Viewer folder.

Confirm files in the VueCentric <sitename> folder:

- IHS.ImageViewer.dll v. 1.0.7349.35790
- IHS.ImageViewer.exe v. 1.0.7349.35796

2.2 System Cryptography Issue

2.2.1 CR_10661

The EHR embedded IHS.ImageViewer.dll fails to load (Figure 2-1), claiming, “Class not registered.” Manually registering the file with **regasm.exe** declares success, but issues persist.

Use FIPS-compliant algorithms for encryption, hashing, and signing. The policy causes the FIPC Compliant flag to toggle back and causes Image Viewer issues on Windows 10 OS and VMs – 2016 servers.

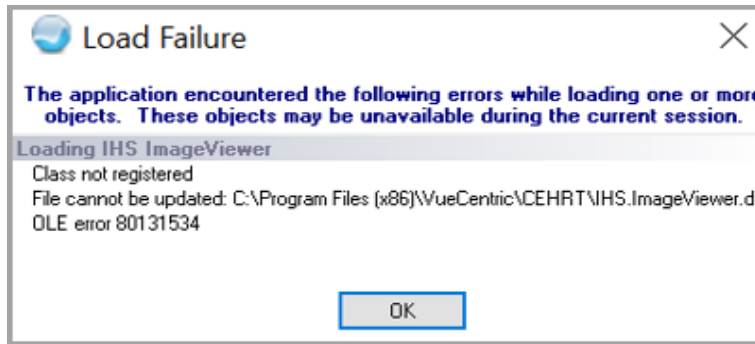


Figure 2-1: Example of a Load Failure corrected with EHR_1.1_27

FIPS compliant algorithm addressed.

2.3 User Rights and Logging and Associated Change Requests

2.3.1 CR_09953

EHR/VI IMG VIEWER Security Issue, as the Viewer does not honor the VA's Vista Imaging MAGDISP CLIN Security Keys (Figure 2-2). Anyone can see the images unless a TIU Business Rule is defined.



Figure 2-2: Example of missing MAGDISP CLIN security key

Resolution: The MAGDISP CLIN Security Key must be assigned for Abstract and Image Viewer use.

2.3.2 CR_09952

EHR/VI IMG VIEWER Security Issue (Figure 2-3). Display of an image file in Internet Explorer History with the file location on server.

Resolution: Image file internal entry numbers, file type, and storage path will not display in IE History.

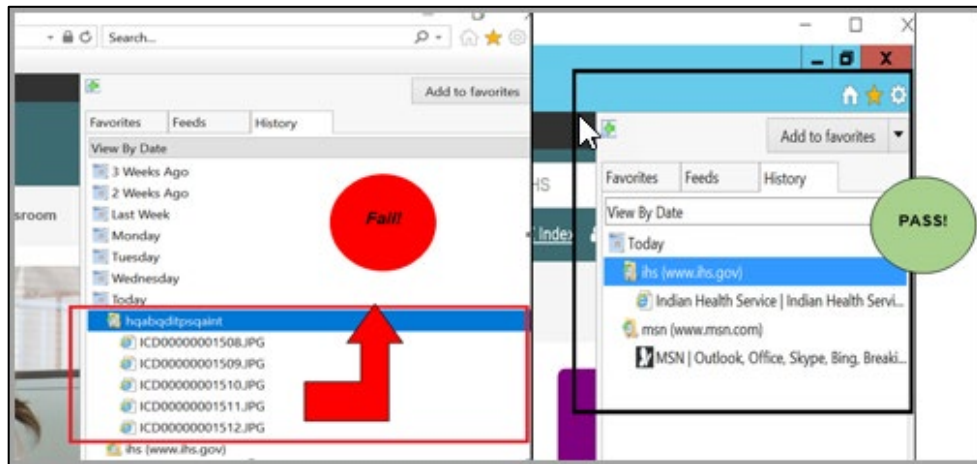


Figure 2-3: Example of initial issue and resolution with EHR_1.1_27

2.4 Connection Issues and Associated Change Requests

2.4.1 CR_09256

EHR/VI IMG VIEWER – VistA IMG VIEWER Display – File Not Found error.

The image file is not viewable in viewer window due to Microsoft Windows session limitations and inability to connect to the same Tier 1 Storage Solution with different Windows credentials during the same Windows session.

Consult with local or area Tier 1 VistA Imaging server management.

2.4.2 CR_09030

EHR/VI IMG VIEWER that pulls IMG VIEWER from VistA Image. There is an Error in loading the image file. Not available for provider in TIU Note.

The issue did not reoccur during integrated, alpha, or beta testing for the BMAG*3.0*190 Image Viewer. Should this error occur, confirm an affirmative image view in VistA Imaging Clinical Display.



Figure 2-4: Example of initial issue reported prior to EHR_1.1_27

Affirmative view with VI Clinical Display may require additional troubleshooting with connection to the Tier 1 Storage Solution from the Windows session. Contact local, area, or IHS IT Service Desk.

2.4.3 CR_10665

EHR/VI IMG VIEWER select thumbnail and black screen is displayed in full resolution viewer for DICOM images.

The issue did not reoccur during integrated, alpha, or beta testing for the BMAG*3.0*190 Image Viewer.

2.4.4 CR_10663

EHR/VI IMG VIEWER – CAO Viewer disappearing after a few seconds of EHR Image Viewer display. Works fine if Clinical Display is launched first.

The issue did not reoccur during integrated, alpha, or beta testing for the BMAG*3.0*190 Image Viewer.

2.4.5 CR_10664

EHR/VI IMG VIEWER Abstract blocked an image and the file does not display. There are times in the EHR that a scanned image can be viewed, but there are other times when it cannot.

The issue did not reoccur during integrated, alpha, or beta testing for the BMAG*3.0*190 Image Viewer.

2.4.6 CR_09272

EHR/VI IMG VIEWER error loading CCDA, does not display the HTML in the Image Viewer nor does the EHR/VI IMG VIEWER display a DICOM encapsulated PDF.

Resolution: EHR_1.1_p27 development includes the ability to view an .XML file for the CCDA associated with a TIU NOTE title and an encapsulated PDF file in the Imaging Reports.

Author/Editor	[Blurred text]		
Reviewed by	[Blurred text]		
Created by	[Blurred text]	[Blurred text]	[Blurred text]
Created on	[Blurred text]	[Blurred text]	[Blurred text]
Created at	[Blurred text]	[Blurred text]	[Blurred text]
Created for	[Blurred text]	[Blurred text]	[Blurred text]
Created by	[Blurred text]	[Blurred text]	[Blurred text]
Created on	[Blurred text]	[Blurred text]	[Blurred text]
Created at	[Blurred text]	[Blurred text]	[Blurred text]
Created for	[Blurred text]	[Blurred text]	[Blurred text]

Figure 2-5: Example of a CCDA import with TOC Note

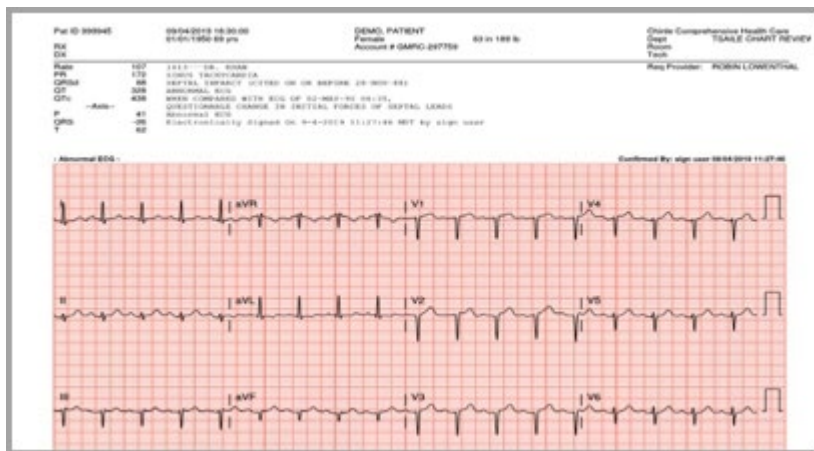


Figure 2-6: Example of an encapsulated pdf for DICOM

2.5 CR_11646

Monitoring Service – Time Synchronization. Not related to the BMAG Image Viewer.

2.6 CR-11647

FIPS 2FA not compliant with FIPS Algorithm. Not related to the BMAG Image Viewer.

3.0 Using the IHS Image Viewer

The workflow of the typical user is a search-and-display process. A particular patient becomes of interest for a clinical reason, a provider looks up the patient, examines the patient chart, discovers that the patient has documentation with attached images, and the provider accesses these images at will.

Note: Security NOTE for EHR_1.1_27, the Image Viewer component, and its use:

RPMS/EHR end users needing to view image files associated with either a TIU NOTE or REPORT (Imaging) **must** have the MAGDISP CLIN security key assigned.

Absence of this security **key** assignment will inhibit both abstract display and the ability to view image files in the IHS Imaging Viewer.

Review pertinent end-user security keys prior to the installation of both the RPMS EHR_1.1_27 KIDS and the EHR_1.1_27 executable.

4.0 Client Configuration

4.1 Adding the IHS Imaging Abstract Viewer Object to a Template

1. To enter Design Mode, right-click the EHR title bar or press Ctrl-Alt-D on the keyboard.
2. Once in Design Mode, select the tab where you want to add the IHS Image Viewer object.

In a practical setting, the **Notes** and **Reports** tabs should have an IHS Image Viewer object inserted, since these are the only RPMS reports that have image indicators in the chart.

Note: Clinical Application Coordinators (CACs) are generally the users given access to Design Mode.

3. Right-click in the EHR template area where you want to insert the IHS Image Viewer object.
4. Select **Add Object** from the context menu. The **Add an Object** (Figure 4-1) dialog displays.
5. Expand the Name item from the **Objects** tree.
6. Scroll down the list of objects and select **IHS Image Viewer**.
7. Click **Add**.

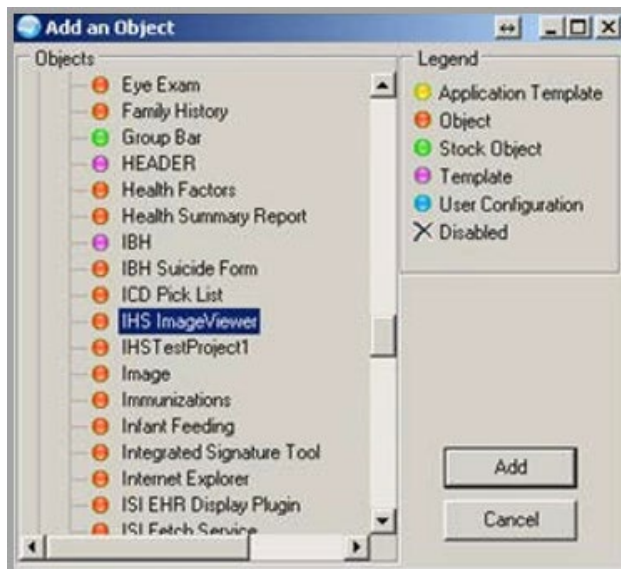


Figure 4-1: Add an Object dialog

This inserts an IHS Image Viewer object into the selected area, which can be sized to fit the client area.

8. To access the properties, right-click the **IHS Image Viewer** object just inserted.
9. Select the **Properties** context menu.

