NilRead User Guide

Contents

1. Overview

1.1 About NilRead

NilRead is a web-based, no installation, diagnostic viewer. NilRead provides physicians with secure, interactive processing, viewing, and sharing of 2D, MPR, 3D, Fusion and other imaging exams. The product is designed for use by qualified medical practitioners to review and interpret imaging studies and reports. NilRead provides interactive image visualization tools, and rule-based hanging protocols for exam viewing according to physician preference and multi-monitor display configuration. NilRead can be easily integrated with any DICOM or HL7 network, connected with a VNA, and can be invoked from a RIS or workflow/reporting solution. NilRead can also query-retrieve remote DICOM nodes, XDS repositories and other medical archives.

Physicians can easily customize how a patient study is presented using a number of configurable layouts, then further arrange images by dragging and dropping series into viewports. This allows each physician to review images based on their personal preferences.

Access NilRead using your mobile device or desktop computer. NilRead runs on all major browsers and supports multi-touch gestures on mobile devices (for details, see “Device specifics” on page 12). For hardware requirements and supported browsers, see “Hardware requirements” on page 146. Please also review the “Warnings and precautions” on page 144.

NilRead uses industry standard security mechanisms (HTTPS, SSL) and does not transfer any patient data to the client device running the viewer. This allows radiology departments and other health care organizations to provide secure access to referring physicians and radiologists on the go without having to setup and maintain an IT infrastructure on devices outside the organization. NilRead supports many modalities (see “Supported modalities” on page 2).

Caution: Federal law restricts this device to sale by or on the order of a physician.

 View additional regulatory information including warnings and precautions (see “Regulatory ” on page 144).

1.1.1. Version number

The NilRead version number can be viewed by hovering over the NilRead logo.

1.2 Intended use within the USA

The NilRead software application provides desktop and portable access to multi-modality softcopy medical images, reports and other patient related information for conducting diagnostic review, planning, and reporting through the interactive display and manipulation of medical data, including mammography and breast tomosynthesis. NilRead also allows users to collaborate by sharing application sessions.

990-12020, Rev 1.0

Lossy compressed mammographic images are not intended for diagnostic review. Mammographic images should only be viewed with a monitor approved by FDA for viewing mammographic images. For primary diagnosis, post process DICOM "for presentation" images must be used.

On mobile platforms, this device is not intended for diagnostic use.

1.3 Manufacturer

Lexmark Canada Inc.

120 Carlton Street, Suite 217

Toronto Ontario, Canada

M5A 4K2

1.3.1. Contact Us

U.S. (toll free): 1-877-201-0001

Direct: 913-227-7030

Email: es_support@lexmark.com

Customer Portal: https://customer.perceptivesoftware.com/

1.4 Supported modalities

NilRead provides imaging data to physicians in many different specialities. Modalities such as MR, CT, Xray, fluoroscopy, ultrasound, mammography, and many more are supported by NilRead.

For a full list of supported modalities, see the NilRead DICOM Conformance Statement at http://www.lexmark.com/en_us/solutions/healthcare/enterprise-imaging/enterprise-viewing/nilread-regulatory-and-approvals.html.

1.5 User interface overview

NilRead contains two main areas: the Patient Study Directory and the image viewing area.

1.5.1. Patient Study Directory

When you first login to NilRead, the Patient Study Directory opens. The navigation tree on the left side of the directory opens at the item you used most recently during your last NilRead session (for example, Patient Directory or a worklist).

Use the navigation tree to:

- Open patient studies (see "Open patient studies" on page 15 and "Open multiple studies" on page 17).

- Access folders and worklists (see “Use worklists and folders” on page 25).

To hide the navigation tree, select  in the top-left corner.

1.5.2. Image Viewing Area

When you open a study, the NilRead image viewing area opens. The image viewing area is organized differently depending on the current study layout and view (see “Customize the image viewing area” on page 7). The image viewing area contains a toolbar and side panel (see “Toolbar overview” on page 3 and “Side panel overview” on page 6).

Maximize a viewport

Double-click (or double-tap) a viewport to maximize it and hide other viewports. The toolbar and side panel are still available while the viewport is maximized. This can be useful for mobile devices with smaller screens. Double-click (or double-tap) again to restore the original viewport layout.

Full screen view

You can view an image using the full screen (see “Use full screen view” on page 53). Other viewports, the toolbar and the side panel are hidden when using full screen view.

Reference lines

Reference lines are shown on all series on the current screen that are in the same frame of reference. The intersection of the reference lines represents the corresponding position in all viewports.

Image details

Details about the study, series and image are shown on an image (see “View image details” on page 53).

Image orientation

Each viewport contains information regarding the image orientation (see “View image orientation” on page 59).

1.6 Toolbar overview

The NilRead toolbar provides quick access to the most important commands for working with images. To move through the tools, use the arrows at the ends of the toolbar. On touch devices, fling the toolbar.

Note
Many tools are available by right-clicking the image viewing area. You can also customize the toolbar (see “Change tool preferences” on page 97) and assign tools to mouse buttons, keyboard shortcuts and touch gestures (see “Change mouse and keyboard preferences” on page 95).

1.6.1. Image visualization tools

Includes tools such as scroll, pan, zoom and rotate. Use these tools to adjust image visualization settings (see “Use image visualization tools” on page 33). These tools are available in all views.

1.6.2. Hanging protocols

Use hanging protocols to customize the image viewing area (see “Select hanging protocols” on page 51).

1.6.3. Study layouts and views

Use study layouts and views to customize the image viewing area (see “Select study layouts and views” on page 50).

1.6.4. Other view specific tools

Certain tools are available for specific views only (see “Use image visualization tools” on page 33).

1.6.5. Cine

View the images in a study as a “movie” (see “Cine” on page 50).

1.6.6. Scrolling arrows

Scroll through the series in a study.

1.6.7. Save

Bookmarks

Use a bookmark to tag an image in a patient study that you want to find again quickly or that you want to share with others (see “Share bookmarked images” on page 89). Bookmarked images are saved in the Presentations panel.

Capture

You can create a series of secondary capture images for a patient study (see “Create secondary capture images” on page 90). Secondary capture images are static screenshots and cannot be modified.

Export

Export the images currently on the screen (see “Export images” on page 91). You can export a single viewport or all viewports.

1.6.8. Print

Print the images currently on the screen (see “Print images” on page 91). You can print a single viewport or all viewports.

1.6.9. Studies

View the Patient Study Directory (see “Open patient studies” on page 15).

1.6.10. Logoff

Exit your current NilRead session.

1.7 Side panel overview

The side panel provides quick access to the following NilRead features. Use the arrows to hide or view the side panel:

1.7.1. Collaboration

Start or join an online meeting (see “Start a meeting” on page 85). Meeting participants all see the same screen and can annotate images at the same time.

1.7.2. Bookmarks

Select a bookmarked image for the current study (see “Share bookmarked images” on page 89).

1.7.3. Tissue

View and edit tissues (see “Segment” on page 48).

1.7.4. Presets

Apply a preset to the current study (see “Apply presets” on page 66).

1.7.5. Presentations

View a presentation for the current study (see “Create presentations” on page 63).

1.7.6. Series

Select a series for the current study (see “Select series” on page 51).

1.8 Customize the image viewing area

Use study layouts and views to customize the image viewing area. This allows you to quickly arrange the series and images you want to view.

- **Study Layout** Apply a study layout to the image viewing area. This divides the area into multiple "screens". You can drag a different series into each screen, allowing you to view multiple series simultaneously.
- **View** Apply a view to a screen. A view is a predefined viewport arrangement specific to a clinical scenario. Some views display a single viewport while others display multiple viewports, each with a different type of visualization. You can apply different views to each screen or apply the same view to all screens.

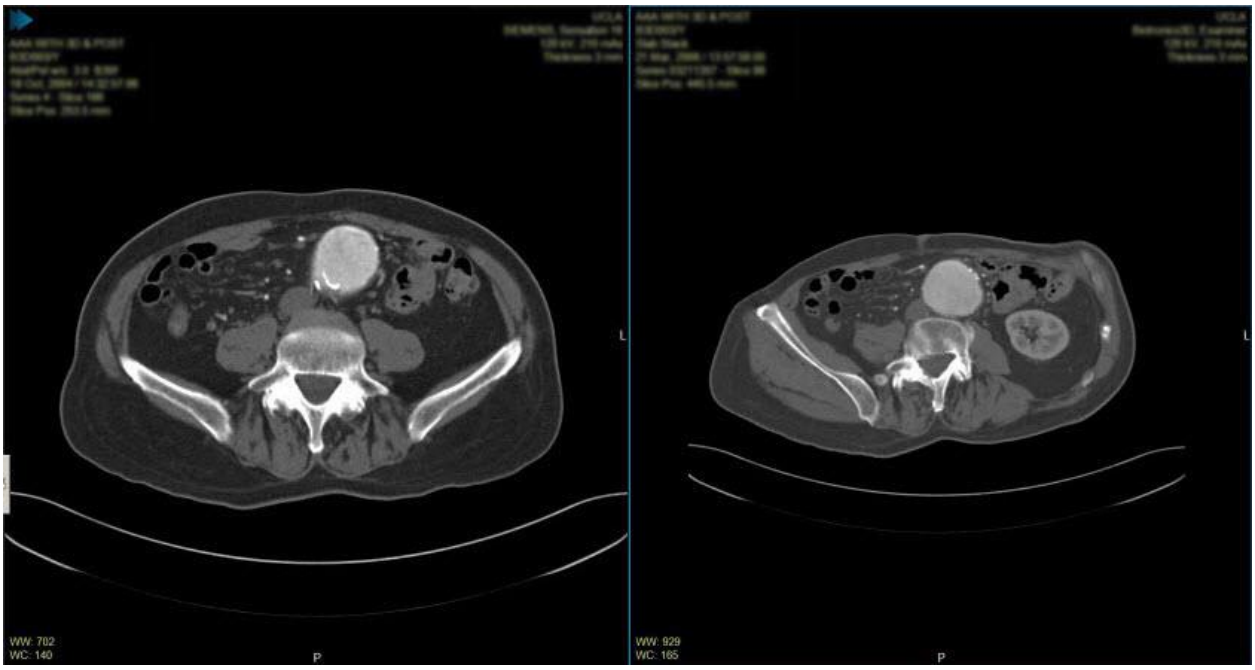
Note
For more information, see "Select study layouts and views" on page 50.

1.8.1. View examples

The following examples show NilRead study layouts and views. Available views depend on your NilRead implementation.

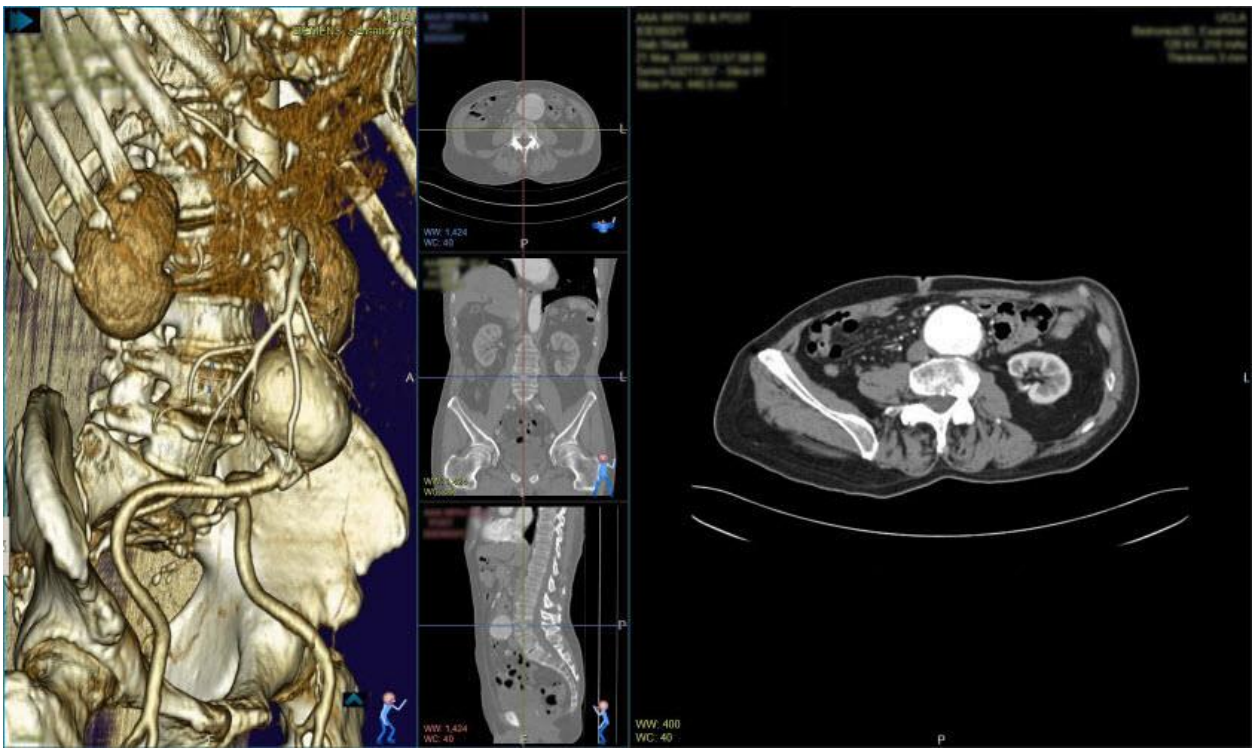
1x2 layout

The following example shows a 1x2 study layout. This creates two side-by-side screens with a different series in each screen:



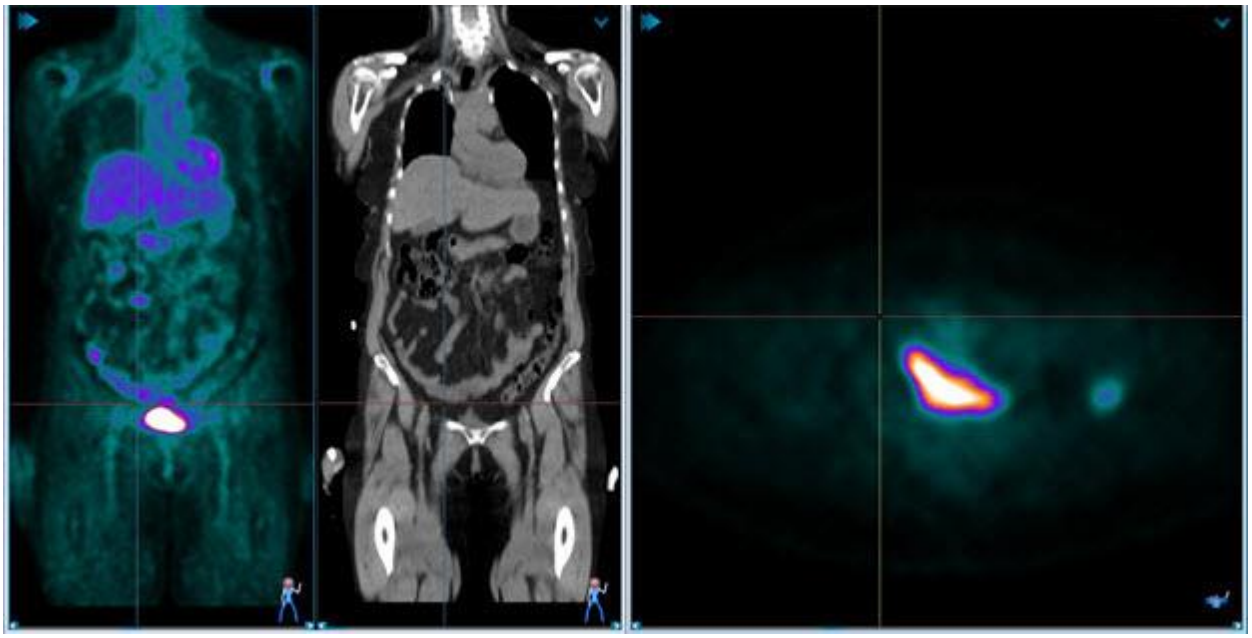
Multiple viewports

When a view is applied to a screen, the screen may be divided into multiple viewports. In the following example, the MPR 3D view has been applied to the first screen, dividing the screen into four viewports. Note that a different view (or the same view) could also be applied to the second screen.



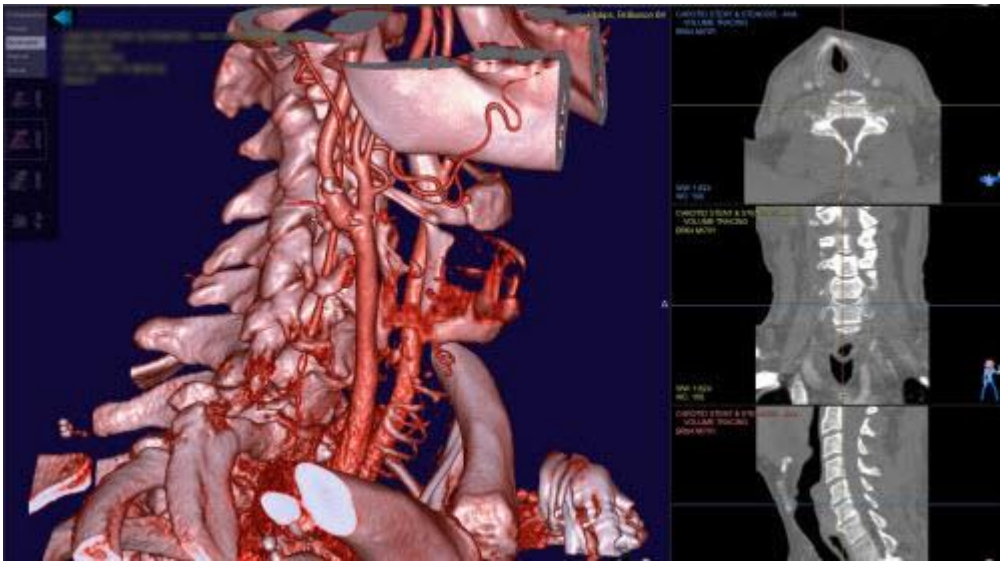
Multiple monitors

Each monitor can have its own study layout. In the following example, the first monitor displays two coronal MPR views and the second monitor displays an axial MPR:

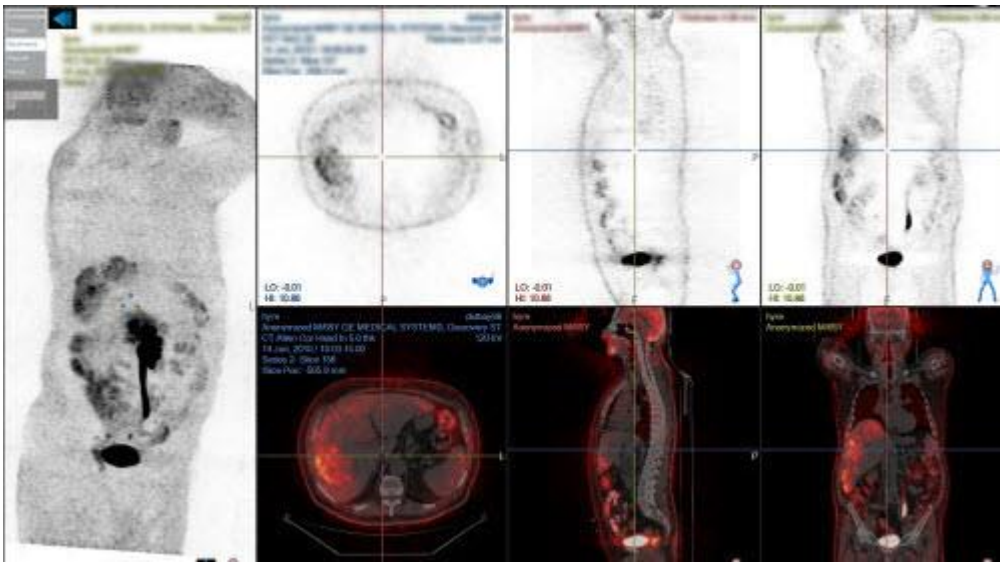


Side-by-side series comparison (study layout)

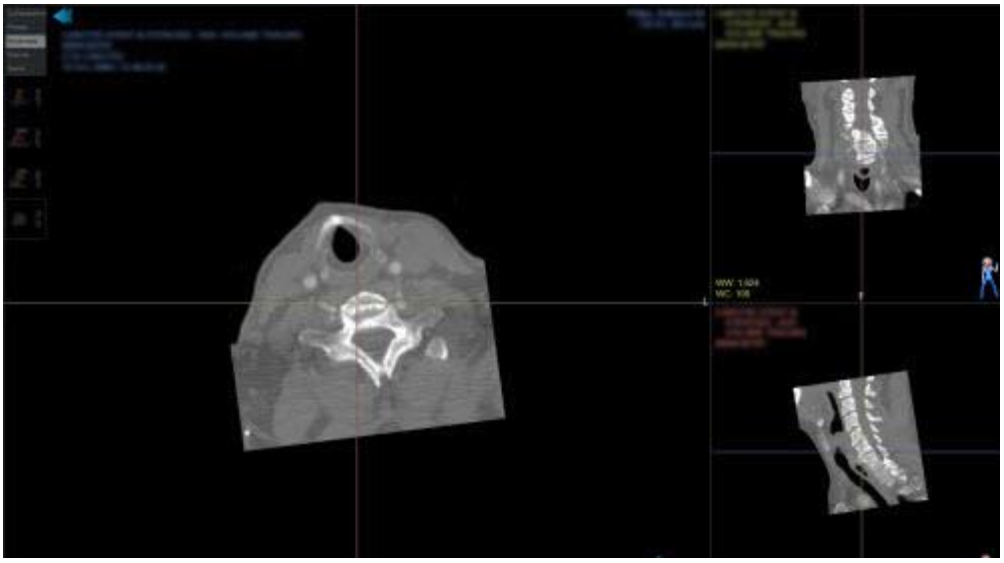
3D view



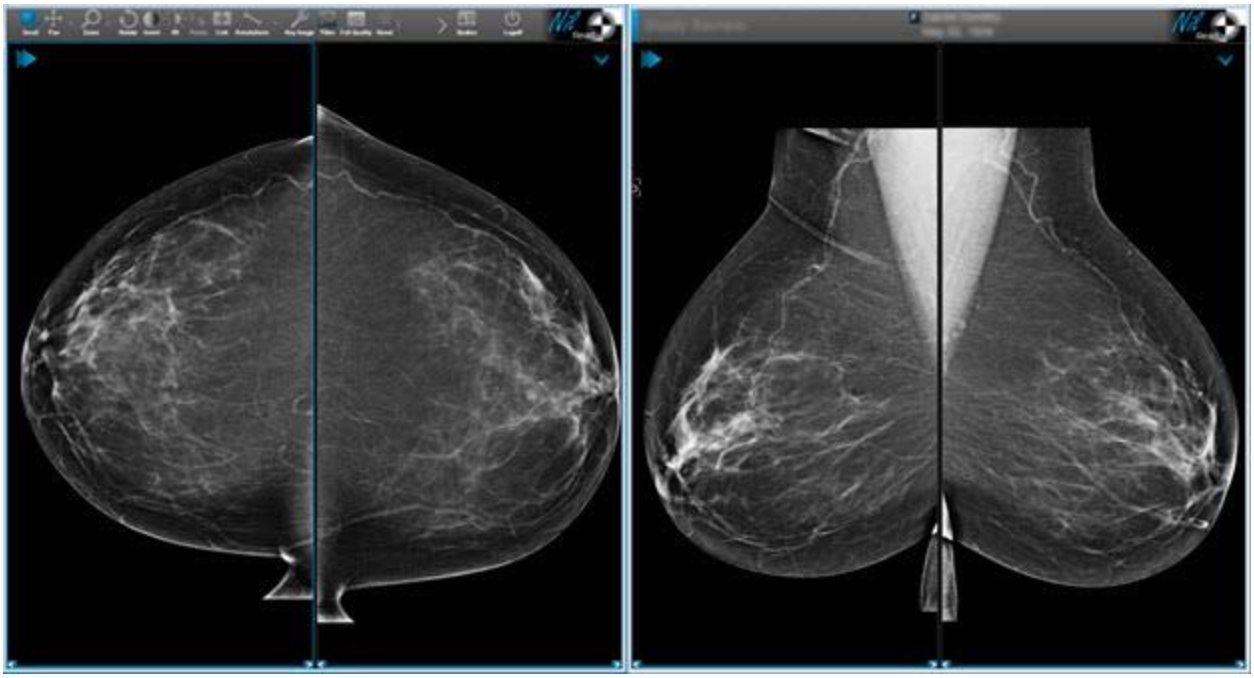
PET-C fusion view



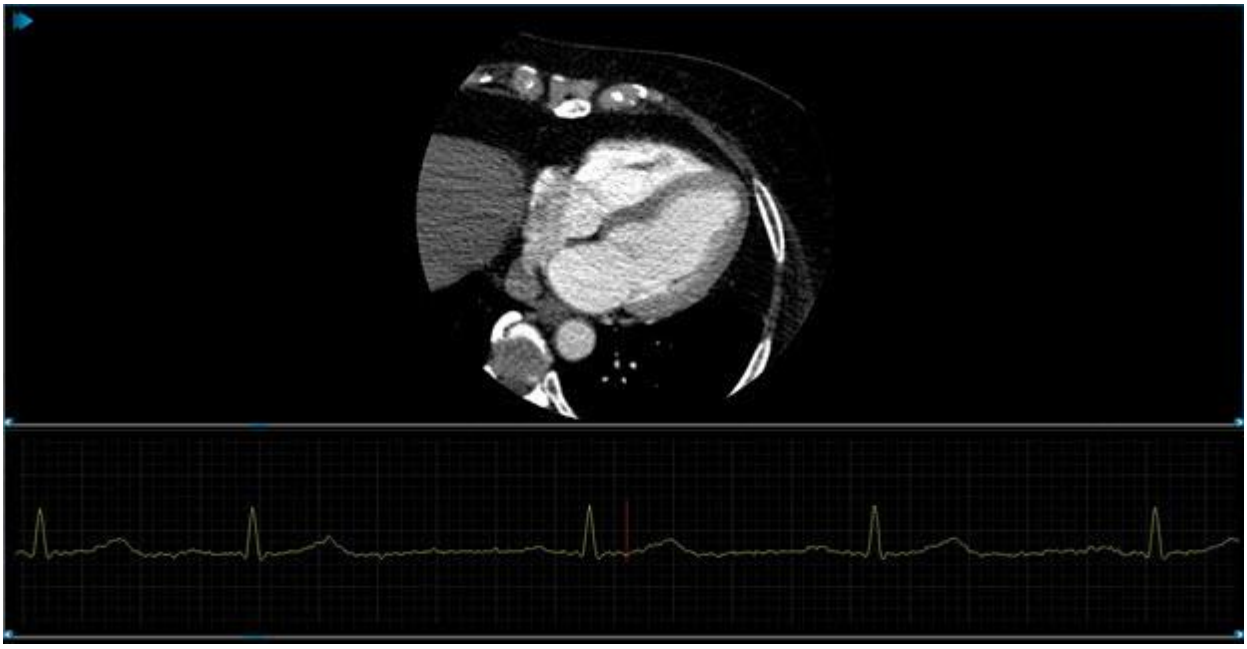
Slab view



Multi-monitor auto-aligned mammography hanging protocol



Non-symmetric 2x1-1/3 study layout with ECG view



1.9 Device specifics

NilRead is available for desktop computers with a diagnostic monitor and for mobile devices. For details, see “Hardware requirements” on page 146.

On mobile devices, images are displayed for informational purposes only — NilRead is not for diagnostic use on mobile devices.

It is the user’s responsibility to ensure NilRead is used on appropriate hardware and that image quality, including display monitors, image resolution and environment lighting, are suitable for the clinical application. Lexmark Canada Inc. recommends that users comply with the applicable regulatory guidelines for the anatomy and pathology being studied. For reference:

- American College of Radiology Practice Guidelines (http://www.acr.org/Quality-Safety/Standards-Guidelines)
- Canadian Association of Radiologists Practice Guidelines (http://www.car.ca/en/standards-guidelines/standards.aspx)

Using NilRead is slightly different on desktop computers and mobile devices.

