



# **Nexus Release Notes**

Version 3.03.00

Pukka-j Limited

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## **1 Introduction**

This version sees a significant number of new features and services built on top of the existing Nexus libraries. The release also sees a clean up of the HTML entry points to the different parts of the user interface and a move towards more customisation. There are a number of apps that sit on top of the standard Nexus service and much of the work in this release has been towards deploying these new apps.

## **2 New Features**

This release has extended the use of the secondary services within Nexus as well as the core Nexus features and nodes.

### **2.1 Tele Radiology Service**

A major feature release is an extension to the reporting platform that formed part of the Nexus App Suite. The extension is focused on a tele-radiology workflow for providing a reporting worklist and disseminating reports via HL7. The reporting service is designed to be used in conjunction with the Nexus Workflow Management Service (NWMS) to handle the ingestion of data. Extensions have been made to the NWMS to handle a RIS/HL7 based workflow and handling of external clinical documents (JPEG/PDF).

### **2.2 RIS Import Service**

A RIS Import Service has been added to compliment the DICOM import process of the Nexus Workflow Management Service. HL7 messages can now be used to create import jobs from PACS and RIS. For PACS, this follows the existing DICOM processes querying PACS, retrieving the primary study and selecting the most relevant priors. The new Nexus RIS Import Service extends this to retrieve the patient RIS history via a QBP message and an RSP response message. An HTTPS document collection service securely connects to the RIS document server to retrieve JPG and PDF files and converts them to DICOM to be stored with the DICOM study from PACS.

## 2.3 HL7 Based Workflow Node

The Workflow Node has been extended to allow HL7 messages to create Workflow Jobs for the Workflow Service.

## 2.4 DICOM Worklist Merge and Export Service

A new service DICOM Worklist Exporter has been created to allow the selection of DICOM database entries against a DICOM worklist and have the data merged with the worklist values and pushed to a DICOM destination.

## 2.5 PACS Manager Service

A PACS view onto database nodes in a Nexus network has been created to allow the management of the data on the system including editing and deleting DICOM files.

## 2.6 Reporting Assignment Service

As an extension to the Tele Reporting service, a service has been added to allow departments to assign a reporting job to a specific user or reporting group. The groups need to be set up in the database and users added to clinical groups so that they see what is assigned to those groups when they are logged in to report on the system. This service also handles marking as “dispatched” reports that have been verified.

## 2.7 Configurable Max UID Length

It has been found that some systems do not support UIDs with a length of 64 characters. Support has been added to the Nexus service to define a maximum UID length when re-UID DICOM files. The max UID length is set using the property:

```
create_uid_max_length=64 {default=64}
```

The property is defined globally and must be added to the deployment.properties file in the Nexus install folder. The change requires a service restart.

## 2.8 Workflow Service Study Wait

Added an option to the pre-processor such that, in the event that no study is found, the pre-processes will not immediately mark the job as failed but will wait for a configurable amount of time (retrying in the meantime) before failing the job. The default is -1 and will not wait but will set the job as failed. The example shows the property set to 300 seconds. The property needs to be added to the trad-config.properties file in docs/config/server/trad in the Nexus install folder.

The change requires a service restart.

```
cfind_max_wait_for_primary=300
```

## 2.9 Workflow Service Minimum Study Age

A property was added to allow the specification of a minimum age of a study to be pulled as a prior. By default, the property is not set and therefore no minimum is used (the same as setting the property to -1). The following property is used to define the minimum age in minutes. This is to prevent the pulling as a prior a study that may be required as a primary. The property needs to be added to the trad-config.properties file in docs/config/server/trad in the Nexus install folder. The change requires a service restart.

```
min_prior_minutes=3600
```

## 2.10 Workflow Service Maximum History Age

A property was added to allow the specification of a maximum age of a study to be pulled as a history HL7 message. By default, a value of 10 years is used. The following property is used to define the maximum age (in years). The property needs to be added to the wf-config.properties file in docs/config/server/wfman in the Nexus install folder. The change requires a service restart.

```
max_history_years=10
```