4.1.1 Properties Dialog

The **Properties** dialog (Figure 4-2) contains the standard EHR object properties and additional custom properties. Two check boxes control what types of images display in the IHS Image Viewer object, and another check box controls the object's appearance.

Property	Value
TOP	0
LEFT	0
HEIGHT	183
WIDTH	1356
ALIGN	All
ANCHORS	<input checked="" type="checkbox"/> Top; Left; Right; Bottom
Radiology	<input type="checkbox"/> False
Notes	<input checked="" type="checkbox"/> True
Compact	<input type="checkbox"/> False

Figure 4-2: Properties dialog

- When the **Radiology** check box is selected, the object displays Radiology images.
- When the **Notes** check box is selected, the IHS Image Viewer object displays images attached to progress notes. This enables the user to have IHS Image Viewer objects inserted into tabs that display radiology reports, progress notes, or both.
- The **Compact** check box enables the IHS Image Viewer object to operate in compact mode. It is beneficial on very crowded tabs. In this mode the IHS Image Viewer object only shows the study information. When the user selects an object, the abstracts display in a pop-up window.

- Clicking outside of the pop-up reverts the Abstract Viewer to its compact display. If the compact mode is not checked, the abstracts and the study information is displayed within the object in detailed mode.
- Clicking **OK** saves the settings for the selected IHS Image Viewer object.
 1. Once the object is sized appropriately, click the **Design** menu.
 2. Select the **Save as Template** menu item and click **Save** to save the current template. You can also select a different template from the list or create a new template.
 3. Exit **Design Mode** by doing one of the following:
 - Right-click the EHR title bar and select **Design Mode** from the context menu
 - Press Ctrl-Alt-D on the keyboard.

Note: The details of working with EHR templates can be found in the VueCentric EHR documentation and are beyond the scope of this manual.

4.1.2 Setting Object Properties

Once the IHS Image Viewer object is inserted and properly sized, the object properties must be set to be able to view images. Figure 4-3 illustrates the IHS Image Viewer object inserted in Detailed Mode into the **Notes** tab.

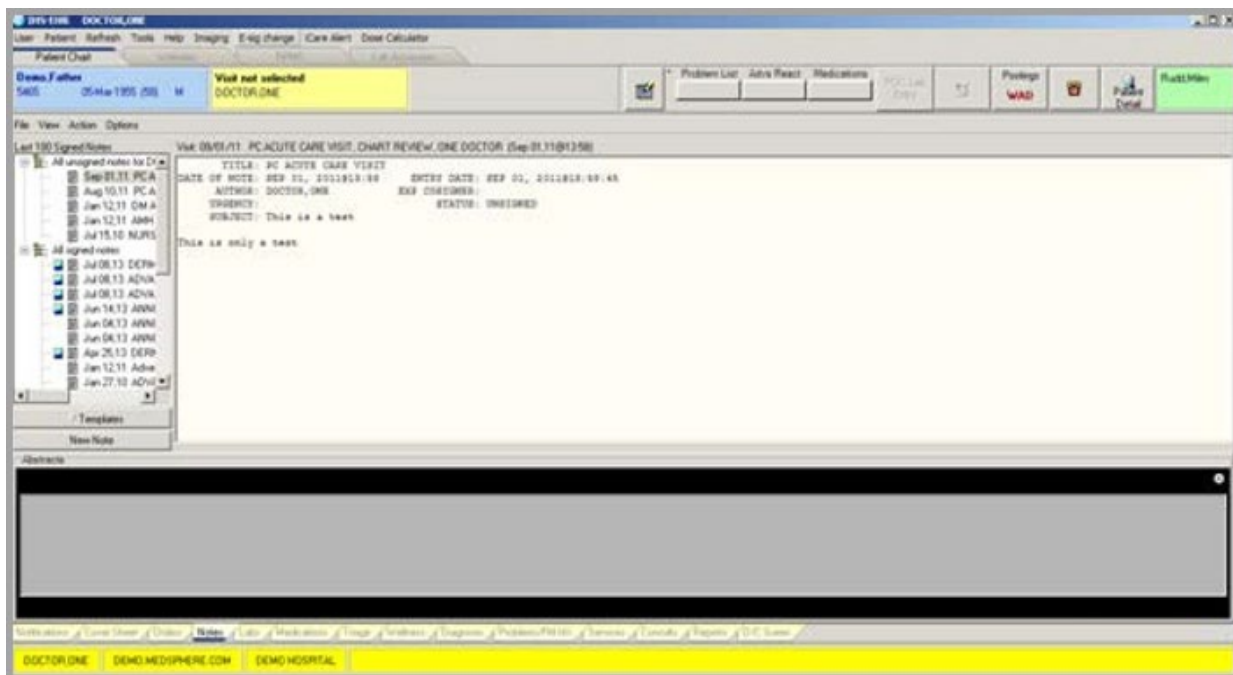


Figure 4-3: IHS Image Viewer Object

4.1.3 IHS Image Viewer Property Settings

Users can access the **Settings** dialog for any of the inserted IHS Image Viewers by clicking the Settings (⚙️) icon on the upper-right corner of the IHS Image Viewer object. Figure 4-4 below shows the general settings.

4.1.3.1 General Tab

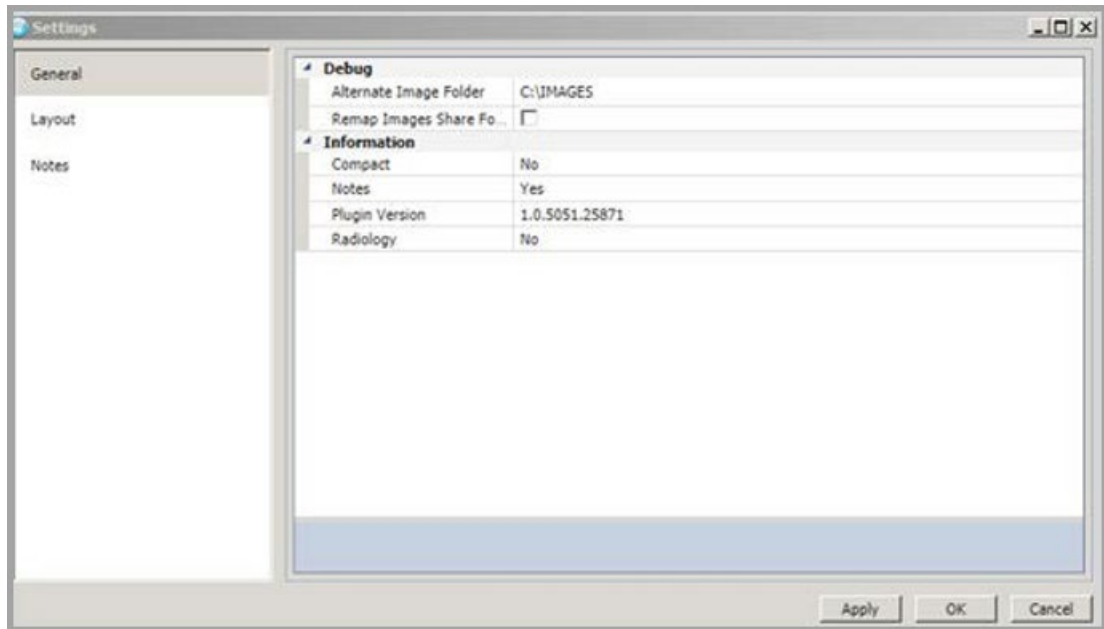


Figure 4-4: Settings dialog – General tab

On the **General** tab, the user may remap the image directory or force the install of the viewer component. These features are used for testing or troubleshooting.

4.1.3.2 Layout Tab

The **Layout** tab (Figure 4-5) is used to control the appearance of radiology studies in the full resolution viewer.

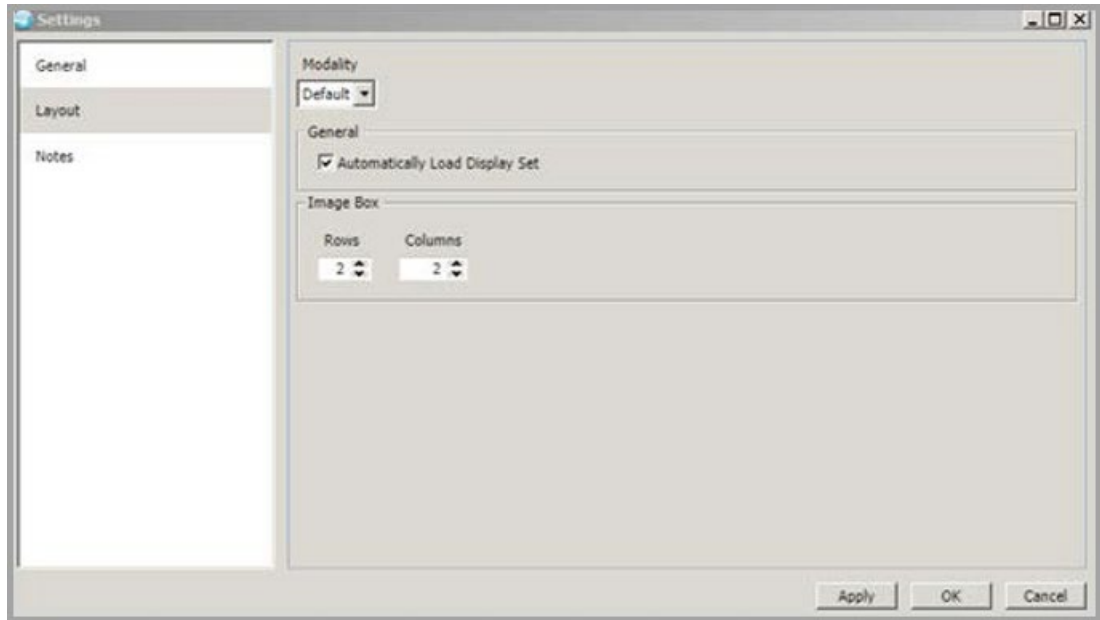


Figure 4-5: Settings dialog – Layout tab

The **Layout** tab provides the user with controls to select the full-resolution viewer layout based on the modality contained in the image headers. The default setting is used for the layout for modalities without specific layout definition.

The **Automatically Load Display Set** check box enables the loading of the entire study into the layout when the abstract is double-clicked in the IHS Image Viewer object inserted into the **Notes** or **Reports** tab.

The expanded **Modality** list shown in Figure 4-6 illustrates the currently supported Modality types.



Figure 4-6: Modality list

The layout enables the user to select optimum configurations for the most common radiology procedures.

4.1.3.3 Notes Tab

The **Notes** tab controls the initial layout of the Viewports on the **Notes** tab of the full resolution viewer.

