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

Correct or abort an activity

You can view a log of recent activities performed on series based on lifecycle policies.

1. Select **Settings**.
2. Under **Devices**, select **Data Lifecycle**.
3. Activities are shown in the **Lifecycles** area. 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. In the **Lifecycles** area, 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).

- In the **Lifecycles** area, select an activity, then select **Abort**.

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 life-cycle policy. After the activities are applied, a message will appear with the results.

Manage FHIR settings

Access FHIR reports

NilRead can be configured to access FHIR® diagnostic reports on a FHIR resource server. FHIR (Fast Healthcare Interoperability Resources) is a next generation standards framework created by HL7. FHIR reports can be accessed the same way as other reports in NilRead (on the patient timeline and in the Patient Directory).

NilRead FHIR report configuration requires the following steps.

1. Enable FHIR reports for the site.
2. (Optional) Modify the FHIR report templates for the site.
3. Complete the following steps for each FHIR service you want to use to access diagnostic reports.
   a. Register with the FHIR service.
   b. Add an endpoint for the FHIR service. This allows NilRead to access the FHIR resource server.
   c. Add a diagnostic report for the FHIR service. This is required to load FHIR reports from the service.

Enable FIHR reports for the site

Use the **Timeline Reports** settings to enable FHIR reports for the site.

1. Select **Settings**. Under **System**, select **Timeline Reports**.
2. Enter the following information.

   Enable reports access Select this option to enable FHIR reports for the site.

Report search adapters Select **Fhir** in the **Excluded** list, then select **Add**. **Fhir** is moved to the **Included** list.

3. Select **Save**.

Modify FHIR report templates

NilRead uses XSL transformation (XSLT) templates to render FIHR reports. You can change the appearance of FHIR reports for your site by modifying these templates. For example, you could add a logo to the reports.

The FHIR report templates are located in the **App_Data/DicomSRTemplates** folder within your NilRead site folder (for example: C:\inetpub\wwwroot\Nil\Nil-4.3.22.95194-Site\App_Data\DicomSRTemplates). This folder contains two XSLT templates you can modify: **FhirReportNarrativeTemplate** and **FhirReportTemplate**.

Some FHIR reports have a built-in narrative. To render FHIR reports with the built-in narrative (when available), add the following parameter to the **configs/Nil.config** file within your NilRead site folder. Set the value to **False** to use the NilRead report templates. Set the value to **True** to use the built-in narrative (the NilRead report templates will be used if a built-in narrative is not available).

```
<setting name="FhirDiagnosticReportShowNarrative" serializeAs="String">
   <value>True</value>
</setting>
```

Register with a FHIR service

Register with each FHIR service you want to use. See the FHIR service web site for details on registering and creating an app to use with NilRead.

Add an endpoint

Add an endpoint for the FHIR service resource server. The endpoint configuration is based on the SMART on FHIR open specifications.

1. Select **Settings**. Under **Devices**, select **FHIR**.
2. In the **FHIR Endpoints** area, select **Create**.
3. Enter the FHIR endpoint information. This information will depend on the service you registered with. For example, the service will require you to use a specific authorization grant type. The required endpoint fields will change based on the authorization grant type you select.
   The NilRead Authorization Code Flow redirection URL is **[base url]/FhirRedirect.aspx**.
4. Select **Verify** to test the configuration settings.
5. Select **Save**.

Add a diagnostic report resource

Add a diagnostic report resource for the FHIR endpoint you want to use for reports.

1. Select **Settings**. Under **Devices**, select **FHIR**.
2. In the **Resources** area, select **Create**.
3. Enter the following information.
   - **Name** Name to identify the diagnostic report.
   - **Endpoint** Endpoint to use with the diagnostic report.
   - **Resource Type** Type of resource to retrieve. Select **DiagnosticReport**.
   - **Filter, Patient Identifier Filter** Search filters to use when querying the FHIR service. Use the format {DicomTagName} to specify the query values NilRead should use. For example, NilRead will replace {AccessionNumber} with the accession number from the study when submitting the query.
4. Select **Enabled** to allow NilRead to query the FHIR service and retrieve information.
5. Select **Verify** to test the configuration settings.
6. Select **Save**.