1.9.1. Desktop computer with a diagnostic monitor

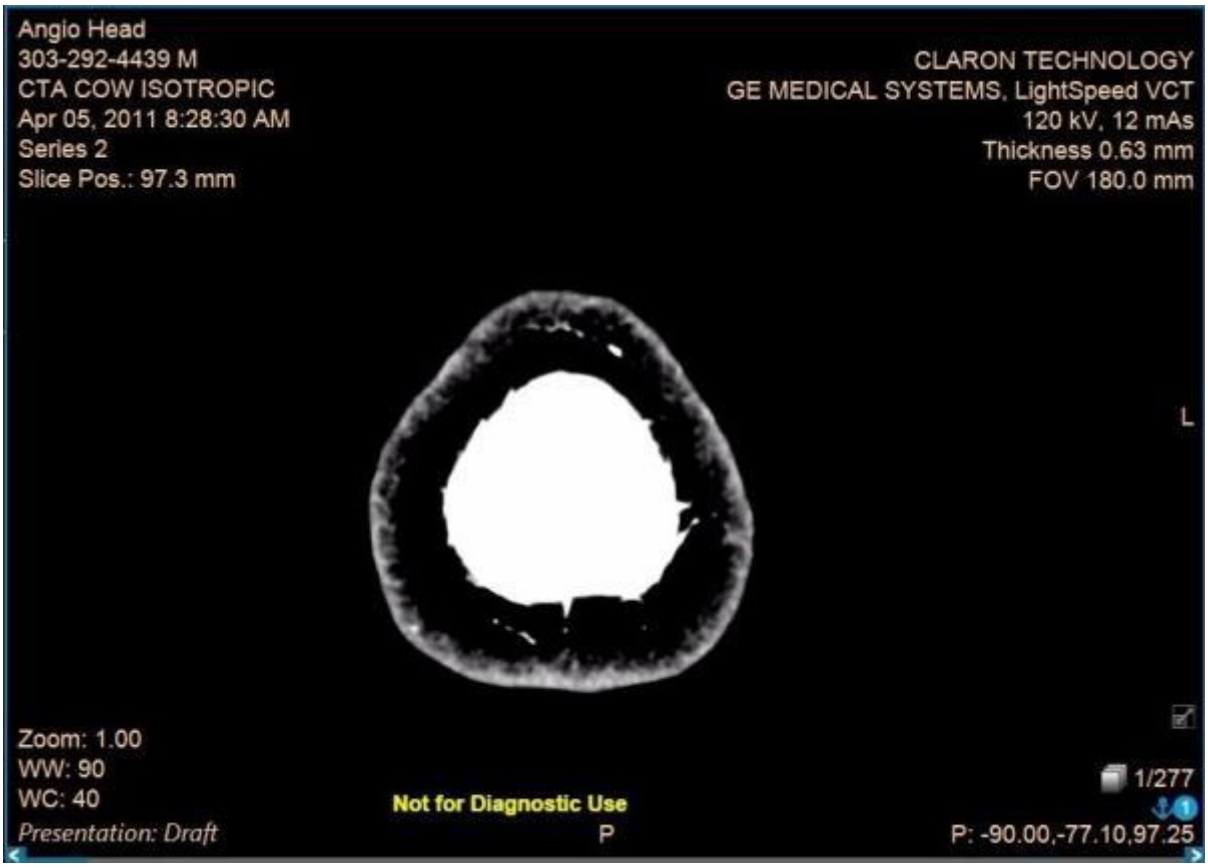
All NilRead features are available.

1.9.2. Mobile devices

Multi-touch gestures are supported (tap, double-tap, drag, swipe, pinch, flingable toolbar). Collaboration is not supported on smartphones.

1.10 Reading environment verification

NilRead provides a reading environment verification tool to assist the user in adjusting device settings (such as brightness) on mobile platforms. It is recommended that users keep mobile screens clear of thumbprints and dirt and that they disable the auto brightness adjustment.



Follow these steps to perform a reading environment verification:

1. Select **Settings**. Under **Preferences**, select **Reading environment verification**.
2. A low contrast pattern is shown in the viewport. Note that in the following example, the contrast has been highlighted for demonstration purposes:

3. Touch the low contrast pattern to indicate its location.

   If you do not select the correct location, the lighting conditions may be too bright or the device's screen may not be at maximum brightness. It is recommended that the auto-brightness adjustment is disabled and the presence of thumbprints in critical parts of the screen is checked frequently. A bright and clean display is the best starting point for viewing images on a mobile device. Also note that LCD displays have angular dependence characteristics. During the assessment, it is recommended that the images are viewed from the front within 10-20 degrees of the viewing angle.

1.11 Mobile device calibration

NilRead allows you to calibrate your mobile device using the DICOM grayscale standard display function (GSDF). The DICOM GSDF defines the luminance response of a display such that an observer's perception of image contrast is consistent throughout the pixel value range of a displayed image.

1. Select **Settings**.
2. Under **Preferences**, select **Mobile Device Calibration**.
3. Select **Instructions**. Follow the instructions to calibrate your mobile device.
4. Select **Apply**.

2. Access patient studies

2.1 Open patient studies

Use the Patient Study Directory to find and open a patient study. The directory contains several options for finding a study:

- **Patient Directory** Lists all studies in the local repository. For details, see the next section, “Patient Directory”.
- **Patient Search** Search for a study on all local and remote repositories. For details, see “Patient Search” on page 17.

> **Note**
> Studies on restricted sites can only be opened through **Patient Search**. Users must have the appropriate privileges to access restricted sites.

- **Recently Opened** Lists the studies you have opened most recently. A maximum of 50 studies are listed for each repository you have used.
- **Worklists and Folders** Create a collection of studies that you want to view as a group. For details, see “Manage worklists” on page 25 and “Manage folders” on page 29.

You can also open multiple studies at once. This allows you to review multiple studies in a single session without having to return to the Patient Study Directory. For details, see “Open multiple studies” on page 17.

Note
The studies you can view depend on your privileges in NilRead. You may be given access to specific studies only or you may be able to view the full directory.

2.1.1. Patient Directory

1. In the Patient Study Directory, select **Patient Directory**. By default, all patient studies are shown. If multiple studies exist for a patient, they are listed on separate lines.

   Note
   Studies are loaded on demand as you scroll down the table. On mobile devices, you can also swipe to move through the pages.

2. To open a study, click (or tap) anywhere on the directory entry for the study.

To search for a study:

1. Enter search information in the blank row below the column headings (patient name, patient ID and so on).
2. In the **Status** column, select a filter to view studies with a specific status.
   - **All** Show all patient studies.
   - **Available** Show patient studies containing at least one report.
   - **Not Available** Show patient studies with no reports.
   - **Approved** Show patient studies containing at least one approved report.
   - **Locked** Show locked patient studies.
3. To remove all search filters, select **Clear**  .
4. Click (or tap) a column heading to sort the column in ascending or descending order.
5. To add columns, select **Customize**  . In the **Customize Columns** list, drag a column to the location where you want to place it. To remove a column, drag it to the **Customize Columns** list.
6. Select  **Reset** to reset the columns to the default sort order, remove any custom columns you have added, and reload all studies.
7. Select  **Refresh** to refresh the Patient Study Directory and view the latest changes made by all users.

2.1.2. Patient Search

1. In the Patient Study Directory, select **Patient Search**.
2. In the Patient Search area at the top of the screen, enter information about the study. Select **More** to view additional fields.
   - **Accession No.** Study accession number.
   - **Data Sources** DICOM and XDS servers you want to search. You can select multiple servers.
   - **Time Range** Time period during which the study was created.
   - **Patient ID** Patient's ID.
   - **Patient Name** Patient's name.
   - **Date of Birth** Patient's date of birth.
   - **Sex** Patient's gender.
   - **Modality** Modality in the study.
3. Select **Query**. Studies matching your search criteria are shown.
4. To find a study in the search results, enter search information in the blank row below the column headings (patient name, patient ID and so on). You can enter partial information (for example, the first few numbers in the patient ID).

   Note
   Studies are loaded on demand as you scroll down the table. On mobile devices, you can also swipe to move through the pages.

5. To open a study, click (or tap) anywhere on the directory entry for the study.
6. To remove all search filters, select **Clear**  .
7. Click (or tap) a column heading to sort the column in ascending or descending order.
8. To add columns, select **Customize**  . In the **Customize Columns** list, drag a column to the location where you want to place it. To remove a column, drag it to the **Customize Columns** list.
9. Select  **Reset** to reset the columns to the default sort order, remove any custom columns you have added, and reload all studies.
10. Select  **Refresh** to refresh the Patient Study Directory and view the latest changes made by all users.

2.2 Open multiple studies

You can open multiple studies at once. This allows you to review multiple studies in a single session without having to return to the Patient Study Directory.

1. In the Patient Study Directory, select **Patient Directory** or **Patient Search**.
2. Select the checkbox beside the studies you want to open in the image viewer (for details on finding studies, see "Open patient studies" on page 15). You can also select studies from a folder or worklist. To select all studies in a folder or worklist, select the checkbox in the top row.
3. Right-click (or touch and hold) one of the studies and select **Load Studies**. Select one of the following options:
    - **Load as batch** Load the studies separately (as separate patients). You can also select the **Load** button to load studies separately.
    - **Load as priors** Treat the studies as a collection of studies from a single patient. The most recent study will open in the image viewer and older studies will appear as prior studies in the timeline.
4. The studies open in the image viewer. If you selected **Load as batch** (or the **Load** button), the number of loaded studies is shown at the top of the image viewer (for example, **1 of 5**).
    - Use the arrows beside the number of loaded studies to navigate through the studies.
    - Click (or tap) the number of loaded studies to select a study.
    - Click (or tap) the patient name to view patient details.

2.3 Use Break Glass to find patient studies

If you are a NilRead guest user, you may be able to use emergency override ("break glass") to find a patient study. Emergency override should only be used to search for studies that you should be authorized to view but are not appearing in the Patient Study Directory.

1. In the Patient Study Directory, select **Break Glass**.
2. Read the privacy rule requirements, then select **I agree** if you agree to comply with the requirements. The **Emergency Override** page appears.
3. To find a patient study, enter information in the search fields at the top of the page:
    - **Family Name** Patient's last name.
    - **Given Name** Patient's first name.
    - **Soundex** Select this option to also search for names that sound like the **Family Name**/**Given Name** you have entered.
    - **Accession Number** Study accession number.
4. Select **Find**.

2.4 Lock patient studies

NilRead automatically deletes older studies from the database when diskspace is low. You can lock studies to ensure they are never deleted.

Note
 appears beside locked studies. The total number of locked studies is shown in the top-right corner of the Patient Study Directory.

In the Patient Study Directory:

1. To lock or unlock a study, right-click (or touch and hold) a study, then select **Lock** or **Unlock**.
2. To lock or unlock multiple studies, select the checkbox beside each study, then right-click (or touch and hold) one of the studies and select **Lock** or **Unlock**.

2.5 Upload studies

NilRead provides multiple ways to upload studies to the database.

Note
Ensure popups are enabled in your browser settings before uploading studies. Google Chrome supports all of the following upload options; other browsers may not support all options.

2.5.1. Upload DIOCM files from media

Upload DICOM files from removable media such as a CD, DVD or USB flash drive. The media must contain a DICOMDIR file. The files may be from multiple patients and studies.

1. Select **Upload New Study**.
2. Select **Upload DICOM Media**.
3. Select the folder containing the DICOM files and the DICOMDIR file. Be sure to select the entire folder; NilRead will ignore files that should not be uploaded.
4. Select **Next**. A list of studies to be uploaded is shown.
5. Select **Upload**. A confirmation message appears when the upload is complete.

2.5.2. Upload zipped DICOM files

Upload a .zip file containing DICOM files. The .zip file must contain DICOM files only. The files may be from multiple patients and studies.

1. Select **Upload New Study**.
2. Select **Upload Zip with DICOM files**.
3. Select the .zip file.
4. Select **Upload**. A confirmation message appears when the upload is complete.

2.5.3. Upload a folder containing DICOM files

Upload a folder containing DICOM files. The folder must contain DICOM files only. The files may be from multiple patients and studies.

1. Select **Upload New Study**.
2. Select **Upload Folder with DICOM files**.
3. Select the folder containing the DICOM files.
4. Select **Next**. A list of studies to be uploaded is shown.
5. Select **Upload**. A confirmation message appears when the upload is complete.

2.5.4. Upload individual DICOM files

Upload individual DICOM files. The files must be uploaded from the same location (for example, the same folder) and may be from multiple patients and studies.

1. Select **Upload New Study**.
2. Select **Upload DICOM files**.
3. Select the DICOM files.
4. Select **Next**. A list of studies to be uploaded is shown.
5. Select **Upload**. A confirmation message appears when the upload is complete.

2.5.5. Upload non-DICOM files

Upload non-DICOM files. The files must be for the same patient and study.

1. Select **Upload New Study**.
2. Select **Upload non-DICOM files**.
3. Select the non-DICOM files.
4. Select **Next**. Enter the study details.
5. Select **Upload**. A confirmation message appears when the upload is complete.

2.5.6. Create an upload link

Create an encrypted link that other people can use to upload files. The link can be used to upload a .zip file containing DICOM files or to upload individual DICOM and non-DICOM files.

1. Select **Upload New Study**.
2. Select **Create Upload Link**.
3. Determine how long the link will be active. You must select at least one of the following options:
    - **Limit number of upload sessions to X** Number of times the link can be used before it expires.

- **Link will expire in X days** Number of days until the link expires.

4. Determine if the user must login to NilRead to use the upload link. You must select only one of the following options:
   - **User must login to upload** If selected, the user must login to their NilRead account before using the link. If not selected, the user does not require an account with NilRead to use the link.
   - **User required to enter this password** If you did not select the **User must login to upload** option, enter the password the user must enter to use the link. The password must contain at least eight characters.
5. Determine if the user can upload DICOM files only.
   - **Allow uploading non-DICOM files** If selected, the user can upload DICOM and non-DICOM files. If not selected, the user can only upload DICOM files.
6. Select **Next**.
7. The upload link is shown. Select one of the following options:
   - **Copy link to clipboard** Copy the link. You can now paste the link into an email or instant message.
   - **Click to send link by email** Create an email with the link, using your default email application.
8. When done, click **Close**.

2.6 Attach files to studies or patients

You can attach files to a study or patient. If you attach files to a study, they are saved as a new series. If you attach files to a patient, they are saved as a new study. You can attach files using the Patient Study Directory or when viewing a study.

Note
Ensure popups are enabled in your browser settings.

1. In the Patient Study Directory, right-click (or touch and hold) a study, then select **Attach files to this study** or **Attach files to this patient**.
   or
   While viewing a study, right-click (or touch and hold) a series (side panel), then select **Upload**. Select **Attach files to this study** or **Attach files to this patient**.
2. Select **Choose Files** and select the files to attach. You can select multiple files if they are located in the same folder.
3. Select the type of files you are attaching (**DICOM** or **Image/Video**).
4. If attaching an image or video file, enter the patient and study information.
5. Select **Upload**.

2.7 Edit or split patient studies

You can edit information for a study such as the patient name or referring physician. You can apply your changes to all series or to selected series, and you can choose to save the changes in the original study or create a copy of the study.

You can split a study by modifying specific series and moving the modified series to a new study. You can leave the unmodified series in the original study or delete them.

In the Patient Study Directory:

1. Right-click (or touch and hold) a study, then select **Edit Patient/Study**.
2. Make changes to the patient and study information. If you want to retrieve information about the patient from a modality worklist, select **Reconcile**. Enter information about the patient and select **Search**. If a match is found, select the patient and select **Select**.

   Note
   To use reconcile, a modality worklist service must be configured for NilRead (see “Manage DICOM services” on page 114).

3. To apply the changes to specific series in the study, select **>**. A list of series appears on the right. Select the series you want to apply the changes to. Note that this option is only available if the **Copy to new study** option is selected.
4. To save your changes in a new study, select **Copy to new study**. To make changes to the original study, do not select this option.

   Note
   If you are modifying only some of the series in the study, the modified series will be moved to a new study. The unmodified series will remain in the original study (unless you choose the **Delete original instances** option).

5. To apply your changes to all studies for this patient, select **Apply changes to all studies for the same patient**.
6. If you are saving your changes in a new study and want to delete the original study, select **Delete original instances**.
7. Select **Save**.

2.8 Merge patients

You can update patient information in one study to match patient information in another study. You can also update information in all studies for the same patient. This ensures consistent patient information exists across all studies.

In the Patient Study Directory:

1. Select the checkbox beside the study that contains the patient information you want to copy into another study.

2. Select the checkbox beside the study you want to copy the patient information into.
3. Right-click (or touch and hold) one of the studies, then select **Merge Patients**. Information for the selected patients is shown.
4. To update patient information in all studies with the same patient ID, select **Apply changes to all studies for the same patient**.
5. To use the patient information from the study shown on the left, select **Merge to left**. The study on the right will be updated to match the study on the left.
6. To use the patient information from the study shown on the right, select **Merge to right**. The study on the left will be updated to match the study on the right.
7. Select **Continue**. The patient information in the study is updated. If you selected **Apply changes to all studies for the same patient**, the patient information is also updated in all studies with the same patient ID.

2.9 Merge studies

You can combine two studies into a single study. When you merge studies, one of the studies is deleted.

In the Patient Study Directory:

1. Select the checkbox beside the two studies you want to merge.
2. Right-click (or touch and hold) one of the studies, then select **Merge Studies**. Information for the selected studies is shown.
3. To merge the studies into the study shown on the left, select **Merge to left**.
4. To merge the studies into the study shown on the right, select **Merge to right**.
5. Select **Continue**. The studies are merged into the study you selected. The other study is deleted.

2.10 Delete studies, series or images

You can permanently delete a patient study, a series or an image.

To delete a study:

- In the Patient Study Directory, right-click (or touch and hold) a study, then select **Delete**.

To delete a series or image:

1. Open a patient study.
2. Right-click (or touch and hold) a series (side panel), then select **Delete Series**.
3. Right-click (or touch and hold) an image, then select **Delete Image**.

2.11 Delete series containing segmentation results

You can delete series that contain part segmentation results. Part segmentation results are typically created through a data lifecycle activity (see “Manage data lifecycle settings” on page 123).

In the Patient Study Directory:

1. Right-click (or touch and hold) a study, then select **Delete Pre-processed Results**.
2. Select **OK**.

3. Use worklists and folders

3.1 About worklists

You can use a worklist to create a collection of studies that you want to view as a group. The studies in the worklist are selected based on the data source and conditions you set. For example, you could create a worklist that includes all studies with a specific modality that originate from a specific data source.

Every time you access a worklist, the worklist is automatically updated to include any new studies that meet the worklist conditions. The studies are not actually moved to the worklist; the worklist just provides you with an easy way to access them.

Worklists created by users with no administrative privileges are automatically private. Users with administrative privileges can also create public worklists that can be accessed by all NilRead users or assign worklists to specific users or groups.

Note
You can also use folders to create a group of studies (see “About folders” on page 28).

3.2 Manage worklists

3.2.1. Add a worklist

1. In the Patient Study Directory, select  . You can also right-click (or tap and hold) an existing worklist, then select **Copy**.
   or
   Select **Settings**. Under **Preferences**, select **Work Lists and Folders**. Select **Add**. You can also select an existing worklist, then select **Copy**.
2. Enter the following information, then select **Save**.

   Name

   Worklist name.

   Comment

   Worklist description.

   Default

   Administrators only. Allows you to specify a default worklist for new users when logging in for the first time.

Folder

Do not select this option. This will create a folder instead of a worklist (see "Manage folders" on page 29).

Deidentify

If selected, studies in this worklist will be anonymized when viewed in NilRead. Select **Nominal** to use the default anonymization profile or select a profile you have created (see "Manage confidentiality profiles" on page 80).

Note
Once the worklist is created, you cannot change the **Deidentify** option.

Note
Studies are only anonymized when opened from a worklist or folder with the **Deidentify** option. Regular patient data will appear if a study is opened from the Patient Study Directory.

Groups

(Administrators only) Select the groups that can access the worklist. Note that this option is not available if no groups are currently defined.

Users

(Administrators only) Select the users that can access the worklist. Note that if you do not have administrative privileges, any worklists you create will be private worklists that only you can access.

- To create a public worklist that all users can access, do not select any users.
- To create a private worklist for specific users, select one or more users in the **Unassigned** area, then select **Add**. These users will see the worklist in their **My Worklists** area. To remove a user's access, select a user in the **Assigned** area, then select **Remove**.

Rule

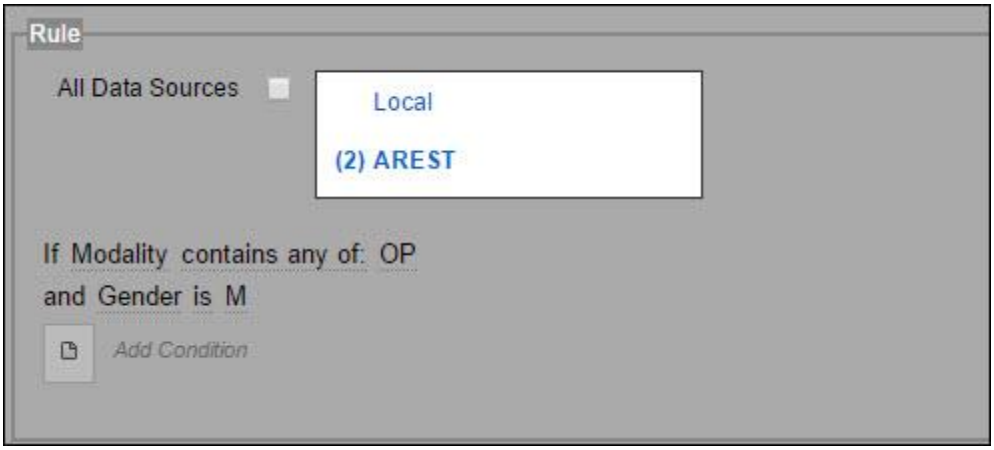
Specify the rule for the worklist by adding one or more conditions. All conditions must be satisfied in order for a study to be included in the worklist.

1. Select **All Data Sources** to search all data sources when selecting studies for the worklist.

   or

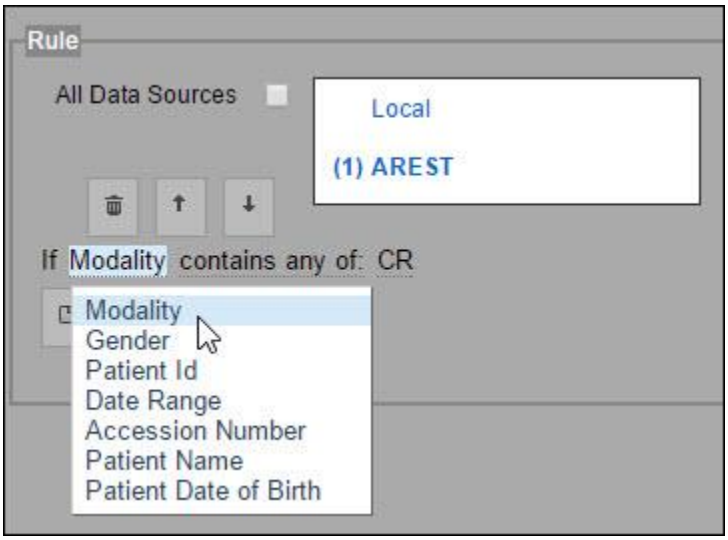
   Select a data source from the list to select studies from this data source only.

   Note that if a data source has any existing rules (from other worklists), the number of existing rules is shown before the data source name. When you select the data source, the existing rules are shown. In the following example, the data source "AREST" has two existing rules:

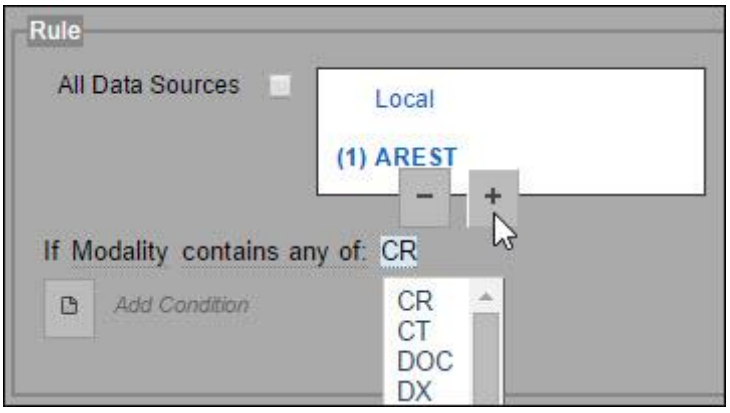


You can delete the existing rules if desired (see step 4).

2. Select **Add Condition**. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.



3. To add an item to a condition, select a customizable area, then select +. To remove an item, select -.



4. To delete a condition, select the first customizable area, then select  .
5. To move a condition to a new position, select the first customizable area, then select  .

3.2.2. Edit or delete a worklist

In the Patient Study Directory:

1. Right-click (or tap and hold) a worklist.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

In Settings:

1. Select **Settings**. Under **Preferences**, select **Work Lists and Folders**.
2. Select a worklist.
3. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

3.3 Use a worklist to view studies

In the Patient Study Directory:

1. Select **+** beside **Public Worklists** or **My Worklists** to expand the category and view the available worklists. Select **–** to collapse the category.

   Note

   Select  to refresh the navigation tree and see any new worklists.

2. Select a worklist. Studies matching the worklist conditions are shown on the right.
3. Select a study to open it.

3.4 About folders

You can use a folder to create a collection of studies that you want to view as a group. For example, you can use a folder to group studies that you want to review in a collaboration session with other users. You select the specific studies you want to include in a folder. The studies are not actually moved to the folder; the folder just provides you with an easy way to access them.

Folders created by users with no administrative privileges are automatically private. Users with administrative privileges can also create public folders that can be accessed by all NilRead users or assign folders to specific users or groups.

Note
You can also use worklists to create a group of studies (see “About worklists” on page 25).

3.5 Manage folders

3.5.1. Add a folder

1. In the Patient Study Directory, select  . You can also right-click (or tap and hold) an existing folder, then select **Copy**.
   or
   Select **Settings**. Under **Preferences**, select **Work Lists and Folders**. Select **Add**. You can also select an existing folder, then select **Copy**.
2. Enter the following information, then select **Save**.

   Name

   Folder name.

   Comment

   Folder description.

   Default

   Administrators only. Allows you to specify a default folder for new users when logging in for the first time.

   Folder

   Select this option. This will create a folder instead of a worklist.

   Deidentify

   If selected, studies in this folder will be anonymized when viewed in NilRead. Select **Nominal** to use the default anonymization profile or select a profile you have created (see “Manage confidentiality profiles” on page 80).

   Note
   Once the folder is created, you cannot change the **Deidentify** option.

Note
Studies are only anonymized when opened from a worklist or folder with the **Deidentify** option. Regular patient data will appear if a study is opened from the Patient Study Directory.

Groups

(Administrators only) Select the groups that can access the folder. Note that this option is not available if no groups are currently defined.

Users

(Administrators only) Select the users that can access the folder. Note that if you do not have administrative privileges, any folders you create will be private folders that only you can access.

- To create a public folder that all users can access, do not select any users.
- To create a private folder for specific users, select one or more users in the **Unassigned** area, then select **Add**. These users will see the folder in their **My Folders** area. To remove a user's access, select a user in the **Assigned** area, then select **Remove**.

3.5.2. Edit or delete a folder

In the Patient Study Directory:

1. Right-click (or tap and hold) a folder.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

In Settings:

1. Select **Settings**. Under **Preferences**, select **Work Lists and Folders**.
2. Select a folder.
3. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

3.5.3. Add studies to a folder

You can add the same study to multiple folders.

In the Patient Study Directory:

1. Right-click (or tap and hold) a study.
2. Select **File Study**, then select a folder.

3.5.4. Remove studies from a folder

In the Patient Study Directory:

1. Select a folder.
2. Right-click (or tap and hold) a study.
3. Select **Remove from Folder**.

In Settings:

1. Select **Settings**. Under **Preferences**, select **Work Lists and Folders**.
2. Select a folder in the **Work Lists** area. The studies in the folder are shown at the bottom of the screen.
3. Select a study, then select **Remove**.