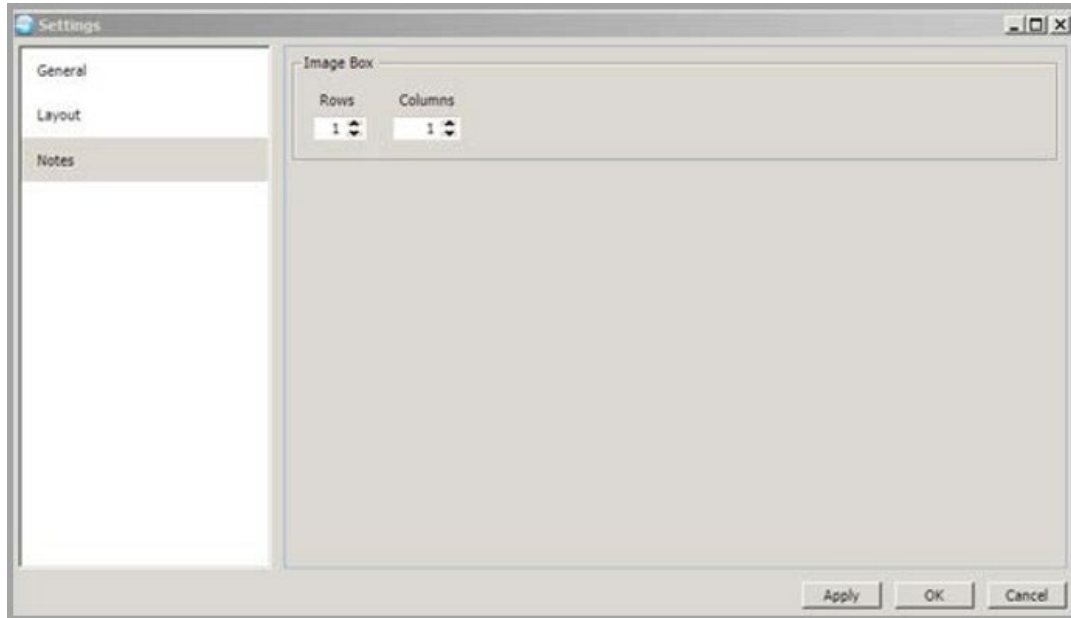


Figure 4-7: Settings dialog – Notes tab

The **Image Box Row** and **Column** selector controls the initial division of the full-resolution viewer into image boxes (also known as Viewports).

5.0 Using the IHS Image Viewer

The workflow of the typical user is a search and display process. A particular patient is of interest for a clinical reason. The provider looks up the patient, examines the patient chart, discovers that the patient has documentation with attached images, and the provider can access these images at will.

5.1 Selecting a Patient

The top-left corner of a chart usually contains the patient pane.

Note: Sites may configure this area as well, so there is no guarantee that the Patient Information pane will be in the same location.

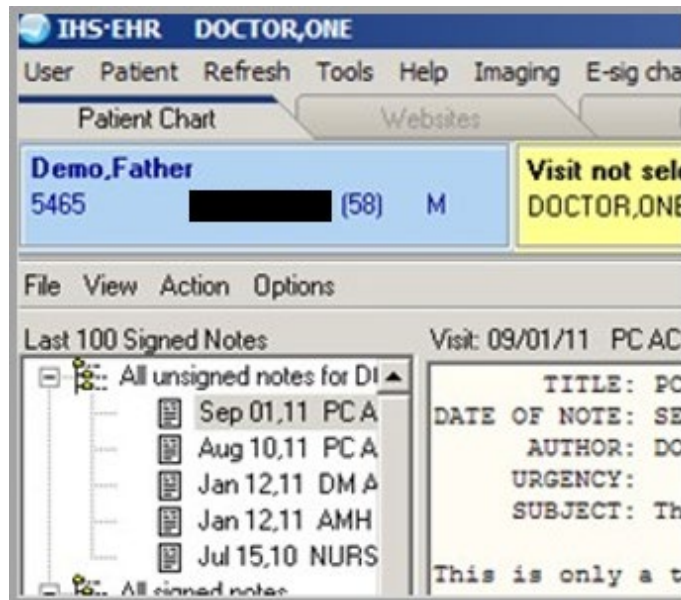


Figure 5-1: Patient chart

Selecting the **Patient Information** pane brings up the **Patient Search** tool.

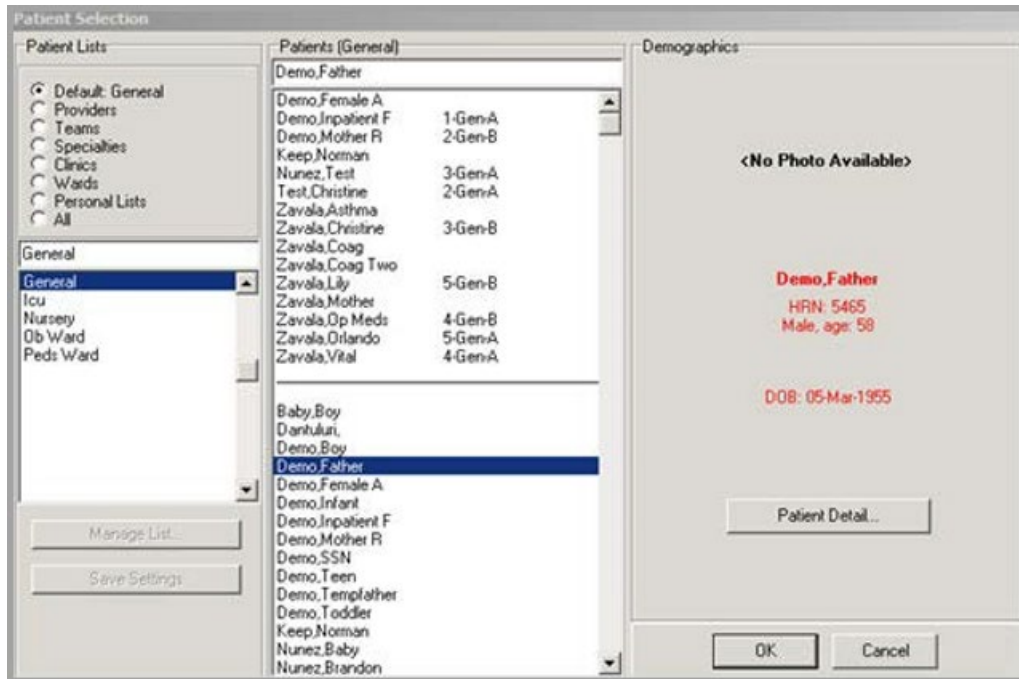


Figure 5-2: Patient Search tool dialog

5.2 IHS Image Viewer Object

Once a patient is selected, the user may interact with the IHS Image Viewer object inserted into one of the tabs. In Figure 5-3, a Detailed Abstract Viewer is inserted into the **Notes** tab. When the **Notes** tab is selected and a note without images is selected, the Abstract Viewer is cleared.

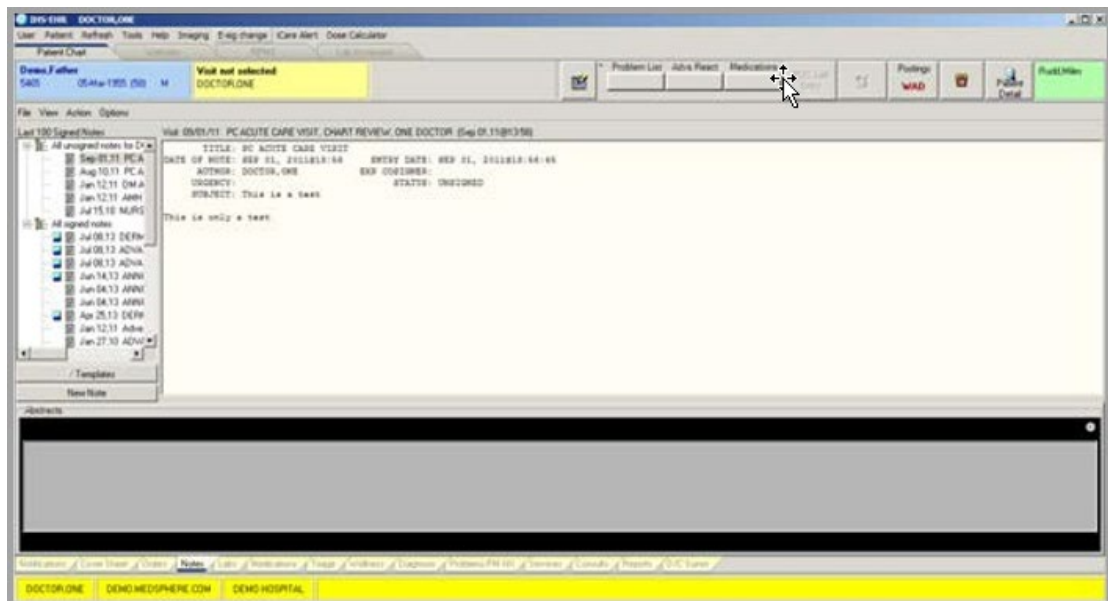


Figure 5-3: Detailed Abstract Viewer

5.2.1 Notes

When a note with attached images is selected, the Abstract Viewer loads the images and displays an abstract for each series of images attached. In most cases, note images have a single image in each series. Therefore, each abstract usually represents a single image.

Some of the more advanced imaging modalities may generate DICOM series of images attached to TIU notes, in which case an abstract may represent multiple related images.

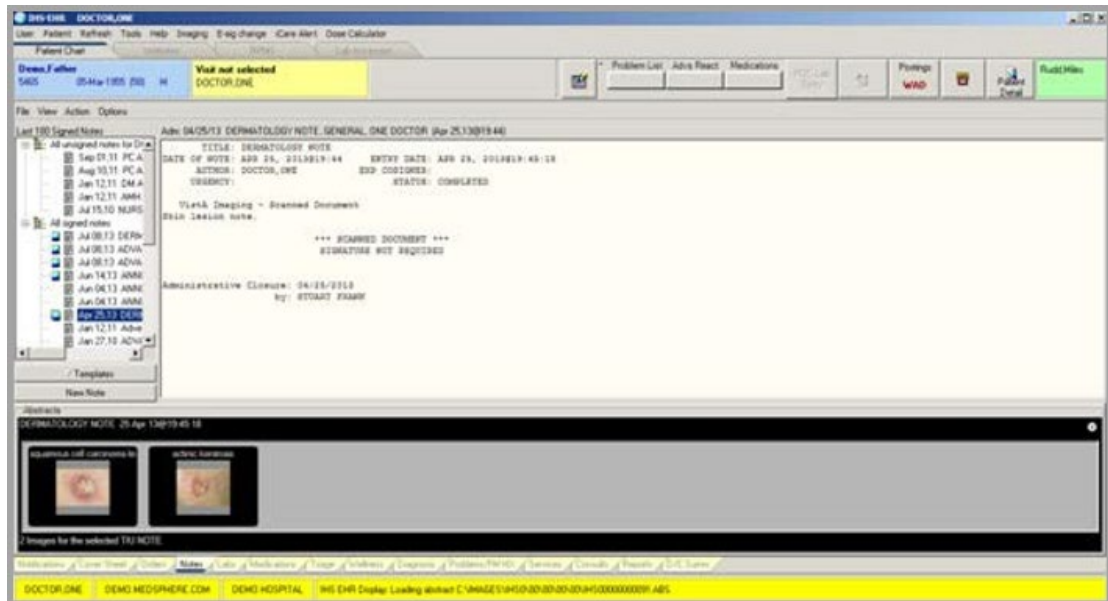


Figure 5-4: DICOM image series attached to notes

In Figure 5-5, a compact Abstract Viewer has been added to the **Reports** tab. When the **Reports** tab is selected, the Abstract Viewer is cleared of images and information if there are no exams with attached images selected.

