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).

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**.

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**).

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.

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.

Access DICOM configuration settings

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

See the next sections for details on configuring your services.

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**.

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**.

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**.

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.

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**.

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**.

Manage hanging protocols

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**).

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. 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. 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.

Set up hanging protocols

1. Select **Settings**.

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

2. Under **Preferences**, select **Hanging Protocols**.
3. Select the **Protocols** tab.

   See the next sections for details on adding, modifying, deleting, and enabling hanging protocols.

Add hanging protocols

1. 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, deselect 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>**.
   3. 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 patient 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 patient timeline is visible or hidden.

Edit or delete hanging protocols

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

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. Select the checkbox beside a protocol. You can also select a protocol, then select **Enable**.
2. To disable a protocol, deselect the checkbox beside the protocol.

Import and export hanging protocols

To import a hanging protocol:

1. Select **Import**.
2. Select a file to import, then select **OK**.

To export a hanging protocol:

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

Set up 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 that template.

> **Note**
>
> For more information about hanging protocols, refer to the **Hanging Protocols Handbook**.

1. From the menu bar, select **Settings**.
2. Under **Preferences**, select **Hanging Protocols**.
3. Select **Rules templates**.

	Name	Modality	User Name	Used as Keyword for Timeline	Adjacent Templates for +1 Timeline Filter
☐	TIBIA		admin	☑	KNEE,FOOT,FEMUR
☐	THORACIC		admin	☑	LUMBAR,CHEST,CERVICAL
☐	PELVIS		admin	☑	ABDOMEN,LUMBAR
☐	OB		admin	☑	PELVIS
☑	NECK		admin	☑	HEAD,CERVICAL
☐	LUMBAR		admin	☑	THORACIC,ABDOMEN,PELVIS
☐	KNEE		admin	☑	TIBIA,FEMUR,FOOT
☐	HEAD		admin	☑	CERVICAL,NECK
☐	FOOT		admin	☑	TIBIA,KNEE,FEMUR,PELVIS
☐	FEMUR		admin	☑	TIBIA,KNEE,FOOT
☐	DEXA		admin	☑	CHEST
☐	CHEST		admin	☑	ABDOMEN,THORACIC,NECK
☐	CERVICAL		admin	☑	NECK

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Edit | Add | Clone | Delete | Import | Export | Refresh

See the next sections for details on adding, modifying and deleting rules templates.

Add rules templates

1. Select **Add**. The **Hanging Protocol Template Editor** is displayed. Customizable areas are shown as between brackets < >, and underlined.

Template Info
This rules template shall be named **PELVIS** . It is intended for **[Imported by admin on 10/21/2020@11:45 AM]** . This rules template **will**
following adjoining templates shall be selected following +1 action: **ABDOMEN,LUMBAR**

Template rules definition
The following dicom matching rules will apply:

Verify that attribute **Study Description** **Contains Any Of** **APPENDIX, RECTAL, COCCYX, SACRUM, CYSTOGRAM, UTERUS, BOWEL, URETHRO, BL**
SURVEY, PELV, COLON, C/A/P, KIDNEY, UTERAL, TESTIC, SACROILIAC, ABD+PEL, TRANS, RENAL, HIP, SCROTUM, SACILIAC, HYST *<add alter*

<add new>

2. Under **Template Info**, enter a <**name**> and <**description**> for the protocol.

3. If the rules template will be used for study keyword tagging, change <will not be> to <**will be**>, and add the **+1 action** (such as ABDOMEN and LUMBAR).

4. Under **Template rules definition**, select <**add new**> to add a new DICOM rule. Then customize the rule, as applicable. For example, you can indicate what is associated with a Study Description.

5. To remove a rule, click the **Verify** text at the beginning of the rule definition, and select **Delete**.

6. When all rules are entered, click **Save**.

Edit a rules template

1. In the **Hanging Protocol Template Editor**, select an existing template.

2. Select the **Edit** button.

3. Modify the details, as necessary.

4. Select **Save**.

Delete a rules template

1. In the **Hanging Protocol Template Editor**, select an existing template.

2. Select the **Delete** button.

Manage data lifecycle policies

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. 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.

Set up data lifecycle policies

1. Select **Settings**.
2. Under **Devices**, select **Data Lifecycle**.

See the next sections for details on configuring policies and endpoints.

Add a policy

The **Policies** area contains a list of all existing data lifecycle policies.

1. In the **Policies** area, select **Add**.
2. Enter the following 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.
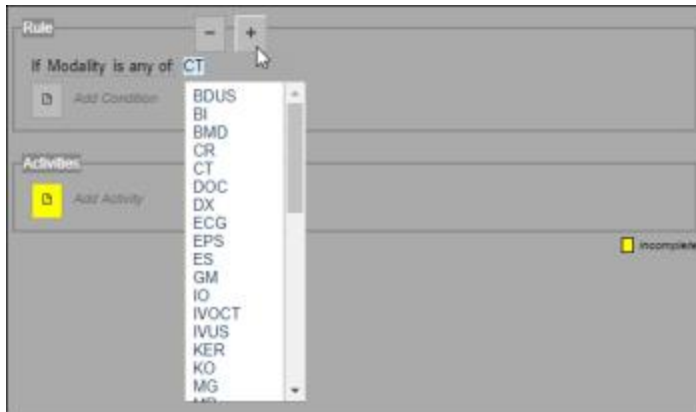
Rule

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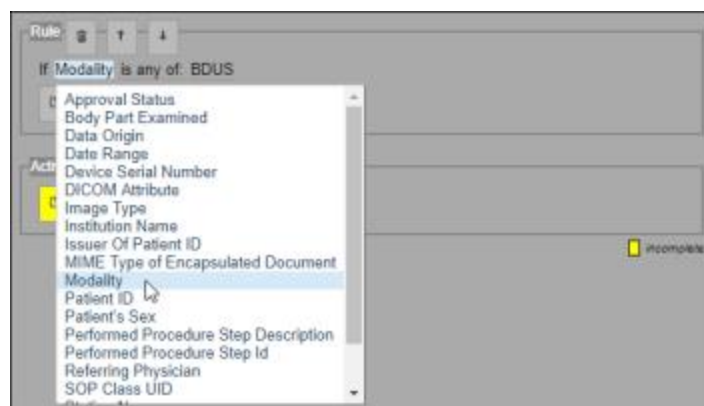
3. To add an item to a condition, select a customizable area, then select +. To remove an item, select -.

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 .

Add an endpoint

The **Endpoints** area contains a list of non-DICOM endpoints (storage tiers and data pickup folders) that can be used for data lifecycle management.

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).

Edit or delete a policy or endpoint

1. In the **Policies** area, select a policy.

   or

   In the **Endpoints** area, select an endpoint.