3.6 Use a folder to view studies

In the Patient Study Directory:

1. Select **+** beside **Public Folders** or **My Folders** to expand the category and view the available folders. Select **–** to collapse the category.

   Note

   Select  to refresh the navigation tree and see any new folders.

2. Select a folder. The studies in the folder are shown on the right.
3. Select a study to open it.

3.7 Customize the navigation tree

Administrators only

By default, the navigation tree in the Patient Study Directory shows only public and your own worklists and folders. You can customize the navigation tree to show worklists and folders belonging to different groups and users.

1. In the Patient Study Directory, select  above the navigation tree.
2. Enter the following information:
   - **Groups** To view work items available to specific groups, select one or more groups in the **Hidden** area, then select **Show**. To hide work items for groups, select one or more groups in the **Shown** area and select **Hide**.

- **Users** To view work items available to specific users, select one or more users in the **Hidden** area, then select **Show**. To hide work items for users, select one or more users in the **Shown** area and select **Hide**.

3. Select **OK**. The worklists and folders for each group and user you selected are now shown on the navigation tree.

4. Review patient studies

4.1 Use image visualization tools

Use the tools in the toolbar to adjust image visualization settings.

You can use the tools in any viewport. Changes to one viewport affect all viewports displaying the same series. If the **Link** feature is active, then changes to one series will affect all series in all viewports.

Note
You can also right-click (or touch and hold) a viewport to access the tools.

After using a tool, your changes are saved unless you select **Annotations > Delete Last** or **Delete All** (removes changes from current image) or **Reset** (removes changes from all images in the series) before closing the patient study.

The toolbar contains the following tools. The study modality and view determine which tools are available.

- Scroll (page 34)
- Pan (page 34)
- Zoom (page 35)
- Rotate (page 35)
- Quadrant Zoom (“Quadrant Zoom” on page 35)
- Invert (page 36)
- Window Level (page 36)
- Gamma (page 36)
- Enhance (page 36)
- Smart Zoom (page 37)
- Relate (page 38)
- Link (page 38)
- Annotations and Measurements (page 39)
- Key Image (page 44)
- Titles (page 44)
- Full Quality (page 44)
- Reset (page 44)
- Hanging Protocols (page 44)
- Study Layout (page 45)

- View (page 45)
- Rendering (page 45)
- Reference (page 45)
- Thickness (page 45)
- Clipper (side panel) (page 46)
- Curved MPR (page 46)
- Segment (page 48)
- NM Map (page 49)
- Fusion Map (page 49)
- Fusion Blend (page 50)
- Cine (page 50)
- First, Previous, Next, Last (page 50)

4.1.1. Scroll

Drag or use the mouse wheel to scroll through images.

- **2D** Drag to scroll forwards or backwards through the images in a series.
- **MPR** Drag to navigate forwards or backwards through the stack of images. The navigation step depends on the slice thickness that is currently selected.
- **3D** Drag to rotate an image with a full three degrees of freedom.
- **Sculpting** Drag to navigate forwards or backwards through the stack of images. The navigation step depends on the slice thickness that is currently selected.
- **ECG** Drag to navigate forwards or backwards in time.

You can also scroll through images using the arrow keys on your keyboard, the arrows at each end of the scroll bar below an image, or by dragging the scroll bar.

4.1.2. Pan

Drag to move an image within a viewport. Panning is applied to all images in the series.

- **Oblique** Drag to move an image in any direction within a viewport.
- **Constrained** Drag to move an image vertically or horizontally within a viewport.

Note
To move an image at any time, hold ALT while dragging the image.

Note
To focus on a specific area, pan the image so the area is centred in the viewport, then zoom in. On mobile devices, use pinch-to-zoom to pan and zoom simultaneously.

4.1.3. Zoom

Drag up to zoom in on an image; drag down to zoom out. Zooming is applied to all images in the series.

When mammography images are linked, the zoom remains consistent between the viewports and is based on physical distance (not the magnification factor).

Note
To zoom an image at any time, hold CTRL while dragging on the image.

Note
To focus on a specific area, pan the image so the area is centred in the viewport, then zoom in. On mobile devices, use pinch-to-zoom to pan and zoom simultaneously.

4.1.4. Rotate

- **MPR** Drag to rotate an image in any direction. Rotation is applied to all images in the series.
- **3D** Drag to rotate an image with a full three degrees of freedom.
- **Sculpting** Drag to rotate an image in any direction. Rotation is applied to all images in the series.
- **Fusion 3D** Drag to rotate an image with a full three degrees of freedom.

Note
The orientation figure and orientation information is updated when you rotate an image (see “View image orientation” on page 59).

4.1.5. Quadrant Zoom

For mammography images, Quadrant Zoom presents a magnified view of the four quadrants.

- To switch quadrants, select  .
- To select a specific quadrant, select the arrow beside  and select a quadrant.
- To exit quadrant zoom, select the arrow beside  and select **Zoom to Fit**.

4.1.6. Invert

Invert grey images. Will be applied to all images in the series.

4.1.7. Window Level

You can adjust the window level based on the entire image or based on a region of interest.

- **Overall window level** Select the **Wl** tool. Drag to adjust the window level. Window level changes are applied to all images in the series. (To change the window level for an image at any time, hold SHIFT while dragging on the image.)
- **Region of interest** Select the **Box WL** tool. Click (or tap) and drag to highlight a region of interest. The window level is adjusted to maximize the contrast of the area you selected.

Note
Use presets (side panel) to apply common window levels (see “Apply presets” on page 66).

4.1.8. Gamma

Drag up or down to adjust the gamma correction. You can adjust the gamma correction for both color and monochrome images.

The gamma value is shown in the lower-left corner of the image.

4.1.9. Enhance

Drag up to sharpen the image. Drag down to blur the image.

The enhancement level is shown in the lower-left corner of the image. A negative value is shown if the image is blurred (maximum is -3); a positive value is shown if the image is sharpened (maximum is +3).

4.1.10. Smart Zoom

To use the **Smart Zoom** box:

- Using the handles on the sides of the box, drag the box to an area on an image.
- To resize the box, drag the handles on the corners of the box.
- Select **Reset** to reset the **Smart Zoom** box to the default settings. You can change the **Smart Zoom** default settings in your user preferences (see “Change your user preferences” on page 93).
- To remove the **Smart Zoom** box, select the **Smart Zoom** icon in the toolbar.

Zoom In on a Portion of an Image

You can use **Smart Zoom** to increase the magnification and window level for a selected area.

Place the **Smart Zoom** box on the area you want to magnify. Select the box, then use the **Zoom** tool to change the magnification within the box. You can also change the **Window Level** within the **Smart Zoom** box.

Compare Images

You can use **Smart Zoom** to compare two series.

To overlay a series on top of another series, drag a series from the **Series** panel or the prior studies timeline into the **Smart Zoom** box. You can also drag a preset into the **Smart Zoom** box.

You can use the following tools on an overlay series. Select the **Smart Zoom** box, then select the tool.

Zoom

Change the magnification factor for the overlay series. Note that if you change the magnification factor for the underlay series, the overlay series will also be affected.

Window Level

Change the window level for the overlay series. Note that if you change the window level for the underlay series, the overlay series will also be affected.

Scroll

Change the overlay image by scrolling through the images in the series.

Pan

Pan the overlay series.

Rotate

Rotate the overlay series.

Gamma

Adjust the gamma correction.

Rendering

Change the rendering mode for the overlay series.

Thickness

Change the plane thickness for the overlay series.

4.1.11. Relate

Not available for 2D views.

Modify the reference lines. Reference lines are shown on all series on the current screen that are in the same frame of reference. The intersection of the reference lines represents the corresponding position in all viewports.

Click (or tap) an image where you want to place the intersection of the reference lines. You can also drag the horizontal and vertical lines individually, or drag the intersection to move both lines simultaneously.

Note
Use **Reference** to show or hide the reference lines.

4.1.12. Link

Link or unlink all currently open series. This allows you to scroll through the linked series in a synchronized manner. Changes (such as Rotation and Zoom) applied to one series are also applied to the other series.

When mammography images are linked, the zoom remains consistent between the viewports and is based on physical distance (not the magnification factor).

4.1.13. Annotations and measurements

Use these tools during image analysis to mark and measure features on an image. Use the arrow beside **Annotations** to select a tool.

Note
Measurement units are set in your user preferences (see "Change your user preferences" on page 93).

Note
A draft presentation is automatically saved when you add annotations and measurements to an image (see "Create presentations" on page 63).

Propagate annotations and measurements

For cross-sectional images, you can propagate an annotation or measurement across all images in the series.

1. Add an annotation or measurement to a cross-sectional image.
2. Right-click (or touch and hold) the annotation or measurement, then select **Propagate**.

Note that when an annotation or measurement is applied to a multiframe image while a cine is playing, the annotation or measurement is automatically propagated across all images in the series. If a propagated measurement cannot be calculated for all images in the series, the measurement value will be ***.

Annotations

Arrow

- Click (or tap) to add an arrow pointing to a feature of the image. Drag to add an arrow and text.
- To move the text, hover over the text until  appears, then drag the text to a new position.
- To edit the text, click (or tap) in the text box. Edit the text, then select **OK**.

Text

- Click (or tap) to add a note without an arrow.
- To move the text, hover over the text until  appears, then drag the text to a new position.
- To edit the text, click (or tap) in the text box. Edit the text, then select **OK**.

Plumbline

- To create vertical lines, click (or tap) and drag up or down.

- To create horizontal lines, click (or tap) and drag left or right.
- Drag a line to move it to a new position.

Curvature

- Click (or tap) and drag to draw a curve between two points.
- To adjust the curve radius, drag in the center or on an end of the curve.
- Drag the curve to move it to a new position.

Spine Labels

- Click (or tap) on the first spinal vertebra, then select the label. Click (or tap) on the remaining vertebrae to apply consecutive labels.
- To display the labels across all views of this body location in the current study, select **Study**. Select **Not Shared** to only display the labels on the current viewport.
- If sharing labels across views, set the **Display Threshold** to indicate how many neighboring slices the label should be displayed on. Labels are displayed on consecutive slices up to the **Display Threshold** (in mm).

Linear Measurements

Cursor

Click (or tap) to display a point intensity measurement. The value is shown in measurement units appropriate for the study type.

Ruler

Click (or tap) and drag to create a linear measurement. After the line is drawn, the line length is calculated and displayed. Measurements are not shown on uncalibrated images.

Contour

Click (or tap) and drag to create a free hand curve and measure its length. Measurements are not shown on uncalibrated images.

Polyline

Use to create a multi-segment line.

- Click (or tap) to create each point in the line. Right-click (or touch and hold) after creating the final point.
- Drag to move a point to a new position.

Ratio

Use to measure the ratio between two lines.

- Click (or tap) and drag to draw the first line, then click (or tap) and drag to draw the second line. The ratio is shown between the lines.
- Drag at the end of a line to adjust a line's length.
- Drag in the center of a line to adjust the line's position.
- Drag the dashed connecting line to move the entire measurement to a new position.

Calibrate

Enabled for images that need to be calibrated due to missing size attributes in the image (for example, an analog image that has been scanned). The **Calibrate** tool should only be used when a scale or an object of known size is present on the image.

Drag to draw a line between scale marks on the image or to cover a known object, then enter the distance. After this calibration, the measurement tools are available for the image.

Area Measurements

You can define patterns for area measurement tools in your user preferences (see "Change your user preferences" on page 93).

ROI-Free

Use to create a border around a region of interest using a freehand shape. Statistics for the area are shown as appropriate for the study type (for example: average intensity, standard deviation, area and main diameters).

- Click (or tap) and drag to create a border around a portion of the image.
- Drag to move the measurement to a new position.
- To increase the measurement area, click (or tap) anywhere on the border (do not select). Draw a line outside the border that connects to another point on the border. This area is added to the measurement.
- To decrease the measurement area, click (or tap) anywhere on the border (do not select). Draw a line inside the border that connects to another point on the border. This area is removed from the measurement.

Note
To increase or decrease the measurement area, the ROI-Free tool must be selected.

ROI-Ellipse

Use to create a border around a region of interest using an elliptical shape. Statistics for the area are shown as appropriate for the study type (for example: average intensity, standard deviation, area and main diameters).

- Click (or tap) and drag to draw an ellipse around a portion of the image.
- Drag the center to move the ellipse to a new position.
- Drag an outer to adjust the length of the corresponding axis of the ellipse.

Circle

Use to create a circular border around a region of interest. Statistics for the area are shown as appropriate for the study type (for example: average intensity, standard deviation, area and main diameters).

- Click (or tap) and drag to draw a circle around a portion of the image.
- Drag an outer to adjust the circle's size.
- Drag the center to move the circle to a new position. You can also drag anywhere on the circumference of the circle (except on an outer).

Grease Pen

Use to highlight a region of interest using a freeform shape. No measurements are shown.

- Click (or tap) and drag to create a shape.
- Drag the shape to move it to a new position.

Area Ratio

Available for OP images. Use to measure the area ratio between two regions.

- Click (or tap) and drag to create a border around the first region, then click (or tap) and drag to create a border around the second region. The area of the two regions are shown. The ratio of the smallest area to the largest area is also shown.
- Drag to move the measurement to a new position.
- To increase the measurement area, click (or tap) anywhere on the border (do not select). Draw a line outside the border that connects to another point on the border. This area is added to the measurement.
- To decrease the measurement area, click (or tap) anywhere on the border (do not select). Draw a line inside the border that connects to another point on the border. This area is removed from the measurement.

Note
To increase or decrease the measurement area, the Area Ratio tool must be selected.

Angle Measurements

Angle

Click (or tap) and drag to create the first side of the angle (the start of this side will be the vertex). Click (or tap) where you want to place the bottom of the second side of the angle. The two sides are automatically connected. The angle between the two sides is shown.

Cobb Angle

Click (or tap) and drag to create the first side of the Cobb angle, then drag to create the second side. The two sides are automatically connected. The angle between the two sides is shown.

Color

Select the color to use for annotations.

Manage

Delete Last, Delete All

Remove the last change or all changes from the current image.

Note
Use Reset to remove changes from all images in the series.

Editing Annotations

You can edit annotations. For example, you can drag to change the annotation's position or size. You can also double-click (or touch and hold) the text in an arrow or text annotation to modify it.

Deleting Annotations

To remove an annotation, right-click (or touch and hold) the annotation, then select **Delete**.

Measurements for wide field ophthalmic photography images

NilRead calculates linear and area measurements on wide field ophthalmic photography images. The calculations are done using a 3D geometric model of the eye.

When you apply a linear measurement to a wide field ophthalmic photography image using the ruler tool, the measurement is calculated as the length of the curve representing the line on the 3D surface of the eye. Area measurements are performed on a 3D model of the eye by projecting the 2D shape

(ellipse or ROI) from the image to the 3D model. The area measurement is calculated from the enclosed pixels on the 3D model.

If the distance or area cannot be measured, the measurement value will be ***. If you move a linear or area measurement to a different location on the image, the measurement will be recalculated based on the measurement's new location.

4.1.14. Key Image

Available for 2D views only.

Create a series of key images for a study. This allows you to quickly access important images within a large series of images.

To mark the current image as a key image, select **Key Image**. The image is added to a key images series and is labelled as a key image.

4.1.15. Titles

Show or hide image details in all viewports (see "View image details" on page 53).

4.1.16. Full Quality

View the original, uncompressed image.

4.1.17. Reset

Remove changes from all images in the series. Changes will only be removed from the current view.

Note
Use **Annotations > Delete Last** or **Delete All** to remove changes from the current image only.

4.1.18. Hanging Protocols

Use hanging protocols to customize the image viewing area (see "Select hanging protocols" on page 51).

4.1.19. Study Layout

Use study layouts to customize the image viewing area (see “Select study layouts and views” on page 50).

4.1.20. View

Use views to customize the image viewing area (see “Select study layouts and views” on page 50).

4.1.21. Rendering

Select the rendering mode for the study. Options are MIP (maximum intensity projection), volume rendering and average.

Note
Use presets (side panel) to apply common rendering settings (see “Apply presets” on page 66).

4.1.22. Reference

Show or hide reference lines.

Note
Use **Relate** to change the position of the reference lines (see “Relate” on page 38).

4.1.23. Thickness

Use the arrows to increase or decrease the plane thickness.

4.1.24. Clipper

Clippers are used to selectively remove portions of a study from a 3D rendering. This is generally used to expose a part of anatomy or a pathology. Several types of clippers are available: Plane, Box, Ellipsoid and Cylinder.

To use the clipper, select **View Tools** (side panel).

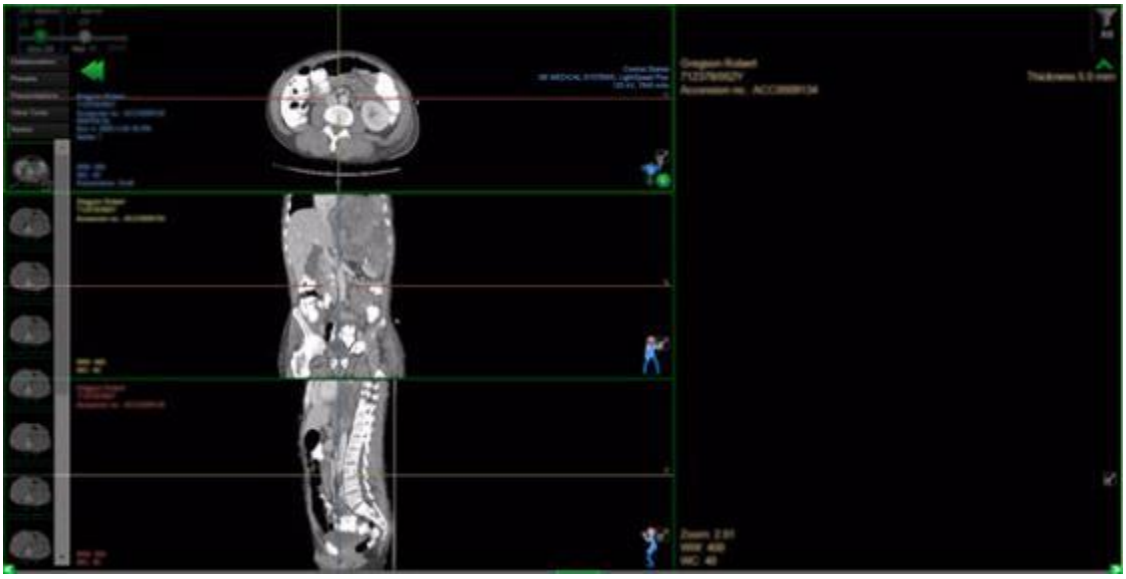
- **Plane** Front plane clipper. Click (or tap) on an image to enable the clipper. Drag to push the plane in and out.
- **Box** Rectangular clipper. Click (or tap) on an image to enable the clipper. Drag a handle on the corner of the box to change the box size. Drag the center of the box to move it.
- **Ellipsoid, Cylinder** Elliptical or cylindrical clipper. Click (or tap) on an image to enable the clipper. Drag the center of the shape to move it.
- **Clear** Remove all clipping from the image.
- **Reset** Reset the currently selected clipper to the default settings.
- **Pin, Unpin** Lock or unlock the clipping changes that have been made to an image. This allows you to retain the current clipping while working with an image (rotating, zooming, etc.). Further clipping cannot be performed until the image is unpinned. Pin is not available for the Plane clipper.

Note
You can perform other actions, such as rotating the image, while using a clipper. You can also save a clipped image as a bookmarked image (see “Share bookmarked images” on page 89).

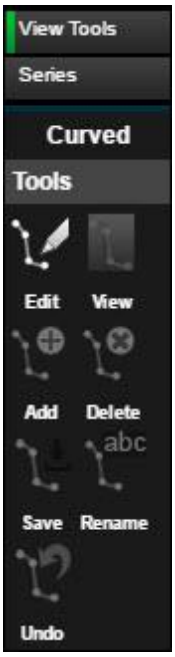
4.1.25. Curved MPR

Curved MPR allows you to define a curve in the volumetric dataset and then view an image along this curve. This is useful for viewing structures such as blood vessels or the spine.

1. Select **View**.
2. Under **MPR Views**, select **Curved**. Three MPR views are shown on the left and a blank viewport is shown on the right.



3. Select **View Tools** (side panel). The curved reformat tools are shown:



4. To create a curved reformat, select **Edit**. You can then select **Add** and add points to the curve reformat.

   The curve on the MPR is shown as follows:

   - The points are shown as circles except for the last point, which is shown as a square.
   - The circle or square is filled if the corresponding point is visible in the current MPR view.
   - The line connecting two points is semi-transparent if one or both points are not visible in the MPR view.

Once you begin adding points, the curved reformat view is shown in the viewport on the right and the curved reformat is listed under **Reformats** in the side panel.

5. To edit a curved reformat, select **Edit**. To edit a point, click (or tap) on the point when it is visible, then drag the point to a new location.
6. When editing a curved reformat, select **Undo** to remove the last action you performed.
7. To save the curved reformat, select **Save**. The curved reformat will be saved in the local database and will be available when the study is reloaded.
8. To rename a curved reformat, select **Rename**.
9. To delete a curved reformat, select **Delete**. The curved reformat will be deleted from the local database.
10. To view a curved reformat, select **View**.

4.1.26. Segment

Available for 3D views. Use to view and edit tissues.

Note
Changes made with the **Segment** tool are not saved when you close the study. However you can save a static screenshot using a secondary capture image (see “Create secondary capture images” on page 90).

To view a tissue:

1. Select a 3D view.
2. Select **Tissue** (side panel). The **Tissue** panel contains part segmentation results by tissue.
3. Select a tissue from the panel. You can select multiple tissues to view simultaneously.

To edit a tissue:

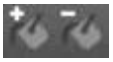
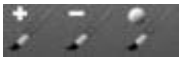
1. In the **Tissue** panel, select  beside a tissue, then select **Segment** (toolbar).

   The **Current Tissue** area shows the tissue you are currently editing. This area also contains rendering presets you can apply to the tissue.
2. You can use the Segmentation tool to edit the tissue. See the following section for details.
3. Select **Undo** to undo the last change made to the tissue.
4. Select **Reset** to remove all changes made to the tissue.

Note
If you do not select a tissue, any changes you make with the **Segment** tool will be saved as a new tissue. You can also create a new tissue based on an existing tissue. If you edit an existing tissue then deselect the tissue in the **Tissue** panel, the edited tissue will be added as a new tissue. You can only create one new tissue.

Segmentation Tools (Available on MPR viewports)

These tools select an area in close proximity to the tissue you select, then grow or shrink this area.

1. Select the type of tissue (**Tissue**, **Nodule**, **Lesion**, or **Vessel**).
2. To select an area, use of the following tools:
   -  Hover over the area, then click (or tap) to select the area.
   -  Drag to select the area. The tool will apply color to the area identified as part of the tissue.

4.1.27. NM Map

Assign a color map to nuclear medicine images.

4.1.28. Fusion Map

Assign a color map to fusion images.

4.1.29. Fusion Blend

Adjust the fusion blend level.

4.1.30. Cine

View the images in a study as a “movie”. Use the Cine controls to:

- **Run** Play the cine.
- **Sync Run** Synchronized play of all viewports.
- **Pause** Pause the cine.
- **Speed** Change the desired playback speed. The actual playback speed is shown while the cine is playing.
- **Range** Select the range of images from the series to include in the cine, based on the current image. For example, selecting 40 will include the 20 images before the current image and the 20 images after the current image. You can also choose to include all images in the series.
- **Replay/Yoyo** Replay the cine continuously or yoyo (play forwards then backwards).

4.1.31. First, Previous, Next, Last

Scroll through the series in a study.

4.2 Select study layouts and views

Use study layouts and views to customize the image viewing area. This allows you to quickly arrange the series and images you want to view.

Note
For more information, see “Customize the image viewing area” on page 7.

4.2.1. Apply a study layout to the image viewing area

This divides the area into multiple “screens”. You can drag a different series into each screen, allowing you to view multiple series simultaneously.

1. Select **Study Layout** (toolbar).

2. Select a study layout. The study layout is applied, dividing the image viewing area into multiple screens.

4.2.2. Apply a view to a screen

A view is a predefined viewport arrangement specific to a clinical scenario. Some views display a single viewport while others display multiple viewports, each with a different type of visualization. You can apply different views to each screen or apply the same view to all screens.

1. Click (or tap) a screen, then select **View** (toolbar).
2. To apply the same view to all screens, select **Apply View Mode to Whole Screen**.
3. Select a view. The view is applied to the selected screen (or all screens).

You can drag a different series into each viewport. You can also drag a study from the prior studies timeline to a viewport.

4.3 Select series

You can view multiple series by dragging different series into different viewports.

Note
For details on enabling multiple viewports, see “Select study layouts and views” on page 50.

1. Select **Series** (side panel). The series in the study are shown below the side panel. A filmstrip icon  is shown on series with a multiframe cine sequence.
2. Hover over a series thumbnail for information (series ID, image count, date, modality, description).
3. Select a series thumbnail to load the series in the viewer. The series is opened in all viewports.
   or
   Drag a series into a viewport.
4. You can view the images in the series using:
   - scrolling (see “Scroll” on page 34)
   - bookmarks (see “Share bookmarked images” on page 89)
   - key images (see “Key Image” on page 44)
   - secondary capture images (see “Create secondary capture images” on page 90)

4.4 Select hanging protocols

The purpose of a hanging protocol is to display the images in a study in a consistent manner. While the term originally referred to the arrangement of physical films in a film box, it now refers to the display of

images on a computer monitor. When properly setup, the use of hanging protocols significantly improves reading quality and efficiency.

When opening a study, NilRead analyzes the DICOM attributes of the study and identifies matching hanging protocols. If any candidates are found, the best one is selected and applied automatically.

You can manually select a hanging protocol from the list of matched protocols. You can also create a new hanging protocol based on the current image viewing area.

Note
See the **Hanging Protocols Handbook** for more information about using hanging protocols.

4.4.1. Apply a hanging protocol

1. Select **Hang. Prot.** (toolbar). Available hanging protocols and the stages within each protocol are shown.
2. Select a stage within a hanging protocol. The image viewing area is updated.
3. Select **Prev H.P.** and **Next H.P.** (toolbar) to move through the stages in the hanging protocol.

4.4.2. Create a new hanging protocol

You can customize the study layout and presentation state (window level, zoom, etc.) while viewing a hanging protocol, then create a new hanging protocol using these settings. Presentation state is not captured for clinical hanging protocols.

1. Select **Hang. Prot.** (toolbar), then select **Capture**. The **Hanging Protocol Editor** appears.
2. Change the protocol name and any other customizable information. Customizable areas are underlined and are also highlighted when you hover over them. For details, see “Manage hanging protocols” on page 118.
3. Select **Save**.

4.4.3. Edit a hanging protocol

You can edit the hanging protocol currently applied to the image viewing area. (You must have the appropriate user privileges to edit hanging protocols.)

1. Select **Hang. Prot.** (toolbar), then select **Edit**. The **Hanging Protocol Editor** appears.
2. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it. For details, see “Manage hanging protocols” on page 118.
3. Select **Save**.

4.4.4. Add a stage to a hanging protocol

While viewing a hanging protocol, you can add more stages. You can create a stage based on the current image viewing area or add a blank stage.

1. If desired, customize the image viewing area to use the settings you want for the new stage. For example, select a study layout and view, select the series to be viewed, and adjust the presentation state (window level, zoom, etc.). All of these settings will be automatically entered in the corresponding sections of the hanging protocol. Presentation state is not captured for clinical hanging protocols.
2. Select **Hang. Prot.** (toolbar), then select **Add Stage**. The **Hanging Protocol Editor** appears. A new stage is added, based on the current settings in the image viewing area.

   Note
   You can also select **<add stage>** to add a blank stage you can customize.

3. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it. For details, see “Manage hanging protocols” on page 118.
4. Select **Save**.

4.5 Use full screen view

You can view an image using the full screen. This hides the toolbar, side panel and other viewports. While in full screen, right-click (or touch and hold) the image to view a list of tools. You can also use keyboard shortcuts to select tools.

1. Select  on a viewport to display the image in full screen view.
2. Select  again to restore the original viewport layout.

Note
You can also maximize a viewport (see “User interface overview” on page 2). The toolbar and side panel are still available while the viewport is maximized.