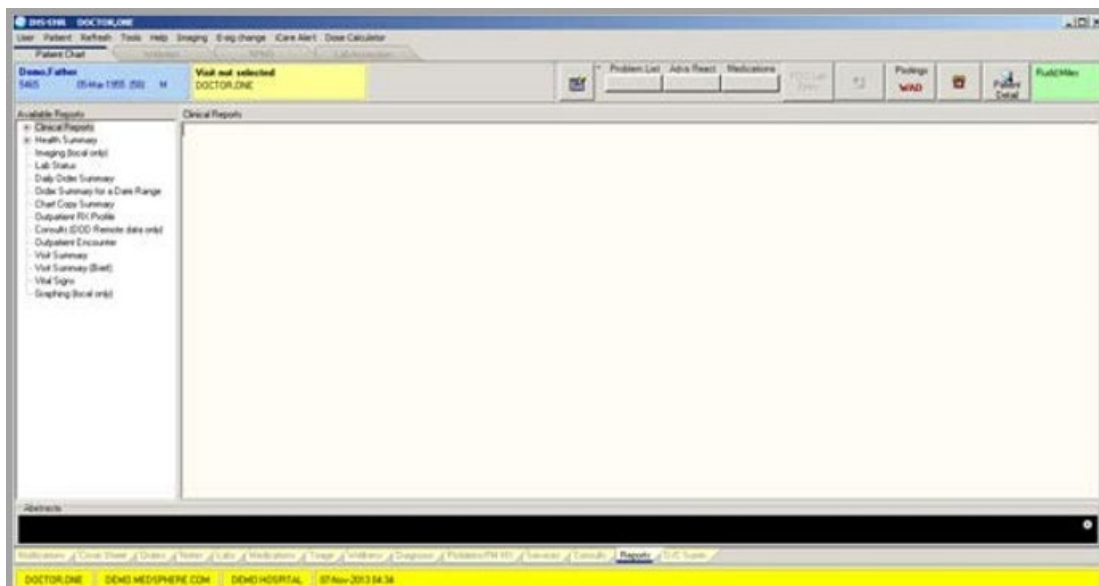


Figure 5-5: Abstract Viewer cleared

When an exam with images is selected, the Abstract Viewer displays information related to the selected case (Figure 5-6) including the exam description and the number of images in the case.

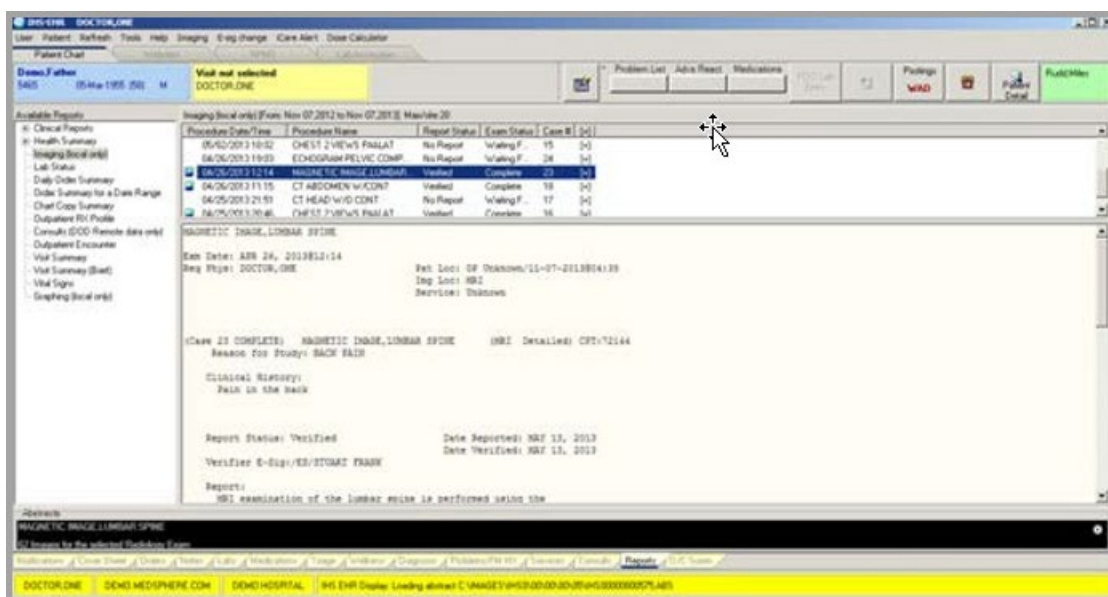


Figure 5-6: Case Information displayed in Abstract Viewer

When the user selects the compact Abstract Viewer (Figure 5-7), the abstracts display in the dialog.

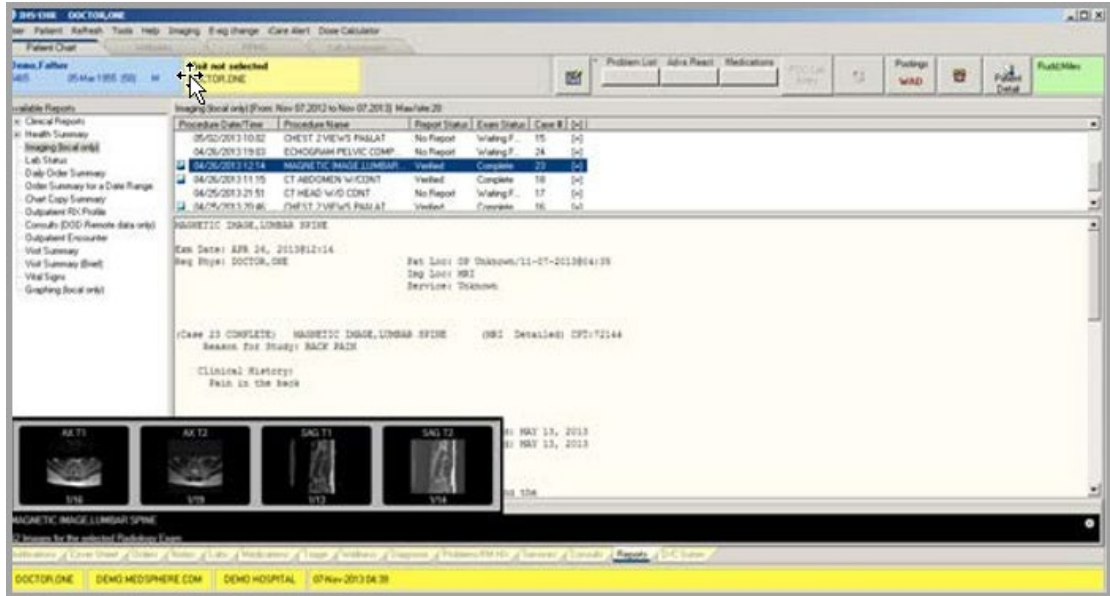


Figure 5-7: Abstracts loaded in the Abstract Viewer

5.3 Full Resolution Viewer

Selecting an abstract opens the full resolution viewer and loads the image into the Viewports. Figure 5-8 displays the full resolution viewer for images attached to a Note.



Figure 5-8: Image-attached notes

Selecting a Radiology abstract opens the full-resolution viewer and loads the images into Viewports if the Autoload setting is selected in the object properties.

If the Autoload setting is not selected, the user can take one of two actions:

- Select an abstract and drag it to an unused Viewport.
- Double-click an abstract, which causes all the images of the case loaded into memory and the series of the case to populate the Viewports from the upper-left corner of the grid.

Figure 5-9 represents a set of radiology images in the full resolution viewer:




Figure 5-9: Radiology images in Full Resolution Viewer

5.4 Working with Note Images

Once images associated with notes are loaded into the full-resolution viewer and automatically arranged into Viewports, the user may start interacting with these images.

It is important to recognize that if a set of note images cannot fit into the configured number of Viewports, the viewer allows paging through multiple sets of images. This is accomplished by using the viewer tools on the Notes tab. The number of images attached to the case and the number of Viewports visible in the viewer determine the number of pages occupied by images.

When there is more than one page of images, the viewer enables the Up and Down Arrow buttons as appropriate. Clicking the Down Arrow displays the next page of images, while clicking the Up Arrow displays the previous page.

To dynamically change the layout, click the **Grid** button () to launch the **Layout Selection** tool (Figure 5-10).

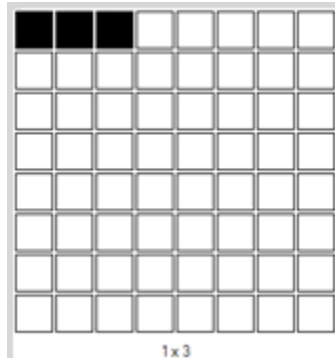








Figure 5-10: Layout Selection tool

The tool's shaded squares represent the grid layout to be applied to the viewer. Once the final selection is made, the viewer renders the case in the selected layout, where the top-left corner Viewport of the grid will be occupied by the image that is in the current layout's top-left Viewport.

The viewport tools (Table 5-1) are used to manipulate image presentation.

Table 5-1: Viewport Tools

Tool	Tool Description
	Adjusts the image magnification to fit the width of the Viewport. The operation preserves the image's aspect ratio.
	Adjusts the image magnification to fit into the Viewport in both vertical and horizontal direction while preserving the image's aspect ratio.
	Magnifier tools can be used to increase or reduce the magnification of the image.
	Rotates the image 90 degrees to the left or to the right.
	Resets the image to the presentation that was used when the image was loaded.
	Sliders adjust brightness and contrast.

5.5 Working with Radiology Images

The loading of radiology images is controlled by the modality specific Layout settings. A radiology case may be auto loaded and laid out using all available Viewports or may only load into the full resolution viewer's abstract strip. The user may, at any time, drag an abstract to an unused Viewport, or double-click an abstract to load the entire case into the available Viewports.

5.5.1 Viewports

The Viewer uses one or more Viewports for image display. A Viewport can contain a single image or a group of related images. How images display is largely dependent on the organization of the DICOM study. As a general guideline one can expect that:

- Images of a general radiology (CR or DX) exam usually display one image per Viewport.
- Images of CT or MR exams are usually divided among several Viewports:
 - One Viewport per series (or sequence)
 - Optionally one Viewport for scout (localizer) images

Images in a Viewport can be adjusted independently from images in other Viewports. Within a Viewport, all images can be adjusted at once or single images can be adjusted independently.

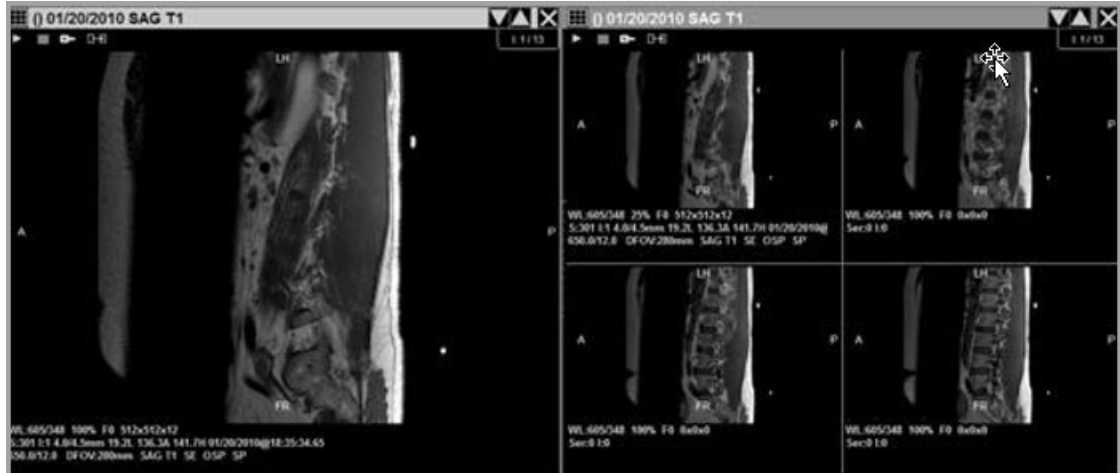


Figure 5-11: Viewport images

Viewports can display one image at a time (stacked view) or several images at once (tiled view). Users can switch between views without having to reload an exam.