## 2.11 User UPN Login

The system was updated to allow a different UPN from the user domain for LDAP authentication. Originally, it was required to use the full domain when logging in if that was how the LDAP service was configured. By setting the deployment.properties with the following settings, the system will automatically append @yourdomain.com to the username value entered by the user when logging in.

```
service.ldap.use.domain=true  
service.ldap.upn.domain=yourdomain.com
```

## 2.12 Purge Service

A new secondary service has been created to allow the purging of data from the system. The data to be purged can be configured and includes DICOM data, Orders, Reports and HL7 messages. The service monitors a purge table in the database to identify patient ID and accession numbers that should be removed from the system. A service has been added with configurable age rules to populate the purge table. There is also an option for the system to consume a

RabbitMQ queue to populate the purge table. Optionally, the purge table can be populated by any external system with access to write to the purge table database.

### 2.13 Workflow Controller Custom Service Lines

The workflow service previously had a fixed set of service line values with limited scope for customisation. The service lines have been made fully customisable and can be user defined by editing the workflow-manager.JSON property file set on the server side in docs/config/server in the Nexus install folder. Add the following to the JSON file to set the service lines to SRV1, SRV2 and SRV3.

```
"serviceLines" : [  
  ["SRV1", "SRV1"],  
  ["SRV2", "SRV2"],  
  ["SRV3", "SRV3"]  
]
```

### 2.14 Nexus Chip HL7 Handling

The chip feature was extended to handle HL7 messages.

### 2.15 HL7 Reconciler Node

A new Nexus node to update the contents of HL7 messages based on the values in a database. The node must be configured with a database for the lookup. Inbound mapping pointers to the IDs used for the lookup can be customised for the incoming HL7 messages. These IDs are used to look up the other patient and order details in the database. Outbound mapping pointers are used to set specific database values into the HL7 message in the specified location. For example, a message containing a study UID can be configured to look up the order details for that study UID and map them into the HL7 message fields in the desired locations.

### 2.16 HL7 to DICOM Node

There is a new node that will receive a HL7 message and read the contents of a field as base 64 encoded bytes. The node will read this field as either JPG or PDF, based on the contents of a definable HL7 field entry. The PDF or JPG will then be used with the values in the message to create a DICOM wrapper around the file to create either a secondary capture file (from JPG) or encapsulated PDF (from PDF). The node uses the secondary output channel (bottom of the node) to allow the generated DICOM files to be passed to a DICOM handler and separate the generated output from the inbound stream of HL7 messages.

## 2.17 HL7 Caching Output Node

A new HL7 output node has been added to act as a cache and forward node rather than a “straight through” proxy. This node writes the HL7 message into a database with a **RECEIVED** status rather than trying to send it directly to the HL7 destination. Another thread running from the node monitors the message queue and sends messages out in the order that they arrive. On success, the status of the messages is updated to **SENT** in the database. In the event of a failure, the messages are queued until the destination comes back online and is able to be sent.

## 2.18 DICOM/HL7 RabbitMQ Output Node

A new node has been added to allow a JSON object to be passed into a RabbitMQ queue. The queue details need to be defined along with any HL7 or DICOM tags that need to be recorded and the JSON key that they should be written against.

# 3 Improvements

## 3.1 HL7 Unicode

Better support for Unicode HL7 support has been added. Originally Nexus only supported a charset value of “Unicode” in the HL7 message header but now supports specific Unicode specifications like “Unicode UTF8”.

## 3.2 MS SQL Server Connectivity

Better support for SQL server connectivity and automatic database schema updates.

## 3.3 User Management

Increased the size of the username field in the database to allow longer fully qualified usernames (as email addresses).

## 3.4 Workflow Service Reset on Restart

The pre-processor logic has been updated to reduce the amount of reprocessing for **ASSIGNED** workflow jobs. Previously, the system would reset **ASSIGNED** and **PREPARED** jobs back to **PENDING** which would result in everything getting re-queried. The system now leaves jobs as **PREPARED** and resets **ASSIGNED** jobs back to the **PREPARED** status.

### **3.5 DICOM to HL7 Study Completion Monitor**

The DICOM to HL7 node creates a HL7 message when the first image in a study arrives (when configured to send just once per study). This has been extended to use a DICOM lookup to try and establish the expected number of images for the study. The node can now be configured such that when the expected number of images have arrived for the study a “complete” message will be generated. If the number of images doesn’t increase within a specified period of time, the node will generate the “complete” message based on that time delay.