4.6 View image details

Details about the study, series and image are shown on an image. The details shown depend on the view mode and image modality.

4.6.1. 2D Images

Modality	Top-Left	Top-Right	Bottom-Left
CT	Patient Name Patient Details Series Description Date and Time Series Number Slice Location Key Image Flag	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width
MR	Patient Name Patient Details Series Description Date and Time (Philips) Scan and Slice Number (Philips) Scan Technique (Philips) MR Echo Repetition (Philips) Flip Angle (Philips) Delay Time (Philips) B Factor Diffusion Direction (Philips) Trigger Delay Time (Philips) Temporal Position Id Slice Location Key Image Flag	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Protocol Name and Receiving Coil Window Center Window Width
NM	Patient Name Patient Details Series Description Date and Time Series Number	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width

Modality	Top-Left	Top-Right	Bottom-Left
	Slice Location Key Image Flag		
OP	Patient Name Series Description Date and Time Instance Number Columns Rows	Hospital Name Equipment Name Image Laterality	Enhancement Gamma Window Width Window Center Image Compression Presentation
OPT	Patient Name Patient Details Series Description Date And Time Series Instance Number Slice Location Key Image Note	Hospital Name Equipment Name Image Laterality	Enhancement Gamma Window Width Window Center Presentation
PT	Patient Name Patient Details Series Description Date and Time Series Number Slice Location Key Image Flag	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width
Others	Patient Name Patient Details Series Description Date and Time	Hospital Name Equipment Name Voltage And Amperage Slice Thickness	Window Center Window Width

Modality	Top-Left	Top-Right	Bottom-Left
	Series Number Slice Location Key Image Flag	Reconstruction Diameter	

4.6.2. Slab Images

Modality	Top-Left	Top-Right	Bottom-Left
CT	Patient Name Patient Details Series Description Date and Time Series and Instance Number Slice Location	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width Rendering Preset Name
MR	Patient Name Patient Details Series Description Date and Time Series and Instance Number Slice Location	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Protocol Name and Receiving Coil Window Center Window Width Rendering Preset Name
NM	Patient Name Patient Details Series Description	Hospital Name Equipment Name Voltage And Amperage Slice Thickness	Window Center Window Width Rendering Preset Name

Modality	Top-Left	Top-Right	Bottom-Left
	Date and Time Series Number Slice Location	Reconstruction Diameter	
OPT	Patient Name Patient Details Series Description Date And Time Series Instance Number Slice Location Key Image Note	Hospital Name Equipment Name Image Laterality	Enhancement Gamma Window Width Window Center Presentation
PT	Patient Name Patient Details Series Description Date and Time Series Number Slice Location	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width Rendering Preset Name
Others	Patient Name Patient Details Series Description Date and Time Series Number Slice Location Key Image Flag	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width

4.6.3. 3D Images

Modality	Top-Left	Top-Right	Bottom-Left
CT	Patient Name Patient Details Series Description Date and Time Series and Instance Number Slice Location	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width Rendering Preset Name
MR	Patient Name Patient Details Series Description Date and Time Series and Instance Number Slice Location	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Protocol Name and Receiving Coil Window Center Window Width Rendering Preset Name
NM	Patient Name Patient Details Series Description Date and Time Series Number Slice Location	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width Rendering Preset Name
OPT	Patient Name Patient Details Series Description Date And Time Series Instance Number Slice Location	Hospital Name Equipment Name Image Laterality	Enhancement Gamma Window Width Window Center Presentation

Modality	Top-Left	Top-Right	Bottom-Left
	Key Image Note		
PT	Patient Name Patient Details Series Description Date and Time Series Number Slice Location	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width Rendering Preset Name
Others	Patient Name Patient Details Series Description Date and Time Series Number Slice Location Key Image Flag	Hospital Name Equipment Name Voltage And Amperage Slice Thickness Reconstruction Diameter	Window Center Window Width

4.7 View image orientation

Applies to MPR and volume viewports. The figure in the bottom-right corner of an image represents the image orientation:

	**Axial** Figure standing on head (feet up)

	**Sagittal** Figure standing sideways
	**Coronal** Figure facing forward
	Select the arrow above the orientation figure to change the cardinal orientation or flip the image 180 degrees.

The orientation is also indicated by the letters to the right of and below the image:

F foot

H head

P posterior

A anterior

L left

R right

4.8 View DICOM attributes

You can view the DICOM attributes for an image.

1. Right-click (or touch and hold) a viewport, then select **View DICOM attributes**. The DICOM attributes appear in a new browser window or tab.
2. Use your browser to search, print or save the attribute list.

4.9 View study information

While viewing an image, you can view details about the study.

1. Right-click (or touch and hold) a viewport, then select **View study info**. The study information appears in a new window.
2. Select **OK** to close the window.

4.10 View prior studies timeline

When you open a study, a timeline with additional studies and reports for the patient is shown at the top of the image viewing area. The current study is also included in the timeline and is marked with an anchor.

Note
The timeline is only shown if prior studies exist for the patient in the database or are accessible through an XDS registry or a query to connected DICOM devices.

4.10.1. Timeline information

The following information is shown on the timeline:

- Prior studies and DICOM embedded PDF reports are shown in chronological order.
- The studies in the timeline are numbered.
- For studies, the modality and date are shown. For reports, the date is shown.
- An exclamation mark is shown if a warning exists for a study or report.
- The current study (the study opened from the Patient Study Directory) is marked with an anchor.

In each viewport, the number of the currently loaded study is shown in the bottom-right corner.

4.10.2. Timeline actions

View study or report details

Hover over a study or report in the timeline to view more detailed information, such as the number of series and images in a study or the title of a report.

View a study

Select a study in the timeline to load it in all viewports. The study is opened using the default hanging protocol for the study.

or

Drag a study from the timeline to a viewport. This allows you to place different studies in different viewports. A warning appears near the top of the image viewing area stating that multiple studies are displayed.

View a report

Select a report in the timeline. The report opens below the timeline. The following options are available when viewing reports:

- **Save** Save a PDF copy of the report.
- **Print Report** Print the report from your browser.
- **Vert/Horiz** Place the report area on the right side (Vert) or bottom (Horiz) of the screen.
- **Maximize/Restore** View the report area only and hide the image viewing area (Maximize) or view both the report area and the image viewing area (Restore).
- **Close** Close the report.

Note
To resize the image viewing and report areas, drag the divider between the two areas.

Select priors to include in the timeline

You can limit the prior studies displayed in the timeline.

1. Select  on the right side of the timeline.
2. The **Patient Timeline** window appears. The available priors are shown at the top of the window. To view more information about a prior study, select a study, then select one of the following options at the bottom of the window:
    - **Study Info** View details about the study.
    - **Reports** View the reports in the study. Select a report to view a preview. When done, select **Close**.
    - **Images** View thumbnails of the images in the study. Select a thumbnail to view a preview of the image. When done, select **Close**.
3. To load a prior study in the image viewer, select the prior, then select **Load** in the bottom-left corner.
4. Beside **Select priors to display in the timeline**, select one of the following options:
    - **All** Include all priors.
    - **Manual Selection** Select the checkboxes beside the priors to include.
    - **Filtered** Enter search information in the blank row below the column headings. You can select studies based on age, modality and description.
5. Select **Set as relevant**. The selected prior studies are shown in the timeline.

Note
The number under  indicates how many studies are displayed in the timeline (for example, All or 2/3).

Hide the timeline

Use the arrow below the timeline to hide or view the timeline.

Note
The timeline content and visibility can also be controlled using hanging protocols (see “Manage hanging protocols” on page 118). Use the **Relevant patient history** section to automatically display only relevant priors in the timeline. Use the **Application preferences** section to keep the timeline closed when that specific hanging protocol is in use.

Retrieve prior studies

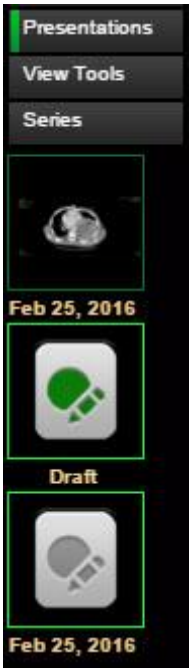
Use the prior icon in the timeline to trigger a background retrieve of prior studies while reading the current (anchor) study. This icon is only available if all of the prior studies have not yet been loaded.

4.11 Create presentations

Use a presentation to save a copy of the measurements and annotations applied to an image. A draft presentation is automatically created when you open a study (if a draft does not already exist). Your changes will continue to be added to the draft until you approve the presentation. Once a presentation is approved, it cannot be modified.

Note
A bookmark is a special kind of presentation. In addition to measurements and annotations, bookmarks also store image visualization settings such as layout, window, level, and zoom. For more information, see “Share bookmarked images” on page 89.

Presentations are shown in the side panel with the most recent presentation at the top of the list. Bookmarks are listed first, then draft presentations, then approved presentations. For approved presentations, the approval date is shown. The following example shows a bookmark, a draft presentation, and an approved presentation:



The list may also include presentations that originated from a third-party, such as PACS or VNA. These presentations are automatically marked as approved and use the following icon:

Note
If you do not have permission to use persistent presentations (for example, if you are a guest user), you will be able create annotations and measurements but your changes will not be saved.

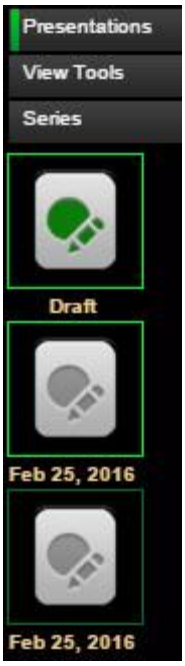
4.11.1. Select presentations

You can apply one or more presentations to the image you are currently viewing. When you open a study, the most recent draft presentation and the most recent approved presentation are automatically applied. Use the **Presentations** side panel to manually select the presentations you want to apply.

Note
Applying a bookmark may change the current draft presentation for the image. When you view a bookmark, the following settings that were captured during the bookmark creation will be applied: the layout, the series selected for each viewport, and the presentations applied to the displayed images.

1. Select **Presentations** (side panel) to view the presentations for a study.
2. Select one or more presentations to apply them.

The presentations you have selected are highlighted in the side panel. In the following example, the draft presentation and the first approved presentation have been applied to the image:



To remove a presentation from an image, select the highlighted presentation in the side panel. The presentation is no longer applied to the image and is no longer highlighted in the side panel.

4.11.2. Approve a presentation

Right-click (or touch and hold) a presentation, then select **Approve**.

An approved presentation cannot be modified. Annotations in approved presentations are shown with dashed lines, indicating that they cannot be modified. The Presentations label in the bottom-left corner of the image will contain the word “Approved” and the approval date.

Note that a typical NilRead implementation will automatically push back to PACS or VNA presentations through a lifecycle rule.

4.11.3. Create a draft presentation

If you approve or delete the draft presentation, a new draft presentation is not automatically created during the current viewing session. To create a new draft presentation, right-click (or touch and hold) any existing approved presentation, then select **Make Draft**. A blank draft presentation is created.

If you attempt to apply annotations or measurements to an image and a draft presentation does not exist, you will be given the choice to:

- Make a new draft presentation which will be used to save your changes.

- Allow transient in-session overlays. This allows you to apply annotations and measurements during your current session. These changes are temporary and will not be saved.

If you choose to allow transient in-session overlays, the Presentations label in the bottom-left corner of the image will contain the word “Transient”, indicating that your changes will not be saved.

4.11.4. Delete a presentation

Right-click (or touch and hold) a presentation, then select **Delete**.

4.12 Apply presets

Use a preset to visualize different aspects of a study. For example, a CT study could include a preset to visualize vessels or a preset to visualize bones. The study view, modality and rendering mode determine what presets are available.

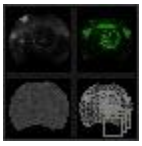
- **2D** Presets can change window level.
- **MPR** Presets can change rendering mode and opacity.
- **3D** Presets can change rendering mode and opacity.
- **Sculpting** Presets can change rendering mode and opacity.

When you apply a preset, any changes you have made to an image will be removed (rotation, annotations, etc.). Any changes you make to a preset are not saved.

1. Select **Presets** (side panel). The presets available for the study are shown below the side panel.
2. Select a preset thumbnail.

4.13 Combine all images in a single series

NilRead can automatically create a “virtual series” that contains all images in a study in the order they were acquired. The virtual series is added to the side panel and the series icon shows four images side-by-side. For example:



When you hover over the series, the description is **All images**.

You can control whether virtual series are created automatically. You can also choose whether virtual series are created only for studies containing a specific modality.

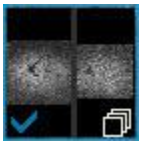
1. Select **Settings**.
2. Under **Preferences**, select **Modality Preferences**.
3. Enter the following information:

- **Modality** Select the modality for which you want to set the virtual series preference.
- **Virtual Series** Select **Yes** to automatically create virtual series for the modality you selected. Select **No** if you do not want to create virtual series for the modality you selected.

4. Select **Save**.

4.14 View stereometric images

If a study contains stereometric images, NilRead automatically creates a series containing all stereometric pairs of images in the study. The series is added to the side panel and the series icon shows two images side-by-side. For example:



- When you hover over the series, the series description is “All stereometric images”.
- When you view images from the series, the 1x2 view is automatically applied and the images in each stereometric pair are shown side-by-side.
- Scrolling through the series will scroll through each pair of images.

4.15 View CAD marks

If a study has an associated computer-aided detection (CAD) report, you can view the CAD marks on the relevant mammography images. CAD marks are also available for DBT mammography images produced by Hologic (if CAD marks are provided by the manufacturer).

Important
Users are instructed to review all images in the study before enabling CAD marks.

1. Select **View Tools** (side panel). An icon for the CAD report is shown. For example:

2. Hover over the icon to view the following information:

- **Manufacturer** CAD report manufacturer.
- **Algorithms** Algorithms used by the CAD software.
- **Calc** Number of calcification marks.
- **Mass** Number of mass marks.
- **Total** Total number of CAD marks in the report.

3. Select **Show CAD** to enable CAD marks on the study images. If an image contains CAD marks, the number of marks is shown on the image.
4. Clear **Show CAD** to hide CAD marks.

4.16 DBT slice position indicator

When scrolling through slices in a DBT series, an indicator appears in the bottom-left corner:

The indicator shows the current slice, total number of slices, and an orientation marker (F = feet, H = head).

4.17 View radiation therapy (RT) plans

For studies containing external beam radiation therapy (RT) plans, the RT plans are available in NilRead for clinical reference viewing. Note that they are not intended for plan approval.

You can view RT plans using any NilRead view. There are also two specific RT views available, RT Graph and DRR.

Note
You can use the RT Graph and DRR views to create hanging protocols for viewing RT plans. For details, see “About hanging protocols” on page 118.

4.17.1. Using the RT Plan panel

When you load a study containing RT plans, **RT Plan** options are available in the side panel. These options allow you to choose the plan details you want to view.

Note
You can customize some of the RT plan display settings, such as the unit to use for radiation doses. For details, see “Change modality preferences” on page 100.

1. Select **RT Plan** (side panel). A list of RT plans appears below the side panel.

2. Select a plan.
3. Select the category you want to view: **Isodoses**, **Structures** or **Beams**. Checkboxes appear, allowing you to select specific items to view.
    - **Isodoses** Select the radiation doses you want to view. The selected doses are highlighted in the images.
    - **Structures** Select the structures you want to view. The selected structures are highlighted in the images.
    - **Beams** Select the beams you want to view. The selected beams are highlighted in the images. For each beam, use the list to select the control point you want to visualize. The shape and source of the beam may change between control points.

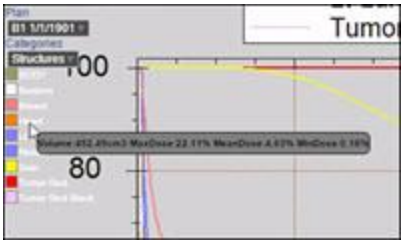
      To view information about the wedge associated with the currently selected beam control point (if one exists), hover over the beam label.

4.17.2. RT Graph view

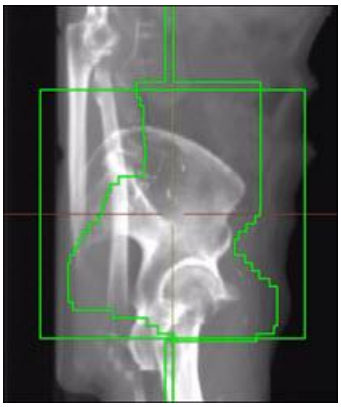
The RT Graph view includes a cumulative dose-volume histogram (DVH) relating radiation dose to tissue volume. You can select the structures to include in the histogram.

1. Select **View** (top toolbar), then select **RT Graph**. (You can also use the Study Layout options to place the RT Graph view beside an existing view. For details, see “Customize the image viewing area” on page 7.)
2. Select **RT Plan** (side panel). A list of RT plans appears below the side panel. Note that when working with the RT Graph, the RT Plan panel lists plans and structures only.
3. Select a plan, then select one or more structures. On the DVH, the dose received for the percentage volume for each structure is shown.
4. Hover over a structure in the side panel to view dose statistics. For example:



4.17.3. DRR view

The digitally reconstructed radiograph (DRR) view allows you to view the treatment field positions for a beam. The rectangle represents the jaw pairs, and the area selected within the rectangle represents the multileaf collimators. For example:



1. Select **View** (top toolbar), then select **DRR**. (You can also use the Study Layout options to place the DRR view beside an existing view. For details, see “Customize the image viewing area” on page 7.)
2. Select the viewport where you want to apply the DRR.
3. Select **RT Plan** (side panel). A list of RT plans appears below the side panel. Note that when working with the RT Graph, the RT Plan panel lists plans and beams only.
4. Select a plan, then select a beam. Optionally, select a beam control point. To switch between control points, select the previous and next arrows beside the control point list.

4.18 Vessel tracer

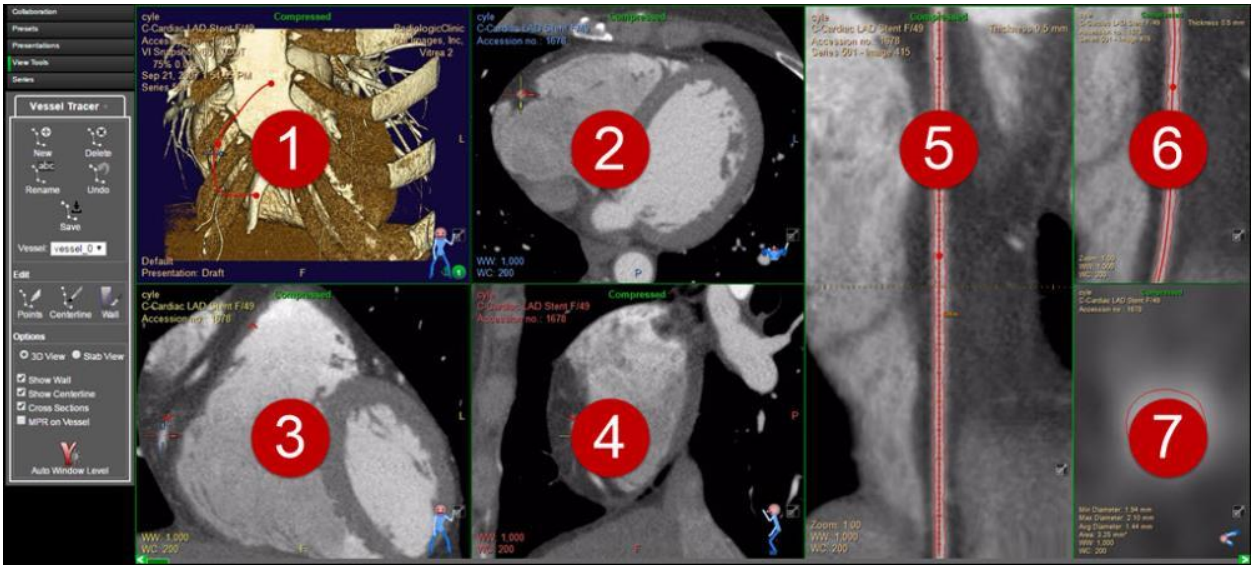
For CT studies, the vessel tracer tools allow you to extract a vessel from the volumetric data set in order to examine the vessel more closely.

4.18.1. Vessel tracer view

To use the vessel tracer tools, first apply the vessel tracer view:

- Select **View** (top toolbar), then select **Vessel Tracer**. (You can also use the Study Layout options to place the vessel tracer view beside an existing view. For details, see “Customize the image viewing area” on page 7.)

The default vessel tracer view contains seven viewports.

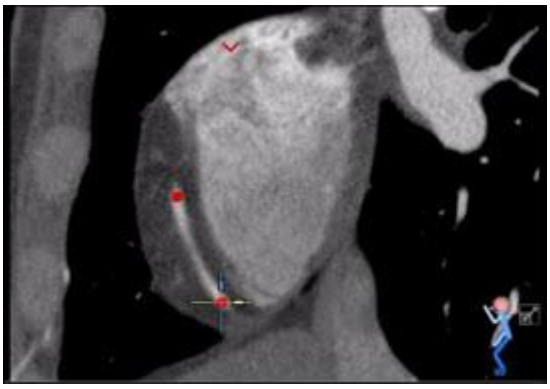


- By default, viewport 1 contains a 3D shaded rendering of the data. To change the viewport to a thick slab MIP rendering, select the **Slab View** option in the **Vessel Tracer** tools panel. To switch back to the 3D rendering, select the **3D View** option.
- Viewports 2, 3, and 4 contain MPR views on the three major planes (axial, sagittal and coronal).
- Viewports 5, 6, and 7 contain reformat views of the selected vessel. These views appear once you have created a vessel.
    - Viewport 5 contains a “stretched” ribbon view along the centerline of the vessel. This view has overlays showing the centerline, the intersecting inner wall curve of the vessel and a reference marker which identifies the location of the cross-section in viewport 7. The reference marker in this view is a pattern of distance ticks. You can edit the vessel in this viewport.
    - Viewport 6 contains a curved reformat view of the vessel. This view has overlays showing the centerline, the intersecting inner wall curve of the vessel and a reference marker which identifies the location and orientation of the cross-section in viewport 7. You cannot edit the vessel in this viewport; it is for viewing only.
    - Viewport 7 shows an axial cross-section through the vessel at the location of the reference marker along the vessel’s centerline. Several cross-section measurements are shown such as the minimum diameter, maximum diameter, average diameter and area of the lumen. Note that you can use the **Cross Sections** option to hide the cross-section view. If the cross-section view is hidden, the curved reformat view is expanded to fill the viewport.

4.18.2. Defining a vessel

Once you have applied the vessel tracer view, you can identify vessels using seed points. After defining a vessel, you can adjust the seed points, centerline and lumen wall.

1. Select **View Tools** (side panel). The **Vessel Tracer** tools panel appears below the side panel.
2. Select **New**. A new vessel is added to the **Vessel** list in the side panel. The vessel is given a default name, such as vessel_0. To change the vessel name, select **Rename**.
3. Note that the **Edit Points** option is now enabled. In one of the MPR viewports (or the 3D viewport), click (or tap) to place seed points within the lumen of the vessel. For example:

   Note that if a point appears as an arrow (instead of a dot), this indicates that the seed point is not on the current plane.

   If the arrow faces down, scroll down to view the seed point. If the arrow faces up, scroll up to view the seed point. You can also use the **Previous Seed Point** or **Next Seed Point** options that appear when you right-click (or touch and hold) a point.

   Note that you can work with points in the ribbon view (5) in addition to the 3D and MPR viewports (1-4).
4. You must place a minimum of two points to define a vessel. Once a vessel is defined, reformat views of the vessel are shown in the ribbon view (5), curved reformat view (6), and cross-section (7).
   - To add more points to the vessel, select **Edit Points** and click (or tap) on the vessel to place a point. You can add (or move) points in any of the MPR, 3D or ribbon viewports.
   - To move a point, select **Edit Points** and drag a point to a new location.
   - To delete a point, right-click (or touch and hold) the point, then select **Delete Seed Point**.
   - To change the focus of the viewports to a specific seed point, right-click (or touch and hold) the point, then select **Focus to This Seed**.
   - To move through the seed points, right-click (or touch and hold) a point, then select **Previous Seed Point** or **Next Seed Point**.
5. In the **Vessel Tracer** tools panel, select **Save**. This will save all of the vessels that have been defined.

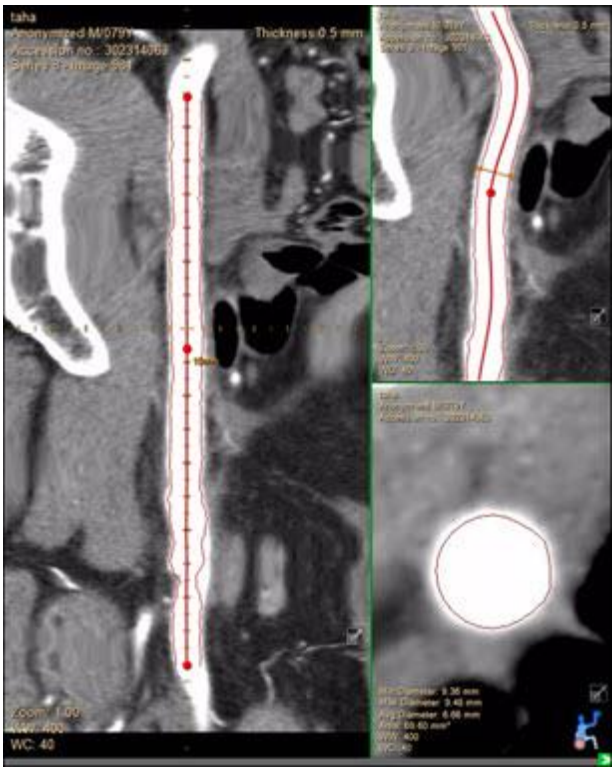
> **Note**
> Before saving, you can select **Undo** to remove your last change to the vessel.

6. To work with a previously defined vessel, select the vessel from the **Vessel** list.
7. To delete a vessel, select the vessel from the **Vessel** list, then select **Delete**.

4.18.3. Adjusting the centerline and wall

NilRead identifies the vessel centerline and lumen wall based on the seed points you have defined. The user is responsible for reviewing and editing the results shown in the vessel tool. A convenient way to view a vessel is to press the middle mouse button and drag in the cross-section viewport.

The centerline is shown in the ribbon and curved reformat views. The wall is shown in the ribbon, curved reformat and cross-section views. For example:



To adjust the centerline:

1. In the **Vessel Tracer** tools panel, select **Edit Centerline**.
2. In the ribbon view, drag to draw a new approximation of the centerline.
3. NilRead uses the new centerline to adjust the vessel visualization. NilRead may add more seed points to accommodate the new centerline.
4. In the **Vessel Tracer** tools panel, select **Save**.

To adjust the wall:

1. In the **Vessel Tracer** tools panel, select **Edit Wall**.
2. In the ribbon view, drag to draw a new approximation of the wall.
3. In the cross-section view, click (or tap) within the boundaries of the wall. A dotted line appears. Drag the dotted line to draw a new approximation of the wall.
4. NilRead uses the new wall to adjust the vessel visualization.
5. In the **Vessel Tracer** tools panel, select **Save**.

To hide the centerline or wall:

- In the **Vessel Tracer** tools panel, clear the **Show Centerline** or **Show Wall** option.

To hide the cross-section view and expand the curved reformat view:

- In the **Vessel Tracer** tools panel, clear the **Cross Sections** option.

To change the orientation of the MPR viewports according to the direction of the vessel:

- In the **Vessel Tracer** tools panel, select the **MPR on Vessel** option.

To apply a window level preset that tries to optimize the display of the vessel:

- In the **Vessel Tracer** tools panel, select **Auto Window Level**.

To use the clipper tools in the **Vessel Tracer** view:

- In the **Vessel Tracer** tools panel, select the arrow beside the **Vessel Tracer** title, then select **Clipper**. The **Clipper** tools panel appears. To return to the vessel tracer tools, select the arrow, then select **Vessel Tracer**.

4.19 Edit videos

You can edit a video in a patient study to remove irrelevant information. The parts of the video you want to retain are saved as a new video in the study. The original video also remains in the study and is not modified.