Figure 5-12: Viewport display

The Paging buttons are shown in Figure 5-13.

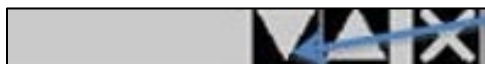


Figure 5-13: Paging buttons

Contents bar: The I label indicates the current image Tick marks as shown in Figure 5-14.

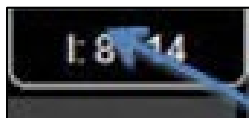


Figure 5-14: Contents bar

The white label indicates the current image as shown in Figure 5-15.



Figure 5-15: White label

The Image Info Area displays at the bottom of the Viewport display.



Figure 5-16: Image Info Area

5.5.1.1 The Title Bar

The Viewport Title bar displays the case ID, status, and date of the exam. The Viewport Title bar may also display other information, such as the series ID.

If there is not enough space to display all the text in the Viewport Title bar, pause the mouse pointer over the title bar expand it and display all its contents.

5.5.1.2 The Contents Bar

The Contents bar is located in the upper-right corner of a Viewport. It displays the number of exams, image sets (series), and images in the Viewport.

5.5.1.3 Tick Marks

In Viewports that contain multiple images, the relative position of the selected image in the stack is indicated by tick marks on the left side of the Viewport. The I label in the Contents bar can also indicate the position of an image in the stack.

5.5.1.4 The Image Information Area

The information area at the bottom of a Viewport displays such details about the selected image as image number, acquisition date/time, the image's current display properties (window/level, scale, and so on), and other acquisition data.

If there is not enough space to display all image information, you can pause the mouse pointer over the area to make it expand and display all its contents.

Clicking the information area opens the **Image Detail** window.

5.6 Manipulating Images

5.6.1 Changing Image Properties

The following changes can be made to images displayed in Viewports:

- Scale
- Pan
- Window/Level
- Invert
- Orientation
- Sharpness
- Reset


5.6.1.1 Scaling Images

An image can be dynamically zoomed from 5% to 800%, or it can be scaled to a specific percentage of its original size. You can also expand an image in the Viewer window to the size of an entire screen.

As an image's scale is changed, the current scale percentage is shown in the image information area at the bottom of the Viewport.




5.6.1.1.1 To Change Scale Dynamically

1. Select the image you want to scale.
2. Drag the image using the right mouse button while pressing the Ctrl key.

You can also turn on the Scale tool ():

1. Select the toolbar or right-click any image.
2. Click **Scale** and change the scale by dragging with the left-mouse button.
3. When you have finished using the scale tool, turn it off by right-clicking once.

To Scale an Image to a Specific Size:

1. Select the Scale tool in the toolbar or right-click any image.
2. Click **Scale**.
3. Point to the image you want to change and do any of the following:
 - a. To scale the image to 100%, point near the top-left corner of the Viewport until the mouse pointer changes to this: . Click once.
 - b. To scale the image to fit the Viewport, point near the top middle part of the Viewport until the mouse pointer changes to this: . Click once.
 - c. To scale the image to 50, 75, 125, 150, or 200%, point near the top-right corner of the Viewport until the mouse pointer changes to this: . Click once. Then click a scale option in the displayed menu.

Note: While the Scale tool is turned on, you can also zoom in or out by dragging with the left mouse button.

4. Do one of the following:
 - Continue using the Scale tool.
 - Disable it by right-clicking once.
 - Select another tool.


To Use Full-Screen View:

1. In the Viewer window, double-click an image. The image expands to fill an entire screen.
2. While the full-screen view is active, you can:
 - Adjust (window/level, flip/rotate, and so on) the current image.
 - Scroll to other images.
 - Use the Cine tool.

3. When you have finished, double-click the image to restore it to its original size.

5.6.1.2 Panning Images

To pan an image, select the image you want to pan and drag it using the left-mouse button. Images that are completely visible cannot be panned.


Note: If the image does not pan, right-click once to make sure that no other tools are active. (The mouse pointer appears like this when no tools are active: .)

5.6.1.2.1 Changing Window/Level


You can change an image's window/level using the mouse, the keyboard, or a combination of both. You can also use the Auto-Window/Level tool to base window/level values on a selected area in an image.

As an image's window/level is changed, the area under the image updates to show the current window/level values. Unless Apply To settings have been changed, window/level changes affect all images in the Viewport.

To Change Window/Level:

1. Point to the image you want to adjust and drag it using the right mouse button.
 - Drag up or down to change window (window width) values.
 - Drag left or right to change level (window center) values.
2. You can also select the Window/Level tool () in the toolbar and change window/level by dragging it with the left-mouse button.
3. When you have finished using the Window/Level tool, turn it off by right-clicking once.

To Use the Auto-Window/Level Tool:

1. Click the Auto-Window/Level tool () in the toolbar.
2. Within the image you want to adjust, drag the mouse pointer to define a rectangular area that includes the tissue you want to base the window/level on.

When the drag/highlight is completed, the new window/level values are applied to the entire image.


3. Do one of the following:
 - Continue using the Auto-Window/Level tool.
 - Disable it by right-clicking once.

- Select another tool.

5.6.1.2.2 Inverting Grayscale Values

You can invert grayscale values to create a Negative view of an image.


To Invert an Image:

1. Right-click any image and click **Invert**. You can also:
 - a. Click the Invert tool () in the toolbar.
 - b. Click the image you want to invert.
 - c. Do one of the following:
 - Continue using the Invert tool.
 - Disable it by right-clicking once.
 - Choosing another tool.


5.6.1.2.3 Reorienting Images

You can change an image's orientation by rotating it 90 degrees or by flipping it front to back. As changes are made, any positional indicators displayed near the edges of the image update to reflect the new orientation. (This does not include markers that are burned into the image itself.)

To Rotate Images 90 Degrees:

1. Click the Rotation tool () in the toolbar.
2. Point to the image you want to rotate.
 - To rotate the image counterclockwise, click the left side of the image.
 - To rotate the image clockwise, click the right side of the image.
3. Do one of the following:
 - Continue using the Rotate tool.
 - Disable it by right-clicking once.
 - Choose another tool.

To Flip Images:

1. Click the Flip tool () in the toolbar.
2. Point to the image you want to flip.
 - To flip the image vertically, click the top part of the image.

- To flip the image horizontally, click the bottom part of the image.

5.6.1.3 Changing Layout


You can specify the layout (number of rows and columns) in a window and in each Viewport. The layout of each Viewport or window can be set independently.

To Use Full-Screen View:

In the Viewer window, you can double-click an image to expand it to fit the current screen.


- While you are in full-screen view, you can adjust the image or scroll to other images.
- When you have finished, double-click again to return to the original screen layout.

To Change Layout in a Viewport:

1. In the upper-left corner of a Viewport, click the Layout tool () and drag it down using the mouse.
2. In the grid that displays, move the mouse until the desired number of rows and columns are highlighted.
3. Click the left mouse button.

Note: Layout cannot be changed if the Viewport contains only one image.

To Change Layout in the Viewer:

1. In the toolbar, select the Viewer Layout tool () and drag it down using the mouse.
2. In the grid that displays, move the mouse until the desired number of rows and columns are highlighted.
3. Click the left mouse button.

5.6.1.4 Copying Properties


You can copy properties, such as window/level, scale, position (pan), and orientation, from one Viewport to another. You can copy several properties at once or copy a single property only.

To Control Which Properties Are Copied:

1. In any occupied Viewport, click the Copy tool () and drag down to display the menu.

- A check mark indicates properties to be copied.
 - The absence of a check mark indicates properties that will not be copied.
2. Select a property to add or remove a checkmark. The settings you select affect all Viewports in all windows and will be retained for the duration of your session.

To Copy Properties (Copy Icon):

1. Select the image with the properties you want to copy.
2. Click the Copy tool () in the source Viewport.
3. Click an image in the target Viewport.
4. Do one of the following:
 - Continue using the Copy tool.
 - Disable it by right-clicking once.
 - Select another tool.

To Set Initial Copy Settings:

1. In the Viewer or Manager toolbar, click **View | Settings**.
2. Click the **Viewport** tab.
3. In the Copy Options area, select each property to be copied when the Copy Properties feature is used.
4. Click **OK**.

5.6.1.5 Linking Viewports

Viewports in the Viewer can be linked. When Viewports are linked, scrolling and paging changes made in one Viewport affect all linked Viewports. Changes to scale, orientation, and so on, performed in one Viewport can affect all linked Viewports as well.

When Viewports are linked, the Link icon located near the top of the Viewport displays as follows:



Figure 5-17: Link icon with Viewports linked



When Viewports are not linked, the Link icon changes appearance:



Figure 5-18: Link icon with Viewports not linked


To Link Viewports:

If the Viewports being linked contain images from different exams, select anatomically equivalent areas in each Viewport before creating the link.

1. In one of the Viewports you want to link, click this Link tool ().
2. Click each Viewport you want to link. As the link is established, the Link icon will change (.
3. When you have finished, right-click once to turn off the link function. Links are retained until the exam is closed or until the link is explicitly removed.
4. Scroll or adjust the contents of one of the linked Viewports as desired. Changes are reflected in all linked Viewports.

Important: If the linked Viewports contain images from the same exam (for example, all images have the same Frame of Reference UID), each Viewport shows the same anatomy as you scroll or page through images in the linked Viewports.

To Unlink Viewports:

1. Use either of the following methods:
 - Point to the Viewport you want to unlink, press the Ctrl key, then click the Link tool (.
 - In the Viewport you want to unlink, click the Link tool, and drag down a short distance with the mouse.
2. Click **Unlink**.

To Control Which Properties are Linked:

1. In a linked Viewport, click the Link tool and drag down to open the menu.
 - A check mark indicates that changes for a particular property have been applied across all linked Viewports.
 - The absence of a check mark indicates that changes for a particular property have been applied to the current Viewport only.
2. Select a property to add or remove a check mark.

The settings you select affect all linked Viewports until the Viewports are cleared. If there are multiple links active, settings for each link group can be set independently.

5.6.1.6 Moving Image Sets

Images can be moved from one Viewport to another.

To Move Images:



1. Locate the Viewport you want to use as the target Viewport.
 - The target Viewport can be empty, or it can contain a single image set.
 - The target Viewport cannot contain more than one image set. The Contents bar in the upper-right corner indicates how many image sets (series) are present.
2. Drag the title bar of the Viewport that contains the images you want to move into the target Viewport.
 - If the source Viewport contains any hidden image sets, the next hidden image set displays when the move is completed.
 - If the target Viewport was previously occupied, your current drag-and-drop settings determine if the contents of the target Viewport are swapped or replaced.

5.6.1.7 Sorting Image Sets

Images in a Viewport are automatically sorted based on information from the acquisition modality. If necessary, you can override the default sorting used and set your own sort order.