### **3.6 HL7 QBP Query Convertor Node**

An option to set a limit on the query results age out of the query convertor has been added. By default, the results will ignore anything older than 5 years old.

### **3.7 Addendum Auto-Text**

The lines to indicate that there is an addendum in a report have been removed from the server side and applied on the client side when the addendum is saved.

### **3.8 Updated Login Prompt and App Background**

A new app login page and login prompt has been created.

## **4 Bug Fixes**

The following issues have been resolved in this release.

### **4.1 DICOM Time**

**Issue:** Some secondary capture files created from JPG or PDF files as part of a RIS Import Process could be badly formatted by missing 0’s from times earlier than 10am.

**Resolution:** The DICOM Time formatter has been adjusted to correct for missing leading 0’s.

### **4.2 JPEG Frame Data**

**Issue:** It was found that secondary capture files from JPEG may have odd length pixel data tags.

**Resolution:** Padding byte has been added to JPEG data used to create secondary capture files.

### 4.3 HTML Encoding in Config

**Issue:** When saving some configuration in the user interface, characters such as spaces could result in the HTML encoded value e.g. %20% being used rather than the required character.

**Resolution:** Any HTML characters are now decoded before being written out to file.

## 5 Known Issues

### 5.1 Max PDU Value

**Issue:** It has been observed that in some cases, a restart of the service can result in the Max-PDU field in the DICOM Listener Node becoming populated with the default user name which can cause an issue with communications.

**Workaround:** Clear the field and re-apply the config.

### 5.2 Workflow Controller Property Changes

**Issue:** The workflow service property prefix was changed from wfman- to wf-.

**Workaround:** Any properties defined in the wfman config file with the old format will need to be updated, either through updating the settings in the UI, or editing the property file directly.

## 6 Installation Instructions

Before making any changes, the **docs** and **lib** folders in the install directory should be backed up along with the **nexus.jar** in the install root.

The libraries required for this release are:

**nexus.jar** 3.03.00

**pjk.jar** 1.19.17

**pacsoology.jar** 1.22.00

**mint.jar** 1.25.00

Plugin library versions are:

**anon.jar** 1.12.05

**broker.jar** 1.12.00

**redact.jar** 1.11.03

For Origin users:

**websocket.jar** 1.12.02

An update MySQL library is potentially required depending upon the MySQL service.

The UI is updated via the files:



**cloe.js.gz**

**pj.css**

There have been significant changes to the UI entry points in this release and as such, the html files for the applications have been updated and need to be replaced. The html files required will depend upon the applications used. index.html and nexus.html are the primary html files used. A list of html files are listed below:

**anonymisation-manager.html**

Entry point for the anonymisation management utility for any Anon Nodes defined in a Nexus network.

**anonymisation-record-manager.html**

Entry point for the anonymisation record manager tool for any Anon Nodes defined in a Nexus network.

**cmdctrl.html**

Entry point for the Workflow Controller Service configuration and management tool.

**dicom-analyser.html**

Entry point for the DICOM File Analyser.

**index.html**

The default entry point. Any html file can be copied to the index.html to be the default application.

**nexus.html**

The entry point for the Nexus configuration and status tool. Usually also the index.html file.

**pacs-manager.html**

The entry point for the PACS manager configuration tool for managing database node data in Nexus.

**reporting.html**

The entry point for the tele-radiology reporting tool.

**reporting-assignment-manager.html**

The entry point for the tele-radiology report assignment and management tool.

**request-portal.html**

The entry point for a view onto the referral booking tool for creating orders in a Nexus database.

**tele-reporting-manager.html**

The entry point for the management tool for the tele-reporting statuses and configuration.

**users.html**

The entry point for managing users on the system.

Any html file can be renamed to suite local requirements.

The jar files need to be replaced in the lib folder the install folder apart from the nexus.jar which is located in the root of the install folder. The html files, cloe.js.gz and the css files should be replaced in the docs folder within the install folder. The new login page/background files should be place in docs/config/login folder in the install location.

Contact [support@pukka-j.com](mailto:support@pukka-j.com) for any help in apply the update.