1. In the Patient Study Directory, open a study that contains a video.

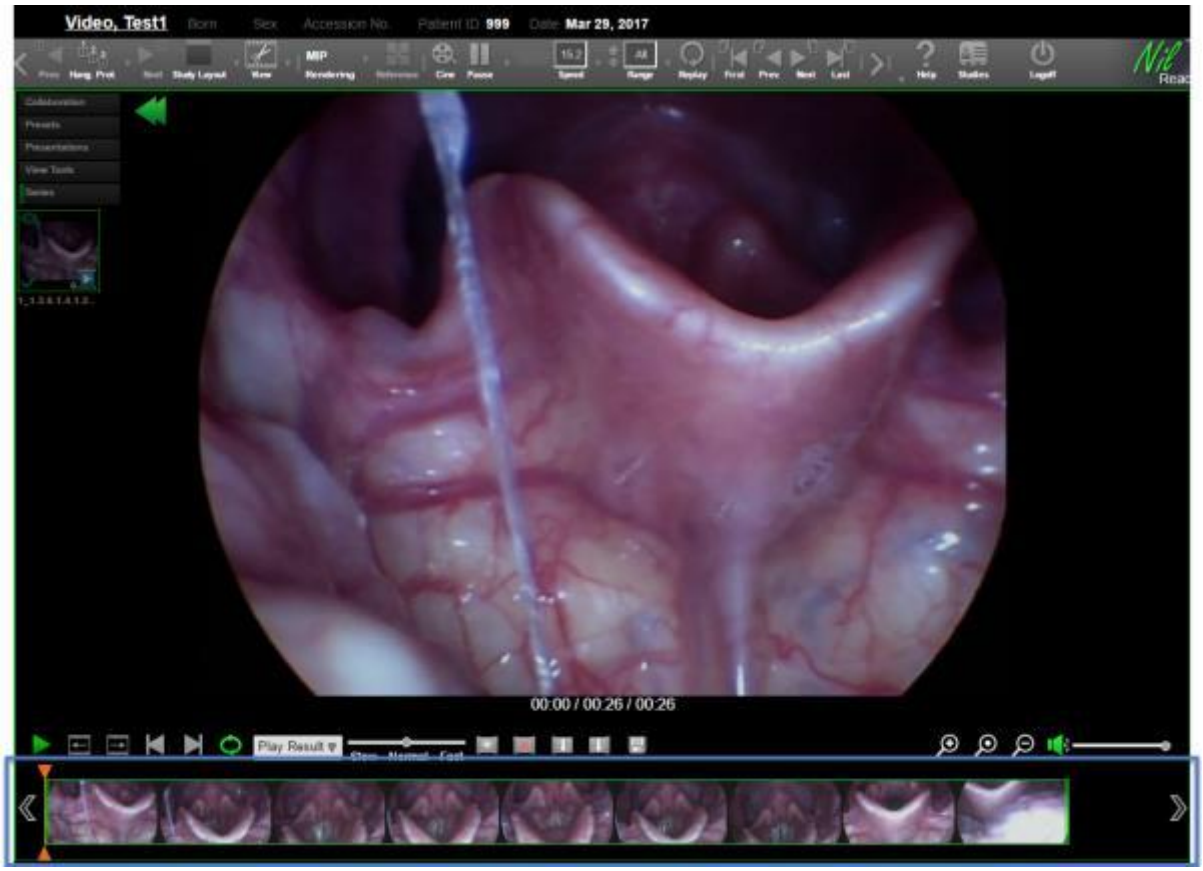
> **Note**
> If you open a video from the QC viewer, the video automatically opens in the video editor.

2. Select **Series** (side panel) and select a video. The video opens in the image viewer and begins to play.
3. Select **View** (top toolbar), then select **Video Editor**.
4. To return to the image viewer and exit the video editor, select **View** (top toolbar), then select **Video**.

4.19.1. Select video content

The timeline at the bottom of the screen contains thumbnail images of the video content. You will use this timeline to select the content you want to include in the edited video.

The clipping box in the timeline contains the information that will be retained in the edited video. When you first open the editor, the entire video is contained in the clipping box.



To create the edited video, you will modify the clipping box so that it contains the content you want to include. You can also add more clipping boxes to the timeline, allowing you to select content from different parts of the video. For example, the following timeline contains three clipping boxes:

Using the timeline

You may need to use the arrows at each end of the row to view all of the thumbnails on the timeline. You can also hold SHIFT while dragging the timeline to view additional thumbnails. On touch devices, use a two-finger drag.

Use the following tools to resize the thumbnail images in the timeline:

 Decrease the thumbnail size. This allows you to view more thumbnails on the screen.

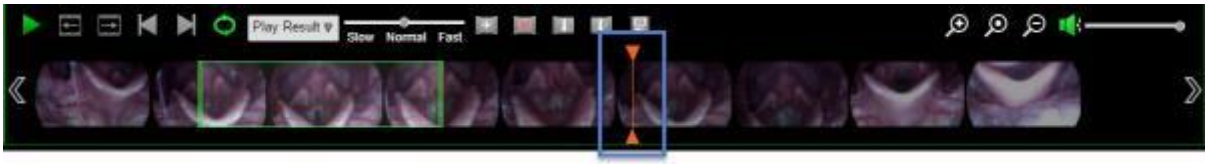
 Fit all thumbnails on the screen.

 Increase the thumbnail size. This allows you to view the thumbnails more clearly; however, this reduces the number of thumbnails shown on the screen.

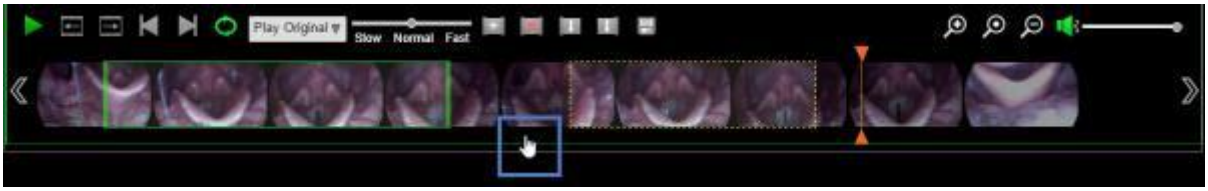
Change the position indicator

To change the position in the video that you are viewing, move the position indicator.

Drag the position indicator to a new location on the timeline.



Click (or tap) above or below the timeline to move the position indicator to a new location.



To move the position indicator to the start of a clipping box, select a clipping box, then select  . To move the position indicator to the end of a clipping box, select a clipping box, then select  .

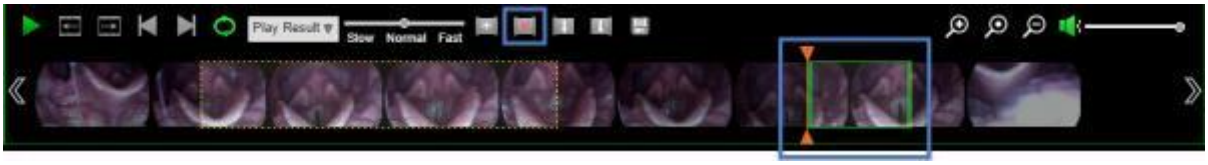
Use  and  to move the position indicator forwards or backwards frame-by-frame. You can click (or tap) and hold these icons to continue moving frame-by-frame.

Add and remove clipping boxes

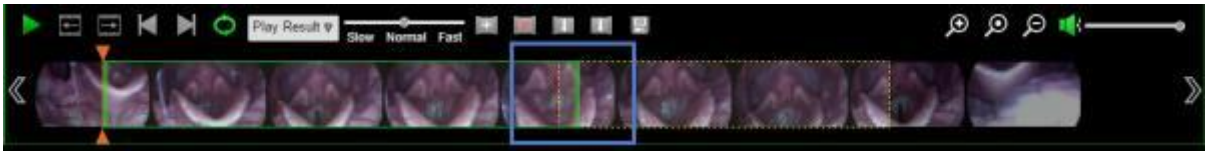
Use multiple clipping boxes to select non-contiguous frames.

To add a clipping box, select  . A new clipping box appears to the right of the current clipping box. Change the clipping box position and size as needed. You can add as many clipping boxes as required.

To remove a clipping box, select the clipping box, then select  . Note that you cannot remove all clipping boxes; at least one clipping box must remain on the timeline.



Note that if clipping boxes overlap, they will be merged together when the edited video is saved.



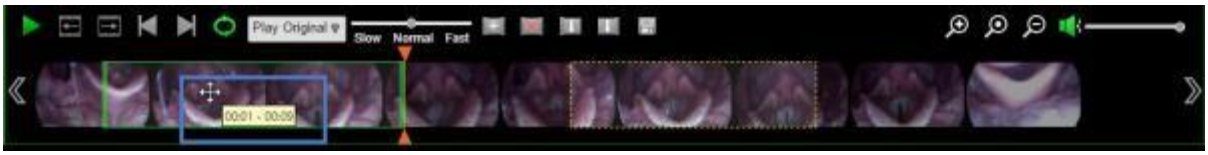
Modify clipping boxes

Drag the ends of the clipping box to resize it.

Drag the clipping box to a new position.

To set the beginning of a clipping box to the current location of the position indicator, select the clipping box, then select . To set the end of the clipping box to the current location of the position indicator, select the clipping box, then select . The clipping box is moved to the new position.

Hover over a clipping box to view the timeframe of the original video that is contained in the clipping box.



4.19.2. Preview the edited video

You can preview the edited and original versions of the video.

- To preview the entire edited video, select **Play Result**, then select .
- To preview one of the clipping boxes in the edited video, select the clipping box, then select **Play Segment**, then select .
- To play the original video, select **Play Original**, then select .
- To skip to the start of the video (or segment), select . To skip to the end of the video (or segment), select .
- To change the playback speed, select **Slow**, **Normal** or **Fast**. You can also use the slider to change the speed.
- To change the playback volume, use the volume controls above the timeline.
- To loop the playback, select .
- To pause the playback, select . You can also click (or tap) on the video preview to pause and resume playback.

4.19.3. Save the edited video

When done editing the video, save your changes. The edited video will be saved as a new video in the study.

1. Select  .
2. Select the following options:
    - **Encoding Profile** Select the encoding profile for the edited video. The profile determines the video quality and file size.
    - **Audio** Include or exclude audio in the edited video.
3. Select **Save**.

5. Anonymize patient data

5.1 About anonymization

NilRead supports anonymization of studies for research, clinical trials or any other workflow which requires patient confidentiality. Anonymization allows you to remove identifying and confidential patient information from studies.

To anonymize studies, do the following:

1. **Create confidentiality profiles** that define how patient data will be anonymized (see “Manage confidentiality profiles” on page 80). You can also use the default confidentiality profile, called Nominal.
2. (Optional) **Create confidentiality masks** that define regions of an image that contain patient data as part of the image. These areas will be redacted to obscure the patient data. Masks are only applied if enabled in the confidentiality profile.
3. **Assign a confidentiality profile to a worklist or folder** (see “Manage worklists” on page 25 and “Manage folders” on page 29). Patient data for studies in the worklist or folder will be anonymized when the study is viewed in the Patient Study Directory or the image viewer. This anonymization is temporary; the original study data is not modified.

   Note
   Studies are only anonymized when opened from a worklist or folder that contains the **Deidentify** option. Regular patient data will appear if a study is opened from the Patient Study Directory.

4. **Create a permanent anonymized copy of a study** by applying a confidentiality profile when downloading a study, series or image (see “Download studies, series or images” on page 88).

5.2 Manage confidentiality profiles

You can create confidentiality profiles that define how patient data will be anonymized based on DICOM attributes. You can also use the default confidentiality profile, called Nominal, which is based on the DICOM standard “PS3.15 Table E.1-1. Application Level Confidentiality Profile Attributes”. For details, see http://dicom.nema.org/standard.html.

You can then assign a confidentiality profile to a worklist or folder (see “Manage worklists” on page 25 and “Manage folders” on page 29). Patient data for studies in the worklist or folder will be anonymized when the study is viewed in the Patient Study Directory or the image viewer. This anonymization is temporary; the original study data is not modified.

Note
Studies are only anonymized when opened from a worklist or folder that contains the **Deidentify** option. Regular patient data will appear if a study is opened from the Patient Study Directory.

You can also create a permanent anonymized copy of a study by applying a confidentiality profile when downloading a study (see “Download studies, series or images” on page 88).

5.2.1. Add a confidentiality profile

1. Select **Settings**.
2. Under **Preferences**, select **Confidentiality Profiles**.
3. Select **Add**. You can also select an existing profile and select **Copy**.
4. Enter the following information:
   - **Name** Profile name.
   - **Comment** Profile description.
   - **Enabled** If selected, the profile can be used to anonymize data.

     Note
     To use a profile, you must assign it to a worklist or folder (see “Manage worklists” on page 25 and “Manage folders” on page 29) or select the profile when downloading a study (see “Download studies, series or images” on page 88).

   - **Apply Masks** If selected, confidentiality masks may be used to redact patient data (see “Manage confidentiality masks” on page 82).
   - **Options** Anonymization options for the profile. To add options to the profile, select one or more options in the **Disabled** area, then select **Enable**. To remove an option, select an option in the **Enabled** area and select **Disable**.
   - **Details** DICOM attributes that will be anonymized by this profile. The action that will be applied to each attribute is shown. If you do not want to anonymize an attribute, select the **Disabled** checkbox beside the attribute.
5. Select **Save**.

5.2.2. Edit or delete a confidentiality profile

1. Select **Settings**. Under **Preferences**, select **Confidentiality Profiles**.
2. Select a profile.
3. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

5.2.3. Refresh the confidentiality profiles list

1. Select **Settings**. Under **Preferences**, select **Confidentiality Profiles**.
2. Select **Refresh** to view the latest changes made by all users.

5.3 Manage confidentiality masks

In addition to confidentiality profiles, you can create confidentiality masks that define regions of an image that contain patient data as part of the image. These areas will be redacted to obscure the patient data.

If you are using a confidentiality profile that has masks enabled, a confidentiality mask will be applied if a mask exists that matches all of the following study attributes: modality, manufacturer and (optionally) scanner model. See “Manage confidentiality profiles” on page 80.

5.3.1. Add a confidentiality mask

1. Select **Settings**.
2. Under **Preferences**, select **Confidentiality Masks**.
3. Under the **Masks** area, select **Add**. You can also select an existing mask and select **Copy**.
4. Enter the following information:
    - **Name** Mask name.
    - **Comment** Mask description.
    - **Modality** Modality. The mask will only be applied to images with this modality.
    - **Manufacturer** Manufacturer. The mask will only be applied to images with this manufacturer.
    - **Model Name** (Optional) Scanner model. The mask will only be applied to images with this scanner model name.
    - **Height, Width** Height and width of the image (in pixels).
    - **Enabled** If selected, the mask can be used as part of a confidentiality profile. Clear this checkbox if you do not want NilRead to use this mask.
5. Select **Save**.

You can now define the regions of the image to be redacted (see the following section).

5.3.2. Add regions to be redacted

You can add multiple regions to a mask.

1. Select **Settings**.
2. Under **Preferences**, select **Confidentiality Masks**.
3. In the **Masks** area, select a mask. The **Mask Regions** area shows the regions defined for the mask.
4. Under the **Mask Regions** area, select **Add**. You can also select an existing region and select **Copy**.
5. Enter the following information:
    - **Top** Top of the region to be redacted (in pixels).
    - **Left** Left side of the region to be redacted (in pixels).

- **Width, Height** Height and width of the region to be redacted (in pixels).

6. Select **Save**.

5.3.3. Edit or delete a confidentiality mask or region

1. Select **Settings**. Under **Preferences**, select **Confidentiality Masks**.
2. Select a mask or mask region.
3. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

5.3.4. Refresh the confidentiality masks or regions list

1. Select **Settings**. Under **Preferences**, select **Confidentiality Masks**.
2. Select **Refresh** to view the latest changes made by all users.

6. Share patient studies

6.1 About sharing studies

Share a patient study using one of the following methods.

6.1.1. Collaboration session

Online meetings allow you to collaborate with other physicians and interactively review a patient study (see “Start a meeting” on page 85).

6.1.2. Study links

Share a patient study with others by sending them a link (see “Send study links” on page 88).

6.1.3. Series links

Share a series of images with other users by sending them a link (see “Send series links” on page 88).

6.1.4. Bookmarks

Use a bookmark to tag an image in a patient study that you want to find again quickly or that you want to share with others (see “Share bookmarked images” on page 89).

6.1.5. Secondary capture images

You can create a series of secondary capture images for a patient study. Secondary capture images are static screenshots and cannot be modified (see “Create secondary capture images” on page 90).

6.1.6. Export

You can export a screenshot of the patient study currently loaded in the image viewing area (see “Export images” on page 91).

6.1.7. Print

You can print the patient study currently loaded in the image viewing area (see “Print images” on page 91).

6.1.8. Download

You can download a copy of a patient study, series, or image (see “Download studies, series or images” on page 88).

6.2 Start a meeting

Online meetings allow you to collaborate with other physicians and interactively review a patient study. Meeting participants all see the same screen and can annotate images at the same time. The person who starts the meeting is the organizer.

Note
The displayed screen size may be reduced if a participant uses an small resolution device such as a phone.

1. Open a patient study.
2. Select **Collaboration** (side panel). The **Collaboration** tools appear below the side panel.
3. Select **Share**. The meeting control panel opens. You can drag the control panel to any location on the screen.
4. To invite participants, select **Invite** on the meeting control panel. A new email is created using your default email application. Enter the email addresses for the participants and any additional information, then send the email.

Participants currently in the meeting are shown in **Active Users** (below the side panel). The symbols beside a participant's name indicate if they are the meeting organizer (O) or the presenter currently in control of the meeting (P). * is shown beside your own name.

During the meeting, you can:

- Start a Skype session (see "Use Skype" on page 87).
- Annotate images with drawings and notes, invite others, and transfer control of the meeting to another participant (see "Use meeting controls" on page 86).

6.3 Join a meeting

Online meetings allow you to collaborate with other physicians and interactively review a patient study. Meeting participants all see the same screen and can annotate images at the same time. The person who starts the meeting is the organizer.

6.3.1. If you receive a meeting link by email:

1. Click (or tap) the link. The NilRead Waiting Room will open in your browser.
2. In the Waiting Room, enter the meeting ID and your name. Select **Join**.

6.3.2. If you are logged into NilRead, you can:

- In the Patient Study Directory, select **Waiting Room**. Enter the meeting ID and your name, then select **Join**.

or

- While viewing a patient study, select **Collaboration** (side panel), then select **Join**. Enter the meeting ID, then select **Join**.

Participants currently in the meeting are shown in **Active Users** (below the side panel). The symbols beside a participant's name indicate if they are the meeting organizer (O) or the presenter currently in control of the meeting (P). * is shown beside your own name.

During the meeting, you can annotate images with drawings and notes (see "Use meeting controls" on page 86).

6.4 Use meeting controls

You can use the following controls during an online meeting. Some controls are only available to the meeting organizer.

	**Transfer control** The organizer can transfer control of the meeting to another participant. Only the participant in control is able to use the NilRead toolbar containing the image tools. To transfer control, select a participant from the **Control** list. The organizer can regain control by selecting their own name.
	**Annotate images** To draw on an image, select **Highlighter**. To add an arrow and note, select **Arrow**. Participants can annotate images at the same time. Annotations made by a participant are shown in the same color as the participant name in the **Active Users** list.
	**Undo all** Select **Undo all** to remove all annotations made by all of the meeting participants.
	**Undo** Select **Undo** to remove the last annotation made by any meeting participant.
	**Invite others** Select **Invite**. A new email is created using your default email application. Enter the recipient's

	email address and any additional information, then send the email.
	**End meeting** Select **Quit**. This can only be done by the meeting organizer. **Note** All annotations are removed from images when the meeting ends. If you want to save the image with annotations, capture the image before ending the meeting (see "Create secondary capture images" on page 90).

6.5 Use Skype

You can use Skype™ calls and instant messaging to communicate with other physicians associated with a study. You can initiate a Skype session at any time when viewing a study, including during an online meeting.

Note
You can only initiate Skype sessions with physicians who are associated with your user profile (see "Manage your user profile" on page 102). Skype must be enabled in your user preferences (see "Change your user preferences" on page 93). Skype software must also be installed and running on participants' devices.

1. Open a patient study.
2. Select **Collaboration** (side panel). The names of any physicians associated with both the study and your user profile are listed below **Settings**.
3. Select **Settings**. Select the type of Skype session:
   - **Call** Voice call. Note that you can enable video once the Skype session is in progress.
   - **Chat** Instant messaging.
4. To start a Skype session, select a physician below **Settings**.
5. To search for a physician in the list:
   a. Enter the physician's first name, last name or NilRead user name in the **Search Users** field.
   b. Select **Search**. Any matching physicians are shown below the **Search** button.
   c. Select a physician to start a Skype session.

6.6 Send study links

Share a patient study with others by sending them a link. Others will see the default view of the study, not the view you are using.

Note
Depending on your organization's NilRead configuration, users may require a login name and password for NilRead to view the study.

In the Patient Study Directory:

1. Right-click (or touch and hold) a study, worklist or folder, then select **Send Study Link**.
2. A new email is created using your default email application. Enter the recipient's email address and any additional information, then send the email.

or

1. Right-click (or touch and hold) a study, worklist or folder, then select **Copy Link**.
2. A box appears with the link. Copy the link and paste it into an email or instant message.

6.7 Send series links

Share a series of images with another user by sending them a link. The series specified in the link will open by default; however the entire study is still available to the user. Note that when you send a series link, the user will see the default view of the series, not the view you are using.

Note
Depending on your organization's NilRead configuration, users may require a login name and password for NilRead to view the study.

1. Open a patient study.
2. Right-click (or touch and hold) a series, then select **Send Series Link**.
3. A new email is created using your default email application. Enter the recipient's email address and any additional information, then send the email.

6.8 Download studies, series or images

You can download a copy of a patient study, series, or image.

In the Patient Study Directory:

1. Right-click (or touch and hold) a study, then select **Download Study**.
2. To download non-DICOM files in their original format, select **Download encapsulated documents in the original file format**.

3. To anonymize the study, select **Deidentify**, then select a confidentiality profile. For more information, see “About anonymization” on page 80.
4. Select **Download**.

While viewing a study:

1. Right-click (or touch and hold) an image, then select **Download**.
2. Select **Download Study**, **Download Series** or **Download Image**.
3. To download non-DICOM files in their original format, select **Download encapsulated documents in the original file format**.
4. To anonymize the study, series or image, select **Deidentify**, then select a confidentiality profile. For more information, see “About anonymization” on page 80.
5. Select **Download**.

6.9 Share bookmarked images

Use a bookmark to tag an image in a patient study that you want to find again quickly or that you want to share with others.

6.9.1. Create a bookmark

Select **Save**, then select **Bookmark** (toolbar). A bookmark is created for the current screen. Bookmarks are saved in the **Presentations** panel.

6.9.2. View a bookmark

1. Select **Presentations** (side panel). Presentations and bookmarks for the study are shown below the side panel.
2. Select a bookmark thumbnail.
3. While viewing a bookmark, select **Series** (side panel) to see which series the image belongs to. The series is highlighted.

6.9.3. Send a bookmark

Share a bookmarked image with others by sending them a link. Others will see the image as you do, including your annotations and visualization changes.

To send a bookmark, you can:

- Right-click (or touch and hold) a bookmark, then select **Email**. A new email is created using your default email application. Enter the recipient’s email address and any additional information, then send the email.

- Right-click (or touch and hold) a bookmark, then select **Copy Link**. A window opens with the link text. Select and copy the link text. You can now paste the link into an email or instant message.

Note
Depending on your organization's NilRead configuration, users may require a login name and password for NilRead to view the study.

6.9.4. Delete a bookmark

Right-click (or touch and hold) a bookmark, then select **Delete Bookmark**.

6.10 Create secondary capture images

You can create a series of secondary capture images for a patient study. Secondary capture images are static screenshots and cannot be modified.

6.10.1. Create a series of secondary capture images

Select **Save**, then select **Capture** (toolbar). A secondary capture image is created for the current screen and is added to a new series. Other secondary capture images created during this NilRead session will be added to the same series.

Note
If you create secondary capture images for the same study in a future session, the images will be saved in a new series.

6.10.2. Share a series of secondary capture images

Share a series of secondary capture images with others by sending them a link.

1. Right-click (or touch and hold) a series thumbnail, then select **Send Series Link**.
2. A new email is created using your default email application. Enter the recipient's email address and any additional information, then send the email.

Note
Depending on your organization's NilRead configuration, users may require a login name and password for NilRead to view the study.

6.10.3. Delete a series of secondary capture images

1. Select **Series** (side panel).
2. Right-click (or touch and hold) a series thumbnail, then select **Delete Series**.

6.11 Export images

You can export a screenshot of the patient study currently loaded in the image viewing area. The screenshot can include one or all viewports and is saved as an image (JPG).

1. (Optional) If you want to export a screenshot of a single viewport, click (or tap) the viewport to select it.
2. Select **Save**, then select **Export** (toolbar).
3. Select the following options for the screenshot:
   - **Save: Viewport/Display** Create a screenshot of the selected viewport (**Viewport**) or all viewports (**Display**).
   - **Titles: Show/Hide** Include (**Show**) or exclude (**Hide**) the information shown on the image (patient name, series number, and so on).
4. Enter a filename in the **Save as** field in the bottom-left of the screen.
5. Select **Download**.
6. When done, select **Close**.

6.12 Print images

You can print the patient study currently loaded in the image viewing area. You can print one or all viewports.

1. (Optional) If you want to print a single viewport, click (or tap) the viewport to select it.
2. Select **Print** (toolbar).
3. Select the following options for the screenshot:
   - **Save: Viewport/Display** Print the selected viewport (**Viewport**) or all viewports (**Display**).
   - **Titles: Show/Hide** Include (**Show**) or exclude (**Hide**) the information shown on the image (patient name, series number, and so on).
4. Select **Print**.

   or

   To use a DICOM printer, select **DICOM Print**. Select a printer and the page layout options, then select **OK**.

   Note
   You must first configure a DICOM printer to use with NilRead (see “Manage DICOM services” on page 114).

5. When done, select **Close**.

6.13 View reports

If one or more reports exist for a patient study, a folder icon is shown in the study's Status column in the Patient Study Directory. Reports can be DICOM structured reports or can be provided through DICOM Detached Interpretation. NilRead also supports custom HL7 integration for obtaining reports from a RIS/HIS system.

Note
You can also access DICOM embedded PDF reports through the prior studies timeline when viewing a patient study (see "View prior studies timeline" on page 61).

1. (Optional) In the blank row at the top of the Patient Study Directory, select an option in the **Status** column.
    - **All** Show all patient studies.
    - **Available** Show patient studies containing at least one report.
    - **Approved** Show patient studies containing at least one approved report.
    - **Not Available** Show patient studies with no reports.
2. To view the reports for a study, select the folder icon beside the patient name. The reports in the study appear below the directory. If the study contains multiple reports, use the arrows in the report area to scroll through the reports.
3. The following options are available when viewing reports:
    - **Save** Save a PDF copy of the report.
    - **Print Report** Print the report from your browser.
    - **Vert/Horiz** Place the report area on the right side (**Vert**) or bottom (**Horiz**) of the screen.
    - **Maximize/Restore** View the report area only and hide the directory (**Maximize**) or view both the report area and the directory (**Restore**).
    - **Close** Close the report.

Note
To resize the directory and report areas, drag the divider between the two areas.

7. Manage your preferences

7.1 Change your user preferences

You can set your preferences for using NilRead.

Note
If you access **Settings** while viewing a study, select **Back to Viewer** to return to the image viewing area.

1. Select **Settings**.
2. Under **Preferences**, select **User Preferences**.
3. Select your preferences, then select **Save**.

Connection Type

Default connection type to access NilRead. (You can select a different option when logging in.) NilRead uses different compression polices based on the selected connection type to provide both interactive performance and image quality.

- **Auto detect** Allow NilRead to detect the network connection.
- **Local network** Connection over a local network.
- **Internet** Connection over the Internet.

Select **Speed Test** to check your NilRead connection speed.

User Interface Size

View NilRead using the default interface size (100%) or a larger size (150%). If using a larger size, you can also choose to enlarge the patient directory.