5.6.1.8 Using the Cine Tool

5.6.1.8.1 Starting and Stopping the Cine Tool

1. If there are multiple images visible in the Viewport (tiled view), click the image that you want to use as a starting point.
2. Click the Arrow () button located in the upper-left corner in a Viewport.
3. When you have finished, click the Halt () button to stop the Cine tool.

5.6.1.8.2 To Set Cine Speed

1. Open the Cine menu by clicking the Arrow or Halt buttons and dragging down with the mouse.
2. Point to **Speed**, then click **Low**, **Medium**, or **High**.

Note: To set the default cine speed, click **View | Settings | Viewport**, then select an option from the Cine Speed box.

5.6.1.8.3 To Set Cine Direction

1. Open the Cine menu by clicking the Arrow or Halt buttons and dragging down with the mouse.
2. Point to **Direction** and click **Loop Forward**, **Loop Reverse**, or **Yoyo**.
 - The direction you select takes effect immediately, including any currently running Cines.
 - All Viewports are affected by the change.

Note: To set the default Cine direction, click **View | Settings | Viewport**, then select an option from the Cine Direction box.

5.6.1.8.4 To Set the Cine Range

1. If the Cine tool is running, stop it by clicking the Halt button.
2. Display the image to be the first image in the Cine range.
3. Open the Cine menu by clicking the Arrow button and dragging down with the mouse.
4. Point to **Range**, then click **First Cine Image**.
5. Display the image to be the last image in the range.
6. Open the Cine menu by clicking the Arrow button and dragging a short distance with the mouse.
7. Point to **Range**, then click **Last Cine Image**.

5.6.1.8.5 To Reset the Cine Range


1. Open the Cine menu by clicking the Arrow or Halt buttons and dragging down with the mouse.
2. Point to **Range**, then click **Reset**.

5.6.1.8.6 Using Sharpen/Smooth

You can apply sharpen/smooth filters to an image. Unless **Apply To** settings have been changed, sharpen/smooth changes affect all images in the Viewport.

The info area at the bottom of each Viewport displays which filter is used, where F+N indicates a sharpen filter, and where F-N indicates a smooth filter.

5.6.1.8.7 Sharpening or Smoothing an Image

1. Click the Sharpen tool () in the toolbar or right-click any image and then click **Sharpen**.
2. Point to the image you want to adjust and drag the mouse using the left-mouse button.
 - To increase sharpness, drag up or left.
 - To decrease sharpness, drag down or right.
3. Continue using the Sharpen/smooth tool or disable it by right-clicking once or by choosing another tool.

5.6.1.9 Mensurated Scale

When an image is displayed, a mensurated scale is displayed on the left side of the image's Viewport. The scale uses pixel size data in the image header. If there is no pixel size data available for the image, you can use the Calibrate tool to establish a pixel size. See Section 5.6.1.14 for additional information.

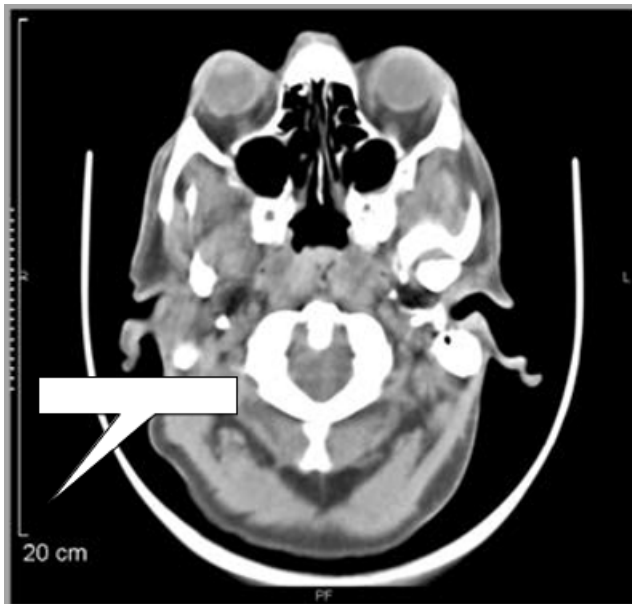


Figure 5-19: Mensurated Scale

To Display the Mensurated Scale:

1. With an image in the Viewport, right-click to display the Context menu.
2. Click the **Mensurated scale** option from the menu. The scale displays to the left of the image.

To Remove the Mensurated Scale From View:

Right-click the image to display the Image context menu.

5.6.1.10 Annotations**5.6.1.10.1 Annotation Basics**

You can use annotations to call attention to areas of interest in an image. Text labels or measure image features can also be added. Annotations that are added during a session are not saved with the image and will be discarded when the Image Viewer is closed.

5.6.1.10.2 Adding Shapes and Labels

You can add lines, shapes, and text to an image.

Note: Any hidden annotations in an image are displayed when you select an annotation- related tool.

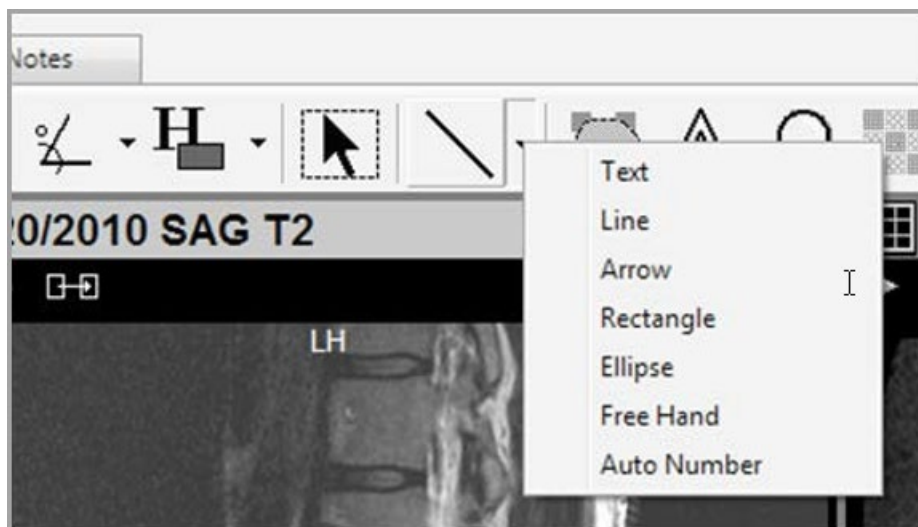


Figure 5-20: Annotation tools

To Add Lines and Arrows:

1. Click the Annotation button in the toolbar to turn on the Line or Arrow tool.
2. Click to set the start point of the line, drag the mouse, and release the mouse button when the line or arrow is the desired length.

You can add additional annotations, select a different tool, or right-click once to turn off the active tool.

To Add Rectangles and Ellipses:


1. Use the Annotation button in the toolbar to turn on the Rectangle or Ellipse tool.
2. Drag the mouse to draw the line or shape. An outline displays as you drag the mouse.
3. Release the left mouse button when the outlined area is the desired size.

You can add additional annotations, select a different tool, or right-click once to turn off the active tool.

To Add freehand Shapes:

1. Use the Annotation button in the toolbar to turn on the Free Hand tool.
2. Outline the area of interest by clicking three or more spots around its area.
3. Right-click once to stop adding handles.
4. Continue adding a new freehand shape, or right-click a second time to turn off the tool.
5. To adjust the freehand shape, enable edit mode, then drag the handles as needed. See [To Edit Annotations](#) for additional information.

To Add text Labels:

1. Turn on the Text tool by doing one of the following:
 - Use the Annotation button in the toolbar to turn on the Text tool.
 - If the button noted above is not visible, click the arrow next to the Annotation button () , then click **Text**.
2. In the image you want to annotate, drag the mouse to define a box that contains the text. When you complete the drag, a blinking cursor is displayed in the box.
3. Type the text you want to display in the box.
 - The text you enter wraps, based on the width of the box.
 - You can copy text to and from the text box using Ctrl-C and Ctrl-V.
 - To add a line break, press Enter.
4. Click once outside of the box to finalize your edits.

You can add additional annotations, select a different tool, or right-click once to turn off the active tool.

To Add Auto Numbers:

1. Turn on the Auto Number tool by doing one of the following:
 - If the button noted above is not visible, click the arrow next to the Annotation button, then click **Auto Number**.
 - In the **Auto Number** dialog that displays, click the buttons that correspond to the numbering style and starting point you want to use.
2. Click each point in the image where you want a number to appear.

Add additional numbers, select a different tool, or right-click once to turn off the active tool.


Note: Spinal labels are incremented from C1 to L6. After L6 is used, auto-numbering is turned off automatically.

5.6.1.11 Adding Measurements

You can measure lengths, areas, angles, and Hounsfield values in an image. If you want measurements to be saved, make sure the exam is locked before adding measurements.

Note: Before measuring a small image feature, increase the scale of the image to improve the placement of the measurement.

To Measure Lines:

1. Click the Measure | Length tool () in the toolbar, or right-click an image and select **Measure | Length**.


Note: If the mouse pointer changes, you must use the Calibrate tool before proceeding.

2. Point to the part of the image from which you want to begin measuring.
3. Drag the mouse to create the measurement line. Once you have finished dragging, a label displays next to the line, displaying the measurement.
4. Drag the **text results** to reposition as needed.


Note: If the measurement label includes a (c) or a (c*) label, the measurement is based on a manual calibration, rather than on a modality-defined pixel size.

5. Continue adding measurement lines or right-click once to turn off the tool.

To Measure Angles:

1. Click the Measure | Angle tool () in the toolbar, or right-click an image and select **Measure | Angle**.
2. Drag the mouse to draw the first line of the angle. The second line of the angle is automatically created.
3. Drag either or both lines by their handles to adjust the angle.
4. Drag the text results to reposition as needed.
5. Continue adding angles, or right-click once to turn off the tool.

To Measure Cobb Angles:

1. Click the Measure | Cobb Angle tool () in the toolbar, or right-click an image and select **Measure | Cobb Angle**.
2. Starting with the top-most line to be drawn, drag the mouse to create the line. The program automatically creates the second line.
3. Reposition the lines as needed by dragging the handles. Drag the text results to reposition as needed.
4. Continue adding angles or right-click once to turn off the tool.

5.6.1.12 Using the Hounsfield Tool

The Hounsfield tool offers the capabilities to measure areas captured in ellipse or freehand shape, as well as rectangles.

To Measure Rectangular or Elliptical Areas:

1. Select the area to be measured.
2. Click to set the start point of the rectangle or ellipse.
3. Drag the mouse and release the mouse button when the ellipse covers the desired area.
4. Drag the end points of the perpendicular lines as needed to adjust.
5. Drag the text results to reposition as needed.
6. Continue adding Hounsfield measurements, or right-click once to turn off the tool.



To Measure Freehand Areas:

1. Outline the area to be measured by clicking three or more spots around its area.



2. Right-click once to stop adding handles.
3. Continue adding a new freehand measurement, or right-click a second time to turn off the tool.
4. To adjust the measurement, enable the Edit mode.
5. Reposition the text results or drag the handles as needed. See [To Edit Annotations](#) for additional information.

5.6.1.13 Working with Annotations

To Move Annotations:

1. Click the Select tool () in the toolbar.
2. Click the Lock tool () near the annotation you want to move or right-click the annotation and select **Edit Annotation**.
3. Once you have finished, you can resize, move, or edit other annotations, or you can right-click once to turn off the tool.