Edit or delete an endpoint or resource

1. Select an endpoint or resource.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

Check the status of a FHIR endpoint

You can check if NilRead is currently authorized to access a FHIR endpoint. You may need to refresh the FHIR endpoint connection periodically if the authorization period has expired. Depending on the authorization type, you may be prompted to log into the FHIR service in order to access the endpoint.

The message "Check FHIR endpoint status" will appear on a FHIR report if NilRead is not able to access the FHIR endpoint. This message will also appear in the image viewing area if the study contains an FHIR report and NilRead is not able to access the FHIR endpoint.

1. Select **Settings**. Under **Devices**, select **FHIR**. In the **Remote FHIR Resources** section, select **Remote FHIR endpoint status**.
   or
   Click (or tap) the "Check FHIR endpoint status" message in a report or the image viewing area.
2. The **FHIR Endpoint Status** window appears. Endpoints that NilRead is currently authorized to access are shown in green.
3. To refresh all endpoints, select **Refresh**. To refresh a specific endpoint, select ↻ beside the endpoint.
4. If prompted, log into the FHIR service.
5. Select **Close**.

Configure NilRead as a FHIR patient resource service

NilRead can be configured as a FHIR patient resource service. This allows authorized NilRead users to query or update patient information using FHIR. NilRead provides a token endpoint for authorization and authentication. NilRead users must have the FhirAccess privilege to obtain an access

token to query the patient information and the FhirUpdate privilege to use the access token to update patient information.

NilRead FHIR service configuration requires the following steps.

1. Enable and configure the NilRead FHIR service.
2. Grant the FhirAccess and FhirUpdate privileges to users that need access to the NilRead FHIR token and patient endpoints.

Enable and configure NilRead FHIR service settings

You can configure general settings for the token endpoint and patient resource endpoint. Note that the FhirConfig privilege is required to access the FHIR settings page.

1. Select **Settings**. Under **Devices**, select **FHIR**.
2. In the **FHIR Services** area, select **Enable**.
3. Enter information in the following sections, then select **Save**.

Token

- **Address** Token endpoint provided by NilRead.
- **Authentication**:
  - **Authorization grant type** NilRead uses the Client Credentials grant type.
  - **Client authentication type** Authentication method.
- **Access token life span** Length of authentication period in minutes.

Patient

- **Address** Patient resource endpoint provided by NilRead.
- **Search**:
  - **Max number of results** Maximum number of patient records to return.
  - **Default patient identifier assigner** Value to return if the patient record does not contain a patient identifier assigner.

- **Overwrite patient ID issuer** Overwrite the existing patient identifier issuer with the value specified for the **Default patient identifier assigner**.
- **When update patient, delete original studies** Whether to delete the patient's original studies after the patient information is updated.

Grant users access to the NilRead FHIR service

Assign the following privileges to each user that is allowed to access the NilRead FHIR service. For details on assigning privileges, see **Manage users**.

- **FhirAccess** Acquire access tokens from the NilRead token endpoint and query patient information on the patient endpoint.
- **FhirUpdate** Modify patient information using the patient endpoint with the access token.

Example of a client application with the NilRead FHIR service

The following code shows a simplified example of updating patient information in NilRead using the FHIR-Net-API library. For more information, see the FHIR specification and the FHIR-Net-API documentation.

```
var client = new FhirClient("[NilRead base URL]/fhir");


var pat = client.Read<Patient>("Patient/1");
pat.Resource.Name.Add(HumanName.ForFamily("John").WithGiven("Doe"));


client.Update<Patient>(pat);
```

Reconcile patient demographics with FHIR patient resources

NilRead can reconcile patient demographics with FHIR patient resources on a FHIR resource server. This allows a FHIR resource server to be used as a data reconciliation source when updating patient information using the NilRead edit patient/study feature (for details, see **Edit or split studies**).