Login Landing Page

First page to view after logging into NilRead. You can choose the Patient Study Directory page or the Patient Search page.

Monitors

Virtual monitor layout. Select a layout based on the number of monitors you are using. Using multiple monitors allows you to display the Patient Study Directory on one monitor and the image viewing area on the remaining monitors.

Series Navigation

Behaviour when scrolling through the series in a study.

- **Scroll By One** Scroll through one series at a time.

- **Scroll By Group** Scroll through all of the series currently shown in the imaging viewing area at the same time.

Magnify Glass

Default magnifying glass size and zoom factor for smart zoom (see “Smart Zoom” on page 37).

Always show timeline and sidebar in image viewer

Whether the prior studies timeline and side panel are always visible in the image viewer. If this preference is enabled, the option to hide these items will be hidden.

Microscopy Measurement Units

Units used for microscopy measurements. Applies to all measurement tools (see “Annotations and measurements” on page 39).

Ruler label placement

Placement of the label on the ruler measurement tool (see “Annotations and measurements” on page 39).

Desktop Touch UI

Whether the NilRead desktop touch interface is enabled. Select this option if you are using a desktop operating system with touch features.

Skype Enabled

Whether other meeting participants can contact you using Skype.

Skin

NilRead skin (dark or light).

Viewer Monitor Type

Whether you are using a color or grayscale monitor.

Preferred Language

Language to use for the NilRead application.

Measurement Patterns

Pre-defined patterns for the area measurement tools (see “Annotations and measurements” on page 39). You can also create new patterns.

1. Select **Add Pattern**.

2. To customize the pattern, select any of the underlined areas and choose an option. (Customizable areas are highlighted when you hover over them.)
3. To delete a pattern, select the first customizable area, then select  .
4. To move a pattern to a new position, select the first customizable area in the pattern, then select  . The patterns will be shown in the Annotations and Measurement tool in the order defined here.

7.2 Change mouse and keyboard preferences

You can assign NilRead tools (such as zoom and scroll) to mouse buttons, keyboard shortcuts and touch gestures. This allows you to quickly access tools you use frequently.

Customizing mouse, keyboard, and touch actions involves two steps:

1. Create templates that define the tools assigned to mouse buttons, keyboard shortcuts and touch gestures.
2. Select the mouse, keyboard and touch templates you want to use when working in NilRead.

Note
If you access **Settings** while viewing a study, select **Back to Viewer** to return to the image viewing area.

7.2.1. Add a template

1. Select **Settings**.
2. Under **Preferences**, select **Mouse, Keyboard and Tools**.
3. Select the **Templates** tab.
4. Select **Add**. You can also select an existing template, then select **Clone**.

   The **Mouse, Keyboard and Tools Template Editor** opens. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.
5. Enter the following information, then select **Save**. The template is added to the **Templates** tab.

   Template Info

   1. Enter a name for the template.
   2. Select whether this is a **Mouse**, **Keyboard** or **Touch** template.
   3. Enter a description for the template.

Template Rules Definition

Select the tools you want to assign. Depending on the type of template, you can assign tools to the mouse buttons and scroll wheel, create keyboard shortcuts, or assign tools to gestures.

Default tools are already assigned. To change a tool:

1. Click (or tap) the tool. A list appears with available tools you can choose from.
2. Select a tool from this list or search for a tool.

7.2.2. Edit or delete templates

1. On the **Templates** tab, select a template.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

7.2.3. Select a template to use in NilRead

Create definitions that specify the templates you want to use in NilRead. For example, you could create different definitions for mouse, keyboard and touch gestures. You can also use different keyboard shortcuts for different devices.

1. Select the **Definition** tab.
2. Select **Add**. You can also select an existing definition, then select **Clone**.

   The **Mouse, Keyboard and Tools Template Editor** opens. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.
3. Enter the following information, then select **Save**. The definition is added to the **Definition** tab and is enabled by default, meaning it will be applied to NilRead. To disable the definition, clear the **Enabled** checkbox.

Protocol Info

1. Enter a name.
2. Select whether this is a **System**, **Group** or **User** protocol. A system protocol will be applied to all users of NilRead. A group protocol will only be applied to the group you specify (enter the group name). A user protocol will only be applied to the type of user you specify (enter **Admin**, **User**, or **Guest**).
3. Select whether this is a **Mouse and Touch** protocol or a **Keyboard** protocol.
4. Select the view mode and modality the protocol applies to.

Mouse

1. Select **<add new>**.

2. Select **<pick>** and select a mouse template.
3. You can select **<add new>** again and add additional mouse templates.
4. To remove a mouse template, select **Cycle** to switch to **Delete**.

Touch

Select **<pick>** and select a touch template.

Keyboard

1. Select which devices these keyboard assignments apply to.
2. Select **<pick>** and select a keyboard template.

7.2.4. Edit or delete definitions

1. On the **Definition** tab, select a template.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

7.3 Change tool preferences

You can customize the tools that appear in the top toolbar, Annotations menu and image viewer context menu. This allows you to quickly access tools you use frequently.

Customizing tools involves two steps:

1. Create templates that define the tools assigned to the top toolbar, Annotations menu and image viewer context menu.
2. Select the tool templates you want to use when working in NilRead.

Note
If you access **Settings** while viewing a study, select **Back to Viewer** to return to the image viewing area.

7.3.1. Add a template

1. Select **Settings**.
2. Under **Preferences**, select **Mouse, Keyboard and Tools**.
3. Select the **Templates** tab.
4. Select **Add**. You can also select an existing template, then select **Clone**.

   The **Mouse, Keyboard and Tools Template Editor** opens. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.

5. Enter the following information, then select **Save**. The template is added to the **Templates** tab.

   Template Info

   1. Enter a name for the template.
   2. Select **Tools** template.
   3. Enter a description for the template.

   Template Rules Definition

   a) Customize the placement of the tools in the top toolbar.

   Note that tools must be placed in a group. The tools in a group will be placed beside each other in the toolbar. To add a new group, select **Add Group** below the **Fixed Controls** or **Scrolling Controls** box.

   To add or rearrange tools in the toolbar, drag a tool or a group of tools to the **Fixed Controls** or **Scrolling Controls** box.

   - **Fixed Controls** contains tools that will also be visible on the left side of the toolbar and will not scroll. Note that if you have too many fixed controls, you may not be able to see all of the tools if your browser window size is reduced.
   - **Scrolling Controls** contains tools that will scroll if there is not enough room to display all of the tools at once.

   To remove a tool from the toolbar, drag the tool to the **Unassigned Controls** box.

   b) Customize the annotations tools.

   - To rearrange the annotation tools, drag a tool to a new position in the **Active Annotations** box.
   - To remove an annotation tool, drag the tool to the **Available Annotations** box.
   - To add an annotation tools, drag the tool to the **Active Annotations** box.

   c) Customize the image viewer context menu. This menu appears when you right-click (or touch and hold) an image.

   - To rearrange the menu items, drag a menu item to a new position in the **Context Menu Items** box.
   - To remove an item from the menu, drag the item to the **Unused Menu Items** box.
   - To add an item to the menu, drag the item to the **Context Menu Items** box.
   - To add a submenu, select **Add Submenu**. Enter a name and select **OK**. Drag the submenu from the **Unused Menu Items** box to the **Context Menu Items** box. You can now drag other menu items into the submenu list.

- To delete a submenu, right-click (or touch and hold) the submenu, then select **OK**.
- To add a separator line, select **Add Separator**. Drag the separator from the **Unused Menu Items** box to the **Context Menu Items** box.
- To remove a separate line, drag the line to the **Unused Menu Items** box.

7.3.2. Edit or delete templates

1. On the **Templates** tab, select a template.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

7.3.3. Select a tool template to use in NilRead

Create definitions that specify the tool templates you want to use in NilRead for different devices.

1. Select the **Definition** tab.
2. Select **Add**. You can also select an existing definition, then select **Clone**.

   The **Mouse, Keyboard and Tools Template Editor** opens. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.
3. Enter the following information, then select **Save**. The definition is added to the **Definition** tab and is enabled by default, meaning it will be applied to NilRead. To disable the definition, clear the **Enabled** checkbox.

   Protocol Info

   1. Enter a name.
   2. Select whether this is a **System**, **Group** or **User** protocol. A system protocol will be applied to all users of NilRead. A group protocol will only be applied to the group you specify (enter the group name). A user protocol will only be applied to the type of user you specify (enter **Admin**, **User**, or **Guest**).
   3. Select **Tools**.

   Tools

   1. Select which devices this toolbar configuration applies to.
   2. Select **<pick>** and select a tools template.

7.3.4. Edit or delete definitions

1. On the **Definition** tab, select a template.

2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

7.4 Change modality preferences

You can change NilRead settings for different modalities.

Note
If you access **Settings** while viewing a study, select **Back to Viewer** to return to the image viewing area.

1. Select **Settings**.
2. Under **Preferences**, select **Modality Preferences**.
3. Enter the following information, then select **Save**.

Modality

Select the modality that you want to set preferences for. The changes you make on the Modality Preferences page will only affect studies containing this modality. Select **All** to apply the changes to all modalities. Note that if you set a preference for an individual modality, this will override the same preference set for all modalities.

Series Navigation

Determines the behaviour of the Scroll tool for the modality you selected. By default, the Scroll tool will scroll through images in the current series only.

- **None** Scroll through the current series only.
- **Single Frame Only** Scroll through all of the series in the study. When advancing to the next series, scroll through single frame images only (omit multiframe images).
- **All** Scroll through all of the series in the study. When advancing to the next series, scroll through all images (single frame and multiframe).

Virtual Series

Determines whether a virtual series is automatically created for a study (see “Combine all images in a single series” on page 66).

- Select **Yes** to automatically create virtual series for the modality you selected.
- Select **No** if you do not want to create virtual series for the modality you selected.

Zoom Policy

Determines the behaviour of the Zoom tool for the modality you select.

- **Zoom at center** Zoom will be applied at the center of the viewport, regardless of where you click (or tap) on the image with the Zoom tool.
- **Relative zoom at mouse position** Zoom will be applied at the point where you click (or tap) on the image with the Zoom tool. This is the default setting for mammography images.

Days from current date to trigger the warning

A warning is displayed in the viewport if an image is older than the specified number of days. The default value for mammography images is 365 days. The default value for other modalities is 0, meaning a warning will not be displayed.

RT plan settings

You can set the following preferences for viewing RT (radiation therapy) plans. These settings are available when you select **RT** in the **Modality** list.

- **Display RT Contours as** View RT structures as **Contours** or **Filled Contours**.
- **Display Radiation Values as** Use **cGy** or **Gy** as the unit of measurement for isodoses values. This unit of measurement will be used in the RT Graph (DVH) and the list of isodoses.
- **Maximum Isodose Level** Select a color (**Dose Color**) to use for isodose levels that are above the maximum level set in the Isodose Levels table. Note that the Dose Comment is reserved for future use and information entered in this field will not appear in NilRead.
- **Display Isodoses as** View isodoses as **Contours** or **Filled Contours**.
- **Isodose Levels** Define the isodose levels and assign colours to the levels. You can add new levels, edit existing levels and delete levels. Note that the Isodose Comment is reserved for future use and information entered in this field will not appear in NilRead.

8. Manage your account

8.1 Manage your user profile

You can manage information in your user profile. You cannot change information such as your username and privileges.

Note
If you access **Settings** while viewing a study, select **Back to Viewer** to return to the image viewing area.

1. Select **Settings**.
2. Under **User Management**, select **Profile**.
3. Change information in the **Account** area.
    - **User Name** Username to login to NilRead. This information cannot be modified.
    - **Role** NilRead role (Admin, User, Guest). This information can be modified by Administrators only. By default:
        - Guests have no privileges.
        - Users have basic privileges, such as accessing the Patient Study Directory.
        - Administrators have full privileges. Only Administrators can manage users.
    - **Email** Email address.
    - **Skype ID** Skype ID. Allows the user to participate in Skype sessions.
    - **Phone** Phone number.
    - **Facility, Department, Job Description** User's facility and job information.
    - **Notify on Study Arrival** User will receive an email when a new study containing one of the user's DICOM person name matches is added to the database.
    - **Last Name, First Name, Middle Name, Prefix, Suffix** User's name.
    - **Expiry Date** Date the user's access to NilRead will expire. This information can be modified by Administrators only.
        - Select  and select an expiry date. Select whether the user's account will be locked or deleted on the expiry date.
        - Select  to remove the expiry date and set the user's access to **Unlimited**.
4. Change your password.
    a. Select **Change Password**.
    b. Enter your current password (**Old**). Enter your new password (**New**, **Confirm**).
    c. Select **OK**.
5. The **Groups** area contains the groups you belong to. This information cannot be modified.

6. The **Privileges** area contains your privileges. This information cannot be modified.
7. Select **OK**.

8.2 Change your password

You can change the password you use to login to NilRead.

Note
If you access **Settings** while viewing a study, select **Back to Viewer** to return to the image viewing area.

1. Select **Settings**.
2. Under **User Management**, select **Profile**.
3. Select **Change Password**.
4. Enter your password:
    a. **Old** Enter your current password.
    b. **New, Confirm** Enter your new password.
    c. Select **OK**.
5. Select **OK**.

9. Manage data quality control

9.1 About data quality control

The NilRead data quality control (QC) tools allow you to make adjustments to data. You can use the QC tools to:

- Modify DICOM attributes for a patient, study, series or image.
- Redact areas on images.
- Add and hide labels on images.
- Split a series into multiple series.

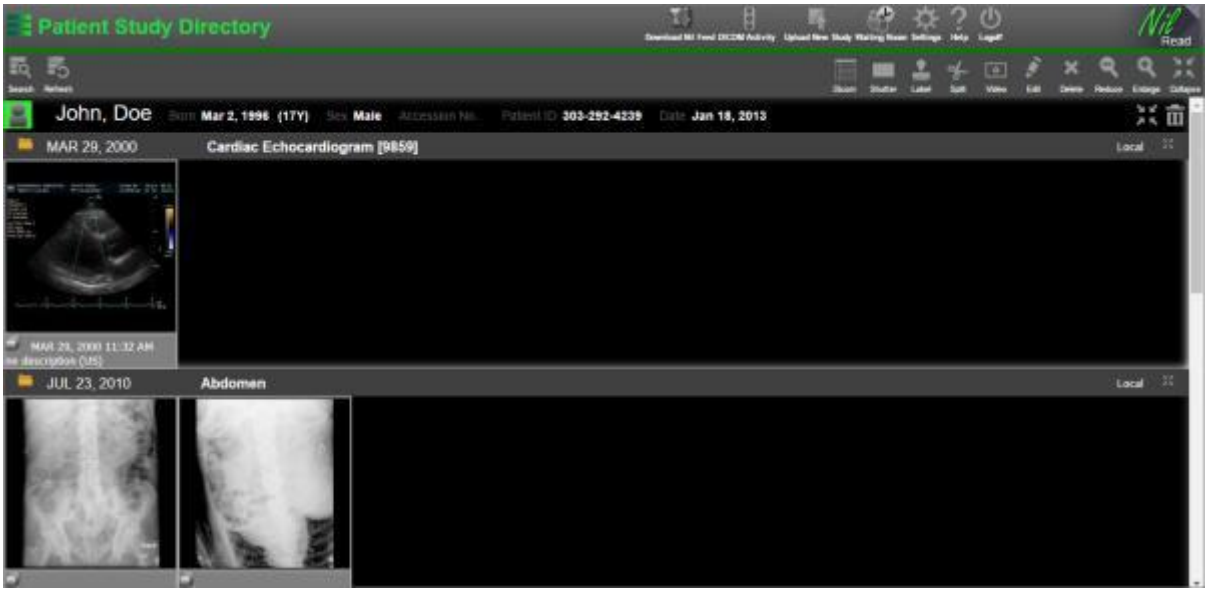
The QC tools are available in the QC viewer. See the next section for details on accessing the viewer.

9.2 Add studies to the data QC viewer

To use the data quality control tools on a study, add the study to the QC viewer. You can add studies for one or more patients to the viewer. For each patient:

- The patient information is shown first. Hover over the patient name to view details.
- Below the patient name, the patient's studies are listed by date. Each study is shown on a separate row. Hover over the study title to view details.
- Below the study date, thumbnails for the series in the study are shown. Series can be color-coded according to the type of series.

The following example shows one patient with two studies.



In the Patient Study Directory:

1. Right-click (or touch and hold) a study, then select **QC**.
2. The QC viewer opens. The selected study is shown, along with all other studies with matching patient information.
3. To add studies belonging to other patients to the QC viewer:
   a. Select **Search** in the top-left corner.
   b. Use any of the options in the navigation tree to find a study (Patient Search, Patient Directory, Recently Opened, Worklists and Folders).
   c. To add a study to the QC viewer, right-click (or touch and hold) a study, then select **QC Add**.
   d. To add multiple studies to the QC viewer, select the checkbox beside the studies, right-click (or touch and hold) one of the studies, then select **QC Add**.
4. To remove a patient from the QC viewer, select  on the patient row.
5. To update the studies in the QC viewer with any changes, select **Refresh** in the top-left corner.

9.3 Optimize the QC viewer display

You can change the amount of information displayed in the viewer and the size of the series thumbnails. This can be useful when using a device with a small screen.

- To view patient information only, select **Collapse** in the top toolbar. The studies and series rows are hidden. Click **Expand** to view the rows.
- To hide the studies and series for a patient, select  on a patient row. Select again to view the rows.
- To hide the series for a study, select  on a study row. Select again to view the rows.
- To reduce the size of the series thumbnails, select **Reduce** in the top toolbar. To enlarge the thumbnails, select **Enlarge**. Note that you can select **Reduce** or **Expand** multiple times until the minimum or maximum size is reached.

9.4 View and modify DICOM attributes

You can modify DICOM attributes for a patient, study, series or image. For example, you may need to correct a patient's name that has been misspelled. You can also add missing attributes.

1. Select **DICOM** in the top toolbar.
2. Select  on a patient row. This allows you to view and modify the DICOM attributes starting at the patient level (patient, studies, series and images).

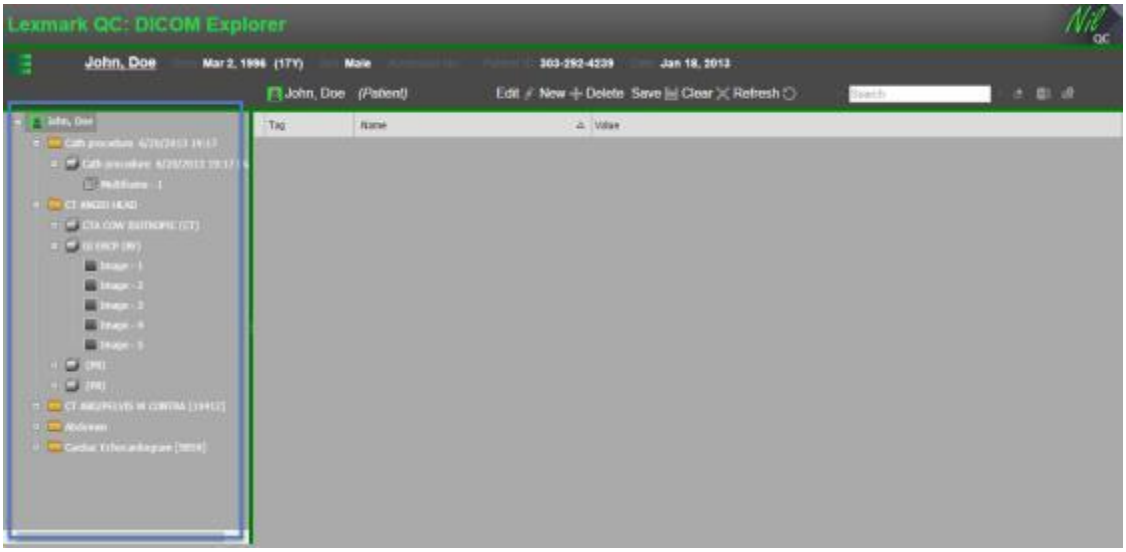
   or

Select  on a study row. This allows you to view and modify the DICOM attributes starting at the study level (study, series and images).

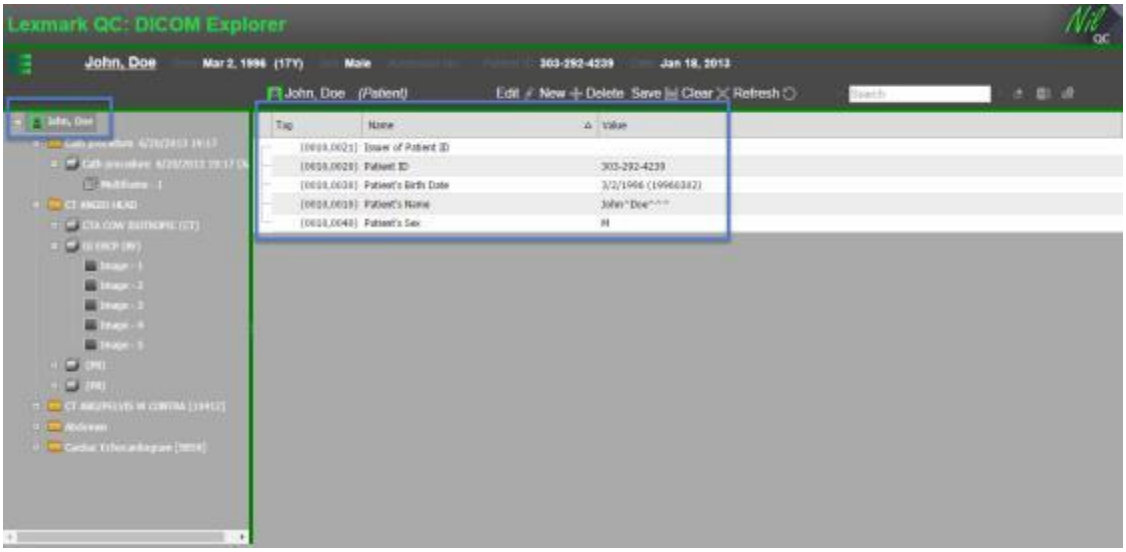
or

Click (or tap) a series. This allows you to view and modify attributes starting at the series level (series and images).

3. The DICOM Explorer opens in a new browser tab. The left pane shows the hierarchy of DICOM attributes. For example, if you selected  on a patient row, then the patient, the patient's studies, the series within each study, and the images within each series are shown. Note that the icon  is shown for multiframe images.



4. Select an item in the left pane. The item's DICOM attributes are shown in the right pane. For example, select a patient to view the patient's attributes. If you select an image, all of the attributes related to the image are shown (patient, study, series and image).



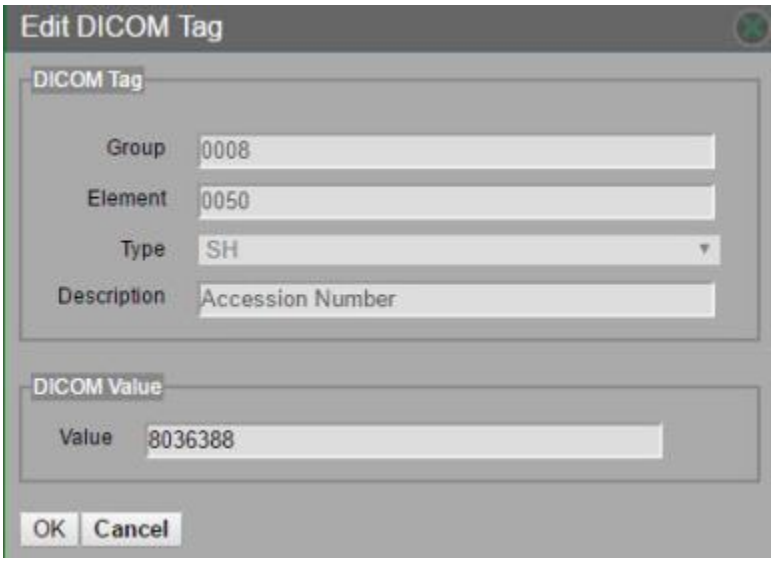
5. To customize the columns in the right pane:

   - Select **Customize**  in the top-right corner. To add a column, drag a column from the **Customize** list to the location where you want to place it. To remove a column, drag it to the **Customize** list.
   - Click (or tap) a column heading to sort the attributes. Click (or tap) the column heading again to sort the attributes in the reverse order.
   - To rearrange the columns, drag a column heading to a new location.

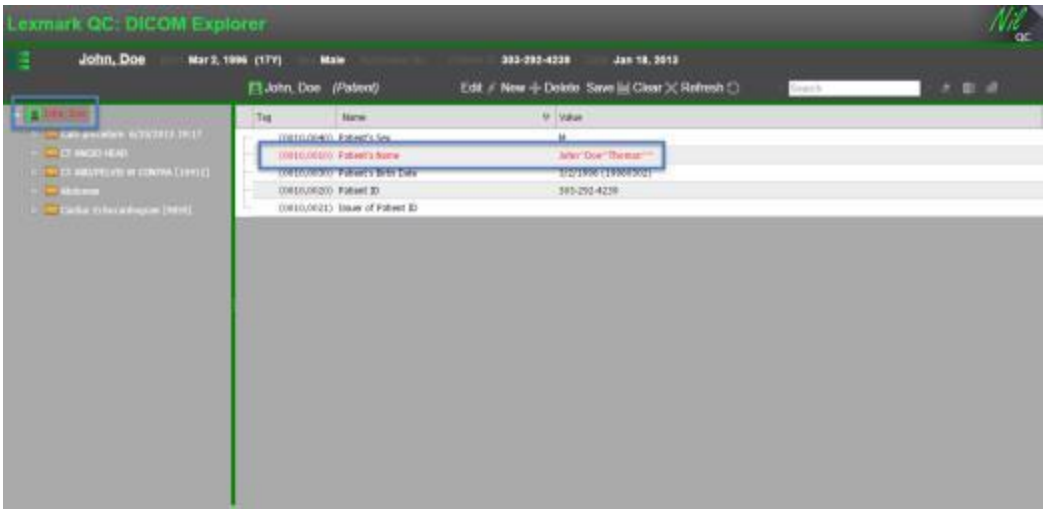
6. To modify an attribute:

   a. Select an attribute in the right pane, then select  beside **Edit**.

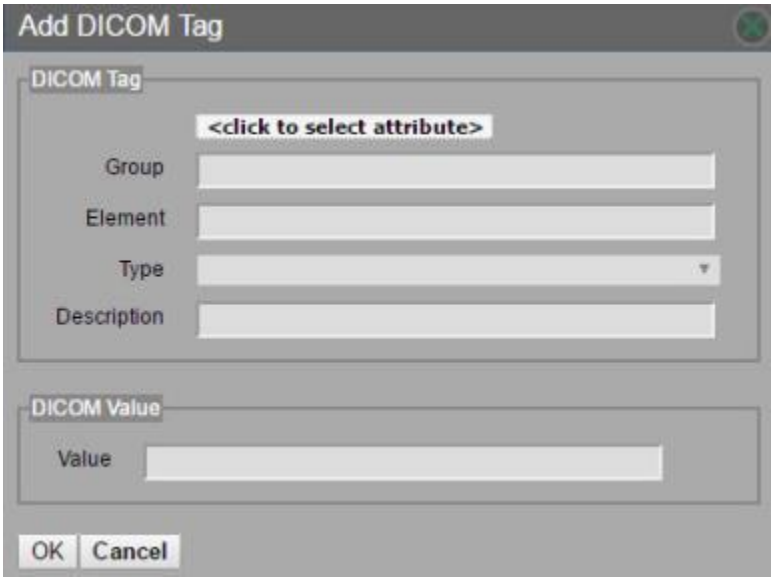
   b. The **Edit DICOM Tag** window appears. The **DICOM Tag** area shows the DICOM tag information. The **DICOM Value** area contains the values you can modify. Make your changes, then click **OK.**



   c. The modified attribute is shown in red in the right pane. The item the attribute belongs to (patient, study, series or image) is shown in red in the left pane.