To Resize Annotations:

1. Click the Select tool () in the toolbar.
2. Click the Lock tool () near the annotation you want to resize. Or right-click the annotation and select **Edit Annotation**.
3. Drag any of the sizing handles to change the size of the annotation.

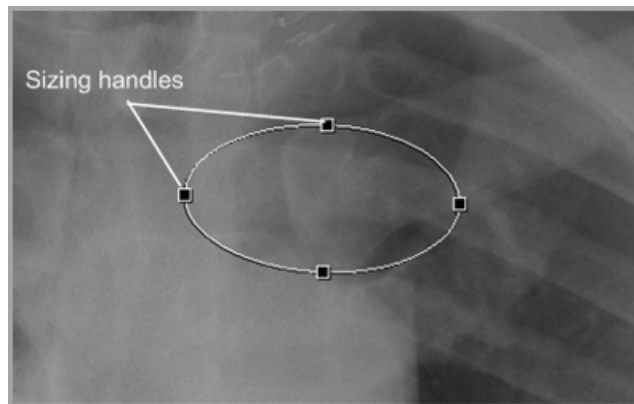




Figure 5-21: Sizing handles

4. Once you have finished, you can resize, move, or edit other annotations, or you can right-click once to turn off the tool.


To Edit Annotations:

1. Click the Lock tool () near the annotation you want to edit. Or right-click the annotation and select **Edit Annotation**.
2. Make the changes you want to the annotation by clicking and dragging handles in a drawing tool or clicking and dragging endpoints in a line.

Note: Only one annotation at a time in an image can be unlocked for editing. Clicking the Lock tool () on an annotation releases only that particular annotation from its locked state.

3. Right-click once to turn off the tool.

To Edit Text Labels:

1. Click the Select tool () in the toolbar to turn on the Select Annotation tool, or right-click the text annotation you want to edit.
2. Double-click the text annotation.
3. Edit the text.
4. Click once outside the text annotation to finalize your edits.
5. Once you have finished, you can resize, move, or edit other annotations, or you can right-click once to turn off the tool.


5.6.1.14 Using Calibrate


The Calibrate tool displays automatically if you try to measure an image that does not have a modality-defined pixel size. If the image in question has an embedded measurement scale, you can use the embedded scale and the Calibrate tool to set a pixel size manually.

If the Calibrate tool has been used, measurement values display one of the following:

- A (c) label indicates that pixel size was set manually
- A (c*) label indicates that a manually defined pixel size has been used to override a modality-defined pixel size

To Use the Calibrate Tool:

1. If the Calibrate tool is not already turned on, click the () tool in the Viewport and drag down to open the menu.
2. Click **Calibrate**.

3. While the mouse pointer appears in this mode () , draw a line between the two points that you want to use to establish a measurement standard.
 - The **Calibrate Image** dialog displays as you start drawing the line.
 - If the line is not ideally placed, you can re-draw the line.
4. In the **Calibrate Image** dialog, enter the length of the line that you drew, and then select the unit length (centimeters, millimeters, or inches).
5. Select the **Apply to Image Set** check box if you want this calibration to be used for all images in the image set. Otherwise, the calibration applies to the individual image only.
6. Click **OK**.


Note: To remove calibration settings for a Viewport, clear and reload the image in the Viewport.


Using the Image Detail Window:

Open the **Image Detail** window by clicking the information area at the bottom of an occupied Viewport. Opening this window causes three tabs to display:

- **Full Header tab** – Displays the entire DICOM header except for private elements and Look Up Tables.
- **Display Data tab** – Lists acquisition data for the selected image
- **Image Data tab** – Lists DICOM header data

Information in the **Image Detail** window is updated if you select a different image in the same Viewport.

To close the **Image Detail** window, click the Exit icon () , or click the information area that the window was opened from.

You can click the Information icon () in the toolbar to open an instance of this window for each occupied Viewport. Clicking the Information icon again closes all windows

Appendix A RPCs

The Image Viewer code calls the following existing RPCs to acquire contextual information upon the receipt of a windows message. All RPC calls are made from the Abstract View component, and the results are communicated to the Full-Resolution Viewer component. This allows the Full-Resolution Viewer component to be independent of EHR.

The KIDS package automatically assigns them to the proper menu options to make them accessible to the EHR client.

Table 5-2: RPC Contextual Information

RPC	Required
RPC: MAGJ USER2	Yes
RPC: MAGG CPRS RAD EXAM INPUT PARAMETER: CPRSMMSG String from the CPRS Windows Message Sample CPRSMMSG: RPT^CPRS^20^RA^i6918775.83 69-1^39 RETURN PARAMETER: Array of Image data	Yes
NAME: MAG3 CPRS TIU NOTE RETURN VALUE TYPE: ARRAY Returns a list of all images for a TIU document INPUT PARAMETER: TIUDA DESCRIPTION: internal entry number of the TIU document RETURN PARAMETER DESCRIPTION: Array of “^” delimited Image information in the format	Yes
RPC: MAGGUSERKEYS RETURN VALUE TYPE: ARRAY Returns an array of Imaging keys that a user holds INPUT PARAMETER: DUZ DESCRIPTION: Internal entry number of current user RETURN PARAMETER DESCRIPTION: Array of imaging keys A(1),A(2)...	Yes Note: This is not a new RPC (it is used by Vista Imaging Clinical Display), but it is new for use with the imaging viewer.

Appendix B Troubleshooting

B.1 Information

Important: Read the EHR_1.1_27 NOTES prior to this installation. Compare and confirm that files from NOTES are present in the VueCentric folder.

B.1.1 Required Software and Security

- VA Kernel v8.0 patch 1019
- VA FileMan v22.0 or later
- Cache v5.0 or later
- EHR*1.1*26 NCPDP
- Microsoft Visual C++ 2013 Redistributable (x86)
- RPMS MAG Security Key: MAGDISP CLIN

B.1.2 RPMS Security Keys Required

Important Security NOTE for EHR_1.1_27 and the Image Viewer Component and Its Use:

RPMS/EHR end users needing to view image files associated with either a TIU NOTE or REPORT (Imaging) *must* have the MAGDISP CLIN security key assigned.

Absence of this security *key* assignment will inhibit both abstract display and the ability to view image files in the IHS Imaging Viewer.

Review pertinent end-user security keys prior to the installation of both the RPMS EHR_1.1_27 KIDS and the EHR_1.1_27 executable.

B.1.3 File Version References for EHR_1.1_27 NOTES for the Image Viewer

Table 5-3: B.1.3 File Version References for EHR_1.1_27

Filename	Version
AvalonDock.dll	2.0.1771
AxInterop.RadCoreLib.dll	1
AxInterop.SumatraPdfOcxLib.dll	1
AxInterop.WMPLib.dll	1

Filename	Version
BEH2FA.dll	1.0.7349.15753
cda.xsl	2019.10.22.230504
DCMActiveX.dll	1.0.0.1
dcmj2pnm.exe	2014.12.18.194842
Dicom.Core.dll	4.0.3
Dicom.Native.dll	2019.10.22.201016
GalaSoft.MvvmLight.Extras.WPF4.dll	4.1.27.22692
GalaSoft.MvvmLight.WPF4.dll	4.1.27.22692
HtmlRenderer.dll	1.0.7348.19004
HtmlRenderer.PdfSharp.dll	1.0.7348.19007
IHS.ImageViewer.Bridge.Viewer.dll	1.0.7348.19009
IHS.ImageViewer.Common.dll	1.0.7348.19007
IHS.ImageViewer.dll	1.0.7349.35790
IHS.ImageViewer.dll.config	2019.12.4.214444
IHS.ImageViewer.exe	1.0.7349.35796
IHS.ImageViewer.exe.config	2019.10.21.232614
IHS.ImageViewer.exe.manifest	2020.2.6.4120
IHS.ImageViewer.RadCore.Net.dll	1.0.7348.19029
IHS.Wpf.DragDrop.dll	1.0.0.1
ImageViewer.chm	2020.1.17.223147
Interop.RadCoreLib.dll	1
Interop.SumatraPdfOcxLib.dll	1
Interop.WMPLib.dll	1
Ionic.Zip.dll	1.9.1.8
LayoutSelect.dll	3.0.0.22
libmupdf.dll	2.4
log4net.dll	1.2.13
LSToolKit.dll	1.0.0.9990
Mag_DicomTags.txt	2014.12.26.212356
MAG_Dicom_Attributes.lst	2014.12.26.212356
MAG_Special_Attributes.lst	2014.12.26.212356
Mag_statusdatasettings.txt	2014.12.26.212354
MediaViewer.Net.dll	1
nunit.framework.dll	2.6.3.13283
PdfSharp.Charting.dll	1.50.4000
PdfSharp.dll	1.50.4000

Filename	Version
RadCore.dll	1.0.0.1
SliceCalc.dll	1.0.0.1
SumatraPDF.dll	2.4
SumatraPdf.Net.dll	1.0.0.1
SumatraPdf.Ocx.dll	1.0.0.1
System.Windows.Interactivity.dll	2.0.20525
TargaFile.dll	3.0.0.22
VA_DelphiUtils.dll	2019.7.29.195918
VA_DelphiUtilsEx.dll	2019.7.29.195918
VA_DICOM.dll	2019.12.4.220910
VA_GridCtrl.dll	1.0.0.1
VA_ImgLdrCtrl.dll	1.0.0.2
VA_Manager.dll	1.0.0.1
VA_Shared.dll	1.0.0.1
VA_StackViewCtrl.dll	1.0.0.1
VA_Vistarad.dll	1.0.0.1
WmpAxLib.dll	1
Xceed.Wpf.Toolkit.dll	2

B.1.4 For additional Technical Support for EHR_1.1_27 and the BMAG*3.0*190 Image Viewer

- Tier 1 Local Information Technology – initiation.
 - Tier 2 Area Office Information Technology. Submitted by local site to Area IT.
 - Tier 3 OIT Help Desk – Submitted by Area IT to IHS IT Service Desk itsupport@ihs.gov

Appendix C Rules of Behavior

The Resource and Patient Management (RPMS) system is a United States Department of Health and Human Services (HHS), Indian Health Service (IHS) information system that is **FOR OFFICIAL USE ONLY**. The RPMS system is subject to monitoring; therefore, no expectation of privacy shall be assumed. Individuals found performing unauthorized activities are subject to disciplinary action including criminal prosecution.

All users (Contractors and IHS Employees) of RPMS will be provided a copy of the Rules of Behavior (ROB) and must acknowledge that they have received and read them prior to being granted access to a RPMS system, in accordance IHS policy.

- For a listing of general ROB for all users, see the most recent edition of *IHS General User Security Handbook* (SOP 06-11a).
- For a listing of system administrators/managers rules, see the most recent edition of the *IHS Technical and Managerial Handbook* (SOP 06-11b).

Both documents are available at this IHS Web site:

<https://home.ihs.gov/security/index.cfm>.

<p>Note: Users must be logged on to the IHS D1 Intranet to access these documents.</p>

The ROB listed in the following sections are specific to RPMS.

C.1 All RPMS Users

In addition to these rules, each application may include additional ROB that may be defined within the documentation of that application (e.g., Dental, Pharmacy).

C.1.1 Access

RPMS users shall

- Only use data for which you have been granted authorization.
- Only give information to personnel who have access authority and have a need to know.
- Always verify a caller's identification and job purpose with your supervisor or the entity provided as employer before providing any type of information system access, sensitive information, or nonpublic agency information.
- Be aware that personal use of information resources is authorized on a limited basis within the provisions *Indian Health Manual* Part 8, "Information Resources Management," Chapter 6, "Limited Personal Use of Information Technology Resources."