Complete the following steps for each FHIR patient resource you want to use as a reconciliation source.

1. Register with the FHIR service.
2. Add an endpoint for the FHIR service. This allows NilRead to access the FHIR resource server.
3. Add a patient resource for the FHIR service. This is required to use the FHIR patient resource as a reconciliation source.

Register with a FHIR service

Register with each FHIR service you want to use. See the FHIR service web site for details on registering and creating an app to use with NilRead.

Add an endpoint

Add an endpoint for the FHIR service resource server. The endpoint configuration is based on the SMART on FHIR open specifications.

1. Select **Settings**. Under **Devices**, select **FHIR**.
2. In the **FHIR Endpoints** area, select **Create**.
3. Enter the FHIR endpoint information. This information will depend on the service you registered with. For example, the service will require you to use a specific authorization grant type. The required endpoint fields will change based on the authorization grant type you select.
   The NilRead Authorization Code Flow redirection URL is **[base url]/FhirRedirect.aspx**.
4. Select **Verify** to test the configuration settings.
5. Select **Save**.

Add a patient resource

Add a patient resource for the FHIR endpoint you want to use for reconciliation.

1. Select **Settings**. Under **Devices**, select **FHIR**.
2. In the **Resources** area, select **Create**.

3. Enter the following information.
   - **Name** Name to identify the diagnostic report.
   - **Endpoint** Endpoint to use with the diagnostic report.
   - **Resource Type** Type of resource to retrieve. Select **Patient**.
   - **Filter, Patient Identifier Filter** Search filters to use when querying the FHIR service. Use the format {DicomTagName} to specify the query values NilRead should use. For example, NilRead will replace {AccessionNumber} with the accession number from the study when submitting the query.
4. Select **Enabled** to allow NilRead to query the FHIR service and retrieve information.
5. Select **Verify** to test the configuration settings.
6. Select **Save**.

Edit or delete an endpoint or resource

1. Select an endpoint or resource.
2. Select **Edit**. Modify the details, then select **Save**.
   or
   Select **Delete**.

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**).

Set up prefetch

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

See the next sections for details on configuring prefetch.

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.

Add a prefetch policy

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

Name

Policy name.

Comment

Policy description.

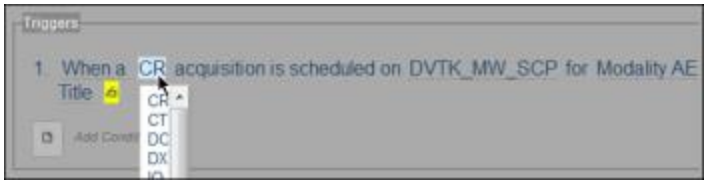
Enabled

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

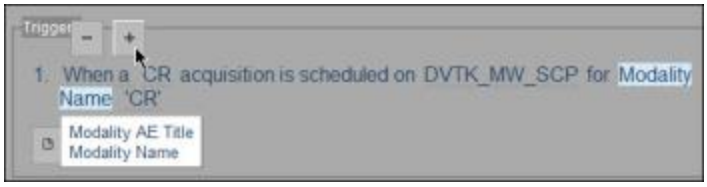
Triggers

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  .

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**.

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 steps.

- **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.

Add an XDS server configuration

You can create configurations for different XDS servers.

1. Select **Settings**.
2. Under **Devices**, select **XDS**.
3. In the **XDS Context** area, select **Add**.
4. Enter a name for the configuration, then select **Save**. The configuration has been created.
5. To enter the XDS server configuration settings, select **Edit**.
6. 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**.

Manage IOCM

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 policies**). 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**.