7. To add an attribute:
   a. Select ✚ beside **New**. The **Add DICOM Tag** window appears.



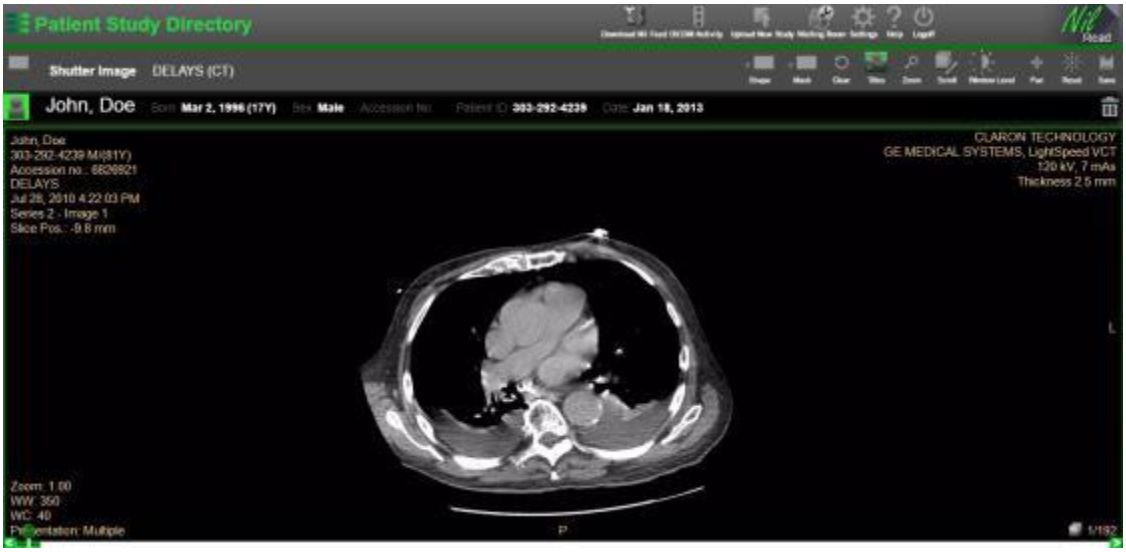
   b. Select **<click to select attribute>** and select the attribute you want to add. To search for an attribute, type all or part of the attribute name in the **Search** box.
   c. When you select an attribute, the **DICOM Tag** area shows the DICOM tag information. The **DICOM Value** area contains the values you can modify. If the attribute already exists, the current values are shown in the **DICOM Value** area and can be modified.
   d. Make your changes, then click **OK**. The new attribute is shown in red in the right pane. The item the attribute belongs to (patient, study, series or image) is shown in red in the left pane.
8. To save your changes (new and modified attributes), select **Save**. To discard your unsaved changes, select **Clear**.

9. To reload the DICOM attributes and view the latest changes made by all users, select **Refresh**. Any unsaved changes you have made will be lost.
10. To save DICOM attributes in a spreadsheet, select an item (such as a patient or study) in the left pane, then select  in the top-right corner. Follow your browser instructions to save the file.

9.5 Redact areas on images

You can redact areas on an image. For example, you may want to anonymize a study by removing patient information. When you make redactions to an image, the changes are applied to all images in the series.

1. In the QC viewer, select **Shutter** from the toolbar.
2. Select a series. You can only select a series containing images eligible for redaction.
3. The first image in the series opens. Use **Scroll** if you want to select a different image.



NilRead provides two methods to redact an image. You can add shutters to cover the areas you want to redact, or you can use a mask to identify the areas you want to retain.

9.5.1. Apply a shutter

1. Select a **Shape** from the toolbar (**Rectangle**, **Square**, **Ellipse**, **Circle**).
2. Draw shapes over the areas you want to redact. The areas covered by shapes will be blocked out on all images in the series.
3. To resize a shape, drag a corner of the shape. To move a shape, drag the shape to a new position.
4. To remove all shapes, select **Clear**.

9.5.2. Apply a mask

1. Select a shape from the toolbar (**Rectangle**, **Square**, **Ellipse**, **Circle**).
2. Draw shapes over the areas you want to retain. Only the areas covered by shapes will be visible; the rest of the image will be redacted.
3. To resize a shape, drag a corner of the shape. To move a shape, drag the shape to a new position.
4. Select **Mask** from the toolbar. Areas not covered by shapes are blocked out on all images in the series.
5. To remove all shapes, select **Clear**.

9.5.3. Save shutters and masks

When done, select **Save** from the toolbar. Select **Clear** to remove your changes.

9.6 Add and correct labels

You can add missing labels to an image or correct labels that have been burned into an image, such as an incorrectly placed label. To correct a label, hide the incorrect label, then add a new label.

1. In the QC viewer, select **Label** from the toolbar.
2. Select a series. You can only select a series containing images that can be labelled.
3. The first image in the series opens. Use **Scroll** if you want to select a different image.

9.6.1. Hide a label

1. Select the arrow beside **Left** in the toolbar, then select **Mask**.

2. Draw a shape over the label you want to hide.
3. To resize a shape, drag a corner of the shape. To move a shape, drag the shape to a new position.
4. To remove all shapes, select **Clear**.

9.6.2. Add a label

1. Select a label (**Left**, **Right**, **Head**, **Foot**, **Anterior**, **Posterior**) from the toolbar.
2. Draw a label on the image.
3. To resize a label, drag a corner of the label. To move a label, drag the label to a new position.
4. To remove all labels, select **Clear**.

9.6.3. Save labels

When done, select **Save** from the toolbar. The modified series will be saved as a new series. Select **Clear** to remove your changes.

9.7 Split a series

You can divide a series of images into multiple series. This can be useful if the images need to be reviewed by different specialists. When you split a series, the selected images are extracted from the original series and moved to a new series. The extracted images are no longer part of the original series.

1. In the QC viewer, select **Split** from the toolbar.
2. Select a series. You can only select a series that can be divided.
3. The series opens.
4. A row of image thumbnails is shown at the bottom of the screen. Drag and resize the box to select the images to include in the new series. You may need to use the arrows at each end of the row to view all of the thumbnails.
5. Larger versions of the images are shown above the thumbnail row. You can choose to use a 1x1 or 1x3 layout to view these images. Icons are shown on the images to indicate if they will be extracted to create a new series.
    - Scissors indicate the first image to be extracted.
    - A checkmark indicates the image will be included in the new series.
    - An X indicates the image will not be included in the new series.
6. When done, select **Save**. The selected images are extracted and saved as a new series.

9.8 Edit a video

You can edit a video from the QC viewer.

Select **Video** from the toolbar, then select a series containing a video. For more information, see “Edit videos” on page 74.

9.9 Edit studies

You can edit a study using the QC viewer.

Select **Edit** from the toolbar, then select a study. For more information, see “Edit or split patient studies” on page 22.

9.10 Delete studies, series or images

You can delete a study, series or image using the QC viewer.

Select **Delete** from the toolbar, then select a study, series or image. For more information, see “Delete studies, series or images” on page 23.

9.11 Close the QC viewer

To close the QC viewer and return to the Patient Study Directory, select **Search** in the top-left corner.

10. Manage DICOM study transfers

10.1 Retrieve studies to the local database

Use **Patient Search** to find patient studies on a remote DICOM server and retrieve the studies to the local database. You can also choose to load a study (open it in NilRead) immediately after retrieving it.

Note
Your user privileges determine whether you can retrieve studies to the local database. Your DICOM settings for Query/Retrieve Service Class Providers also determine whether you are able to retrieve studies (see “Manage DICOM services” on page 114). If retrieve mode is not enabled, you can load studies from a remote server but the studies are not saved in the local database.

Note
You can monitor patient study transfers using the DICOM Activity page (see “Monitor DICOM patient study transfers” on page 114).

1. In the Patient Study Directory, select **Patient Search**.
2. Find the study or studies you wish to retrieve (see “Open patient studies” on page 15).

   You can now transfer studies to the local database. You can also choose to open studies in NilRead after they are transferred.

   View a study

   Click (or tap) a study in the search results. You can also right-click a study, then select **Load Studies**.

   The study is opened in NilRead. Depending on the retrieve mode that has been configured for the remote DICOM server, the study may also be transferred to the local database (if it is not already in the directory).

   View multiple studies

   Select the checkbox beside each study. Right-click (or touch and hold) one of the studies and select **Load Studies**.

   The studies are opened in NilRead. Depending on the retrieve mode that has been configured for the remote DICOM server, the studies may also be transferred to the local database (if they are not already in the directory).

Transfer one or more studies

Select the checkbox beside each study. Right-click (or touch and hold) one of the studies and select **Retrieve Studies**. The studies are transferred to the local database (if they are not already in the directory).

10.2 Send studies, series or images to a DICOM server

You can send a patient study, series or image to a remote DICOM server. The study, series or image remains in NilRead as well.

In the Patient Study Directory:

- Right-click (or touch and hold) a study, select **Send to Device**, then select a remote device.

While viewing a study:

1. To send a series, right-click (or touch and hold) a series (side panel), then select **Send Series**.
2. To send an image, right-click (or touch and hold) an image, then select **Send Image**.

10.3 Monitor DICOM patient study transfers

Monitor patient studies transfers between the local database and remote DICOM servers. You can view current, completed, and failed transfers.

In the Patient Study Directory:

1. Select **DICOM Activity**.
2. The **Current**, **Completed** and **Failed** tabs contain the following areas. Click (or tap) a column heading to sort the column in ascending or descending order.
    - **Inbound Associations** Studies received by NilRead from a remote DICOM server.
    - **Outbound Associations** Studies sent from NilRead to a remote DICOM server.
    - **Retrievals** Studies retrieved by NilRead from remote DICOM servers (see “Retrieve studies to the local database” on page 113).
3. The **Deleted** tab lists the studies that have been purged from the local database.
4. To update a tab with the latest activities, select **Refresh**.
5. To remove the activities list from a tab, select **Clear**. You cannot clear the **Current** tab.

10.4 Manage DICOM services

Configure your NilRead server and the remote DICOM servers on the network. You can use several types of DICOM services:

- **Local Application Entity Configuration** Refers to NilRead. NilRead is a Storage Service Class Provider that can receive patient studies from remote DICOM servers.

- **Streaming Service** NilRead DICOM Query/Retrieve Service Class User service, which incrementally retrieves DICOM data and loads it directly to the NilRead viewer without caching in the file system.
- **Repository** Refers to a data directory path which can be used to store imported DICOM data.
- **Acuo VNA Providers** Acuo VNA repositories that NilRead has direct access to.
- **Storage Service Class Providers** Remote DICOM servers that can receive patient studies from NilRead.
- **Storage Commitment Service Class Providers** Remote DICOM servers that support the DICOM storage commitment service. Used to confirm that data has been permanently stored by a server to ensure it is safe to delete the data locally.
- **Query/Retrieve Service Class Providers** DICOM servers that NilRead can query and retrieve patient studies from.
- **Modality Worklist Service Class Providers** Facilitate the communication of patient and scheduled acquisition procedure information to imaging modalities.
- **Instance Availability Notification Service Class Providers** NilRead can notify the configured IAN DICOM AE of the availability of the replacement instances. The notification contains the AE titles of the replacement instances, from which the replacement instances can later be retrieved.
- **Detached Interpretation Management Service Class Providers** Provide detached reports and notifications associated with studies.
- **Print Service Class Providers** Remote DICOM servers which support DICOM printing.
- **RESTful Dicom Service Providers** Remote DICOM servers which support DICOM QIDO-RS, WADO-RS, and STOW-RS protocols.

10.4.1. Access DICOM configuration settings

1. Select **Settings**.
2. Under **Devices**, select **DICOM**.

See the next sections for details on configuring your services.

10.4.2. Configure the NilRead DICOM Storage Service

1. In the **Local Application Entity Configuration** area, select **Edit**.
2. Modify the service details.
    - **AE Title** NilRead DICOM server's DICOM Application Entity Title.
    - **Host** IP address of the TCP/IP network endpoint that the NilRead DICOM server listens at.
    - **Port** Port number of the TCP/IP network endpoint that the NilRead DICOM server listens at.

- **Maximum Inbound Associations, Maximum Outbound Associations** Maximum number of DICOM associations that the DICOM server will execute concurrently. This controls system resources utilization of the DICOM server (CPU, Disk I/O, etc.).

3. Select **Save**.

10.4.3. Configure Streaming Service

1. In the **Streaming Service** area, select **Edit**.
2. Modify the service details.
   - **AE Title** NilRead streaming service's DICOM Application Entity Title.
   - **Port** Port number of the TCP/IP network endpoint that the NilRead streaming service listens at.
   - **Maximum Inbound Associations, Maximum Outbound Associations** Maximum number of DICOM associations that the DICOM streaming service will execute concurrently. This controls system resources utilization of the DICOM server (CPU, Disk I/O, etc.).
   - **Enabled** Indicates whether the DICOM streaming service is enabled.
3. Select **Save**.

10.4.4. Configure Repository Information

1. In the **Repository** area, select **Edit**.
2. Modify the repository details.
   - **Repository path** Path to the data repository.
   - **Free disk space watermark** Drag to select the low and high watermark settings used to trigger the purging service.
   - **Critical disk space watermark** Drag to select the watermark settings that will trigger the DICOM storage SCP service to enter suspended mode. The service will remain in suspended mode until enough free disk space is available.
   - **CPU idle watermark** Drag to select the CPU idle threshold when purging can be performed.
   - **Number of protected studies** Auto-purging will stop if the number of studies in the database is equal to or less than this number.
   - **Free disk space check interval (seconds)** Interval (in seconds) to check for free disk space. Also triggers purging if all purging criteria are met.
   - **Number of studies to delete per batch** Number of studies to delete when the system performs an automatic data purge (performed when disk space is reaching capacity).
   - **Dicom activity retention period (days)** Number of days to retain DICOM activity logs. Logs will be deleted after this period.

- **Email notification address** Email address to send notifications when the critical disk space watermark is reached.

3. Select **Save**.

10.4.5. Configure patient search results

In the **Patient Search** area:

- **Maximum number of query results** Enter the maximum number of studies that are returned on the **Patient Search** tab in the Patient Study Directory.

10.4.6. Add a remote DICOM server

1. In the **Remote AE Configuration** area, select a DICOM services type. The existing servers are shown.
2. Select **New**.
3. Enter the server details.
4. Select **Update**.

10.4.7. Edit or delete settings for a remote DICOM server

1. In the **Remote AE Configuration** area, select a DICOM services type. The existing servers are shown.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

11. Manage hanging protocols

11.1 About hanging protocols

The purpose of a hanging protocol is to display the images in a study in a consistent manner. While the term originally referred to the arrangement of physical films in a film box, it now refers to the display of images on computer monitors. When properly set up, the use of hanging protocols significantly improves reading quality and efficiency.

When opening a study, NilRead analyzes the DICOM attributes of the study and identifies matching hanging protocols. If any candidates are found, the best one is selected and applied automatically. You can also choose a hanging protocol when viewing a study (see “Select hanging protocols” on page 51).

Depending on your NilRead license, you will have access to either clinical or advanced hanging protocols.

- Clinical hanging protocols allow you to quickly create protocols based on the study modality. You can also include studies based on the series description.
- Advanced hanging protocols have additional anchor study matching options. They also include the ability to select prior studies for comparison, load prior studies in specific viewports, and apply presentation settings (window level, invert greyscale, zoom, and orientation).

The Hanging Protocols page has two tabs:

- **Protocols** Contains a list of all hanging protocols in NilRead (see “Manage hanging protocols” on page 118). You can add, edit, clone, delete, enable/disable, import and export protocols.
- **Rules templates** Contains a list of rules templates you can optionally use when creating a hanging protocol (see “Manage hanging protocol rules templates” on page 121). Rules templates make it easy to apply a standard set of rules to multiple hanging protocols. If you make changes to a rules template, the changes will also be applied to all protocols using the template.

Note
See the **Hanging Protocols Handbook** for more detailed information about using hanging protocols.

11.2 Manage hanging protocols

1. Select **Settings**.
2. Under **Preferences**, select **Hanging Protocols**.

See the next sections for details on configuring hanging protocols.

Note
If you access **Settings** while viewing a study, select **Back to Viewer** to return to the image viewing area.

11.2.1. Add hanging protocols

1. On the **Protocols** tab, select **Add**. You can also select an existing protocol, then select **Clone**.

   The **Hanging Protocol Editor** appears. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.

   Note
   See the **Hanging Protocols Handbook** for more detailed information about using hanging protocols.

2. Enter the following information, then select **Save**. The hanging protocol is added to the **Protocols** tab and is enabled by default, meaning it will be available in NilRead. To disable the hanging protocol, clear the **Enabled** checkbox.

   Protocol Info

   1. Enter a name for the protocol.
   2. Select whether this is a **System** or **User** protocol. A system protocol will be applied to all users of NilRead. A user protocol will only be applied to the type of user you specify (Admin, User, or Guest).
   3. Select the type of users, based on job description, for this protocol.
   4. Enter a **description** for the protocol.

   Anchor study matching

   Define the type of studies the protocol will apply to.

   1. To add a new DICOM rule, select **<add new>**. Customize the rule. For example, you could state that images must be a specific modality. For clinical hanging protocols, attribute options include Modality and Series Description only.
   2. To add a rules template, select **<add new ruleset>**. Select **<pick>** and select a template. If you are using clinical hanging protocols, any attributes in the template that are not applicable to clinical hanging protocols will be shown in red and will be ignored.
   3. To remove a rule or ruleset, select **Verify** to switch to **Delete**.

   Comparison study matching

   Select whether the hanging protocol includes prior studies. This section is not available for clinical hanging protocols.

   1. By default, prior studies are not included. To include prior studies, select **will not be** to switch to **will be**.
   2. Select **<add new>** or **<add new ruleset>** and add the same rules as the **Anchor study matching** section.

Relevant Patient History

Define filters to determine which prior studies are shown in the prior studies timeline for this hanging protocol.

1. Be default, all prior studies are shown. To define filters, select **all** to switch to **these**.
2. You can enter filters based on modality, keywords, and the study age. Keywords are words that will be searched in a few common DICOM attributes such as body part examined, region of interest, and study description.

Monitors and protocol stages

Define the image placement.

1. On the **Stage 1** tab, the number of screens is shown under **Monitors and screen layouts**. The default number of screens is 1x1. If desired, select **1x1** and select a different number of screens.
2. In the **Protocol layouts** section, define the rules for each screen. Presentation state settings are not available for clinical hanging protocols (window level, invert greyscale, zoom, orientation).
3. If desired, select **<add stage>** and add additional stages to the hanging protocol. Define the screen layout for each stage.

Application preferences

1. Select whether the side panel is visible or hidden.
2. Select whether the prior studies timeline is visible or hidden.

11.2.2. Edit or delete hanging protocols

1. On the **Protocols** tab, select a protocol.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

11.2.3. Enable a hanging protocol

You must enable a hanging protocol to make it available in NilRead. You can disable protocols that you do not want to make available to NilRead users.

1. On the **Protocols** tab, select the checkbox beside a protocol. You can also select a protocol, then select **Enable**.
2. To disable a protocol, clear the checkbox beside the protocol.

11.2.4. Import and export hanging protocols

To import a hanging protocol:

1. On the **Protocols** tab, select **Import**.
2. Select a file to import, then select **OK**.

To export a hanging protocol:

1. On the **Protocols** tab, select a protocol.
2. Select **Export**.
3. Under **Export Range**, choose whether to export the selected protocol only or export all protocols.
4. Select **OK**. You will be prompted by your browser to save or open the exported file.

11.3 Manage hanging protocol rules templates

You can create rules templates to use in hanging protocols. If you make changes to a rules template, the changes will also be applied to all protocols using the template.

1. Select **Settings**.
2. Under **Preferences**, select **Hanging Protocols**.
3. Select the **Rules Templates** tab.

See the next sections for details on configuring rules templates.

Note
If you access **Settings** while viewing a study, select **Back to Viewer** to return to the image viewing area.

11.3.1. Add rules templates

1. On the **Rules Templates** tab, select **Add**. You can also select an existing template, then select **Clone**.

   The **Hanging Protocol Template Editor** appears. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.

   Note
   See the **Hanging Protocols Handbook** for more detailed information about using hanging protocols.

2. Enter the following information, then select **Save**.

   Template Info

   1. Enter a name for the protocol.

2. Enter a description for the protocol.

Template rules definition

1. Select **<add new>** to add a new DICOM rule. Customize the rule. For example, you could state that images must be a specific modality.
2. To remove a rule, select **Verify** to switch to **Delete**.

11.3.2. Edit or delete rules templates

1. On the **Rules Templates** tab, select a template.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

12. Data lifecycle policies

12.1 Manage data lifecycle settings

Use data lifecycle policies to manage the lifecycle of any series imported into NilRead or created in NilRead. A data lifecycle policy is defined in terms of conditions and activities. If a series meets all of the policy conditions, the lifecycle activities defined in the policy are applied to the series. For example, a policy could state that all data imported from a specific institution (condition) will be retained in NilRead for six months before being moved to a new storage location (activity).

Note
NilRead automatically verifies series against your data lifecycle policies. You can also choose to apply a policy to a study (see "Apply a data lifecycle policy to a study" on page 127). This is useful if you created a new policy or modified your existing policies after the study was imported to the database.

Note
See the **Data Lifecycle Management Handbook** for more detailed information about creating policies.

12.1.1. Access data lifecycle settings

1. Select **Settings**.
2. Under **Devices**, select **Data Lifecycle**.
3. The **Data Lifecycle** page contains three areas:
   - **Lifecycles** Contains a list of recent activities related to the execution of data lifecycle policies.
   - **Policies** Contains a list of all existing data lifecycle policies.
   - **Endpoints** Contains a list of non-DICOM endpoints (storage tiers and data pickup folders) that can be used for data lifecycle management.

Note
Select **Refresh** under each of these areas to view the latest changes made by all users.

See the next sections for details on configuring data lifecycle settings.

12.1.2. Add a policy

1. In the Policies area, select **Add**.
2. Enter the policy information, then select **Save**. The policy is added to the **Policies** area.

   Name

   Policy name.

Comment

Policy description.

Enabled

If selected, the policy can be applied to NilRead data.

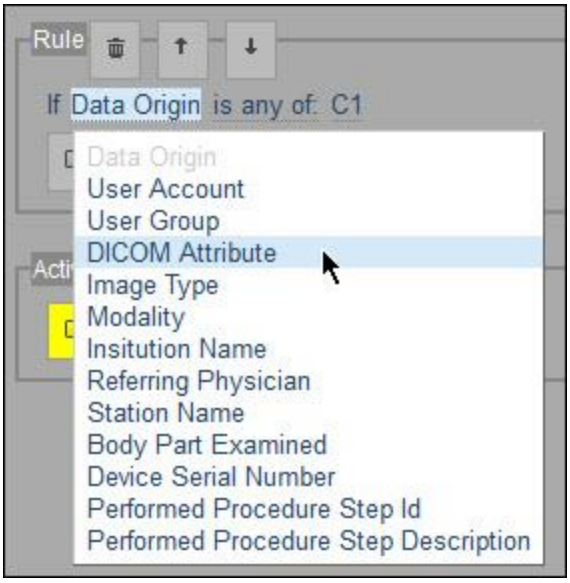
Training

If selected, the policy will be run in a "training" mode. The activities will be logged but will not be applied to data.

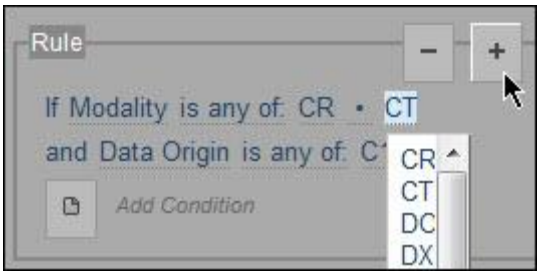
Rule

Specify the rule for the policy by adding one or more conditions. All conditions must be satisfied in order for the policy to be applied to a study.

1. Select **Add Condition**.
2. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.



3. To add an item to a condition, select a customizable area, then select +. To remove an item, select -.



4. To delete a condition, select the first customizable area, then select  .
5. To move a condition to a new position, select the first customizable area, then select  .

Activities

Specify the activities that will occur if the policy rule is satisfied. You can use a series of activities to manage data. For example, you could retain series for six months before moving them to a storage location; you could then move the series to an offline storage location after two years.

Activities are executed in the order listed in the policy.

1. Select **Add Activity**.
2. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.

You can use activities to:

- **Retain** Specify how long to retain data in the database. Typically used in conjunction with another activity, such as moving data to a storage location.
- **Route** Move data to a DICOM server.
- **Relocate** Copy data to a storage location (defined by a Storage Tier endpoint).
- **Recycle** Delete data.
- **Email** Send an email to a specified email address.
- **Notify Study Import** Receive a notification when a study is imported.

3. To delete an activity, select the activity, then select  .
4. To move an activity to a new position, select the first customizable area, then select  .

12.1.3. Add an endpoint

1. In the **Endpoints** area, select **Add**.

2. Enter the endpoint information, then select **Save**.
    - **Name** Endpoint name.
    - **Type** Endpoint type:
        - **Storage Tier** Storage location used to store NilRead data.
        - **EventSink** Remote endpoint capable of receiving NilRead study import event notifications.
    - **Path** Path to the endpoint location (for example, c://storage1).

12.1.4. Edit or delete a policy or endpoint

1. In the **Policies** area, select a policy.
   or
   In the **Endpoints** area, select an endpoint.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

12.1.5. Correct or abort an activity

The **Lifecycles** area contains a log of activities performed on series based on lifecycle policies. The **Status** column indicates whether the activity was performed successfully.

- **OK** The activity is executing successfully and is not yet complete.
- **Waiting** The workflow is waiting for a condition in order to proceed.
- **Faulting** The activity failed to execute successfully. You can correct or abort the activity.
- **Completed** The activity executed and completed successfully.
- **Aborted** The activity was aborted.
- **Failed** The activity failed to execute successfully. The activity cannot be corrected or aborted.

If an activity has a Faulting status, you can correct the activity workflow and rerun the activity.

1. Select an activity, then select **Correct**.
2. Modify the workflow.
3. Select **Save**.

You can abort an activity that has not yet completed (OK, Waiting, or Faulting status).

- Select an activity, then select **Abort**.

12.2 Apply a data lifecycle policy to a study

NilRead automatically verifies series against your data lifecycle policies. You can also manually apply a policy to a study. There may be cases when you need to manually apply activities associated with a data lifecycle policy to a particular study, either to bypass the policy rule conditions or to apply the policy to a series that was already in NilRead before you created (or modified) the policy.

In the Patient Study Directory:

1. Select the checkbox beside each study to which you want to apply the policy.
2. Right-click (or touch and hold) one of the studies and select **Apply Policy**, then select a data lifecycle policy. After the activities are applied, a message will appear with the results.

13. Manage NilRead settings

13.1 Manage Patient Search results

You can set the maximum number of studies that are returned on the **Patient Search** tab in the Patient Study Directory.

1. Select **Settings**.
2. Under **Devices**, select **DICOM**.
3. In the **Patient Search** area, click **Edit**.
4. Enter the maximum number of query results, then click **Save**.

13.2 Manage XDS settings

The XDS and XDS-I profiles (defined by Integrating the Healthcare Enterprise, or IHE) provide standards-based cross-enterprise document sharing among healthcare organizations. NilRead can be configured to use these profiles to obtain patient data from multiple healthcare organizations, allowing physicians to build comprehensive patient histories. NilRead XDS configuration requires the following:

- **XDS registry** Registry that stores meta-data for documents located in multiple XDS repositories (e.g. at multiple healthcare institutions).
- **Master Patient Index** Database that maintains a unique index for every patient registered at a healthcare organization. Alternatively, Patient Identity Domains can be specified instead of using the MPI.
- **XDS endpoints** Repositories that store patient documents.

13.2.1. Access XDS settings

1. Select **Settings**.
2. Under **Devices**, select **XDS**.

See the next sections for details on configuring XDS settings.

13.2.2. Add an XDS server configuration

You can create configurations for different XDS servers.

1. In the **XDS Context** area, select **Add**.
2. Enter a name for the configuration, then select **Save**. The configuration has been created.
3. To enter the XDS server configuration settings, select **Edit**.
4. Enter information in the following sections, then select **Save**.

XDS Content

- **Disable** Disable this XDS server. For example, you may want to exclude a server while it is undergoing maintenance.
- **MPI** Use the Master Patient Index (MPI) with this XDS server.
- **Reports** Select the report types to include (Approved, Submitted, Deprecated).