RPMS users shall not

- Retrieve information for someone who does not have authority to access the information.
- Access, research, or change any user account, file, directory, table, or record not required to perform their *official* duties.
- Store sensitive files on a PC hard drive, or portable devices or media, if access to the PC or files cannot be physically or technically limited.
- Exceed their authorized access limits in RPMS by changing information or searching databases beyond the responsibilities of their jobs or by divulging information to anyone not authorized to know that information.

C.1.2 Information Accessibility

RPMS shall restrict access to information based on the type and identity of the user. However, regardless of the type of user, access shall be restricted to the minimum level necessary to perform the job.

RPMS users shall

- Access only those documents they created and those other documents to which they have a valid need-to-know and to which they have specifically granted access through an RPMS application based on their menus (job roles), keys, and FileMan access codes. Some users may be afforded additional privileges based on the functions they perform, such as system administrator or application administrator.
- Acquire a written preauthorization in accordance with IHS policies and procedures prior to interconnection to or transferring data from RPMS.

C.1.3 Accountability

RPMS users shall

- Behave in an ethical, technically proficient, informed, and trustworthy manner.
- Log out of the system whenever they leave the vicinity of their personal computers (PCs).
- Be alert to threats and vulnerabilities in the security of the system.
- Report all security incidents to their local Information System Security Officer (ISSO)
- Differentiate tasks and functions to ensure that no one person has sole access to or control over important resources.
- Protect all sensitive data entrusted to them as part of their government employment.

- Abide by all Department and Agency policies and procedures and guidelines related to ethics, conduct, behavior, and information technology (IT) information processes.

C.1.4 Confidentiality

RPMS users shall

- Be aware of the sensitivity of electronic and hard copy information and protect it accordingly.
- Store hard copy reports/storage media containing confidential information in a locked room or cabinet.
- Erase sensitive data on storage media prior to reusing or disposing of the media.
- Protect all RPMS terminals from public viewing at all times.
- Abide by all Health Insurance Portability and Accountability Act (HIPAA) regulations to ensure patient confidentiality.

RPMS users shall not

- Allow confidential information to remain on the PC screen when someone who is not authorized to that data is in the vicinity.
- Store sensitive files on a portable device or media without encrypting.

C.1.5 Integrity

RPMS users shall

- Protect their systems against viruses and similar malicious programs.
- Observe all software license agreements.
- Follow industry standard procedures for maintaining and managing RPMS hardware, operating system software, application software, and/or database software and database tables.
- Comply with all copyright regulations and license agreements associated with RPMS software.

RPMS users shall not

- Violate federal copyright laws.
- Install or use unauthorized software within the system libraries or folders.
- Use freeware, shareware, or public domain software on/with the system without their manager's written permission and without scanning it for viruses first.

C.1.6 System Logon

RPMS users shall

- Have a unique User Identification/Account name and password.
- Be granted access based on authenticating the account name and password entered.
- Be locked out of an account after five successive failed login attempts within a specified time period (e.g., one hour).

C.1.7 Passwords

RPMS users shall

- Change passwords a minimum of every 90 days.
- Create passwords with a minimum of eight characters.
- If the system allows, use a combination of alpha-numeric characters for passwords, with at least one uppercase letter, one lower case letter, and one number. It is recommended, if possible, that a special character also be used in the password.
- Change vendor-supplied passwords immediately.
- Protect passwords by committing them to memory or store them in a safe place (do not store passwords in login scripts or batch files).
- Change passwords immediately if password has been seen, guessed, or otherwise compromised, and report the compromise or suspected compromise to their ISSO.
- Keep user identifications (IDs) and passwords confidential.

RPMS users shall not

- Use common words found in any dictionary as a password.
- Use obvious readable passwords or passwords that incorporate personal data elements (e.g., user's name, date of birth, address, telephone number, or social security number; names of children or spouses; favorite band, sports team, or automobile; or other personal attributes).
- Share passwords/IDs with anyone or accept the use of another's password/ID, even if offered.
- Reuse passwords. A new password must contain no more than five characters per eight characters from the previous password.
- Post passwords.
- Keep a password list in an obvious place, such as under keyboards, in desk drawers, or in any other location where it might be disclosed.

- Give a password out over the phone.

C.1.8 Backups

RPMS users shall

- Plan for contingencies such as physical disasters, loss of processing, and disclosure of information by preparing alternate work strategies and system recovery mechanisms.
- Make backups of systems and files on a regular, defined basis.
- If possible, store backups away from the system in a secure environment.

C.1.9 Reporting

RPMS users shall

- Contact and inform their ISSO that they have identified an IT security incident and begin the reporting process by providing an IT Incident Reporting Form regarding this incident.
- Report security incidents as detailed in the *IHS Incident Handling Guide* (SOP 05-03).

RPMS users shall not

- Assume that someone else has already reported an incident. The risk of an incident going unreported far outweighs the possibility that an incident gets reported more than once.

C.1.10 Session Timeouts

RPMS system implements system-based timeouts that back users out of a prompt after no more than 5 minutes of inactivity.

RPMS users shall

- Utilize a screen saver with password protection set to suspend operations at no greater than 10 minutes of inactivity. This will prevent inappropriate access and viewing of any material displayed on the screen after some period of inactivity.

C.1.11 Hardware

RPMS users shall

- Avoid placing system equipment near obvious environmental hazards (e.g., water pipes).
- Keep an inventory of all system equipment.

- Keep records of maintenance/repairs performed on system equipment.

RPMS users shall not

- Eat or drink near system equipment.

C.1.12 Awareness

RPMS users shall

- Participate in organization-wide security training as required.
- Read and adhere to security information pertaining to system hardware and software.
- Take the annual information security awareness.
- Read all applicable RPMS manuals for the applications used in their jobs.

C.1.13 Remote Access

Each subscriber organization establishes its own policies for determining which employees may work at home or in other remote workplace locations. Any remote work arrangement should include policies that

- Are in writing.
- Provide authentication of the remote user through the use of ID and password or other acceptable technical means.
- Outline the work requirements and the security safeguards and procedures the employee is expected to follow.
- Ensure adequate storage of files, removal, and nonrecovery of temporary files created in processing sensitive data, virus protection, and intrusion detection, and provide physical security for government equipment and sensitive data.
- Establish mechanisms to back up data created and/or stored at alternate work locations.

Remote RPMS users shall

- Remotely access RPMS through a virtual private network (VPN) whenever possible. Use of direct dial in access must be justified and approved in writing and its use secured in accordance with industry best practices or government procedures.

Remote RPMS users shall not

- Disable any encryption established for network, internet, and Web browser communications.

C.2 RPMS Developers

RPMS developers shall

- Always be mindful of protecting the confidentiality, availability, and integrity of RPMS when writing or revising code.
- Always follow the IHS RPMS Programming Standards and Conventions (SAC) when developing for RPMS.
- Only access information or code within the namespaces for which they have been assigned as part of their duties.
- Remember that all RPMS code is the property of the U.S. Government, not the developer.
- Not access live production systems without obtaining appropriate written access and shall only retain that access for the shortest period possible to accomplish the task that requires the access.
- Observe separation of duties policies and procedures to the fullest extent possible.
- Document or comment all changes to any RPMS software at the time the change or update is made. Documentation shall include the programmer's initials, date of change, and reason for the change.
- Use checksums or other integrity mechanism when releasing their certified applications to assure the integrity of the routines within their RPMS applications.
- Follow industry best standards for systems they are assigned to develop or maintain and abide by all Department and Agency policies and procedures.
- Document and implement security processes whenever available.

RPMS developers shall not

- Write any code that adversely impacts RPMS, such as backdoor access, "Easter eggs," time bombs, or any other malicious code or make inappropriate comments within the code, manuals, or help frames.
- Grant any user or system administrator access to RPMS unless proper documentation is provided.
- Release any sensitive agency or patient information.

C.3 Privileged Users

Personnel who have significant access to processes and data in RPMS, such as, system security administrators, systems administrators, and database administrators, have added responsibilities to ensure the secure operation of RPMS.

Privileged RPMS users shall

- Verify that any user requesting access to any RPMS system has completed the appropriate access request forms.
- Ensure that government personnel and contractor personnel understand and comply with license requirements. End users, supervisors, and functional managers are ultimately responsible for this compliance.
- Advise the system owner on matters concerning information technology security.
- Assist the system owner in developing security plans, risk assessments, and supporting documentation for the certification and accreditation process.
- Ensure that any changes to RPMS that affect contingency and disaster recovery plans are conveyed to the person responsible for maintaining continuity of operations plans.
- Ensure that adequate physical and administrative safeguards are operational within their areas of responsibility and that access to information and data is restricted to authorized personnel on a need-to-know basis.
- Verify that users have received appropriate security training before allowing access to RPMS.
- Implement applicable security access procedures and mechanisms, incorporate appropriate levels of system auditing, and review audit logs.
- Document and investigate known or suspected security incidents or violations and report them to the ISSO, Chief Information Security Officer (CISO), and systems owner.
- Protect the supervisor, superuser, or system administrator passwords.
- Avoid instances where the same individual has responsibility for several functions (i.e., transaction entry and transaction approval).
- Watch for unscheduled, unusual, and unauthorized programs.
- Help train system users on the appropriate use and security of the system.
- Establish protective controls to ensure the accountability, integrity, confidentiality, and availability of the system.
- Replace passwords when a compromise is suspected. Delete user accounts as quickly as possible from the time that the user is no longer authorized system. Passwords forgotten by their owner should be replaced, not reissued.
- Terminate user accounts when a user transfers or has been terminated. If the user has authority to grant authorizations to others, review these other authorizations. Retrieve any devices used to gain access to the system or equipment. Cancel logon IDs and passwords and delete or reassign related active and backup files.

- Use a suspend program to prevent an unauthorized user from logging on with the current user's ID if the system is left on and unattended.
- Verify the identity of the user when resetting passwords. This can be done either in person or having the user answer a question that can be compared to one in the administrator's database.
- Shall follow industry best standards for systems they are assigned to and abide by all Department and Agency policies and procedures.

Privileged RPMS users shall not

- Access any files, records, systems, etc., that are not explicitly needed to perform their duties
- Grant any user or system administrator access to RPMS unless proper documentation is provided.
- Release any sensitive agency or patient information.

Acronym List

Acronym	Term Meaning
CAC	Clinical Application Coordinator
CCDA	Consolidated Clinical Document Architecture
CISO	Chief Information Security Officer
CR	Change Request
EHR	Electronic Health Record
FIPS	Federal Information Processing Standards
HHS	Department of Health and Human Services
HIPAA	Health Insurance Portability and Accountability Act
ID	Identification
IHS	Indian Health Service
ISSO	Information System Security Officer
IT	Information Technology
KIDS	Kernel Installation and Distribution System
PDF	Portable Document Format
ROB	Rules of Behavior
RPC	Remote Procedure Call
RPMS	Resource and Patient Management System
SAC	Standards and Conventions
TIU	Text Integration Utility
VA	Department of Veterans Affairs
VPN	Virtual Private Network

Contact Information

If you have any questions or comments regarding this distribution, please contact the IHS IT Service Desk.

Phone: (888) 830-7280 (toll free)

Web: <https://www.ihs.gov/itsupport/>

Email: itsupport@ihs.gov