XDS Registry

- **Address** XDS registry address.

If you selected MPI, enter the following additional information:

- **Application** XDS registry application name.
- **Facility** XDS registry facility name.

Master Patient Index

This section is shown if you selected MPI. The MPI contains two integration profiles: PDQ (Patient Demographics Query) and PIX (Patient Identifier Cross Referencing).

- **Application** MPI application name.
- **Facility** MPI facility name.
- **PDQ Address** IP address (including port) of the TCP/IP network endpoint that NilRead XDS queries for MPI resolution.
- **PIX Address** IP address (including port) of the TCP/IP network endpoint that NilRead XDS queries for MPI resolution.

Patient Identity Domain

This section is shown if you did not select MPI and allows you to enter patient identity domains manually.

1. In the **Patient Identify Domain** area, select **Add**. (To edit a domain, select the domain, then select **Edit**.)
2. Enter the following information, then select **Save**.
    - **Disable** Disable this patient identity domain.
    - **UID** Unique IHE identifier for the domain supplied by the issuer of the patient ID.
    - **Domain** Patient identity domain (typically ISO).
3. To delete a domain, select the domain, then select **Delete**.

XDS Endpoints

1. In the **XDS Endpoints** area, select **Add**. You can also select an existing endpoint, then select **Copy**. (To edit an endpoint, select the endpoint, then select **Edit**.)
2. Enter the following information, then select **Save**.
    - **Name** A unique friendly name to identify the endpoint.
    - **UID** Unique identifier supplied by the endpoint provider.
    - **Type** Endpoint type:
        - **XDS Repository** Endpoint supplying XDS documents.
        - **RAD 69 (Retrieve Imaging Document Set)** Endpoint supplying images over the RAD 69 protocol.
        - **RAD 55 (WADO Retrieve)** Endpoint supplying images over the RAD 55 protocol.
    - **Address** Web service address (URL) of the network endpoint that NilRead XDS queries for document or image resolution.
3. To delete an endpoint, select the endpoint, then select **Delete**.

13.3 Manage prefetch settings

NilRead can be configured to retrieve archived images from external sources in advance of a scheduled patient visit. This ensures prior exams are available for comparison.

Prefetch is controlled by user-defined polices. Each policy is defined in terms of triggers and actions. Triggers specify conditions on which prefetch should be performed while actions specify the prefetch details. NilRead can be configured to query multiple MWL service class providers for scheduled workflow items associate with a specific modality, station name, and AE title. Alternatively, prefetch can be triggered by an imported study based on a study modality, data source, or age.

If a trigger condition is satisfied, priors will be prefetched based on the configured number of studies, age, modality, data source, and patient matching. For example, a policy could state that when a CR acquisition is scheduled on a specific device (or when a CR study is imported from a specific DICOM server), NilRead will prefetch a maximum of three CR studies, not older than six months, from a specific data source, and the studies will be selected by matching the patient name.

Note
Prefetch activities are logged and can be reviewed on the DICOM Activity page (see “Monitor DICOM patient study transfers” on page 114).

13.3.1. Access prefetch settings

1. Select **Settings**.
2. Under **Devices**, select **Prefetch**.

See the next sections for details on configuring prefetch.

13.3.2. Prefetch settings

1. In the **Services** area, define the prefetch settings.
    - **Enable** If selected, prefetch is enabled.
    - **Modality Worklist Poll Period** Frequency (in hours) to check the modality worklist. Select **Poll** to check the worklist immediately.
    - **Query Modality Worklist Items not older than** Age (in days) of modality worklist items to include when checking the worklist.
    - **Prefetch Activation** Frequency to run prefetch (check the modality worklist and fetch data). You can activate prefetch immediately or schedule it to run between specific hours. When **immediate** is selected, prefetch actions will be executed immediately when a worklist item is scheduled or a study is imported to NilRead which matches a policy trigger; otherwise, prefetch actions will be executed within the configured time range.
    - **Keep prefetch request records for** Period (in days) to retain scheduled prefetched requests. If data cannot be accessed within this period, the requests will be removed from the system.
2. Select **Save**.

Note
Select **Reset** to restore the default settings.

13.3.3. Add a prefetch policy

1. In the **Policies** area, select **Add**.
2. Enter the policy information, then select **Save**.

Name

Policy name.

Comment

Policy description.

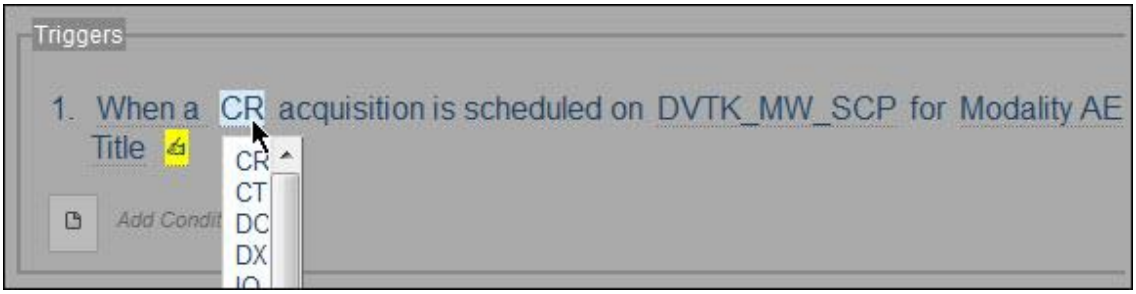
Enabled

If selected, the policy will be applied to NilRead data.

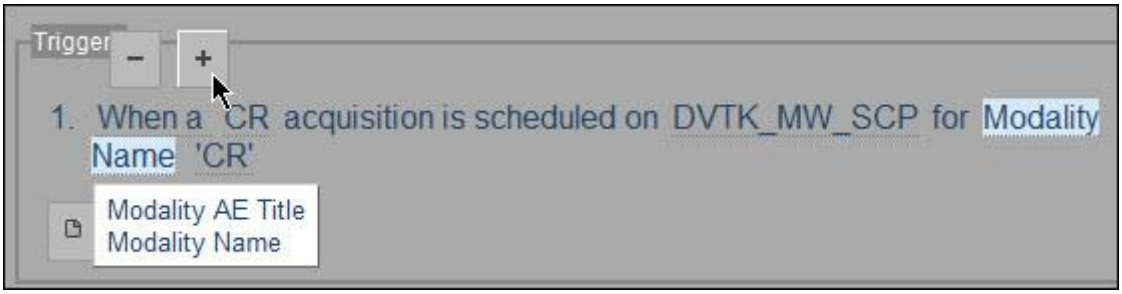
Triggers

Specify the triggers for the policy by adding one or more conditions. The policy actions will be triggered if any of the trigger conditions are satisfied.

1. Select **Add Condition**.
2. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.



3. To add an item, select a customizable area, then select +. To remove an item, select -.



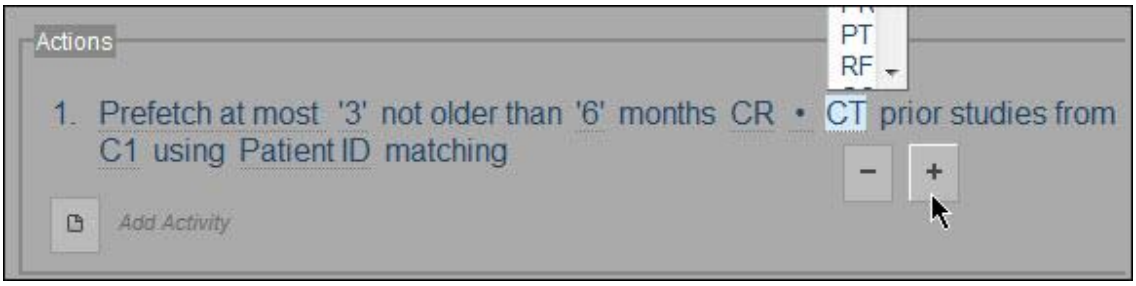
4. To delete a condition, select the first customizable area, then select  .
5. To move a condition to a new position, select the condition, then select  .

Actions

Specify the actions that will occur if any of the policies triggers are satisfied. Actions are executed in the order listed in the policy.

1. Select **Add Activity**.
2. Customizable areas are underlined and are highlighted when you hover over them. Click (or tap) a customizable area to edit it.

3. To add an item, select a customizable area, then select +. To remove an item, select -.



4. To delete an action, select the action, then select .
5. To move an action to a new position, select the action, then select .

13.3.4. Edit or delete a prefetch policy

1. In the **Policies** area, select a policy.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

13.4 Manage IOCM settings

Image object change management (IOCM) manages the synchronization of changes applied on existing imaging objects between NilRead and remote servers. IOCM uses rejection notes (DICOM key object selection documents) to ensure that remote servers are notified when studies, series or images are deleted on the NilRead server, and that the NilRead server is notified when these items are deleted on a remote server.

Replacement instances can be sent to the remote server through the NilRead data lifecycle services (for details, see “Manage data lifecycle settings” on page 123). Alternatively, NilRead can send instance availability notifications (IAN) to remote application entities (AE). The notification contains the AE titles of the replacement instances, from which the replacement instances can later be retrieved. For details, see “Manage DICOM services” on page 114.

13.4.1. NilRead rejection notes

If a study, series or image is deleted from the NilRead server, a rejection note is created with a list of the rejected (deleted) instances. Rejection notes are used to notify remote servers to delete these rejected instances. You can configure which remote servers receive NilRead rejection notes.

Rejection notes are created in the following scenarios:

- a user deletes a study from the Patient Study Directory
- a user edits a study and deletes the original study
- a user deletes a series from a study
- a user deletes an image from a study

By default, rejection notes generated by NilRead use the following title:

(113039, DCM, "Data Retention Policy Expired")

13.4.2. Received rejection notes

NilRead can also accept rejection notes from remote servers. If a study, series or image is deleted on a remote server and NilRead receives a rejection note, the rejected instances will be deleted on the NilRead server as well.

13.4.3. Configure IOCM settings

1. Select **Settings**.
2. Under **Devices**, select **IOCM**.
3. Enter the following information, then select **Save**.
    - **Enable** Allow NilRead to send and receive rejection notes. If this option is disabled, NilRead will not create rejection notes. NilRead will still receive rejection notes from remote servers but the notes will not be applied.
    - **Accept rejection notes from** Select the types of sources that NilRead will accept rejection notes from.
    - **Send Nil rejection notes to** Select the remote application entities (AE) that NilRead will send rejection notes to.
    - **Generate rejection notes when delete** You can choose to create rejection notes when a study is deleted (**Study**) and when a series or images is deleted (**Series/instances**).
    - **Keep rejection notes for XX days** Number of days to keep rejection notes. Notes older than the retention period will be deleted the next time a scheduled data purge occurs. To remove older notes immediately, select **Purge** at the bottom of the page.

The **Rejection Notes** list contains the notes NilRead has sent and received. Rejection notes received from a remote server are applied automatically (check the timestamp in the Applied column to verify

that a note has been applied). To apply a rejection note immediately, select the note, then select **Apply**. To delete a rejection note, select the note, then select **Delete**.

NilRead ignores all instances that have been rejected. If the rejected instances must be reimported, delete the corresponding rejection notes and resend the rejected instances to NilRead.

Note
Rejection notes are also shown on the **DICOM Activity** page.

13.5 Use the dashboard

Use the dashboard to view system information and counters regarding NilRead components and operational environment. The Dashboard is only available for single tenant configurations of NilRead.

1. Select **Settings**.
2. Select **Dashboard**. The dashboard contains the following areas:
    - **Server Status** NilRead server system level information including the server name, build version, current CPU utilization, available RAM, and current number of users. Select the number of users to view statistics for the users currently logged into NilRead.
    - **DICOM Statistics** NilRead DICOM service counters, including CPU utilization, inbound throughput, and total number of imported studies and images.
    - **User Statistics** Statistics for the users currently logged into NilRead, including the user account name, current session start time, and recent inactivity time.
    - **Database** Database information, including the database server name, database name, current database size, and database capacity usage.
    - **Licensing** NilRead licensing information, including the maximum number of concurrent users, expiration time, and enabled NilRead features.
    - **Network** NilRead server network interface card information, including the adapter name, network utilization, link speed, and operational status.

13.6 Use analytics

Use the NilRead analytics to view detailed information including audit trails, user activity, study access and load-balancing statistics.

1. Select **Settings**.
2. Select **Analytics**. You can view the following information:
    - Patient audit trail
    - User activity
    - Event audit trail
    - Patients accessed by user

- Top users by patient access
- Study access by modality
- User login load-balancing across servers
- Study review load-balancing across servers

13.7 Federation

Administrators only

1. Select **Settings**.
2. Select **Federation**. You can view the following information:
    - Status
    - Archiving & Backup
    - Software Updates
    - Network Utilization

13.8 System preferences

Administrators only

Select the region where NilRead is deployed. This ensures that the appropriate NilRead settings and labels are shown for the region.

1. Select **Settings**.
2. Under **Preferences**, select **System Preferences**.
3. In **Deployment Region**, select the region where NilRead is being used.
4. Select **Save**.

14. Manage users (Admin only)

14.1 About user privileges

Administrators Only

You can manage NilRead user privileges at several levels. This allows you to tightly control user access to NilRead features and the Patient Study Directory. A user's privileges are initially based on their role and group assignment; these are both assigned in the user's account. The user's privileges can then be customized through their account.

Note
Users must be assigned the StudyListAccess privilege in order to access the Patient Study Directory. For more information about the privileges that can be assigned to users and groups, see "Privilege descriptions" on page 138.

14.1.1. Role

Users are assigned default privileges based on their role (Admin, User or Guest). This role is assigned in the user's account.

- **Administrators** typically have full privileges for NilRead use and configuration; only Administrators can manage NilRead users. By default, Administrators have full privileges.
- **Users** are regular NilRead users. Users typically have access to the entire Patient Study Directory.
- **Guests** are occasional NilRead users, such as external referring physicians. Guests can typically only see studies for their own patients. Guests can access emergency override ("break glass"). By default, Guests have no privileges.

For more information, see "Manage user accounts" on page 141.

14.1.2. Group

Users are also assigned the default privileges of the group to which they belong. This group is assigned in the user's account. For details on setting up groups, see "Manage user groups" on page 140.

14.1.3. Account

User privileges can be customized in the user's account. The default privileges inherited from the user's role and group can be changed and additional privileges can be assigned. For more information, see "Manage user accounts" on page 141.

14.1.4. Profile

Administrators can manage their privileges using their profile. Guests and Users can only change settings such as their name, email address and password. For more information, see “Manage your user profile” on page 102.

14.2 Privilege descriptions

The following privileges can be assigned to a group or user.

- **AutoEnroll** Automatically create NilRead user accounts for members of a Windows group on their first login.
- **BookmarkSaveSend** Create and share a bookmark.
- **Collaboration** Access collaboration tools.
- **CreateAccounts** Create new NilRead user accounts.
- **ContentDownload** Download DICOM files using NilFeed.
- **ContentUpload** Upload DICOM files using NilFeed.
- **DicomClearLogs** Remove logs from the DICOM Activity page (see “Monitor DICOM patient study transfers” on page 114).
- **DicomConfig** Manage DICOM services (see “Manage DICOM services” on page 114).
- **DicomConfigEdit** Edit DICOM configuration.
- **DicomDelete** Remove DICOM services from the database (see “Manage DICOM services” on page 114).
- **DicomPrint** Manage DICOM printers.
- **DicomQueryRetrieve** Access the Search tab in the Patient Study Directory and retrieve patient studies from a DICOM server (see “Retrieve studies to the local database” on page 113).
- **DicomRT** Enables protocol support and tools for DICOM RT studies.
- **DicomStore** Access the DICOM store features.
- **EditAnonTemplates** Create, modify and delete anonymization profiles and masks.
- **EditHangingProtocols** Create, modify, delete and enable/disable user hanging protocols.
- **EditPatientStudy** Edit study-level DICOM attributes.
- **EditSystemHangingProtocols** Create, modify, delete and enable/disable system hanging protocols.
- **EditWorkItems** Create, modify and delete worklists and folders.

- **EmergencyOverride** Use emergency override ("break glass") to access patient studies (see "Use Break Glass to find patient studies" on page 18). NilRead guest users typically have limited access to the Patient Study Directory. However, guests may be given access to emergency override ("break glass") which allows them to search for studies based on patient name and study accession number. For example, a referring physician may only have access to studies containing his own name. If the referring physician's name is misspelled or missing from a study, he will be unable to access the study using the Patient Study Directory. However, the referring physician can search for the study if he has been granted the emergency override privilege.
- **GuiAdvanced** Access all user interface features. (The user's role and privileges may limit the features they can view.)
- **GuiBasic** Access basic user interface features. Only a single study can be reviewed in the image viewing area. Advanced features, such as measurement tools and hanging protocols, will not be available. (The user's role and privileges may limit the features they can view.)
- **GuiIntermediate** Access intermediate user interface features. For example, basic measurement tools, screen layouts and cross-correlation between series are available. Multiple studies can be reviewed in the image viewing area at the same time. Advanced features, such as advanced measurement tools and hanging protocols, will not be available. (The user's role and privileges may limit the features they can view.)
- **GuiPatient** Access simple user interface features. Intended for patient use.
- **LifecycleManagement** Enable and modify data lifecycle options (see "Manage data lifecycle settings" on page 123).
- **MprProtocols** View Slab views.
- **OverrideLosslessModalities** Override system settings that specify that images from specific modalities are always shown as lossless, uncompressed images. If a user has this privilege, the user is able to turn off Full Quality for images, regardless of the default system settings (see "Full Quality" on page 44).
- **PatientDirectory** View all studies in the local database.
- **PersistentAnnotations** Allow persistent annotations and measurements across review sessions.
- **RestrictedSiteAccess** Access sensitive data on restricted sites.
- **SaveEvidence** Save secondary capture images, key images and bookmarks.
- **SecondaryCaptureCreation** Create secondary capture images (see "Create secondary capture images" on page 90).
- **ShowBookmark** Display a list of bookmarks in Presentations (see "Create presentations" on page 63).
- **SkypeIntegration** View Skype controls in the Collaboration panel.

- **StudyListAccess** Access the Patient Study Directory.
- **ThreeDProtocols** View 3D views.
- **VesselTrace** Access the Vessel Trace view.
- **ViewAnalytics** View Analytics (see “Use analytics” on page 135).
- **ViewPublicWorkItems** Access public (unassigned) worklists and folders created by administrators.
- **XdsAccess** Access XDS repositories.

14.3 Manage user groups

Administrators Only

You can use groups to assign NilRead privileges to users (see “Privilege descriptions” on page 138). If NilRead is part of a domain, you can also add Active Directory groups to NilRead. If changes are made to an Active Directory group, such as adding users, the changes are automatically applied in NilRead as well.

Note
You can also manage privileges for individual users (see “Manage user accounts” on page 141).

14.3.1. Access group settings

1. Select **Settings**.
2. Under **User Management**, select **Groups**.

See the next sections for details on managing groups.

14.3.2. Create an application group

An application group is specific to NilRead and is not linked to an Active Directory group.

1. In the **Group** field (below the **Application Groups** area), enter the group name.
2. Select **Create**.
3. Select the type of group (Admin or User).
4. The **Granted Privileges** area lists the default privileges assigned to the group. By default, User groups have basic privileges (such as accessing the Patient Study Directory) and Admin groups have full privileges. To add or remove privileges from the group:
    - **Add a privilege** Select a privilege in the **Revoked Privileges** area, then select **Grant**.
    - **Remove a privilege** Select a privilege in the **Granted Privileges** area, then select **Revoke**.

5. In the **Session Timeout** field, select the session timeout period. A user's session will end if they are inactive for this amount of time.

14.3.3. Add an AD group to NilRead

You can add Active Directory groups to NilRead.

1. In the **AD Groups** area, select a group, then select **Add**.
2. Enter the following information, then select **OK**.
   - **Name** Name of the LDAP server.
   - **URL** URL for the LDAP server.
   - **Username**, **Password** Credentials for connecting to the LDAP server. Leave blank to connect using the credentials of the IIS application pool.
   - **Simple Bind** Use simple bind authentication when connecting to an LDAP provider. Typically used with ADAM and other non-Microsoft servers.
   - **SSL** Use a secure connection when using simple bind authentication.
3. In the **CN** field, enter the name of the Active Directory group you want to add, then select **Search**. Groups matching your search criteria are shown in the **AD Groups** area.
4. In the **AD Groups** area, select the group you want to add, then select **Add**. The group is added to the **Application Groups** area.
5. The **Granted Privileges** area lists the default privileges assigned to the group. To add or remove privileges from the group:
   - **Add a privilege** Select a privilege in the **Revoked Privileges** area, then select **Grant**.
   - **Remove a privilege** Select a privilege in the **Granted Privileges** area, then select **Revoke**.

14.3.4. Edit or delete a group

1. In the **Application Groups** area, select the group, then select **Delete**.
2. In the **AD Groups** area, select the group, then select **Remove**.
3. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

14.4 Manage user accounts

Administrators Only

A user account defines the NilRead user's username, role, and group assignment. The user's privileges are shown in the user's account and can be modified. You can also lock user accounts and reset user passwords.

Note
Users can manage some of their account information through their profile (see "Manage your user profile" on page 102).

1. Select **Settings**.
2. Under **User Management**, select **Accounts**. Existing NilRead user accounts are shown.
3. If you have included Active Directory groups in NilRead, select **Refresh** to update the **Accounts** tab with any changes to Active Directory user accounts.

See the next sections for details on managing user accounts.

14.4.1. Add an account

1. Select **Add**.
2. In the **Account** area, enter the user's information.
    - **User Name** Username to login to NilRead.

      Note
      The user receives an automatic email with their NilRead password when their NilRead user account is created.

    - **Role** NilRead role (Admin, User, Guest). By default:
        - Guests have no privileges.
        - Users have basic privileges, such as accessing the Patient Study Directory.
        - Administrators have full privileges. Only Administrators can manage users.
    - **Email** Email address.
    - **Skype ID** Skype ID. Allows the user to participate in Skype sessions.
    - **Phone** Phone number.
    - **Facility, Department, Job Description** User's facility and job information.
    - **Notify on Study Arrival** User will receive an email when a new study containing one of the user's DICOM person name matches is added to the database.
    - **Last Name, First Name, Middle Name, Prefix, Suffix** User's name.
    - **Password** Password to login to NilRead.
    - **Expiry Date** Date the user's access to NilRead will expire.
        - Select  and select an expiry date. Select whether the user's account will be locked or deleted on the expiry date.
        - Select  to remove the expiry date and set the user's access to **Unlimited**.

3. (Optional) In the **Groups** area, select the group to which the user belongs. Guests cannot be assigned to groups.
    - **Add a user to a group** Select a group in the **Not Member** area, then select **Add**.
    - **Remove a user from a group** Select a group in the **Members** area, then select **Remove**.
4. The privileges assigned to the user are shown in the **Privileges** area (see "Privilege descriptions" on page 138). These privileges are initially based on the user's role and group but can be modified.
    - **Grant a privilege to a user** Select a privilege in the **Revoked** area, then select **Grant**.
    - **Remove a privilege from a user** Select a privilege in the **Granted** area, then select **Revoke**.
5. Select **OK**.

14.4.2. Edit or delete an account

1. Select the user account. To find an account, enter account information in the blank row at the top of the tab.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

14.4.3. Lock an account

1. Select the user account. To find an account, enter account information in the blank row at the top of the tab.
2. Select **Lock**. The user's Locked status changes to True.
3. To unlock an account, select **Lock**. The user's Locked status changes to False.

14.4.4. Reset a user's password

If you reset a user's password, the user will receive an email with a new auto-generated password.

1. Select the user account. To find an account, enter account information in the blank row at the top of the tab.
2. Select **Reset**.

15. Regulatory

15.1 Warnings and precautions

Before attempting to use NilRead, you must read this manual thoroughly, paying particular attention to all Warnings and Cautions incorporated in it.

WARNING		Directions, which if not followed, could cause fatal or serious injury to an operator, patient or any other person, or could lead to a misdiagnosis or mistreatment.
CAUTION		Directions, which if not followed, could cause damage to the equipment described in this Instructions for Use and/or any other equipment or goods, and/or cause environmental pollution.

15.1.1. General Usage

 NilRead is intended for use by physicians trained in reviewing and interpreting medical images.

 Users are to ensure that the appropriate study is loaded based on the identification on the timeline and in the viewport.

 It is recommended that NilRead be installed on the minimum hardware requirements (see “Hardware requirements” on page 146). Users are to ensure guidelines and warnings (including maintenance provisions) provided by the hardware manufacturer are adhered to, and that hardware is used under safe operating conditions. Users shall not install any additional third party software on the NilRead server to prevent compromising the software performance.

 A user’s access to the NilRead software is dependent upon the connectivity of their computer or mobile device to the NilRead server. A NilRead site should maintain the network integrity since the network is a critical part of the distributed image viewing system.

 NilRead uses compressed images during interactive manipulation, clearly marking them on the screen as “lossy” images. The diagnostic quality image is presented at the end of the manipulation, as part of a progressive refinement display.

 NilRead has been qualified on a variety of operating system and browsers (see “Device specifics” on page 12). However, operating system and browser version updates may affect the NilRead software. We recommend verifying the NilRead functionality after a modification to the operating system or browser.

 NilRead could be used as a temporary data cache and local changes might be out of synch with the master database. If NilRead is configured as a temporary cache, it is recommended that either the data correction functions are disabled or that an appropriate data lifecycle policy is setup to propagate changes to the master database.

 Patient data may be incorrectly removed by improperly configuring a data lifecycle policy. The system administrator shall make sure that when NilRead is used as primary data storage, data lifecycle is setup to include hierarchical storage endpoints, including a long term archive. This will prevent purging policies from automatically deleting studies when the local cache is full.

 The system administrator shall ensure that when NilRead is used as primary data storage, that the site implements an appropriate backup and recovery procedure of the NilRead database.

 The system administrator shall ensure that Data QC privileges are assigned to users familiar with the hospital’s workflow.

15.1.2. Use on Mobile Devices

 Users are to ensure guidelines and warnings provided by the mobile device manufacturers are adhered to regarding care and operation of the mobile devices.

15.1.3. Measurements

 On MPR and 3D views, interpolation may be done depending on the spacing between the original slices (as the spacing increases, the amount of interpolated data increases). For any image, when displaying images on the monitor at a scale other than 100%, data is interpolated. Measurement results are affected when interpolation is done. Interpolation always implies a certain inaccuracy.

 Do not perform pixel value measurement on compressed images. Compressed images are marked as “lossy” on the screen.

 NilRead allows 3D measurements to be performed. 3D measurements can change significantly with small changes in a line’s location or with changes in opacity.

 The accuracy of any measurement also depends on the user’s ability to select appropriate measurement points on the display device.

 The accuracy of calibrated measurements should be visually verified with the size of an anatomical object.

15.2 Hardware requirements

15.2.1. Desktop computers

The minimum hardware requirements for desktop computers running NilRead are:

- CPU: 1GHz Intel processor
- Available Memory: 500MB

The minimum network connection speed for a desktop computer is 1Mbps download, 256Kbps upload.

NilRead functions on any browser that supports JavaScript but has only been formally verified on the following browsers:

- Microsoft® Internet Explorer® (8.0 and higher)
- Mozilla® Firefox® (3.0 and higher)
- Google Chrome™ (3.0 and higher)
- Apple® Safari® (4.0 and higher)

15.2.2. Mobile devices

NilRead is verified to work on the following mobile devices:

- Apple® iPhone® (iOS 3.0 and higher)
- Apple® iPad®
- Android™ devices (2.3 and higher)
- Microsoft® Surface™
- Windows® Phone (8.0 and higher)

NilRead requires mobile devices to have a minimum network connection of 3G or WiFi.

15.3 Copyright and trademarks

15.3.1. Trademarks

Microsoft, Internet Explorer, Surface, ClickOnce and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Firefox is a registered trademark of the Mozilla Foundation.

Chrome is a trademark of Google Inc.

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15.4 DICOM conformance statement

The NilRead DICOM Conformance Statement is available at http://www.lexmark.com/en_us/solutions/healthcare/enterprise-imaging/enterprise-viewing/nilread-regulatory-and-approvals.html.